Addressing Declining Female Labor Force Participation in India: Does Political Empowerment Make a Difference?

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ABSTRACT Despite income growth, fertility decline, and educational expansion, female labour force participation in rural India dropped precipitously over the last decade. Nation-wide individual-level data allow us to explore if random reservation of village leadership for females affected women’s access to job opportunities, their demand for participation in the labour force, and income as well as intra-household bargaining in the short- and medium term. Gender reservation of local leadership affected female but not male participation in public works and regular labour markets, their income, and their influence on key household decisions with a lag, suggesting that such reservation affected social norms and stereotypes.

KEYWORDS: Political reservation; female labor force participation; India; public work; NREGA

1. Introduction

Since the 1990s, India experienced robust economic growth, declines in fertility, expansion of education, and improved access to infrastructure. These are all factors that are generally believed to be associated with sustained increases in female labour force participation (Klasen, 2019). Yet, India’s female labour force participation rate was, with 48 percent in 1984, low by global standards to start with and, in rural areas, declined further to 33 percent in 2012 (Andres, Dasgupta, Joseph, Abraham, & Correia, 2017). Reductions in rural women’s labour force participation e.g. due to life cycle events or exogenous shocks that were intended to be temporary often were difficult to reverse and led to permanent dropping out of the labor force (Sarkar, Sahoo, & Klasen, 2019). The effects of such shifts go well beyond foregone income as women’s labor market participation status will affect their welfare as well as that of future generations through impacts on autonomy, outside options, and ability to invest in children’s education and health (Afridi, Mukhopadhyay, & Sahoo, 2016). Women’s labor market participation will thus reduce human and physical capital accumulation and India’s ability to take advantage of its ‘demographic dividend’. Identifying ways to reverse or at least arrest this
decline is thus a priority for policy (Pande, Moore, & Fletcher, 2017), especially in light of the devastation wrought by the COVID pandemic.

The economic literature identifies supply and demand factors as important determinants of labor market participation. Agricultural mechanization and manufacturing’s rising capital intensity reduced female labour demand as many women lack the education and skills that would allow them to shift to higher-paying sectors. This interpretation and the importance of demand side rationing is supported by women’s strong response to workfare programs (Desai, 2018; Sarkar et al., 2019). On the other hand, some studies argue that social norms may have interacted with higher real wages in rural areas affected supply through an income effect (Mehrotra & Parida, 2017), a reaction that may be reinforced by changes in educated women’s returns to home production vs. market participation (Afridi, Dinkelman, & Mahajan, 2018).

Beyond economic factors, female labour force participation is affected by laws and social norms. Regulations restricting factory work by women during certain hours such as the 1948 Factory Act may reduce demand for female labour. In rural areas where the role of married women is widely perceived to be limited to taking care of domestic duties (Bernal, 2008), having married women work outside the home may reflect badly on their family (Eswaran, Ramaswami, & Wadhwa, 2013). This, together with the challenges it may pose to their role, may lead men to oppose their spouses participating in labor markets as reported from rural Madhya Pradesh (Bernhardt et al., 2018). Yet, social norms change only slowly (Kandpal & Baylis, 2019) and are closely aligned with broader shifts in culture, perception, and learning (Fernandez, 2013) that often persist over time across generations (Dhar Jain & Jayachandran, 2019).

A large body of literature has assessed the impact of reserving village leadership positions for women on the village level resources across different types of public goods (Chattopadhyay & Duflo, 2004) and, possibly after incurring some learning costs (Afridi, Iversen, & Sharani, 2017), long-term outcomes. Studies suggest that, by affecting gendered stereotypes and attitudes regarding women’s ability (Beaman, Duflo, Pande, & Topalova, 2012) the latter can give women voice (Iyer, Mani, Mishra, & Topalova, 2012), altering long-held beliefs on the status of girls vs. boys (Kalsi, 2017) and the importance of having adolescent girls enrolled in school (O’Connell, 2018) that can shift labor market outcomes including self-employment in the informal manufacturing sector (Ghani, Kerr, & O’Connell, 2014).

By providing predictable labor demand, the National Rural Employment Guarantee Scheme (NREGS) not only increased wages, especially for women (Azam, 2012), in the dry season (Imbert & Papp, 2015), and for the unskilled (Berg, Bhattacharyya, Rajasekhar, & Manjula, 2014) but also reduced short-term migration (Imbert & Papp, 2020), encouraged diversification of cropping patterns (Gehrke, 2017), improved agricultural productivity (Deininger, Nagarajan, Singh, & Nagarajan, 2016), and reduced rural violence (Fetzer, 2020).

While India’s combination of reservation of village leadership positions for women that aims to affect social norms with a direct increase in labor demand via workfare offers an opportunity to observe the interaction of supply and demand side factors, few studies have linked the two. In Uttar Pradesh, Bose and Das (2018) use data from a large number of panchayats to show that having a female leader on a reserved position increased female interest in public works as measured by the number of job cards issued as well as actual demand for work under the National Rural Employment Guarantee Scheme (NREGS) but did not affect actual employment outcomes, possibly due to measurement error in the administrative data they use. In Andhra Pradesh, Afridi et al. (2016) use child level panel data to show that shifts in female labor force participation brought about by NREGS improve children’s educational outcomes but do not explicitly discuss reservation as a potential channel for such effects to materialize.

