

# Is There a Gender Premium?

## Financial Frictions and Credit to Female Entrepreneurs

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## Introduction

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# Motivation

- Women are significantly underrepresented in entrepreneurship, even more so than in other labor indicators.
- Around the world, only around 30% of businesses are owned by female entrepreneurs (World Bank, 2024), while women represent 40% of the labor force (ILO, 2024).
- Among the reasons described by the literature are less risk-averse occupational preferences or less access to entrepreneurial networks (Wallskog, 2021).
- However, one relevant factor that has not received much attention in the literature is the higher entry barriers to the credit market that women may face.

# Motivation

- Research indicates that access to credit is crucial for the establishment, growth, and overall success of businesses.
  - Employment (Chodorow-Reich, 2013; Greenstone et al., 2020; Gutierrez et al., 2023).
  - Investment, and exports (Amiti & Weinstein, 2018; Berton et al., 2018; Chodorow-Reich & Falato, 2022; Fraise et al., 2020).
- Thus, if female entrepreneurs encounter financial frictions, their firms may face greater challenges in accessing credit, which could diminish firm growth and success or dissuade them from pursuing entrepreneurship.
- These financial frictions could arise from supply-side factors if banks perceive women as riskier (e.g., because they have fewer assets to use as collateral, less credit history, or discrimination for loan officers).

# Motivation

- In Mexico, women-owned SMEs represent only 32% of those with access to credit and account for only 24% of total credit amount.
- These gender gaps are much larger than the ones observed in the labor market, where women represent around 40.4 % of formal employment and 41.4% of informal jobs.
- Gender gaps in access to firm credit in Mexico have been largely overlooked in the literature.
- To the best of our knowledge, there are no studies that analyze gender gaps in firm credit in Mexico.

- This is the first paper that explores the gender gaps in commercial banks' lending to firms.
- We use a proprietary dataset that encompasses all loans granted by commercial banks in Mexico between 2018 and 2021.
- We divide the analysis into 3 main sections:
  1. How significant are the gender gaps in credit conditions in the Mexican market?
  2. Do gender gaps in credit access widen during periods of macrofinancial uncertainty?
  3. How do gender gaps evolve with increased credit availability?

- **Access to Commercial Credit and Lending Conditions:** Studies for other countries have shown that, even when presenting similar risk profiles, women often face higher interest rates and receive smaller loan amounts compared to their male counterparts (Alesina et al., 2013; Mascia & Rossi, 2017). Additionally, women entrepreneurs are subject to greater barriers when entering the credit market. The literature points to higher denial rates for loan applications, which further restricts their ability to engage in and scale entrepreneurial ventures (Buvinic & Berger, 1990; Ongena & Popov, 2016; Wellalage & Thrikawala, 2021; Chiplunkar & Goldberg 2024; Morazzoni & Sy, 2022).
- **Gaps in the Labor Market:** Labor market gaps are particularly pronounced at the top of the income distribution, where self-employment and occupational choices significantly contribute to earnings gaps (Bertrand, 2018; Goldin, 2015; Yavorsky et al., 2019).

## Conceptual framework

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# Conceptual framework

- We follow the occupational choice model from Buera and Shin (2013).
- In the model, individuals choose between becoming entrepreneurs or working for a wage. They opt for entrepreneurship if the expected profit from their specific technology (firm) exceeds the expected wage as an employee.
- This expected profit depends on access to resources like credit. In perfectly competitive markets, occupational choices are based solely on productivity, not constrained by credit access (Buera & Shin, 2013).
- Building on this framework, we follow Morazzoni and Sy (2022) by modeling gender-related financial frictions explicitly.
- We modify the model to include a gender premium in the borrowing constraint.

# The Model

- **Technology:** The entrepreneurial production is a function of the individual's entrepreneurial productivity  $e$  capital  $k$  and labor  $l$

$$f(e, k, l) = e (k^\alpha l^{1-\alpha})^{1-\nu} \quad \text{where } 0 < 1 - \nu < 1$$

- Entrepreneurs may face gender-related financial frictions. We add a gender premium  $p_g$  that varies by gender  $g$ . In this case,  $p_f = \varphi$  for female entrepreneurs and  $p_m = 0$ , otherwise. Thus, the borrowing constraint is as follows:

$$\begin{cases} k \leq \lambda a & \text{if men,} \\ k \leq \lambda a - \varphi k & \text{if women.} \end{cases}$$

- $\lambda$  represents normal financial market frictions,  $a$  is the individual asset endowment.
- $\varphi$  indicates gender-related frictions.

