

Does Financial Inclusion Mitigate Social Exclusion?

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Background

- Financial inclusion and its wide-ranging socioeconomic impacts.
- Direct and indirect impact on household well-being, women's empowerment and accumulation of human capital, especially in underdeveloped and developing countries (Burgess and Pande, 2005; Ashraf et al., 2006; Banerjee et al., 2017; Kochar et al., 2022; Ngo and Wahhaj, 2012; Dupas and Robinson, 2013; Cramer, 2021; Gupta and Sedai, 2023).
- Financial inclusion is identified as an enabler for seven Sustainable Development Goals (SDGs).
- Gap in literature- lack of large-scale and comprehensive causal investigation into how financial inclusion can alleviate deeply entrenched social disparities.
- Caste-based discrimination: major source of social disparity in India.

What We Do

- **Broad Question:** Can financial inclusion reduce welfare disparity resulting from caste-based social exclusion?
- It can, through a reduction in caste-based discrimination.
- **Quasi-experimental setup:** Reserve Bank of India (RBI) bank branch expansion policy (2005)
- Incentive to banks to open branches in the underbanked districts.
- Causal **regression discontinuity (RD) framework.**
- General equilibrium framework that integrates household-level data, administrative records, and Census data to investigate the multifaceted implications of bank branch expansion on both households and enterprises by caste.
- Effectiveness of the bank branch expansion policy in enhancing financial inclusion. Resulting reduction in caste-based welfare disparity.

Role of Caste Identity

- Caste: A determining factor in **education** (Munshi and Rosenzweig, 2006; Hanna and Linden, 2012; Hoff and Pandey, 2014), **access to healthcare services** (Luke and Munshi, 2007), **access to public goods** (Anderson, 2011) and **marital choices** (Munshi and Rosenzweig, 2009).
- World's largest affirmative action program was undertaken by GOI to eliminate caste-based discrimination and social exclusion, but **caste continues to play a significant role in all facets of Indian society**.
- The caste-based discrimination has resulted in **significant welfare disparity between marginalized and non-marginalized castes in India** (Deshpande, 2000; Kijima, 2006).

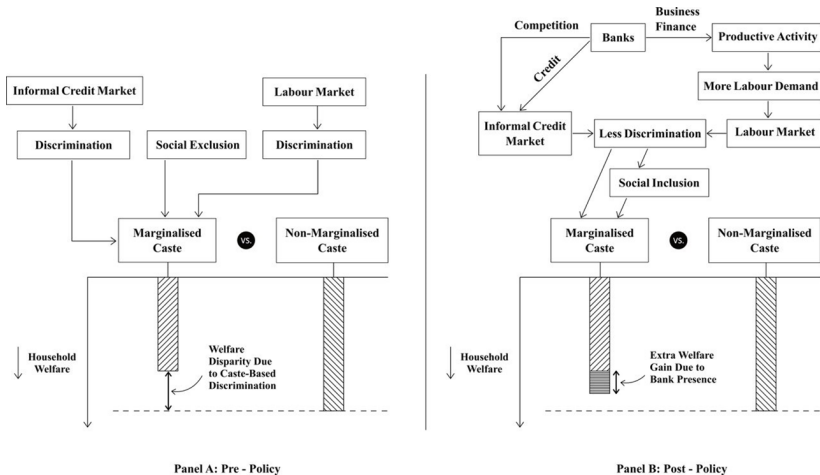
Caste Discrimination in Labour Market

- In the labour market, the caste identity often restricts occupational mobility (Munshi and Rosenzweig, 2006) and gives rise to **caste-based wage discrimination** where marginalized workers systematically get lower wages compared to their non-marginalized counterparts (Banerjee and Knight, 1985; Ito, 2009; Das and Dutta, 2007).
- Furthermore, workers from marginalized castes often get assigned to less prestigious jobs (Das and Dutta, 2007; Deshpande and Sharma, 2016).
- The implication of caste in the labour market is so intense that workers often decline higher wages to avoid employments that do not fit with their caste identity (Oh, 2023).

Caste Discrimination in Informal Credit Market

- Caste-based discrimination acts as a barrier to access to credit, majorly in informal credit markets where the rate of interest charged can be heavily impacted by the caste-biasedness of the informal lender (Kumar, 2013; Mosse, 2018).
- A vast literature suggests that credit constraint can induce income inequality (Demirguc -Kunt and Levine, 2009), hinder agricultural investment and income growth (Kaboski and Townsend, 2012) and limit entrepreneurial opportunities (Banerjee et al., 2017).
- Credit constraints stemming from caste discrimination and the resulting interest rate disparity between marginalized and non-marginalized caste borrowers significantly contribute to the caste disparity in India.

