Financial Stimulus and Microfinance Institutions in Emerging Markets

Carlos Burga  Walter Cuba  Eduardo Díaz  Elmer Sánchez
PUC-Chile  Central Reserve Bank of Peru  Central Reserve Bank of Peru  Central Reserve Bank of Peru

CEMLA/Dallas FED Financial Stability Workshop
December 1, 2023

*The views expressed herein are those of the authors and do not necessarily reflect those of the Central Reserve Bank of Peru*
Motivation

• Financial stimulus policies are usually implemented through the banking sector.
  • Banks are heterogeneous in their portfolios: e.g., big banks attend bigger firms.
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• However, their participation in financial stimulus programs is still limited
  • High operational costs, less sophisticated institutions
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- Many countries have promoted the growth of microfinance institutions
  - Reach out small and young borrowers
- However, their participation in financial stimulus programs is still limited
  - High operational costs, less sophisticated institutions
- Whether promoting the participation of MFIs is desirable or not is an empirical question

Target small firms with ↑ needs of ext. financing vs. ↑ leverage of opaque firms + ↓ screening incentives
  \[ > 0 \quad \text{vs.} \quad < 0 \quad + \quad < 0 \]
This paper:

What are the effects of Loan Guarantee Programs (LGP) on financial stability?

What is the role of micro-finance institutions (MFIs) in shaping the aggregate effects of LGP?
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Context & Empirical approach:
Reactiva Perú, a program of loan guarantees to help firms dealing with Covid-19 restrictions
- Program represented 8% of GDP, key role of MFIs in bancarization, detailed MFIs credit data and balance sheet information

Tracing the effects of loan guarantees on small firm lending in a diff-in-diff setting
- Bank shock $\Rightarrow$ credit supply $\Rightarrow$ firms’ delinquency rates

Mapping firm-level elasticities to allocation of loan guarantees across financial institutions
Empirical findings

Average effects:

• More treated banks expand credit supply relative to less treated ones after the program (1 SD ⇒ ↑ 7%), totally driven by LG, while normal loans decline (1 SD ⇒ ↓ 10%)

• Firms attached to highly treated banks increase total outstanding credit (1 SD ⇒ ↑ 10%), reduce normal debt (25%), and are less likely to exhibit repayment delays (3 ppts)

Heterogeneous effects and the role of MFIs:

• Smaller firms are more responsive in terms of delinquency

• Increasing credit by 10% reduces prob. of repayment delay in 5 ppts (vs. 1 ppts for larger firms)

• MFIs provide more guarantees to smaller firms: 52% of their LGP portfolio vs. 21% for big banks

• Limited participation: 52% of pre-Covid debt and 30% of guarantees

BoE: decline in delinquency 4 ppts without MFIs and 5 ppts with MFIs - key assumption: homogeneity within size-group
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- key assumption: homogeneity within size-group
Theoretical results

Building blocks:

• Bank profits depend on **firm characteristics** and **poaching probability**
  • cash-in-hand, initial debt

• Banks trade-off **client size** and **treatment effect**

• Two types of banks: Big banks and MFIs

• Calibrated model: **size-dependent** average treatment effect + Banks **distribution of clients**
Theoretical results

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Results and counterfactuals:

- Private allocation not necessarily optimal, depends on poaching & bank future profits from clients

- 30% gains from MFIs observed participation in terms of aggregate debt in default

- Negligible gains from further increasing MFIs’ participation
Literature

Loan guarantees


- **Heterogeneous effects on delinquency rates and optimality of credit allocation**

Financial stimulus in recessions


- **Role of micro-finance institutions in shaping the allocation loan guarantees and aggregate effect on financial stability**

Microfinance institutions in emerging markets


- **MFIs participation in a large scale program of guarantees in a global recession**
Data & Empirical Framework
Program of guarantees: Reactiva Perú

- Government guarantees on private bank loans \([\text{average} = 97\% , \text{median} = 98\%]\)
  - Stimulus equivalent to 29\% of pre-covid total credit and 8\% of GDP

- Allocated through **first-price auctions** where banks bid on interest rates

- Auctions for different **types of loans**
  - Loans to **micro-firms, small firms**, medium-size firms, large firms, corporations

- High **operational costs** limited MFIs from participating in the program

- The Central Bank launched **auctions only for MFIs**, increasing their participation
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- **Data:**
  - Credit registry: Outstanding debt at the bank-firm level in 2019-2021
  - Covid-19 relief funds: Loan guarantees at the bank-firm level in 2020-2021
Bank level exposure

- Exploit differences in banks’ takeover of guarantees for each type of loan $k$
  
  \[
  \text{Treatment}_{bk} = \frac{\text{Share of Covid-19 Loans}_{bk} - \text{Share of Total Loans}_{bk,0}}{\text{Share of Covid-19 Loans}_{bk} + \text{Share of Total Loans}_{bk,0}}
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- Focus: small and micro credit

Reimbursement shock (Granja et al., 2022)
Bank level exposure

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Reimbursement shock (Granja et al., 2022)
Empirical Results
Loan-level effects: Increasing total credit

\[ \ln Y_{ibt} = \beta \times \text{Treatment}_b \times \text{Post}_t + \delta_{ib} + \delta_{q(b),t} + \delta_{it} + u_{ibt} \]

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<td>Observations</td>
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Loan-level effects: Decline in normal loans

\[ \ln Y_{ibt} = \beta \times \text{Treatment}_b \times \text{Post}_t + \delta_{ib} + \delta_{q(b),t} + \delta_{it} + \epsilon_{ibt} \]

