Disentangling the Impact of Financial Inclusion on Households and Firms: The Business Finance Channel

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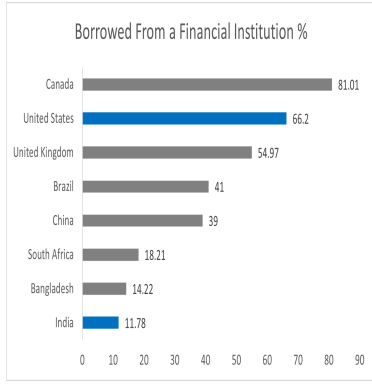
How does expansion in bank access affect households?

- Increases household consumption, reduces poverty
  - eg. Burgess and Pande, 2005, Bruhn and Love, 2014, Agarwal et al., 2017, Celérier and Matray, 2019, Cramer, 2021, Barboni et al., 2022.
- Household demand channel: households borrow and consume more, increasing household demand.
- Business finance channel: banks ease firm financial constraints.
- But household debt may reduce growth, increase poverty (Mian, et al., 2017, Fulford, 2013).



Research Questions

1. How does a nationwide bank expansion program affect households and firms?
2. Is the household demand or business finance channel operative in emerging markets?
3. Do banks facilitate urbanization and structural change?

Identification Strategy

- Use the Reserve Bank of India's nationwide **branch expansion policy**.
- Policy incentivized banks to set up branches in **underbanked** districts.
- Regression discontinuity design pioneered by Young (2017), and used by Khanna and Mukherjee (2020) and Cramer (2021).

Preview of results

- Household consumption expenditures, purchase of durable goods increases.
- Not financed by household borrowing.
- Financial access for households increases - household savings and investments rise.
- Effects are skewed to urban households.
- *Firms* increase borrowing and employment; household wage earnings rise.
- Borrowing concentrated in urban firms in formal, manufacturing, service sectors.

Related literature

- Bank access increases household consumption, decreases poverty (eg. Burgess and Pande, 2005, Bruhn and Love, 2014, Celerier and Matray, 2019, Cramer, 2021, Barboni et al., 2022).
  - *We find that nationwide bank expansion benefits urban not rural households; esp poor and marginalized.*

- Bank access increases household borrowing (Burgess and Pande, 2005, Celerier and Matray, 2019, Barboni et al., 2022), reduces informal borrowing (Agarwal et al., 2017), or has no effect (Cramer, 2021).
  - *We find consumption loans, interest payments, loans from informal & formal sources, and debt fall.*

- Banks ease financial constraints for firms (Bai, et al. 2018, Young, 2017, Dehejia and Gupta, 2022. Fonseca and Matray, 2022, Jiao and Mo, 2023, Kulkarni et al. 2023); hospitals (Cramer, 2021); increases household wages (Burgess and Pande, 2005, Bruhn and Love, 2014, Barboni, et al., 2022).
  - *We link effect on firms to households, and wage rise in households to firms.*

- Informal entrepreneurship increases (Bruhn and Love, 2014, Barboni et al. 2022); informal micro-entrepreneurship falls (Dehejia and Gupta, 2022).
  - *We find formal, urban firms increase borrowing and employment, not informal, rural firms.*

Bank expansion policy and regression discontinuity design

Bank Expansion Policy and Regression Discontinuity Design

- In 2005, RBI incentivized banks to open branches in under-banked districts.

- Under-banked districts defined as those with a population-to-branch ratio below the national average; which allows for a regression discontinuity (RD) design.

- Young (2017) first used this RD design with ASI and night lights data; Cramer (2021) combines RD with household data, as we also do here.

