

Voter versus Leader Preference: What Drives the Gender Quota Effect in Politics?

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- Gender quotas used to improve women's representation
- Mixed evidence on how they affect public good provision
 - Positive effect (Chattopadhyay and Duflo 2004; Clots-Figueras 2011)
 - No or negative effect (Ban and Rao 2008; Bardhan, Mookherjee and Torrado 2010; Gajwani and Zhang 2014; Gangadharan et al. 2016; Afridi et al. 2017)

Research Question

- Why reservation might improve public good provision?
 - **Supply**: different preferences of male and female leaders
 - **Demand**: differential responsiveness to voter demand or differential demand by voters towards female leader

- Why reservation might improve public good provision?
 - **Supply**: different preferences of male and female leaders
 - **Demand**: differential responsiveness to voter demand or differential demand by voters towards female leader
- We look at which channel matters:
 - Provision of household toilets—for which women have greater preference (Coffey et al. 2014; Khanna and Das 2016)
 - Exploit differential gender gap in preference across religion—Hindus and Muslims
 - Population threshold based regression discontinuity design based on rule used for allocation of reservation (Eggers et al. 2017)

- Higher open defecation rate in rural India (65%) than Sub-Saharan Africa (34%) and Bangladesh (5%) despite higher per capita income, education and water access (WHO-UNICEF JMP 2012)
- Proportion of rural households having a toilet: 22% and 31% in 2001 and 2011 respectively
- Uttar Pradesh (population over 150 million) worse than the national average: 19% and 22% in 2001 and 2011 respectively
- Worsens child health outcomes (Hammer and Spears 2016) and women's safety (Mahajan and Sekhri 2019)

Swachh Bharat Mission-Gramin (SBM)

- Launched in October, 2014
- Target of open defecation free India by October, 2019
- Subsidy of Rs. 12000 (\$ 170) for construction of household toilet:
 - Twin-pit toilet design recommended
 - Subsidy paid in two installments of Rs 6000 each—after pit is dug, and then after completion
- IHHL coverage increased from 39% to 84% during 2014–2018; in UP from 31% to 66% in the same period.

Rural U.P. IHHL Coverage

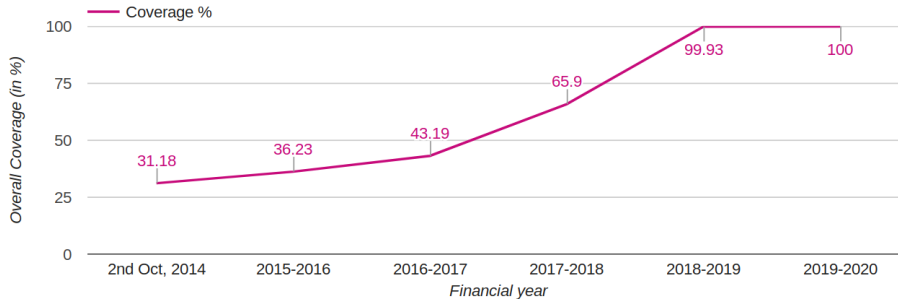


Figure: Percent households covered in rural Uttar Pradesh over time

- District magistrate responsible for overall management
- Implemented at GP level:
 - Identification of potential beneficiaries
 - Fund flow, maintenance of records and monitoring
 - Information, Education and Communication (IEC) utilization: awareness, procedural information and behavior change ($\geq 8\%$)

Preference for Toilets: Gender Gap and Cultural Beliefs

- Men face lower cost of open defecation compared to women
- **Hindus** consider latrine within home premises ritually polluting
- Manual emptying of pits traditionally done by Dalits who do not want to engage in this activity now
- Absence of these cultural beliefs among **Muslims**
- ∴ More likely to adopt affordable latrines \implies higher toilet ownership (Coffey et al. 2017b)
- National Family Health Survey (2015–16): Muslims 21% less likely to defecate in the open
- Strong cultural beliefs against in-home toilets might reduce the gender gap in toilet preference within Hindus