# The Model

## Individual's problem

- The individual faces the following occupational choice problem at period  $t$ :

$$\max_{\{c_t, a_{t+1}\}_{t=0}^{\infty}} \mathbb{E} \sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma} - 1}{1-\sigma}$$

st:

$$c_t + a_{t+1} \leq \max \{w_t, \pi(e_t, a_t; w_t, r_t, p_{t,g})\} + (1 + r_t)a_t$$

F.O.C.

$$l_f^{opt} = \left( \frac{(1-v)(1-\alpha)e(k_t^\alpha)^{1-v}}{w_t} \right)^{\frac{1}{1-(1-\alpha)(1-v)}} \quad k_f^{opt} = \left( \frac{(1-v)\alpha e(l_t^{1-\alpha})^{1-v}}{r_t + \delta + \mu_t \frac{1+\varphi}{\lambda}} \right)^{\frac{1}{1-\alpha(1-v)}}$$

## The Model - Main results

- As in Morazzoni and Sy (2022), gender-related financial frictions affect women's capital choices. The gender premium  $\varphi$  appears as an additional parameter in the denominator of the first-order optimality conditions. Thus:

$$k_f^{opt} < k_m^{opt}$$

- The reduction in the loan amount affects the indebtedness of women-owned SMEs, linking the gender premium to decreased leverage (indebtedness per worker).
- The gender premium skews women's decisions to pursue entrepreneurship by raising the associated costs. Women need to be more productive to navigate these higher entry barriers. This results in a stronger selection of women into entrepreneurship, which is expected to lead to lower delinquency levels.

**Data**

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- We utilize a proprietary dataset that includes all firm loans from 33 financial intermediaries mandated to disclose their loans.
- In Mexico, commercial banks must submit monthly reports to the National Banking and Securities Commission (CNBV) detailing all new and existing loans to firms.
- Our dataset covers the period from January 2018 to December 2021 and contains comprehensive loan-level information, including characteristics such as interest rates, loan amounts, maturity, and firm attributes like age, size, and default probability.
- We concentrate on SMEs, where financial frictions are more pronounced due to greater information asymmetries. Within this group, we focus on individual-owned businesses, as they enable us to identify the owner's gender.

We exploit the dataset's granularity to derive four outcome variables from two samples.

- We analyze newly originated loans to estimate gender gaps in credit conditions, focusing on interest rates and loan amounts as outcomes.
- Using the total sample of outstanding loans. We aggregate the data at the firm level to examine how delinquency rates and firm leverage may contribute to the gender gap in credit conditions.

Table 1: Summary statistics for all loans

Variable	Female Mean/(SE)	Male Mean/(SE)	Pairwise t-test Mean difference
New originated loans			
Interest rate spread (%)	10.088 (1.371)	7.406 (1.073)	2.683***
Loan amount (million pesos)	1.429 (0.561)	2.043 (0.466)	-0.614***
Full sample loans			
Non Performing Loans	5.724 (0.124)	5.079 (0.096)	0.645***
Debt by worker (Log)	12.879 (0.026)	13.510 (0.024)	-0.631***
Firm size (number of employees)	11.812 (0.233)	20.393 (0.338)	-8.581***
Total sales (million pesos)	39.135 (6.627)	97.646 (14.610)	-58.512***
Probability of default	9.101 (0.115)	8.436 (0.094)	0.666***
Credit lines with collateral	0.497 (0.012)	0.505 (0.008)	-0.007**
Maturity	41.722 (0.437)	40.771 (0.435)	0.951***



**1. How significant are the gender gaps in credit conditions in the Mexican market?**

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# Empirical Strategy - Loan level analysis - Newly originated loans

## *Loan level sample*

$$y_{l,s,e,t,b} = \beta F_{l,s,e,t,b} + \nu X_{l,s,e,t,b} + \epsilon_{l,s,e,t,b} \quad (1)$$

- The outcome variable  $y_{l,s,e,t,b}$  represents either the interest rate or the credit amount of a new loan  $l$ , in state  $s$ , economic sector  $e$ , originated in month  $t$  by bank  $b$ .
- Our variable of interest is the indicator variable  $F_{l,s,e,t,b}$ , which equals 1 when the loan is granted to a women-owned SME and 0 otherwise.
- Thus,  $\beta$  represents the conditional gap between men and women entrepreneurs
- We use insights from the labor literature on wage gaps to assess the robustness of the gender gap in credit conditions. This involves estimating equation (1) with an expanding set of controls, leading to a total of seven specifications.

