

Women Left Behind: Gender Disparities in Utilization of  
Government Health Insurance in India

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Online Appendix

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## Contents

<a href="#">A Conceptual Framework</a>	2
<a href="#">B Additional Figures and Tables</a>	3

# A Conceptual Framework

We consider a utility-maximizing household with two members indexed by  $i \in [m, f]$ . The household chooses the levels of health investments  $x_m$  and  $x_f$  in each member. Investment in health weakly increases the household's present discounted lifetime earnings, based on the earnings function:  $R_i(x_i) \equiv R(x_i, g_i)$ . Earnings depend on the member's health investments well as their gender,  $g_i$ . The cost of the health input (a hospital visit) to the household is  $c$  for males and  $c + c_f$  for females to allow for the possibility that there may be additional female-specific care-seeking costs.

The household's utility function is:

$$U(X, x_m, x_f) = \alpha X + [R_m(x_m) + R_f(x_f)] + \gamma(x_m)$$

where  $\alpha$  is the weight put on consumption of non-health goods  $X$  (priced at 1) relative to the present discounted value of lifetime earnings, and  $\gamma$  represents the preference for investing more in the male than the female due to taste-based gender bias.

Total household income is  $I$ , and the budget constraint is:

$$X + c(x_m + x_f) + c_f x_f = I.$$

The first-order conditions yield the following result:

$$\frac{\partial R_f}{\partial x_f} = \frac{\partial R_m}{\partial x_m} + \gamma + \alpha c_f$$

We see that, first, if there are no female-specific costs of care ( $c_f = 0$ ) and no preference for males ( $\gamma = 0$ ), the household equalizes returns to investments across the two members ( $\frac{\partial R_f}{\partial x_f} = \frac{\partial R_m}{\partial x_m}$ ). Thus, if the returns to health investments are lower for females, the household invests less in female health as long as the common cost of healthcare is strictly positive ( $c > 0$ ), even absent biased preference or female-specific costs. Second, male preference ( $\gamma > 0$ ) also reduces investments in female health as long as the common cost of care is positive ( $c > 0$ ). Third, female-specific costs ( $c_f > 0$ ) lower investments in females even if the common cost of care is zero ( $c = 0$ ), there are no gender differences in returns to health investments ( $R_f = R_m$ ), and no taste-based discrimination ( $\gamma=0$ ).

## B Additional Figures and Tables

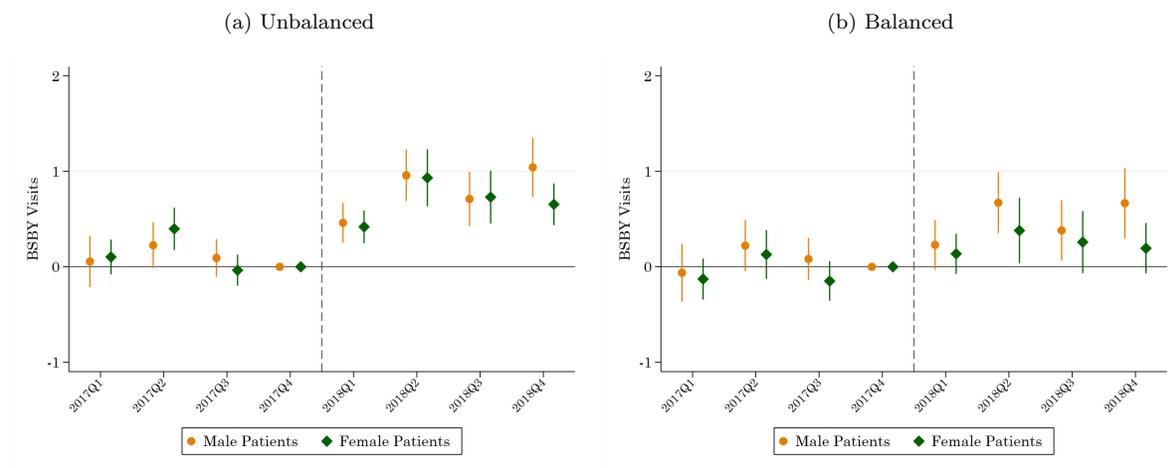
### Additional Figures

B1	Empanelment Results Without Entropy Balancing . . . . .	4
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### Additional Tables

