Can Regulatory Policies Foster Women's Financial Inclusion? The Role of Loan Loss Provisioning

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The views expressed are those of the authors and not necessarily those of the Bank of Mexico

Outline

Introduction

Motivation

Literature

- Women may face higher obstacles than men when accessing credit (Demirgüç-Kunt et al., 2013).
  - Evidence suggest that women outperform men in terms of loan repayment (Perrin and Weill, 2022).
  - Greater financial inclusion could increase savings and raise the country's entrepreneurial capacity (Allen et al., 2016; Aristei and Gallo, 2016).

The Mexican Case

- The gender gap in access to credit is more challenging in low- and middle-income economies (Demirguc-Kunt et al., 2022).
- The Mexican case may provide valuable insights for other countries where individuals face high entry barriers to credit markets.

This paper

Research question and design

Research question

- Can regulatory policies foster women's financial inclusion?

Research design

- We assess the causal effect of a reform that reduced the loan loss provisions required for loans granted to women in Mexico.
- We use a proprietary dataset with information on the universe of consumer loans granted by commercial banks.
- This information allow us to estimate the causal effect at the loan level and exploit potential sources of heterogeneity.
- We take advantage of the exogenous nature of the reform to estimate the effects using DiD and Event Study designs.

The reform

A reduction in loan loss provisioning

Regulatory change

- Women may face higher obstacles than men when accessing credit.
- Implemented in July 2021.
- All new non-revolving consumer loans granted to women with no overdue payments.
- Granted by all commercial banks following the formula established by the regulator.
- Weighting factor in provisioning formula.

Provisioning formula

$$Provisions_i = PD_i * LGD_i * EAD_i \tag{1}$$

- PD = Probability of default.
- LGD = Loss given default.
- EAD = Exposure at default.

Weighting factor

$$Provisions_i = PD_i * W_i * LGD_i * EAD_i \tag{2}$$

The reform

Provisioning formula with weighting factor

For new loans

$$Provisions_i = PD_i * W_i * LGD_i * EAD_i \tag{3}$$

- PD = ex-ante risk measure based on individual characteristics
- LGD = a coefficient determined by the regulator.
- EAD = the loan amount.
- W = 0.96 for personal and automotive loans.
- W = 0.98 for salary-based loans.

Provisions per borrowed peso

$$Provisions_i = PD_i * W_i \tag{4}$$

Our analysis

Focus on personal loans

Non-revolving consumer loans

The reform was effective on personal, salary-based, and automotive loans

Personal loans

- The gender gap in credit conditions is more prevalent in this type of loans.
- Easy access loans, so any changes in this type of loans can potentially affect a larger pool of people.
- Any change in the required loan loss provisions would have a larger effect in this type of loans.

$$Provisions_i = PD_i * W_i \tag{5}$$

Outline

Data

Consumer loans

Proprietary dataset

- Loan level.
- Bimonthly data for all new loans granted in 2021.
- Repeated cross-sections.
- Variables:
  - Provisions, interest rate, amount.
  - Probability of default, age.
  - Length of the client-bank relationship.
  - Payment mechanism, maturity, frequency of payments.

Outline

Empirical Strategy

Design

Treatment

- Exogenous.
- Binary (either treated or untreated).
- Rolled out at the same time (no variation in treatment timing).

Groups

- Treated: new loans granted to women.
- Control: new loans granted to men (never treated).

Empirical Strategy

Specifications

2x2 DiD

$$y_{i,t} = female_i + post_t + \beta female_i * post_t + \theta C_i + \epsilon_{i,t} \tag{6}$$

