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The Pandemonics of Informal Credit Markets

Filipe Correia, António Martins

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REM RESEARCH IN ECONOMICS AND MATHEMATICS

REM – Research in Economics and Mathematics

Rua Miguel Lupi, 20
1249-078 LISBOA
Portugal

Telephone: +351 - 213 925 912
E-mail: rem@iseg.ulisboa.pt

https://rem.rc.iseg.ulisboa.pt/

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The Pandemonics of Informal Credit Markets[*]

FILIPE CORREIA[†]
University of Illinois at Urbana-Champaign

ANTÓNIO MARTINS[‡]
Lisbon School of Economics and Management
Research Unit on Complexity and Economics (UECE)
Research in Economics and Mathematics (REM)

Abstract

Credit markets are at the core of any economic crisis, and informal loans are largely understudied. We collect a dataset on an online informal lending community to study the impact that the 2020 pandemic crisis had on informal credit markets. We find that these informal loans are short duration, expensive and that borrowers and lenders exhibit some sense of community. Our results suggest that the financial hardship imposed by stay at home orders is perceived as persistent, and borrowers expect lower future income, hence reducing loan demand. Moreover, loans directly associated with the pandemic are more likely to be transacted by newcomers to this market, and mentioning the pandemic in a loan request lowers the chance that it originates a loan. The absence of an increase of violations of community rules and the reduction in promised repayment time highlights the importance of informal credit communities in hard times.

KEYWORDS: informal credit, online lending, pandemic, non-pharmaceutical interventions.
JEL CLASSIFICATION: G21, G50, G51.

[†]Corresponding Author. Gies College of Business, University of Illinois at Urbana-Champaign. Email: **filipec2@illinois.edu**. Website: **sites.google.com/site/filipecorreiauiuc**.
[‡]Lisbon School of Economics and Management. Email: **amcmartins93@phd.iseg.ulisboa.pt**.

We are observing a unique crisis scenario, triggered by a pandemic of a severe acute respiratory syndrome, that already caused more than a quarter million deaths. The reaction of the economy is massive. Such a contagious disease is stopped by isolating consumers, workers, travellers, freelancers, and informal workers. We are also witnessing the largest policy packages ever released worldwide, constantly tracked by the scientific community, the media, with the massive utilization of technology.

All this to say that the effect of this crisis touches all geographies, socioeconomic status, in a highly dimensional vector of outcomes, and potentially in a very heterogeneous manner. This paper adds to the existing efforts on understanding the impact of the COVID-19 crisis in one of the most understudied, yet relevant commonplace to the most sensitive consumers, the informal lending market. Everyday, in a crisis or not, consumers borrow money from each other in an unsecured, unregulated way, with no financial intermediary. Our goal is to study how these market reacts to an unprecedented crisis like this, in terms of both supply and demand of credit, its price and delinquency. As more information becomes public and the pandemic evolves, we aim to update our findings, as it is crucial to know the response of this invisible market for credit.

Our main source of data is collected in-house from an online forum, in which a channel is devoted to informal borrowing and lending. This online lending community is not mediated by any kind of peer-to-peer platform, credit is unsecured, and there is no regulation other than voluntary compliance to the community's rules. Even though loan arrangements are made in private conversations, we can observe loan requests (i.e., borrowers requesting money) from posts in the online community, and the loans themselves, made available from a database used for monitoring the community's activity.

For each request we have a borrower ID, that allows us to merge requests with loans, and we parse requested amounts, repayment dates, promised repayment amount, and borrower location for the vast majority of requests. For each loan we have loan amount, loan date, lender ID, and flags for whether the loan was marked as paid or unpaid. We also have access to online metrics like the number of comments a given post gets, and the channel's daily activity, and we can tag pandemic-related loan requests.

At a first level, we want to identify key changes in the activity of the forum during the time of the pandemic. We would expect more activity driven by larger needs for liquidity, but it

might be a borrowing channel that is forgotten, because of its characteristics. At a second level, we want to quantify changes in credit supply and credit demand in this market, and its effect in equilibrium quantity and prices. If on one hand we would expect a more constrained credit market on the supply side, on the other we also expect higher demand for loans. Theoretically, this would result on higher price and an ambiguous effect on quantities.

We find that informal lending markets are a growing arena for consumers to obtain credit. These loans, however are very expensive and low in maturity. Our evidence suggests that there is a strong sense of community with borrowers and lenders engaging in repeated transactions, and complying with the community rules. That is so important, that even in the event of the pandemic, we find high levels of compliance with community rules, and no evidence of increased violations or defaults.[1] Loans that we can directly relate with the COVID outbreak are 25 p.p. more likely to be contracted by a new borrower in the market and 7 p.p. more likely to be financed by a new lender in the market. Mentioning any tag related with the pandemic is associated with a lower ability to convert a loan request to a loan.

Our lockdown event study results corroborate our descriptive evidence. State stay at home orders and its economic consequences do not appear to trigger post removal, commonly associated with non-compliance with community rules. Borrowers signal a perception of a rather persistent shock and lower expected future income upon lockdown: they request less credit, they do less requests, they promiss to repay earlier and are not able to increase interest rates. This is consistent with anticipating some hardship to repay credit in the future.

Understanding the real effects of the pandemic and the public health interventions associated with it is crucial. Our results consolidate choices and actions of thousands of economic agents, from which we can understand how this invisible layer of credit market players are perceiving this crisis. Policymakers involved with financial intermediation and consumer protection should consider the millions of dollars transacted every year as informal loans, that are not visible in any database they can obtain. A limitation of our study is representativeness, as we have no form of assessing how selected our sample is. Yet, we believe that there is a large marginal value of this work as being the only analyzing the effect of a big crisis in informal credit markets, to the best of our knowledge.

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[1]We will need to analyze a larger sizefor more accurate conclusions on default.

Broadly, this paper adds to the literature in the functioning of online lending. Because online lending does not require social interaction, it becomes an interesting exercise to analyze how it responds to a period in which social distancing is common ground. Earlier research lies on understanding the mechanisms at play in the increasingly common peer-to-peer lending markets (Havrylchyk et al. (2017)). Morse (2015) brings to academic research the importance of understanding how this alternative credit markets work, focusing on the potential for mitigation of information frictions, by the elimination of the middle man. Before that, Duarte et al. (2012) study how a potential borrower appearance affects loan outcomes, suggesting trust as a central piece of the online lending decision. Lin et al. (2013) use data from microloans in the platform *Prosper.com* to reinforce the importance of trust in the form of "friendship".