- Two preference measures from SQUAT survey conducted by RICE:
 - **Revealed preference**: likelihood of using toilet conditional on ownership
 - **Direct preference**: top three priorities of randomly chosen respondent (male or female) in households not owning a toilet

Women are Less Likely to Defecate in the Open

Table: SQUAT Survey: Gender Gap in Preference

	Latrine Usage		Latrine Preference		
	(1)	(2)	Top (3)	Top 2 (4)	Top 3 (5)
Female	0.0933*** (0.00792)	0.0940*** (0.00620)	0.0507* (0.0300)	0.0114 (0.0282)	0.0215 (0.0252)
Mean Dep. Var.	0.80	0.80	0.46	0.64	0.78
Observations	7,731	7,717	1,472	1,472	1,472
Fixed Effect	Village	HH	Village	Village	Village

Gender Gap Higher Among Muslims than Hindus

Table: SQUAT Survey: Gender Gap in Latrine Preference

	Latrine Usage		Latrine Preference		
	(1)	(2)	Top (3)	Top 2 (4)	Top 3 (5)
Female	0.0889*** (0.00841)	0.0903*** (0.00651)	0.0456 (0.0309)	0.00322 (0.0290)	0.0150 (0.0257)
Muslim * Female	0.0549** (0.0234)	0.0475** (0.0209)	0.0811 (0.141)	0.238* (0.124)	0.221* (0.114)
Muslim	0.0903*** (0.0252)		0.0328 (0.119)	0.0128 (0.107)	0.00193 (0.106)
Mean Dep. Var.	0.80	0.80	0.46	0.64	0.78
Observations	7,731	7,717	1,472	1,472	1,472
Fixed Effect	Village	HH	Village	Village	Village

- **2015 GP elections**

- State Election Commission (SEC) of Uttar Pradesh
- Over 59,000 GPs in UP and about 470,000 candidates contested the sarpanch elections
- Candidate characteristics: name, parent/spouse's name, gender, reservation status for each GP, vote share

- **GP caste composition**

- State Election Commission (SEC) of Uttar Pradesh
- Survey conducted before elections

- **Toilet Construction**

- Ministry of Drinking Water and Sanitation, Government of India
- Household level information for each GP: toilet ownership at baseline survey in 2012 and subsequent year-wise provision for each household from 2013
- Household characteristics: name of household head, name of parent/spouse, gender for over 26 million households

- **GP level covariates**

- Village amenities from Census 2011

- Hindus and Muslims primary religious groups in U.P. and comprise over 99% of rural population (Census 2011).
- Identify religion of sarpanch and household:
 - **Sarpanch**: annotate manually
 - **Household**: over 26 million hh's, use a character-sequence based deep neural network developed by Chaturvedi and Chaturvedi (2019)
 - Algorithm correctly identifies over 97.5% of true Hindus as well as true Muslims in a random sample of 20,000 manually classified households in rural U.P.

Muslim Household Prediction: Tehsil level



Figure: Muslim population share based on 2011 census and household share estimated by the algorithm for 312 tehsils in U.P. (correlation = .9776).

U.P. Gram Panchayat Elections (November, 2015)

- Reservation across GPs based on a deterministic algorithm
- **Caste reservation** for ST, SC and OBC:
 - Proportion of pradhan positions for every caste group in U.P. equal to their rural population share in the state.
- **Gender reservation**
 - At least a third of Pradhan positions for every caste group in each block reserved for women of that caste
 - Reserved GP's for caste group arranged in descending order of the caste's population share
 - Top 33% reserved for women
 - For unreserved, use general GP population
 - Correctly predict gender reservation for more than 95 percent GPs