Event study

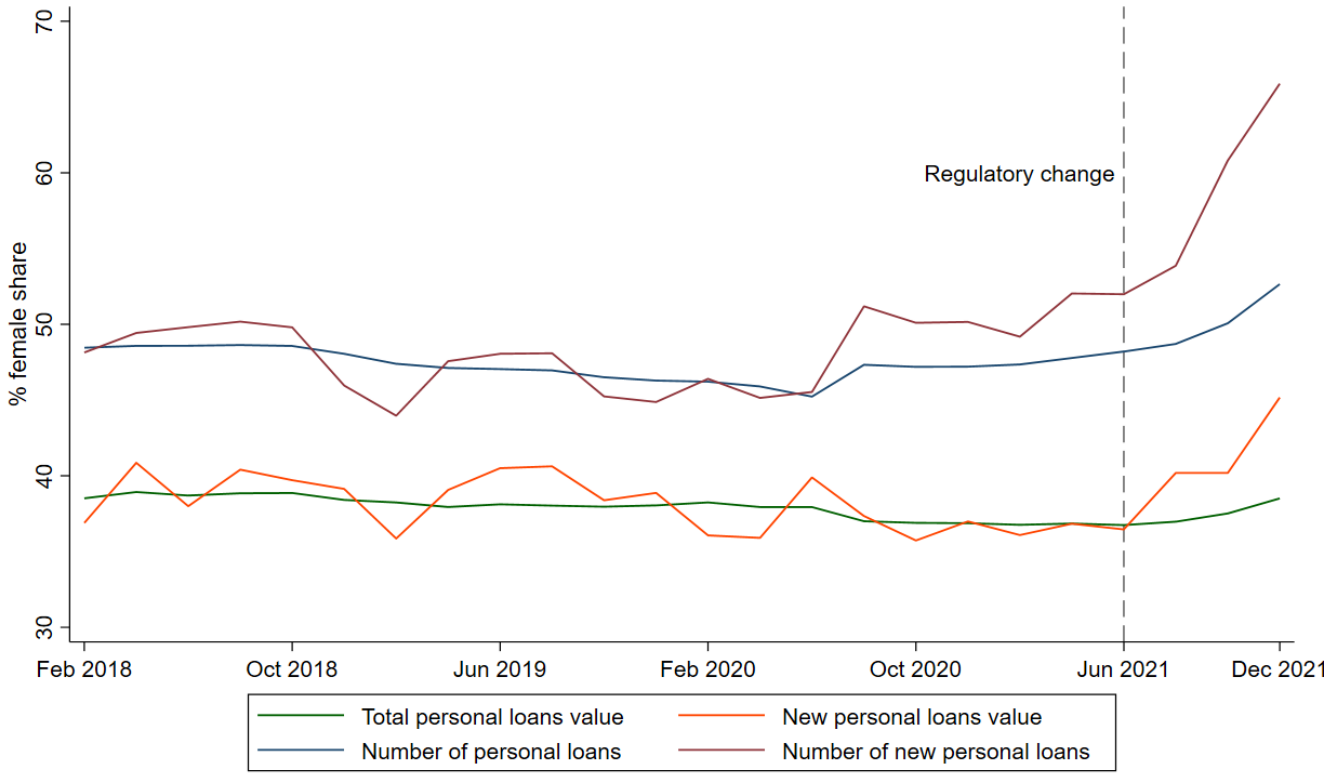
$$y_{i,t} = \alpha_i + \gamma_t + \sum_{m=-G}^{M} \beta_m female_{i,t-m} + \theta C_i + \epsilon_{i,t} \tag{7}$$

Outline

Results

New loans and share of credit

Increase in the share of credit and suggestive increase in the number of loans.



Results

2x2 DiD: Provisions and credit conditions

Improvement in credit conditions.

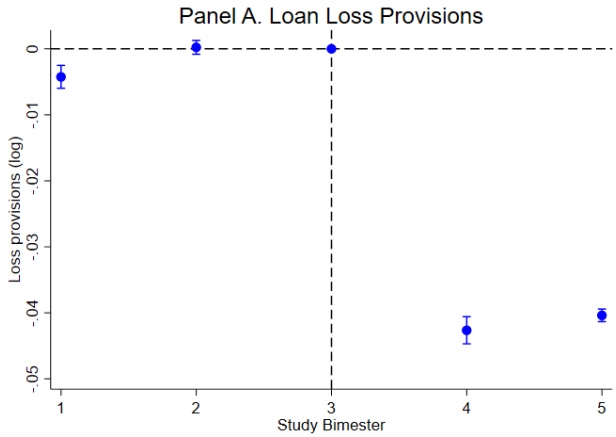
	Loss Provisions (log)	Spread	Amount (log)
Treatment effect	-0.041***	-0.519***	0.020**
	(0.001)	(0.028)	(0.004)
Female = 1	-0.001***	0.264***	-0.048***
	(0.000)	(0.017)	(0.003)
Bank FE	YES	YES	YES
Municipality FE	YES	YES	YES
Credit Controls	YES	YES	YES
Individual Controls	YES	YES	YES
Time Interactions	YES	YES	YES
N	871,638	871,639	871,639
R-squared	0.990	0.827	0.579