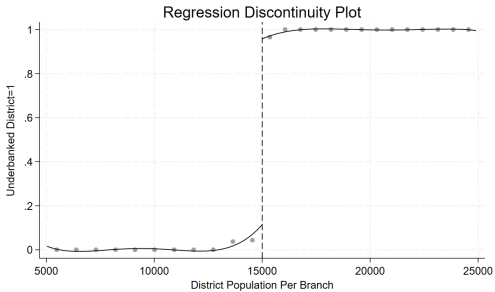
- Compare districts just above the cutoff to those just below and estimate a fuzzy RD specification (Imbens, 2007):

$$Y_{h,d} = \alpha + \gamma_1 \mathit{Treated}_d + f(\mathit{Population\ per\ Branch} - \mathit{Cutoff})_d + \epsilon_d$$

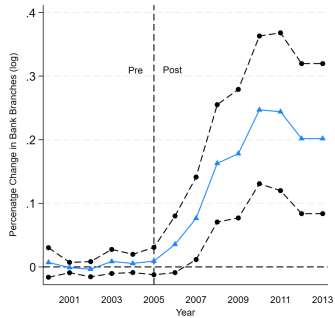
  - $Y_{h,d}$ is a banking, household, or enterprise outcome in district d
  - $\mathit{Treated}_d$ is equal to 1 if a district's population-to-branch ratio is greater than the national average
  - $f(\mathit{Population\ per\ Branch} - \mathit{Cutoff})_d$ is a flexible functional form estimating the fuzzy approach
  - ϵ_d is an idiosyncratic error term clustered at the district level.

Fuzzy RD design

- Predict under-banked status of 579 of 582 districts in RBI's list of under-banked districts.
- Bank branches increase post-policy.



Likelihood of being Under-banked



Bank Branches, Pre and Post Policy

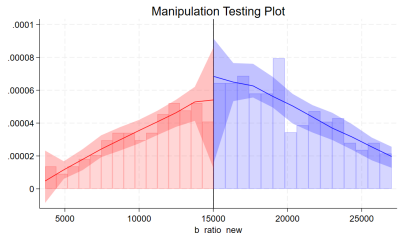
Data sources: RBI Quarterly Branch Statistics, 2006 and Census, 2001.

Testing RD Identification Assumption

Districts just above and just below the cutoff are comparable, except for the treatment.

Check if districts manipulate the ratio to become treated.

1. Population data from 2001 census; branches data collected by RBI.
2. No evidence of manipulation of district population or bank branch data.
   - McCrary density test
   - Smoothness before the policy for all outcome variables Smoothness Tests
3. Heterogeneity analysis (rural-urban populations) does not bias identification. Rural-Urban



McCrary Population Density Test

Figure: The t-statistic for the McCrary discontinuity estimate is 0.1483 with a p-value of 0.8821.

Data

Data

- Bank branch data from the Reserve Bank of India.
  - RBI MOF (Cramer)
  - RBI's Quarterly Statistics of Bank Branches, Credit and Deposits
  - RBI Basic Statistical Returns (2005-2015)

- India Human Development Survey (IHDS)
  - Panel data on 40,000 households.
  - Observe consumption expenditures, schooling, use of financial products, employment.
  - Pre Policy–2005, Post Policy–2012.

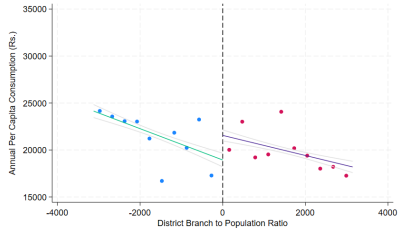
- Economic Census (EC)
  - Universe of enterprises; observe employment, loans. Pre Policy–2005, Post Policy–2013

- All India Debt and Investment Survey Data (AIDIS)
  - Household survey data on debt and assets; Pre Policy–2003, Post-Policy–2013

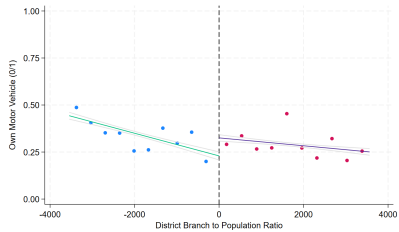
Impact of bank expansion on household consumption

Bank expansion increases household consumption

- Household per capita real consumption expenditures increase by 13%.
- Likelihood of owning a motor vehicle increases by 9%.



Real consumption exp (Rupees)

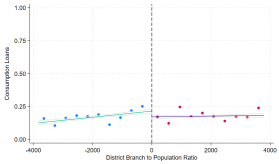


Motor Vehicle Ownership (0/1)

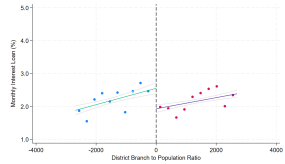
Impact of bank expansion on household borrowing

Increase in consumption not financed by household borrowing

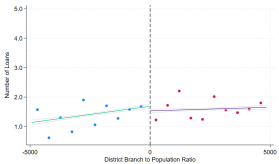
- Likelihood of **consumption loans falls by 40%**.
- **Interest rate** falls 47%.
- Number of loans from any source falls.
- **No increase** in debt.