B1	Gender Differences in Out-of-Pocket (OOP) Charges . . . . .	5
B2	Characteristics of Observations Matched to Locations . . . . .	5
B3	Empanelment Analysis Location Characteristics Before and After Entropy Balancing . . . . .	6
B4	Descriptive Statistics on Gram Panchayats Matched to BSBY Visits . . . . .	7
B5	Patient Residence Location Characteristics by Reservation Status . . . . .	8
B6	Effects of Political Reservations: Contemporary vs. Historical Reservations . . . . .	9
B7	Effects of Political Reservations on Location-Level Care Volume . . . . .	10
B8	Impact of Hospital Empanelment on BSBY Utilization Differs by Reservation Status . . . . .	11

Figure B1: Empanelment Results Without Entropy Balancing



Notes: The figure replicates the event study analysis exploiting new hospital empanelments shown in Figure 7 of the main manuscript without reweighting observations through entropy balancing in Panel A and after reweighting in Panel B. [Table B3](#) shows the range of observable location characteristics on which observations were balanced.

Table B1: Gender Differences in Out-of-Pocket (OOP) Charges

	(1)	(2)
	Any Charge	Amount Charged
Female	0.012 (0.009) {0.185}	25.458 (81.624) {0.755}
Month Fixed Effects	Yes	Yes
Hospital Fixed Effects	Yes	Yes
Service Fixed Effects	Yes	Yes
Observations	9,845	9,844
Mean   Male	0.28	1222.11

Notes: The unit of observation is a hospital visit for which a patient exit survey was conducted. The table presents results from regressions of a dummy for whether the hospital charged the patient (column 1) or the amount charged (column 2) on a dummy for the patient being female. Regressions include month, hospital, and service fixed effects. Data come from the post-visit patient audit surveys (see notes to Figure A3). The analysis is restricted to private hospital visits and excludes childbirths. Mean values of each of the outcomes for males are reported at the bottom of the table for comparison. Monetary values are expressed in INR.

Table B2: Characteristics of Observations Matched to Locations

	Sample Mean	Patient residence location merged with			
		PC11 Location Coordinates		GP Reservation History	
		Coeff	SE	Coeff	SE
Female	0.45	-0.0029	(0.0006)	-0.0046	(0.0006)
Age	41.68	-0.6457	(0.0232)	-0.1114	(0.0218)
Private Hospital	0.55	0.0145	(0.0006)	0.0274	(0.0006)
Tertiary Care	0.26	-0.0946	(0.0006)	-0.0627	(0.0005)
Merged with PC11 village	0.29				
Merged with GP reservation history	0.39				
Observations	3209675	3209675		3209675	

Notes: The table presents Sample Means in the BSBY administrative claims data, including matched and unmatched observations, as well as results from t-tests comparing characteristics of BSBY hospital visits for which the patients' residence locations were matched to 1) 2011 Population Census village/town locations and are geocoded and included in the analyses of distance and empanelment to those that were not and 2) Gram Panchayat (GP) locations and have full 2005-2015 electoral histories and included in the reservations analyses to those that were not. The Claims data are restricted to the study sample: they exclude 2016, childbirth, and neonatal care claims (see Table A1 notes).

Table B3: Empanelment Analysis Location Characteristics Before and After Entropy Balancing