Conceptual Framework



RBI Policy 2005

- Bank branch expansion policy of RBI (2005)
- The policy incentivizes commercial banks (excluding Regional Rural Banks) to open branches in 'underbanked' districts to increase their chance of obtaining branch-opening licenses for favoured locations.
- A district is tagged as 'underbanked' when the ratio of population to the number of bank branches in the district exceeds the national ratio.

Underbanked Districts

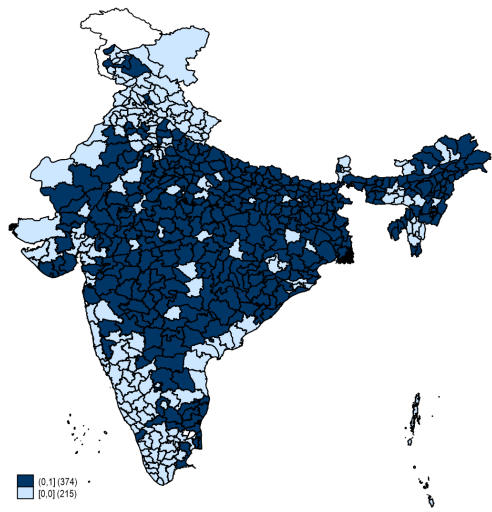


Figure 1: Map of Underbanked Districts in India

Regression Discontinuity Framework

- District-level population-to-bank branch ratio: Running variable
- National-level ratio (computed to be 14,780): Cutoff
- Treated=Underbanked

Fuzzy RD

- RBI's published list of underbanked districts (2006): Does not include the district level population-to-branch ratios.
- We reconstruct the ratio for each district using population census 2001 and RBI's data on number of bank branches.
- There are 10 districts for which the predicted underbanked status from our reconstructed ratio is different from their 'underbanked' status as per the RBI list.
- RBI could have used its own discretion in determining the underbanked status of these 10 districts ([Cramer, 2021](#))
- We adopt the fuzzy RD design instead of the sharp design ([Lee and Lemieux, 2010](#); [Dong and Lewbel, 2015](#)).

Fuzzy RD

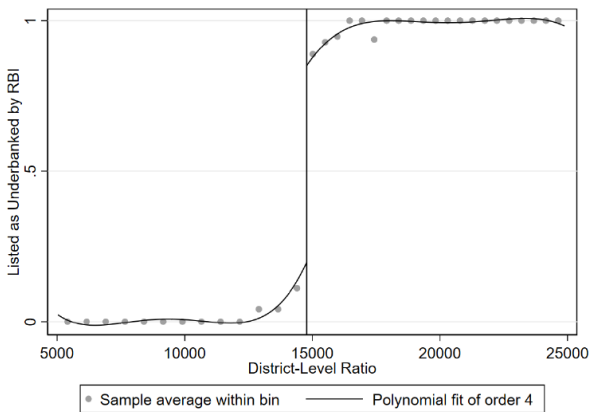


Figure 2: First Stage RD plot

Fuzzy RD Model

$$U_d = \beta_0 + \beta_1 T_d + \beta_2 R_d + \beta_3 T_d R_d + \alpha_1 X_d + e_d \quad (1)$$

$$Y_{h,d} = \delta_0 + \delta_1 U_d + \delta_2 R_d + \delta_3 R_d T_d + \alpha_2 X_d + v_d \quad (2)$$

- $U_d = 1$ if district d is listed as underbanked by RBI
- $T_d = 1$ if the district-level ratio is higher than the cutoff
- R_d is the running variable (the district-level population-to-branches ratio).
- Under the identifying assumption, the coefficient δ_1 can be interpreted as the local average treatment effect (LATE) of belonging to an underbanked district.

