Lending Rate Caps, Credit Reallocation, and Financial Stability

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Abstract

We estimate the effects of lending rate caps on small firms by studying a regulation that prohibited interest rates above 83.4% in Peru, affecting 27% of loans to small firms. We define treatment at the city level as the percent decline necessary to bring interest rates on all loans issued before the reform down to the lending rate cap. We find that one standard deviation higher treatment is associated with a 5 percentage points decline in the weighted average interest rate with null effects on the balance of loans to small firms. Banks can reallocate credit away from risky borrowers towards new clients within highly concentrated local credit markets. The decline in interest payments and the reallocation of credit led to a reduction of non-performing loans, suggesting a minor role for the risk-taking channel associated with the deterioration of banks charter value when interest rates are regulated.

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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 credit markets over the last decade (Ferrari et al. (2018)). But what are the consequences of regulating interest rates? And what is the role of firm risk and bank market power? We study these questions in the context of Peru, where lending rate caps were introduced in 2021.

The effects of lending rate caps are a priori unclear. They can increase the volume of loans by restraining bank market power, but they can also reduce the amount of loans by excluding risky borrowers from bank credit markets. Developing economies are characterized by highly concentrated banking sectors and strong informational frictions, such that bank market power and firm risk are in principle two major concerns. Thus, whether lending rate caps can increase credit or not remains an open question. The response of financial stability is also ambiguous. Lending rate caps might reduce risk-taking incentives by limiting the ability of banks to properly price risk. However, the decline in banks charter value associated with the regulation of interest rates might 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%. This policy was introduced in July 2021 and affected 27% of loans to small firms that represent 6% of the value of these loans. Moreover, if we bring interest rates on all loans issued in the pre-reform period down to the lending rate cap, the annualized interest payments faced by small firms would decline by 10%.

We combine two main datasets provided by the Central Bank of Peru covering the universe of loans to small firms. The first one includes information on new issued loans in a monthly basis. We observe the value of loans, interest rates, and maturity at the bank-firm level. The second one includes information on the balance of loans. We observe the total balance of loans and the balance of loans with more than 30 days of repayment delay. The first block of our data is available from March to December of 2021, while the second part goes from 2020 to 2021. Both datasets include information of the city where the loan was issued, the industry where the firm operates, and a unique client identifier used for bank regulation purposes.

We estimate the effects of lending rate caps using a difference-in-differences strategy. Our benchmark definition of treatment is equal to the city-level percent decline in interest payments necessary to bring interest rates on all loans issued in the pre-reform period down to the lending rate cap. We quantify the effects of this policy by comparing multiple outcomes in more treated cities relative to less treated ones before and after the reform. Our identification exploits differences in the distribution of interest rates across cities and requires for more and less treated locations to follow similar trends in the absence of the reform.

We provide supporting evidence for our identification in three ways. First, we provide clean, graphical 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 the level of covariates, 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 perform placebo tests using large firms, a segment of the credit market that is not affected by the policy.

In the first part of the paper, we estimate the response of interest rates and credit. We show that lending rate caps were effective in reducing interest rates without affecting the balance of loans to small firms. One standard deviation higher treatment is associated with a 5 percentage points decline in the weighted average interest rate on new issued loans after the reform. Despite this substantial reduction in interest rates, the effects on total loans is positive, albeit small and statistically insignificant. We then explore the role of firm risk and bank market power in shaping the response of credit. We define firms as risky if they had experience more than 30 days of repayment delays at least once in 2020. The remaining firms with active lending relationships in 2020 are classified as safe firms. We define new firms as those without any balance of credit in 2020. We find that the null effects on total loans hides a significant heterogeneity across borrowers. Risky firms experience a 0.6% decline in credit in cities with one standard deviation higher treatment. This effect is offset by an expansion of 1.6% in credit to new borrowers. Thus, the ability of banks to reallocate credit away from risky borrowers towards new clients determines the null response of total loans to small firms.

Then we explore what determines the ability of banks to reallocate credit towards new customers. One possibility is that banks might have market power. If banks provide credit to safe and risky borrowers in segmented markets, once lending rate caps are implemented banks will no longer attend some of the riskiest borrowers. Banks can rebalance loans towards marginal safe borrowers that have no credit just because banks prefer to exert market power in the absence of lending rate caps. We explore the role of market power by calculating the Herfindahl Hirschman Index (HHI) at the local level. Then, we split cities in two groups based on their HHI such that each group accounts for one half of the population. We find that the reallocation of credit is significant only in cities with high levels of concentration. One standard deviation higher treatment leads to a 0.8% contraction in credit to risky borrowers and a 1.9% increase in loans to new clients in more concentrated markets. These effects are small and statistically insignificant in less concentrated cities. Our results indicate that market power plays a crucial role in shaping the reallocation of credit towards new clients, and then, the response of total loans after the policy.

In the second part of the paper, we study the effects of lending rate caps on financial stability. We estimate the response of non-performing loans, defined as the balance of credit with more than 30 days of repayment delay. We find that one standard deviation higher treatment is associated with a 5.5% decline in non-performing loans. This decline is offset by an increase of 1.7% in the balance of loans with less than 30 days of repayment delay. This results in a contraction of 0.9 percentage points in the share of non-performing loans, which represents 8% of the pre-policy average share across cities. Our results indicate that the reduction in interest payments and the reallocation of credit strengthen financial stability, suggesting that the reduction of banks charter value associated with the regulation of interest rates has minor effects on risk-taking incentives.

Our paper shows that lending rate caps can reduce interest rates without affecting total loans because banks can substitute credit away from risky firms towards new clients within highly concentrated markets. The decline in interest payments and the reallocation of credit reduce the share of non-performing loans and strengthens financial stability, suggesting a minor role for the risk-taking channel 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 countries, a feature that can not be accounted for by default rates (Banerjee (2003)). Second, we provide empirical evidence of a novel channel through which credit markets adjust to the regulation, named banks reallocate credit away from risky borrowers towards new clients in highly concentrated markets. Third, we study how lending rate caps affect financial stability.

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)). Our contribution is to study the effects of lending rate caps, which is a simpler and widely used policy. 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 use administrative data to document that the effects of lending rate caps depend on the degree of competition in local credit markets.

Second, we contribute to the broad literature that studies how financial frictions affect economic development. On the empirical side, we contribute to the literature that studies how economic policy can promote 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. The effect of this policy is a priori ambiguous given the high levels of concentration and informational frictions in bank credit markets of developing countries. Second, we use administrative data that allows us to disentangle the role of firm risk and bank market power in shaping the effect of lending rate caps. Third, we explore the effects on financial stability, which is an important concern when designing financial policy 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 such as short-term subsidies for productive borrowers or pro-business policies at an early stage of development that allow firms to accumulate capital and eventually overcome the collateral constraint (Itskhoki and Moll

(2019)). However, these papers are silent about price regulations despite of the empirical evidence suggesting that small firms in emerging markets face high interest rates that cannot be explained by observed default rates (Banerjee (2003)). Moreover, there is growing evidence that low bank competition might reduce credit access and economic growth in emerging markets (Joaquim et al. (2020), Burga and Céspedes (2021)). In a recent paper, Joaquim and Sandri (2020) study the role of firm risk and bank market power in a calibrated model and evaluate the effects of lending rate caps on economic growth. Our paper contributes to this literature by documenting empirical evidence that lending rate caps can lead to substantial reductions in interest payments without affecting the total volume of loans, highlighting the role of bank market power.