Empirical Strategy: Fuzzy Regression Discontinuity Design

- Discontinuities in ordered list of GP's reserved for women
- Running variable construction (taking e.g. of GP's reserved for ST's):

$$X_{g,b} = \frac{ST_{g,b} - ST_{threshold,b}}{\sigma_{ST}}$$

Where,

σ_{ST} : standard deviation of ST population share across the entire state;

$ST_{g,b}$: proportion of ST population share in a GP in block b ;

$ST_{threshold,b}$: the mean of lowest ST population share at which the GP sarpanch position should have been reserved for an ST woman within the block and the next GP in terms of ST population share

- Do the above for all caste groups and unreserved GP's, generate one running variable

Empirical Strategy: Second Stage

$$Y_g = \alpha_0 + \tau T_g + \alpha_1 X_g + \alpha_2 X_g D_g + u_g$$

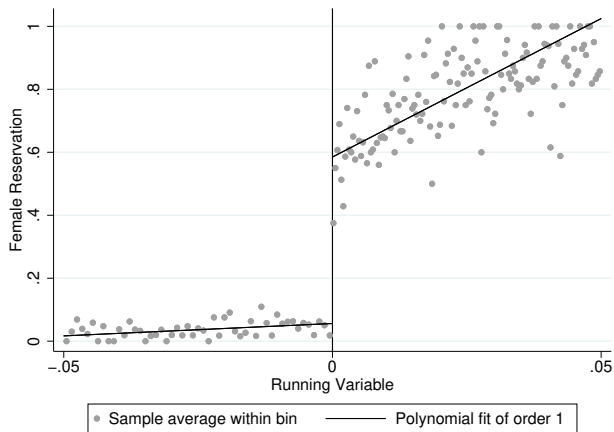
- Y_g : additional households covered with toilet in GP g during 2016–2017 as a proportion of uncovered households
- Treatment: $T_g = 1$ if a GP is reserved for female sarpanch
- Assignment: $D_g = 1$ if our algorithm predicts that the sarpanch position should be reserved for woman ($X_g \geq 0$), 0 otherwise ($X_g < 0$)

Empirical Strategy: First Stage

$$T_g = \beta_0 + \gamma D_g + \beta_1 X_g + \beta_2 X_g D_g + \epsilon_g$$

- T_g is instrumented with D_g in the first stage
- Restrict sample to GPs within bandwidth h , i.e., $X_g \in [-h, h]$
- Estimate results at three bandwidths—0.100, 0.075 and 0.050.

First Stage is Strong



No Significant Overall Gender Reservation Effect

Table: Female Reservation Effect (GP)

	Households Covered 2016–17		
	(1)	(2)	(3)
Female reservation	0.0132 (0.0156)	0.0188 (0.0185)	0.0269 (0.0231)
Observations	9,211	7,258	5,291
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.100	0.0976	0.0961

First Stage Holds for Both Hindu and Muslim Sarpanch

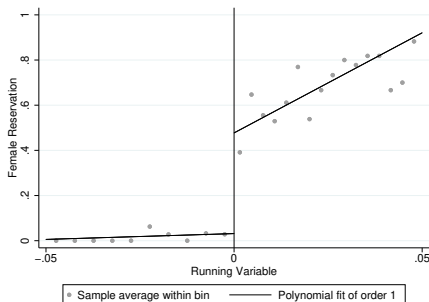
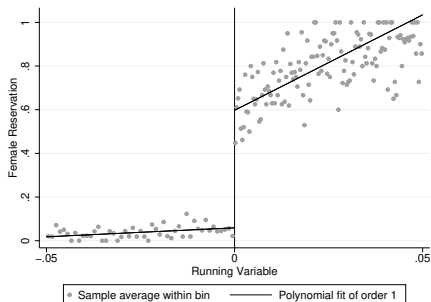


Figure: First stage: Hindus (left) and Muslims (right)

Gender Reservation Effect Only Among Muslim Sarpanch

Table: Hindu Vs. Muslim Sarpanch (GP)

