Health and the Political Agency of Women

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Abstract

This paper investigates whether improvements in women's political representation are associated with higher child survival, and whether any improvements are greater for girls. It also differentiates the caste of both the child and the political leader. We use within-district variation in electoral outcomes for 286 districts across 31 years and within-mother variation in survival outcomes for 0.75 million children. To control for omitted preferences that may drive a positive correlation between female leadership and child health, we instrument female representation with female representation in elections in which the woman wins over a man by a small margin. We find that a one standard deviation increase in female political representation results in a 1.1% reduction in neonatal mortality, the average incidence of which is 6.3%. We find no effects on post-neonatal (or under-5) mortality and no significant difference in the effect for boys and girls. With a view to illuminating pathways, we investigate a range of indicators of investment in child health. We find that female political representation is associated with more antenatal care visits and with higher probabilities of breastfeeding in the first 24 hours following birth, giving birth in a government [and not private] facility rather than at home, and full immunization by the age of one. Improvements in post-natal investments are larger for boys. Other than for breastfeeding, outcomes for low caste mothers and children are more responsive to female leadership and especially low caste female leadership.

Keywords: political economy, legislator identity, gender, caste, mortality, health, India.

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1. Introduction

This paper investigates whether women leaders are more effective than their male counterparts in improving child health and survival. We discriminate by the caste of the leader and by the caste (and gender) of the child. We test two related hypotheses. First, that female politicians care more about child health than male politicians. Second, that politicians favour individuals of their own identity. In particular, we hypothesise that women leaders attach greater weight to girls' (rather than boys') health and that lower caste women leaders attach greater weight to the health of lower caste children. Research on the effects of legislator identity on policy choices is vibrant. Besley and Coate (1997) and Osborne and Slivinski (1996) demonstrate that, in the absence of complete policy commitment, the identity of the legislator matters for policy determination, so that increasing political representation of a group will increase its influence in policy.

There is some previous evidence that political preferences differ by gender. Women tend to be more liberal, favouring redistribution and supporting child-related expenditures; see, for example, Lott and Kenny (1999), Edlund and Pande (2002), Edlund, Haider and Pande (2005), and Alesina and La Ferrara (2005). Women also appear to favour child-related expenditure at the household level; see Lundberg, Pollak and Wales (1997), for example, who analyse the UK child benefit. There is evidence that women favour girls at the household level (e.g. Duflo 2003, Thomas 1990). India is a mature federal democracy and its political economy has claimed considerable attention in recent years. The impact of long-standing caste reservations on outcomes for lower caste groups has been analysed by Pande 2003, Besley et al. 2004, Bardhan et al. 2005, Banerjee and Somanathan 2006 and Krishnan 2007. Reservations for women in village councils were introduced in India in 1992. Their impact on policy outcomes has been analysed by Chattopadhay and Duflo (2004). There are no reservations for women at any higher levels of government although reservation in State Legislative Assemblies (SLAs) has been discussed, so that this analysis is topical.

In this paper we analyse the effects of district-level female political representation in SLAs on health and survival outcomes for individual births that occur across 286 districts over the 31 year period, 1968-1998. In contrast to a lot of the existing literature on India, variation in female political representation arises, in our data, as an electoral outcome rather than as a consequence of government reservations. If common unobservables drive electoral preferences for women and health-related behaviours then our estimates will be biased. To account for this, we instrument female leadership with close elections between men and women. The idea is that, in a first-past-the-post electoral system, the gender of the elected leader in a close election can be considered to be random. However, even if the outcomes of close elections can be considered as good as random, the presence of close elections between a man and a woman is not random. For this, we control for the fraction of constituencies that had close elections between women and men in both the first and second stages; see Clots-Figueras (2007), who finds that women leaders encourage primary education powering India. No previous study has analysed the effects of women's leadership on health. Health is more intangible than education and it is unclear that it is as salient an issue in India.