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Standard errors clustered at the bank-level

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

The program increased total credit, partially crowding out the normal activity of banks
**Firm-level effects: Total credit increases for better connected firms**

\[ \ln Y_{it} = \theta \times \text{Exposure}_i \times \text{Post}_t + \delta_i + \delta_{x(i),t} + u_{it} \]

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<td>( \ln_{\text{total loans}} )</td>
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- Observations: 12,478,501, 12,324,192, 12,478,501
- Firm FE: ✓ ✓ ✓
- Firm size-Year FE: ✓ ✓ ✓
- Age-Year FE: ✓ ✓ ✓
- Industry-Year FE: ✓ ✓ ✓
- City-Year FE: ✓ ✓ ✓
- Risk-Year FE: ✓ ✓ ✓

Standard errors clustered at the industry-level

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The program expanded credit supply and reduced repayment delays.

- Need of external financing
- Risk-shifting / weak screening

![Graph showing the change in credit over time](image-url)
Firm-level effects: Decline in normal loans

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Firm-level effects: Better connected firms are less likely to delay in repayment

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The program expanded **credit supply** and reduced **repayment delays**
- Need of external financing >> risk-shifting / weak screening
**Heterogeneity:** Role of need of external financing. Are smaller firms more sensitive?

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\text{Delinquency}_{it} = \beta_2 \times \ln \text{Loans}_{it} + \delta_i + \delta_{x(i),t} + u_{1,it}
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\ln \text{Loans}_{it} = \rho_2 \times \text{Exposure}_i \times \text{Post}_t + \delta_i + \delta_{x(i),t} + v_{2,it}
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**Heterogeneity and Allocation**

**Heterogeneity:** Role of need of external financing. Are smaller firms more sensitive?

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<th>Variable</th>
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<th>Bottom Quintiles</th>
<th>Top Quintile</th>
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<td>In total loans</td>
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Heterogeneity: Role of need of external financing. Are smaller firms more sensitive?

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### Table: Financial Institution Distribution

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<tr>
<th>Financial institution</th>
<th>Type of client</th>
<th>Share of pre-Covid debt</th>
<th>Share of guarantees</th>
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<tr>
<td>MFI</td>
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<tr>
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MFIs represent 52% of pre-Covid loans but obtained 30% of LG

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Model
• Bank $k$ profits depend on firm j’s characteristics and poaching probability ($\psi_C$)
  • net cash ($\rho_j - b_j$), firm future profits ($\psi_F b_j$), prob. of survival ($\Phi_j(\varphi), \Phi_j(0)$), participation ($\ell^k_j, \varphi$)

$$
\Pi^k_j = \ell^k_j \left\{ \Phi_j(\varphi) \left( 1 + \psi_F \right) + \left( 1 - \Phi_j(\varphi) \right) \delta \right\} b_j \\
+ \left( 1 - \ell^k_j \right) \left\{ \Phi_j(0) \left[ (1 - \psi_C) \left( 1 + \psi_F \right) + \psi_C \right] + \left( 1 - \Phi_j(0) \right) \delta \right\} b_j \\
= \ell^k_j \Omega^k_j b_j + \Theta^k_j b_j
$$

where

$$
\Omega^k_j = T_j \left[ (1 - \delta) + \psi_F \right] + \Phi_j(0) \psi_C \psi_F
$$
• Bank $k$ profits depend on firm j’s characteristics and poaching probability ($\psi_C$)
  • net cash ($\rho_j - b_j$), firm future profits ($\psi_F b_j$), prob. of survival ($\Phi_j(\varphi), \Phi_j(0)$), participation ($\ell_j^k; \varphi$)

$$\Pi_j^k = \ell_j^k \{ \Phi_j(\varphi) (1 + \psi_F) + (1 - \Phi_j(\varphi)) \delta \} b_j$$

$$+ (1 - \ell_j^k) \{ \Phi_j(0) [(1 - \psi_C)(1 + \psi_F) + \psi_C] + (1 - \Phi_j(0)) \delta \} b_j = \ell_j^k \Omega_j^k b_j + \Theta_j^k b_j$$

where $\Omega_j^k = T_j [(1 - \delta) + \psi_F] + \Phi_j(0) \psi_C \psi_F$

• Banks trade-off: client size ($b_j$) vs. treatment effect ($T_j \equiv \Phi_j(\varphi) - \Phi_j(0)$)

$$\max_{\ell_j^k \in \{0,1\}} \int \ell_j^k \Omega_j^k b_j dG^k(\rho_j, b_j) \quad \text{s.t.: } \int \ell_j^k \varphi b_j dG^k(\rho_j, b_j) = \gamma_k M$$

• Firm survives iff $\rho_j - b_j + \ell_j \varphi b_j > \nu_j$ with $\nu \sim \tilde{\Phi}(.)$

• Size-dependent $T_j +$ distribution of clients $G^k$ determines optimal participation of MFIs
Main results

Private allocation is not socially optimal

The diagram illustrates the relationship between cash-in-hand and debt across the range of possible allocations. The shaded areas represent different scenarios involving participation and non-participation of MFIs, with the blue area indicating a stronger aggregate effect when MFIs participate. The text highlights:

- 30% gains from MFIs observed participation in terms of aggregate debt in default
- Non-participation leads to 50% of debt saved by the program relative to constrained first best
- Negligible additional gains from increasing MFI's participation
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  - Model where banks trade-off treatment effect and client size, calibrated with micro-data
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  - Negligible additional gains from increasing MFI’s participation to the optimal level