In this paper, we bring these two strands together more explicitly by using detailed individual data to assess the short- and medium-term impact of female reservation together with NREGS on female labour supply, identify mechanisms that might underpin such changes and, for a
subsample for which such data were collected, explore impacts on female empowerment. Identification relies on the fact that, in each period, villages to be reserved were randomly chosen. We analyze outcomes at individual level by linking household data for India’s 12 main states from the Rural Economics and Demographic Survey (REDS) to villages’ reservation history. As our data were collected when NREGS was active, we can assess if exogenous exposure to female leadership improved women’s ability to take advantage of the income earning opportunities associated with this program, potentially catalyzing broader changes in their access to and use of resources. Moreover, by providing estimates of the impact of female reservation in the current and the previous local election period, we can assess longer-term effects on labour force participation, demand for work, and involvement in household decision-making.

We find that contemporaneous reservation of leadership for women affected local governance as measured by the quality of NREGS implementation but had no measurable impact on female labour supply. At the same time, female leadership reservation affected female labour supply to public workfare and private sector labour markets in the following period. Effects were quantitatively large (half a standard deviation) and most pronounced for married women. Past reservation also increased women’s income, their demand for work, and – presumably due to increased access to resources – their participation in household decisions relating to spending on food items, health, and education.

Our paper contributes to the literature in several respects: It points towards a role model effect as the avenue through which political reservation affects behavioral norms, women’s economic participation, their control over resources, and their bargaining power. Although large part of this effect seems to be brought about by workfare participation (Deininger, Nagarajan, & Singh, 2020), there is also evidence of reservation-induced effects on participation in regular labour markets. We also add to the evidence regarding the impact of gender preferences including quotas by showing that, even if women leaders may lack experience or have to contend with male backlash (Gangadharan, Jain, Maitra, & Vecci, 2016) so that pre-existing gaps cannot be fully closed (Iyer & Mani, 2019), politically empowering women can have positive effects in the medium term, consistent with the notion that agency problems may hinder female political participation (Casas-Arce & Saiz, 2015).

The rest of the paper is organized as follows. Section 2 describes institutional background and context by documenting the paradox of India’s secular decline of female labour force participation and discusses origin, nature, and evidence of impact of the country’s reservation policy as well as its Employment Guarantee Scheme. Section 3 describes data and estimation strategy, including balance tests to ascertain that random assignment of reservation status as mandated by legislation was indeed implemented. Section 4 presents results regarding impacts of reservation on (i) female labour force participation (separately for NREGS-related and other employment) and the heterogeneity of these impacts by marital status and age; (ii) individual income, desire to work, and participation in household decision-making; and (iii) voice in terms of affecting the way NREGS is implemented and tests for their robustness. Section 5 concludes by discussing policy implications and suggestions for further research.

2. Background and institutional context

We show that, despite favorable external conditions such as increased levels of income and education and declining fertility over the last decades India’s level of female labour force participation declined from an already low level. This is likely due to a combination of supply- and demand-side factors including strong social norms. We discuss background of political reservation and how reservation of local political leadership for women could possibly reverse this trend by altering social norms and, in interaction with other Government policies such as NREGS, generate mutually reinforcing feedback loops between economic and political empowerment.
2.1. India’s declining female labour force participation: evidence and policy implications

A large literature explores determinants and impact of female labour market participation within and across countries. Early studies often assumed that, due to growth-related changes in countries’ economic structure, education, and fertility, labour force participation would increase and then possibly decline with income. While support for this hypothesis is weak (Gaddis & Klasen, 2014), female empowerment seems a key driver of labour force participation; from the 1970s, gender-friendly legal reforms consistently led to higher female labour force participation (Hyland, Djankov, & Goldberg, 2019) and greater female participation in legislative bodies is also fund to be associated with higher female labour force participation (Lv & Yang, 2018).

India is characterized by some of the most glaring levels of gender inequality globally and very low female involvement in wage work. Although sustained growth of GDP, education, and access to key infrastructure (electricity, cooking gas and piped water) vastly improved Indians’ lives since the early 1990s, women’s labour force participation stagnated in urban areas (Klasen & Pieters, 2015) and actually declined in rural ones. Drops in labour market participation have been pronounced after 2005, for those aged 15–24 year, and the married (Andres, et al., 2017). While educated women may decrease their labor market participation by choice, lack of opportunity and social stigma are key factors for the less educated.

Agricultural mechanization and increased capital intensity in manufacturing are argued to have limited opportunities for casual work by low-skilled females (Das, Mehta, Zumbyte, Sasmal, & Goyal, 2019). Lower labour force exit (Sarkar et al., 2019) and significantly increased work force participation by women (Desai & Joshi, 2019) in response to workfare support this notion and point towards job creation, reinforced by overall growth (Pande et al., 2017), as a key to higher female labour force participation (Chatterjee, Murgai, & Rama, 2015). Social norms also affect female autonomy (Debnath, 2015). Similarly, economically empowering women, e.g. via financial literacy training and transfer of wage payments to their own bank accounts, did help to increase their labour supply (Field, Pande, Rigol, Schaner, & Troyer, Moore, 2021).

2.2. Can political reservation affect females’ labour market outcomes?

Together with a constitutional amendment to give more power to local Governments, reservation of village council leadership positions for women and scheduled castes (SCs) or tribes (STs) was introduced in India in 1993 to among others overcome long-standing inequalities and discrimination. The share of seats reserved for women was fixed at the state level. Unlike reservations for SCs, seats to be reserved for women are selected randomly in every election. Studies have shown that reservation-induced female leadership can directly alter the nature and quality of public goods supplied locally, e.g. by women leaders providing goods such as water and roads preferred by women (Chattopadhyay & Duflo, 2004). At the same time, their longer-term impact on creating role models (Beaman, Chattopadhyay, Duflo, Pande, & Topalova, 2009) may be equally or even more important as such role model effects can explain effects of female leadership reservation on rates of breastfeeding and immunization as well as higher child survival (Bhalotra & Clots-Figueras, 2014). Children’s exposure to reservation in utero or early in life has also been shown to be associated with better learning outcomes in primary school (Pathak & Macours, 2017) through role model effects.