Another potential identification problem is that female leadership influences the risk composition of births. This is plausible if female leadership creates the expectation of other changes that make some sections of the population (for example, low caste or uneducated mothers) feel less vulnerable, or if female leaders campaign against female feticide. Endogenous heterogeneity in the sample of births will tend to bias the effects of female leadership on health and survival. The direction of this bias is, *a priori*, unclear, although it is something we investigate. As we have sibling-linked data, we use mother fixed effects estimation, which resolves this problem to the extent that selection is on fixed characteristics of mothers. We are now comparing the risk of dying in infancy of siblings, one born in the regime of a female elected leader and one not. This approach also contributes to controlling for selectivity on account of (non-random) foetal death (see Bhalotra 2007).

The health outcomes that we investigate are neonatal, infant and under-5 mortality, for which we have sibling-linked data that span about forty years. To investigate channels through which any effects on mortality risk operate, we further analyse data on health seeking behaviours. We find that a one standard deviation increase in female representation decreases the probability of neonatal mortality by

1.1%, which is large given that the mean neonatal mortality rate in our sample is 6.3%. Effects on infant and under-5 mortality are small and insignificant effects.

Using a smaller sample of more recent births, we find that female representation increases the number of antenatal care visits a woman has, the probability of giving birth in a government facility (as opposed to at home), the probability of a child being immunized by the age of one, and the probability of breastfeeding in the first 24 hours after birth. It is widely accepted that, amongst interventions relevant to infant mortality in poor countries, improvements in maternal health, antenatal care, skilled attendance at delivery and immunization are central (Black et al. 2003, Jones et al. 2003). Since the samples analysed for survival and for healthy behaviours are different, we cannot conduct an accounting exercise measuring the contributions of the behaviours to the neonatal outcome but it is plausible that the mechanisms by which female leaders lower neonatal mortality involve these behaviours.

The main analysis is extended to investigate heterogeneity by gender of the child and by the caste of both the child/mother and the elected leader. Our estimates indicate that the marginal effect of female representation on neonatal mortality is much larger for boys than for girls and for low than for higher caste children, but these differences are not significant. We also find that the advantage that low caste children derive from a female politician is twice as large if the leader is a low caste woman but, again, this difference is not significant.

There are some significant differences by gender and caste in the effects of female representation on health-related behaviours. The effects on full immunization and on initiation of breastfeeding are larger for boys. Immunization and antenatal care improve most amongst low caste families. The decline in birthing at home is also greatest amongst low caste families although they shift into birthing in private facilities whereas higher caste mothers shift into birthing in government facilities. This suggests that women politicians discourage home births all around but that low caste mothers may not have equal access to public facilities, for example, they may be stigmatised, rather like black mothers were in the USA (Almond, Chay and Greenstone 2006, for example). Early breastfeeding is the one indicator that exhibits no improvement amongst low caste women while showing an increase for higher caste women. The size of the effect is not different by the caste of the female leader

and sometimes larger for lower caste leaders, but the effects are better determined for higher caste leaders, who are about three times as prevalent.

Preliminary estimates indicate that women's leadership does not increase the probability of birth but that, conditional upon this, it increases the probability that the birth is a girl. We speculate that this may reflect a reduction in female feticide associated with women leaders being more likely to monitor this. An alternative explanation would be that less well-off mothers are over-represented amongst mothers increasing fertility. We will extend this investigation to consider endogenous heterogeneity in the sample of births, with mothers of certain types (education, caste, religion, rural location) being more likely to give birth in the regime of a woman leader. Other extensions that we envisage include interaction of female representation with an indicator for left-wing party and analysis of the maternal education as a mechanism by which women leaders impact child health. Overall, this paper contributes to a recent literature on political economy in developing countries and also to the wider public policy literature on public goods provision.

2. Background

Political Organisation

India is the most mature democracy amongst developing countries. It is a federal country in which the constitution devolves significant control over their own government to the 28 states and 7 union territories. Development policies including health and education are mostly in the care of State Legislative Assemblies (state governments), although there are some ear-marked transfers from the central government. States and union territories are divided into single-member constituencies in which candidates are elected in first-past-the-post elections. The boundaries of assembly constituencies are drawn to make sure that there are, as near as practicable, the same number of inhabitants in each constituency. Thus, assemblies vary in size according to state population. Districts are the administration unit below the state level. Each district includes between one and 37 constituencies. The median district has 9 electoral constituencies.