Validity of RD Framework

- **Identifying assumption:** Districts above and below the cutoff are similar in all aspects except the status of banked/underbanked.
- Smoothness of the running variable around the cutoff
- McCrary test
- Smooth pre-policy

Validity of RD Framework

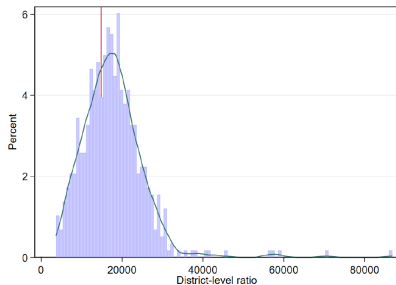


Figure 3: Histogram

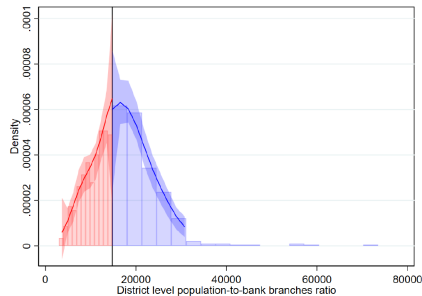
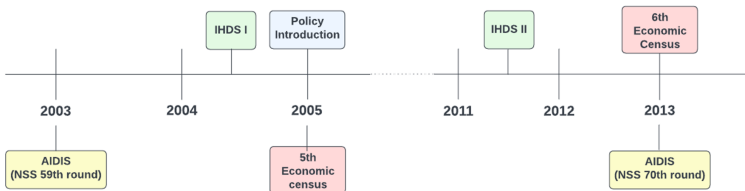


Figure 4: McCrary Test

Data Sources

- RBI Master Office File (MOF)
- Indian Human Development Survey (IHDS): 2004-05 and 2011-12
- All India Debt and Investment Survey (AIDIS): 2003 and 2013
- Economic Census: 2005 and 2013



Banks and Financial Inclusion

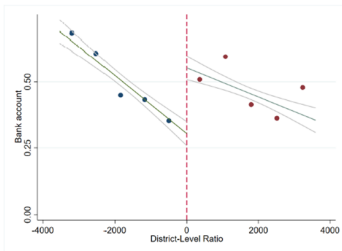
Table 1

Financial inclusion
increases across all
caste categories

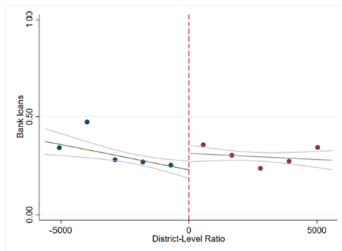
	(1) Bank Account	(2) Bank Loan	(3) Fixed Deposit	(4) Securities	(5) Insurance
(a) SC					
Treatment	0.400*** (0.157)	0.143* (0.074)	0.036 (0.024)	-0.002 (0.002)	0.135** (0.054)
Control mean	0.56	0.35	0.09	0.01	0.32
Robust p value	0.008	0.066	0.113	0.309	0.024
Bandwidth	3600	5664	5666	2253	4418
Effective obs	3920	2991	5107	2664	4467
Observations	8,451	4,813	8,453	8,453	8,452
(b) OBC					
Treatment	0.149** (0.084)	0.095 (0.077)	0.115*** (0.041)	0.009 (0.007)	0.045 (0.066)
Control mean	0.55	0.50	0.11	0.02	0.43
Robust p value	0.035	0.242	0.007	0.330	0.613
Bandwidth	5060	4107	3490	3834	5940
Effective obs	8510	4297	6362	6862	6989
Observations	13,291	8,088	13,292	13,293	13,293
(c) Gen					
Treatment	0.263*** (0.087)	0.120* (0.072)	0.082** (0.043)	0.022* (0.010)	0.045 (0.066)
Control mean	0.72	0.58	0.22	0.04	0.43
Robust p value	0.004	0.095	0.035	0.085	0.613
Bandwidth	5342	6605	7255	6749	5940
Effective obs	4673	2767	6649	5949	6989
Observations	8,425	3,997	8,420	8,423	13,293

Note: Treatment is district-level expansion of bank branches following the Reserve Bank of India, Branch Authorization Policy in 2005. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Standard errors clustered at district level. Data used: IHDS 2011-12. District population and number of bank branches in 1996 are controlled for. Source: Authors' calculation.

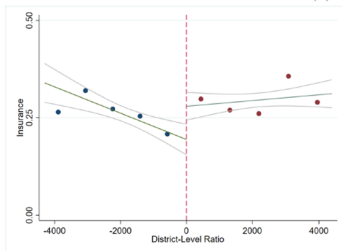
Banks and Financial Inclusion



(a) Bank Account



(b) Bank Loan



(c) Insurance

Banks and Household Welfare

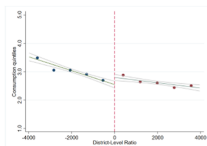
Table 2

- Household welfare increases mostly for SCs
- A reduction in caste-based welfare disparity

