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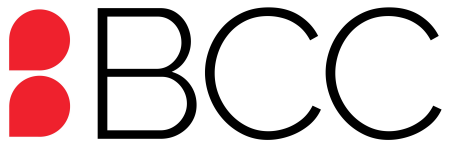
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Effect of caps on interest rates in Peru

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Bilateral Assistance
& Capacity Building
for Central Banks

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Abstract

We review the initial effects of the imposition of caps on interest rates in Peru's financial system. We developed a methodology that allows us to quantify the potential exclusion of clients. We found that financial institutions excluded close to 243 thousand clients from the financial system. Regarding consumer loans, the exclusion ratio was higher among debtors outside the capital city, under the age of 25. Additionally, the effect was smaller for married debtors. In the case of small and micro-business loans, the effect was higher for natural persons, the commerce sector, and firms in the capital city. In summary, the effects induced by caps on interest rates are concentrated among people with lower incomes and those with vulnerable firms. Additionally, these debtors typically had the highest interest rates and were the main clients of non-banking financial institutions.

Keywords: Cap on interest rate; credit market; exclusion.

JEL Classification: G21; G23; G28; K20.

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1 Introduction

Over time, legislators worldwide have expressed concern about establishing caps on interest rates. Furthermore, considering that the application of caps on interest rates is related to the establishment of monetary policies, various countries have considered it prudent to let their central banks be responsible for setting caps on interest rates¹. There are also various factors that encourage legislators to propose laws to set caps on interest rates. For example, they may wish to help specific economic sectors in which financial institutions do not have sufficient incentives to cater to clients. Furthermore, the application of caps on interest rates is justified to protect debtors from possible abuse by financial institutions. For example, in a non-competitive credit market, financial institutions can charge an interest rate far greater than the true cost of loans, which is a practice known as usury.

According to Hidalgo (2013), Maimbo and Henriquez (2014), and Calice et al. (2020), various countries have established caps or limits on the interest rates charged by financial institutions to promote financial debtor advocacy and avoid usury. These countries have adopted different methodologies to set caps on interest rates. However, most studies have shown that enforcing caps on interest rates generates adverse effects on financial inclusion by restricting access to loans, particularly for consumer loans, and micro-business and small-business (SMB) loans. In Chile, the SBIF (2017)² estimated that by the third year following the enactment of legislation for caps on interest rates, between 151 thousand and 227 thousand clients would cease to have access to formal credit. Madeira (2019), who used a representative sample of Chilean families, found that a reduction in caps on interest rate restricted the number of debtors with new loans by 9.7% at the end of 2015, which was equivalent to 197 thousand potential debtors. In France, Ellison and Forster (2010) found that informal loans were more prevalent than in other European countries that do not have caps on interest rates. In Japan, Maimbo and Henriquez (2014) determined that the number of informal loans grew following the imposition of caps on interest rates. Likewise, Porteous et al. (2010) indicated that, based on the restrictions imposed by caps on interest rates, small financial institutions had to cut back their operations, and some even merged with larger financial institutions to avoid going bankrupt.

In this study, we analysed the effects of the imposition of interest rate caps in Peru (Law

¹Jimenez (2021) explained the difference between the types of interest rates in Peru and how throughout history, central banks have been chosen to establish caps on interest rates (compensatory interest rates).

²Superintendencia de Bancos e Instituciones Financieras (SBIF) is a Chilean institution in charge of supervising banking institutions and other financial institutions in Chile to safeguard deposits and loans.

Nr. 31143), which were introduced in May of 2021 and seem to have led to the exclusion of consumers and SMB debtors. Among other provisions, this legislation established caps on interest rates in the financial system only for consumer and SMB loans, and setting these limits falls under the purview of the Central Reserve Bank of Peru (BCRP). The caps on interest rates started at 83.40% and 68.38% for the aforementioned loan types in local and foreign currency, respectively. This law was implemented gradually according to the type of financial institution, starting with the larger institutions (banks).

To analyse the impact of this legislation, the BCRP can leverage the 'Credit Registry', which provides information regarding outstanding debt and the characteristics of debtors. This database contains a unique identifier (debtor code) that allowed us to merge it with the 'Interest Rate Report', which is a database containing information on the interest rates, amounts and terms of loans for each contract associated with a single debtor. The matched data contain information from March of 2020 to June of 2022 and include 4 to 5 million observations per month.

To measure the impact of the law, we used the methodology presented by Madeira (2019). In his study, he used information from the Chilean Household Finance Survey (Encuesta Financiera de Hogares). He matched this information with the administrative records kept by the SBIF based on the identities of households. Similar to Madeira, we estimated an 'exclusion ratio' using the probability of continuing to have debt in the financial system as an input. Therefore, the first step was the estimation of a panel logit model. The dependent variable of the model was a dummy equal to one in periods where a person or SMB had debt and equal to zero when they did not have any debt in the financial system. The independent variable was defined for debtors that maintained at least one current debt in April of 2021 (before the law was enacted) and for each debtor, we considered the minimum interest rate of their current loans granted between March of 2020 and March of 2021. This was done to identify if any loans had interest rates above the cap because in some cases, it is possible that if a loan is associated with a financial institution charging an interest rate higher than the cap, a debtor could apply for a new loan with a financial institution who offered an interest rate below the cap.

It is important to clarify that clients are excluded from the financial system when they stop receiving new loans. This could occur for different reasons. i) A financial institution may decide not to offer new loans to clients because it would incur a higher cost compared to the

profit allowed by the interest rate cap. ii) A financial institution may stop offering loans to clients because they have undesirable payment histories. iii) Clients may simply have no need for more loans (reduction of demand for loans). Therefore, various controls are considered for application to models such as risk classification, and the possession of other types of loans. Additionally, to isolate other possible effects that could influence the permanence of clients in the formal credit market for reasons other than caps on interest rates, we considered additional control variables such as gender, age, rescheduling and participation in relief programs of the government.

Finally, the exclusion ratio was constructed to calculate the number of debtors excluded. To this end, counterfactual probabilities were estimated by assuming that all debtors had an interest rate far below the cap (i.e., assuming that the cap does not exist). We computed the mean exclusion ratio by period to estimate the percentage of clients not receiving new loans.

The remainder of this paper is organised as follows. Chapter 2 provides a brief overview of the credit market in Peru, where one can see that the current banking law in Peru establishes seven types of loans, which are mainly classified by the amount of debt borrowers maintain in the financial system and the amount of their sales (in the case of firms). This is important given that the law applies to only three types of loans. Chapter 3 describes how we applied Madeira's methodology and the changes we implemented to estimate the impact of caps on interest rates in Peru. Chapter 4 summarises the main results and provides empirical explanations. Chapter 5 provides conclusions regarding the effects of the law on the Peruvian credit market and some recommendations that could be applied to Peru.

2 Data and Institutional Background

2.1 The credit market in Peru

The financial system in Peru consists of 51 financial institutions³ that offer different types of loans to firms and households. This number consists of 16 banking companies, 10 financial companies, 12 municipal savings and loans companies, six rural savings and loans companies, and seven loan companies. Banks account for approximately 87.8% of loans within the financial system, as well as the largest amount of assets and deposits. However, non-banking institutions have the largest proportion of loans in the retail customer segments (SMB and consumer debtors).