Concerns have been raised that reserving leadership positions for females who lack relevant experience and connections may in the short term reduce quality of program implementation (Afridi et al., 2017), trigger male backlash (Gangadharan et al., 2016), or lead to females only standing in for their husbands. Yet, studies show that in the medium term such issues may be sorted out and the policy has considerable potential to affect a wide range of outcomes. Female leadership has been shown to increase level and quality of women’s political participation, their
willingness to contribute to public goods, and their ability to hold leaders accountable (Deininger, Jin, Nagarajan, & Xia, 2015). Exposure to female leaders acting as role models triggered higher school enrollment by adolescent girls, especially those from poorer and less-educated households (O’Connell, 2018). It narrowed gender gaps (Beaman et al., 2012), improved female labour force participation (Duflo, 2005; Iyer et al., 2012), and raised girls’ educational attainment and aspiration. Changes in beliefs regarding gender roles and greater voice by women are argued to be central reasons for increased survival of higher-birth-order girls where local seats were reserved for women (Kalsi, 2017). Enhanced female participation in program oversight, civic engagement, and electoral participation in ‘reserved’ villages point towards potential complementarities between political and economic empowerment (Deininger et al., 2020).

The National Rural Employment Guarantee Scheme (NREGS) has been designed to expand demand for unskilled work, especially by women. Building on the country’s long tradition of food-for-work schemes (Dutta, Murgai, Ravallion, & van de Walle, 2012; Subbarao, 1997), this program guarantees up to 100 days of employment per year to households that have registered locally and established eligibility by obtaining a job card. Unskilled labour supplied by locals is expected to build productive assets (access roads, water harvesting structures, etc.) to increase agricultural productivity. NREGS explicitly encourage female participation by paying equal wages to men and women and requiring that a minimum share of work be performed by women. While there is considerable heterogeneity in program implementation across states, e.g. the use of electronic payment of wages directly into beneficiaries’ accounts (Muralidharan, Niehaus, & Sukhtankar, 2016), major program-induced effects have been confirmed in three areas. First, NREGS increased wages, especially for women (Azam, 2012), in the dry season (Imbert & Papp, 2015), and for the unskilled (Berg et al., 2014). Second, by providing a predictable source of income, it helped reduce seasonal short-term migration (Imbert & Papp, 2020), encouraged diversification of cropping patterns (Gehrke, 2017), and improved agricultural productivity (Deininger et al. 2016). Finally, as the program is self-targeting, distributional effects have been largely positive: NREGS enhanced consumption (Bose, 2017) and asset accumulation by the poor (Deininger & Liu, 2013). Through provision of an effective safety net, it can reduce rural violence (Fetzer, 2020) and has been shown to have positive impact on health (Ravi & Engler, 2015), primary school participation (Islam & Sivasankaran, 2015), learning outcomes in primary (Mani, Behrman, Galab, & Reddy, 2014) although not secondary (Shah & Steinberg, 2021) school, gender-based violence (Amaral, Bandyopadhyay, & Sensarma, 2015).

Yet, despite far-reaching positive impacts (Duflo, 2005; Iyer et al., 2012), the literature finds at best tenuous links between political reservation and labour force participation. Using state level data, Ghani et al. (2014) find that female reservation did not increase female manufacturing employment. A study closely related to ours is Bose and Das (2018) who use administrative data from 6,000 panchayats in the state of Uttar Pradesh to show that having a female leader increased issuance of job cards and women’s demand for NREGS work without affecting actual female employment. Detailed individual level data on participation in labor markets and NREGS governance allow us to (i) assess gender-specific empowerment effects in greater detail, discerning in particular if reservation affected women’s labor market participation beyond the increased labor demand by the NREGS program and expand the sample to cover more than a single state; (ii) reduce measurement error invariably associated with administrative data and control for covariates at individual level; and (iii) explore potential synergies between a role model effect brought about by female leadership reservation and an empowerment effect arising from independent income earned through labor market participation.

3. Data and econometric approach

We use descriptive data to check for balance in pre-program characteristics between ever and never reserved villages and differences in program-affected variables that, if allocation was
random, can be interpreted as causal interpretation. Data are consistent with random allocation of reservation, suggest it brought to power leaders with less formal education, and point towards gender differences in the impact of reservation on labour market participation at the extensive and intensive margin.

3.1. Data and descriptive statistics

To explore possible links between political and economic empowerment, we use individual data from a complete enumeration of all adult residents in 190 villages in 13 states implemented in 2014/15 as part of the long-running ARIS-REDS panel. Information was collected on 275,677 individuals in 91,984 households of which 23,350, generally the most disadvantaged ones, had a job card allowing household members to apply for work under NREGS. As earlier studies have shown that access to job cards was not affected by a village’s current or past reservation status (Deininger et al., 2020) and to obtain a conservative estimate of reservation-induced effects, our analysis focuses on these households.