The rest of this paper is organized as follows. Section 2 provides a description of the data and policy. Section 3 presents our empirical approach. Section 4 shows the response of interest rates and credit, and section 5 studies the implications for financial stability. Section 6 concludes.

2 Data

We combine two main datasets provided by the Central Bank of Peru. The first dataset includes information of new loans issued to small firms. The second database contains information of the balance of loans to small firms.

2.1 Interest rates

We use loan-level data from the *Reporte de Tasas de Interés* provided by the Central Bank of Peru to estimate the effect of lending rate caps. This is a monthly loan-level panel data that includes loan-size, annualized interest rates, and maturity for all loans to small firms issued between March and December 2021 by banks that are established in Peru. We also observe the city where the loan was issued, the industry where the borrower operates, and a unique client identifier used for regulation purposes. We use this dataset to construct our measure of treatment at the municipality and to estimate the response of the city-level weighted average interest rates on new issued loans.

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 balance of loans that firms have with each bank established in Peru. We observe loans to small and large firms, and we can distinguish loans with more than 30 days of repayment delay that we define as non-performing loans. We use the client identifier to combine this data with the interest rates dataset described above. This dataset allows us to quantify the response of total loans and non-performing loans, to define a measure of ex-ante risk among borrowers, and to conduct placebo tests using credit to large firms.

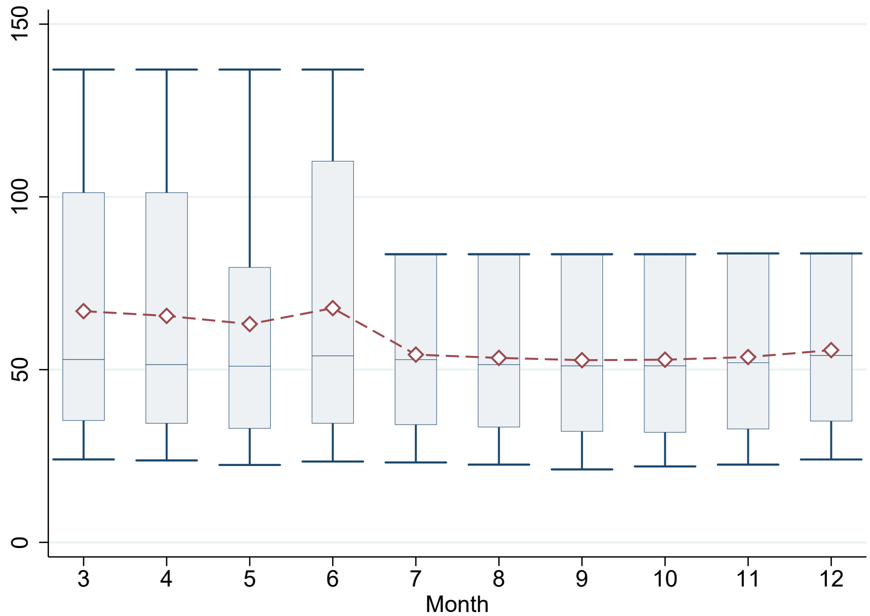
2.3 Institutional background

Lending rate caps were introduced in Peru in two steps. First, it prohibited interest rates above 83.4% for all consumer loans since May 2021. Second, since July 2021, it also prohibited interest rates above the same cap for small firms. We focus on loans to small firms, and our administrative data includes information for 35 regulated banks. The five largest banks account for 66% of total loans issued in the pre-merger period and 82% of loans issued in the same period are accounted for by 8 banks. The distribution of banks exposure is highly skewed. If we measure the decline in annualized interest payments necessary to bring all interest rates down to the lending rate cap, only one bank is strongly affected with a 30% decline. Other 5 banks are affected with around 1% decline.

2.4 Descriptive statistics

Figure 1 provides information of interest rates on the universe of loans to small firms issued between March and December 2021. We observe a large dispersion in interest rates before the reform, where 27% of loans exhibited interest rates above the lending rate cap. These loans represented 7% of the total volume of loans issued to small firms in the pre-reform period. The average interest rate declined from 65 to 53%, while the median interest rate did not change. The policy was expected to have important effects on interest payments. For example, if we bring interest rates on all loans issued in the pre-reform period down to the lending rate cap, the total annualized interest payments would have declined by 10%. We provide the same information for 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 in this statistics 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

The reform prohibited all financial institutions to charge interest rates above 83.4%, and was implemented in July 2021 for loans to small firms. We define a local credit market at the city level and identify the effects of lending rate caps by comparing the evolution of multiple financial outcomes in cities that were differently treated by the policy, before and after its implementation, using a difference-in-difference approach. We define treatment in city c and month t as follows[1]:

$$\text{Treatment}_{ct} = \frac{\sum_{i \in c} \ell_{it} \times \max\{r_{it} - \bar{r}, 0\}}{\sum_{i \in c} \ell_{it} \times r_{it}} \times 100 \tag{1}$$

Where ℓ_{it} denotes the value of loans issued to firm i in month t, r_{it} is the interest rate charged on those loans, and $\bar{r}$ is the lending rate cap. This measure depends both on the share of firms who pay interest rates above the lending rate cap and on how much interest rates are above the lending rate cap. It indicates the percent in which interest payments should decline to bring

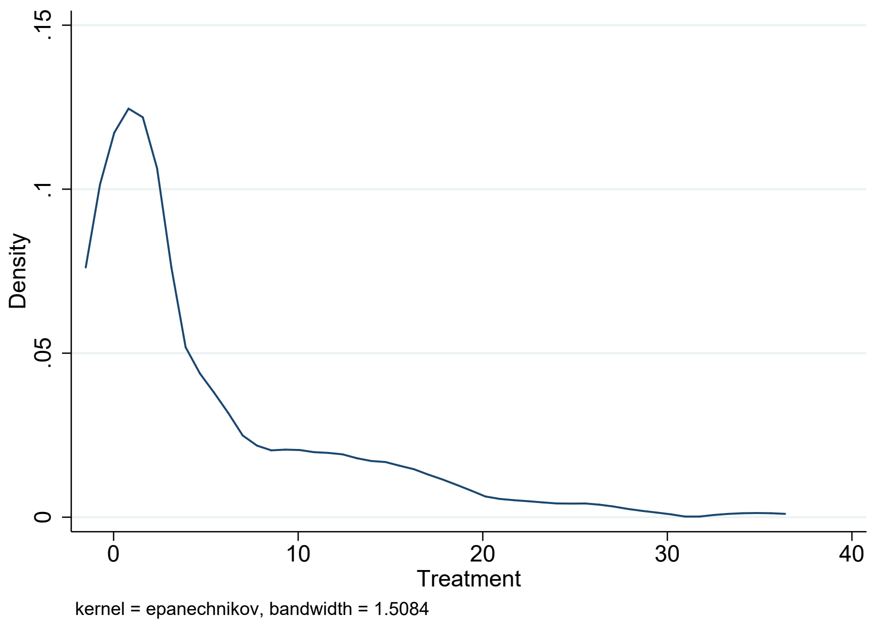
[1]This measure follows the minimum wage literature. See for example Card and Krueger (1994), Draca, Machin, and Van Reenen (2011), and Dustmann et al. (2021)

interest rates on all loans issued in city c and month t down to the lending rate cap level. We take the average of this measure between March and June 2021 to define our treatment measure at the city level:

$$\text{Treatment}_c = \frac{1}{4} \sum_{k=2021m3}^{2021m6} \text{Treatment}_{ct} \tag{2}$$