Table 1: Structure of the Financial System, June of 2022

	Number of Institutions	Assets		Loans		Deposits	
		Million USD	%	Million USD	%	Million USD	%
Financial System	51	148 772	100	106 367	100	95 155	100
Banks	16	133 530	89.8	93 422	87.8	86 151	90.5
Big four banks	4	111 160	74.7	78 429	73.7	71 387	75.0
Median banks	9	20 198	13.6	13 505	12.7	13 255	13.9
Specialised in consumption	3	2 173	1.5	1 487	1.4	1 509	1.6
Non Banks	35	15 241	10.2	12 945	12.2	9 004	9.5
Financial companies	10	4 141	2.8	3 502	3.3	1 958	2.1
Municipal saving and loans	12	9 503	6.4	8 091	7.6	6 623	7.0
Rural saving and loans	6	733	0.5	611	0.6	423	0.4
Loan companies	7	865	0.6	741	0.7	-	-

Source: Financial Institutions

According to the General Law for Financial and Insurance Systems and the Organic Law for the Superintendency of Banking and Insurance (Law Nr. 26702), there are economic groups with different characteristics according to their scope of operations, organisation, debt in the financial system, and financial information, which are represented by the type of loan (shown in Table 2). Each type of loan has characteristics that are translated into a diverse degree of payment capacity, guarantees, terms, and size of loan that they demand. This information

³The number of financial institutions corresponds to the number reported by June of 2022 and does not include Peru's two national banks (Banco de la Nacion and Agrobanco), Credit Unions (349 financial institutions that have been under the supervision of the Financial Superintendence of Peru since 2019, and that are still in the process of disclosing their actual financial situation), Fintech, NGOs, investment banks, individual lenders, among others.

determines a different level of risk for each borrower, which increases the interest rates at which they can obtain loans.

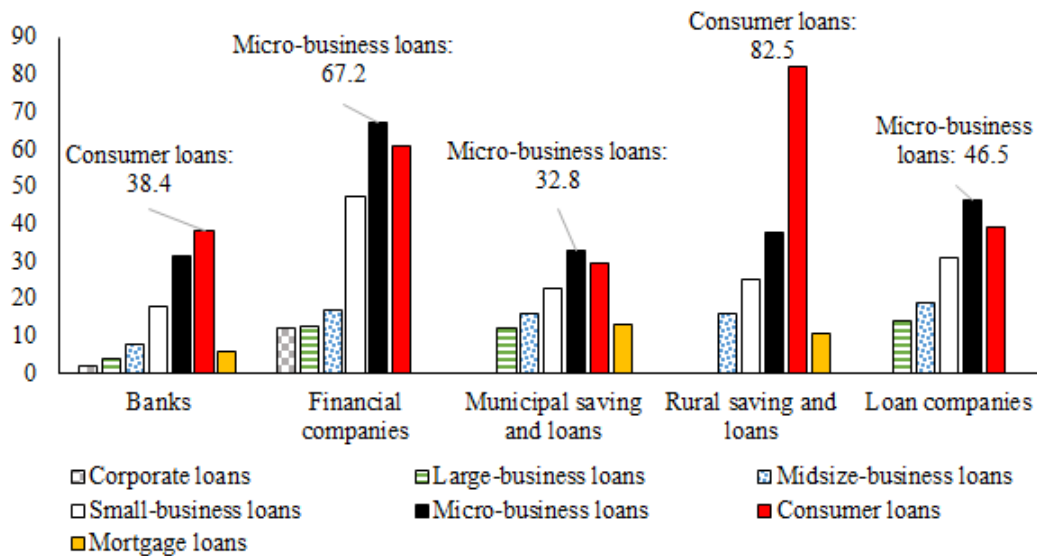
Table 2: Types of loans and their main characteristics

Type of loan	Amount	Term	Guarantee	Utilisation
Corporate loans	High	Variable	Not specific	Productive
Large-business loans	High	Variable	Not specific	Productive
Midsize-business loans	Medium	Variable	Specific	Productive
Small-business loans	Low	1 year	Specific and supportive	Productive
Micro-business loans	Low	3 years	Third party endorsement, solidarity	Productive
Consumer loans	Low	3 years	Specific, non-specific and supportive	Consumption
Mortgage loans	Low to Medium	12 years	Mortgage	Home

Source: Costo de Crédito en el Perú, Noviembre 2002, BCRP

A common characteristic is that consumer and SMB loans have the highest interest rates among different types of loans. Additionally, smaller financial institutions (banks specialising in consumer loans and non-banks) are those that charge the highest interest rates (Figure 1). This is a result of their business model, as these institutions mainly offer loans to the lower-income customer segment, which translates to higher costs because lower-income customers are more likely to default on their loans. Therefore, they receive lower loan principals, which increases the share of fixed costs in the cost of credit.

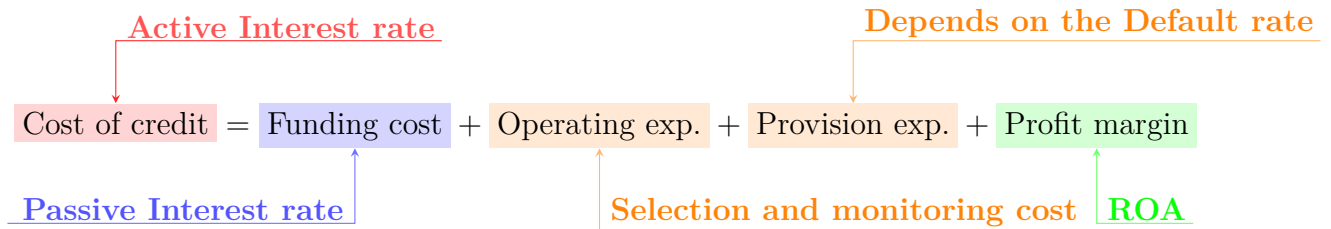
Figure 1: Average interest rates by group of entities and type of loan, April of 2021



Source: SBS

To understand why interest rates on some types of loan are high, we must understand the cost of credit, which is made up of four elements, as defined by Choy et al. (2015): i) cost of funding (represented by the passive interest rate), ii) operating expenses, iii) compensation for default risk (required provisions in the event of possible deterioration of the credit portfolio), and iv) profit margin (returns on the capital invested by financial institutions).

Figure 2: Elements of the cost of credits



Additionally, it is important to mention that loans are heterogeneous products based on the different operating costs involved and different credit risks. For this reason, interest rates are higher in some segments, such as consumer and SMB loans, particularly when clients have little or no credit history, which increases the default risk and cost of provision. Similarly, because the credit business incurs operating costs that do not depend on the size of loans (call centers, registration with the system, customer monitoring, regulatory compliance, etc.), the interest rates necessary to cover such fixed costs will be higher when a loan is for a lower principal. As a result, provision and operating expenses are the most important components of the cost of credit that financial institutions charge for consumer and SMB loans. In such cases, there is a greater spread between active and passive interest rates (rates that financial institutions pay for their deposits, which reflects the entity’s cost of funding). Therefore, higher interest rates in some segments are not necessarily reflected in their profits.