	Households Covered 2016–17		
	(1)	(2)	(3)
<i>Panel A: Hindu sarpanch</i>			
Female reservation	0.00312 (0.0159)	0.00333 (0.0188)	0.00506 (0.0236)
Observations	8,304	6,564	4,788
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.103	0.102	0.102
<i>Panel B: Muslim sarpanch</i>			
	(1)	(2)	(3)
Female reservation	0.132** (0.0657)	0.203** (0.0798)	0.270*** (0.0980)
Observations	907	694	503
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.0786	0.0545	0.0461

Effect on Toilet Construction By Sarpanch Religion

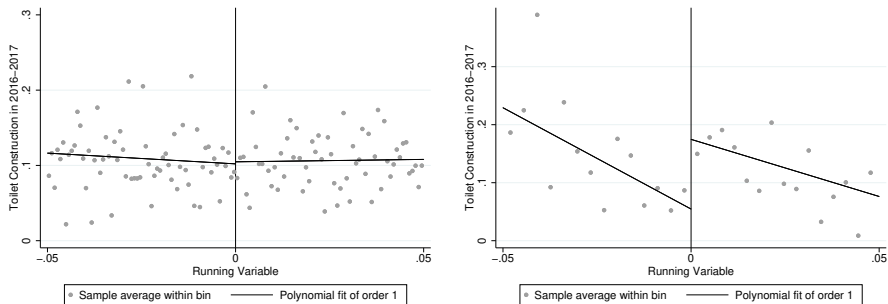


Figure: Female reservation effect for Hindus (left) and Muslims (right)

Empirical Strategy: Household Level Fuzzy RDD

$$Y_{h,g} = \alpha_0 + \tau T_g + \alpha_1 X_g + \alpha_2 X_g D_g + u_g$$

- $Y_{h,g}$ is a categorical variable indicating whether a toilet was constructed in household h in GP g during FY 2016–17
- Sample restricted to hh's not having toilet at the end of FY 2015–16
- Weights for each household to give equal consideration to all GP's
- Standard errors clustered at GP level

Results Consistent Using Household Data

Table: Hindu Vs. Muslim Sarpanch

	Household Covered 2016–17		
<i>Panel A: Hindu Sarpanch</i>	(1)	(2)	(3)
Female reservation	0.00413 (0.0163)	0.00532 (0.0193)	0.00837 (0.0241)
Observations	2,486,590	1,983,185	1,474,694
Number of GPs	8,296	6,556	4,786
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.104	0.103	0.102
<i>Panel B: Muslim Sarpanch</i>	(1)	(2)	(3)
Female reservation	0.150** (0.0653)	0.206*** (0.0786)	0.257*** (0.0962)
Observations	230,045	177,382	128,326
Number of GPs	902	694	503
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.0752	0.0545	0.0480

Is it Supply or Demand?

- **Supply:**
 - Gender gap in preference higher among Muslims than Hindus
 - Measure supply effect using gender of sarpanch, given religion
- **Demand:**
 - Targetable at household level
 - Muslims have stronger preference
 - Provision higher for Muslim households if Sarpanch responds to demand

- **Difference-in-discontinuities** approach of Grembi et al. (2016):

$$Y_{h,g} = \alpha_0 + \tau T_g + \alpha_1 X_g + \alpha_2 X_g D_g + M_{h,g}[\theta_0 + \rho T_g + \theta_1 X_g + \theta_2 X_g D_g] + u_g$$

- First stage:

$$T_g = \beta_0 + \gamma D_g + \beta_1 X_g + \beta_2 X_g D_g + M_{hg}[\delta_0 + \lambda D_g + \delta_1 X_g + \delta_2 X_g D_g] + \epsilon_g$$

$$T_g * M_{h,g} = \beta'_0 + \gamma' D_g + \beta'_1 X_g + \beta'_2 X_g D_g + M_{h,g}[\delta'_0 + \lambda' D_g + \delta'_1 X_g + \delta'_2 X_g D_g] + \epsilon'_g$$

