Bank Market Power and Credit Allocation

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The Micro and the Macro of Financial Intermediation
Banco Central de Chile

Motivation

- Large literature documenting existence of bank market power and its effects on pass-throughs to rates (Crawford et al. (2018), Drechsler et al. (2017), Benetton & Fantino (2021), & others)

- Effects of market power on output/welfare is theoretically ambiguous
  - Pricing power from demand inelasticity can benefit borrowers through ex-ante lender incentives (Petersen & Rajan (1995), Yannelis & Zhang (2023))
  - Competition-fragility debate (Keeley (1990), Martinez-Miera & Repullo (2010))

- Understudied: Supply-side sources of market power (softened price competition)

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  demand-side (elasticity) + **supply-side (conduct)** + **risk-adjustment**

  to explore effects of **supply-side** pricing power on credit allocation and efficiency

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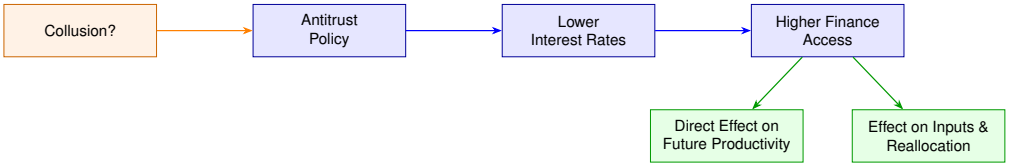
- **This paper:** Decompose markups into

  demand-side (elasticity) + **supply-side (conduct)** + **risk-adjustment**

  to explore effects of **supply-side** pricing power on credit allocation and efficiency
- Financial sector is special: supracompetitive pricing may particularly affect firm growth

In this paper



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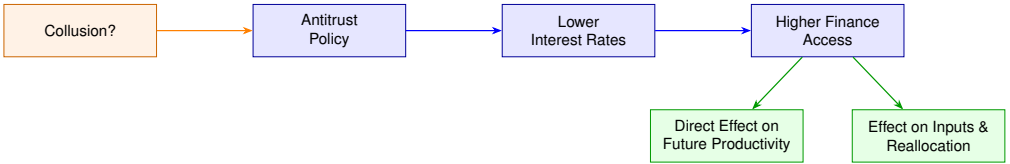
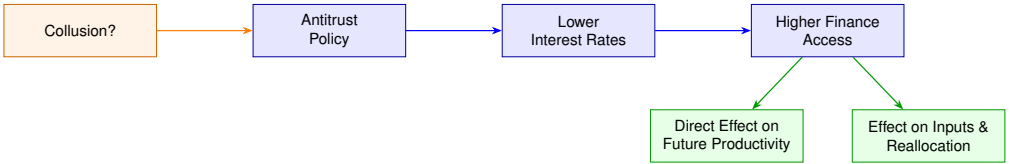


1. Quantify the effects of market power on prices in Ecuador

- Simplified version of conduct model in Brugués & De Simone (2024) for credit demand & supply (nests Crawford et al. (2018), Benetton (2021), Ioannidou et al. (2022))
- Pass-through of a surprise loan tax in Ecuador as moment to identify conduct
- Markups: demand-side (70%) + supply-side (26%) + risk-adjustment (4%)

In this paper

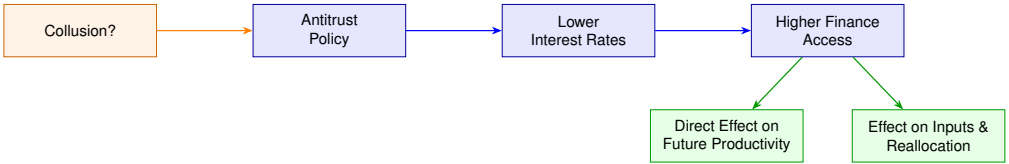


1. Quantify the effects of market power on prices in Ecuador

2. Quantify the effects of conduct on credit allocation via anti-trust counterfactual

- Equilibrium prices $\downarrow$ 17%
- Two responses:
  - Loan use $\uparrow$ 21%
  - Credit demand $\uparrow$ 12%

In this paper



1. Quantify the effects of market power on prices in Ecuador
2. Quantify the effects of conduct on credit allocation via anti-trust counterfactual
3. **Aggregation via allocative efficiency framework** (Petrin & Levinsohn (2012), Bau & Matray (2023))

- **IV Firm-level:** 20% loan use ↑ 0.4% TFPR
- **Aggregate:** TFP ↑ 0.7%
  - 56% of Ecuador TPFR growth in 2010-2017
  - Comparable to Indian credit subsidy program in Rotemberg (2019)

Related literature

Market power in financial markets

Cornaggia et al. (2015), Scharfstein & Sunderam (2017), Drechsler et al. (2017), Crawford et al. (2018), Allen et al. (2019), Benetton (2021), Hatfield & Wallen (2023), Jiang et al. (2023), Yannelis & Zhang (2023), Cox et al. (2023), Cuesta & Sepúlveda (2024), Brugués & De Simone (2024)

- Decompose the sources of market power and isolate supply-side

Incidence and welfare effects of market power

Ciliberto & Williams (2014), Miller & Weinberg (2017), De Loecker & Eeckhout (2018)

- Focus on credit markets
- Consider personalized pricing and study heterogeneity of effects