In addition to standard demographic and socio-economic characteristics at individual and household level, the survey obtained detailed information on actual and desired labour market participation at individual level. Individuals who participated in NREGS were also asked about key program implementation features including whether dated work receipts were issued; payment was deposited in beneficiaries’ account; and wages were in line with regulations (or if not whether a complaint was lodged). A village questionnaire was administered to, among others, elicit characteristics of all village leaders elected from 2005 together with election details, including if the election was ‘reserved’. In a subsample of states with traditionally high levels of discrimination against women, an extra module was administered asking about individuals’ involvement in key household-level decisions.

Following the constitutional mandate for female reservation, most states held local government elections in 5-year intervals, i.e. in 1995/96, 2000/01 and 2005/06. NREGS was rolled out in a phased manner starting from 2006 and administered by local governments that had been recently elected when NREGS was launched in 2006-2008. Another round of elections was held in 2010 or 2011 and the village council leaders elected then had just completed their terms when our data were collected. Under the assumption of pre-program balance, random assignment of female leadership reservation to villages provides an opportunity to assess if exposure to female leadership in the current or immediately preceding election period improved women’s ability to take advantage of labour market opportunities in NREGS or the private sector although we are unable to analyze impacts of reservation and NREGS separately.

To check balance in observables between treated and untreated villages before reservation was mandated in 1993, supporting the notion of reservation having been assigned randomly so that results can be given a causal interpretation, we use 1991 Census data accessed via the Socioeconomic High-resolution Rural-Urban Geographic Platform (SHRUG) for India (Asher, Lunt, Matsuura, & Novosad, 2021) together with 1990 Economic Census data. The latter are important as it differentiates the non-agricultural labor force by gender. We combine this with detailed information on individuals and village leaders from the 2014/15. Household and village characteristics are reported in Tables A1 and A2 (see Supplementary Online Appendix) separately for the entire sample (col. 1) and for villages that had or had not been reserved in the two previous election periods (cols. 2 and 3) with col. 4 reporting p-values for equality of means in the 2014/15 periods. None of the individual or household characteristics differs significantly between ever and never reserved villages, suggesting that the policy of random assignment of villages to female leadership was adhered to (please see the online appendix for detailed description of the data).

Table 1 presents information on individuals’ actual and desired labour market participation, involvement in household decision-making and, if they participated in NREGS, program
In line with the literature, data show that labour force participation rates and number of days worked by men (87% participation with 189 days worked annually) exceed those for women (64% and 66 days). Significant gender differences are visible in the way labour days are allocated across sectors. Men spend close to 50% of working time in non-agricultural casual employment followed by agricultural self-employment in (40%), casual labour in agriculture (34%), and salaried work (7%) and rather limited use of NREGS (23%) which accounts for less than 5% of their time. Women, by contrast, rely much more on employment in agriculture and workfare as they spend more than 60% of their time in agriculture (33% self-employed and 30% in casual labour), followed by NREGS (27%) and non-agricultural casual labour (10%). Such disproportional reliance on unskilled agricultural work makes women more susceptible to being displaced by agricultural mechanization (Mehrotra & Parida, 2017) with access to workfare possibly providing a safety net uptake of which could be affected by women’s voice.
As these variables may be affected by female leadership reservation, tests for significance of differences in cols. 4 and 8 are of interest. We find time use, reservation-induced effects are more pronounced for females than for males: while there is no difference in labour force participation for males between ever (88%) and never (87%) reserved villages and males even work and earn significantly more in never (192 days and Rs. 66,000) vs. ever (186 days and Rs. 63,724) reserved villages, the opposite is true for women for whom labour force participation (68% vs. 59%), number of days worked per year (68 vs. 62), and total earnings (Rs. 22,490 vs. Rs. 19,804) are all significantly higher in ever vs. never reserved villages. At the same time, willingness to work more is significantly higher for males and females in ever vs. never reserved villages. The difference is larger for women than for men (9.1 vs. 4.5 percentage points), possibly pointing towards greater rationing for female labour market participation (Desai, 2018).

Reservation also appears to affect adherence to program rules and, for indicators in which women were particularly disadvantaged, allowed them to achieve gender parity. In ever reserved villages, the share of women who got a dated work receipt and were paid directly into their bank account increased from 62% to 68% and from 80% to 91%, respectively. Reservation does not seem to have affected the share of females who were under-paid (about 45% for ever and never reserved villages) and increased it for males (35% in never vs. 41% in ever reserved villages), though close to two thirds of those who did not get paid the set amount did launch a complaint, much higher than those who did so in never reserved villages (39% of men, and 46% of women). For the smaller sample where such data was collected, evidence on involvement in decisions on food, non-food, health, and education suggests reservation led to significant, though quantitatively modest, increases in involvement in all these decisions by males as well as females; with 76% in ever vs 70% in never reserved villages, potential reservation-induced effects are largest for females’ participation in education decisions.

3.2. Econometric approach

To assess impacts of political preference on women’s economic empowerment, we use the fact that, in each period, a predetermined share of villages is randomly chosen to have the leadership position reserved for a woman. Data on current and previous reservation status allows us to test for persistence of such effects, i.e., if –in line with the notion that gender attitudes change slowly with individuals altering their attitude only after having been exposed to female leadership for some time (Beaman et al., 2012)– past reservation of a village for female leadership affects current outcomes. Synergies between political and economic empowerment (Deininger et al., 2020) would yield the same result. Letting $v$ denote villages, $i$ individuals, and $t$ time, we assess the impacts of female reservation on outcome variables relating to individual $i$’s labour force participation as well as other outcome variables by estimating the following equation.