Results

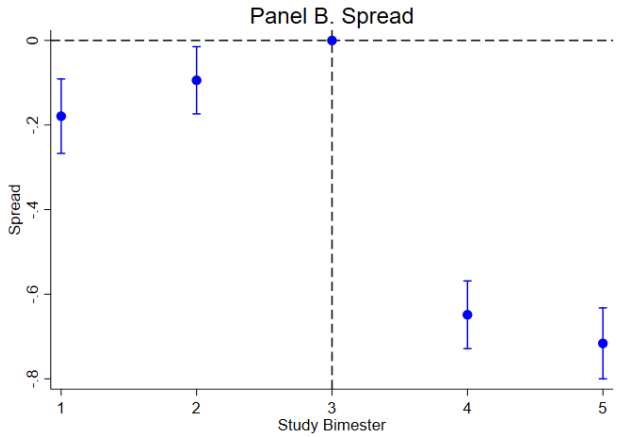
Event study: Provisions and credit conditions

Improvement in credit conditions.

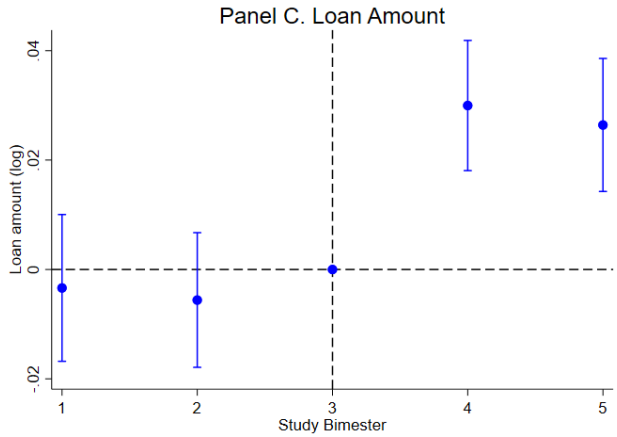
Provisions (log)



Spread



Amount (log)



Results

2x2 DiD: Heterogeneous effects: probability of default

Concentrated on women with higher probability of default.

	Loan Loss Provisions (log)		Spread		Loan Amount (log)	
	1	2	3	4	5	6
	Low PD	High PD	Low PD	High PD	Low PD	High PD
Treatment effect	-0.039***	-0.040***	-0.279***	-0.670***	-0.005	0.024***
	(0.001)	(0.000)	(0.054)	(0.028)	(0.007)	(0.005)
Female=1	-0.002***	-0.000	0.200***	0.355***	-0.084***	-0.017***
	(0.001)	(0.000)	(0.034)	(0.015)	(0.004)	(0.003)
Bank FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES
Credit Controls	YES	YES	YES	YES	YES	YES
Individual Controls	YES	YES	YES	YES	YES	YES
Time Interactions	YES	YES	YES	YES	YES	YES
Obs	373,585	496,333	373,585	496,333	373,585	496,333
R2	0.995	0.994	0.864	0.790	0.577	0.392

Results

2x2 DiD: Heterogeneous effects: length of the client-bank relationship

Concentrated on women who related with the bank for the first time.

	Loan Loss Provisions (log)		Spread		Loan Amount (log)	
	1	2	3	4	5	6
	New Client	Previous Client	New Client	Previous Client	New Client	Previous Client
Treatment effect	-0.039***	-0.036***	-0.800***	0.013	0.032***	-0.020***
	(0.000)	(0.001)	(0.027)	(0.059)	(0.004)	(0.007)
Female=1	0.000	-0.002**	0.335***	0.246***	-0.021***	-0.087***
	(0.000)	(0.001)	(0.015)	(0.038)	(0.003)	(0.005)
Bank FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES
Credit Controls	YES	YES	YES	YES	YES	YES
Individual Controls	YES	YES	YES	YES	YES	YES
Time Interactions	YES	YES	YES	YES	YES	YES
Obs	524,757	345,164	524,757	345,164	524,757	345,164
R-squared	0.998	0.992	0.811	0.868	0.377	0.560

Results

2x2 DiD: Heterogeneous effects: labor informality

Larger effects in municipalities with high levels of labor informality.