- $M_{h,g} = 1$ for Muslim households
- Do this separately for Hindu and Muslim sarpanch

Hindu Sarpanch: No Effect of Beneficiary Religion

Table: Hindu Sarpanch: Hindu vs. Muslim Beneficiary

<i>Hindu Sarpanch</i>	Household Covered 2016–17		
	(1)	(2)	(3)
Female reservation	0.00590 (0.0160)	0.00667 (0.0189)	0.00940 (0.0235)
Female reservation*Muslim Household	-0.0206 (0.0289)	-0.0160 (0.0352)	-0.0125 (0.0456)
Muslim Household	0.0192 (0.0126)	0.0176 (0.0148)	0.0188 (0.0182)
Observations	2,486,590	1,983,185	1,474,694
Number of GPs	8,296	6,556	4,786
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.102	0.101	0.0998

Muslim Sarpanch: No Effect of Beneficiary Religion

Table: Muslim Sarpanch: Hindu vs. Muslim Beneficiary

<i>Muslim Sarpanch</i>	Household Covered 2016–17		
	(1)	(2)	(3)
Female reservation	0.126*	0.181**	0.214**
	(0.0704)	(0.0872)	(0.109)
Female reservation*Muslim Household	0.0540	0.0565	0.0974
	(0.0579)	(0.0687)	(0.0808)
Muslim Household	0.00299	-0.0156	-0.0412
	(0.0219)	(0.0251)	(0.0287)
Observations	230,045	177,382	128,326
Number of GPs	902	694	503
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.0750	0.0614	0.0640

Is it in-group Favoritism?

Table: Hindu Vs. Muslim Sarpanch

	Household Covered 2016–17		
	(1)	(2)	(3)
<i>Panel A: Hindu Sarpanch</i>			
Female reservation*Muslim Household	-0.00245 (0.00933)	0.000813 (0.0111)	0.00129 (0.0138)
Observations	2,486,569	1,983,171	1,474,683
Number of GPs	8,275	6,542	4,775
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
GP fixed effects	YES	YES	YES
<i>Panel B: Muslim Sarpanch</i>			
	(1)	(2)	(3)
Female reservation*Muslim Household	-0.0102 (0.0221)	-0.0124 (0.0245)	-0.00845 (0.0277)
Observations	230,044	177,381	128,325
Number of GPs	901	693	502
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
GP fixed effects	YES	YES	YES

Difference in Ability? NREGA per Capita Expenditure

Table: Hindu Vs. Muslim Sarpanch: NREGA PCY

	NREGA Expenditure Per Capita 2016–2017		
	(1)	(2)	(3)
<i>Panel A: Hindu sarpanch</i>			
Female reservation	4.85e-05 (0.000249)	5.62e-05 (0.000300)	0.000111 (0.000386)
Observations	7,834	6,195	4,520
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.00290	0.00294	0.00297
<i>Panel B: Muslim sarpanch</i>			
	(1)	(2)	(3)
Female reservation	0.000490 (0.000800)	0.000531 (0.000972)	0.000524 (0.00119)
Observations	879	673	490
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	0.00255	0.00253	0.00264

Difference in Ability? NREGA Person Days per Capita

Table: Hindu vs. Muslim Sarpanch: NREGA Person-days per capita

NREGA Person-days Per Capita 2016–2017			
	(1)	(2)	(3)
<i>Panel A: Hindu sarpanch</i>			
Female reservation	0.0277 (0.117)	0.0520 (0.141)	0.0771 (0.183)
Observations	7,891	6,238	4,548
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	1.292	1.300	1.309
<i>Panel B: Muslim sarpanch</i>			
	(1)	(2)	(3)
Female reservation	0.327 (0.353)	0.261 (0.438)	0.340 (0.541)
Observations	884	677	493
Polynomial order	1	1	1
Bandwidth	0.100	.075	0.050
Estimated mean at the threshold	1.093	1.112	1.156