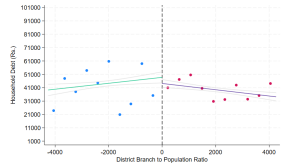
Likelihood of Consumption Loans (0/1)



Monthly Interest Rate (%)



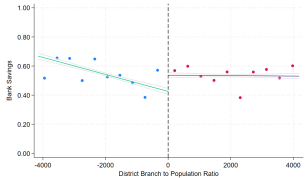
Total Number of Loans



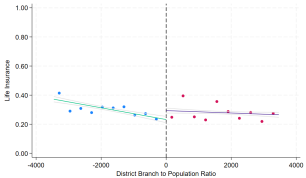
Aggregate Household Debt (Rupees)

Household access to savings & investments increases

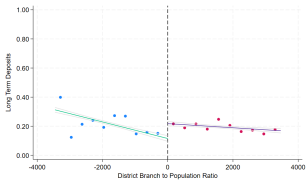
- Increases household savings by 35%.
- Purchase of life insurance by 17%.
- Increases long term deposits by 37%.



Household Savings Account (0/1)



Life Insurance (0/1)

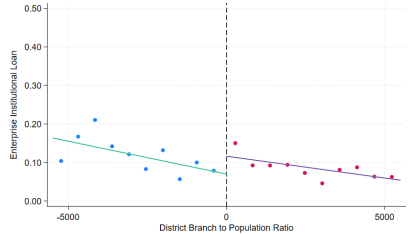


Interest-bearing deposit Account (0/1)

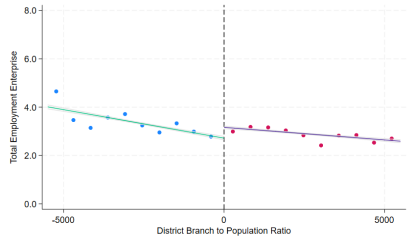
Impact of bank expansion on firms

Bank expansion increases borrowing and employment in firms

- Increases likelihood that firms borrow from a financial institution by 57%.
- Increases total employment in firms by 25%.



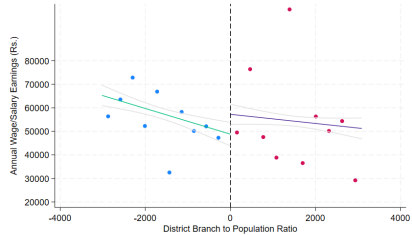
Likelihood of bank loan (0/1)



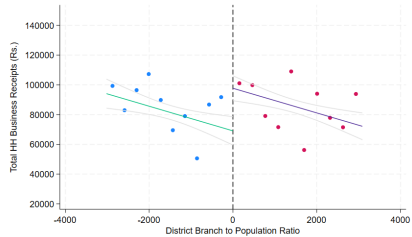
Total employment

Bank expansion increases household wages

- Increases household wage income by 16%.
- Increases business revenues of household-owned enterprises by 61%.



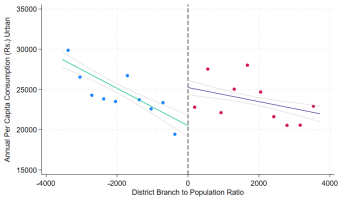
Household Wage Earnings (Rupees)



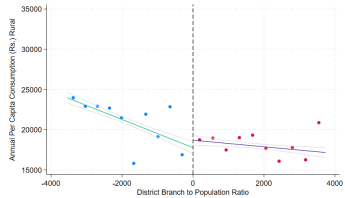
Household-owned Business Revenues (Rupees)

Heterogeneous impact of bank expansion on households

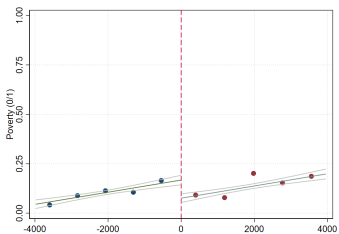
Consumption increases and poverty falls for *urban* households