	Unbalanced			Balanced	
	Treatment	Control	p-val	Treatment	Control
Total Population ('000')	1.61	1.21	0.00	1.61	1.61
Share Female Population	0.47	0.48	0.00	0.47	0.47
Share SC Population	0.25	0.15	0.00	0.25	0.25
Share ST Population	0.09	0.28	0.00	0.09	0.09
Share Under-6 Female Population	0.47	0.48	0.00	0.47	0.47
Female Literacy Rate	0.39	0.33	0.00	0.39	0.39
Share Female Workers	0.41	0.45	0.00	0.41	0.41
Female Labor Force Participation	0.53	0.59	0.00	0.53	0.53
Urban Area Indicator	0.01	0.01	0.05	0.01	0.01
Distance to District Headquarters	62.93	68.78	0.00	62.93	62.93
Distance to Sub-District Headquarters	17.41	26.06	0.00	17.41	17.41
Male Literacy Rate	0.64	0.58	0.00	0.64	0.64
Male Labor Force Participation	0.64	0.65	0.00	0.64	0.64
Village Irrigated Land Share	0.45	0.34	0.00	0.45	0.45
Village Healthcare Access	0.37	0.32	0.00	0.37	0.37
Village Road Access	0.93	0.89	0.00	0.93	0.93
Village Bus Access	0.23	0.20	0.00	0.23	0.23
Village Train Access	0.04	0.02	0.00	0.04	0.04
Village Power Communication	0.44	0.34	0.00	0.44	0.44
Village ATM Access	0.11	0.07	0.00	0.11	0.11
Village Drainage System	0.76	0.64	0.00	0.76	0.76
Per Capita Consumption	17677.53	15933.99	0.00	17677.53	17677.53
Share of Households with Main Income from Cultivation	0.41	0.55	0.00	0.41	0.41
Poverty Rate	0.33	0.40	0.00	0.33	0.33
Mean Household Size	6.15	5.84	0.00	6.15	6.15
Distance to Nearest Public Hospital 2017Q3	10.39	12.47	0.00	10.39	10.39
Distance to Nearest Private Hospital 2017Q3	33.59	34.34	0.00	33.59	33.59

Notes: The table examines balance in the characteristics of census village/town locations used in the empanelment analysis discussed in section 5 of the main manuscript. The unit of observation is a census location-quarter, covering the period January 2017 to December 2018. The sample is the same as that in the empanelment analysis: census village/town locations where the closest participating private BSBY hospital is 25-50km in 2017. Treatment locations saw empanelment into BSBY of a private hospital within 25km in 2018 Quarter 1; control locations saw no such empanelment through December 2018. The table presents mean values for a series of observable location-level characteristics from the 2011 Population Census and the 2013 Socioeconomic and Caste Census and the p-value from t-tests of their difference in the first three columns. We use entropy balancing to reweight observations to achieve balance on the full set of characteristics (Hainmueller, 2012; Athey and Imbens, 2017). The last two columns present reweighted means after entropy balancing.

Table B4: Descriptive Statistics on Gram Panchayats Matched to BSBY Visits

	Mean
<b>GP Reservation Status</b>	
Number of times GP reserved	1.3
GP never reserved (%)	11.6
GP reserved once (%)	52.1
GP reserved twice (%)	31.8
GP reserved thrice (%)	4.6
<b>Reservation and Compliance</b>	
2005: Reserved for female (%)	33.6
2005: Filled by female (%)	36.4
2005: Filled by female (reserved) (%)	99.9
2005: Filled by female (unreserved) (%)	4.3
2010: Reserved for female (%)	47.8
2010: Filled by female (%)	52.9
2010: Filled by female (reserved) (%)	100.0
2010: Filled by female (unreserved) (%)	9.7
2015: Reserved for female (%)	47.8
2015: Filled by female (%)	46.9
2015: Filled by female (reserved) (%)	92.3
2015: Filled by female (unreserved) (%)	5.3
Observations	8,818

Notes: The table presents statistics on Gram Panchayats (GPs) included in the study—that is, the GPs for the patient residence locations in the BSBY claims data that were successfully geocoded and matched to GP reservation histories for the 2005, 2010 and 2015 election cycles (see Table A1 for statistics on BSBY visits to GP reservation histories). Per national rules, 33% of all GPs are required to have seats reserved for a female Sarpanch. In 2009, Rajasthan increased this to 50%, which explains the higher reserved shares in the 2010 and 2015 elections. In 2014, Rajasthan introduced minimum education requirements for Sarpanches, which may explain the slightly lower adherence to reservation randomization in the 2015 election.