## *Firm level sample*

$$y_{f,s,e,t,b} = \beta F_{f,s,e,t,b} + \nu X_{f,s,e,t,b} + \epsilon_{f,s,e,t,b} \quad (2)$$

- The variable  $y_{f,s,e,t,b}$  represents either the firm's leverage or its credit delinquency, using the full set of pre-existing loans (not just newly originated ones) for firm  $f$  in state  $s$ , economic sector  $e$ , originated in month  $t$  by bank  $b$ .
- Similar to the loan-level analysis, our variable of interest is the indicator variable  $F_{f,s,e,t,b}$ , which equals 1 when the loan is granted to a women-owned SME and 0 otherwise.
- Likewise,  $\beta$  represents the conditional gap between men and women entrepreneurs
- We also reference the labor literature on wage gaps to assess the robustness of the gender gap in credit conditions.

## Main Results

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Table 2: Interest rate

	Dependent variable: Interest rate spread						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Women	1.662*** (0.142)	0.857*** (0.118)	0.456*** (0.103)	0.405*** (0.108)	0.262*** (0.093)	0.180** (0.088)	0.184** (0.088)
Time FE	X	X	X	X	X	X	X
Firm characteristics		X	X	X	X	X	X
Credit characteristics			X	X	X	X	X
Bank FE				X	X	X	X
State FE					X	X	X
Sector FE						X	X
Credit record							X
N	201,714	201,714	201,714	201,714	201,714	201,714	201,714
R-squared	0.234	0.334	0.399	0.443	0.457	0.463	0.465

- Women-owned SMEs receive loans with higher interest rates than men-owned firms. On average, they pay 1.66 percentage points more (22% higher than men's average).
- This gap narrows to 0.18 pp (2.4% higher than men's) after accounting for observable firm characteristics (e.g., size, economic sector, state), financing characteristics (e.g., maturity, collateral provision, interest rate type), and firm performance.

Table 3: **Loan amount**

	Dependent variable: Loan amount						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Women	-0.191*** (0.009)	-0.036*** (0.008)	-0.075*** (0.007)	-0.139*** (0.006)	-0.138*** (0.006)	-0.137*** (0.006)	-0.131*** (0.006)
Time FE	X	X	X	X	X	X	X
Firm characteristics		X	X	X	X	X	X
Credit characteristics			X	X	X	X	X
Bank FE				X	X	X	X
State FE					X	X	X
Sector FE						X	X
Credit record							X
N	201,714	201,714	201,714	201,714	201,714	201,714	201,714
R-squared	0.020	0.267	0.343	0.473	0.476	0.488	0.491

- Women-owned SMEs are given smaller loans compared to their male counterparts. In particular, women get 19.1% less in loan amounts compared to men. However, this gap narrows to 13.1% after adjusting for firm and credit characteristics and fixed effects.

## Firm level regressions

Table 4: Non-performing loan ratio

	Dependent variable: Non-performing loan ratio						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Women	0.589*** (0.061)	-0.147*** (0.033)	0.072** (0.032)	-0.001 (0.032)	-0.017 (0.032)	-0.093*** (0.033)	-0.074*** (0.028)
Time FE	X	X	X	X	X	X	X
Firm characteristics		X	X	X	X	X	X
Credit characteristics			X	X	X	X	X
Bank FE				X	X	X	X
State FE					X	X	X
Sector FE						X	X
Credit record							X
N	6,404,819	6,404,819	6,404,819	6,404,819	6,404,819	6,404,819	6,404,819
R-squared	0.001	0.725	0.727	0.735	0.735	0.735	0.783

- Gender gaps in credit conditions aren't due to differences in delinquency rates. At first, women entrepreneurs seem to have worse credit performance, but after accounting for firm-specific factors, the gap reduces to -0.074 percentage points (1.4% lower than men's).