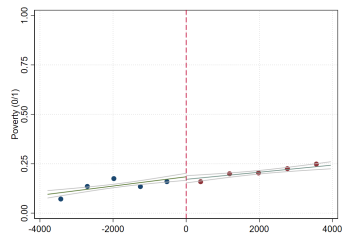
Urban HH Consumption Expenditures (Rs)



Rural HH Consumption Expenditures (Rs)

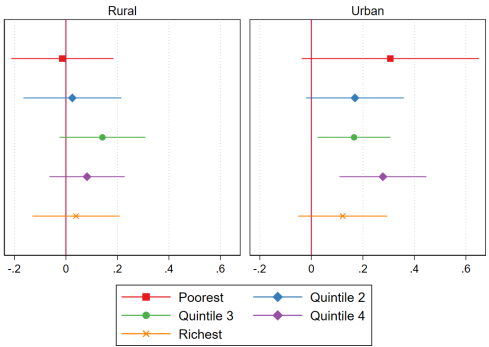


Urban Poverty (0/1)

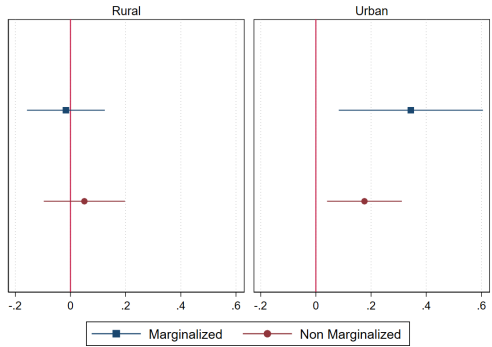


Rural Poverty (0/1)

Poorest, *socially marginalized*, urban households benefit

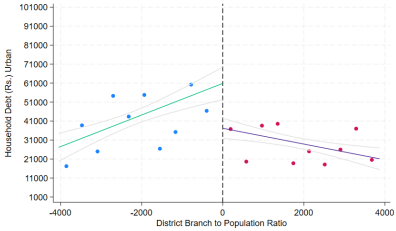


Treatment Effect by Income Quintiles

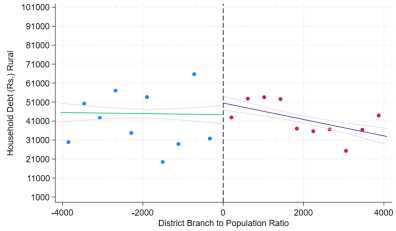


Treatment Effect by Social Group Marginalization

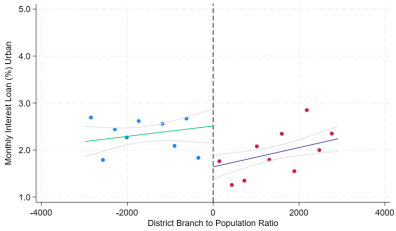
Borrowing and debt decreases for urban households



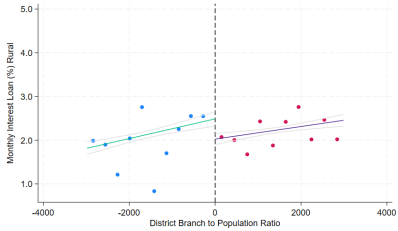
Urban household debt



Rural household debt



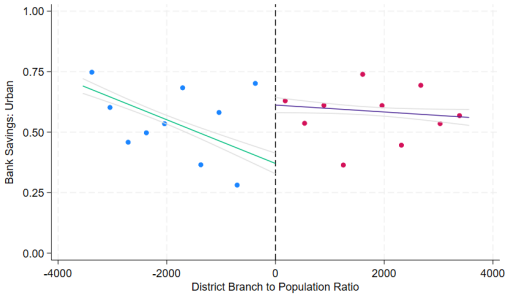
Urban Monthly Interest Rates on Loans(%)



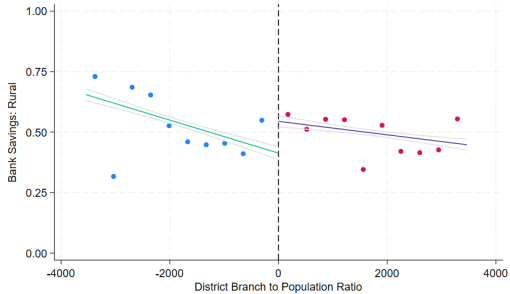
Rural Monthly Interest Rates on Loans(%)

Not explained by lack of financial access for rural households

Both rural and urban households more likely to have savings accounts.