Table B5: Patient Residence Location Characteristics by Reservation Status

	Mean if Never Reserved (SD)	Coefficient (SE) on:	
		Reserved 2015	Nbr Times Reserved
<u>2001 Population Census Characteristics</u>			
Population ('000)	1.425 (4.124)	-0.0761 (0.0601)	-0.0423 (0.0301)
Share female population	0.481 (0.027)	0.0001 (0.0003)	0.0003 (0.0002)
Share female under-6 population	0.476 (0.058)	0.0001 (0.0007)	0.0007 (0.0005)
Share SC population	0.179 (0.172)	0.0012 (0.0023)	0.0035 (0.0016)
Share ST population	0.162 (0.275)	-0.0010 (0.0040)	-0.0033 (0.0027)
Share with bus service	0.467 (0.499)	-0.0002 (0.0068)	0.0062 (0.0046)
Share with banking facility	0.079 (0.269)	-0.0045 (0.0035)	-0.0046 (0.0024)
Share with paved road	0.576 (0.494)	0.0054 (0.0071)	-0.0007 (0.0048)
Share with primary health center	0.246 (0.431)	0.0012 (0.0054)	-0.0015 (0.0036)
Share with hospital	0.004 (0.065)	-0.0003 (0.0009)	0.0001 (0.0006)
Share urban	0.001 (0.029)	-0.0004 (0.0005)	-0.0003 (0.0002)
<u>2011 Population Census Characteristics</u>			
Population ('000)	1.373 (1.647)	-0.0091 (0.0187)	-0.0154 (0.0129)
Share female population	0.482 (0.025)	-0.0002 (0.0003)	0.0000 (0.0002)
Share female under-6 population	0.471 (0.064)	-0.0005 (0.0008)	-0.0007 (0.0005)
Share SC population	0.185 (0.180)	0.0016 (0.0023)	0.0036 (0.0016)
Share ST population	0.168 (0.283)	-0.0016 (0.0041)	-0.0027 (0.0028)
<u>Caste Reservation History</u>			
Number of times reserved OBC	0.458 (0.528)	-0.0158 (0.0118)	-0.0089 (0.0082)
Number of times reserved SC	0.603 (0.526)	0.0052 (0.0116)	-0.0182 (0.0079)
Number of times reserved ST	0.506 (0.768)	-0.0222 (0.0125)	-0.0261 (0.0089)
Number of Locations			30,826

Notes: The table examines balance in the characteristics of BSBY patient residence locations in the study sample by their GP reservation status to assess whether the randomization protocol was adhered to. The unit of observation is a patient residence location. The table presents coefficients from regressions of 2001 and 2011 Population Census characteristics on a dummy for whether the location was reserved for a female Sarpanch in 2015 and a categorical measure of the number of times it was reserved over the 2005, 2010, and 2015 GP elections. The sample is restricted to patient residence locations in the BSBY claims data that were successfully matched to the 2011 Population Census and have complete political reservation histories (see Table A1 notes). SC and ST stand for Scheduled Caste and Scheduled Tribes. Standard deviations are in parentheses in column 1 and standard errors are in parentheses in columns 2 and 3.

Table B6: Effects of Political Reservations: Contemporary vs. Historical Reservations

	(1)	(2)	(3)	
	Dependent Variable: Patient is Female			
	All Claims	Under 15 years old	15-45 years old	46+ years old
Reserved 2015	-0.0017 (0.0046) {0.721}	-0.0028 (0.0063) {0.655}	0.0045 (0.0070) {0.525}	-0.0083 (0.0063) {0.190}
Reserved 2015 x Nbr Prior Reservations	0.0020 (0.0045) {0.650}	0.0126 (0.0065) {0.054}	0.0043 (0.0068) {0.531}	-0.0019 (0.0061) {0.763}
Nbr prior reservations	0.0033 (0.0031) {0.291}	0.0057 (0.0041) {0.172}	0.0070 (0.0046) {0.126}	-0.0014 (0.0043) {0.752}
Age Group Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Patient District Fixed Effects	Yes	Yes	Yes	Yes
Specialty Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,969,980	149,553	970,391	850,036
Female share   Never reserved	0.492	0.326	0.549	0.445
Average 2015 Reservation Effect	0.000	0.010	0.009	-0.010
Average 2015 Reservation P-value	0.907	0.041	0.076	0.022