Aggregate effects of frictions on allocative efficiency

Hsieh & Klenow (2009), Asker et al. (2014), Midrigan & Xu (2014), Buera et al. (2015), Asker et al. (2019), Rotemberg (2019), Catherine et al. (2022), Sraer & Thesmar (2023), Bau & Matray (2023)

- Simulate effects of anti-trust policy

Outline

Policy reform and data

Pass-through estimates

Sketch of model

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Using tax pass-throughs to test lender competition

- At least since Sumner (1981) and Bresnahan (1982), interest in testing firm conduct consistent with observed outcomes

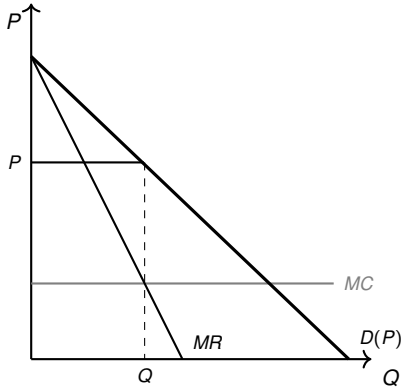
- Conduct can be identified from exclusion restriction that shifts markups but not marginal costs (Berry and Haile (2014); Duarte et al. (2024); Backus et al. (2021))

BUT instruments are difficult to find in markets with selection!

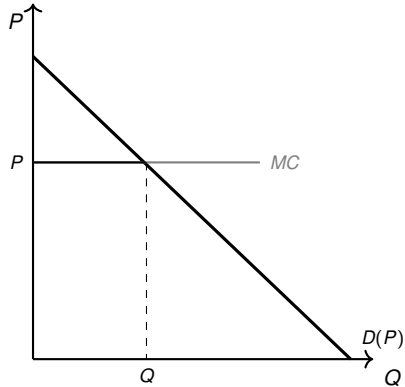
- Instead, we look at changes in taxes as a markup shifter

Illustrative example

Demand $D(P)$, prices P, and quantities Q not sufficient to identify both marginal costs MC and lender competition



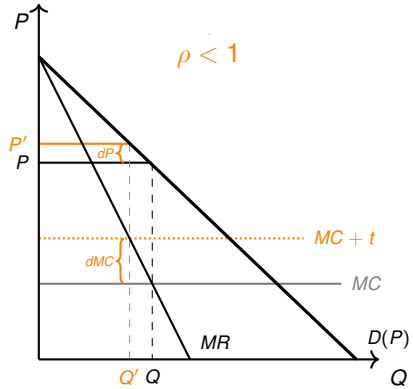
(a) Monopoly or Cartel



(b) Perfect Competition

Illustrative example

***But* with demand $D(P)$ and prices P + pass-throughs $\rho \equiv dP/dMC$ we can test/identify lender competition and estimate marginal costs MC**



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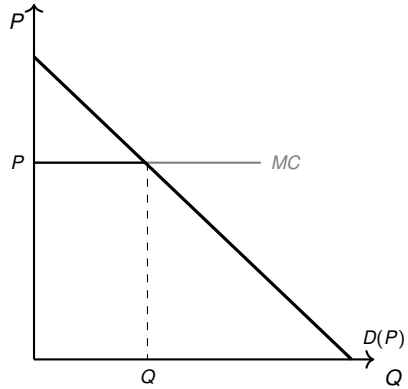

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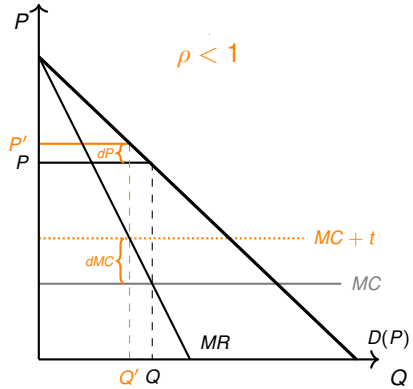

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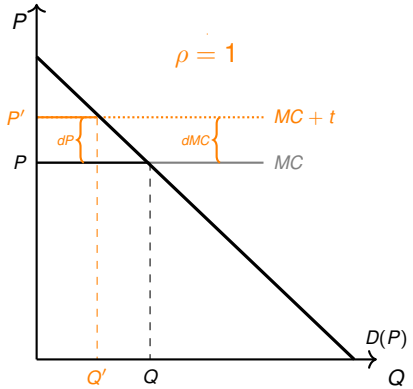

(b) Perfect Competition

Cancer treatment tax (SOLCA tax)

- 1964 - 2008: Ecuador uses financial taxes to fund cancer treatment
- September 2014: SOLCA tax reintroduced as a last-minute amendment to new law "Código Orgánico Monetario y Financiero"
  - New loans granted by private banks carry a tax of 0.5% of the value of transaction (proportionally reduced for maturities $<$1 year)
  - Law specifies borrower pays the tax on the date the loan is contracted
- October 2014: The SOLCA tax comes into force

Data

Combine two sources of administrative data from Ecuador for 2010-2017

- **Loan registry** from Superintendencia de Bancos (bank regulator):
  - Bank ID, borrower ID, date, interest rates, amount, term-to-maturity, credit score, default & repayment history

- **Firm dataset** from Superintendencia de Compañías (business bureau):
  - Firm ID, year, industrial sector, revenue, assets, debt, wages

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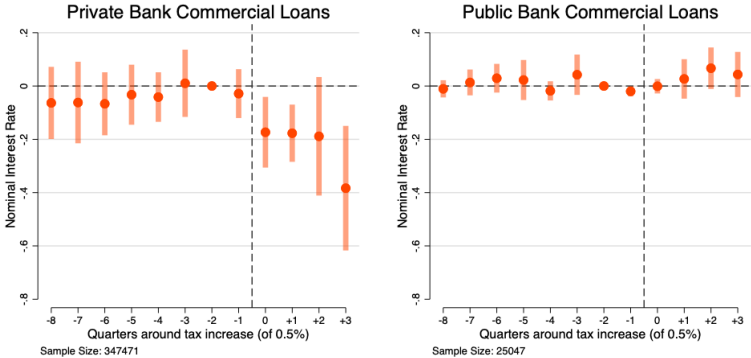
Motivation: Event study



Note: Includes firm-bank fixed effects and nonparametric controls for loan maturity and face value.

