The Impact of Women's Self Help Groups on Electoral Participation: Evidence from India

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Abstract

The democratization of political entry is key to maintaining a robust representative democracy. We study if the presence of self-help groups (SHGs), which have a documented history of empowering women, change women's political entry. Using a randomized roll-out of the program across 180 village-councils (Gram Panchayats) in Bihar in India, we find that the SHG program alone does not significantly affect political entry. However, GPs with both SHGs and quotas for SC leaders (reservations) lead to a substantial increase in the number of candidates running in local elections. We confirm these findings using an alternate empirical strategy that uses the staggered roll-out of SHGs across the entire state. Temporal dynamics reveal more candidates run in GPs with earlier SHG adoption when coupled with SC reservations. Moreover, in reserved GPs, SHGs induce changes in the democratic process by increasing turnout and fostering candidates from economically disadvantaged backgrounds. This research contributes to the understanding of SHG impacts, highlighting their role in encouraging marginalized candidates and fostering increased community engagement in local elections.

JEL codes: D71, D72, O12

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1 Introduction

Leaders influence growth and development (Jones and Olken, 2005). However leaders, even when democratically elected, are generally male and from elite backgrounds. For instance, in the United States, under 30% of 2023 senators were women, and nearly 80% of congress members were non-Hispanic white. Increasing representation from disadvantaged groups remains a global challenge for democracies. This is arguably more important for disadvantaged minorities in developing countries, who often face significant entry barriers. In India, the setting of this paper, women occupy 13% of seats in parliament. Women – and members of disadvantaged caste/racial groups – face at least three barriers to political entry: high campaign costs, limited social networks, and are susceptible to backlash from privileged groups.

Since the 1980s, women's self-help groups (SHGs) have gained popularity in the developing world (Brody et al., 2015, Gugerty et al., 2019). SHGs are fora where poor rural women come together in small groups to collectively lend small amounts of money. SHGs have been shown to eliminate some of the entry barriers documented in the literature. SHGs improve finance and livelihoods and have also been shown to increase women's social networks (Prillaman, 2023b, Dıaz-Martin et al., 2022, N. Kumar et al., 2019, Deshpande and Khanna, 2021, Datta, 2015). SHGs also impact a variety of broader outcomes, such as individual agency and decision making, mobility, and also imbibe in women a sense of collective identity, which could be crucial to resisting patriarchal structures. Yet, the direct connection between SHGs and political entry remains empirically unexamined.

In this paper, we study how SHGs impact political entry in village-councils (Gram Panchayats (GPs)) in the state of Bihar in India. Bihar, with over 120 million people, is one of India's largest states and is also among its poorest. Bihar's society is riddled with caste and gender discrimination. The state's SHG program, Bihar Rural Livelihoods Project (more commonly known as "Jeevika"), has established over 1 million SHGs to date (with over 12 million women). Jeevika, part-funded by the World Bank, is among the most celebrated SHG programs in India and has formed the basis for state-run SHG models adopted in other states in India and elsewhere in the world (WB, 2017).

Bihar's SHG movement focused on enrolling women from historically marginalized Scheduled Caste (SC) households. SCs are a collection of sub-castes at the bottom of the caste hierarchy and are severely discriminated against. SC women, therefore, are among the most disadvantaged groups in Bihar, with severely circumscribed social lives and limited political agency. When the government formed SHG groups in villages, it usually focused on creating groups of 10-12 SC women. Multiple groups came together to form GP-, block- and district-level structures that oversaw the functioning of individual village-level groups. These higher-level bodies provided leadership opportunities to SC women and expanded their networks and agency. In this paper, we study if SC women also used the improved financial, social and leadership opportunities to participate in local elections.

To identify impacts of Jeevika participation on political entry of SC women, we leverage two sources of variation: first, the experimental sample in Hoffmann et al., 2021 comprising 180 GPs. SHGs were introduced two years earlier in treatment GPs in 2012 compared to control GPs in 2014. Second, we use a staggered differences-in-differences (DiD) strategy to study how political entry of SC women varies by length of exposure to SHGs. To do so, we employ a panel dataset of all 1 million SHGs in Bihar, which allows us to study how political entry varies by length of time since SHG formation in a GP and how entry is affected by strength of groups (we use number of members as a proxy for group strength). Our political entry outcomes are drawn from the GP elections of 2016.

In GPs in Bihar – and indeed in India – the predominant path to political entry for women and SCs is through political reservations (Chattopadhyay and Duflo, 2004, Dunning and Nilekani, 2013). In line with this understanding, we delineate effects of how SHG participation affects entry in places with and without political reservations. In order to causally identify effects of reservations, we focus on the algorithm used to reserve seats for SCs that gives rise to a regression discontinuity design framework. Specifically, we identify a sample above and below the cutoff for political reservations to study the dynamics of SHG adoption on political entry over time.

We report several findings. First, in the RCT sample, we find that treated GPs see an increase in SC women candidates by 69%. Moreover, using the randomization as an instrument for the number of groups formed in 2015 (the year prior to the election), we observe significant effects for SC women candidates. We find that for every 42 groups formed, an additional candidate runs for election.[1]

Second, we consistently find a large increase in the number of SC female candidates running in GPs with both SHGs and SC reservation. We find an average of 4.3 additional SC women candidates running in such GPs. Indeed, the overall effects of SHGs seem to be driven only in places where there is SC reservation. These are heterogeneous treatment effects. We show that these results are robust to an alternate empirical strategy that combines the RCT (for SHG formation) and an RD (for SC reservation).

Third, using a larger sample based on SC and female reservation rules in Bihar, and the staggered introduction of SHGs around these reservation cutoffs, we show that entry effects are proportional to length of exposure of GPs to SHGs, but only when GPs are reserved. In other words, within reserved GPs, those that saw SHG formation between 2007-09 see greater effects than areas that see formation between 2010-12, which, in turn see larger effects than those that had exposure between 2013-15. In this larger sample, we also document spillover effects (specifically if SC reserved GPs are also not reserved for women), and find that more SC men are running. We think this is intuitive in the following way; since very few women run when the GP is not reserved for women, it is easier and less costly for SC women to instead support other SC male candidates.

[1]The main threat to validity of the instrument is the failure of the exclusion restriction: if SHG presence had an impact independent of the number of groups on outcome, then this instrument is not valid.

Fourth, we find that SHGs spur entry by relaxing constraints to entry. If entry costs are constant and SHGs improve financial well-being of SC households, then the marginal SC woman or male candidate in treated GPs should be from *ex ante* poorer households. Matching candidate names in the RCT sample to household characteristics from the socioeconomic caste census (SECC 2012), we show that SC candidates in GPs with SHGs and reservation are generally from poorer households. They are also less educated. In addition, these GPs see a higher turnout, which we interpret as evidence that women use their SHG networks to galvanize votes. Finally, we provide suggestive evidence that Jeevika imbues SC women with leadership skills: SHG leaders are much likelier to be candidates than members.

We then show evidence that rules out alternative hypotheses. As argued above, Jeevika targeted SC women: thus, treatment effects on non-SC women should be considerably lower. We show that this is indeed the case. We also subject our main findings to a battery of robustness checks: the RCT results remain stable even we add/drop controls or change our definition of p-values. Our RD sample results are robust to comparison with never-treated and not-yet-treated GPs and adding/dropping controls.

We are the first paper to show an explicit link between women's SHGs and political entry. The current literature shows that SHGs have the potential to increase participation in local village government meetings, encourage women's collective action, and consequently, through sustained political action, provide them with the means and agency to challenge existing patriarchal norms (Prillaman, 2023b, Das et al., 2019, N. Kumar et al., 2019). Our primary contribution is demonstrating that this increased agency – especially in conjunction with reservations – extends to greater involvement in formal political participation in the form of contesting local elections. We deepen our contribution by delineating mechanisms: improvements in turnout and the democratization of the candidate pool caused by a lowering of entry barriers.

There is a vast literature studying how political reservations in local government fundamentally alter women's and SC/STs political entry and consequent downstream outcomes (Chattopadhyay and Duflo, 2004, Chin and Prakash, 2011, Beaman et al., 2009 C. Kumar and Sharan, 2024, Gulzar et al., 2023, Chauchard, 2014). This paper proposes a novel mechanism that increases reservation's potential to boost entry: SHG formation. Additionally, we show that the combination of SHGs and SC reservation alters the profile of candidates running, i.e. they are less educated and from poorer households. This is consistent with and adds to a new literature studying the democratic entry of different types of households in electoral politics particularly with reservations in place (Bamezai et al., 2024).