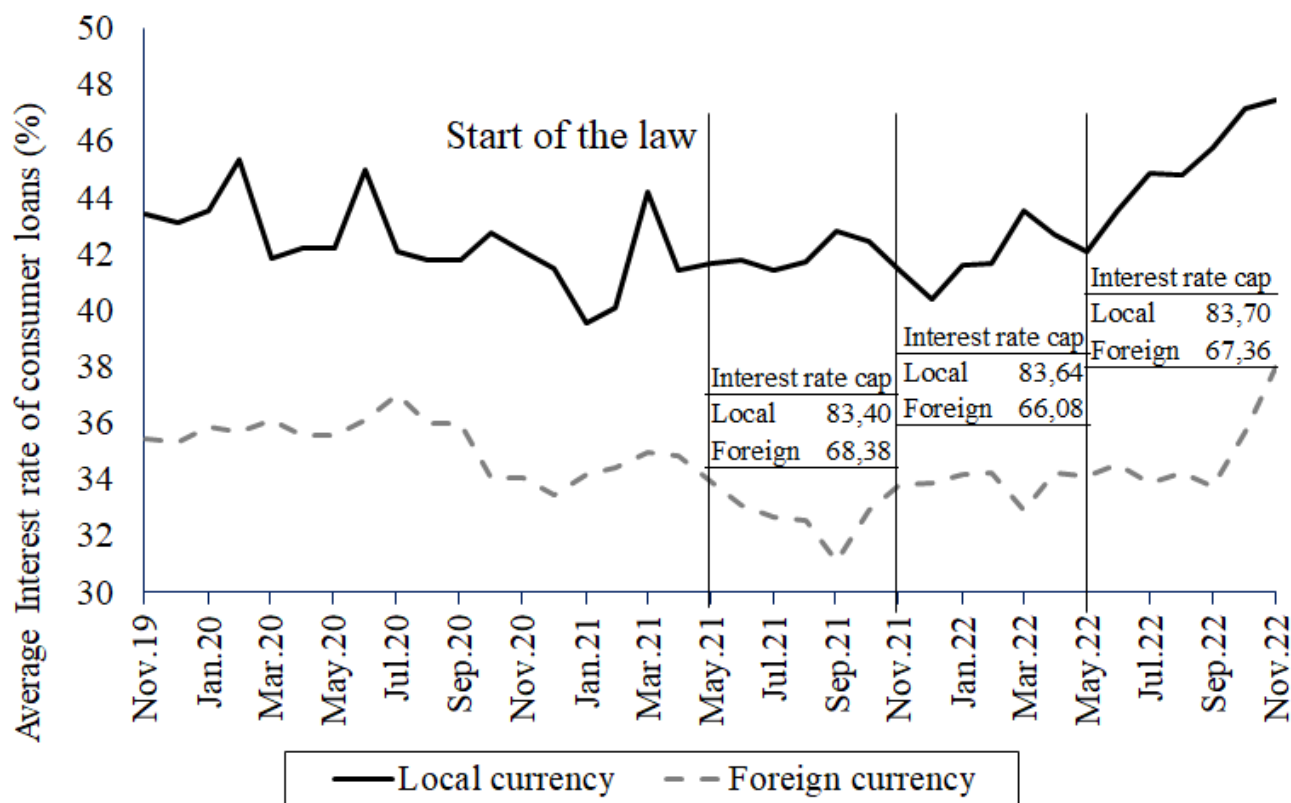
2.2 The interest cap law in Peru

In December of 2020, the Peruvian Congress approved Law Nr. 31143, ‘Law that protects consumers of financial services from usury’, which incorporates, among other provisions, caps on interest rates in the financial system for consumer and SMB loans. According to this law, the BCRP defines interest rate caps on a half-yearly basis with the goal of regulating the market. It is important to note that interest rates charged above these caps are considered usury rates, meaning they are considered as crimes. The Superintendency of Banking, Insurance,

and Private Pension Fund Administrators (SBS)⁴ are in charge of monitoring and supervising compliance with interest rate caps, enforcing sanctions, and reporting financial institutions that exceed the caps.

Therefore, the BCRP, based on the distribution of interest rates of different types of loans and the desire to minimise potential negative effects, established that caps on interest rates are equivalent to twice the average interest rate of consumer loans (which are published by the SBS on a daily basis) depending on whether they are in local currency or foreign currency.

Figure 3: Evolution of average interest rate of consumer loans and caps on interest rates



⁴The SBS is in charge of regulating and supervising financial, insurance, and private pension systems, as well as preventing and detecting money laundering and terrorist financing. Its primary objective is to preserve the interests of depositors, policyholders, and members of private pension funds.

Table 3: Date of applicability by type of financial institution and product

Entry into force	Financial institutions - products to which the law applies
May 10, 2021	Banks – except credit card revolving credit
June 1, 2021	Banks – credit card revolving credit Municipal saving and loans – all types of credit
July 1, 2021	Other financial institutions – all types of credit

Prior to the enactment of the law, financial institutions expressed their disagreement with the imposition of caps on interest rates, alleging that the majority of international experience indicates that caps on interest rate have not been positive and that the technical opinions of the Ministry of Economy and Finance (MEF), BCRP, SBS, and the unions of financial institutions were not taken into consideration.

2.3 Central bank policy rate in Peru














The design and implementation of monetary policy are conducted under the scheme of explicit inflation targeting. The BCRP seeks to anchor agent inflation expectations by announcing an inflation goal (currently between 1% and 3%). For this reason, every month the BCRP makes decisions regarding the central bank policy rate⁵ to keep inflation within the target range. Changes in the central bank policy rate are transmitted to the interest rates of the interbank market and financial system (loans and deposits), which affect the spending decisions of firms and households, aggregate demand, and inflation.

According to Lahura (2017), the pass-through effect of the Central Bank policy rate on the interest rates of the financial system is stronger when the terms of deposits or loans are shorter than one year. He also found that the speed of transmission of short-term rates adjusted faster than that of long-term rates. It is important to consider that interest rates for retail loans (SMB and consumer loans) have remained relatively stable, despite the increase in the central bank policy rate. In periods of rising passive interest rates, increases in interest rates are contained by existing competition within the financial system among other factors. The interest rates of wholesale loans (corporate loans, large business loans, and mid-size business loans) and mortgage loans tend to be more sensitive and react more quickly to adjustments in the central bank policy rate because the cost of funding accounts for a major portion of the

⁵Central Bank policy rate represents the interest rate that the BCRP sets to establish a reference interest rate level for interbank operations, which affects the operations of financial institutions with regard to their clients.

cost of these loans. For other loans, the reaction to interest rates is typically slower and smaller because operating and provision expenses account for a greater portion of the cost of credit.

Table 4: Average interest rates

	Levels (%)			Changes (%)			Evolution *
	Dec.19	Jul.21	Jun.22	Jul.21 - Dec.19	Jun.22 - Jul.21	Jun.22 - Dec.19	
Central bank policy rate	2.25	0.25	5.5	-2.00	5.25	3.25	
Interest rate of loans **							
<u>Banks</u>							
Corporate	3.8	2.2	6.8	-1.6	4.6	3.0	
Large-business	6.0	3.4	8.3	-2.6	4.9	2.3	
Midsize-business	9.3	5.2	11.9	-4.1	6.7	2.6	
Small-business	18.0	17.6	20.4	-0.4	2.8	2.4	
Micro-business	31.3	32.4	35.2	1.0	2.9	3.9	
Consumer	40.9	39.5	44.6	-1.3	5.1	3.7	
Mortgage	7.0	5.9	8.1	-1.1	2.2	1.1	
<u>Non-banks</u>							
Midsize-business	15.5	13.7	15.4	-1.7	1.7	0.0	
Small-business	30.1	27.5	24.0	-2.6	-3.5	-6.1	
Micro-business	45.9	43.9	40.9	-2.0	-3.0	-5.1	
Consumer	55.4	51.1	48.4	-4.3	-2.6	-6.9	
Mortgage	11.3	14.0	13.0	2.6	-1.0	1.7	

*Monthly evolution from December of 2019 to June of 2022. The vertical line corresponds to July of 2021.