Figure 2 shows the distribution of treatment across cities. The average treatment is 6% and the standard deviation is 7%. The distribution is highly skewed to the right, with half of cities exhibiting treatment below 3% and one quarter of them above 8%.

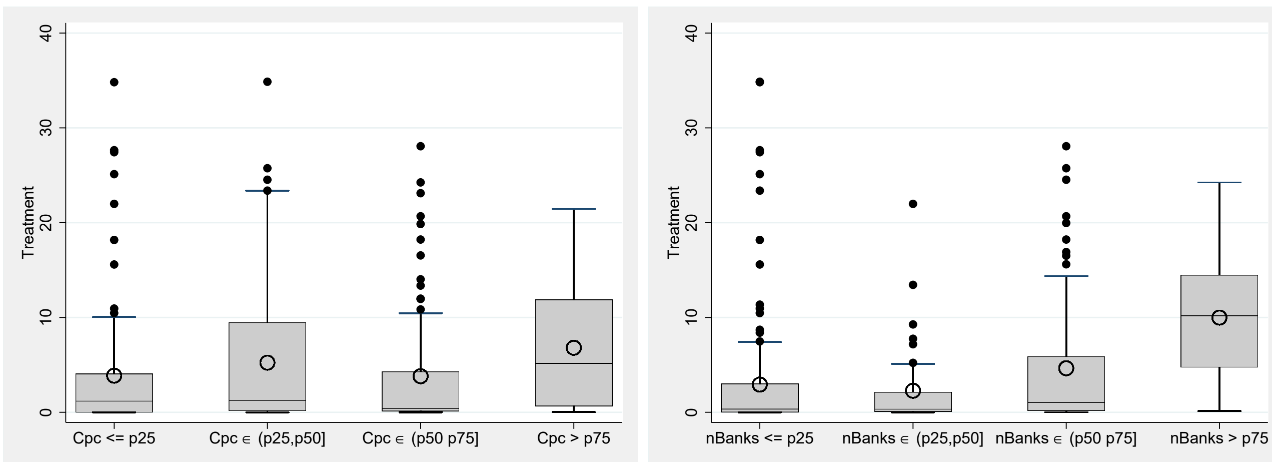
Figure 2: Density Distribution of Treatment across Cities



Note: This figure shows the distribution of treatment as defined in equations (1) and (2).

Our identifying assumption is that absent the policy, cities that are more treated would have evolved in parallel trends with less treated cities. This identification does not require such cities to be similar in levels prior to the reform. However, if we consider that small locations would grow at higher rates in a setting of regional economic convergence, then it is important to compare cities of similar size when estimating the treatment effect. Figure 3 shows the distribution of treatment across cities for each quartile of the city size distribution defined by credit percapita and number of banks. This figure shows that large cities are on average more treated. We can notice that there is enough variation in treatment within quartiles to be able to estimate the effects of lending rate caps by comparing cities of similar size. Thus, we will include time-varying fixed effects for each quartile of the city size distribution in our benchmark specification.

Figure 3: Distribution of Treatment across Cities by Size



(a) Credit per capita (b) Number of banks

Note: This figure shows the distribution of treatment as defined in equations (1) and (2) 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 construct a discrete measure of treatment as follows. First, we split cities in three groups based on the continuum treatment. Each group accounts for one third of the population. 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 289 cities in our data. The average city is highly concentrated (average HHI equals .42), has USD 7 thousand of loans percapita and 8 banks. We have 65 strongly treated locations where the continuum measure of treatment is 17% on average, and 182 non-treated cities where this measure is 2% on average. Strongly treated locations are bigger and less concentrated than non-treated locations. We use the continuum measure of treatment in the main text and we report our estimation results with the discrete measure in the Appendix.

Table 1: Characteristics of Cities

	All Cities		Strongly Treated		Non-Treated	
	Mean (1)	Median (2)	Mean (3)	Median (4)	Mean (5)	Median (6)
Treatment	6	3	19	17	2	1
HHI	.42	.32	.29	.17	.49	.39
Loans percapita	7	3	12	3	4	3
Num. banks	8	5	13	14	5	3
Distinct cities	289		65		182	

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

Econometric specification at the city level We quantify the effects of lending rate caps on financial outcomes by estimating the following difference-in-difference equation:

$$Y_{crt} = \sum_{\substack{k=2021m1 \\ k\neq 2021m6}}^{2021m12} \gamma_K \times \text{Treatment}_c \times \mathbb{1}[t=k] + \sum_{q=1}^{4} X_c^q \times \delta_t + \delta_c + \delta_{rt} + u_{ct} \tag{3}$$

Where Y_{crt} denotes an outcome variable in city c, region r, and time t. X_c^q contains fixed effects for each quartile of the city size distribution, defined by credit percapita and number of banks in 2019, that we interact with time fixed effects δ_t to control for any shock at the city size level. 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 aggregate shocks affecting cities in the same region.[2] Standard errors are clustered at the city level.

The coefficient of interest is γ_k, which captures the monthly effect of being one standard deviation more treated on a set of city-level financial outcomes. We identify this parameter comparing cities before and after the regulation. By including the set of fixed effects described above, we compare cities within cells defined by region and city-size bin.

We provide evidence supporting our identifying assumption in three ways. First, we provide clean, graphical event studies showing that being more treated by the policy has null effects before the regulation. Second, we include high-dimensionality time-varying fixed effects to account for multiple shocks at the region and city-size levels. Third, we perform placebo tests using loans to large firms and show that this type of credit was not affected by the regulation.

[2] Peru has 25 regions.

4 Effects on Interest Rates and Credit

We start by estimating how interest rates and credit changed following the implementation of lending rate caps. Table 2 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 effects on the balance of loans to small firms. In our benchmark specification reported in column 3, interest rates decline by 5.1 percentage points on average in cities with one standard deviation higher treatment after the implementation of lending rate caps. Our results are robust to partially excluding fixed effects as we can see in columns 1 and 2. Despite the large decline in interest rates, column 6 reports null effects on the balance of loans.