Indicative of ***incomplete*** pass-through

Magnitude: On average, the pass-through is approximately (0.5-0.2) / 0.5 = 0.6

Tax pass-through regression

To estimate the pass through to final prices:

$$\tilde{r}_{lfbt} = \rho taxRate_{lfbt} + \sum_{a=1}^{20} \alpha_a 1\{A \in j\} + \sum_{m=1}^{20} \eta_m 1\{M \in z\} + \eta DP + \delta_{fb} + \epsilon_{lfbt}$$

- $\tilde{r}$: gross interest rate $\equiv$ pre-tax nominal interest rate + tax rate
- Tax rate is proportional to the maturity (in years) of the loan M, after the tax is implemented ($Post = 1$):

$$taxRate = 0.5 \times \min\{M, 1\} \times Post$$

- Coefficient ρ captures the pass through of taxes to final prices
  - $\rho > 1$: more-than-complete
  - $\rho = 1$: complete
  - $\rho < 1$: incomplete

Pass-through estimates

Tax-inclusive interest rate		
	(1)	(2)
Pass-through (ρ)	0.529	0.536
	(0.137)	(0.150)
[T-value for null $\rho = 1$]	[3.438]	[3.093]
Pr(Default) Control	No	Yes
Maturity & Amount Controls	Yes	Yes
Pair FE	Yes	Yes
Observations	378,747	347,471
R-squared	0.783	0.777

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Quantitative model of credit demand & supply

Demand

- Borrowers have heterogeneous preferences over loan terms
- Simultaneously choose loan size & lender

Supply

- Differentiated banks with asymmetric marginal costs
- Compete on interest rates
- Maximize profits subject to conduct and heterogeneous borrower default probability

Pass-through depends on demand/supply parameters and conduct

- Additional moment allowing exactly identified system of equations

Sketch model: Demand

- Borrowers with heterogeneous preferences over interest rates and other characteristics

$$\Pi_{ikmt} = \overline{\Pi}_{ikmt}(X_{it}, r_{ikmt}, X_{ikmt}, N_{kmt}, \psi_i, \xi_{kmt}; \beta) + \varepsilon_{ikmt},$$

- Choose bank k in market m that gives them highest expected return $\Pi_{ikmt} > \Pi_{ik'mt}$ over all available banks $k' \in m$

- Make continuous choice over loan size

$$L_{ikmt} = -\frac{\partial \Pi_{ikmt}}{\partial r_{ikmt}}$$

- Total demand $Q_{ikmt}(r) = L_{ikmt} Prob(\Pi_{ikmt} \geq \Pi_{ik'mt}) = L_{ikmt} s_{ikmt}$

Sketch of model: Supply

- Banks compete on interest rates while maximizing bank profits subject to conduct

$$\max_{r_{ikmt}} B_{ikmt} = (1 - d_{ikmt}) r_{ikmt} Q_{ikmt}(r) - mc_{ikmt} Q_{ikmt}(r)$$

$$\text{s.t. } \upsilon_m = \frac{\partial r_{ikmt}}{\partial r_{ijmt}} \text{ for } j \neq k,$$

  - d: bank's expectation of default probability at loan grant
  - Q: bank's total expected loan demand at each r
  - mc: pair-market-time varying marginal cost of lending
- Market conduct parameter, υ_m, defined as in Weyl and Fabinger (2013); Kroft et al. (2023):

$$\upsilon_m = \frac{\partial r_{ijmt}}{\partial r_{ikmt}} (j \neq k)$$

where

  - $\upsilon_m = 0 \implies$ Bertrand-Nash competition
  - $\upsilon_m = 1 \implies$ joint-maximization

Conduct and markup: Intuition

- After rearranging the banks' FOC:

$$r_{ikmt} = \frac{mc_{ikmt}}{1 - d_{ikmt}} - \frac{Q_{ikmt}}{\underbrace{\frac{\partial Q_{ikmt}}{\partial r_{ikmt}}}_{\text{Bertrand-Nash Competition}} + \underbrace{\upsilon_m \sum_{j \neq k} \frac{\partial Q_{ikmt}}{\partial r_{ijmt}}}_{\text{Alternative Conduct}}}$$

  - $\upsilon_m > 0 \implies$ bank considers joint losses from competition when setting r_{ikmt}
  - Note that, in terms of own and cross price elasticities,

$$\frac{Q_{ikmt}}{\frac{\partial Q_{ikmt}}{\partial r_{ikmt}} + \upsilon_m \sum_{j \neq k} \frac{\partial Q_{ikmt}}{\partial r_{ijmt}}} = \frac{1}{\frac{\epsilon_{kk}}{r_{ikmt}} + \upsilon_m \sum_{j \neq k} \frac{\epsilon_{kj}}{r_{ijmt}}}$$

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Estimation steps

1. Create matched non-borrowers group to allow for demand for outside option (Crawford et al. (2018)) Matching

2. Predict prices for unobserved offers (Crawford et al. (2018)); choice set for each firm are all banks active in HQ's province Price Prediction

3. Estimate discrete-continuous demand model using maximum likelihood by region (Benetton (2021); Benetton et al. (2021))

4. Recover endogenous price coefficient through instrumental variables
   - Instruments for bank-province-level prices: average price of commercial, sole-proprietorship, and household loans by same bank in other provinces; aggregate default rate in non-commercial loan products in bank Instrumented Alphas: Region Avg.