**Interest rates of operations conducted in the last 30 days by financial institutions.

Source: BCRP, SBS

2.4 The credit registry and the Interest rate report

2.4.1 Credit registry

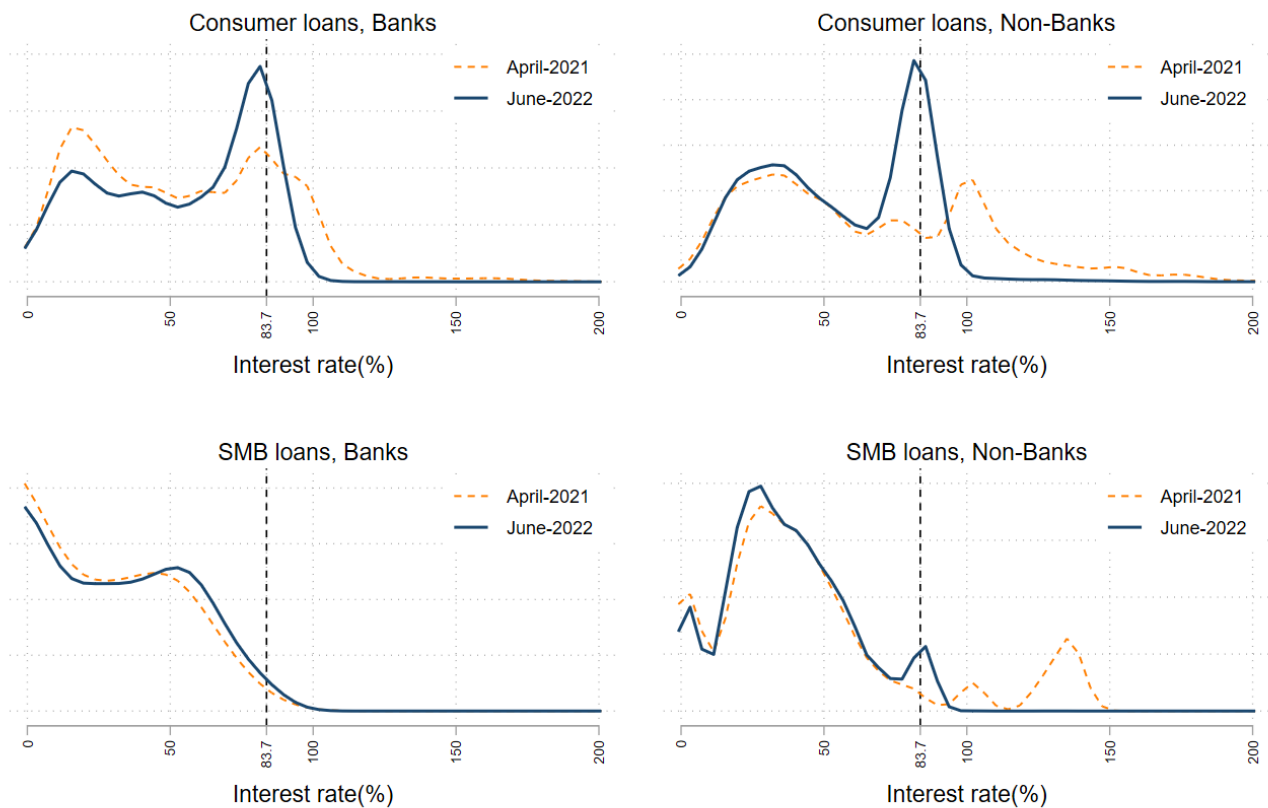
The credit registry is a monthly panel representing the period of 2019 to 2022 in which we can observe the loan balance that debtors hold with each financial institution established in Peru. This database also includes information regarding non-performing loans, type of loan, revolving debt, city, marital status, age, and gender of debtors.

The credit registry contains no information on the default of security titles such as bills and promissory notes because this information is published by the ‘Registro Nacional de Protestos y Moras’ of the ‘Cámara de Comercio de Lima’ according to the Securities Law (Law Nr. 27287).

2.4.2 Interest rate report

The interest rate report is a database covering the period of April of 2021 to June of 2022 that contains information regarding the amount disbursed, date of issuance, maturity, and interest rate by type of loan and debtor. The granular information in this database helps us verify that in the case of banks specialising in consumer loans and non-banking institutions, most have a higher proportion of clients from segments of the population with a lower income, some of which are linked to the informal sector with little or no credit history. In contrast, banking companies (large and medium) generally offer loans to segments of the population with higher income whose credit risk is lower. This scenario is reflected in the distribution of interest rates for consumer and SMB loans for banking and non-banking institutions, where the latter granted a higher proportion of loans above caps on interest rates prior to the implementation of the law.

Figure 4: Kernel of the distribution of loans



Source: Interest Rate Report

Similarly, as of June of 2022, following the implementation of the law, a greater concentration of rates can be observed around the cap, and only a small portion of loans with rates greater than the caps have not yet expired.⁶

2.4.3 Matched data

We merged the information on all debtors with outstanding debt amounts greater than zero in April of 2021 with the credit registry from March of 2020 to June of 2022. Therefore, we are only evaluating the exclusion of debtors prior to the law. For this reason, the interpretation of our results will be in reference to April of 2021.