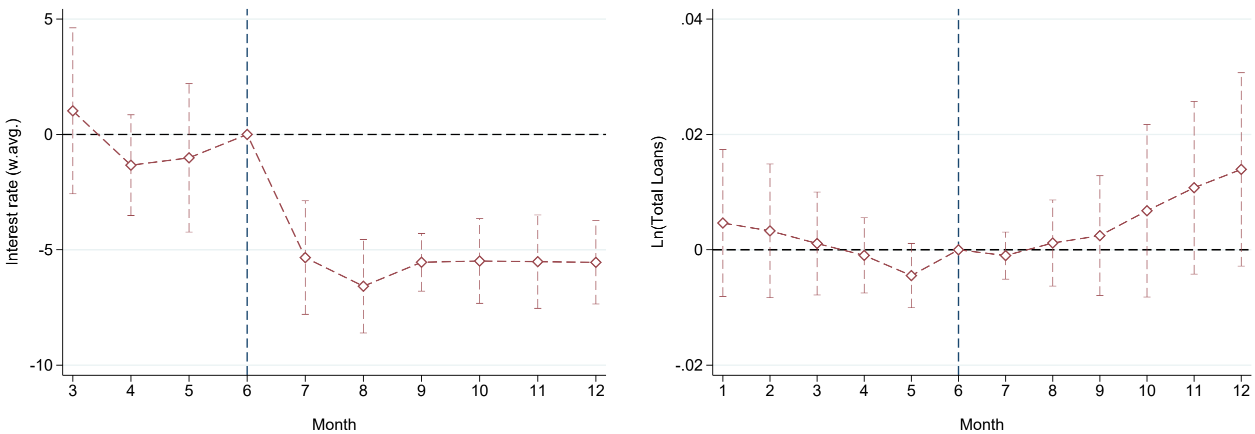
Table 2: Average Effect of Lending Rate Caps on Interest Rates and Loans

	Interest Rates			Total Loans		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment$_c$ × Post$_t$	-4.261***	-4.921***	-5.335***	0.003	0.005	0.005
	(0.442)	(0.462)	(0.537)	(0.005)	(0.006)	(0.007)
Fixed Effects						
City	✓	✓	✓	✓	✓	✓
Month	✓	✗	✗	✓	✗	✗
City size-Month	✗	✓	✓	✗	✓	✓
Region-Month	✗	✗	✓	✗	✗	✓
Observations	2,890	2,890	2,880	3,468	3,468	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. 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 4 plots the event study graphs for the response of interest rates and balance of loans to small firms. 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. The plots show null effects of being treated 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 that the balance of loans to small firms increases steadily over time after the reform, although the point estimates are not statistically significant. Figure A3 in the Appendix plots event-study graphs for the other specifications reported in Table 2, showing no evidence of pre-trends.

Figure 4: 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. 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 (3). Our results, reported in Table A1, are qualitatively similar. Interest rates exhibit a significant decline while total loans are not affected by the policy. Figure A4 display the event study graphs with no evidence of pre-trends. Another concern is that our results could be driven by small cities with minor implications for the aggregate economy. We weight our regressions using the level of population according to the 2017 Peruvian Census. Our results are reported in Table A2 and Figure A5. 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 A3 and Figure A6. Finally, we compare cities in the top and the bottom tercile of the treatment distribution. Our results are shown in Table A4 in the Appendix. The average strongly treated city (top tercile) experiences a 12 percentage points decline in interest rates after the reform, while total loans exhibit a small and insignificant increase of 2%. Figure A7 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 perform placebo tests by quantifying the response of large firms that are not affected by this regulation. We estimate equation (3) using the balance of loans to large firms as our dependent variable. We report our results in Column 1 of Table 3. The balance of loans to large firms exhibit a small and insignificant increase in more treated cities after the reform. Figure 5 shows the monthly estimates where we can notice that, different from small firms, loans to large firms do not show a steady increase after the regulation. Notice that loans to large firms are provided in a fewer number of locations. Columns 2 and 3 of Table 3 show the response of interest rates and total loans to small firms in cities where banks provide credit to large firms. Our results are qualitatively similar as those reported in Table 2.

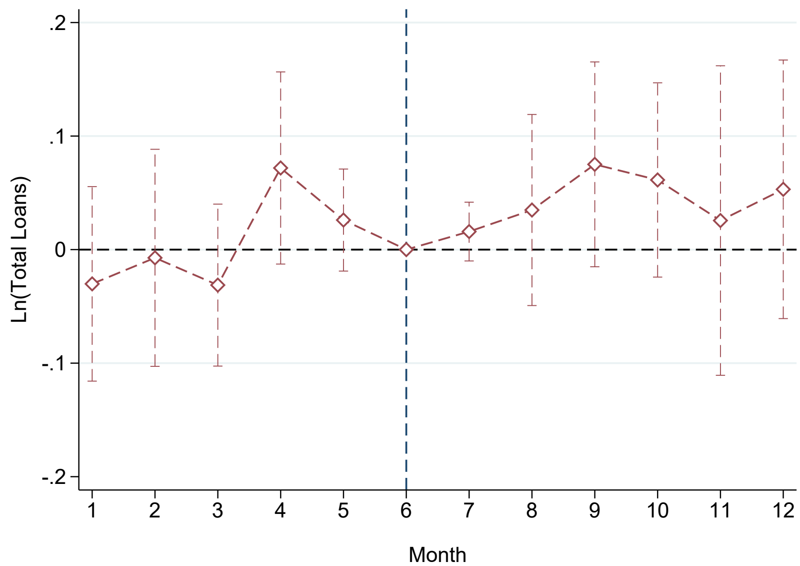
Our results show that the policy was effective in reducing interest rates without affecting total credit. However, high interest rates might reflect firms risk. In that case, lending rate caps will limit banks from extending loans to risky borrowers. Then, why is credit not declining in more treated locations? In the next section, we explore how banks rebalance their portfolios such that total loans are not affected.

Table 3: 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 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 5: Event Study Graphs for the Average Effect of Lending Rate Caps on Large Firms

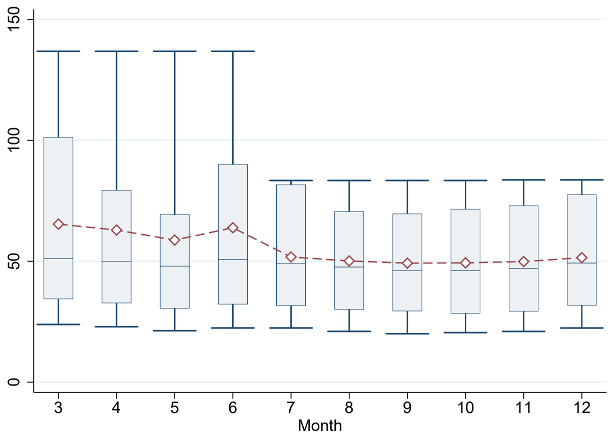


Notes. This figure reports the event study graph for the average effect of lending rate caps on total loans to large firms. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