$$Y_{iv} = \beta_0 + \beta_1 R_1^v + \beta_2 R_2^v + \beta_3 X_{iv} + \beta_4 V_v + u_d + \epsilon_{iv} \quad (1)$$

where $Y_{iv}$ is the outcome variable of interest for individual $i$ in village $v$, $R_1^v$ is an indicator variable that equals one if council leadership in village $v$ was reserved for women in the most recent election (i.e., the pradhan at the time of the survey was a woman who assumed her position as a result of reservation) and zero otherwise; $R_2^v$ is an indicator variable that equals one if council leadership in village $v$ had been reserved for a woman in the previous election and zero otherwise; $X$ is a vector of household and individual controls; $V$ is a vector of village and pradhan characteristics; $u_d$ a district fixed effect; and $\epsilon_{iv}$ an error term. Our main interest is in $\beta_1$ and $\beta_2$, the parameter estimates of current or past reservation on individual outcomes relative to the base category of a village never having been reserved.
Similarly, $\beta_1 + \beta_2$ denotes the impact of political leadership reservation in a village both in the present and the past and it is straightforward to test for this joint impact either being significantly different from zero or from the estimated coefficients for current and past reservation.

To explore the gender dimension of reservation, we let $f_{it}$ be an indicator variable taking a value of one if the respondent is female and zero otherwise. With interactions between respondent’s gender and current or past reservation, our estimating equation becomes:

$$ Y_{iv} = \beta_0 + \beta_1 R_{1v} + \beta_3 (R_{1v} \times f_{it}) + \beta_2 R_{2v} + \beta_4 (R_{2v} \times f_{it}) + \beta_5 X_{iv} + \beta_6 V_v + u_d + e_{iv} $$  \hspace{1cm} \text{(2)}

where parameters are as above and the main difference here is that the parameters estimated are gender specific. In other words, $\beta_1$ and $\beta_2$ are the estimated impact of current or past reservation on men and $\beta_1 + \beta_3$, as well as $\beta_2 + \beta_4$ are estimated impacts of current and past reservation on women. The significance of any linear combinations of estimated parameters can be tested via F-tests which are reported in the results tables throughout.

An equivalent econometrics strategy that provides a more intuitive distinction between effects of one-time vs. cumulative female reservation on individual $i$’s labour force participation and other outcome variables as above is

$$ Y_{iv} = \alpha_0 + \alpha_1 R_{cv} + \alpha_2 R_{pv} + \alpha_3 R_{cpv} + \alpha_4 X_{iv} + \alpha_5 V_v + u_d + e_{iv} $$ \hspace{1cm} \text{(3)}

where $R_{cv}$, $R_{pv}$, and $R_{cpv}$ are indicator variables of whether or not council leadership in village $v$ was reserved for women in the most recent election only; the election previous to it; or both periods, respectively, and parameters of interest are $\alpha_1$, $\alpha_2$, and $\alpha_3$, the estimated effect of current only, past only, both current and past reservation on individual outcomes relative to the base category of a village never having been reserved. In this specification, results of which are reported in online appendix tables, the gender dimension of reservation is obtained by adding interaction terms between respondent’s gender and the reservation variables to (3)

$$ Y_{iv} = \alpha_0 + \alpha_1 R_{cv} + \gamma_1 (R_{cv} \times f_{it}) + \alpha_2 R_{pv} + \gamma_2 (R_{pv} \times f_{it}) + \alpha_3 R_{cpv} + \gamma_3 (R_{cpv} \times f_{it}) + \alpha_4 X_{iv} $$
$$ + \alpha_5 V_v + u_d + e_{iv} $$ \hspace{1cm} \text{(4)}

In this specification, $\alpha_1$, $\alpha_2$, and $\alpha_3$ are the estimated impact of current only, or past only, or both current and past reservation on men, and $\alpha_1 + \gamma_1$, $\alpha_2 + \gamma_2$ as well as $\alpha_3 + \gamma_3$ are estimated impacts of current only, past only, and both current and past reservation on women. The significance of linear combinations of estimated parameters can be tested via F-tests which are reported in the results tables throughout. The significance of linear combinations of estimated parameters can be tested via F-tests which are reported in the results tables throughout.

4. Results and discussion

Regressions at household- and individual-level suggest that reservation had no concurrent impact on female labour force participation but affected modalities of NREGS implementation, e.g., if work receipts were issued and those receiving less than the stipulated wage complained. Past reservation is estimated to have led to gains in female labour force participation at the extensive and the intensive margins via a role model effect and associated increased female labor demand. Combined with a NREGS-induced shift in labor supply, it in turn triggered higher female labor market participation, leading to higher levels of income and intra-household bargaining power for women.
4.1. Impacts of reservation on female labour market participation

Table 2 reports results from regressions of labour force participation without and with gender-differentiated effects that correspond to Equations (1) and (2) in panels A and B, respectively. Beyond results for overall participation along the intensive (col. 1) and extensive (col. 4) margin, estimated coefficients are reported separately for NREGS-related activities (cols. 3 and 6) and all activities except NREGS (cols. 2 and 5). The equivalent specification with three indicators for the incidence of reservation as discussed above (Equations (3) and (4)) is in Supplementary Online Appendix Table A3.

Concurrent reservation is estimated to have had no impact on participation at the extensive margin. At the intensive margin, there is some evidence (imprecisely estimated) that
introduction of NREGS crowded out non-NREGS activities with a marginally significant increase in NREGS days (coefficient of 0.150 in col. 6 of panel A) substituting for a reduction in non-NREGS related labour supply (coefficient of -0.063 in col. 5). Differentiating by gender in panel B suggests that this is driven by a small contraction of male labour supply. We thus cannot reject the hypothesis that, during the reserved period, there is no impact of reservation on either the extent or the intensity of overall female labour market participation.