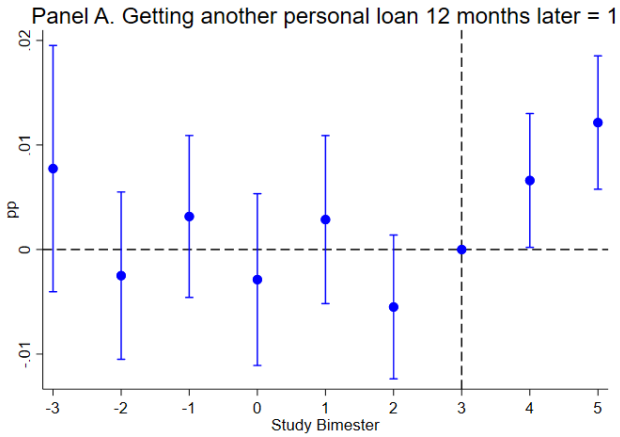
	Loan Loss Provisions (log)		Spread		Loan Amount (log)	
	Informal	Formal	Informal	Formal	Informal	Formal
	1	2	3	4	5	6
Treatment effect	-0.042***	-0.039***	-0.714***	-0.472***	0.046***	0.013**
	(0.001)	(0.001)	(0.040)	(0.042)	(0.005)	(0.006)
Female=1	-0.001**	-0.001***	0.167***	0.255***	-0.033***	-0.043***
	(0.000)	(0.000)	(0.024)	(0.026)	(0.004)	(0.004)
Bank FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES
Credit Controls	YES	YES	YES	YES	YES	YES
Individual Controls	YES	YES	YES	YES	YES	YES
Time Interactions	YES	YES	YES	YES	YES	YES
Obs	397,500	386,064	397,500	386,064	397,500	386,064
R2	0.990	0.990	0.837	0.881	0.477	0.571

Results

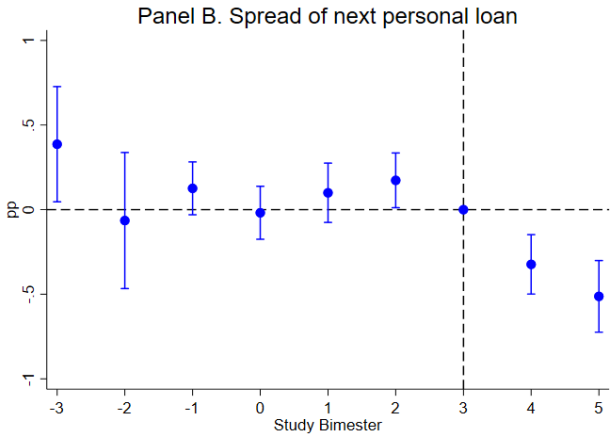
Event study: Financial inclusion

Improved the likelihood of getting subsequent personal loans with better credit conditions.