The earliest work we can relate with ours, in the sense that it studies a type of informal financial product is an economic analysis of rotating savings and credit associations, *roscas*, by Anderson and Baland (2002). Roscas are groups of individuals, mostly woman who earn their independent income in developing regions, that meet regularly, forming a collective pot of money, that is given to each member at a time, so that each member experiences a positive large liquidity shock some time. Hence, it works more as a protection device of these womens' savings. The authors do a thorough economic modelling of intra-household dynamics, but their data collection is based on interviews to a small number of households, when compared to our dataset. We, in turn, use data generated by thousands of online users. Also, the competitive feature of the online market we are analyzing, with borrowers keeping their reputation, and lenders wanting to profit is not present in such a collective action community.

Most recently, the discussion is more focused in FinTech lending (a very complete review is done by Thakor (2019)), and its interplay with other lending markets, including traditional banks. Navaretti et al. (2018) examine exactly this interplay from a regulation policy perspective, while recent work by Tang (2019) discusses potential complementarity between banking and peer-to-peer markets. This paper adds to the extant literature not only by being the first to our knowledge to bring questions on the informal lending market to the data, but also by performing an urgent examination of how informal credit responds to an unseen and unanticipated crisis with a global impact.

The 2020 COVID-19 pandemic froze economic activity significantly. Yet, it stimulated economic and financial research. From macroeconomists adopting epidemiology pricinples (Faria-e Castro (2020) and Eichenbaum et al. (2020)) to a large body of papers inspecting consequences of this pandemic directly in household activity. Baker et al. (2020a) measure US consumption responses to the pandemic, using spending data from an account aggregator, while Chronopoulos et al. (2020) analyze the British case.

Our paper adds to the evidence on liquidity constraints during the pandemic, which can have dramatic consequences. Iverson et al. (2020) study the mixed effects of this crisis and court closures in bankruptcy fillings, both for consumers and businesses. Baker et al. (2020b) use the same account aggregator data mentioned above to inquire exactly about liquidity constraints, but their focus is not credit. We add to these works by considering a group of consumers that goes online to borrow and pay a much higher interest expense than that of a traditional bank, and a group of individuals who in an uncertain time choose to lend to the former.

This draft continues as follows. Section 1 describes the online market under analysis and the data collection process. Section 2 presents descriptive evidence of the impact of the pandemic in this market. In Section 3 we describe the methodology used to pin down accurate measures of the impact of the pandemic and policy interventions to decrease contagion. In Section 4, we present and discuss our results and Section 5 concludes.

1. Informal Credit on an Online Forum

An online forum is a space for open debate, conversation and communication of its members, with or without a specific discussion topic. In the channel from which we source our data, henceforth *the channel*, it serves the specific purpose of arranging loans between users. The broad user base of all the channels comprises 430 million active users per month, while the informal credit channel has 62.7 thousand users.

The channel community has a set of basic rules. Any account requesting a loan has to have 90 days or more since its creation for the whole forum. Additionally, of course, active utilization of the same account in other channels prompts higher chances of a loan being granted, as that lowers the chances of a fake or fraudulent account. Hence, consistent with the evidence in peer-

Figure 1. Modified Example of Loan Request and Data Extraction Schema
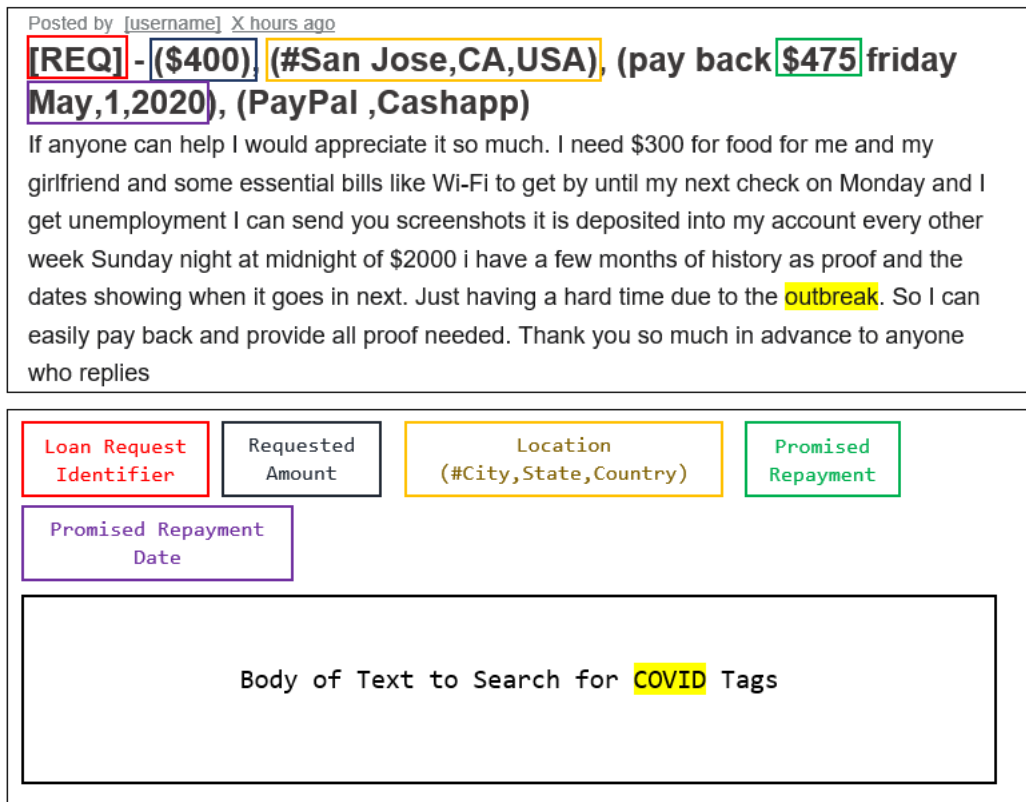
Note: On the upper box, we present a modified version of an original loan request in the online forum. Coloured highlights are the data we collect on each post. On the lower box, we document how the information in the title is interpreted by our algorithm.

to-peer lending, trust is a central point in informal loans too, and reputation is largely valuable in online communities. Users are banned if they delete any post, so that credit history is available, and can only post one loan request for each 24 hour period. Also, the post title of a given request has to follow a defined syntax. This facilitates automated moderation activities, and also our parsing method in data collection. A modified example of a loan request can be seen in Figure 1.

All loans are arranged without any intermediary. Users are expected to post a request, and any lender interested in originating the loan should directly and privately message the borrower. Upon agreement, funds are made available using payment technologies that are independent of the forum (e.g., PayPal, Venmo, or any other means agreed upon). Borrowers and lenders are advised to keep frequent communication regarding compliance of promised amount and dates. Upon transfer of funds, the lender notifies the community, and the borrower confirms the

transfer, both by commenting the original post requesting the loan. From that point, the loan is outstanding, and registered in a loan database, to which we also have access.