Notes: The unit of observation is a hospital visit. The table presents regressions of a binary measure for whether a BSBY hospital visit was for a female on a binary measure of whether the patient resided in a location with a female-reserved Sarpanch seat in 2015 (Reserved 2015), a categorical measure of whether it was reserved zero, one or two times between 2005 and 2015 (Nbr prior reservations), and the interaction of the two. The sample is restricted to BSBY hospital visits where the patient residence location is successfully matched to GP reservations history (see Table A1). All regressions include location level controls for the 2001 and 2011 Population Census variables listed in Table B5, caste reservations (number of times reserved for each category: OBC, SC and ST), distances to district and sub-district headquarters in the 2011 Census, and distances to the nearest public and private BSBY hospitals. Age group fixed effects are in ten-year age bins. The female share of visits in locations with Sarpanch seats that were never reserved for a female between 2005 and 2015 is reported at the bottom of the table for comparison. Standard errors are clustered at the GP level in parentheses, p-values in curly brackets.

Table B7: Effects of Political Reservations on Location-Level Care Volume

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent Variable: Number of BSBY Visits							
	Under 15		15 to 45 years old		46+ years old		15 to 45 years old, including deliveries	
	Females	Males	Females	Males	Females	Males	Females	Males
Number of times GP reserved	0.025 (0.017) {0.125}	-0.009 (0.013) {0.493}	0.007 (0.013) {0.604}	-0.020 (0.014) {0.153}	-0.013 (0.011) {0.256}	0.013 (0.011) {0.265}	0.008 (0.011) {0.499}	-0.019 (0.014) {0.164}
Location-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	254,322	254,322	254,322	254,322	254,322	254,322	261,420	261,420
Unique Locations	30,586	30,586	30,586	30,586	30,586	30,586	30,450	30,450
Mean   Never reserved	0.130	0.130	1.267	1.267	1.009	1.009	1.689	1.689

Notes: The unit of observation is a location-quarter. The table presents the effect of exposure to Gram Panchayat (GP) reservations on the volume of male and female visits. Estimates are from poisson regressions of the number of BSBY hospital visits from a location in a quarter on a categorical measure of whether the location had a female-reserved Sarpanch seat in zero, one, two, or three of the Gram Panchayat election terms between 2005 and 2015. The sample is a balanced panel of census locations in Rajasthan, including those with zero BSBY claims, that were successfully matched to GP reservations history (whereas Table A1 only reports locations with BSBY claims). The number of observations varies between columns 1-6 and 7-8 because the latter includes locations with childbirth visits; a small set of locations had no non-childbirth BSBY visits in any quarter, but at least one childbirth visit, and drop out of the regressions in columns 1-6. All regressions include controls for caste reservations (number of times reserved for each category: OBC, SC and ST), quarter fixed effects, location level controls for the 2001 and 2011 Population Census variables listed in Table B5, distances to district and sub-district headquarters in the 2011 Census, and distances to the nearest public and private BSBY hospitals (which may vary within location across quarters due to empanelment). Standard errors are clustered at the GP level and in parentheses, p-values are in curly brackets.

Table B8: Impact of Hospital Empanelment on BSBY Utilization Differs by Reservation Status

	(1)	(2)	(3)	(4)
	All GP Locations		Reserved 2+ Times	
	Male Visits	Female Visits	Male Visits	Female Visits
Treatment x Post-empanelment	0.4270 (0.1255) {0.0007}	0.2791 (0.0996) {0.0051}	0.5321 (0.2132) {0.0126}	0.4277 (0.1704) {0.0121}
Location Fixed Effects	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes
Observations	94,929	94,929	26,419	26,419
Unique Locations	11,907	11,907	3,311	3,311
Treatment Locations	1,085	1,085	345	345
Pre-empanelment mean	2.238	1.871	2.208	1.799

Notes: The unit of observation is a census location-quarter. The sample is restricted to census locations where the closest participating private BSBY hospital is 25-50km in 2017 (as in Table 4) and for which GP reservation information is available. The analysis compares locations that saw empanelment of a private hospital within 25km in 2018 Quarter 1 (treatment) with locations that did not see any closer empanelment by 2018 Q4 (control). Columns 1-2 reproduce columns 3-4 of Table 4 for the subsample for which GP reservation information is available. Columns 3-4 conducts the same analysis on the subsample of locations that experienced a female reservation for the GP head (Sarpanch) in two or more electoral terms.

## References

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