Our research also contributes to a broader literature studying SHGs and their impacts on participating individuals and the broader community (Dıaz-Martin et al., 2022). SHGs have been shown to improve a wide range of financial outcomes, including access to credit with lower interest rates, boosting savings, and boosting household income through various channels, including wage labor, self-employment, participation in NREGA, and providing a cushion against weather shocks. (Deshpande et al., 2023, Demont, 2022, Hoffmann et al., 2021, Kochar et al., 2020, Pandey and Gupta, 2019). Importantly, the literature has also shown that participating

in SHGs can empower members, increasing both their bargaining power within the household but also social networks and connections within the village (Kochar et al., 2022, N. Kumar et al., 2019). We find that while this results in only a smaller number of SHG members running themselves in local elections, SHG members may come together to support other candidates. Similarly, SHGs help increase overall voter turnout in GPs, leading to more participation in local elections.

2 Institutional Background, Data, and Sample Selection

2.1 The Self Help Group (SHG) program in Bihar

SHG programs in India date back to the mid-1980s, when these were primarily run by NGOs at a smaller scale with the assistance of development agencies such as the World Bank. In 2012, the Government of India formally established the current version of the program, known as the *National Rural Livelihoods Mission*, and the program was scaled up across all Indian states thereafter.

Bihar is arguably India's poorest state, with a population of over 130 million. The SHG program was piloted earlier in the state in 8 districts between 2007 and 2011 before being scaled up over time in all 38 districts from 2012 onwards. In Bihar, the program initially targeted women from SC/ST households and currently includes about 12 million members as part of just over 1 million SHGs.[2]

The SHG program mobilizes between 10-15 women from impoverished households within a hamlet into forming a group. A majority of women in SHGs belong to SC households. Groups are established in the village until all women who wish to participate are included. After formation, members start to save and can borrow from various funds made available to the groups.

Over time, SHGs are incorporated into a larger, federated structure. The federated structure is an important feature, as it helps to better coordinate and manage across a larger number of groups, as well as an infusion of additional funds, resources, and training that are made available to the groups within the structure. Specifically, the structure includes SHGs at the bottom, Village Organizations (VOs) in the middle, and a Cluster Level Federation (CLF) at the top. Members from each SHG represent the group as part of governing bodies in VOs, and this process is repeated at the CLF level. Therefore, members that represent groups at these higher level structures, already possess or are able to develop skills such as good communication and coordination skills. Furthermore, they gain access to larger social networks and information beyond goings on in their own groups.

[2]Numbers were accessed from the NRLM website in March 2024:
https://nrlm.gov.in/shgOuterReports.do?methodName=showShgreport

2.2 Reservations in Local Elections

Political reservations were established in India in 1992 along with the devolution of certain responsibilities and powers to local level government. India's villages are grouped into administrative units called Gram Panchayats (GP). Local elections are held for a GP head.

Political reservations were not implemented in Bihar until 2006. GP head positions are reserved for the two disadvantaged minorities in India, SCs and STs, as well as OBCs for a certain share of villages. Additionally, in Bihar specifically, over 40% of GP head positions are reserved for women.

We utilize the SC and female reservation status of a GP in Bihar in the 2016 local GP elections. Reservations for different caste categories are typically assigned for each block (or sub-district) separately based on the caste population of the GPs in the block. This results in a population cut-off in each block below which no GP is reserved, and above which most are reserved. We calculate and use a running variable based on SC population for SC reservations.

Furthermore, female reservations are allocated as follows: we sort the GPs reserved for SC, ST, OBC, and unreserved GPs by group specific population. Half of the GPs, specifically those with largest populations for these corresponding groups are also reserved for women. Section 9 in the appendix details the reservation algorithm.

2.3 Data Sources and Sample Selection

For the SHG program, we obtained data from two sources: First, we obtained group level administrative data from the Bihar state department that runs the program (also known as *Jeevika*) including formation date, number of members, and whether members are from marginalized groups at the village and GP levels. This data is available for the period between 2007-2022 for all of Bihar's 8,392 GPs. The growth and coverage of the program in Bihar state is shown in Appendix Figure A1.

Second, we scraped SHG member names, father/husband names, caste category and GP location from the *National Rural Livelihoods Mission* for 9,868,688 SHG members (out of about 12 million members) in Bihar. We also scraped the names of the President and Secretary (i.e. leaders) for all VOs and CLFs as part of the federated structure in Bihar.

Political participation data is obtained from publicly available data for the 2016 local village elections in Bihar. We were able to obtain data for 7,792 out of 8,392 GPs. We also obtain the reservation status (whether reserved for women, SC, ST, or OBC). Our main outcome variables, number of SC and female candidates running is summarized in Appendix Table A1 across GP reservation status. Candidate data also includes name, father/husband's name, caste, education, and age, as well as if s(he) is the winner. We use political reservation in the 2006 local elections as controls.

Finally, we use additional baseline GP characteristics such as poverty scores at the GP level from the Socio-economic and Caste Census (or SECC) survey that was conducted in 2012 and the 2011 Census. We utilize a few downstream outcomes from the Mission Antyodaya Village Facilities database available from the Socioeconomic High-resolution Rural-Urban Geographic Platform for India (SHRUG) (Asher et al., 2021).

We use two data samples in the paper. First, we use the experimental sample in Hoffmann et al., 2021. This includes 89 GPs where the program was initiated in 2012 (i.e. treatment GPs) and 90 GPs where groups were initiated later in 2014 (i.e. control GPs). Appendix Figure A2 shows that differences still persist in a higher number of groups being formed in treatment and control GPs in 2020.

Second, we use a larger sample of GPs above and below the SC and female reservation cutoffs. We utilize the block-level SC population-based running variable to determine the cutoff for SC reservations as discussed in C. Kumar and Sharan, 2024. Similarly, we recreate the running variable for female reservations in order to use a sample of GPs above and below the cutoff (as described in Section 2.2). Appendix Figures A3 and A4 shows the jump in reservations using these running variables for SC and female reservations respectively.

3 A Basic Conceptual Framework

Our empirical examination is guided by a simple framework, originally formalized by Black, 1972. Individuals deciding to run for office carry out a straightforward cost/benefit analysis represented by:

$$\mu = PB - C. \tag{1}$$

Here, P represents the candidate's estimate of their chances of winning if they choose to run, B stands for the benefits of holding office, and C represents the costs associated with campaigning. If the expected benefits outweigh the costs, and if this net gain surpasses other available options, the individual will choose to run for office.

The extremely low number of SC women contesting in open seats suggests that μ. is lower than the outside option for SC women. Assuming everyone benefits equally in office and the campaigning costs are the same across castes, this implies that P_{SC} – the probability that an SC women wins elections – is low or C is too high for SC women.

SHG Membership: Jeevika could affect the calculus of SC women in three ways: first, by improving SC women's financial well-being, it could make it easier for some households to overcome the costs of campaigning, C and make μ better than the alternate option. Assuming that Jeevika doesn't affect campaigning costs, this implies that the marginal candidate in treated GPs could be poorer. Second, by expanding SC women's social networks, it could increase P_{SC}. Typically, women's social networks are stronger within their own sub-castes. If Jeevika expands

women's networks across castes, one potential implication is that the marginal candidate in treated GPs is from smaller SC sub-castes (CHECK!!). Moreover, women who become SHG leaders could also see an increase in P, since citizens could value individuals with leadership skills.

Reservation: In reserved GPs, the costs of campaigning, C_R, is lower: this is because only SC households can contest and SC households are considerably poorer than the median household. Moreover, given that only SCs (or SC women) can contest, the probability of victory, P_{SC_R}, is also mechanically higher for SC women. More formally, for SC women in reserved GPs, we have: $C_R < C$ and $P_{SC_R} > P_{SC}$.

SHG Membership + Reservations: If SHG membership substantially increases P_{SC} and improves SC women's ability to bear costs C, then one could see more SC women contest elections. However, if either C is very high in unreserved GPs or the nature of caste and gender hierarchies make it extremely hard for SC women to contest and win elections in open seats (i.e. $P_{SC} = \epsilon \to 0$), then SHG membership alone may not result in political entry. In other words, μ could still be low such that SC women belonging to SHGs would choose not to contest elections.

However, in reserved GPs, owing to lower costs of campaigning and higher probability of victory, it is possible that SHG membership could create more entry.

Ward Elections: The effects of SHG membership on lower-tiered ward elections are more ambiguous. Wards are largely caste homogenous, owing to residential segregation in Bihar's villages. Most GPs have a few "SC wards" where the majority of residents are SCs. Typically, these are the wards reserved for SCs too. Hence, unlike at the GP level, the marginal effect of SC reservation on SCs contesting ward elections is small.

Ward members in 2016 had no funds to spend and functioned as figureheads, with the village council being entirely controlled by the GP head (Sharan, 2021). Thus, B_W, the benefits from winning ward elections is very small. However, owing to the tiny geographical size of these constituencies and their caste-homogeneous nature, $P_{SC_W} > P_{SC}$ and $C_W < C$. SC women have a higher probability of winning ward than GP elections and the costs of campaigning are small too.

Now, SHGs could make it easier for women to overcome C_W and improve P_{SC_W} too. However, if B_W is very small, this may not result in entry at all. On the other hand, if B_W is somewhat large, then SHGs could cause more entry of SC women in ward elections. The size of these effects, therefore is a function of how large B_W is.