Check 1: Pre-treatment Outcomes Balanced

Table: Pre-treatment Outcomes (GP level)

	Overall (1)	Hindu Sarpanch (2)	Muslim Sarpanch (3)
Covered 2013–14	-0.00116 (0.00600)	-0.000531 (0.00651)	-0.00921 (0.00854)
Covered 2014–15	0.00294 (0.00964)	0.00761 (0.0102)	-0.0459 (0.0289)
Covered 2015–16	-0.000836 (0.0125)	0.00513 (0.0127)	-0.0639 (0.0547)
Polynomial order	1	1	1
Bandwidth	0.050	0.050	0.050

Check 2: Manipulation in Running Variable at Threshold

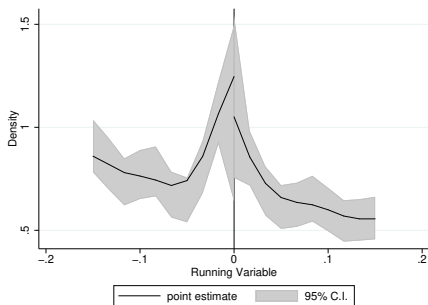
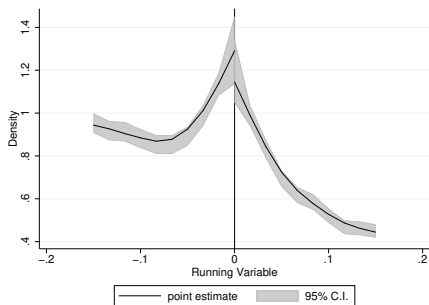


Figure: Density plot for Hindus (left) and Muslims (right) shows no discontinuity at the cut-off

Check 3: Covariates are balanced

Table: Covariate Balance Test (GP level)

	Overall (1)	Hindu Sarpanch (2)	Muslim Sarpanch (3)
Total population	114.5 (146.0)	155.0 (154.2)	-313.7 (447.2)
Proportion Muslims	0.00649 (0.0169)	0.00995 (0.0114)	0.00684 (0.0973)
Primary school within 5 km	0.0293 (0.0270)	0.0334 (0.0283)	-0.0152 (0.0859)
Middle school within 5 km	0.0562 (0.0364)	0.0805** (0.0375)	-0.223 (0.148)
Secondary school within 5 km	-0.00220 (0.0492)	-0.00777 (0.0508)	0.0465 (0.188)
Tap water	-0.0581 (0.0371)	-0.0380 (0.0384)	-0.279* (0.143)
Closed drainage	0.00605 (0.0206)	0.00590 (0.0215)	0.0130 (0.0723)
Waste disposal	-0.0121 (0.0259)	-0.0176 (0.0273)	0.0525 (0.0818)
All weather roads	0.00706 (0.0458)	-0.0161 (0.0475)	0.260 (0.177)
Domestic power	0.00566 (0.0269)	0.0116 (0.0275)	-0.0652 (0.112)
Irrigation	-0.00655 (0.0210)	-0.0126 (0.0218)	0.0592 (0.0787)
Polynomial order	1	1	1
Bandwidth	0.05	.05	0.05

- Supply preferences seem to matter
 - Gender gap in preferences smaller among Hindus \therefore no significant differences in toilet provision
 - Among Muslims, gender gap in preferences larger leading to significant gender reservation effect among Muslim Sarpanch
- Can demand also matter?
 - If it did, should have found greater provision towards Muslim households by Hindu women
 - Again, should have found greater provision towards Muslim households by Muslim women (positive but insignificant effect here)
- Supply preferences of women who come through reservation prerequisite for provision
- If gender gap in preferences not large enough, gender reservation may not improve public good provision