Demand-side

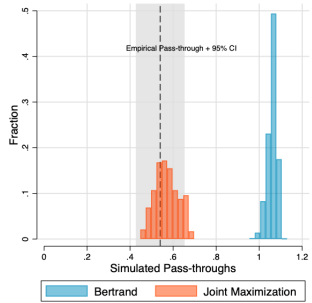
- Estimate demand parameters for each province using IO tools (Train 1986, Berry et al. 1995, Benetton 2021) >
- Model delivers reasonable elasticities > RF
- The model fits the data well >

Supply-side: Conduct

We *simulate* the introduction of the tax in the model and obtain Nash-equilibrium prices under two modes of conduct:

1. Bertrand-Nash: $\upsilon_m = 0$
2. Joint-Maximization: $\upsilon_m = 1$

and compare it to observed pass-throughs.



$\Longrightarrow$ Rejects Bertrand; fails to reject Joint-Maximization

Consistent with findings in Brugués & De Simone (2024), which use internalization approach looking at partial cartels

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Simulate Antitrust Policy: Marginal costs and prices

	Mean	Median
	Panel A: Marginal Cost	
Marginal Cost - Not Accounting for Conduct	8.82	9.30
Marginal Cost - Accounting for Conduct	4.87	3.10
% Change in Marginal Cost	-50.57	-55.75
Deposit Interest Rates	3.79	3.81
	Panel B: Prices	
Prices - Base Prices	11.25	11.56
Prices - Moving to Bertrand-Nash	9.43	10.34
% Change in Equilibrium Prices	-17.18	-5.36

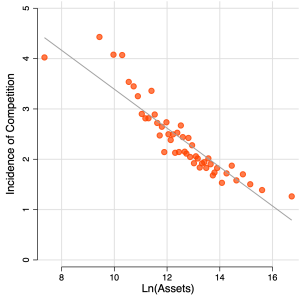
Decompose Markups

	Mean	Median
	Panel C: Markups	
Markup - Not Accounting for Conduct	2.43	2.30
Markup - Accounting for Conduct	6.38	4.79
Markup - Moving to Bertrand-Nash	4.56	2.43
% Share of Markup due to Conduct	25.46	19.18
% Share of Markup due to Preferences	70.27	72.62
% Share of Markup due to Risk	4.26	0.33

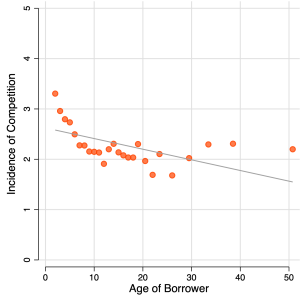
Simulate Antitrust Policy: Demand and welfare effects

	Mean	Median
	Panel D: Intensive & Extensive Margin	
% Change in Continuous Loan Use - Move to Bertrand-Nash	21.39	20.29
Market Share Outside Option - Predicted Prices	0.033	
Market Share Outside Option - Move to Bertrand-Nash	0.029	
% Change in Risk in Borrowers (Adverse Selection)	0.45	
	Panel E: Welfare and Incidence	
Incidence of Competition ($-\Delta CS/\Delta PS$)	2.81	1.62

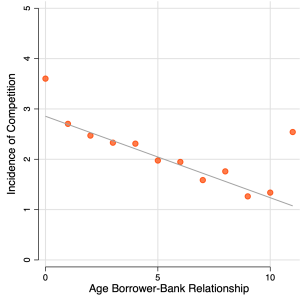
Heterogeneity in welfare effects: Incidence (-ΔCS/ΔPS)



(a) Assets



(b) Firm Age



(c) Relationship Length

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Aggregating productivity growth

$$APG = \sum_i (D_i \Delta \ln TFPR_i) + \sum_i D_i \left[\sum_{\text{Input}} (\alpha_{\text{Input}} - s_{\text{Input}_i}) \Delta \ln Input_i \right]$$

- Aggregate productivity following literature (Petrin & Levinsohn (2012);Rotemberg (2019); Bau & Matray (2023))
- Combines estimates of how changed credit usage from increased lender competition affects:
  - Technical efficiency: Firm internal efficiency improvements
  - Allocative efficiency: Shift resources between firms

Aggregating productivity growth

$$APG = \sum_i (D_i \Delta \ln TFPR_i) + \sum_i D_i \left[\sum_{\text{Input}} (\alpha_{\text{Input}} - s_{\text{Input}_i}) \Delta \ln Input_i \right]$$

- D_i: firm's i share of total sales in industry — observed
- $\Delta \ln TFPR_i$: the causal change in productivity from anti-trust policy — estimated through production function estimation (PFE) and instrumental variable (IV) models
- α_{Input}: revenue elasticity with respect to input — estimated through PFE
- s_{Input}: firm-level revenue share of input — observed
- $\Delta \ln Input_i$: causal change in input from policy — estimated via IV