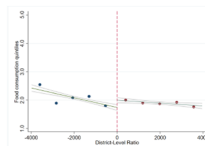
	(1) Consumption Quintiles	(2) Food Consumption Quintiles	(3) Poverty	(4) Multidimensional Poverty	(5) Social Inclusion
(a) SC					
Treatment	0.488** (0.300)	0.416** (0.179)	-0.104*** (0.049)	-0.061** (0.033)	0.172* (0.084)
Control mean	3.08	2.19	0.174	0.802	0.14
Robust p value	0.050	0.014	0.009	0.041	0.058
Bandwidth	3176	3792	4635	5483	5843
Effective obs	3652	3610	4718	18363	5198
Observations	8,580	7,601	8,580	31,090	8,538
(b) OBC					
Treatment	0.121 (0.246)	0.398** (0.202)	-0.033 (0.049)	-0.090* (0.062)	-0.018 (0.096)
Control mean	3.37	2.23	0.098	0.727	0.24
Robust p value	0.550	0.040	0.393	0.068	0.628
Bandwidth	3851	3997	4997	3561	3676
Effective obs	7053	6375	8605	23980	6747
Observations	13,610	12,081	13,610	50,181	13,530
(c) Gen					
Treatment	-0.005 (0.223)	0.110 (0.215)	-0.011 (0.024)	-0.127** (0.067)	0.083 (0.078)
Control mean	3.83	2.68	0.047	0.609	0.21
Robust p value	0.864	0.457	0.260	0.034	0.290
Bandwidth	5931	6103	5160	7071	6938
Effective obs	5285	4973	4751	24424	6420
Observations	8,624	7,749	8,624	31,333	8,593

Note: Treatment is district-level expansion of bank branches following the Reserve Bank of India, Branch Authorization Policy in 2005. Robust standard errors in parentheses (***) p<0.01, ** p<0.05, * p<0.1). Standard errors clustered at district level. Data used: IHDS 2011-12 household file for columns (1), (2), (3), (5) and individual file for panel (4). District population and number of bank branches in 1996 are controlled for. Source: Authors' calculation.

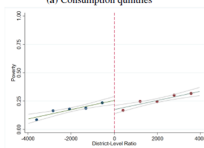
Banks and Household Welfare



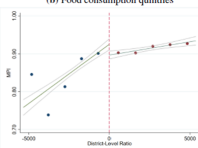
(a) Consumption quintiles



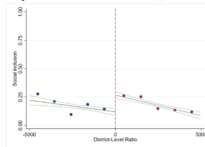
(b) Food consumption quintiles



(c) Poverty



(d) Multidimensional Poverty



(e) Social Inclusion

Mechanisms

- Informal Finance Channel
- Business Finance Channel
- Labour Market Channel

Informal Finance Channel

Table 3

Mode of discrimination: Excessive and unrealistic rate of interest demanded from the SCs.

AIDIS 2003: The average interest rate for SCs was 28%, whereas the same for OBCs and generals was 22% and 16%.

Banks - Competition - Reduced Informal Interest Rate for SCs

More informal loan taken by SCs. Mostly used for consumption. Additional channel of welfare enhancement.

	(1)	(2)	(3)
	SC	OBC	Gen
(a) Annual informal interest rate on loan			
Treatment	-8.113** (3.329)	-5.025* (2.574)	-3.377 (2.586)
Control mean	34.72	32.51	30.25
Robust p value	0.016	0.092	0.189
Bandwidth	3016	4312	4670
Effective obs	3613	9958	3604
Observations	7,401	16,856	6,426
(b) No mortgage informal loan			
Treatment	-0.152* (0.097)	-0.131** (0.080)	0.004 (0.021)
Control mean	0.88	0.89	0.93
Robust p value	0.075	0.050	0.949
Bandwidth	3521	3819	5234
Effective obs	5554	13374	7827
Observations	12,127	27,828	14,037
(c) Informal loan			
Treatment	0.090** (0.040)	-0.022 (0.029)	-0.006 (0.035)
Control mean	0.32	0.29	0.22
Robust p value	0.015	0.587	0.814
Bandwidth	4395	5307	5732
Effective obs	19693	60570	37941
Observations	38,436	95,887	64,034

Note: Treatment is district-level expansion of bank branches following the Reserve Bank of India, Branch Authorization Policy in 2005. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Standard errors clustered at district level. Data used: AIDIS 2013. District population and number of bank branches in 1996 are controlled for. Source: Authors' calculation.