## Firm level regressions

Table 5: Leverage

	Dependent variable: Leverage (total debt / n. employees)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Women	0.024*** (0.002)	0.044*** (0.002)	-0.120*** (0.002)	-0.106*** (0.002)	-0.108*** (0.002)	-0.116*** (0.002)	-0.099*** (0.002)
Time FE	X	X	X	X	X	X	X
Firm characteristics		X	X	X	X	X	X
Credit characteristics			X	X	X	X	X
Bank FE				X	X	X	X
State FE					X	X	X
Sector FE						X	X
Credit record							X
N	6,404,819	6,404,819	6,404,819	6,404,819	6,404,819	6,404,819	6,404,819
R-squared	0.002	0.126	0.318	0.341	0.343	0.352	0.364

- We also find that gender gaps in credit conditions are not due to differences in firm leverage. Initially, women's SMEs appear 2.4% more leveraged than men's, but after accounting for firm and loan characteristics, the estimate stabilizes at about -10%.



**2. Do gender gaps in credit access widen during periods of macrofinancial uncertainty?**

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# The impact of the COVID-19 pandemic

- After estimating gender gaps in credit conditions, we broaden the analysis to see how supply-side factors might influence these gaps across various settings.
- We assess if gaps widen in high-risk environments with macrofinancial uncertainty, where banks may restrict credit to riskier borrowers, limiting women's access to credit.
- The COVID-19 pandemic serves as a relevant case study because social distancing restrictions led to decreased economic activity, heightening macrofinancial uncertainty.

$$\begin{cases} k \leq \lambda a & \text{if men,} \\ k \leq \lambda a - \varphi k & \text{if women.} \end{cases}$$

## Empirical strategy - 2x2 DiD specification

We use 2x2 DiD regressions to estimate the impact of the COVID-19 pandemic on both credit conditions and firm outcomes.

$$Y_{l,f,s,e,t} = \beta F * I(t \geq \text{COVID-19}) + \theta_{s,t} + \delta_{e,t} + \epsilon_{l,f,s,e,t} \quad (3)$$

- Where  $Y_{l,f,s,e,t}$ , can be credit conditions such as the interest rate or the credit amount of a new loan  $l$  originated in month  $t$ , or firm outcomes (leverage, credit delinquency, and extensive margin) for the firm  $f$ , in state  $s$  economic sector  $e$  originated in month  $t$ .
- The  $\beta$  coefficient measures the impact of the COVID-19 pandemic on women-owned SMEs relative to men-owned SMEs.

# Gender gap under macrofinancial uncertainty - New loans results

Table 6: **COVID-19's effects on the gender gap - New loans**

	Interest rate (percentage points)		Loan amount (log)	
	(1)	(2)	(3)	(4)
Woman x Covid	0.678*** (0.159)	0.631*** (0.147)	-0.079*** (0.026)	-0.088*** (0.025)
Observations	133,050	129,679	133,050	129,679
R-squared	0.883	0.904	0.785	0.808
Time FE	X	X	X	X
Firm FE	X	X	X	X
Time by sector FE	X		X	
Time by state FE	X		X	
Time by state-sector FE		X		X

- An increase in macrofinancial uncertainty significantly widens the gaps.
  - Interest rate gap rise by 0.6 percentage points.
  - Women-owned SMEs receive loans that are 8% smaller.

## Gender gap under macrofinancial uncertainty - Firm results

Table 8: **COVID-19's effects on firms' outcomes**

	Leverage (log)		NPL ratio (%)		Extensive margin (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
Woman x Covid	-0.018*	-0.017*	0.006	0.005	-1.075***	-1.095***
	(0.009)	(0.009)	(0.004)	(0.004)	(0.247)	(0.247)
Observations	452,568	452,514	452,568	452,514	767,972	767,928
R-squared	0.833	0.834	0.568	0.580	0.440	0.442
Time FE	X	X	X	X	X	X
Firm FE	X	X	X	X	X	X
Time by sector FE	X		X		X	
Time by state FE	X		X		X	
Time by state-sector FE		X		X		X

- Macrofinancial uncertainty results in a decline in indebtedness levels per worker.
- There are no significant changes in delinquency rates due to macrofinancial uncertainty.
- Reduces the likelihood of women-owned SMEs securing new loans or refinancing.