Step 1: Production function estimation: Elasticities

Consider Cobb-Douglas revenue production function for firms (borrowers):

$$Revenue_{it} = TFPR_{it} K_{it}^{\alpha_k} L_{it}^{\alpha_l} M_{it}^{\alpha_m}$$

Input	α_{Input}
Labor	0.321
	(0.032)
Expenditures	0.701
	(0.006)
Capital	0.120
	(0.005)
Observations	334,732

Note: Labor Measured in # Employees

Step 2: Constructing instrument

1. Create *firm-level* instruments for credit usage based on *supply-side* instruments used in demand estimation:

$$ln(Credit_{ispt}) = \alpha r_{ispt} + \gamma_t + \gamma_s + \gamma_p + \varepsilon_{ijpt},$$

to obtain $ln(\widehat{Credit})_{ispt}^{supply}$ netting out residuals ε_{ijpt}

$\Rightarrow$ Isolates variations in credit that are driven by credit supply factors
- $\alpha = -0.34$ *[consistent with structural demand estimates for loan use]*
- F-stat $= 102$

2. Regress $TFPR_{ispt}$ on lagged $ln(\widehat{Credit})_{ispt}^{supply}$ + controls

Step 3: Regress firm $TFPR_{ispt}$ on lagged $\widehat{ln(Credit)}^{supply}_{ispt}$ + controls

VARIABLES	(1) F. ln(TFPR)	(2) F. ln(TFPR)	(3) F. Δ ln(TFPR)	(4) F. Δ ln(TFPR)
Instrumented ln(Credit)	0.0208***	0.0189***	0.0175***	0.0224**
	(0.00508)	(0.00703)	(0.00467)	(0.00953)
ln(TFPR)	0.441***	-0.0125		
	(0.00844)	(0.0107)		
Observations	70,065	63,285	70,065	63,285
R-squared	0.343	0.625	0.016	0.175
Year FE	YES	YES	YES	YES
Sector FE	YES	NO	YES	NO
Province FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Robust standard errors clustered at the firm-level in parentheses

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

- 20% loan use ↑ 0.4% firm TFPR

Step 4: Estimating aggregate productivity growth

$$APG = \sum_i (D_i \Delta \ln TFPR_i) + \sum_i D_i \left[\sum_{\text{Input}} (\alpha_{\text{Input}} - s_{\text{Input}_i}) \Delta \ln Input_i \right]$$

Estimated and Calibrated Targets			
Target	Elasticity to Credit	Input Elasticity	Mean Shares of Revenue
TFPR	0.02	–	–
Capital	0.09	0.12	0.06
Expenditures	0.10	0.70	0.62
Labor	0.02	0.32	0.27
	p25	Median	p75
% Change in Credit	3.42	20.28	61.19
APG Estimates (%)			
Type of Effect of Credit	Total Effect	Allocative Efficiency	Reallocation
Homogeneous at 20%	0.35	0.23	0.12
Heterogeneous	0.71	0.46	0.25

Benchmark: Aggregate TFPR growth between 2010 to 2017 $= 1.26\%$

Overview

- **Novel evidence:**
  - Decompose markups into demand-side, supply-side, and risk-adjustment
  - Find supracompetitive pricing from reduced competition ($\uparrow$ 17%)

- **Implications for credit allocation:**
  - Reduced loan use ($\downarrow$ 21%) and demand use ($\downarrow$ 13%)
  - Welfare effects are not equally distributed — smaller/younger firms more distorted

- **Implications for aggregate economy:**
  - APG 0.7 p.p. smaller than in competitive benchmark (56% of Ecuador TPFR growth in 2010-2017)
  - 2/3 from direct effect on within-firm productivity
  - 1/3 from reallocation between firms

Thank you!

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Event-study regression

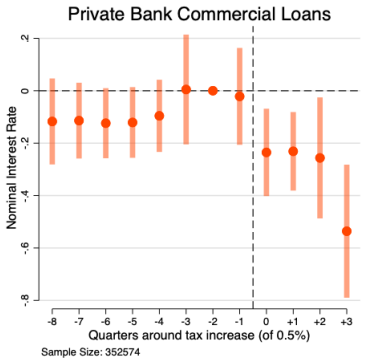
For loan l to firm f from bank k at quarter t

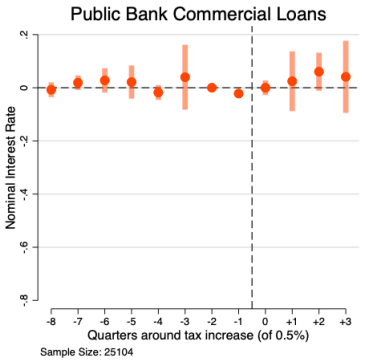
$$r_{lfbt} = \sum_{k=-8}^{3} \delta_k 1\{t \in k\} + \sum_{a=1}^{20} \beta_a 1\{A \in j\} + \sum_{m=1}^{20} \gamma_m 1\{M \in z\} + \lambda DP + \alpha_f + \alpha_b + \varepsilon_{lfbt}$$

- r: pre-tax nominal interest rate (in percentage points)
- δ_k: dynamic coefficients; normalize $\delta_k = 0$ for $k = -2$
- A & M: amount borrowed & maturity buckets
- DP: Default probability
- α_f: firm fixed-effects
- α_b: bank fixed-effects
- Standard-errors clustered at bank-quarter level