Figure 5: Schema of data consolidation

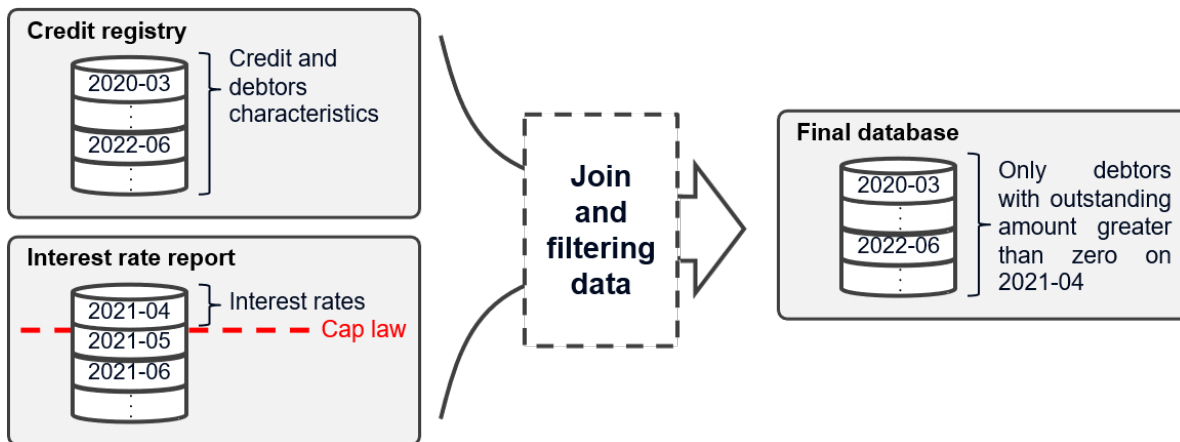


Table 5: Descriptive statistics for April of 2021

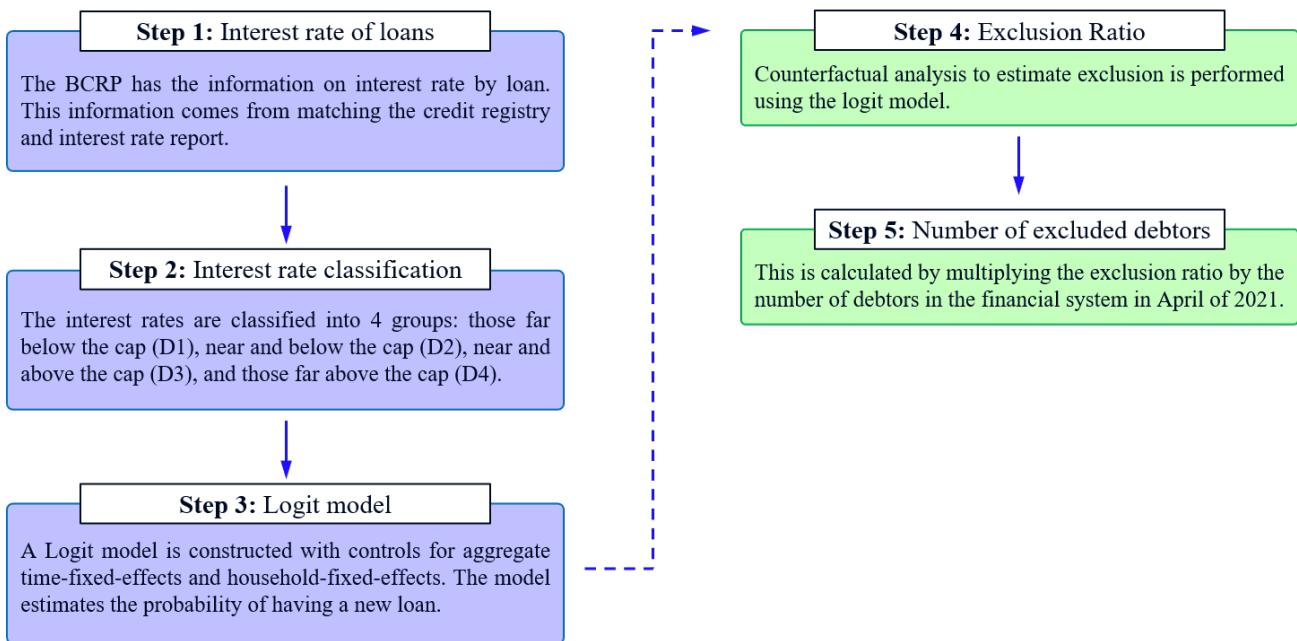
Database	Variable	Obs (M)	Mean	Std. Dev.	Min	Max
Credit registry	Outstanding debt (M USD)	4 888	3.7	10.0	0	6586
	% Rolling debt	4 888	0.6	0.5	0	1
	% Delinquency	4 888	0.2	0.4	0	1
Interest rate report	Interest rate	4 471	52.3	42.0	0	783
	Amount disbursed (M USD)	4 471	2.2	10.3	0	5428
	Maturity (years)	4 471	1.3	1.8	0	33

⁶Appendices A1, A2, A3, and A4 present the changes in interest rates by type of loan between April of 2021 and June of 2022.

3 Methodology

We followed the methodology presented by Madeira (2019), who analysed the impact of changes in maximum interest rates in the Chilean financial system by focusing on the percentage of new borrowers. Madeira used the Chilean Household Finance Survey in combination with household credit information. In this study, we analysed the effect of the introduction of caps on interest rates on the number of people that participated in the financial system.

Figure 6: Methodology used to calculate the exclusion of debtors



Madeira (2019) estimated a risk-adjusted interest rate $(tar_{i,t}^S)^7$. However, in this study, it was not necessary to estimate the interest rate given the availability of market data. We assumed that the minimum interest rate a debtor had among the debts obtained in the past 12 months was the representative interest rate for that debtor. This measure was chosen because if the rate was above the cap, then all the interest rates for the client were above the cap. Having obtained the minimum interest rate for each debtor, we classified debtors into four groups depending on how close their rates were to the cap. Margins around the cap were selected to balance the percentage of debtors in each category. The first margin was calibrated to make group D1

⁷Madeira calculated a risk-adjusted interest rate $tar_{i,t}^S = \frac{AC^S + DR_t + LGDxPr(Df_{i,t}=1)}{1 - LGDxPr(Df_{i,t}=1)}$. The equation includes the opportunity cost (standardised as 1), administrative costs (AC^S), the banking sector one-year deposit rate (DR_t), and probability of default ($Pr(Df_{i,t} = 1)$)

contain 66% of the debtors, and the second margin was selected to make groups D3 and D4 contain the same number of debtors.

Figure 7: Dummy construction with distance to interest rate cap



For the dependent variable, a dummy was created and set equal to one for periods in which a person or SMB had debt and equal to zero when they did not have any debt in the financial system. For example, if a debtor had debts only in December of 2020 and December of 2021, then the dummy variable was equal to one only during those two periods (see Table 6). Therefore, our definition of participating in the financial system assumes having at least one direct debt. If a person had an unused credit card line, we did not consider this to be participation in the financial system.

Table 6: Example dummy variables

	Juan		Maria		Pedro	
	Debt	Dummy	Debt	Dummy	Debt	Dummy
2020-03	0	0	0	0	50	1
2020-06	100	1	100	1	50	1
2020-09	200	1	0	0	0	0
2020-12	200	1	50	1	0	0
2021-03	500	1	0	0	0	0
2021-06	0	0	0	0	0	0
2021-09	0	0	0	0	0	0
2021-09	0	0	20	1	0	0
2021-12	0	0	120	1	0	0
2022-03	0	0	30	1	0	0
2022-06	0	0	20	1	0	0

Other control variables are also included. These controls serve to isolate the effects of other variables that could influence the permanence of debtors for reasons other than caps on interest rates. We use different controls for consumer and SMB loans. For SMB loans, we include two indicator variables for participation in the Paycheck Protection Program ('Reactiva Peru')⁸

⁸Reactiva Peru is a macro program initially designed by the Central Reserve Bank of Peru to provide liquidity

and having 'rescheduled loans'⁹, which are two special programs introduced in response to the COVID-19 crisis.

Table 7: Control variables by type of loan

Consumer loans	SMB loans
-Delinquency status	-Delinquency status
-Gender	-Amount of sales
-Marital status	-Economic sector
-Age	-To have rescheduled loans
-City	-To give credits of Reactiva Peru
-Other credits of the clients (consumer, SMB loans)	-City
	-Other credits of the clients (consumer, SMB loans)

To measure the impact of the law, we defined a logit model to estimate the probability of receiving a new loan ($NC = 1$) with controls for aggregate time-fixed effects and dummies that helped us classify whether debtors belong to Groups 2, 3, or 4, as defined in Figure 7.

$$Pr(NC = 1|X_{i,t}; D_{j=2,3,4}) = \Lambda(\theta(X_{i,t}, \text{distance to cap}_{i,t})) \quad (1)$$

With $\Lambda = \frac{e^{\theta X}}{1+e^{\theta X}}$, and some observable characteristics ($X_{i,t}$).