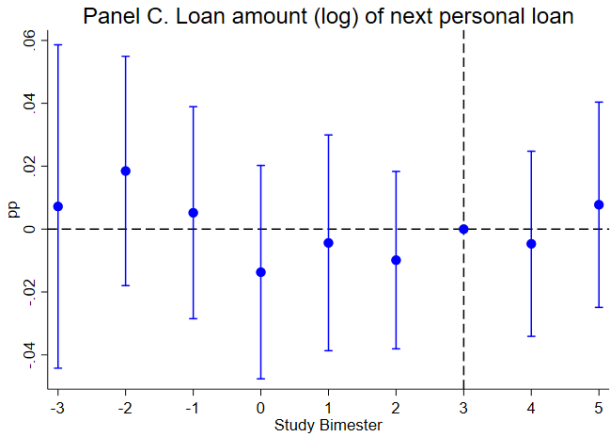
Getting another personal loan



Spread of the next personal loan



Amount of the next personal loan

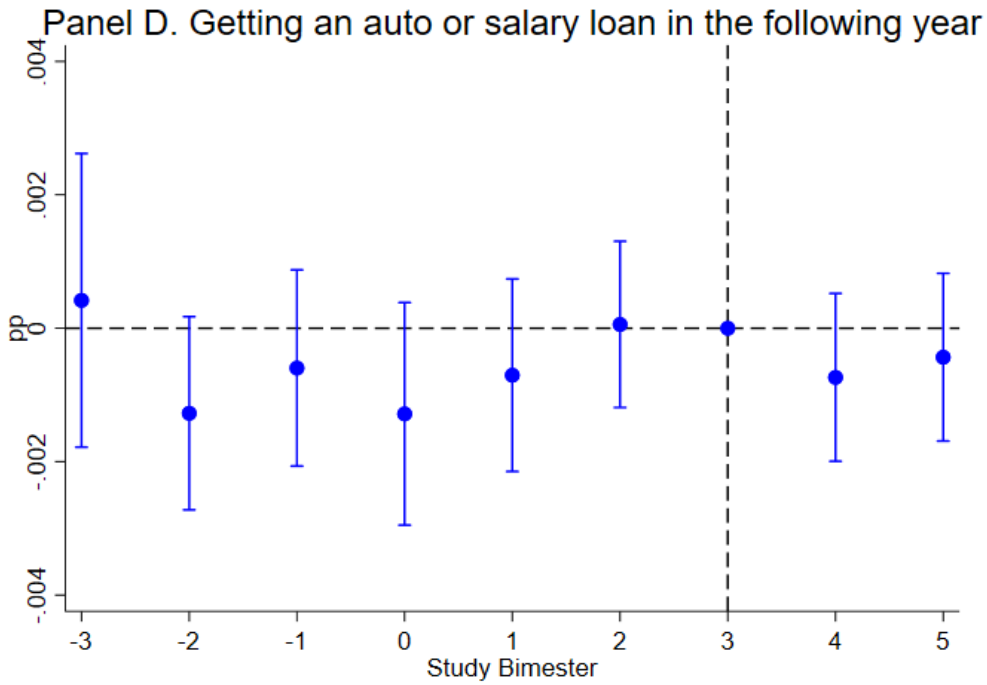


Results

Event study: Financial inclusion

No effects on the likelihood of moving from personal to automotive or salary-based loans.

Getting an auto or salary-based loan



Results

2x2 DiD: Financial stability

No negative effects on financial stability.

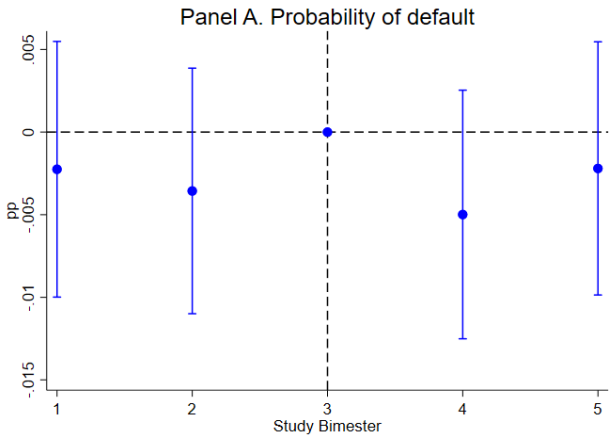
	Impact on risk measures				
	Probability of default (log)	At least one default event in up to 12 months = 1		Share of defaulted periods in up to 12 months	
	1	3	4	5	6
Treatment effect	-0.002	-0.014***	-0.006***	-0.004***	-0.002***
	(0.003)	(0.001)	(0.001)	(0.000)	(0.000)
Female = 1	0.001	-0.017***	-0.021***	-0.003***	-0.005***
	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)
Bank FE	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES
Credit Controls	YES	YES	YES	YES	YES
Individual Controls	YES	YES	YES	YES	YES
Time Interactions	YES	YES	YES	YES	YES
Credit Conditions with Bank Interactions			YES		YES
N	871,638	829,484	829,484	829,484	829,484
R-squared	0.528	0.116	0.132	0.188	0.214