Business Finance Channel

Table 4: Banks and the number of enterprises with formal finance as main source of credit

- How do banks finance businesses owned by different castes?
- Three key observations:
 1. Overall business loans increase for all caste categories
 2. Agricultural loans increase for the SC and OBC owners
 3. Nonagricultural business loans increase for the OBC and general categories.

	(1) SC	(2) OBC	(3) Gen
(a) All enterprises			
Treatment	80.80* (50.85)	647.41** (298.73)	376.27** (237.17)
Control mean	184.92	976.91	1199.38
Robust p value	0.081	0.031	0.048
Bandwidth	4481	4486	4805
Effective obs	284	284	296
Observations	581	581	581
(b) Agricultural enterprises			
Treatment	7.64* (5.39)	31.31* (21.33)	7.24 (22.03)
Control mean	5.64	39.98	35.93
Robust p value	0.083	0.093	0.305
Bandwidth	4160	4361	4237
Effective obs	260	277	268
Observations	581	581	581
(c) Non-agricultural enterprises			
Treatment	83.51 (65.86)	661.1** (291.9)	609.28* (375.38)
Control mean	179.28	936.94	1163.45
Robust p value	0.159	0.024	0.073
Bandwidth	4608	4405	4960
Effective obs	280	280	307
Observations	581	581	581

Note: Treatment is district-level expansion of bank branches following the Reserve Bank of India, Branch Authorization Policy in 2005. Robust standard errors in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Data used: Economic Census 2013. District population, number of bank branches in 1996 and pre-policy values of the outcome variables are controlled for. Source: Authors' calculation.

Labour Market Channel

- What do SCs, OBCs and generals do with the formal loans?
- The answer will provide insight into the labour market's response to the policy.
- We study the elaborate mechanisms in agricultural sector and non-agricultural sector separately.

Banks and Agricultural Sector

Table 5

SCs mechanize the process of agriculture.

Agricultural productivity and crop income increases: Additional channel for welfare enhancement.

	(1) Value of agricultural machinery	(2) Value of agricultural machinery: power-operated	(3) Number of livestock	(4) Labour hours: agriculture	(5) Income: agriculture
(a) SC					
Treatment	1,946.328** (838.012)	15047*** (7,288.128)	0.608* (0.352)	-7.109** (3.241)	3,625.582** (1,969.989)
Control mean	2118.502	8778.52	2.62	24.30	4166.69
Robust p value	0.024	0.004	0.060	0.042	0.047
Bandwidth	3926	3394	2709	4336	3666
Effective obs	3767	401	1232	3160	4033
Observations	9,632	1,154	4,912	5,196	8,583
(b) OBC					
Treatment	-729.233 (1,315.220)	2,760.711 (2,190.110)	0.446** (0.248)	-4.671 (3.398)	-1,281.121 (4,680.583)
Control mean	3882.38	12336.34	3.22	22.87	9225.86
Robust p value	0.668	0.123	0.044	0.401	0.804
Bandwidth	4791	4621	8414	3712	3997
Effective obs	14929	3305	10703	3157	7275
Observations	28,850	6,721	13,481	5,995	13,619
(c) Gen					
Treatment	2,104.938 (1,488.745)	693.683 (2,151.968)	0.230 (0.417)	-4.973 (4.246)	-4,361.575 (6,035.694)
Control mean	5330.11	14374.01	3.45	22.59	13092.28
Robust p value	0.102	0.597	0.513	0.549	0.556
Bandwidth	4408	7004	4289	4110	5739
Effective obs	7936	3231	3572	761	5136
Observations	18,120	4,461	8,133	1,343	8,630

Note: Treatment is district-level expansion of bank branches following the Reserve Bank of India, Branch Authorization Policy in 2005. Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Standard errors clustered at district level. Data used: IHDS 2011-12 and AIDIS 2013. District population and number of bank branches in 1996 are controlled for. Source: Authors' calculation.

Banks and Non-agricultural Sector

Table 6

- Business expansion by OBCs and Generals → Additional labour demand in the market.
- The business owners find it more rational to meet that excess demand by raising the wages of cheaper SC labourers.
- SC wage increases: Reduction in caste-based wage discrimination.
- More wage/salary employment in SC households: Additional channel of welfare enhancement