4 Results from a Randomized Roll Out of the SHG program

4.1 Empirical Strategy

To study the impact of earlier exposure to SHGs on political participation, we first use the RCT sample to estimate the following using OLS:

$$Y_i = \beta_o + \beta_1 early\_shg_i + C_i + pw_i + \epsilon_i \tag{2}$$

where Y_i is the number of SC, women, and SC women candidates running for the GP head position in the 2016 elections. $early\_shg_i$ is an indicator variable for the earlier randomized introduction of the SHG program in 2012 (as compared to later in the control group pf GPs in 2014). All specifications include the following controls, C_i: GP population, area, and distance to district headquarters. The original RCT design included randomizing within 85 pair wise strata, pw_i, with most strata including 2 GPs and a few including 3 GPs. Next, we use a second specification where we use the additional variation in the formation of groups (num_shg_i) by 2015, and instrument the number of groups formed with the indicator for early assignment ($early\_shg_i$) in the RCT sample as shown below. ϵ_i and ν_i are robust standard errors.

$$num\_shg_i = \alpha_0 + \alpha_1 early\_shg_i + C_i + pw_i + \nu_i \tag{3}$$

$$Y_i = \beta_0 + \beta_1 \widehat{num\_shg_i} + C_i + pw_i + \epsilon_i \tag{4}$$

Our next specification estimates separately the interaction effect of SHGs and reservations, R_i (for SCs and women and both SC and women), since reservations determine which demographic(s) can run in local elections. Furthermore, we control for past GP reservation (in local elections in 2006) since this controls for past reservation experience. Specifically, we control for SC, female, and reservations for "Other Backward Castes" or OBCs (as denoted by X_i) in Eq. (4) below:

$$Y_i = \beta_o + \beta_1 R_i + \beta_2 SHG_i + \beta_3 R_i SHG_i + X_i + C_i + b_i + \epsilon_i \tag{5}$$

where SHG_i is either an indicator for earlier introduction of SHGs or number of groups instrumented with an indicator for both earlier introduction and the reservation status. In this specification we use block fixed effects b_i since the RCT treatment and control samples were also balanced within blocks by design but using the pairwise strata would be too restrictive for including reservations (and interactions with reservations).

Additionally, we also show results using a version of Eq. (4) that instruments for reservation status using the SC population of the GP being above a threshold. Within each block, GPs are

reserved once the SC population is above a threshold. Each block has 2 thresholds: one each for SC and SC-Female reservation status. We refer to this design as an RD-RCT design. Below, we describe the fuzzy RD design.

$$R_i = \alpha_0 + \alpha_1 1(Pop_i > T_b) + \alpha_2(Pop_i - T_b) + \\ \alpha_3(Pop_i - T_b) * 1(Pop_i >= T_b) + \delta * X_i + b_i + \eta_i \tag{6}$$

$$Y_i = \beta_o + \beta_1 R_i + \beta_2 SHG_i + \beta_3 R_i SHG_i + X_i + b_i + \epsilon_i \tag{7}$$

Here T_b is the population threshold above which GPs are reserved for SCs/SC women (see Appendix Section 9 for a long discussion on the reservation rule).

4.2 Threats to validity

Both compliance with the SHG program, as well as balance on covariates in this experimental sample is robust and discussed in Hoffmann et al., 2021. We also show differences in group formation in fact persist till 2020 in earlier versus later GPs (Appendix Figure A2). We also use the indicator variable for when SHGs were first introduced in the GP, and/or instrument for the number of groups, as subsequent group formation can be endogenous when feasible. We still on occasion show results using the number of groups because of the small RCT sample, and since group formation appears to be helpful in capturing important variation (these results are mostly shown in the Appendix). However, we appreciate that this could be capturing other aspects in GPs that lends itself to both greater group formation and political participation.

Furthermore, the timing of SHG introduction in the experimental sample, coincidentally, is beneficial to the analysis in this paper. In the control group, where SHGs were introduced in or after 2014, can be thought of as GPs where SHGs did not likely influence the local elections in 2016. This is because both group formation and stabilization as well as the formation of higher federated structures is known to take some time.

4.3 Results

We first present the relationship between SHGs and political participation following Eq. (1). Table 1 Cols 1 shows that on average nearly 1.6 additional SC candidates ran in the 2016 local elections in GPs where the SHG program was introduced 2 years earlier. Since Jeevika targeted SC women in particular, we now switch focus to the number of SC females running in particular. Col 2 shows that 1 additional SC female candidate ran and this result is statistically significant at the 10% level with a p-value of 0.07. Col 3 shows the same outcome with the number of groups instrumented with the earlier introduction of SHGs following Eq. (2) and (3) above. The results indicate that approximately 42 additional groups lead to 1 additional candidate

running, and it is significantly different for SC women. Col 4 shows that there is no effect of Jeevika on SC female candidates running without reservation by restricting the sample to GPs that were unreserved (for SCs and OBCs) in 2016. We leave outcomes for female reserved GPs in the Appendix, since the latter appears to have not influenced participation. We discuss why this may be the case in the Discussion section.

Additionally, since the RCT sample is small we compute randomized inference p-values as a robustness measure. This entails a simulation of randomly reassigning the treatment variable multiple times and re-estimating Eq (1) to calculate the share of estimates that are more extreme than the original estimate. We estimate p-values of 0.145, and 0.082 for SC and SC female candidates respectively as shown in Table 1, which are consistent with the original results with the implication that it's not influenced by finite sample bias.

Col 5 shows results following Eq. (5) which includes the interaction term with SC reserved GPs in the RCT sample. The results highlight an important source of heterogeneity, i.e. they are driven by GPs that were both reserved and had SHGs. We see large impacts on SC female candidates when the GPs were also reserved for SCs. There were over 4 additional candidates on average running in such GPs.[3] Col 5 shows the estimation results using the population based running variable to better identify reservations in Eqs. (6) and (7) in Section 4.1. The magnitude we estimate here is the largest: an additional 5 SC female candidates running in SC reserved GPs.[4]

We show results using the additional variation in group formation in Appendix Table A2. The results are significant when using both group formation as well as group formation instrumented with the earlier introduction of SHGs (with the exception of Col.5 in the case of only female reservations) and the implication is that an additional 18-29 groups in such GPs are related to 1 additional candidate running.

Along with SC female candidates, the SHG program also included individuals from Scheduled Tribes or STs as members (another marginalized group with a much lower population). However, there are no ST reserved GPs in the RCT sample, and there are only 3 GPs with any ST candidates running in the local election. In Table 2, as placebo tests, we show that more candidates do not run for other categories that the SHG program did not target. For instance, Cols 1 and 2 shows that there are no additional OBC female candidates or Non-SC/Non-OBC (i.e. Other) female candidates running in GPs where the program was introduced earlier.

Local elections are also held for ward members who wish to represent their ward (each GP in India is further sub-divided into Wards). Cols 3 and 4 confirms that SHGs and reservations do not lead to additional candidates running at the Ward level. We find a small but significant effect of more female candidates running in SC reserved areas with the earlier introduction of SHGs but overall there does not appear to be additional entry at the Ward level (additional

[3]The number of SC reserved GPs in the RCT sample are 32 GPs

[4]note that Cols 2 and 4 are slightly different in that Col 2 shows the interaction with both SC and female reservation, whereas Col 4 shows SC female candidates running in SC reserved GPs.

results are shown in A6.

Table 1: Number of SC female candidates running in treatment GPs

	(1) SC Cand	(2) SC F Cand	(3) SC F Cand	(4) SC F Cand	(5) SC F Cand	(6) SC F Cand
early_shg	1.562	1.073*		-0.327	-0.069	-0.279
	(1.042)	(0.580)		(0.267)		(0.230)
num_groups_2015			0.024**			
			(0.010)			
sc_reserved_2016					2.374*	
					(1.431)	
early_shgXsc_reserved_2016					4.317*	
					(2.483)	
early_shgXsc_reserved_2016						5.159**
						(2.208)
Observations	179	179	179	114	179	179
RI	0.145	0.082			0.155	
Fixed Effects	Strata	Strata	Strata	Strata	Block	Block
GP Controls	Yes	Yes	Yes	Yes	Yes	Yes
Past Reserv Controls	No	No	No	No	Yes	Yes