At maturity, lenders should mark the loan as paid, or if they lose contact with the borrower before receiving the repayment, as unpaid. This is, however, not enforceable, as again, the transactions are privately arranged between borrowers and lenders. The history of all requests and all loans is available to all participants of the market. Loan pricing is initiated on the borrower end, since part of the syntax of the post title contains the requested amount and the promised repayment. Any change to this information that happens in private communications is not observable. However, we believe that there is no good reason for which a lender would offer to receive less return in an unsecured, very risky informal loan. And there is no good reason for the borrower to give the lender more than what was previously arranged.

In this credit market, other than online reputation, a set of rules that are voluntarily followed, and monitored but impossible to enforce by a group of moderators, there is no regulation. These loans do not have any collateral, so loss given default is 100%, in most cases. They are short term loans, with small amounts. Regarding how active it is, the channel originated around $100,000 in 396 small loans in the first week of May 2020. Which is more than 50 loans per day and 2 loans per hour.

Being unregulated, unsecured, without intermediaries, with the same information available to all users, and totally independent of a peer-to-peer platform, this is the first organized database of informal loans with these characteristics, to the best of our knowledge.

1.1 Studying the COVID-19 Crisis

The characteristics mentioned above about this market already make these data an interesting source of insights on economic decision-making. The key characteristic that makes this forum a suitable laboratory to analyze the impact of the pandemic crisis is that it works purely online.

During a period in which social distancing is of utmost importance to constrain the contagion of the coronavirus disease, and with shelter in place orders, it would be normal to see a shutdown on bank credit, or even storefront payday loans, due to locations closing their doors. Variation due to closures of stores are completely ruled out by the nature of this market, so

what we aim to observe are pure supply and demand shifts, not directly induced by credit stimulus programs, monetary policy responses, *moratoria* or any channel that usually operates in regulated or secured or intermediated credit markets.

Another reason to motivate the study of this market's response to the crisis, is that like in any other crisis, the impact is not uniform. Some consumers are more affected than others, and usually we observe a harsh impact in financially vulnerable households. Albeit having enough technological literacy to find and use this market, these borrowers are likely under-banked or suffer from some deficit in access to credit, be it information, socioeconomic structure, or even geographical distance from the nearest lender.

This study will shed light on the impact that this crisis would have in most credit markets would they not be regulated, or on the importance of collateral in most large loans. Intuitively, we can postulate that on the demand side, the need for liquidity and immediacy increased, due to job losses, temporary layoffs, and a drop in services provided by independent workers, leading to a rise in demand. On the supply side, with more uncertainty, and likely an ex-ante higher probability of default, we would expect it to decrease. This would, in theory result in us observing higher prices and an ambiguous effect on quantities.

1.2 Data Collection

We collect data for the full year of 2019 and until mid-April 2020 on all the posts (99,758), and identify loan requests (75,998), following the required syntax. We also have the information of whether a given post was removed by the moderators, due to non-compliance with the title syntax. For each post, we have date, title, body, and user. We parse the title to extract required amounts, promised repayment, promised repayment date, and location. From the body of the post, we create a flag of whether it mentioned any tag from: "covid", "corona", "virus", "pandemic", "outbreak", "stay at home", "lockdown", "quarantine", "social distancing", and "shelter in place".

We then obtain the loan database. It contains information on date, lender, borrower, amount, amount repaid, and a flag of whether the loan was market as unpaid. Because per day, each borrower can only make one valid loan request, a pair of date and borrower that identifies a

Figure 2. Weekly COVID-related activity.
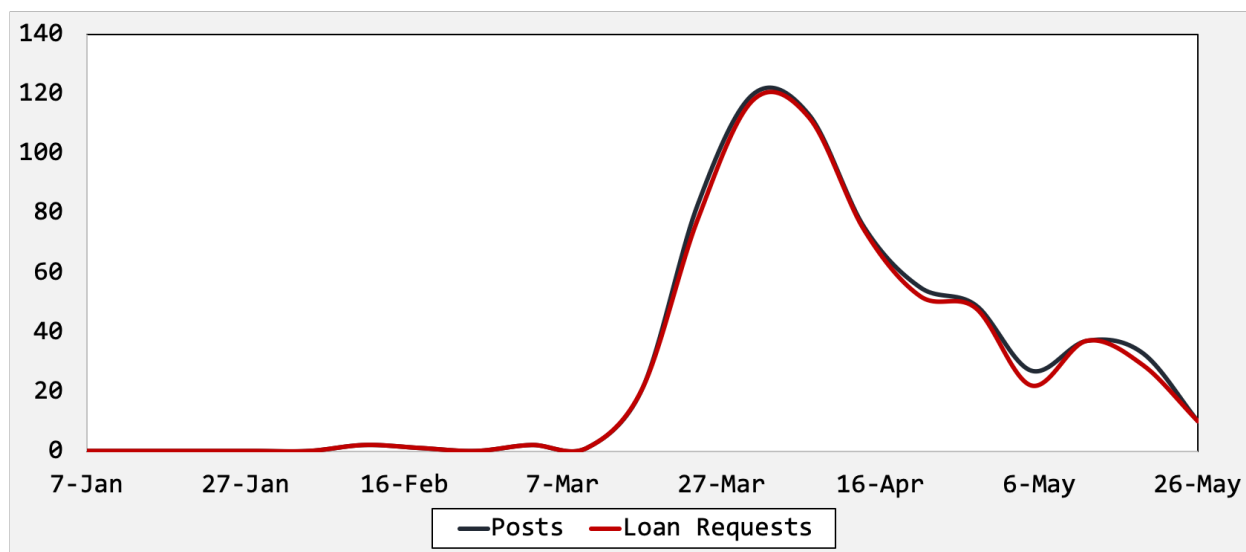
Note: We plot the time-series of the weekly number of posts which contain at least one of the following tags ("covid", "corona", "virus", "pandemic", "outbreak", "stay at home", "lockdown", "quarantine", "social distancing", and "shelter in place") .

loan, also identifies a request, so we can merge all the details in the request to the respective loan. We identify 19,924 loans frm the first day of 2019 to the end of our sample, in May 2929. We can merge complete request information (location, interest and maturity) to 47% of them.

2. Descriptive Evidence

We start by analyzing the dynamics of activity of the channel, comparing year-on-year with the analogous period in 2019. We expect to observe excess activity generated by liquidity needs induced by the COVID-19 pandemic. Figure 2 illustrates this comparison in the upper panel. Panel B shows the number of posts and requests marked as being associated with the pandemic or non-pharmaceutical interventions (NPIs). Posts mentioning at least one of the COVID-19 tags start to show by mid-March 2020 and reach it's peak (120/week) by the end of that month. In April, the weekly number of COVID-19 mentioning posts continuously declines and in May, we registered around 40/week.