Results

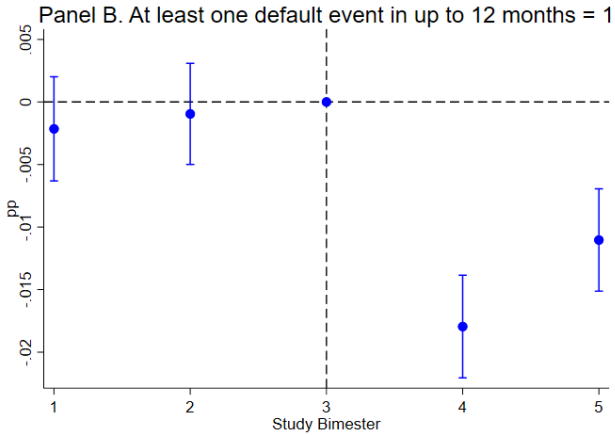
Event study: Financial stability

No negative effects on financial stability.

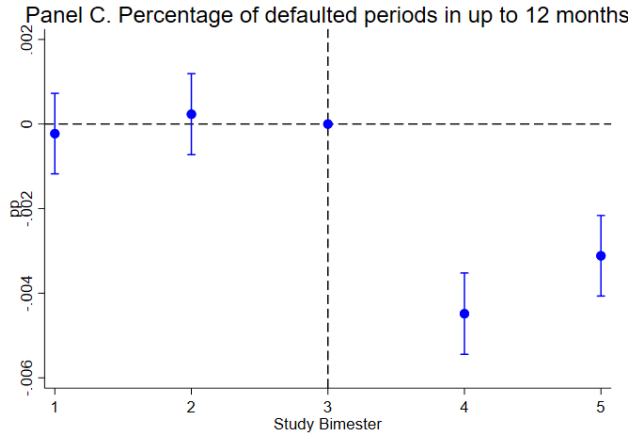
Probability of default



At least one default in the following year



Share of periods in default in the following year



Results

Other types of credit

Findings

- We find no economically relevant results neither for automotive nor for salary-based loans.

Hypothesis

- Loans with lower probability of default compared to personal loans.
- Design of the reform.

$$Provisions_i = PD_i * W_i \tag{8}$$

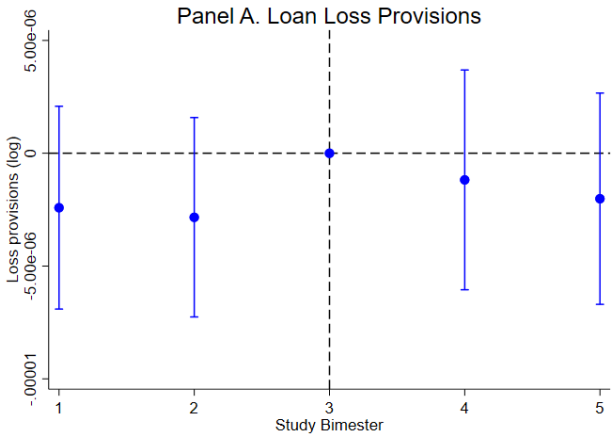
Outline

Robustness Checks

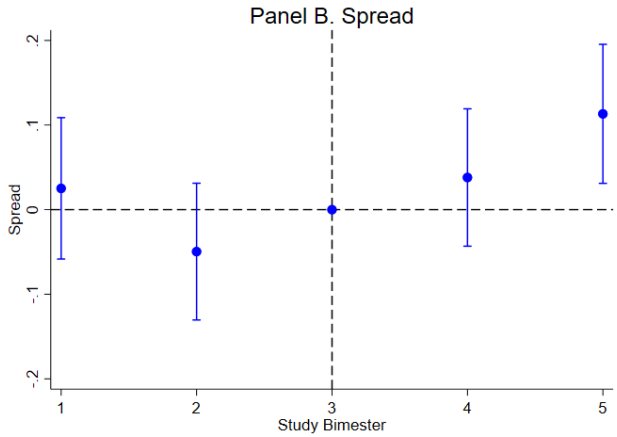
Non-affected banks

To rule out contemporaneous shocks.