Notes: The outcome variable in Col 1 is the number of SC candidates that ran in the local village elections in 2016. The outcome variable in all remaining Cols are the number of SC female candidates. *early_shg* is an indicator variable for GPs where SHGs were randomly introduced earlier in 2012. Col 3 shows the number of groups in 2015 instrumented using the *early_shg* instrument. Col 4 shows results for the sample excluding GPs reserved for SCs and OBCs in 2016. In Col 5, *sc_reserved*_2016 is the reservation indicator for GPs reserved for SCs and the interaction with earlier SHG rollout is shown as *early_shgXsc_reserved*_2016. Col 6 shows the results from the RD-RCT specification i.e. shows the coefficient on the interaction term above the SC reservation cutoff. RI shows the randomization inference values. Fixed Effect denotes whether the paired RCT strata or block fixed effects were used. Past Reserv Controls includes past reservation controls from the 2006 local elections. All regressions include village controls including GP population, area, and distance to the district headquarter controls, and robust standard errors shown in brackets. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 2: Number of Other candidates running in treatment GPs and Wards

	(1) OBC F Cand	(2) Other F Cand	(3) SC F Ward Cand	(4) SC F Ward Cand
early_shg	-2.125**	0.728	0.039	0.243
	(0.849)	(0.540)	(0.037)	(0.179)
Observations	179	179	1435	177
Fixed Effects	Strata	Strata	Block	Block
GP Controls	Yes	Yes	Yes	Yes

Notes: The outcomes OBC and female candidates that are not SC or OBC i.e. Other candidates in Cols 1 and 2. *early_shg* is an indicator variable for GPs where SHGs were randomly introduced earlier in 2012. Cols 3 and 4 are regressions run at the ward level. Col 3 includes wards where SC population is at least 1. Col 4 includes wards with a greater than 50% SC population. All regressions include GP controls and Strata or Block fixed effects. Cols 1-2 includes robust standard errors, and errors are clustered at the GP level in Cols 3-4. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

5 Empirical Strategy and Results from Staggered Introduction of SHGs and Reservation cutoffs in Bihar

5.1 Empirical strategy

The RCT results above indicate that SHG formation spurs political entry, but only in reserved GPs. Next, we test to see if these effects vary over time. To do so, we rely on a panel dataset of SHG group formation across all GPs of Bihar between 2007 and 2015, i.e. until just before the elections.

Since the prior results highlighted the importance of political reservations even in a small sample of GPs, we discuss a specification utilizing discontinuities in reservations for local elections that helps to conduct analysis with this expanded sample of GPs. Specifically, we use the SC running variables for reservation to designate similar GPs on either side of cutoff.[5]

We test if GPs with and without SHGs prior to the 2016 elections show differences in participation above and below the reservation cutoff. Bihar implemented the program in a phased manner over time. In fact, by 2017 about 90% of GPs in the state had received the program demonstrating the need for the program in most GPs in the state. Specifically, we argue that the phased roll out of the program is unrelated to GPs being reserved. Appendix Figure A5 shows that the total number of SHGs by 2015 on either side of the SC and female reservation cutoffs are similar. We take a few other precautions, including utilizing a binary indicator for first year the SHG program was introduced, restricting the analysis to the extensive margin, as well as the the comparison of SHG and non-SHG GPs to within a district. However, it is of course feasible that there are other unobserved characteristics or time varying features that affected the selection in GPs for SHG rollout, and this cannot be ruled out.

We therefore estimate the following equation separately above and below the cutoff:

$$Y_i = \alpha_c + \beta_c SHG_i + running\_var_i + d_d + \epsilon_i \tag{8}$$

where Y_i is the number of SC and SC women candidates running for the GP head position in the 2016 elections as before. However, SHG_c is an indicator for the introduction of the SHG program in year c in GP i and SHG adoption cohort $c \in (2007..2015)$. We run Eq. (7) pooling cohorts c across 3 year periods as well as separately for above and below the reservation running variable cutoff of 0. Specifically, since each SHG cohort year and comparison groups are small, we club the 9 years before the 2016 into 3 groups between 2007-2009, 2010-2012, and 2013-2015. We show results comparing to two comparison groups without the SHG program; never treated GPs and both not yet treated and never treated GPs. Not yet treated GPs are those that received the program after the elections between 2016 and 2021, and never treated are

[5] In our earlier analysis, we found no strong evidence of female reservations and SHGs improving participation, and therefore, show corresponding results for female reservations in Appendix Figure A6. Furthermore, we do not have sufficient power to conduct such analysis for SC female reserved GPs.

those that had not yet received the program by 2021. $running\_var_i$ is the running variable that determines the SC cutoff centred at 0 and is used to restrict GPs that fall within the bandwidth, d_d are district fixed effects, and ϵ_i standard errors clustered at the block level. Furthermore, Eq (5) is estimated excluding GPs that were reserved in the past for SCs, since this may instead reflect past experience.

The bias corrected bandwidth, calculated using Calonico et al., 2014, is 732 GPs on either side for SC reservations (and 1410 GPs for female reservations). We increase the bandwidth (about 2 times for SC) in order to include sufficient cohorts of GPs over time. Final samples are 1391 above and below the cutoff for SC reservations (and 1401 for above and below the female reservation cutoff).

5.2 Threats to validity

Since we expand the RD sample in order to study the variation of SHG introduction over time, this may result in the inclusion of GPs around the cutoff that are dissimilar. Furthermore, the introduction of SHGs in GPs is not randomized.

To alleviate the first concern, show that SHG rollout is uncorrelated with observable GP level characteristics within the RD bandwidth (Appendix Table A3). Furthermore, we use the recommended bandwidth around the cutoff to show that overall results still hold as shown in Appendix Table A4. And second, we combine the RCT and RD analysis to examine outcomes above and below the SC cutoff in the RCT sample, where both SHGs and political reservations are identified in Table 1.

5.3 Results

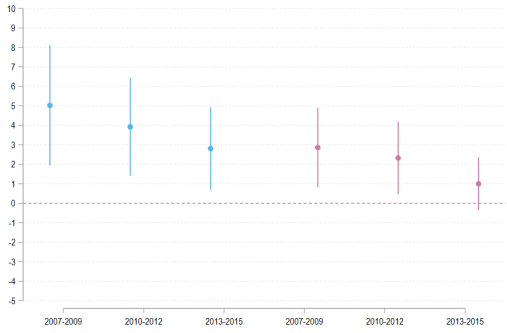
The results using Eq.(8) pooled across 3 year periods are shown in Figure 1 for above and below the SC reservation cutoffs separately in Panels (a) and (b). The figure shows both comparisons; with never treated GPs and for both never treated and not yet treated GPs together. Participation above the SC cutoff is higher for earlier SHG cohorts, particular for GPs where the program was introduced in and prior to 2012. Panel (a) shows significant differences of an additional 3-5 candidates running if SHGs were introduced between 2007-2009, about 2.5-4 additional candidates running if SHGs were introduced between 2010-2012, and between 1-3 additional candidates running if SHGs were introduced after 2012.

The patterns for participation below the SC reservation cutoff, shown in panel (b) for both comparison groups are also very clear - there is no difference in SC candidate participation below the reservation cutoffs for GPs with and without SHGs. The figure showing results for each cohort year separately are shown in Appendix Figure A6. When comparing participation above and below the female reservation cutoff, similar patterns can be observed, but with results that are not significantly different (see Appendix Figure A7). Panels (a) and (b) therefore underscores

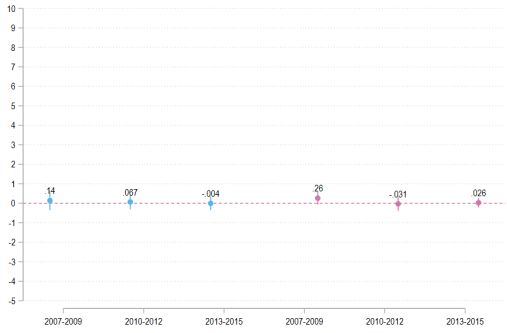
the importance of temporal dynamics in political entry, i.e. longer exposure to SHGs results increases the likelihood of entry (but only in conjunction with political reservation). Appendix Figure A8 shows the same pattern and robustness to controlling for past reservations in this sample with only slightly reduced estimates (a range of 5-2 additional candidates when compared to the never treated group, and 1-2 for comparison with the not yet treated group).

Figure 1: Political participation by SHG cohort above and below SC cutoffs

(a) Above cutoff



(b) Below cutoff



Notes: Figure shows differences in the number of candidates running in the 2016 elections for GPs that received the SHG program in a certain 3 year period. Mean differences along with 95% CIs are shown first with never-treated GPs(blue) and with both never treated and not yet treated GPs (pink). Differences are shown separately in (a) and (b) for above and below the SC reservation cutoff within a bandwidth. The difference estimate calculations include distance from cutoff as control, district fixed effects, and errors are clustered at the block level.

6 Mechanisms

The results above underline our main finding: we observe an increased number of candidates in GPs with both SHGs and reservations contesting local elections, and these results are stronger in the case of SC reservations (and both SC and female reservations) compared to only female reservations. What can explain this?