Finally, we performed counterfactual analysis to estimate the rate of exclusion. To this end, we estimated probabilities based on the results of a logit model and the counterfactual probabilities were calculated by replacing the dummies $D_{j=2,3,4}$ with zero (i.e., assuming that all debtors belong to Group 1 as if the caps on interest rates did not exist). Finally, we estimated new probabilities and the exclusion ratio as shown below.

$$\text{Exclusion Ratio} = \frac{Pr(NC = 1|X_{i,t}; D_{j=2,3,4} = 0) - Pr(NC = 1|X_{i,t}; D_{law} = 1)}{Pr(NC = 1|X_{i,t}; D_{law} = 1)} \quad (2)$$

This ratio defines the probability of remaining in the financial system, which was calculated for each debtor. Based on these results, we averaged the values in the sample and estimated the total percentage of debtors that were no longer part of the financial system.

to the financial system and prevent a break in the payment chain during the COVID-19 pandemic. This policy was implemented through loans backed by government guarantees.

⁹Under the rescheduled condition, loans are not considered to be past due and debtors maintain their risk rating. Therefore, they do not generate additional provisions. Additionally, financial institutions book interest when customers pay their obligations.

4 Results

4.1 Model

We defined four logit models (two for each type of loan, namely consumer and SMB loans). The first model for each type used variables defined in levels, whereas the second considered the interaction of the distance-to-cap dummies with the variable of delinquency status. The results are presented in Table 8.

In model M1, the D2 group exhibited no significant effects. However, when we included interactions, the variable became significant with a positive sign for the D3 group. D4 exhibited a smaller effect.

The signs of D2, D3, and D4 interact with the delinquency variable, reflecting the effect of belonging to each group given that a debtor was not in delinquency. The positive sign of D2 seemed to indicate that financial institutions preferred to retain debtors in this group who were not in delinquency over debtors in group D1, potentially because they could be charged at a higher interest rate to compensate for the loss of revenue. The sign of D3 could indicate that financial institutions preferred to retain debtors that had previously had interest rates above the cap by reducing interest rates, but only for debtors who were not in delinquency. One can see that being in any of these groups and being delinquent significantly reduced the probability of being a client participating in the financial system.

In the case of SMB debtors, the sign of the coefficients indicates that financial institutions prefer to retain debtors in group D1, regardless of their delinquency status, although as indicated by consumer equations, having this status reduces the probability of participating in the financial system.

The sign of group D2 in equations M3 and M4 indicates that despite complying with the caps on interest rates in April of 2021, similar to group D1, there was also a lower probability of participating in the financial system. This may be a result of the fact that clients in this group are riskier than those in group D1, meaning they are more prone to have an increase in their interest rates, resulting in a greater perceived risk for financial institutions. Additionally, because debtors in group D2 have interest rates closer to the caps, as the average consumer and SMB interest rates increased, the caps on interest rates could be more easily breached.

Table 8: Results of the panel logit model*

Main variables	Consumer		SMB	
	M1	M2	M3	M4
D2	0.016 (0.021)	0.279*** (0.024)	-0.623*** (0.022)	-0.336*** (0.024)
D3	-0.155*** (0.026)	0.072** (0.031)	-1.206*** (0.037)	-0.936*** (0.041)
D4	-0.711*** (0.035)	-0.212*** (0.045)	-0.822*** (0.036)	-0.729*** (0.038)
D2 x delinquency		-0.859*** (0.041)		-1.337*** (0.046)
D3 x delinquency		-0.753*** (0.052)		-1.072*** (0.071)
D4 x delinquency		-1.222** (0.063)		-0.265*** (0.072)
Delinquency	-2.907*** (0.017)	-2.623*** (0.019)	-2.434*** (0.020)	-2.025*** (0.025)
Records	3 364 392	3 364 392	2 838 852	2 838 852
Number of debtors	608 835	608 835	525 043	525 043
Interaction effects		✓		✓

Standard errors are shown in parenthesis

*** p<0.01, ** p<0.05, * p<0.10

* Sample of 25%. The variable 'Delinquency' is equal to one when a debtor is 30 days or more behind in their payments.

4.2 Exclusion

Following the methodology proposed by Madeira (2019), an exclusion ratio was constructed to calculate the number of debtors excluded. To this end, counterfactual probabilities were estimated by assuming that all debtors belong to group D1 (i.e., assuming that there are no caps on interest rates). This was achieved by setting variables D2, D3, and D4 equal to zero for all debtors and using models M2 and M4. The value of this exclusion ratio was averaged for each period, and we calculated the percentage of debtors excluded from the financial system. Then, by multiplying this result by the total number of debtors, we obtained the number of debtors that we considered to be excluded.

Given the construction of the dependent variable, this number reflects debtors who ceased to participate in the financial system for at least one quarter. For example, by June of 2022, 104 969 consumer debtors and 138 362 SMB debtors that were present in April of 2021 continued

to participate in the financial system when assuming that caps on interest rates rate did not exist.

Table 9: Estimation of excluded clients

		Dec-21	Mar-22	Jun-22
%	Consumer	1.35	1.78	2.16
	SMB	3.25	4.04	4.83
N°	Consumer	65 561	86 628	104 969
	SMB	93 052	115 880	138 362

Table 10: Exclusion estimation by type of financial institution

	Consumer		SMB	
	%	Number	%	Number
Total	2.16	104 969	4.83	138 362
Banks	1.74	50 707	1.28	20 959
Non-Banks	2.87	54 262	3.79	117 403

The effects differed between banking and non-banking debtors. The debtors of non-banking institutions with a lower socioeconomic level were the most significantly affected with a 2.87% rate of exclusion for consumer loans and 3.79% rate of exclusion for SMB loans.

Table 11: Exclusion ratio by characteristics of loans

Consumer		SMB	
<u>City</u>		<u>Type of client</u>	
Lima (capital city)	1.71	Natural person	9.89
Other cities	2.70	Legal person	2.93
<u>Age</u>		<u>City</u>	
Less than 25	5.00	Lima	5.56
Between 25 and 50	2.06	Other cities	4.59
More than 50	1.47	<u>Sector</u>	
<u>Civil status</u>		Commerce	5.59
Married	0.99	Service	3.94
Not married	2.50	Others	3.43

For consumer loans, the exclusion ratio was higher among debtors outside the capital city, where the regional GDP is the lowest, and for younger debtors.¹⁰ This may be because people with these characteristics typically have lower incomes than other debtors. Additionally, the effect was less significant for married debtors, which are associated with greater wealth and ability to handle a debt burden. In the case of SMB loans, the effect was stronger for clients who were natural persons that worked in the commerce sector, which is very sensitive to changes in economic activity.¹¹ Additionally, it was also stronger for firms in the capital city.¹²

These results indicate that the strongest effect of caps on interest rates was concentrated among lower-income debtors and vulnerable firms, which correspond to clients that typically have higher interest rates based on their higher credit risk.

Prior to the implementation of the law, financial institutions reduced interest rates for new loans to below established limits. To maintain their profitability, these institutions adopted measures such as transferring some expenses that they previously assumed to clients (relief insurance cost and cost of jewel custody in the case of loans that had jewels them as collateral), establishing moratorium rates when they were not charged (in some products), optimising their recovery and collection processes, reducing their spending on collaborators, raising average loan amounts in some operations, and raising interest rates for some clients if there was room to do so within the cap.

These strategies reduced the negative effects of caps on interest rates on financial institution profitability. However, as determined in this study, caps on interest rates seem to lead to the exclusion of clients, particularly for low-income sectors and clients that require small loans. These negative effects are in line with findings reported in the literature.

¹⁰In Appendix A5, one can see the exclusion ratio for every city in Peru for consumer loans.

¹¹In Appendix A1, one can see the exclusion ratio for every sector in Peru for SMB loans.