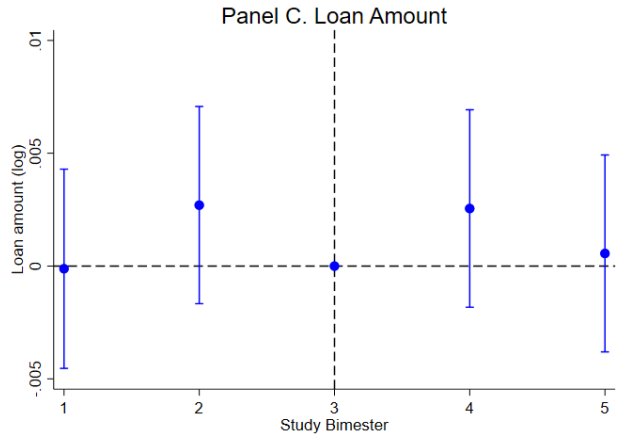
Provisions (log)



Spread



Amount (log)

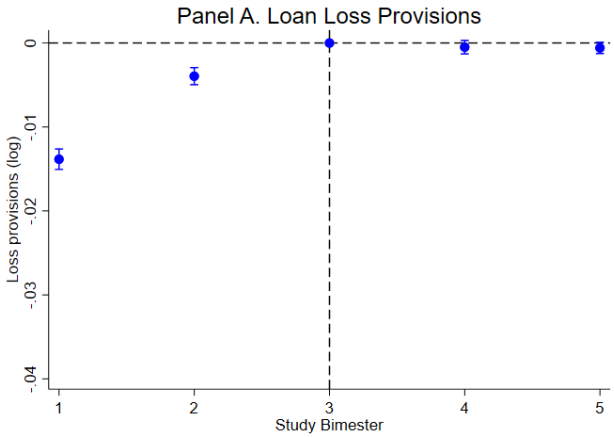


Robustness Checks

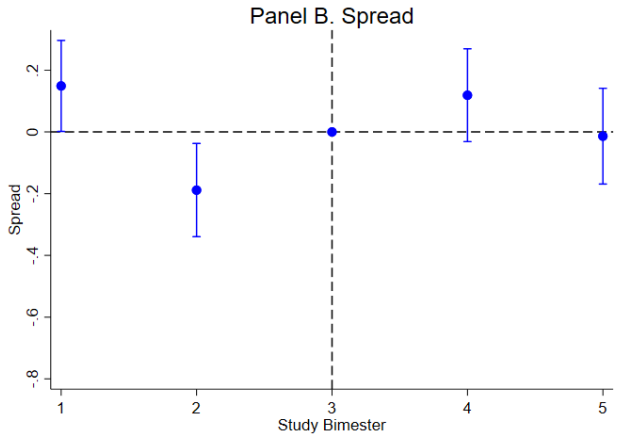
2019

To rule out seasonality.

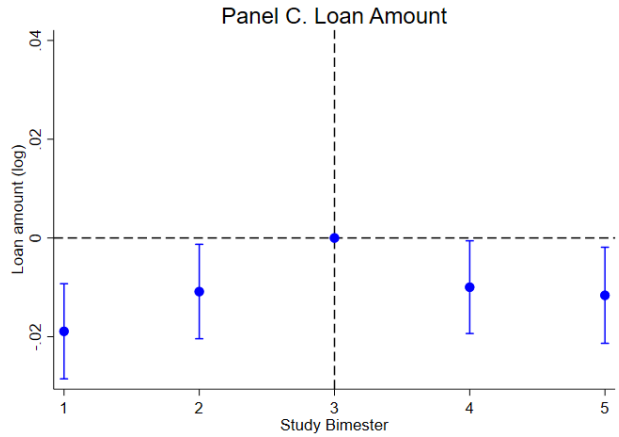
Provisions (log)



Spread



Amount (log)



Outline

Conclusions

Summary of findings

Research question

- Can regulatory policies foster women's financial inclusion?

Findings

- Improved credit conditions (lower interest rate and higher loan amount).
- Concentrated on women with higher probability of default.
- Concentrated on women who related with the bank for the first time.
- Larger effects in municipalities with high levels of labor informality.
- Improved the likelihood of getting subsequent personal loans with better credit conditions.
- No effects on the likelihood of moving from personal to automotive or salary-based loans.
- No negative effects on financial stability.

Conclusions

Policy implications

- Reducing provisions can have a positive, but limited effect on fostering financial inclusion.
- The effects on financial inclusion may be nonlinear and require further analysis.

Thanks!

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