6.1 Effects on Education and Wealth of Candidates

We first explore characteristics of candidates in such GPs to better understand if the pool of candidates is different. We find that the combination of reservations and SHGs further democratizes the candidate pool, specifically enabling those who are lesser educated and come from poorer households to contest local elections. Figure 2 below shows the coefficients on the interaction term from Eq (4) i.e., the interaction of the SHG indicator or the number of groups in the RCT sample with GPs that are reserved for SCs or both SC and women. The outcome shown in Panel (a) is years of education of the candidates. We find that years of education is approximately between a year and two lower for candidates in such SHGs, with the implication that SHGs are enabling lesser educated candidates to contest elections.[6] The

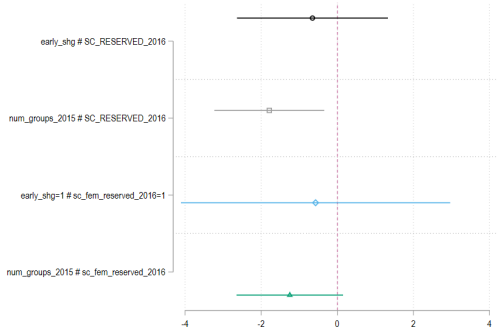
[6]The education variable used is from candidate data in local elections

results are stronger for SC reserved areas when we use the additional variation from SHG group formation. Again, randomization inference p-values for the interaction term indicates that the results are not driven by finite sample bias. We estimate randomized inference p-values of 0.00 and 0.0230, for the 2 interaction terms on the treatment variable (early_shg) shown in Figure 2, Panel (a).

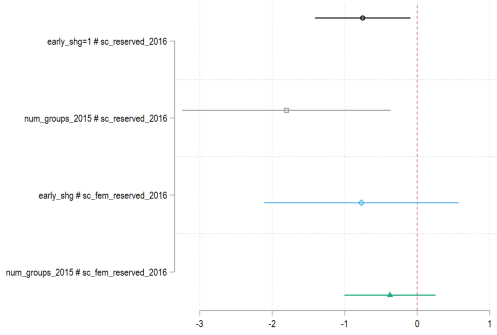
We also find that SHGs enable poorer candidates to run in reserved areas in Panel (b). We first construct poverty scores for each candidate using the first component from principal components analysis of all household assets.[7] We then aggregate these to the GP level. We find that assets scores are lower in SC reserved GPs (with smaller confidence intervals) compared to GPs that are reserved for both SC and female.[8] Randomization inference p-values are 0.00 for the interaction terms on the treatment (i.e. early_shg) in Figure 2, panel (b).

Figure 2: Candidate characteristics

(a) Years of education



(b) Poverty score



Notes: The outcome variables in Panel A is average years of education, and in Panel B is a poverty score for candidates based on principal components analysis of households assets, and then aggregated to the GP level. Only the interaction term between reservation and SHG terms are shown. The SHG variable is either an indicator for early treatment GPs or number of groups formed by 2015 as indicated. The coefficient for the number of groups is scaled by 100. All regressions include past reservation controls and block fixed effects with robust standard errors.

6.2 Entry Among SHG Members and SHG Leaders

Next, we use the entire roster of SHG member names to try and understand who runs: SHG members, SHG leaders or other women. In particular, we focus on two outcomes: first, to understand temporal variation, we measure the differential rate of matches of SHG member names with candidate names over time; second, to see how SHG leadership is correlated with political entry, we measure the differential match rates of names of SHG members versus SHG leaders. If the match rates of leaders with candidates is higher, then it could indicate that SHG leadership spurs political entry.

We are able to match with confidence a small percentage, about 5.3% of female candidates, that

[7] Asset information is available for 2,116 candidates from 176 GPs in the RCT sample from the SECC survey run in 2012

[8] The corresponding figure for female reservations is shown in Appendix Figure A9

ran in the 2016 elections to SHG members.[9] Furthermore, and consistent with our prior results, we find that the match rate more than doubles to 11.8% when we restrict to GPs that are reserved for SCs. We are wary of fully embracing the interpretation of these as suggesting that most women who run in the 2016 GP elections are not SHG members: this is mainly because name-matching in this context is tricky and we err on the side of caution when we determine two names to be a match. Therefore, there could be many more matches than what we can ascertain. Thus, below, we focus on relative match rates – across time or across members and leaders – since those are less likely carry systematic biases.

To highlight the importance of timing in the introduction of the SHG program and participation in local elections, we estimate:

$$y_i = \sum_{c=2007, c\neq 2015}^{2014} \beta_c shg_i + d_d + \epsilon_i \tag{9}$$

where y_i are a number of different outcomes for GP i we discuss below, β_c are coefficients for when the SHG program was first introduced between 2007 and 2014, while 2015 is always the comparison year, d_d are district fixed effects, and standard errors are clustered at the GP level.

Using Eq (6), we first estimate the match rate over time. Table 3 Col 1 shows that the percentage match rate is higher in GPs where the SHG program was introduced earlier. As a robustness check, we also verified that it is also higher in treatment GPs compared to control GPs in the RCT sample (about 4.6 more matches, p-value = 0.17).

There are 0.3% of SHG members who also won the election. As expected, the share of SHG member winners are also higher from earlier years as shown in Col 2. Next, after restricting the sample to matches (i.e. both candidates, and SHG members) we find that overall such candidates were able to achieve a higher ranking (amongst all candidates) (Col 3) and able to garner more votes (Col 4) if they were from an earlier cohort.

GPs with early adoption could see a higher match rate for two reasons: first, that these GPs have *more* SHG members: this mechanically increases the match rate; second, that these GPs have achieved greater gains for individual members, reducing their entry barriers. The effects in Cols. 1 and 2 of Table 3 are a combination of both these effects. However, the fact that, conditional on matching, candidates are better ranked (col 4) and gain more votes (Col 4) suggest that membership size alone cannot explain all the temporal entry effects.

If SHG members do run for office, are they regular group members or do they also hold leadership positions, for instance, as part of VOs and CLFs? Overall, we are able to match 2023 out of 3,664,520 members that were part of SHGs in 2015 to candidates. This indicates that a match

[9] We first restricted our analysis to 41,239 female candidates. We then used a high fuzzy match threshold of 0.98 to determine a good match. While we matched candidates to all 9,868,688 SHG members that we were able to access information for in 2023, we restrict to SHG members from groups formed in 2015 or before, i.e. before the 2016 local elections.

Table 3: Candidates matched to SHG members

	(1) match	(2) win	(3) rank_votes	(4) total_votes	(5) total_votes
yr=2008	5.962***	0.220	0.477	268.5*	236.8***
	(1.142)	(0.204)	(0.831)	(145.6)	(91.00)
yr=2009	2.988***	-0.0514	0.900	127.8	133.2
	(0.913)	(0.156)	(0.830)	(129.2)	(85.21)
yr=2010	2.557**	0.205	1.376	447.5	304.7
	(1.169)	(0.217)	(0.927)	(321.8)	(214.5)
yr=2011	6.057***	0.145	2.300**	-3.983	103.0
	(1.251)	(0.202)	(0.985)	(149.8)	(94.33)
yr=2012	3.685***	0.0718	1.739**	-20.90	126.1
	(0.834)	(0.144)	(0.833)	(154.2)	(87.10)
yr=2013	3.517***	0.0128	1.724**	-18.44	-2.618
	(0.618)	(0.110)	(0.759)	(125.9)	(76.03)
yr=2014	2.799***	0.0373	0.783	66.21	79.29
	(0.489)	(0.0916)	(0.710)	(120.8)	(72.42)
TotGP_Pop2001				0.116***	0.0889***
				(0.0283)	(0.0114)
Constant	3.251***	0.297***	7.859***	3,326***	3,736***
	(0.399)	(0.0859)	(0.665)	(272.8)	(121.3)
Observations	33,845	33,845	2,142	2,083	33,126
R-squared	0.031	0.003	0.063	0.358	0.237

Notes: The outcome variables in Column 1 is the percentage match rate between candidate names and SHG members. Column 2 shows the percentage rate for if the name matched and the candidate was also the winner. Column 3 shows a ranking of the matched names based on votes received, and Columns 4 and 5 shows total votes if matched and overall respectively. The rows are cohort year indicators for when the SHG program was introduced in the GP. $Tot\_Pop2001$ controls for the GP population in 2001. All regressions include district fixed effects and clustered standard errors at the GP level in brackets. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

rate of 0.06% for all SHG members. Similarly, we are able to match about 159 names from higher level federations that help to manage SHGs out of 39,785 leaders or a match rate of 0.4%. [10] Therefore, leaders are much more likely to enter, but it's still a small fraction of leaders who enter. This suggests that perhaps there is a pathway from SHG leadership to political entry. We also note that this pathway doesn't establish a causal result: many factors – like wealth, personality traits or network centrality – could drive both SHG leadership and participation in local elections.

6.3 Turnout

Finally, we ask if political entry is driven by greater turnout. Increases in turnout could reflect greater mobilization potential for women. Table 3 Col 5 shows that this is indeed true, and total votes are higher for places where the SHG program was introduced earlier (after controlling for GP population). In the RCT, we find results consistent with our earlier findings, i.e., voter turnout appears to be higher in GPs with both SHGs and reservations (see Appendix Table **??**). The effects are large and significant for treated GPs reserved for SC women (column 3).