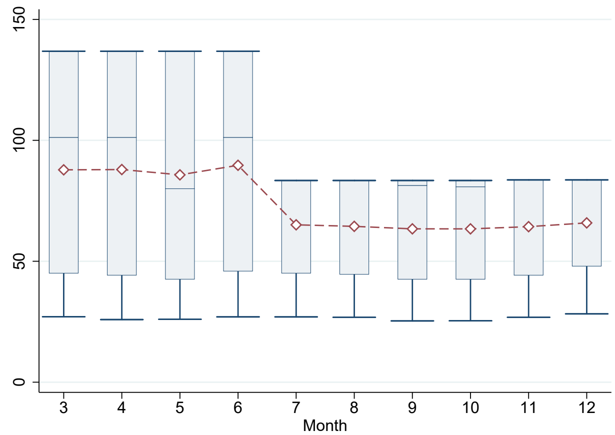
4.1 Risky loans

This section explores the role of firms risk in shaping the response of total loans. Lending rate caps might reduce credit by not allowing banks to properly price risky borrowers. We exploit our data of repayment delays to quantify the role of firms risk. We define firms as risky if they have experienced repayment delays of more than 30 days at least once in 2020. Firms with bank credit lines in 2020 that have not experience delays of more than 30 days are classified as safe and firms without credit lines in 2020 are defined as new firms. Figure 6 plots the distribution of loans to safe and risky borrowers in 2021. We observe that the median interest rate at which risky borrowers obtain credit in the pre-reform period is 100%, while it is 50% for safe borrowers. 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 issued to risky borrowers were above the cap. This share is 25% for safe borrowers and 20% for new clients.

Figure 6: 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.

We decompose the growth rate of total loans to small firms into the contribution of loans to safe and risky borrowers, as well as new firms as follows:

$$\frac{\mathrm{L_{post}} - \mathrm{L_{pre}}}{\mathrm{L_{pre}}} = \frac{\mathrm{L_{post}^{Safe}} - \mathrm{L_{pre}^{Safe}}}{\mathrm{L_{pre}}} + \frac{\mathrm{L_{post}^{Risky}} - \mathrm{L_{pre}^{Risky}}}{\mathrm{L_{pre}}} + \frac{\mathrm{L_{post}^{New}} - \mathrm{L_{pre}^{New}}}{\mathrm{L_{pre}}} \tag{4}$$

Where "pre" and "post" denote average values in the first and second semester of 2021, respectively. The three terms in the right hand side represent the contribution of loans to safe, risky and new borrowers to the growth rate of total loans. We estimate the following regression using each term of equation (4) as a dependent variable.

$$Y_{cr} = \gamma \mathrm{Treatment}_c + \delta_{q(c)} + \delta_r + u_{cr} \tag{5}$$

Where $\delta_{q(c)}$ and δ_r denote city-size quartile and region fixed effects, respectively. City size is measured by credit percapita and number of banks in 2019. This specification is consistent with our difference-in-differences equation (3) and allows us to decompose the response of total loans into the response of each component of equation (4).

Table 4 reports our results. Column 1 shows that, consistent with our previous results, total loans exhibit a small and insignificant increase after the reform. This effect hides an important reallocation of credit. Loans to risky borrowers experience a significant decline of 0.7% that is offset by an expansion of credit to new borrowers by 1.7%. Our results indicate that lending rate caps can generate substantial reductions in interest rates without affecting total loans when banks can reallocate credit away from risky borrowers towards new clients. But what determines the ability of banks to reallocate credit? One possibility is that banks have market power. If banks provide credit to safe and risky borrowers in segmented markets, once lending rate caps are implemented, banks can no longer issue loans to the riskiest borrowers. But banks can rebalance loans towards marginal safe borrowers that are not attended just because banks prefer to exert their market power in the absence of lending rate caps. In the next section, we explore the role of this channel by estimating the response of loans in local credit markets with high levels of concentration.

Table 4: Decomposition of Loans Growth Rate by Type of Borrower

	Total Loans	Existing Borrowers			New Borrowers
		All	Safe	Risky	
	(1)	(2)	(3)	(4)	(5)
Treatment_c	0.007	-0.009*	-0.003	-0.006**	0.016***
	(0.007)	(0.005)	(0.003)	(0.003)	(0.005)
Fixed effects					
City size	✓	✓	✓	✓	✓
Region	✓	✓	✓	✓	✓
Observations	289	289	289	289	289

Notes. This table reports the effect of lending rate caps on each component of equation (4). 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.

4.2 Banks market power

We now explore the role of bank market power by estimating the effects of lending rate caps in cities with different levels of bank concentration. We use the Herfindahl Hirschman Index (HHI) and define highly concentrated cities as those whose HHI is above the percentile 25. These cities account for half of the population. We then estimate the following regression:

$$\begin{aligned} Y_{cr} = \gamma \text{Treatment}_c + \beta \text{Treatment}_c \times \text{High HHI}_c + \delta_{q(c)} + \delta_r + \\ \delta_{q(c)} \times \text{High HHI}_c + \delta_r \times \text{High HHI}_c + u_{cr} \end{aligned} \tag{6}$$

Table 5 reports our results. We can observe that the reallocation of credit is significant in highly concentrated locations. One standard deviation higher treatment leads to a 0.8% larger contraction in credit to risky borrowers and a 1.9% larger increase in loans to new clients in more concentrated markets relative to less concentrated ones. Our results indicate that market power plays a crucial role in shaping the reallocation of credit towards new clients. Finally, it is important to notice that we observe a substantial decline in interest rates with null effects on total loans to small businesses even in less concentrated markets.

Table 5: Decomposition of Loans Growth Rate by Type of Borrower and Bank Concentration

	Total Loans	Existing Borrowers			New Borrowers
		All	Safe	Risky	
	(1)	(2)	(3)	(4)	(5)
Treatment$_c$	-0.001	-0.003	-0.002	-0.001	0.001
	(0.007)	(0.005)	(0.004)	(0.002)	(0.002)
Treatment$_c \times$ High HHI	0.008	-0.012	-0.004	-0.008*	0.019**
	(0.013)	(0.009)	(0.006)	(0.004)	(0.008)
Fixed effects					
City size	✓	✓	✓	✓	✓
Region	✓	✓	✓	✓	✓
Observations	289	289	289	289	289

Notes. This table reports the effect of lending rate caps on each component of equation (4) 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.

5 Effects on Financial Stability

Our results indicate that lending rate caps can generate substantial reductions in interest rates without affecting total loans because banks can reallocate credit away from risky borrowers towards new clients, mainly in highly concentrated markets. This reallocation of credit might have important implications for financial stability depending on the characteristics of new borrowers. In theory the effects are unclear. Lending rate caps reduce banks charter value and might increase risk-taking incentives. On the other hand, by not allowing banks to properly price risk, lending rate caps can reduce risk-taking incentives. To quantify the response of financial stability, we estimate equation (3) using non-performing loans, defined as credits with more than 30 days of repayment delay, as the outcome variable. We also estimate the response of normal loans (less than 30 days of repayment delay) and the share of non-performing loans.

Table 6 reports the average effects. One standard deviation higher treatment is associated with a 5.5% decline in non-performing loans, while normal loans increase by 1.7%. As a result, the share of non-performing loans decline by 0.9 percentage points. Notice that these point estimates tend to underestimate the effect of the policy because the share of non-performing loans declines steadily over time in our sample, while these coefficients show the average effect over the whole post-reform period.