Return

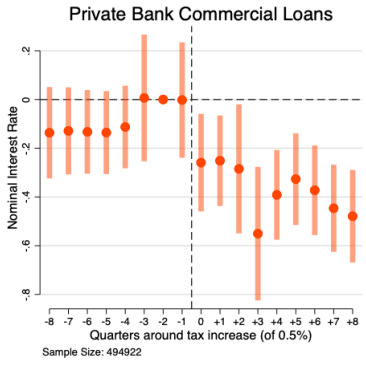
Event study: Bank+Firm FE





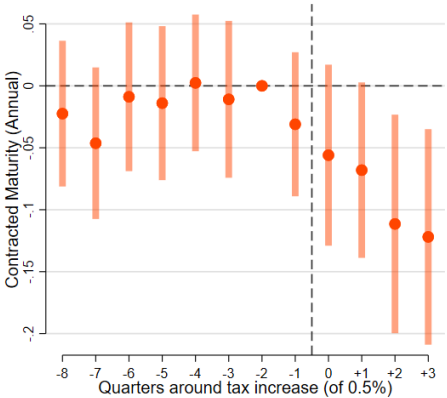
Return

Event study: Long-term

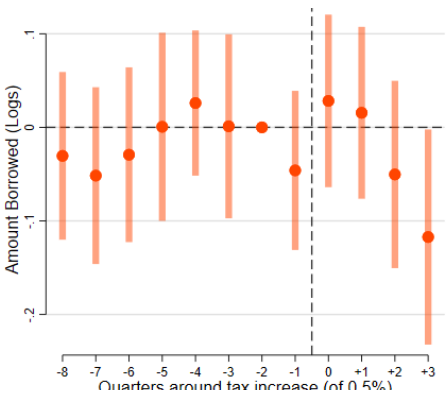


Return

Event study: Maturity and amount



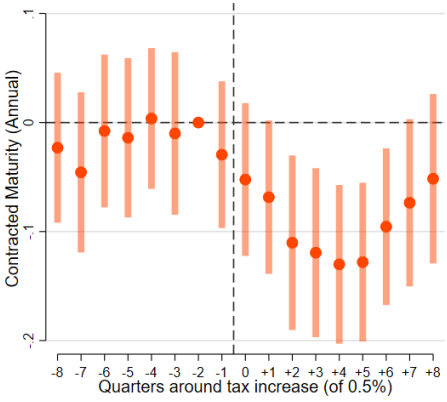
(a) Maturity; bank & firm FE



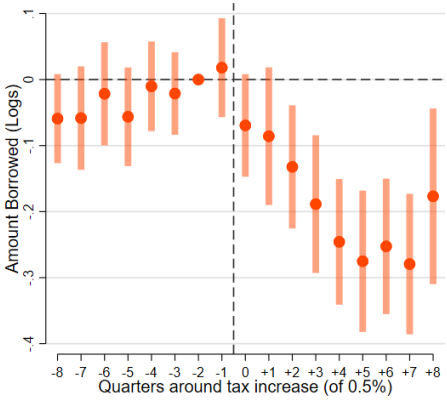
(b) Amount, bank & firm FE

Return

Event study: Long-term maturity and amount



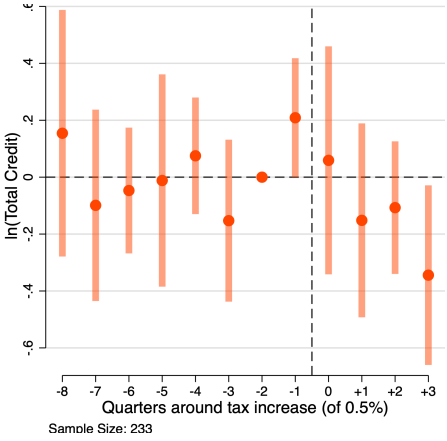
(a) Maturity; bank & firm FE



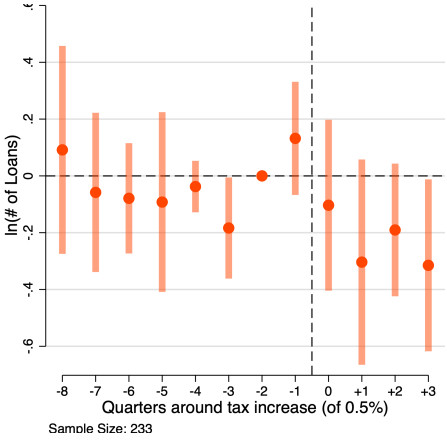
(b) Amount, bank & firm FE

Return

Event study: Aggregate



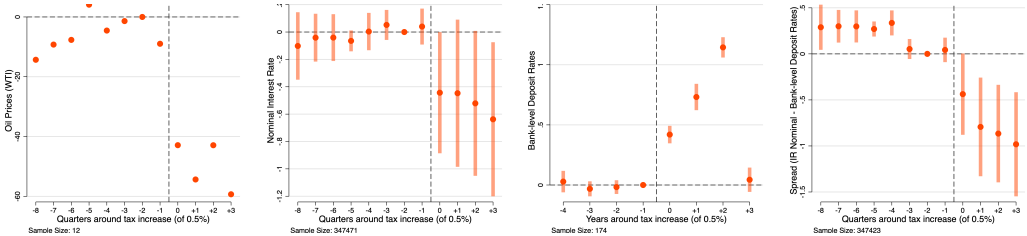
(a) Total Volume Credit



(b) Total # Loans

Return

Event study: Threats to identification



(a) Oil Prices **(b)** IR cont. Oil **(c)** Deposit Rates **(d)** Spread

- Oil price collapse in 2014: pattern of oil prices is not sufficient to explain changes in interest rates (panel a) + pass-through is still incomplete after controlling for flexible oil price trend (panel b)
- Bank-level *yearly* deposit rates also adjust in 2015 (panel c), though effect is further evidence *against* complete pass-through
- Spreads (transaction-level interest rates minus bank-year-level deposit rates) consistent with incomplete pass-through (panel d)