7 Discussion

In this paper, we study how SHG participation could affect women's political entry. We show that SHGs improve political entry of Scheduled Caste and women, but only when these GPs are reserved. Longer exposure to SHGs results in greater entry. There are three explanations that our evidence seems to point towards: first, given that SC women are among the most marginalized groups anywhere in India, SHG formation reduces entry costs as seen by the entry of a poorer and less educated pool of candidates; second, SHG formation creates a space for women to build and nurture leadership skills, which results in a greater rate of entry for these women when compared to members; third, the community mobilization aspect of SHGs could translate into greater participation of women in the electoral process as voters and campaigners for their preferred candidates. This, in turn, could be a cause of greater turnout.

SHG movements' primary goal is to increase women's financial security, but a growing literature documents how SHGs contribute to community-wide changes and benefits (Dıaz-Martin et al., 2022). Prillaman, 2023a shows that in Madhya Pradesh, an SHG movement led by a prominent NGO, Pradhan, encourages women's collective action that consequently transforms women's non-electoral political participation. Studying the initial roll-out of Jeevika, Sanyal et al., 2015 note that SHGs could create a "mini-social movement within the village that challenges traditional structures of power and patriarchy." In this paper, we show that Jeevika, despite being state-run in a state with historically weak capacity, also results in women contesting local elections, but only when reservation is also in place. Furthermore, GPs with longer

[10] (Specifically, we include the Presidents and Secretaries of the two higher level bodies, the Village Organization and the Cluster Level Federation. These individuals by definition also have to remain SHG members.

exposure to SHGs see more entry, emphasizing that length of time matters for improving difficult development outcomes (Gulzar et al., 2023, Beaman et al., 2009, C. Kumar and Sharan, 2024).

This paper also throws up a series of important questions: first, while Jeevika focused primarily on SC women, over time, as per official estimates, nearly 60% of Bihar's households had an SHG member. While we do not find effects for the time period of our study, it would be of interest to examine if these results extend to non-SC women in the later years. Second, while these results focus on local political entry, where politically parties are formally banned, the question of how parties use women's collective action through Jeevika for mobilization of support remains an important open question. Third, we are unable to empirically examine the effects of Jeevika-induced greater political entry on downstream governance outcomes.

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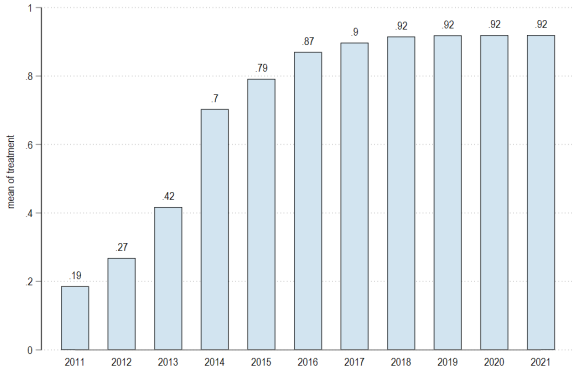
8 ONLINE APPENDIX

Figure A1: Percentage of villages reached by the SHG program (2011-2021)



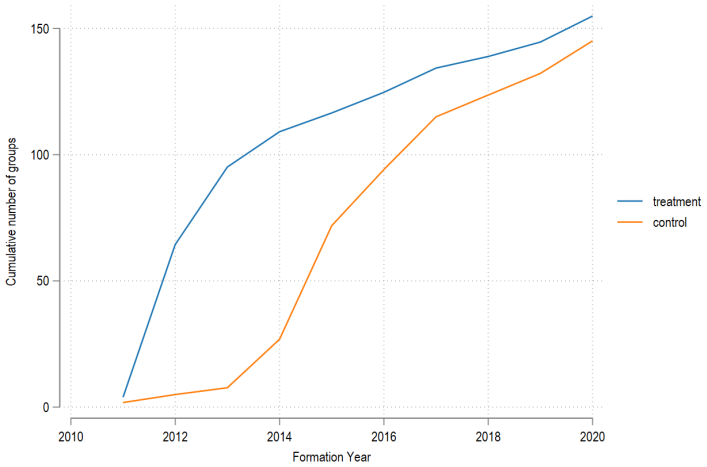
Notes: Total GPs in Bihar state = 8,392 (Census 2011). Data source: SHG program administrative data.

Table A1: Number of female and SC candidates running for local elections in 2016

	Num female candidates	Num SC candidates	Num GPs
Reserved for women in 2016	10.9	2.6	3,720
	(6.3)	(5.2)	
Reserved for SC in 2016	5.2	13.5	1,377
	(7.5)	(6.3)	
Reserved for OBC in 2016	5.3	0.0	1,416
	(7.6)	(0.2)	
Unreserved in 2016	0.1	0.9	2,879
	(1.1)	(1.5)	

Notes: 557 and 573 GPs have both women + SC and women + OBC reservations respectively. Data source: 2016 GP Elections administrative data.

Figure A2: Evolution of Groups in RCT sample



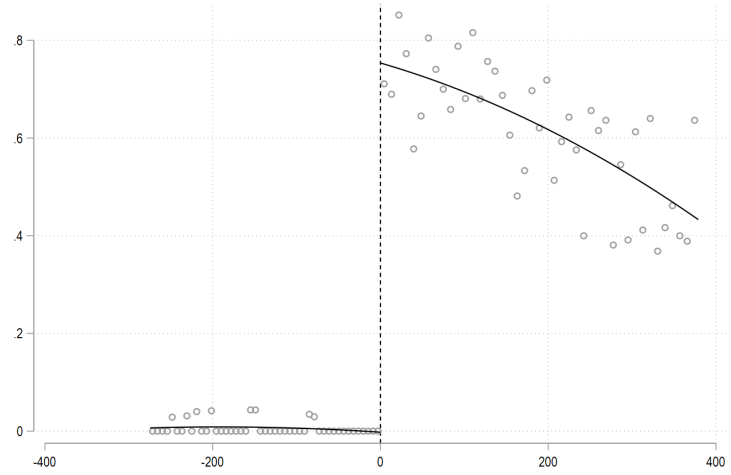
Notes: The figure shows the evolution of SHGs across treatment and control GPs. Eighty nine treatment GPs randomly assigned to receive the SHG program in 2012, 90 control GPs received program in 2014.

Table A2: Relationship between number of candidates and number of groups in the RCT sample

	(1) SC Cand	(2) F Cand	(3) SC F Cand	(4) SC Cand	(5) F Cand	(6) SC F Cand
num_groups_2015	-0.00404	-0.00711	-0.00227*	-0.00704	0.00626	-0.00343
	(0.00281)	(0.00456)	(0.00117)	(0.00638)	(0.00956)	(0.00235)
Reservation	10.62***	8.691***	8.624***	11.33***	10.52***	10.14***
	(1.060)	(1.183)	(1.308)	(2.025)	(2.438)	(1.464)
Interaction	0.0497***	0.0351***	0.0541***	0.0421*	0.0148	0.0405***
	(0.00747)	(0.0110)	(0.00708)	(0.0223)	(0.0255)	(0.0135)
Controls	YES	YES	YES	YES	YES	YES
Observations	179	179	179	179	179	179
R-squared	0.896	0.792	0.942	0.894	0.786	0.937

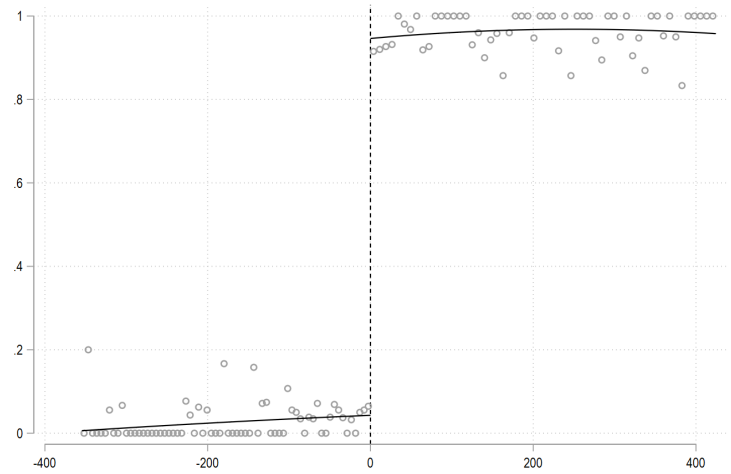
Notes: The SHG variable is the number of groups in Columns 1,2,3 and instrumented with early treatment in Cols 4 ,5, and 6. The Reservation variable is an indicator for GPs reserved for SCs in Cols 1,4, females in Cols 2 and 5, and both SC and female in 3 and 6. The interaction term is the interaction between the number of groups and the corresponding Reservation variable. All regressions include past reservation controls, GP population, area, and distance to HQ controls, and block fixed effects with robust standard errors are shown in brackets. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}\ p < 0.1$

Figure A3: Block level population based SC reservation



Notes: The figure shows GPs reserved for SCs in the 2016 elections based on the block level SC population.