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

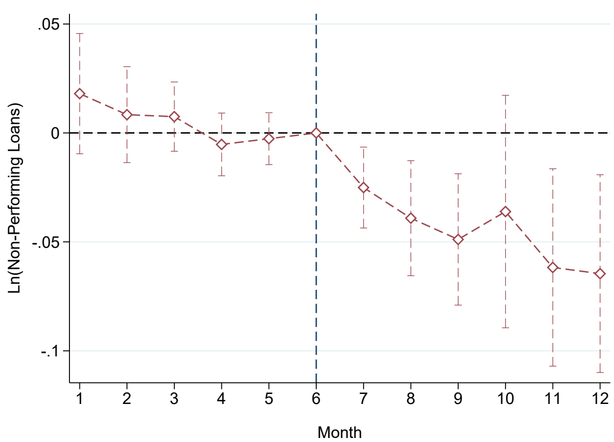
	NPL (1)	Normal Loans (2)	Share of NPL (3)
$\text{Treatment}_c \times \text{Post}_t$	-0.050***	0.017**	-0.934***
	(0.015)	(0.008)	(0.288)
Fixed effects			
City	✓	✓	✓
City size-Month	✓	✓	✓
Region-Month	✓	✓	✓
Observations	3,455	3,456	3,456

Notes. Normal loans is the balance of loans with no delays in repayment, NPL is the balance of loans with more than 30 days of delay in repayment, 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 issued in March 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.

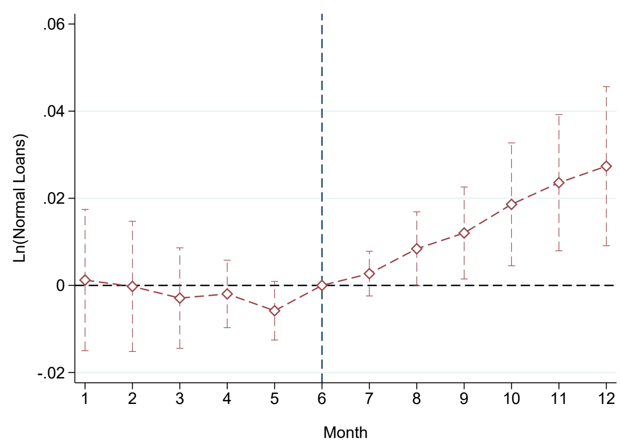
Figure 7 shows the evolution of non-performing loans, normal loans, and the share of non-performing loans, before and after the policy implementation. Panel (a) displays the evolution of non-performing loans, which exhibits a significant decline after the implementation of lending rate caps, and Panel (b) shows that the balance of normal loans grows steadily in more treated locations after the reform. As a result, the share of non-performing loans shows a substantial reduction after the policy, as we can observe in Panel (c). None of these variables exhibit pre-trends before the policy. The response of financial stability is meaningful, one standard deviation higher treatment leads to a 1 percentage point decline in the share of non-performing loans in December 2021, which represents 8% of the pre-policy average share of non-performing loans across cities.

Our results indicate that the reallocation of credit away from risky borrowers towards new clients reduces repayment delays and strengthen financial stability, suggesting that the reduction of banks charter value has minor effects on banks incentives to take risk.

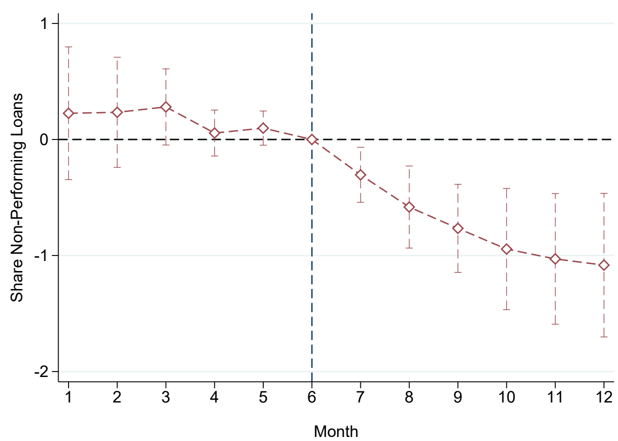
Figure 7: Event Study Graphs for the Average Effect of Lending Rate Caps on Financial Stability



(a) Non-performing loans



(b) Normal loans



(c) Share NPL

Notes. This figure reports the event study graph for the average effect of lending rate caps on normal loans, non-performing 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.

6 Conclusions

Small firms face high interest rates in developing economies, which makes lending rate caps a common tool among policy makers. Indeed, most developing countries have introduced or strengthen existing regulations on interest rates in the past decade. However, there is little evidence on the effects of these policies on small firms in emerging markets.

In this paper we quantify the local credit market effects of lending rate caps by studying a policy introduced by the Central Bank of Peru in 2021 that prohibited interest rates above 83.4%. We provide empirical evidence that lending rate caps can reduce interest rates without affecting total loans. We find that banks can substitute credit away from risky firms towards new clients in cities with high levels of bank concentration. The reduction in interest payments and the reallocation of credit have important implications for financial stability. We find a significant decline in the share of non-performing loans, suggesting a minor role for the risk-taking channel associated with the deterioration of banks charter value when interest rates are regulated.

Current work is focused on three main blocks. First, we plan to estimate the response of firm-level outcomes. Second, we expect to combine our credit registry data with tax reports to estimate the response of real outcomes. Finally, we intend to build a model where banks compete over safe and risky borrowers in segmented markets such that lending rate caps can generate a reallocation of credit by affecting risky loans. The model will be useful to quantify welfare gains and discuss optimal policy.

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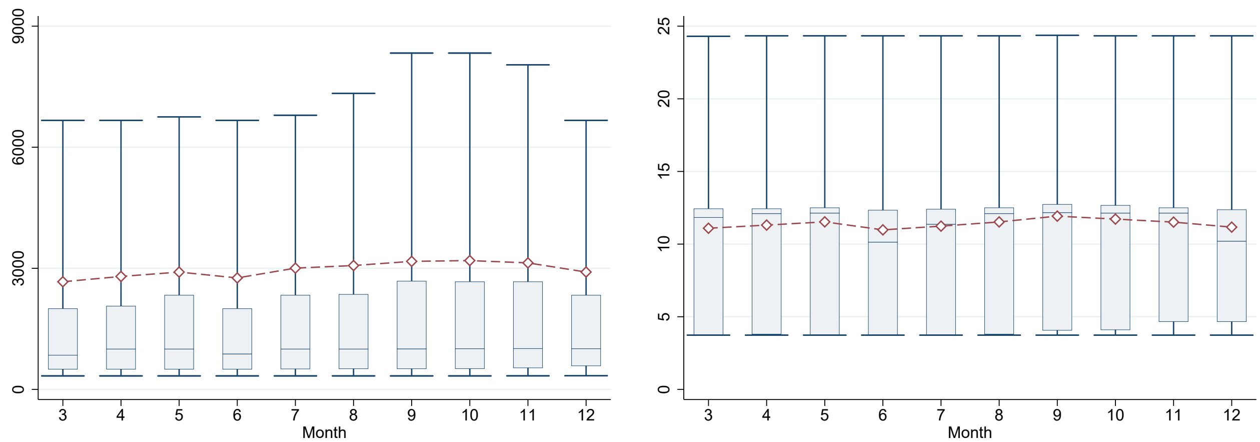
Appendix