¹²In Appendix A6, one can see the exclusion ratio for every city in Peru for SMB loans.

5 Conclusions and Recommendations

As of June of 2022, the caps on interest rates appear to have excluded 243 thousand debtors (105 thousand consumer debtors and 138 thousand SMB debtors). These results are in line with those of other studies conducted in Peru, including those by Nivin (2018) and Sánchez et al. (2021), who described how the imposition of caps on interest rates has the potential to exclude clients from the financial system and promote informal loans. In this study, we found that for consumer loans, the exclusionary effect was higher for younger and unmarried debtors, whereas in the case of firms, the exclusionary effect was higher for those that operate in the commercial sector and as natural persons.

Public authorities should seek ways to stimulate competition in the credit market to combat the negative consequences of caps on interest rates. Such measures could aim to promote financial education within the population, which would help clients be more aware of the benefits of meeting their obligations and provide them with decision-making tools to select the best financing alternatives among the offerings of different financial institutions.

Additionally, we consider it advisable for financial institutions to improve access to debtor information. Greater transparency should mainly benefit new and smaller financial institutions by reducing the cost of credit risk. To this end, additional information on credit operations such as credit terms, constituted guarantees, and credit flow reports should be incorporated into credit bureaus.

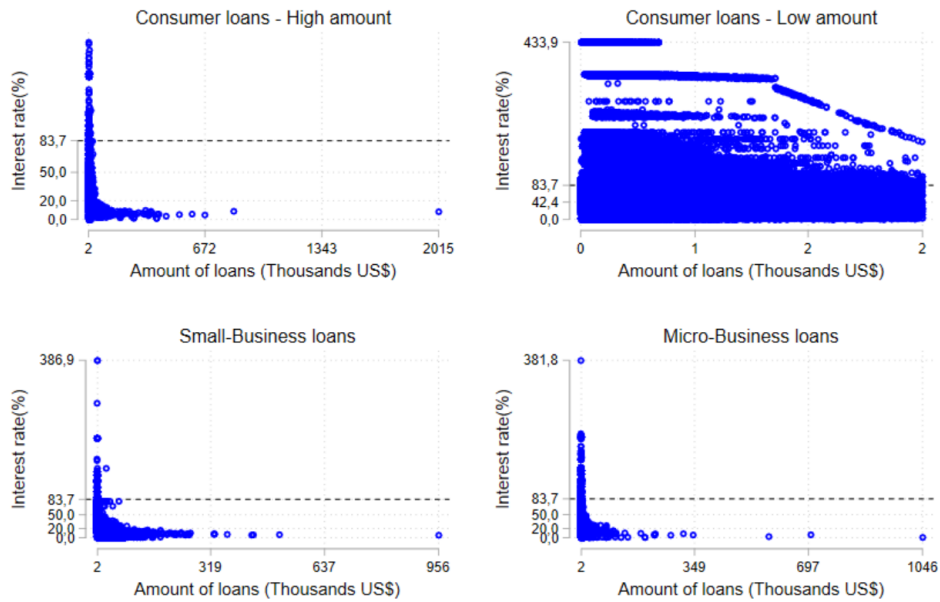
Finally, the incorporation of new technologies when providing financial services offers the possibility of reducing the traditional costs associated with the loan process. For example, worldwide, the use of big data facilitates the creation of alternative credit risk analysis tools, particularly for prospective clients with little or no credit history. These types of analyses are conducted by specialised institutions such as fintech companies, which offer these services to traditional financial institutions or offer their services directly to potential consumers through financing alternatives such as crowdfunding or peer-to-peer lending.

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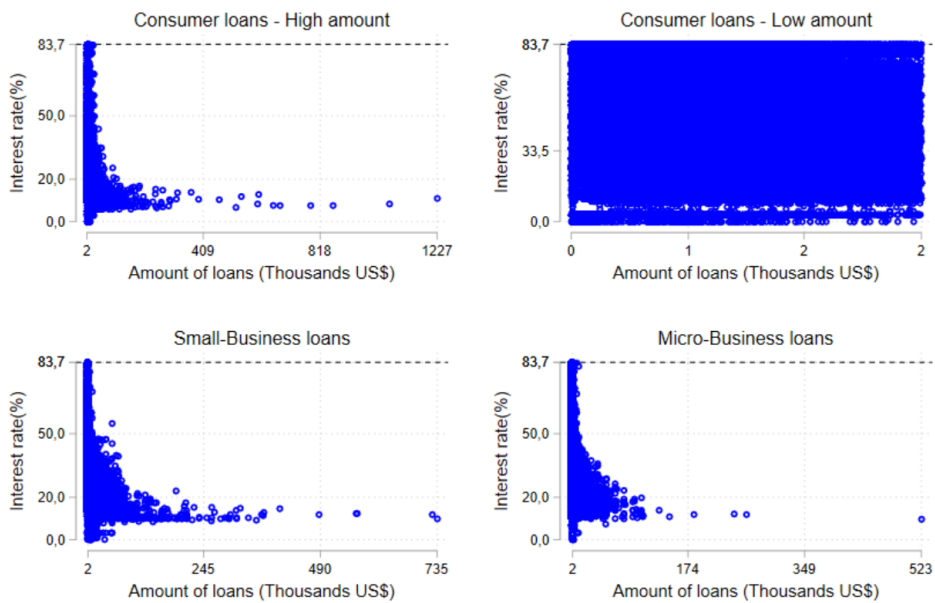
Appendix