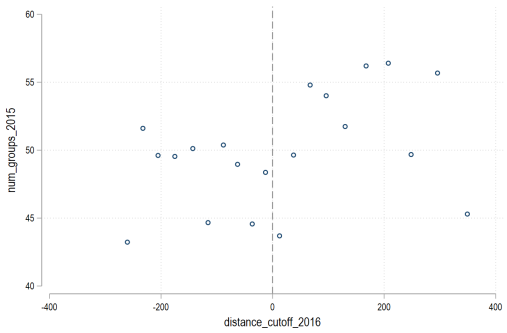
Figure A4: Block level population based female reservation



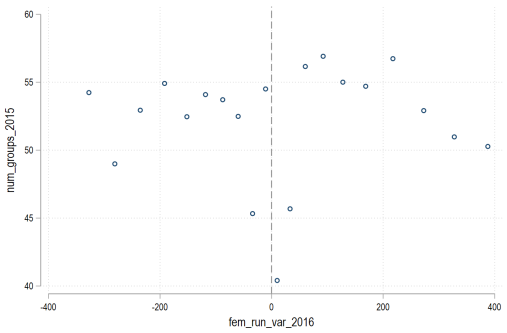
Notes: The figure shows GPs reserved for women in the 2016 elections based on block level population.

Figure A5: Number of SHGs in 2015 around the SC and Female reservation cutoff

(a) SC reservations



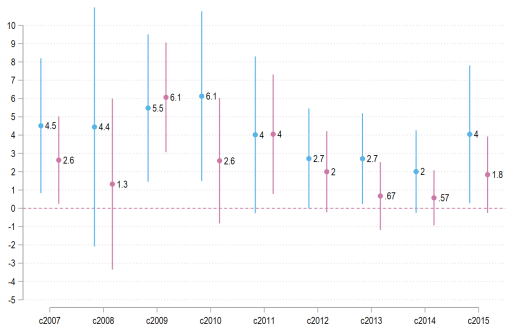
(b) Female reservations



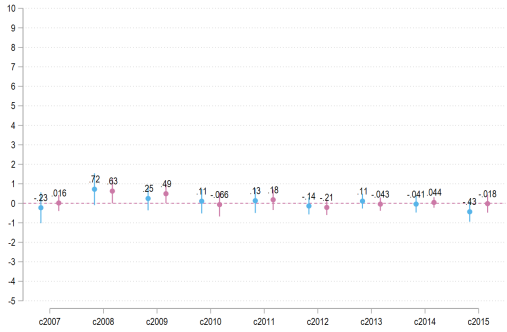
Notes: Figure shows average number of SHGs formed by 2015 above and below the SC and female reservation cutoffs.

Figure A6: Political participation by SHG cohort above and below the SC reservation cutoff

(a) Above cutoff



(b) Below cutoff

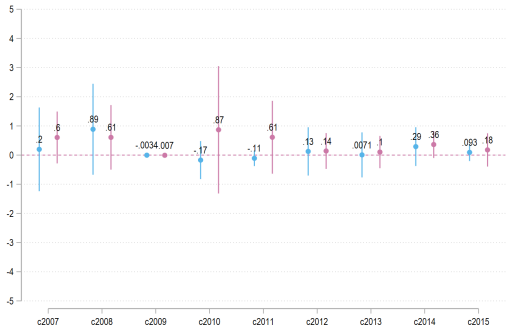


Notes: Figure shows difference in the number of candidates in the 2016 elections for GPs that received the SHG program in a certain year. Mean differences along with 95% CIs are shown first with never-treated GPs(blue) and with both never treated and not yet treated GPs (pink). Differences are shown separately in (a) and (b) for above and below the SC reservation cutoff within a bandwidth. The estimates are calculated using distance from cutoff as control, district fixed effects, and errors are clustered at the block level.

Figure A7: Political participation by SHG cohort above and below the female reservation cutoff

(a) Above cutoff

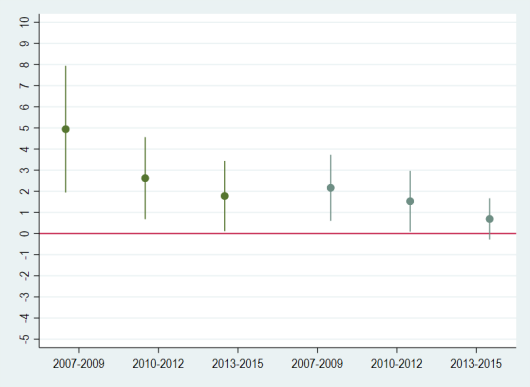
(b) Below cutoff



Notes: Figure shows difference in the number of candidates in the 2016 elections for GPs that received the SHG program in a certain year. Mean differences along with 95% CIs are shown first with never-treated GPs(blue) and with both never treated and not yet treated GPs (pink). Differences are shown separately in (a) and (b) for above and below the female reservation cutoff within a bandwidth. The estimates are calculated using distance from cutoff as control, district fixed effects, and errors are clustered at the block level.

Figure A8: Political participation by SHG cohort above and below SC cutoffs

(a) Above cutoff

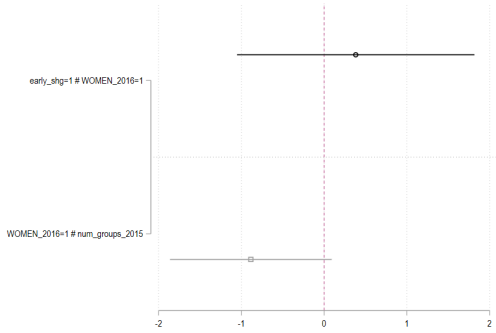


(b) Below cutoff

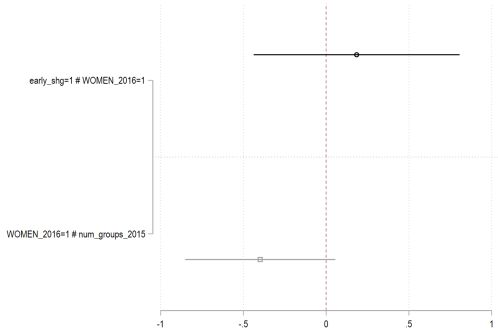
Notes: Figure shows differences in the number of candidates running in the 2016 elections for GPs that received the SHG program in a certain 3 year period. Mean differences along with 95% CIs are shown first with never-treated GPs(green) and with both never treated and not yet treated GPs (gray). Differences are shown separately in (a) and (b) for above and below the SC reservation cutoff within a bandwidth. The difference estimate calculations include distance from cutoff, as well as past reservations as controls, and district fixed effects, and errors are clustered at the block level.

Figure A9: Candidate characteristics and female reservations

(a) Years of education



(b) Poverty score



Notes: The outcome variables in Panel A is average years of education, and in Panel B is a poverty score for candidates based on principal components analysis of households assets, and then aggregated to the GP level. Only the interaction term between the reservation and SHG terms are shown. The SHG variable is either an indicator for early treatment GPs or number of groups formed by 2015 as indicated. The coefficient for the number of groups is scaled by 100. All regressions include past reservation controls and block fixed effects with robust standard errors.

Table A3: Balance Table for SHG rollout within RD bandwidth

	(1) TotGP_LnPop2001	(2) DistHQ2001	(3) NearTown2001	(4) TotalArea2001	(5) SCProp2001	(6) Villages2001
Phase 1(2007-2011)	0.000227	-2.615*	-1.423	27.30	0.00425	0.655*
	(0.0169)	(1.518)	(1.106)	(50.56)	(0.00332)	(0.348)
Constant	9.110***	32.09***	20.76***	1,116***	0.174***	5.503***
	(0.00815)	(0.790)	(0.578)	(21.83)	(0.00143)	(0.109)
Observations	2,772	2,770	2,770	2,782	2,772	2,782
R-squared	0.046	0.132	0.134	0.168	0.396	0.256

Notes: We compare SHG rollout between 2007-2011 with 2012-2015 within the expanded RD bandwidth. The variables in Cols 1-6 are baseline GP characteristics from the 2001 Census. All regressions control include district fixed effects and standard errors clustered at the block level. ***$p < 0.01$, **$p < 0.05$, * $p < 0.1$

Table A4: Differences in participation above and below the SC reservation cutoff for SHG cohorts (comparisons with never treated and not yet treated GPs with smaller bandwidth)