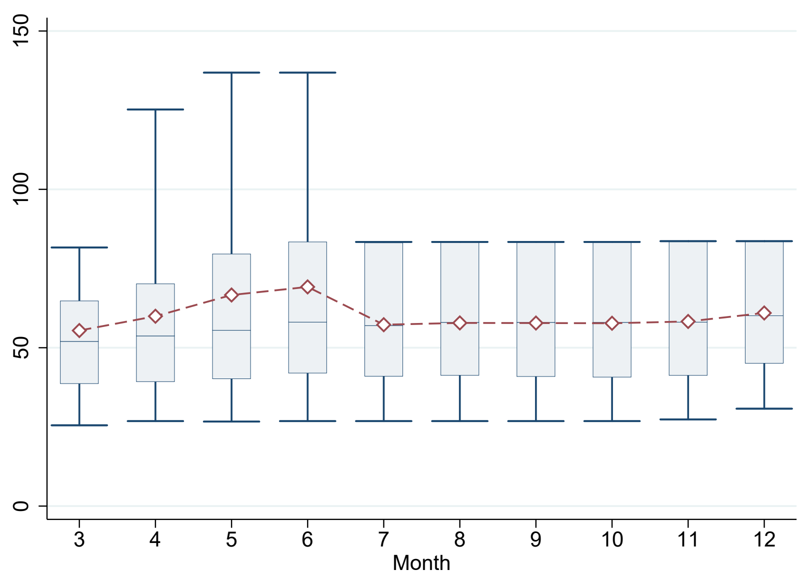
Figure A1: Distribution of Loan-size and Maturity



(a) Loan-size (b) Maturity

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

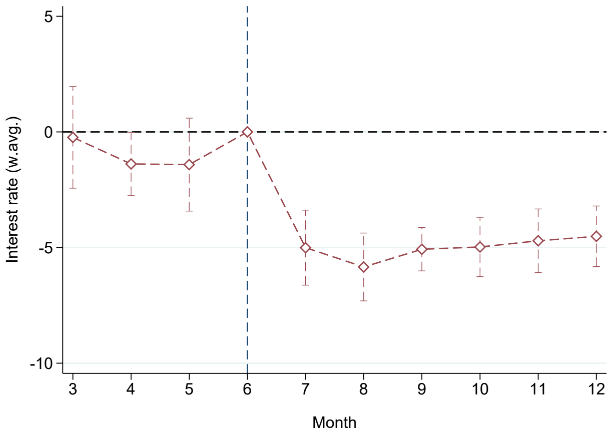
Figure A2: Distribution of Interest Rates on Loans to New Borrowers



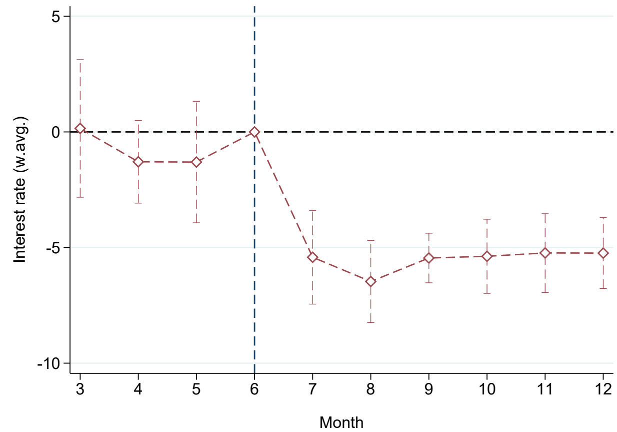
Note: This figure shows the distribution of annualized interest rates in 2021.

Different set of fixed effects

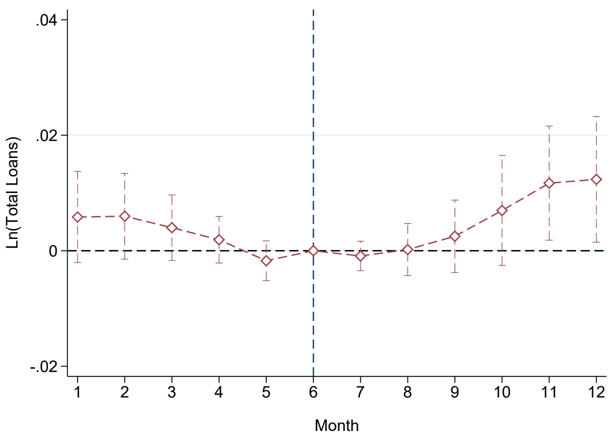
Figure A3: Event Study Graphs for the Average Effect of Lending Rate Caps on Interest Rates and Loans with Different Fixed Effects



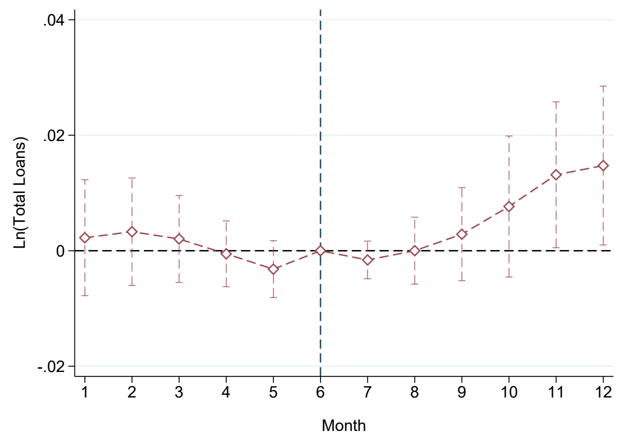
(a) Interest rates (City and Year FE)



(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.