Figure A1: Interest rates and amounts of loans - April of 2021



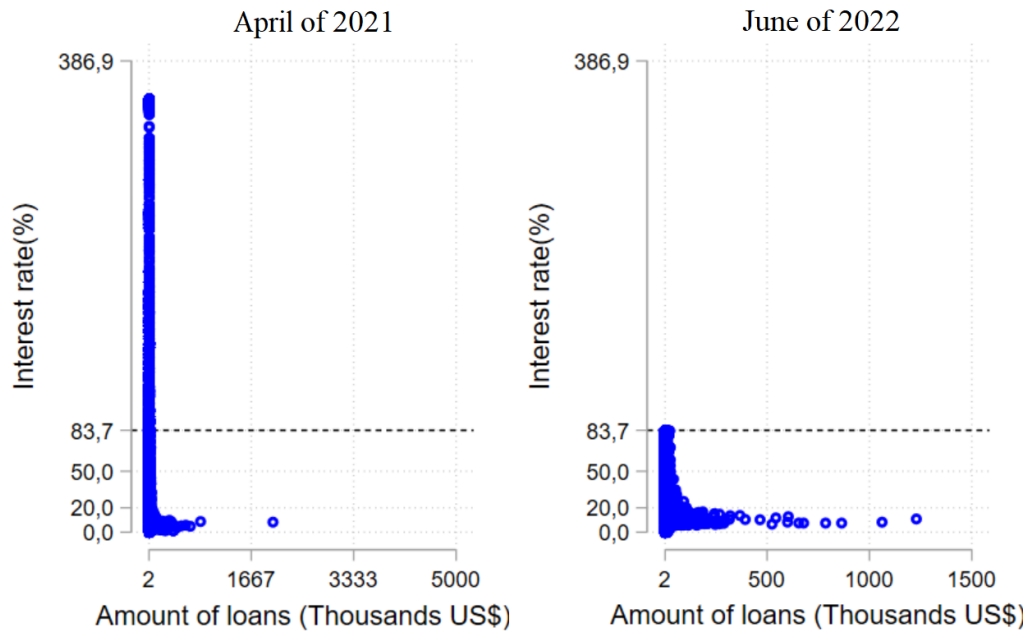
Source: Interest rate report

Figure A2: Interest rates and amounts of loans - June of 2022



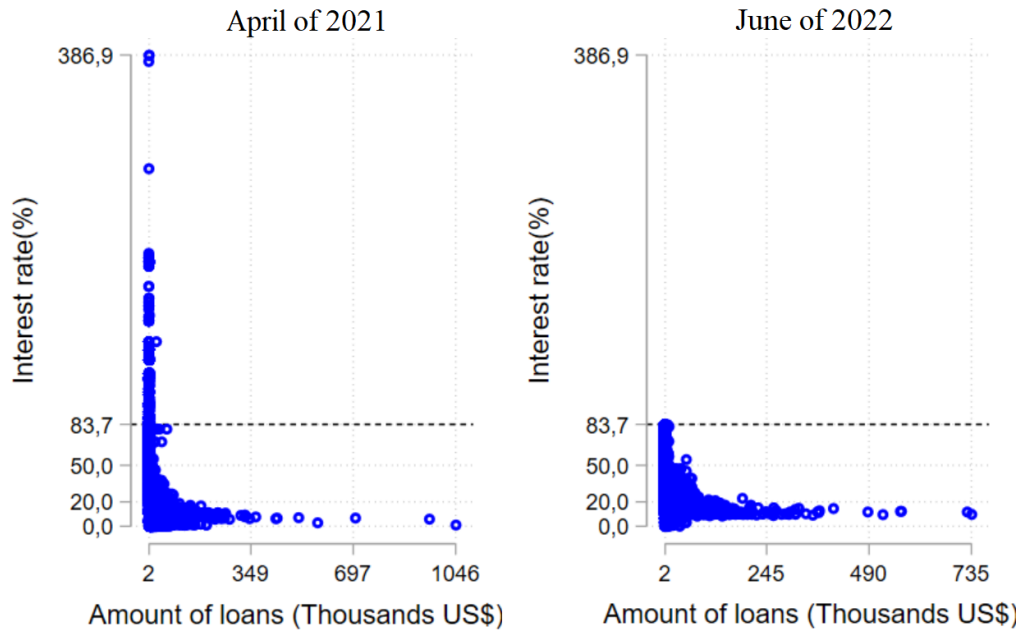
Source: Interest rate report

Figure A3: Interest rates and amounts of loans - Consumer loans



Source: Interest rate report

Figure A4: Interest rates and amounts of loans - SMB loans



Source: Interest rate report

Figure A5: Exclusion ratio by city - Consumer loans

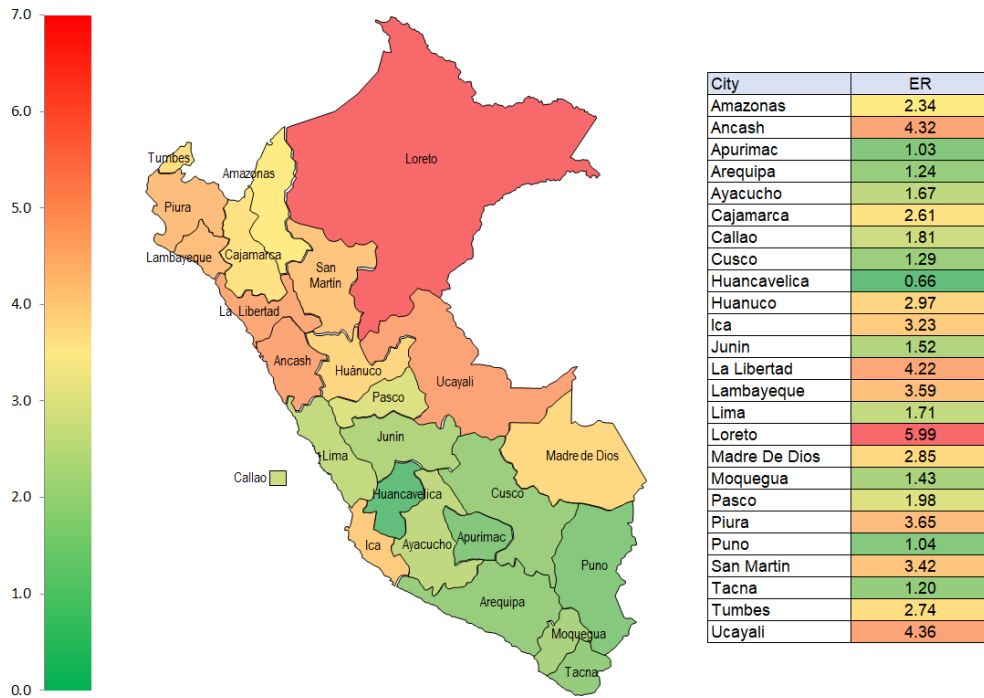


Figure A6: Exclusion ratio by city - SMBs loans

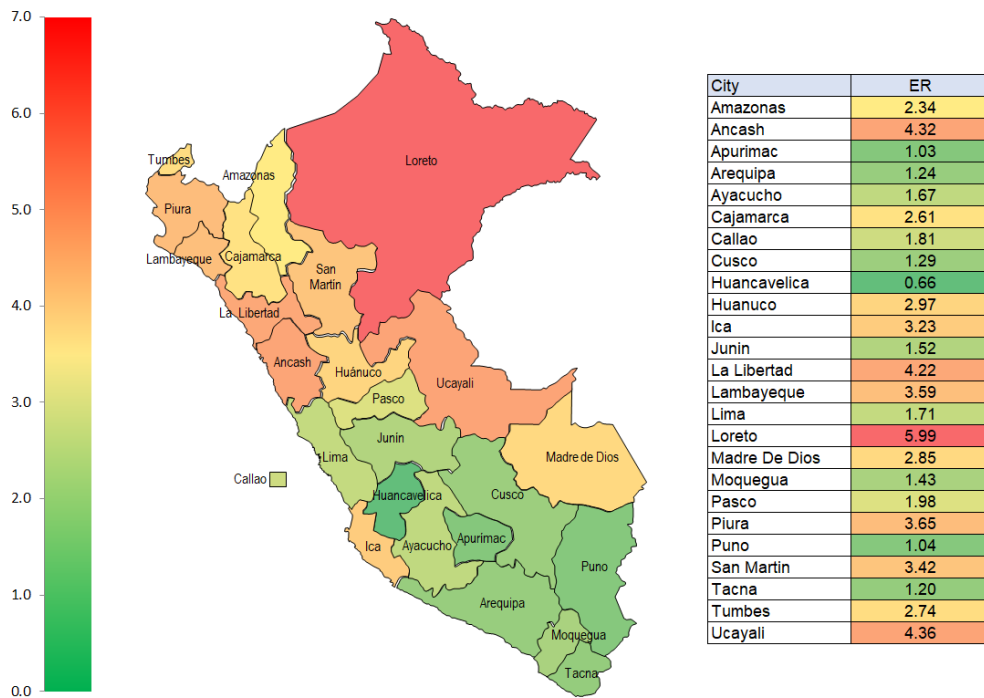


Table A1: Exclusion ratio by sector - SMB loans

Agriculture and livestock	3.06
Commerce	5.88
Construction	3.94
Manufacturing	3.81
Mining and fuel	1.77
Fishing	3.44
Services	3.83
Electricity and water	3.65