	(1) SC_Cand	(2) SC_Cand	(3) SC_Cand	(4) SC_Cand
cohort_years (2007-2015)	3.202***	0.0319	0.918	0.0640
	(1.113)	(0.212)	(0.716)	(0.138)
distance_cutoff_2016	-0.00189	0.000135	-0.00329	-0.000485
	(0.00378)	(0.000924)	(0.00368)	(0.000874)
Constant	8.919***	0.804***	11.15***	0.692***
	(1.163)	(0.218)	(0.741)	(0.127)
Observations	750	748	831	860
R-squared	0.111	0.109	0.096	0.091

Notes: The outcome variables in all Columns is the number of SC candidates that ran in the local village elections in 2016. Differences with GPs receiving the program are shown in comparison with the never treated and not yet treated groups. Columns 1 and 3show this difference above the SC reservation cutoff and within the smaller bandwidth, whereas Columns 2 and 4 show below the cutoff. All regressions control for the running variable, and include district fixed effects and standard errors clustered at the block level. ***$p < 0.01$, **$p < 0.05$, * $p < 0.1$

Table A5: Voting in the RCT sample

	(1) RCT share_vote	(2) RCT share_vote	(3) RCT share_vote	(4) RD-RCT share_vote
early_shg	-0.00745	-0.0152	-0.0140	
	(0.0174)	(0.0201)	(0.0180)	
sc_reserved_2016		-0.0490		
		(0.0382)		
early_shg#sc_reserved_2016		0.0505		
		(0.0459)		
sc_fem_reserved_2016			-0.139**	
			(0.0606)	
early_shg#sc_fem_reserved_2016			0.155**	
			(0.0664)	
early shg#sc reserved 2016				0.0497
				(0.0899)
Constant	0.530***	0.539***	0.538***	0.536***
	(0.0174)	(0.0187)	(0.0170)	(0.0256)
Controls	YES	YES	YES	YES
Observations	178	178	178	178
R-squared	0.285	0.294	0.304	0.272

Notes: The outcome variable is total votes in the GP divided by the GP population in 2001. *early_shg* is an indicator variable where SHGs were randomly introduced earlier in 2012. Cols 2 and 3 show the interaction with SC and SC and female reservations and *early_shg*, and Col 4 shows the RD-RCT specification. All regressions control for past reservation and include block fixed effects and robust standard errors in brackets. ***$p < 0.01$, **$p < 0.05$, * $p < 0.1$

Table A6: Number of candidates running at the Ward level

	(1) SC Cand	(2) SC Cand	(3) SC Cand	(4) SC F Cand	(5) SC F Cand	(6) SC F Cand
early_shg	0.0347	0.107	0.0986	0.0445	0.179*	0.146
	(0.0621)	(0.128)	(0.127)	(0.0358)	(0.102)	(0.101)
Constant	0.904***	2.348***	2.409***	0.345***	0.853***	1.015***
	(0.0380)	(0.0949)	(0.360)	(0.0204)	(0.0610)	(0.254)
Controls	NO	NO	YES	NO	NO	YES
Observations	1,435	362	362	1,435	362	362
R-squared	0.070	0.376	0.390	0.033	0.073	0.088

Notes: The outcome variables are SC candidates (Cols 1-3) and SC Female candidates (Cols 4-6). *early_shg* is an indicator variable where SHGs were randomly introduced earlier in 2012. All regressions are restricted to GPs with SC presence. Cols 2,3,5, and 6 restrict the sample only in SC reserved areas. All regressions control for past reservation, GP population, area and distance to HQ controls, as well as block fixed effects and standard errors clustered at the GP level in brackets. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table A7: Downstream outcomes in treatment GPs

	(1) Total Roads	(2) Total schools	(3) School Quality	(4) Tap water	(5) NREGA SC workdays
early_shg	-0.321	0.112	12.085	0.054	-1585.344
	(0.483)	(0.383)	(40.698)	(0.062)	(1936.183)
Observations	179	179	178	178	179
Fixed Effects	Strata	Strata	Strata	Strata	Strata
GP Controls	Yes	Yes	Yes	Yes	Yes

Notes: Cols 1-4 use outcomes from the SHRUG Antodaya datase and Col 5 is from NREGA admin data. Col 1 outcome is total roads in GP. Col 2 outcome is the total primary, middle, secondary and higher secondary schools in GP. Col 3 an total available services in school including playground, electricity, computer, drinking water, mid-day meal, and teachers. Col 4 is mean share of villages in GP that have access to tap water. Col 5 is total SC workdays in GP from 2017-2020. *early_shg* is an indicator variable for GPs where SHGs were randomly introduced earlier in 2012. All regressions include village controls including GP population, area, and distance to the district headquarter controls, strata fixed effects, and robust standard errors shown in brackets. All columns control for the baseline value of the variable estimated from Census 2011 in Cols 1-4 and the NREGA database in Col 5. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

9 Reservation rule Description

Bihar has reservation for SCs, STs, EBCs (*not* OBCs) and women. The rule for these is given below. The crucial takeaway from the sections below is that, focusing solely on SC reservation, there exists an SC population threshold below which no GP is reserved and above which a majority of GPs are reserved. Within this set of GPs, there exists another SC population threshold above which GPs are to be reserved for women. Note, also, that the rule for 2006 is fixed till 2016 (two election cycles), after which the reservation cycle switches Below, we describe the reservation algorithm for caste/gender, first for 2006 and then for 2016.

9.1 2006

The reservation rule proceeds in the following manner:

- First, based on the proportion of SCs (STs) in the block, the number of GPs to be reserved for SCs (STs) is decided. If there are N_j GPs in block j and θ_j is the proportion of SCs (STs) in block j, then the number of GPs, n_j, to be reserved is
$$n_j = round(\theta_j * N_j, 1)$$
- Let n_{SC} and n_{ST} be the number of GPs to be reserved in block j for SCs and STs, respectively. The number of GPs to be reserved for EBCs is given by
$$n_{EBC} = min(round(0.2 * N_j, 1), round(0.5 * N_j - n_{SC} - n_{ST}, 1))$$
- If there are no STs in the block or n_{ST} is 0 (which is true in 480 of the 534 blocks), then the rule skips to the next step. However, if $n_{ST} > 0$, the rule proceeds by arranging all GPs in descending order of their ST population. The first GP in the list is then reserved for STs.
- Now, all remaining GPs are rearranged in the descending order of their non SCST population. The first GP on this truncated list is "blocked". The choice of word is deliberate and conveys an important distinction: the GP is not "reserved", it is merely blocked.
- Now, all unreserved and unblocked GPs are rearranged in descending order of their SC population. The first GP in this further truncated list is now reserved for SCs.
- This algorithm proceeds until the number of GPs reserved for STs = n_{ST} or the number reserved for SCs is n_{SC}. Once, a group hits its quota of reserved GPs, then the rearranging of GPs is no longer done by that group. For instance, if $n_{ST} = 1$, then, in the second round, GPs are no longer rearranged by ST population - instead, the rule proceeds straight to rearranging by non-SCST population.
- The algorithm further proceeds till the second group also hits its quota of reserved GPs. This throws up two sets of GPs, n_{ST} GPs that are reserved for STs and n_{SC} GPs that are reserved for SCs.
- Now, all the unreserved GPs (including the "blocked" ones) are collected and arranged by descending order of GP population.
- The first n_{EBC} GPs in this list is reserved for EBCs.
- Thus, for each block, one can arrive at an SC population cut-off - the SC population of the last GP to be reserved for SCs - below which no GP is reserved. This threshold varies by block. Figure **??** gives the first stage and shows that the first stage is robust to (a) adding block fixed effects (Panel (b)) and (b) dropping all ST/EBC reserved GPs.

9.1.1 Gender Reservation

- All the n_{SC} seats determined to be reserved for SCs within a block are arranged in descending order of SC population and *up to* 50% of them with the highest populations are reserved for SC women. For instance, if there are $n_{SC} = 3$, then 1 GP is reserved for SC women – the one with the highest SC population. On the other hand, if $n_{SC} = 4$, then 2 GPs are reserved for SC women – the top 2 highest SC population GPs.

- All the n_{ST} seats determined to be reserved for STs within a block are arranged in descending order of ST population and *up to* 50% of them with the highest ST populations are reserved for ST women.
- All the n_{EBC} seats determined to be reserved for EBCs within a block are arranged in descending order of total population and *up to* 50% of them with the highest total populations are reserved for EBC women.
- All the n_{GEN} seats determined to be caste unreserved within a block are arranged in descending order of non-SCST population and *up to* 50% of them with the highest non-SCST populations are reserved for women.

9.2 2016

The reservation rule for 2016 proceeds in a similar manner to that of 2006, with two major changes. First, it changes the order in which GPs are arranged. In 2006, GPs were arranged first by STs, then non-SCSTs, then SCs. In 2016, GPs are arranged first by non-SCSTs, then by SCs, then by STs. Second, since there is no provision for recudrring reservation, no GP previously reserved for SCs (STs/EBCs) can again be reserved for the same. So, when GPs are arranged by descending order of population of a particular group, those previously reserved are struck off the list, even before the algorithm begins.