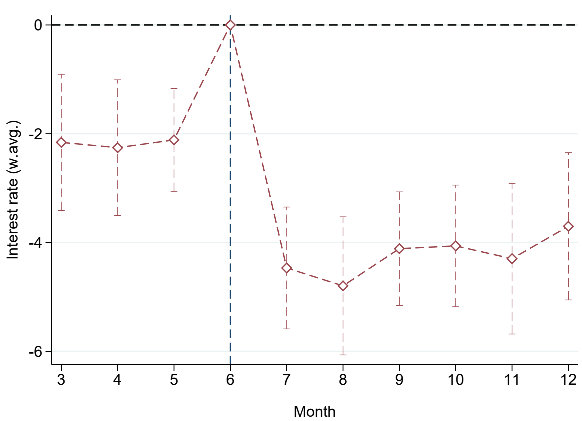
Province-level results

Table A1: Average Effect of Lending Rate Caps on Interest Rates and Loans

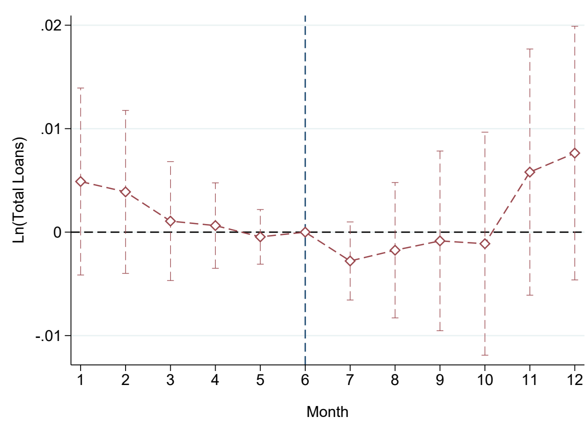
	Interest Rates (1)	Total Loans (2)
Treated$_c$ × Post$_t$	-2.608***	-0.001
	(0.292)	(0.005)
Fixed Effects		
Province	✓	✓
Month	✓	✓
Province size-Month	✓	✓
Region-Month	✓	✓
Observations	1,530	1,836

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 A4: 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.

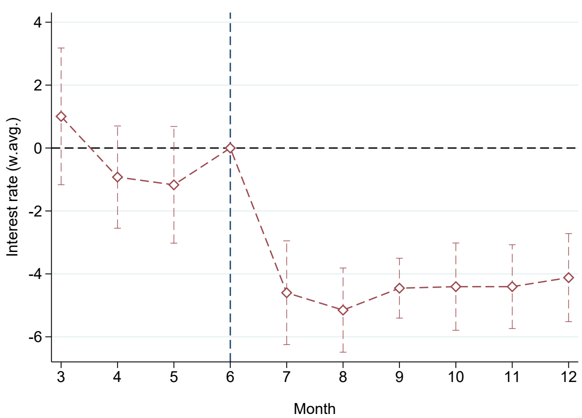
Weighted regressions

Table A2: Average Effect of Lending Rate Caps on Interest Rates and Loans

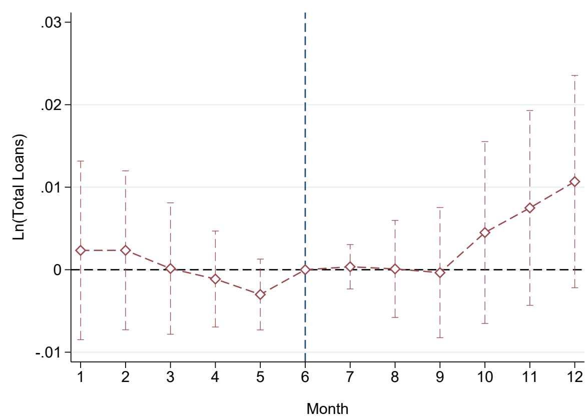
	Interest Rates	Total Loans
	(1)	(2)
Strongly Treated$_c$ × Post$_t$	-4.251***	0.004
	(0.404)	(0.006)
Fixed Effects		
City	✓	✓
Month	✓	✓
City size-Month	✓	✓
Region-Month	✓	✓
Observations	3,508	4,212

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 A5: 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.

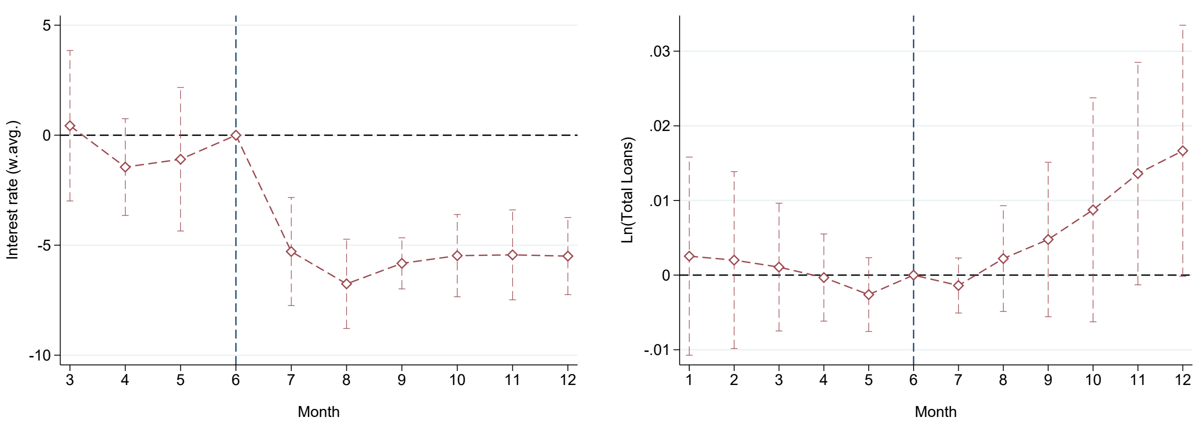
Excluding Lima

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

	Interest Rates (1)	Total Loans (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 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 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.

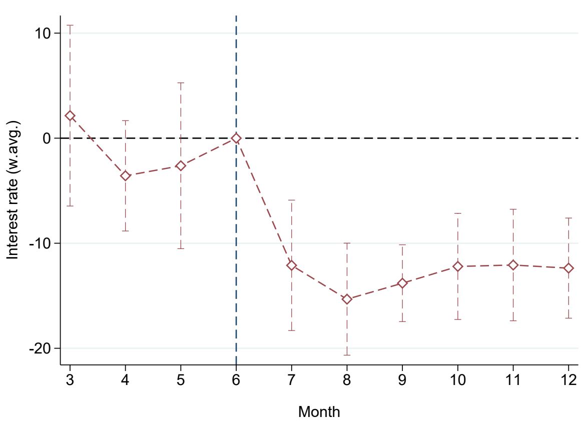
Discrete treatment

Table A4: Average Effect of LRC on Interest Rates and Loans

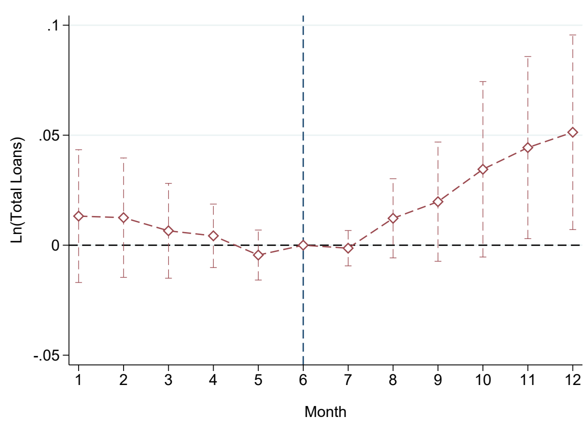
	Interest Rates (1)	Total Loans (2)
Strongly Treated$_c$ × Post$_t$	-11.967***	0.021
	(1.728)	(0.018)
Fixed Effects		
City	✓	✓
Month	✓	✓
City size-Month	✓	✓
Region-Month	✓	✓
Observations	2,878	3,456

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 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.