Return

Event study: Robustness

	Outcome: Tax-inclusive interest rate			
	(1) Oil	(2) GDP	(3) Year-Q	(4) Short-term
Pass-through (ρ)	0.609	0.408	0.705	0.702
	(0.387)	(0.214)	(0.372)	(0.159)
WTI Oil Price	0.128			
	(0.043)			
(WTI Oil Price)^2	-0.002			
	(0.001)			
(WTI Oil Price)^3	0.000			
	(0.000)			
Province GDP Growth		-0.013		
		(0.026)		
(Province GDP Growth)^2		-0.003		
		(0.006)		
(Province GDP Growth)^3		-0.000		
		(0.004)		
Pr(Default) Control	Yes	Yes	Yes	Yes
Maturity & Amount Controls	Yes	Yes	Yes	Yes
Pair Fixed Effect	Yes	Yes	Yes	Yes
Year-quarter Fixed Effect	No	No	Yes	No
Observations	347,471	489,251	489,251	287,070

Return

Summary statistics: Commercial loan market

Variable	Below Median HHI	Above Median HHI
	Panel A: Branch Information	
# Branches	5.16	2.69
# Other Private Banks	15.93	10.45
# Other Private Branches	104.13	43.32
Observations	891	880
	Panel B: Credit Information	
Total Volume	105,000,000	12,600.000
# Clients	141.53	25.37
# Loans	937.30	93.01
Av. Loan	182,430.30	99,334.42
Av. Maturity	1.09	0.92
Av. Interest Rate	9.99	11.01
# Loans per Client	114.79	12.97
Observations	891	880

Return

Summary statistics: borrowers

Variable	Mean	Median	SD	Min.	Max.	Obs.
	Panel A: Firm-Level Data: Active Borrowers					
Firm Age	12.25	9.00	11.14	0.00	96.00	97,796
Total Assets	2.05	0.40	4.22	0.00	20.66	97,796
Total Sales	2.57	0.62	4.86	0.00	23.14	97,796
Total Wages	0.36	0.10	0.63	0.00	2.98	97,796
Total Debt	1.31	0.28	2.61	0.00	12.65	97,796
Leverage	0.66	0.71	0.28	0.00	1.19	97,796
	Panel B: Firm-Level Data: Non Active Borrowers					
Firm Age	9.92	7.00	10.09	0.00	93.00	359,827
Total Assets	0.46	0.05	1.73	0.00	20.66	359,827
Total Sales	0.43	0.03	1.70	0.00	23.14	359,827
Total Wages	0.07	0.01	0.25	0.00	2.98	359,827
Total Debt	0.26	0.02	1.01	0.00	12.65	359,827
Leverage	0.54	0.58	0.40	0.00	1.19	359,827

+

Return

Summary statistics: Loans

Variable	Mean	Median	SD	Min.	Max.	Obs.
			Panel C: Loan-Level Data			
Number of Bank Relationships	1.38	1.00	0.79	1.00	7.00	97,796
Number Loans	8.88	2.00	100.66	1.00	9,195.00	97,796
Age Bank Relationship	2.31	2.00	2.41	0.00	16.00	135,091
Loan Interest Rate	9.20	8.95	3.48	0.00	25.50	885,229
Loan Amount	0.10	0.01	1.73	0.00	466.00	885,229
Annual Loan Maturity	0.51	0.25	0.80	0.00	27.39	885,229
1(Loan with Rating $<$ B)	0.02	0.00	0.14	0.00	1.00	885,229
Default Observed	0.00	0.00	0.06	0.00	1.00	744,257