Table 1 compares some key sample indicators between the first five months of 2019 and the first five months of 2020. The community has been growing since its inception in 2014, and it still shows in 2019 and 2020. The number of posts and requests, user activity, daily volume

Table 1. Sample Description

	Jan-May 2019	Jan-May 2020
All Posts	22,770	26,417
Unique Users	5,045	7,295
Posts/Day	165	191
% Loan Requests	76%	76%
(of which)		
All Loan Requests	17,290	19,964
Unique Users	4,338	6,317
Requests/Day	125	145
Dollars Requested/Day	26,436	39,494
Avg. Amount Requested	211	273
Avg. Promised Maturity (Days)	77	28
% US-based	63%	58%
% Removed	30%	32%
% Originates Loan	37%	43%
(of which)		
All Loans	4,494	5,865
Unique Borrowers	1,710	2,626
Unique Lenders	321	450
Loans/Day	33	43
Dollars/Day	9,539	10,435

Note: This table compares key sample indicators between 2019 and 2020. Loan requests are a subset of posts in the online forum. Loans, in turn, are originated through a subset of loan requests.

requested and even loan volume increased. The later grew from mid nine thousands to mid ten thousands between the two years in our sample. Average requested amount increased, even though not substantially (from 211 to 273 dollars). Percentages of non-US users and capacity of converting a request to a loan are higher in 2020, when compared to 2019. Finally, the number of unique borrowers and unique lenders we identify also increases, meaning that even though there is repeated interaction in the community, it is still attracting new members.

We compare loan characteristics for years 2019 and 2020 in Table 2. The loan profile in these two years did not change substantially. These are very expensive loans, with an average monthly interest rate of more than 120%. Only less than 5% of these loans are supplied by new entrants in the market, and one fifth are contracted with first-time borrowers. Default rates in 2019 were bounded between 8% and 15%, and because at the drafting date some loans in 2020 had not reached their maturity, we abstain from comparing these values for 2020.

On the loan side, we reproduce time series graphs of weekly amounts and number of loans for the same period in 2019 and 2020 in Figure 3. We observe that activity until mid-February

Table 2. Loan Summary statistics

|	Jan-May 2019			Jan-May 2020		
	p10	**Mean**	**p90**	**p10**	**Mean**	**p90**
Loan Amount	40	292.93	700	35	245.53	500
Loan Maturity	4	28	61	4	28	79
Interest Rate Per Month	8.60%	121%	500%	7.50%	123%	500%
I(New Lender)	0	0.046	0	0	0.042	0
I(New Borrower)	0	0.213	1	0	0.231	1
I(Marked as Unpaid)	0	0.083	0	0	0.045	0
I(Marked as Paid)	0	0.853	1	0	0.733	1

Note: This table exhibits summary statistics of loan characteristics for the period between January 1st and May 18th in 2019 and 2020. Pain and Unpaid info might be incomplete for 2020, since at the date of writing this draft some loans had not reached their maturity. New lender/borrower indicators are 1 when the lender/borrower never had lent/borrowed in this community since January 1st 2018.

2020 was between two-thirds to 100% above last year record. The series was oscillating between 800 and 1000 requests/week. After that, the number of loan requests takes a downward trend and crosses 2019 levels (around 500 requests/week) by the end of March and finishes with close to 400 requests/week in mid-May, contrasting with the over 600 in 2019. Turning our attention to Panel B, we record a similar behavior regarding the weekly amounts requested. Until early February 2020, between $300 thousand and $400 thousand were requested every week in the forum, contrasting with the near $200 thousand observed in the homologous period. Then, the weekly volume requested started to decrease reaching a local minimum in late February with a medium-sized boost during early March and a continuous slump afterwards. By the end of March, the weekly volume requested was already at 2019 levels (around $200 thousand per week) and in May it stabilized around $150 thousand which is $100 thousand less than in 2019. These trend inversions can be associated with the COVID-19 pandemics and provide the first glimpse on the quantity effects in this market.

On pricing, we plot the distributions of per month interest rates of all loans for 2019 and 2020 in panel A of Figure 4, and in panel B, we compare the interest rates for loans with requests related to the pandemic. Beyond the observation that interest rate on these informal loans are abnormally high, 2020 seems to have some of the most extreme values. However, we cannot directly relate that increase in the frequency of high rates with the COVID pandemic, since loans originated by COVID-related requests in 2020 actually appear to exhibit less extreme values.