**How do gender gaps evolve with  
increased credit availability?**

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## Gender gap and credit availability

- How do gender gaps evolve with increased credit availability?
- Increased credit availability, due to banks' greater willingness to lend, may lead to less stringent credit conditions, benefiting groups facing access barriers and promoting a more inclusive financial system.

$$\begin{cases} k \leq \lambda a & \text{if men,} \\ k \leq \lambda a - \varphi k & \text{if women.} \end{cases}$$

## Credit availability - Empirical strategy - Credit Supply Shocks

- We compute Credit Supply Shocks (CSS) at the level of commuting zones, referred to as Local Labor Markets (LLMs) (Blyde et al., 2020).
- We follow Greenstone et al., (2020) and Gutierrez et al., (2023) to construct the bank supply shocks as presented in the following equation

$$g_{b,m,t} = b_t + m_t + e_{b,m,t} \quad (4)$$

- Where  $g_{b,m,t}$  is the annual real credit growth rate of bank  $b$  in LLM  $m$  for year  $m$ . On the right-hand side,  $b_t$  is the bank fixed effect, and  $m_t$  denotes the LLM fixed effect, interpreted by Greenstone et al. (2020) as a measure of lending variation across markets based on local credit demands.



- Then, we compute the credit supply shocks at the LLM level by taking the weighted average of the bank fixed-effects, using each bank's share of credit in the LLM as the weight, as described in the following equation:

$$\text{Credit Supply Shocks}_{m,t} = \text{CSS}_{m,t} = \sum w_{b,m,t-1} b_t \quad (5)$$

- Where  $w_{b,m,t-1}$  is the share of credit that any given bank  $b$  had in LLM  $m$  in the previous year  $t - 1$ , and  $b$  is the vector of fixed effects computed in equation (4). Then, the credit supply shock distribution is normalized.

- Finally, we calculate the effect of lending shock to the gender gaps using equation (6)

$$y_{f,g,m,t} = \beta CSS_{m,t} + \delta \cdot F \cdot CSS_{m,t} + \gamma_{g,t} + \vartheta_{g,m} + e_{f,g,m,t} \quad (6)$$

- Where the outcome of interest is a set of characteristics of credit access and conditions held by women entrepreneurs  $f$  in time  $t$  at the LLM level  $m$ . This group of characteristics includes the number of firms (access), and the interest rate and loan amount (conditions).
- Thus, the key coefficients are  $\beta$  and  $\delta$ , which measure the impact of a supply shock on credit characteristics by gender. Using these coefficients, we also determine the overall effect on credit conditions for women-owned SMEs ( $\beta + \delta$ ).

Table 9: **Effects of credit supply shocks on credit access and conditions**

	Log Number of Firms (1)	Interest rate (2)	Log average amount (3)
Credit Supply Shock	0.078** (0.032)	-0.006** (0.003)	-0.090** (0.041)
Woman · Shock	-0.087*** (0.033)	-0.003 (0.005)	0.023 (0.085)
Total effect of credit shock on Woman	-0.008 (0.038)	-0.008* (0.005)	-0.067 (0.075)
Observations	843	843	843
R-squared	0.983	0.658	0.654
Gender x Time FE	X	X	X
Gender x LLM FE	X	X	X

- An increase in credit supply leads to a 7.8% increase in the number of men-owned SMEs, which receive loans 9% smaller but benefit from slightly lower interest rates.
- Credit supply shocks reduce interest rates for women-owned SMEs by 0.008 percentage points, but this change is not significantly different from that for men-owned SMEs.

## Discussion

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# Conclusions

- We are the first to examine gender gaps in credit conditions in Mexico.
- Women-owned SMEs receive smaller loans and higher interest rates than men-owned ones despite similar credit performance.
- During the COVID-19 pandemic, increased macrofinancial uncertainty significantly widens the gaps in interest rates and loan amounts.
- While credit supply shocks improved financial inclusion, the benefits did not specifically reach women-owned SMEs.
- All these results are consistent with a supply-side gender premium, indicating that women may be perceived as riskier than men of similar characteristics.

## Policy implications

- For women, it is particularly important to implement policies that help maintain a stable economic environment with price stability, financial stability, and sound public finances.
  - A stable macro-financial framework reduces uncertainty and thus prevents gender gaps from widening.
- A policy that increases credit availability, in general, may not contribute to closing the gender disparities in commercial credit.
- Need to implement policies to reduce gender disparities in the credit market. These policies should be designed to identify and eliminate the specific barriers women face.
  - This includes, for example, direct credit allocation to women in times of economic uncertainty, the provision of guarantees, or regulatory policies that incentivize private financial intermediaries to extend credit themselves, as has already been done in recent years.