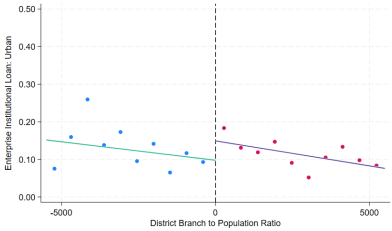
Urban Household Savings (0/1)



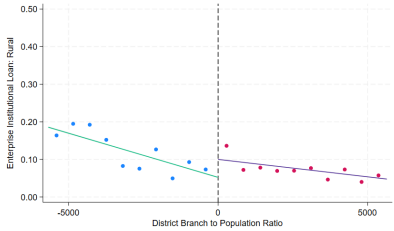
Rural Household Savings

Heterogeneous impact on firms

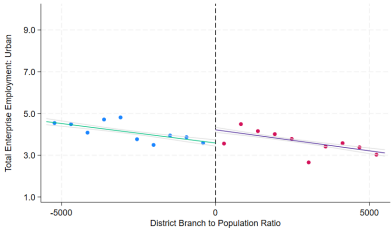
Borrowing and employment increases in urban firms



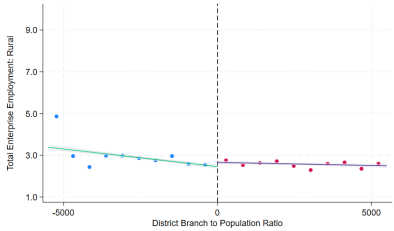
Urban Firm Bank Loan (0/1)



Rural Firm Bank Loan (0/1)



Urban Firm Total Employment



Rural Firm Total Employment

Bank expansion channels capital to formal firms

Increases borrowing by formal, manufacturing, and service sector firms in urban areas.

	(1)	(2)	(3)	(4)	(5)	(6)
	Formal			**Informal**		
	All	Rural	Urban	All	Rural	Urban
Enterprise Institutional Loans (0/1)						
Treated	0.0414**	0.0540**	0.0400**	0.00878	0.010	0.014**
	(0.018)	(0.025)	(0.019)	(0.007)	(0.006)	(0.006)
Observations	722,363	329,975	392,388	54,282,267	33,131,949	21,150,318

	Rural			**Urban**		
	Primary	Secondary	Services	Primary	Secondary	Services
B: Enterprise Institutional Loans						
Treated	0.0133	0.006	0.015*	0.008*	0.019**	0.013*
	(0.008)	(0.010)	(0.008)	(0.004)	(0.007)	(0.007)
Observations	11,623,782	5,821,063	16,017,079	1,022,318	4,998,381	15,522,007

Conclusion

- Using data on both households and firms show that nationwide bank expansion benefits households by easing financial constraints for firms.
- Positive labor market effects reduce household dependence on borrowing to finance consumption.
- Benefits of nationwide bank expansion accrue to urban, not rural households, driven by positive impact on urban labor markets.
- Bank expansion facilitates urbanization, formalization, and structural change.

Survey Sub-sample Check

Table: Bank expansion validity with survey sub-samples

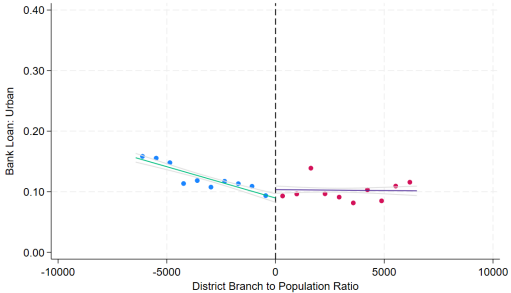
Notes: Aggregate, rural or urban sub-samples when analyzed separately satisfy the randomization required for the RDD.