Figure 3. Loan Requests

(a) Weekly Number of Requests
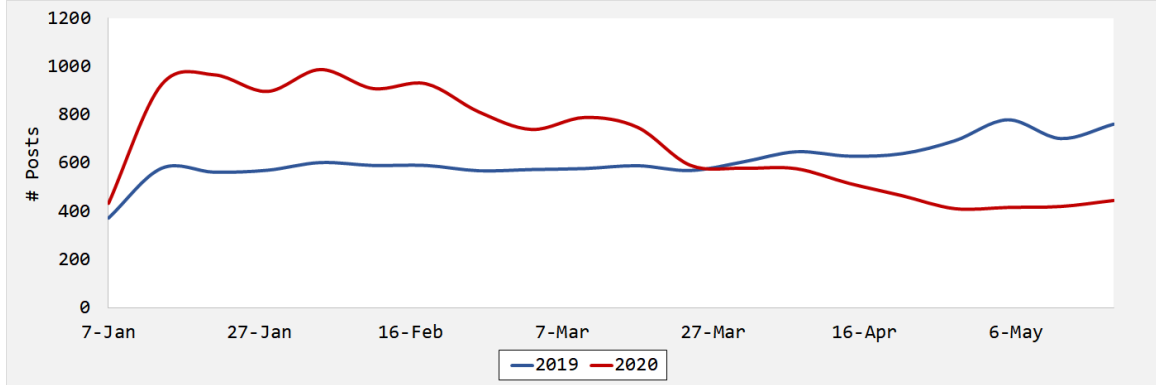

(b) Weekly Amount Requested (in thousands)
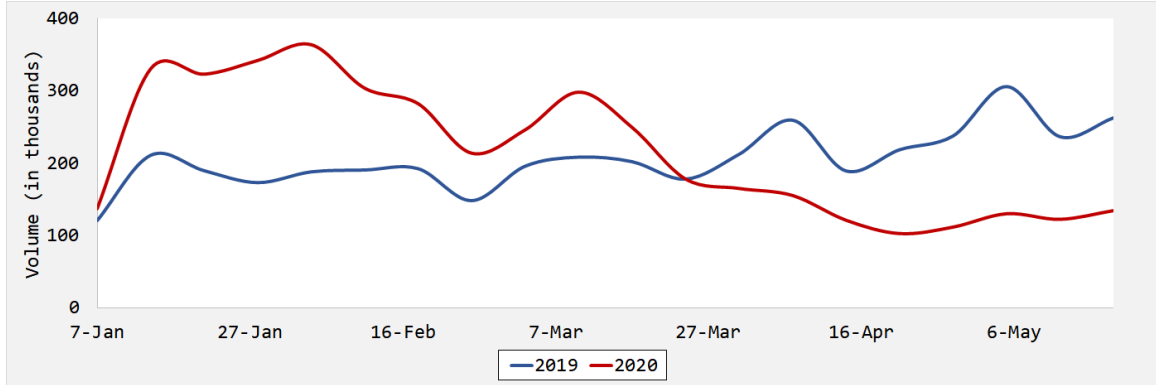
Note: This figure shows the evolution of the weekly number of posts identified as loan requests (a) and the weekly amount requested in these posts (b) for the years 2019 (blue) and 2020 (red).

An angle of interest is whether mentioning any of the tags related with the pandemic increases the chances of converting a given request to a loan, or whether loans originated from requests that mention those tags have different characteristics. To answer these questions, we run a descriptive regression to support our analysis, with the equation:

$$Y_{it} = \alpha + \beta_{COVID,i} + \phi X_{it} + \gamma_t + \varepsilon_{it} \tag{1}$$

where $\beta_{COVID,i}$ measures the quantity of interest, which is the conditional (on the vector of controls, X_{it}) difference in means, associated with the pandemic-related tags. Y_{it} is the outcome of interest for loan/request i at day t, and outcomes are: requested amount, promised maturity, request-to-loan conversion flag, monthly interest rate, loan amount, loan maturity, a dummy for whether the borrower is a new borrower, and the lender is a new lender.

Figure 4. Distribution of Monthly Interest Rates

(a) 2019 vs. 2020

(b) COVID-19 vs. non COVID-19
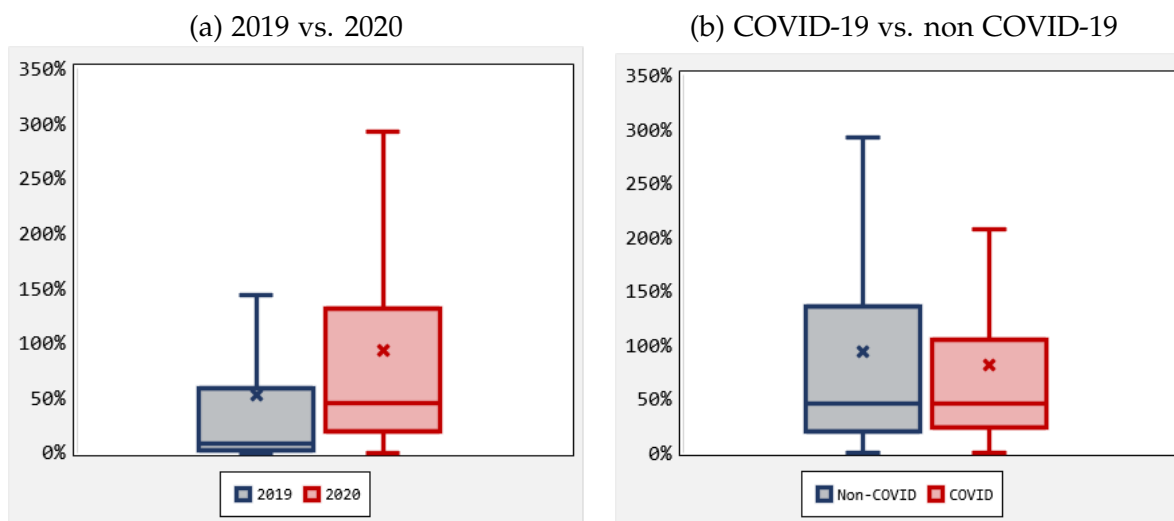
Note: This plot compares distributions of loan interest rates. In panel A, we plot the distribution of interest rates in 2019 versus 2020. In panel B, we plot the distribution of interest rates in 2020 split by loans whose requests contained any COVID-related tag and those which did not.

In Table 3, we report estimates for post activity outcomes, and vary control variables and fixed-effects across specifications. Loans that mention any of the COVID-related tags do not appear to have a different requested amount, conditional on any set of controls and fixed effects. Estimates for the difference in conditional means in the monthly interest rate are negative and economically big (7-4 p.p. per month). However, they are not statistically significant.

COVID-related requests, when time effects are not netted out, exhibit lower promised maturity, meaning that the prospective borrower is promising to repay earlier (3 days, on average). This might be a misleading interpretation, since we observe different propensities of mentioning COVID tags throughout our 2020 sample. Hence, the COVID dummy will absorb all time effects. When we control for time fixed effects (in any of the three fashions - calendar week, calendar week and day of month, and calendar month and day of month), COVID-related loan requests promiss to repay 4 days later actually.

This is very informative to understand the last and most striking result. Without a higher interest rate, and promising to repay later, COVID-related loan requests have a lower likelihood of converting to loans. The economic magnitude is large: COVID related requests have a propensity to convert that is 15 p.p. lower, which is around one third of the 43 p.p. average conversion rate of non-COVID related requests.

Table 3. Correlation Between COVID Tags and Loan Request Outcomes

	Requested Amount					Promised Maturity				
COVID	-75.26	-15.76	5.92	5.89	-16.10	**-3.21**	**-2.73**	**4.35**	**4.42**	**3.83**
	(45.40)	(23.04)	(24.40)	(24.48)	(24.15)	(1.24)	(1.26)	(1.24)	(1.25)	(1.26)
	[0.10]	[0.49]	[0.81]	[0.81]	[0.51]	[0.01]	[0.03]	[0.00]	[0.00]	[0.00]
# Obs	13,120	7,593	7,593	7,593	7,593	11,570	7,593	7,593	7,593	7,593
Adj R^2	0.00	0.08	0.08	0.09	0.08	0.00	0.23	0.26	0.26	0.26

	Interest Rate (%)					Request Converted to Loan (%)				
COVID	-4.47	**-7.66**	-5.12	-5.33	-6.85	**-15.50**	**-15.10**	**-14.90**	**-14.90**	**-16.10**
	(3.59)	(3.25)	(3.66)	(3.67)	(3.55)	(1.85)	(2.30)	(2.48)	(2.49)	(2.41)
	[0.21]	[0.02]	[0.16]	[0.15]	[0.05]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
# Obs	8,357	7,593	7,593	7,593	7,593	13,830	7,593	7,593	7,593	7,593
Adj R^2	0.00	0.21	0.22	0.22	0.22	0.00	0.07	0.08	0.08	0.08

Controls	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Calendar Week FE	No	No	Yes	Yes	No	No	No	Yes	Yes	No
Day of Month FE	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Calendar Month FE	No	No	No	No	Yes	No	No	No	No	Yes

Note: We present coefficients for each outcome regressed in a dummy indicating whether the loan request mentions any COVID-related tag. Controls include request amount, promised maturity, interest rate and the number of posts by the author since Jan 1st, 2018, when not in the left-hand side. The sample comprises is all loan requests for 2020, for which we have values for all the variables. Bold coefficients are statistically significant at 5%, standard errors are in parentheses and p-values are in brackets.