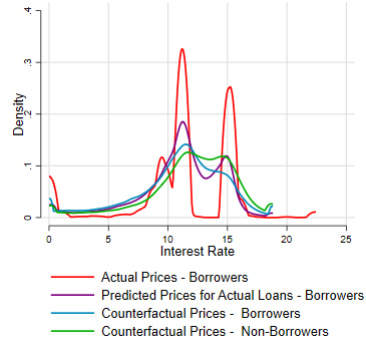
Return

Matching process

VARIABLE	Unmatched / Matched	Mean: Treated	Mean: Control	% bias	% Reduction in bias	t-test: t	t-test: p>t
Age - Bucket 1	U	0.155	0.305	-36.3		-31.39	0
	M	0.155	0.154	0.4	98.9	0.96	0.335
Debt - Bucket 1	U	0.073	0.220	-42.5		-41.51	0
	M	0.073	0.073	0.1	99.9	0.14	0.885
Assets - Bucket 1	U	0.073	0.206	-39.2		-37.77	0
	M	0.073	0.073	-0.1	99.8	-0.19	0.85
Sales - Bucket 1	U	0.063	0.207	-42.9		-42.98	0
	M	0.063	0.063	0.2	99.6	0.49	0.622
Wages - Bucket 1	U	0.075	0.232	-44.7		-43.88	0
	M	0.075	0.073	0.4	99.1	1.1	0.273
Age - Bucket 2	U	0.379	0.381	-0.3		-0.25	0.804
	M	0.379	0.380	-0.1	58.9	-0.28	0.778
Debt - Bucket 2	U	0.423	0.455	-6.5		-5	0
	M	0.423	0.425	-0.4	94.4	-0.77	0.443
Assets - Bucket 2	U	0.436	0.466	-6		-4.61	0
	M	0.436	0.436	-0.1	98.7	-0.17	0.868
Sales - Bucket 2	U	0.373	0.460	-17.8		-13.91	0
	M	0.373	0.374	-0.2	98.7	-0.52	0.606
Wages - Bucket 2	U	0.389	0.484	-19.2		-15	0
	M	0.389	0.390	-0.2	99.1	-0.38	0.707
Age - Bucket 3	U	0.465	0.314	31.5		23.59	0
	M	0.465	0.466	-0.2	99.3	-0.42	0.671
Debt - Bucket 3	U	0.504	0.325	37		27.74	0
	M	0.504	0.502	0.3	99.1	0.68	0.495
Assets - Bucket 3	U	0.491	0.328	33.6		25.25	0
	M	0.491	0.490	0.1	99.6	0.26	0.792
Sales - Bucket 3	U	0.563	0.333	47.7		36.03	0
	M	0.563	0.563	0.1	99.7	0.26	0.794
Wages - Bucket 3	U	0.536	0.285	53		39.22	0
	M	0.536	0.537	-0.1	99.8	-0.21	0.835

Return

Predicted prices



$$r_{ikmt} = \gamma_0 + \gamma_x X_{ikmt} + \gamma_2 ln(L_{ikmt}) + \gamma_3 ln(M_{ikmt}) + \lambda_{kmt} + \omega_i^r + \tau_{ikmt}$$

- Explains ≈65% of the variation in observed commercial loan prices

Return

Over-identification tests for instrumented price parameter (α)

Region	$\widehat{\alpha}$	t-statistic	F-statistic (Cragg-Donald)	P-value over-identification (Sargen-Hansen)
Azuay	-0.245	-4.47	246	0.249
Costa	-0.048	-2.30	1,756	0.214
Guayas	-0.434	-2.75	816	0.341
Pichincha	-0.386	-3.83	305	0.753
Sierra	-0.091	-7.71	3,841	0.666

Return

Demand-side: Parameters

Variable	(1) Mean Across Markets	(2) Standard Error (1,000 Bootstraps)
Price	-0.24	0.08
Sigma (unobserved heterogeneity)	0.81	0.05
Scaling factor (match proportion borrowers)	1.06	0.39
Log(Branches)	2.26	1.02
Age Firm	-0.03	0.01
Age Relationship	0.39	0.04
Assets	0.24	0.11
Debt	-0.01	0.05
Expenditures	0.06	0.04
Revenues	-0.02	0.04
Wages	0.01	0.03

Return

Demand-side: Elasticities

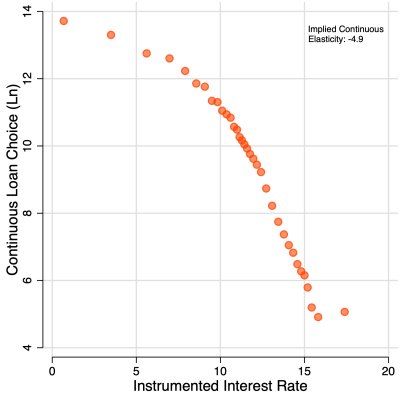
Elasticities	Mean	Median	Std. Dev.	Min.	Max.	Count
Continuous	-4.63	-4.50	2.68	-9.58	-0.86	628,450
Discrete	-6.01	-0.55	11.33	-42.80	0.00	628,450
Total	-10.71	-7.31	10.21	-44.68	-2.81	628,450
Cross	0.17	0.01	0.36	0.00	1.38	627,704

A 1% increase in price results in a:

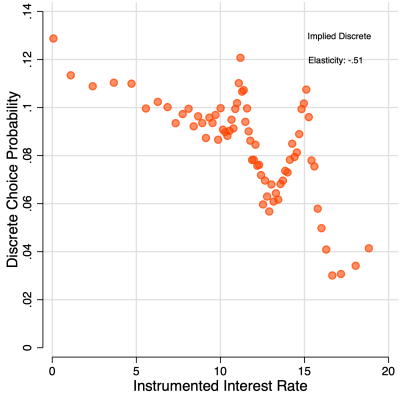
- 4.50% decrease in loan size demanded
- 0.55% decrease in market share
- Increases competitor's market shares by 0.01%

Return

Demand-side: Elasticities (Reduced-form)



(a) Continuous



(b) Discrete

Return

Demand-side: Fit

	Mean	SD	Count
Observed Market Share	0.06	0.25	681,722
Model Market Share	0.06	0.15	681,722
Observed Loan Use	9.43	2.33	39,586
Predicted Loan Use	9.42	1.49	39,586
Observed Prices	11.27	4.42	39,586
Predicted Prices	11.21	3.54	39,586
Observed Default	0.02	0.14	39,586
Predicted Default	0.02	0.04	39,586

Return