	(1)	(2)	(3)
	Full Sample	Rural Sample	Urban Sample
RD Robust Estimate	-0.005 (0.150)	-0.002 (0.183)	0.003 (0.165)
Two stage q values	0.991	0.994	0.892
Bandwidth	4,339	4,126	4,798
Baseline Controls	No	No	No
Observations	581	581	581

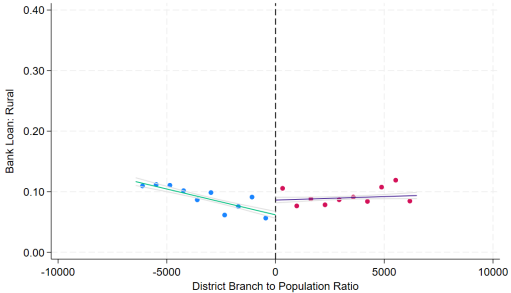
back

Financial access in rural versus urban areas

Likelihood of households having a bank loan (AIDIS data) increases for rural households $\Rightarrow$ results not explained by selective branch expansion into urban areas.

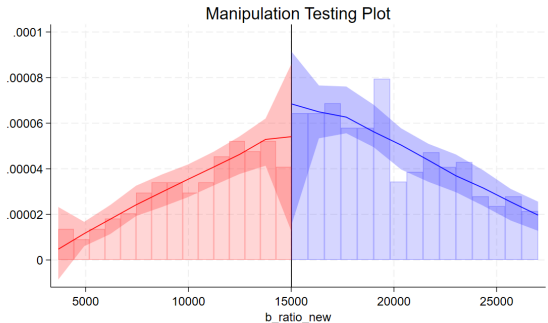


Bank Loan (0/1) for Urban Households



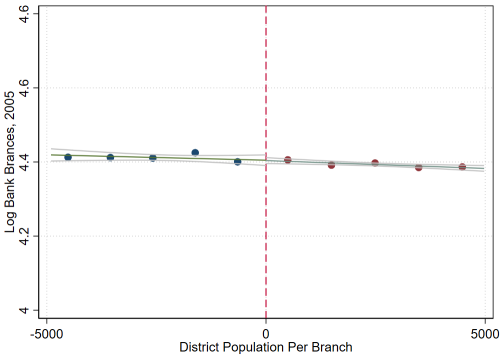
Bank Loan (0/1) for Rural Households

McCrary Density Test

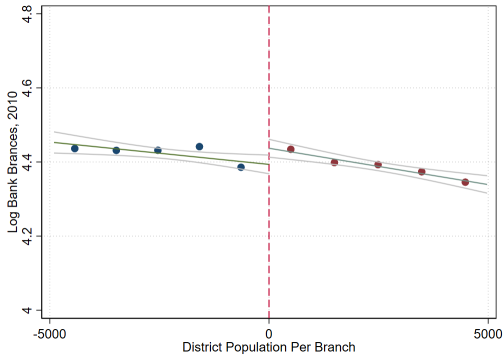


The t-statistic for McCrary discontinuity estimate is 0.1483 with a p-value of 0.8821.

Pre-policy Smoothness and Post-policy Discontinuity in Bank Branches



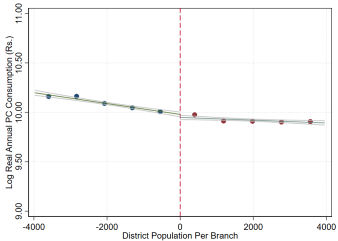
Pre-policy Log Bank Branches



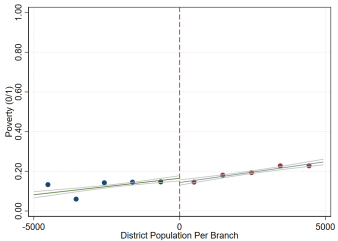
Post-policy Log Bank Branches

Back

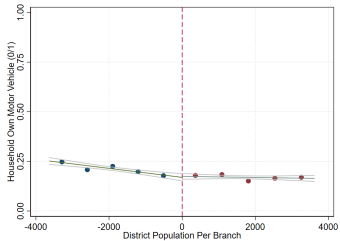
Pre-Policy Smoothness in Household Consumption



Pre-policy Consumption Expenditures



Pre-policy Poverty



Pre-policy Motor Vehicle Ownership

Back