Table 4 presents the analysis of loan outcomes. As opposed to the one-sided aspect of loan requests, loan outcomes represent the interaction between the supply and demand of this informal credit market. It is interesting to see that there is no significant shift on the conditional means of prices and quantities of loans originating from requests associated with the outbreak.

Where we do see an effect is in the fact that for requests that mention any COVID tag, the likelihood that the borrower is a newcomer to the market is 25 p.p. higher. Also higher (7 p.p.) is the likelihood that the lender is also a new member of the online informal credit community. These suggests that even some life events that might lead consumers to borrow informally for the first time, do not alter the credit conditions in these markets.

Understandably, we need to compare the pricing results presented above with changes in credit risk of these loans. Figure 5 shows the upper and lower bounds for the default rate of loans settled in 2019 and 2020. These bounds are calculated with the paid/unpaid flags posted by the lenders. The percentage of loans marked as unpaid constitutes a lower bound for the default rate. This is because an unpaid loan might not be flagged as such and thus would not

Table 4. Correlation Between COVID Tags and Loan Outcomes

	Loan Amount						New Borrower				
COVID	-13.90	8.04	15.61	18.87	5.54		**0.23**	**0.21**	**0.25**	**0.25**	**0.25**
	(24.39)	(29.74)	(30.18)	(30.19)	(30.12)		(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
	[0.57]	[0.79]	[0.61]	[0.53]	[0.85]		[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
# Obs	5,865	3,248	3,248	3,248	3,248		5,865	3,248	3,248	3,248	3,248
Adj R^2	0.00	0.07	0.08	0.08	0.08		0.01	0.03	0.03	0.04	0.04
	Interest Rate (%)						New Lender				
COVID	-0.01	-0.05	0.00	-0.01	-0.03		**0.07**	**0.07**	**0.06**	**0.06**	**0.07**
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)		(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
	[0.92]	[0.55]	[1.00]	[0.93]	[0.71]		[0.00]	[0.01]	[0.03]	[0.03]	[0.02]
# Obs	3,248	3,248	3,248	3,248	3,248		5,865	3,248	3,248	3,248	3,248
Adj R^2	0.00	0.20	0.20	0.21	0.21		0.00	0.01	0.02	0.02	0.02
Controls	No	Yes	Yes	Yes	Yes		No	Yes	Yes	Yes	Yes
Calendar Week FE	No	No	Yes	Yes	No		No	No	Yes	Yes	No
Day of Month FE	No	No	No	Yes	Yes		No	No	No	Yes	Yes
Calendar Month FE	No	No	No	No	Yes		No	No	No	No	Yes

Note: We present coefficients for each outcome regressed in a dummy indicating whether the loan requests that originates the loan mentions any COVID-related tag. Controls include loan amount, loan maturity, interest rate, when not in the left-hand side. The sample comprises is all loans for 2020, for which we have values for all the variables. Bold coefficients are statistically significant at 5%, standard errors are in parentheses and p-values are in brackets.

count for this statistic. On the other hand, the percentage of loans not flagged as paid constitutes an upper bound for the default rate, as if the lender does mark the loan as paid, it wont count as a default. If they do not, either it was a default or an unreported paid loan. Overall, we can infer the weekly default rate in 2019 with much higher precision (between 10-15%), as the bounds distance less apart and fluctuate less when compared to 2020. The wider interval recorded for 2020 can be explained by the short time elapsed since the inception of these loans. Some of the loans are possibly still outstanding, or the lenders did not flagged them during the time analysed. Although we expect that in a next version of this paper, the red lines will narrow down. So far, we can say that the default rate in 2020 has not exceeded 30%.

Figure 5. Time Series of Default Rate Bounds
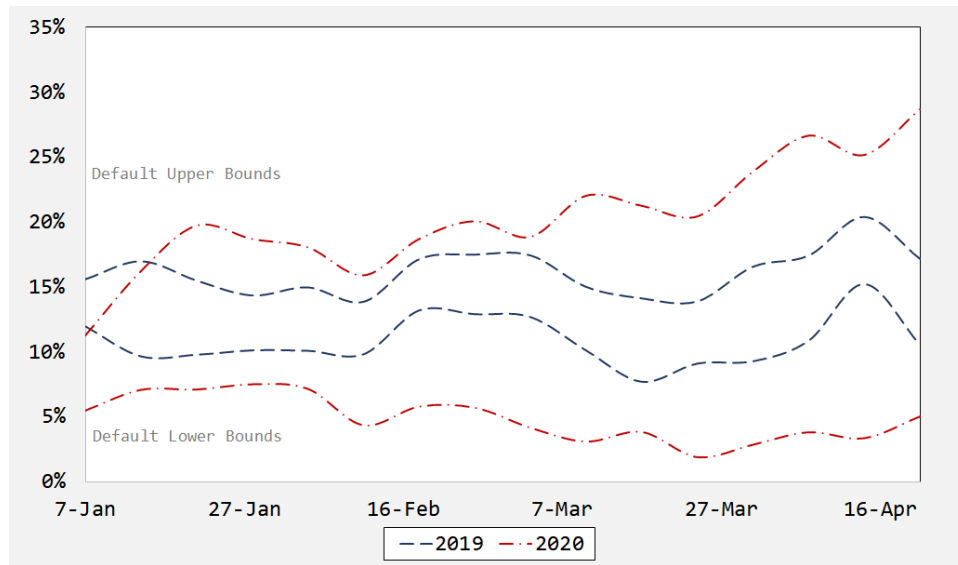
Note: This plot compares the upper and lower bounds for the default rate in 2019 and 2020. Lower bound is determined as the percentage of all loans in a given week that were marked as unpaid. Upper bound is determined by the percentage of loans in a given week not marked as paid.