By contrast, we find highly significant gender effects of reservation in the previous period: the likelihood of labour market participation overall is estimated to have increased by 2.7 percentage points or 3.6 percent at the mean, an effect comprised of estimated increases by 6.3 percentage points (25.2%) and 2.5 percentage points (3.6%) for NREGS and non-NREGS work, respectively (Table 2). A similarly significant effect -with estimated size of 0.202 and 0.138 percentage points for NREGS- and non-NREGS-related work, equivalent to a 13.7 and 4.1% increase at the mean, respectively (cols. 6 and 5), emerges at the intensive margin.

Disaggregating these effects by gender (Table 2 panel B) highlights that virtually all long-term impacts can be attributed to changes in women’s rather than men’s labour market participation. F-tests in the bottom rows indicate that estimated impacts of past reservation on women’s labour supply ($\beta_2 + \beta_4$) are significant at the 1% level throughout. Past reservation is estimated to have led to an 8.9 percentage point increase in the likelihood of female labour force participation equivalent to a 11.8% increase at the mean, comprised of estimated increases of 15 and 6 percentage points in women’s likelihood of participating in NREGS and non-NREGS work, respectively. With 46 percentage points (12.7%) overall (col. 4) -31 percentage points (9.3%) for non-NREGS (col. 5) and 54 percentage points (37%) for NREGS work (col. 6) – estimated effects at the intensive margin are even larger.

While the evidence presented here is thus consistent with the lack of a reservation-induced impact on female participation in wage labor force the short term (Bose & Das, 2018; Ghani et al., 2014), in the medium term it increased women’s response to labor demand from NREGS and beyond. Estimated coefficients for non NREGS work are significant throughout, consistent with the notion that, beyond potential effects on how workfare was provided and participation in NREGS work, reservation increased women’s demand for wage work more broadly. While a cumulative income-induced empowerment effect of participation in NREGS could be consistent with these facts, we will below discuss evidence on changes in levels and quality of women’s political participation in line with what was suggested by Deininger et al. (2015). It is suggestive that reservation of panchayat leadership positions for women has provided a role model and thus performed an additional catalytic role.

4.2. Heterogeneity of effects

If, as the literature suggests, the scope for labour market participation is particularly limited for married women (Eswaran et al., 2013), reservation-induced effects may be more pronounced for this group, either by providing them with economic resources and social connections that they would not otherwise have access to or by helping to change their husbands’ attitude to general gender roles and particularly female labour force participation (Bernhardt et al., 2018). To test this, we run the above regressions separately for the sub-samples of married and unmarried individuals.

Results from doing so in Table 3 indeed support this notion, suggesting estimated effects are consistently more significant and larger for married than for unmarried individuals: First, the insignificant aggregate effects of concurrent reservation on labour supply in the total sample is reinforced by the results based on dividing the sample into married and unmarried samples. The likelihood of labour force participation in either the overall labor or in the NREGS-related work is again insignificant for the married sample (panel A, col. 3; or equivalent specification with three reservation indicators in Supplementary Online Appendix Table A4) or for the unmarried sample (panel B col. 1).
Second, past reservation is estimated to have had a gender-differentiated impact whereby a reduction in the likelihood of married males’ participation – by 3.5 percentage points – is more than compensated for by an increase in married females’ propensity to participate to yield a net
increase of 9.1 percentage points overall due to female reservation. Disaggregating by type of labour suggests that most of this effect can be attributed to increased participation in NREGS activities, estimated to increase by 17 percentage points, versus 6.3 percentage point gain in non-NREGS activities. The comparison of estimated elasticities at the intensive margin between NREGS and non-NREGS demonstrates even large difference between the two types of job activities (0.61 for NREGS vs. 0.31 for non-NREGS activities).

By comparison, for unmarried individuals, past reservation is estimated to have had smaller effects that do not differ by gender and are less dominated by NREGS. For example, past reservation would increase female’s probability to participate in non-NREGS and NREGS by 5 percentage points and 7.1 percentage points, respectively. The gain in intensive margins are even more similar as the estimated effects for NREGS and non-NREGS activities are 0.26 and 0.27 percentage points, respectively.

4.3. Exploring impact pathways

To explore if reservation affected supply- or demand-side factors, we report effects on modalities of NREGS implementation that are likely to have affected the supply of jobs and women’s bargaining power within the household separately. Results from regressions (1) and (2) with the key indicators of program implementation in Table 4 (or the equivalent regressions in Supplementary Online Appendix Table A5) suggest that current and past reservation helped improve quality of program implementation in several dimensions: The share of those who received a dated receipt for work performed under NREGS (col. 1) increased significantly during the reserved period and beyond (with elasticities of 27 percentage points (38%) and 50 percentage points (70%), respectively). The likelihood of lodging complaints in case of underpayment also increased in the reserved period (with an elasticity of about 27 percentage points, or 47% at the mean level), though no longer thereafter (col. 4). Significant lagged effects are observed for an increased likelihood of wages being paid directly into beneficiaries’ account (col. 2) with an estimated elasticity of 23 percentage points (25.8%); the likelihood of complaints for underpayment being addressed (col. 6 with an elasticity of 24 percentage points (57.3%)) and possibly as a result, a reduction in the likelihood of under-payment (col. 4). While reservation undeniably improved program governance and enhanced females’ ability to access jobs under NREGS, none of these effects are gender-specific; to the contrary, for some, mainly lodging and response to complaints, regression results suggest that women still lag behind men, consistent with the notion that changes in social norms are not instantaneous.