	(1) SC	(2) OBC	(3) Gen
(a) Log nonfarm business revenue			
Treatment	0.481 (0.332)	1.06*** (0.327)	0.551** (0.306)
Control mean	11.20	11.48	12.04
Robust p value	0.103	0.001	0.039
Bandwidth	4879	3486	5070
Effective obs	581	1301	1026
Observations	1089	2808	1938
(b) Hourly wage/salary (Rs)			
Treatment	2.84* (1.72)	2.58 (2.24)	2.59 (2.28)
Control mean	23.75	24.53	27.61
Robust p value	0.079	0.363	0.270
Bandwidth	5567	3700	5067
Effective obs	7285	6839	3083
Observations	11,464	13,076	5,591
(c) Number of wage/salary jobs in the household			
Treatment	0.172* (0.105)	0.139 (0.120)	0.035 (0.074)
Control mean	1.21	1.12	1.08
Robust p value	0.081	0.191	0.566
Bandwidth	4488	4791	5946
Effective obs	3348	4419	2157
Observations	6,081	7,077	3,468

Note: Treatment is district-level expansion of bank branches following the Reserve Bank of India, Branch Authorization Policy in 2005. Robust standard errors in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Data used: IHDS 2011-12, household file [for panels (a) and (c)] and individual file [for panel (b)]. District population and number of bank branches in 1996 are controlled for. For hourly wage, we winsorize the outcome at 5th and 95th percentile to remove outliers and additionally control for pre-policy values of the outcome, education, union membership and region dummies to separate out the wage increment induced by reduced labour market discrimination. Source: Authors' calculation.

Impact on Taste-based Discrimination

(a) Problem if SC enters kitchen (0/1)						
	RD coefficient	Reference mean	Robust p value	Bandwidth	Effective Obs	Observations
SC	-0.003 (0.39)	0.075	0.994	5863	4369	7186
OBC	-0.031 (0.063)	0.103	0.547	4206	5698	9669
General	-0.11* (0.062)	0.117	0.060	5021	3370	5926
(b) Social Inclusion (Membership in atleast one socioeconomic community groups) (0/1)						
	RD coefficient	Reference mean	Robust p value	Bandwidth	Effective Obs	Observations
SC	0.172* (0.084)	0.14	0.058	5843	5198	8538
OBC	-0.018 (0.096)	0.24	0.628	3676	6747	13530
General	0.083 (0.078)	0.21	0.290	6938	6430	8593
(c) Social network (0/1)						
	RD coefficient	Reference mean	Robust p value	Bandwidth	Effective Obs	Observations
SC	0.184* (0.103)	0.20	0.077	4050	4286	8583
OBC	0.078 (0.074)	0.22	0.544	4800	8333	13619
General	0.106 (0.072)	0.32	0.122	5038	4710	8630
(d) Number of caste-based violence (Registered under POA act) in the district						
	RD coefficient	Reference mean	Robust p value	Bandwidth	Effective Obs	Observations
District level	-13.12* (7.78)	8.77	0.087	3799	241	580

Note: This table presents the impact of the RBI bank expansion policy on taste-based discrimination. In panel (a), our outcome variable is a dummy which takes value 1 if the household head reports that the members have a problem is a person from SC caste group enters their kitchen, and zero otherwise. In panel (b), the outcome is a social inclusion dummy that takes value 1 if the household is a member of at least one socioeconomic group in the community. In panel (c), the outcome variable is a dummy that takes value 1 if the household has at least one connection with doctors, health workers, teachers, officers, government or inspectors. Data from panels (a), (b) and (c) are drawn from IHDS household file. In panel (d), we look at the impact on a total number of caste-based violence registered under the Prevention of Atrocities Act (POA) in a district. This data is drawn from NCRB. Robust standard errors in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at the district level. District population and number of bank branches in 1996 are controlled for. In addition, in panel (d), we control for the total number of IPC crimes in the pre-policy period (2004). Source: Authors' calculation.

Robustness Checks

- Placebo cutoffs
- Second-order Polynomial
- Bandwidth Multiplier Test
- Bandwidth Selector Test
- Donut hole Test

Wrapping up

- Financial inclusion increased across all castes, but welfare increased mostly for SCs.
- Additional channel for SCs:
 - 1. Reduction in discrimination in informal credit market → More informal loans
 - 2. More formal loan in agricultural sector → More agricultural income
 - 3. More labour demand → Increase in SC wage and employment

Conclusion

- The bank expansion policy has enhanced access to formal financial services across all caste categories.
- The policy has reduced welfare disparity and caste-based discrimination.
- Results are causal and robust in nature.
- Policy Highlights:
 - Importance of strengthening the formal banking sector to reduce social disparity.
 - Making it more inclusive in order to reduce the sticky social norms like caste-based discrimination in India.

Thank you!

Comments and questions are welcome.

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