3. Event Study

Descriptive evidence suggests that the COVID-19 crisis affected informal credit markets. There are two potential channels operating here. One hypothesis is that the meltdown in loan demand could be provoked by the pandemic itself and all the uncertainty it brings regarding the future. Under this scenario, because we look at an online credit market, we would observe no major effects pinned down around lockdown dates.

An alternative story is that it is not the pandemic triggering these changes in the informal lending market, but the economic consequences of confinement policies aimed at slowing down contagion. Increased uncertainty regarding firms to keep workers on their payroll, revenues falling, and slower economic activity would make us observe these effects around lockdown dates.

To disentangle which of these angles best fits what we observed in descriptive evidence, we match each loan request originated from the United States, for which we are able to parse a state of origination, to the date of stay-at-home order issued by each state.[2]. To account for

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[2]The *New York Times* has a comprehensive list of these dates at: https://www.nytimes.com/interactive/2020/us/coronavirus-stay-at-home-order.html

Figure 6. Event Study of COVID-related Loan Requests Around Lockdown Date
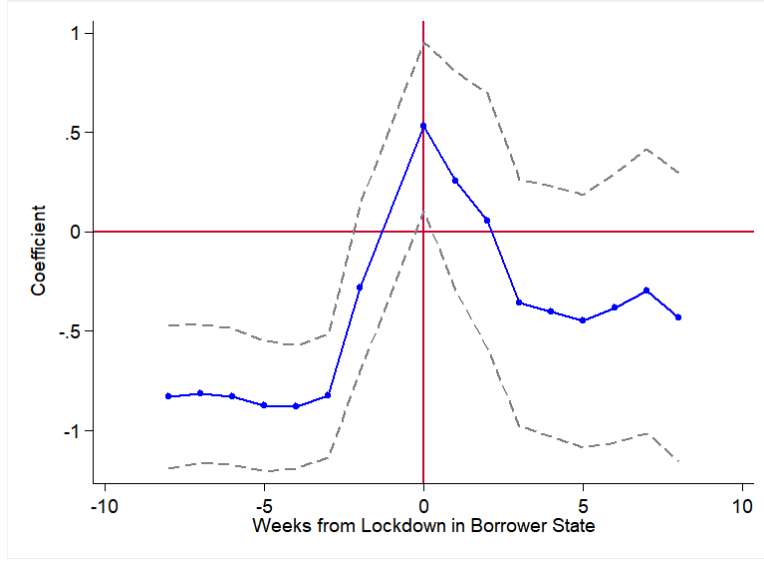
Note: We plot the coefficients for event time dummy variables in a regression with state and calendar month fixed effects, and the 95% confidence interval. The dependent variable is the weekly count of COVID-related posts in the respective state. N = 863 state-week observations.

differences in state policies and time trends, we conduct these event studies in a regression framework. We run the following specification:

$$y_{s,t,m,\tau} = \lambda_s + \gamma_m + \sum_{k=-10}^{-2} \phi_{k=\tau} + \sum_{k=0}^{10} \phi_{k=\tau} \tag{2}$$

where $y_{s,t,m,\tau}$ is the outcome of state s at calendar week t, calendar month m and τ weeks from state's lockdown order effective date. λ_s and γ_m are state and month fixed effects, respectively. The coefficients of interest are those in the sequence $\{\phi_{k=\tau}\}$, which we plot for a window of 8 weeks before and after the lockdown. The ommitted event time is -1, which means that we interpret the coefficients of interest as the difference with respect to the average of the outcome one week prior to the stay-at-home order.

4. Results

The first outcome we focus on is the count of COVID-related loan requests in the online community. We see this test as a first-stage validation that the lockdown orders are the events that ought to be considered as trigger of changes in this informal market. In Figure 6, we

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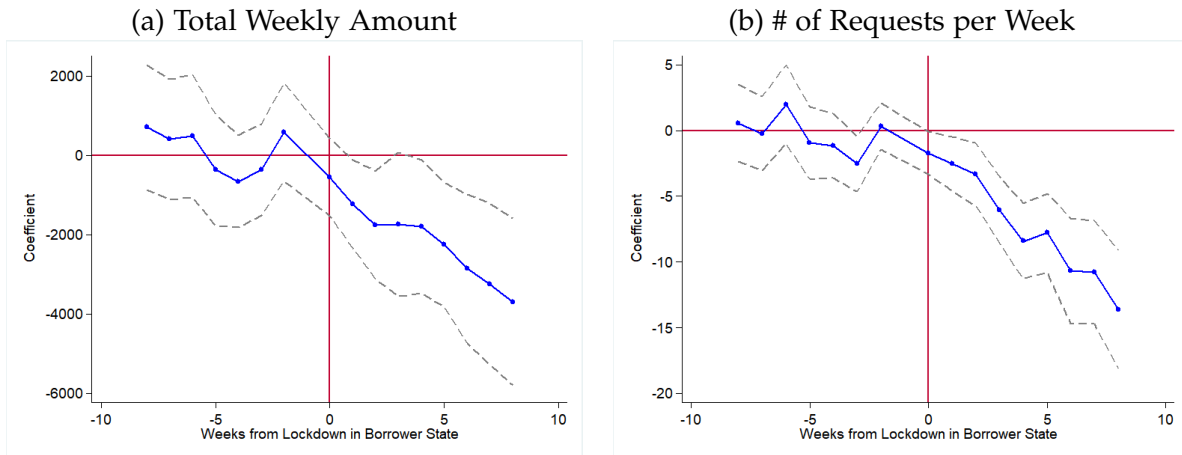**Figure 7. Event Study of Post Removal Rate Around Lockdown**
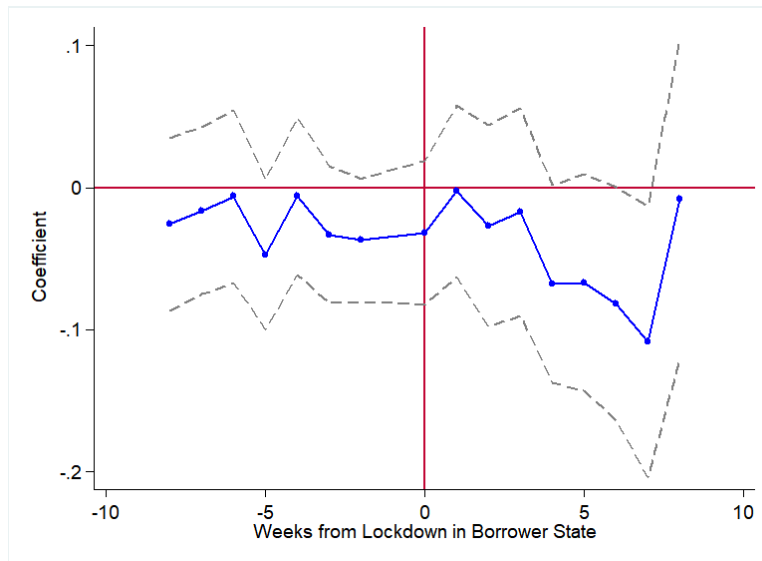
Note: We plot the coefficients for event time dummy variables in a regression with state and calendar month fixed effects, and the 95% confidence interval. The dependent variable is the weekly removal rate of loan requests in the respective state. N = 863 state-week observations.

plot the event study graph. We see that the peak of mentions of COVID-related tags happens precisely in the week of lockdown. Besides rapidly declining to lower levels, making the shock be perceived as purely transitory, at horizons of 4 weeks before and after, we see that it remains at a moderately higher levels.