Results from regressions in Table 5 (equivalent to Supplementary online appendix Table A6) allow us to explore if reservation increased women’s demand for work as well as their income and bargaining power. As one would expect if reservation relaxed constraints to female labour supply, it triggers significant lagged increases of women’s individual income, estimated to have increased by some 76 percentage points (8.4%) and females’ (but not males’) demand for work by some 16 percentage points. Although not available for the entire sample, data on intra-household bargaining power support the notion of a role-model effect of reservation having, with a lag, led to higher levels of female autonomy: The share of women who participate in decision-making on food, health, and education is estimated to have increased by 18, 14, and 8 percentage points, respectively.

We conclude that, beyond improving supply of jobs that are suitable and attractive for females, reservation enhanced female decision-making autonomy and their potential and actual participation in the labour force. A plausible interpretation of this evidence is that the role model effect provided by female leaders had an enduring effect that enhanced women’s ability to take advantage of changed labor demand, irrespectively of whether such demand came from Government programs with preferential treatment for females or not.
Motivated by the recent decline of female labour force participation in India, this paper explores if random reservation of political leadership positions for women affects women’s labour force participation as well as supply- and demand-related factors. While there is no contemporaneous effect, past leadership reservation for women significantly increased females labour supply by allowing individuals to join the labour force and increasing the amount of time spent working by those already in work.

While large part of observed effects is attributable to females’ improved ability to take advantage of public workfare under NREGS, female participation in non-NREGS labour markets (especially non-agricultural casual and self-employment) expands as well. Estimated effects are stronger for married than for unmarried women. Labour force participation allows women to obtain higher levels of individual income, increases their demand for work, and affects bargaining power by enhancing their participation in intra-household decision making on spending for consumption, health, and education. Avenues to enhance these effects by combining them with
targeted provision of information and training to change not only norms regarding women’s labour force participation but also equip them with the skills to adapt to changing labour market conditions are a priority area for further research.

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Disclosure statement

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Table 5. Estimated effects of reservation and women’s participation in households’ day to day decision making

| Variables                        | Individual Wants to work more | Participation in household decisions on... |
|----------------------------------|-------------------------------|-------------------------------------------|
|                                  | Income                        | Food | Nonfood | Health | Education |
| Reserved now (β₁)               | 0.009                         | 0.014 | 0.013   | -0.005 | 0.000     | 0.018     |
|                                  | (0.226)                       | (0.044) | (0.039) | (0.038) | (0.031)   | (0.025)   |
| Reserved before (β₂)            | -0.221                        | 0.005 | -0.029  | 0.143** | 0.085*    | 0.044     |
|                                  | (0.211)                       | (0.047) | (0.045) | (0.054) | (0.045)   | (0.032)   |
| Res now × fem (β₃)              | 0.072                         | 0.025 | -0.094  | -0.004  | -0.014    | -0.001    |
|                                  | (0.425)                       | (0.059) | (0.063) | (0.045) | (0.025)   | (0.028)   |
| Reserved before × fem (β₄)       | 0.983**                       | 0.163** | 0.204*** | -0.009 | 0.057**   | 0.040*    |
|                                  | (3.888)                       | (0.071) | (0.048) | (0.042) | (0.022)   | (0.023)   |
| Observations                     | 66,362                        | 66,362 | 22,571  | 22,571  | 22,571    | 22,571    |
| R-squared                        | 0.286                         | 0.251 | 0.277   | 0.220   | 0.229     | 0.290     |
| Dep. Var mean                    | 9.118                         | 0.296 | 0.733   | 0.781   | 0.816     | 0.336     |
| Test:                            |                               |       |         |         |           |           |
| F test (β₁ + β₂ = 0; p val)      | 0.399                         | 0.724 | 0.713   | 0.000   | 0.001     | 0.009     |
| F test (β₃ + β₄ = 0; p val)       | 0.009                         | 0.046 | 0.098   | 0.800   | 0.135     | 0.212     |
| F test (β₁ + β₃ = 0; p val)       | 0.747                         | 0.302 | 0.068   | 0.833   | 0.693     | 0.561     |
| F test (β₂ + β₄ = 0; p val)       | 0.003                         | 0.000 | 0.000   | 0.016   | 0.002     | 0.014     |
| F test (β₁ + β₂ + β₃ + β₄ = 0; p val) | 0.002  | 0.000 | 0.036   | 0.002   | 0.000     | 0.000     |

Note: ‘Reserved now’ and ‘Reserved before’ are indicator variables of whether village panchayats are reserved in the current or the previous panchayat periods. Regressions for desire to work and individual income include the entire sample whereas those for intra-household bargaining is limited to the states of Gujarat, Uttar Pradesh, Maharashtra, Orissa, and West Bengal where a supplemental questionnaire on intra-household bargaining was administered. Control variables included throughout but not reported include household size, composition, land ownership, and the head’s marital status, gender, age, and education; individuals’ gender, marital status, age, education and their squared terms; village-level access to road, distance to town and district HQ, population, share of SCs, STs, and key religions; years since the last village election; pradhan characteristics (education, caste, religion, previous tenure and candidacy for office) and district fixed effects. Standard errors are clustered at village panchayat level. Robust standard errors are reported in parentheses. ***p < 0.01; **p < 0.05; *p < 0.10.

targeted provision of information and training to change not only norms regarding women’s labour force participation but also equip them with the skills to adapt to changing labour market conditions are a priority area for further research.
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Data availability statement

Data and code will be made available to researchers upon request.