A natural question would be: are these borrowers so desperate mentioning the effects of the pandemic, so that they disrespect community rules? We run the event study on the post removal rate. Usually posts are removed by moderators, once they detect that the community rules are not followed. Because we have access to removed posts, we can measure it. Figure 7 shows that there was no significant increase in the post removal rate. If anything after the lockdown it started decreasing. This is consistent with a strong sense of community, in which lending relationships are to be preserved, and there is a reputation to maintain by each user.

Turning to loan demand, we plot event studies for the requested volume and number of requests in panels A and B of Figure 8, respectively. Both panels show no pre-trend and a decrease in loan volume. While we could postulate behavioral arguments that relate this result with uncertainty, fear, and even reputation in the community, they are also consistent with rational intertemporal consumption arguments. Even with perfect foresight, which we

Figure 8. Event Study of Loan Demand

(a) Total Weekly Amount   (b) # of Requests per Week
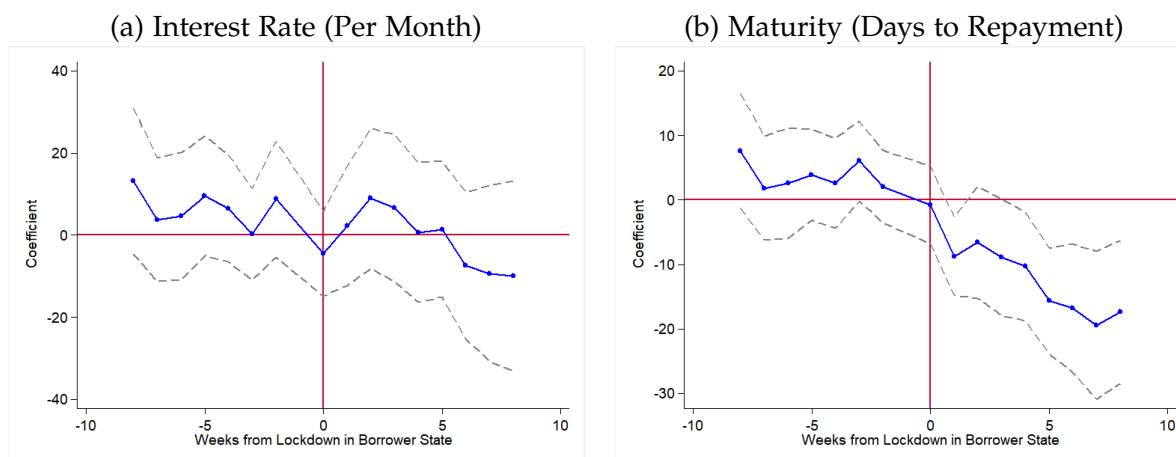

Note: We plot the coefficients for event time dummy variables in a regression with state and calendar month fixed effects, and the 95% confidence interval. The dependent variable is the volume requested per week in the respective state in Panel A, and number of requests per week in Panel B. N = 863 state-week observations.

are far from being experiencing, if the economic shock is perceived as persistent rather than temporary and income is anticipated to decrease, at the same time current consumption is bound to be lower, then it is rational to borrow less at current dates. An extended version of this event study at a later point will be very informative of the dynamics of borrowers perceptions regarding the persistence of this shock.

Still on the demand side, we conduct the event study on two loan characteristics that are proposed in each loan request - promised interest rate and maturity. Coefficients are plotted in Figure 9. Conditional on requesting a loan in hard times, we could expect to see higher promised interest rates. As we can see in panel A, that is not the case. This is also consistent with both views above mentioned. The behavioral view of reputation in the community: borrowers who do not need to raise promised interest borrow, but borrowers who feel riskier and need to raise the rate to obtain cash, refrain from borrowing. Also, the intertemporal consumption income shock view would imply that with perceived lower future income, it will be harder to repay higher interest. In Panel B, we observe a significant decrease in promised loan maturity. Even though borrowers cannot afford to promiss a higher return to lenders, they are offering to repay earlier. This minimizes the risk of the loan, and increases the ability that lenders have to compound their gains from loan to loan.

Figure 9. Event Study of Promised Loan Characteristics

(a) Interest Rate (Per Month)   (b) Maturity (Days to Repayment)

Note: We plot the coefficients for event time dummy variables in a regression with state and calendar month fixed effects, and the 95% confidence interval. The dependent variable is the promised interest rate per month in Panel A, and promised loan maturity in Panel B. N = 863 state-week observations.

5. Conclusion

This paper provides the first overview of an informal market where individuals meet to exchange credit with very little to none information about lenders and borrowers. The absence of intermediaries, fees and frictions as well as the high number of participants, settled loans and their weekly volume makes this market an interesting object of study, capable of providing a clean sight over the responses unsecured unregulated credit markets to exogenous occurrences such as the nature determined COVID-19 pandemic.

In our event study, we observe that compliance with community rules appears neutral to crisis events. It remains stable during the experiment. We conclude that any observed changes are results of different behaviour of the participants and not due to any structural change in the market itself. The evidence found suggests that borrowers perceived the lockdowns as a permanent negative shock on their future income. This is shown by the a decrease in loan requests, earlier promised repayments on loans to be settled after lockdown and no increase on offered interest rates.

This paper contributes to show some of the financial effects of the COVID-19 on a fringe of the population which would otherwise remain invisible. Those who borrow in this market hardly count for national statistics, and are not represented in the standard credit databases. Moreover,

these loans appear to incorporate their high risk on the price. The extremely high interest rates could be compensating the absence of any guarantee of compliance on the borrowers side. This could be partially achieved, should these loans take a more formal contract. The fact that these loans are so expensive leads us to believe they could be a channel used by the underbanked population, in the absence of access to other traditional forms of credit.

This paper sheds light on a vulnerable fringe of society which is often hard to study, due to their invisibility at the usual credit databases. Our work extends the information set that policymakers have. It is of utmost important to see the complete picture, when designing tools to mitigate the harm of this pandemic on those most affected by it.

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