Notes

1. India ranks 149 of 153 in the Economic Participation and Opportunity sub-index of the 2020 World Economic Forum’s Global Gender Gap Index, before only Pakistan, Yemen, and Iraq. Although levels of gender inequality across Indian regions vary with agricultural endowments that affected demand for and value of female labour (Carranza 2014), such intra-country variation cannot explain low overall levels of female participation.

2. Changes in returns to home vs. market production may have adversely affected educated women’s labour force participation (Afridi et al. 2018). Yet, higher wealth and income by other household members also reduce women’s probability of entry to the labour force and increases the likelihood of their exit (Sarkar et al., 2019). Increased real wages may have resulted in a negative income effect, potentially outweighing increases in labour supply (Mehrotra & Parida 2017).

3. Access to roads or transport is also associated with increased access to nonagricultural employment that affects women more than men, especially in communities with more egalitarian gender norms (Lei, Desai, & Vanneman, 2019).

4. The functions of the village leader (sarpanch) are defined in states’ Panchayat Raj Acts. For example the Telangana Act states that “The sarpanch shall (a) exercise all the powers and perform all the functions specifically conferred or imposed on the Sarpanch by this Act or the rules made thereunder; (b) exercise administrative control over the Panchayat Secretary and supervise his work for the purpose of implementation of the resolutions of the Gram Panchayat or any committee thereof; (c) incur contingent expenditure up to such limit as may be fixed by the Government from time to time and authorize payment and refunds with the approval of Gram Panchayat; (d) act only within the terms of sanction given in any resolution of the Gram Panchayat; (e) maintain sanitation in the village; (f) take up plantation and maintain Green coverage in the village; (g) for the purpose of effective functioning of the Gram Panchayat, the Sarpanch shall reside in the village and visit the Gram Panchayat office regularly.” See https://www.indiacode.nic.in/bitstream/123456789/8492/1/Act%205%20of%202018.pdf

5. Beyond gender, pradhan (village council’s headship) seats can also be reserved for scheduled castes and tribes. As seats are not allocated randomly and evidence suggests that politicians’ incentives to allocate benefits along party lines may blunt such quotas’ effects (Dunning & Nilekani, 2013), we focus on female reservation only. For discussion of caste reservation see (Kaletski & Prakash, 2016) and (Chin & Prakash, 2011).

6. In Spain, quotas resulted in slightly better electoral results for parties most affected, suggesting that without the quota, party leaders were not maximizing electoral results due to agency problems hindering female representation in political institutions (Casas-Arce & Saiz, 2015).

7. Similar outcomes are observed in West Bengal (Beaman et al., 2009), South India (Besley, Pande, Rahman, & Rao, 2004) and urban Mumbai (Bhavnani, 2009). Length of exposure to women politicians is also linked to more formal sector entrepreneurship (Ghani et al., 2014).

8. Applicants are eligible to receive a job card containing photos of all adult household members free within 15 days of application. The indicative work demands by job-card holders lead to elaboration of an annual plan that, once ratified by the village assembly, is transmitted for consolidation at the district level, although in practice a more top-down process is often followed, based on central budget allocations.

9. The original survey, in 1971, was based on a representative sample of about 4,500 households in 252 villages in 16 states in 1971. Subsequent rounds took place in 1982, 1999, and 2006. While resource limitations precluded expansion of this exercise to all states, villages in the states of Andhra Pradesh, Bihar, Chhattisgarh, Haryana, Jharkhand, Madhya Pradesh, Rajasthan, Tamil Nadu, Uttar Pradesh, Maharashtra, Orissa and West Bengal were revisited in 2014/15 by IRMA with funding support from Brown University, German Development Institute, and the World Bank. Figure 1 displays the location of sample villages in REDS.

10. Data can be accessed at https://www.devdatalab.org/shrug. Village names could be matched manually for all except 14 villages and the IDs obtained in this way were matched to data from the Economic Census accessible at http://microdata.gov.in/nada43/index.php/catalog/ECO.

11. In 2009/10 all states in our sample except Bihar and Madhya Pradesh (where the share was 50 percent) required a third of villages to reserve the pradhan position for a woman. By 2015 all except Haryana and Uttar Pradesh had increased the share of panchayats required to reserve seats for women to 50 percent. Whatever the overall share, because a village’s reservation status is exogenously given it does not affect our analysis. For a detailed
discussion of how randomization is implemented see Dunning and Nilekani (2013) and Chattopadhyay and Duflo (2004).

12. To illustrate: $R^I_v$ for villages in Andhra Pradesh equals one if, in this village, the 2011 election was reserved for a woman and $R^W_v$ equals one if in this village the 2006 election had been reserved. Similarly, for villages in Orissa $R^I_v$ and $R^W_v$ equal 1 if the 2012 or 2007 elections were reserved.

13. Control variables are included to increase efficiency but do not affect the significance of parameter estimates for the variables of interest.

14. As NREGS is required to offer conditions favorable for females by law, it is not surprising to find estimated coefficients for work performed under this program to be consistently larger than for non-NREGS-related work.

15. Regressions distinguishing non-NREGS related work for married and unmarried individuals along the extensive and intensive margin (table A4) are included in the appendix.

16. As Table 5 shows, reservation-induced impacts on NREGS governance preceded effects on program participation and income that, based on our results, materialized with a lag only. Resources from increased labor market participation in the second period thus appear to reinforce the role model effect rather than the reverse.

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