The Indian constitution (1950) provides political reservation for scheduled caste (SC) and scheduled tribe (ST) members. Following convention, we shall refer to these two groups together as "low caste".(Both SC and ST tend to be socially and

economically disadvantaged. They constitute approximately 25% of the total population in India. Scheduled Tribe (ST) seats are reserved according to the concentration of ST population in that particular constituency. Scheduled Caste (SC) seats are reserved according to two standards: the concentration of SC population and how dispersed reserved constituencies are in a given state. There has almost never been a case in which an SC/ST legislator won a non-reserved seat. Thus, knowing whether a seat is reserved or not is equivalent to knowing the caste of the legislator who wins the seat.

Some advances have been made, to increase female political representation at lower levels of government. In 1992, the 73rd Amendment to the Constitution of India established that one-third of the seats in the Panchayat councils (rural local governments) and one-third of the Pradhan positions would be reserved for women. However, there are no similar reservations for women in the State and Central Governments. In September 1996, the government introduced a parliamentary bill that proposed the reservation of one-third of the seats for women in the Central Government and the State Assemblies. Since then, this proposal has been widely discussed in several parliamentary sessions. Women in India are underrepresented in all political positions. Between 1967 and 2001 in the 16 main states, at most 14% of the general seats and 24% of the seats reserved for SC/STs in the State Assemblies were won by women. Figure 1 shows the fraction of seats in each state won by women between 1967 and 2001. There are significant differences across states in both the level and trends of female representation. Figure 2 shows the fraction of constituencies in the different districts won by a woman by state and election year. This is the key variable in the analysis to follow. It exhibits significant district-time variation although, for many district-year observations, female representation is zero.

India has a first-past-the-post electoral system. The probability of election held in single-member constituencies is a function of the vote difference between the winner and the runner-up. This function has a discontinuity when the vote difference is zero because the winner has to receive more votes than the runner-up to win the election. In elections in which the winner and the runner-up are of different gender, as the vote difference becomes smaller and approaches the discontinuity, constituencies in which the vote difference is very small and a woman wins will be increasingly similar to constituencies in which the vote difference is very small and a man wins.

We will defend our identification strategy (below) on the grounds that this discontinuity at the zero vote difference will provide as good as random treatment.

Regression discontinuity was first introduced in the context of elections by Lee (2001) for incumbency advantage and by Pettersson-Lidbom (2001) for the effect of party control on fiscal policies. It has since been used by Rehavi (2003), who uses close elections between women and men in the US as an instrument to estimate the effect of female politicians on expenditures at the state level.

Data

A detailed dataset on elections to State Legislatures in India during 1967-1999 was gathered from reports published by the Election Commission of India (ECI). The ECI provides information at the constituency level on the name and gender of the winning candidate, the number of votes obtained, whether (s)he contested in a SC/ST reserved constituency, and their political party affiliation.[2] . For candidates who won against a candidate of the other gender, information was gathered on the number of votes obtained by the runner-up (see Clots-Figueras 2007 for more detail). Each candidate was elected in a single-member constituency to occupy a seat in the State Legislative Assembly. Given that each district has between 1 and 37 electoral constituencies, each district has between 1 and 37 representatives in the Assembly. Our measure of female representation is the fraction of leaders in the district who are female. Overall, these data contain information on 29686 politicians who contested in the 16 larger states during 1967-2001[3]

Individual data on child health and survival, together with a rich set of covariates including maternal education is obtained from the second round of the Indian National Family Health Survey (NFHS) which, unlike the first and third round, includes district identifiers. Ever-married women aged 15-49 in 1998-99 recorded the time and incidence of all births and any child deaths. Individual mortality data are

[2] Details on the political parties and how are they grouped can be found in the Data Appendix.

[3] These 16 states account for more than 90 per cent of the total population in India, about 935 million people. They are Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajashtan, Tamil Nadu, Uttar Pradesh and West Bengal.

thus available for cohorts of children (implicitly) followed over time from birth. Children in the sample are born in 1961-1999 (see Bhalotra 2007, 2008).[4]

Because the NFHS data only provide information on individual residence up to the district level and the politicians are elected in constituencies, which are smaller in size than districts, to merge the two datasets the electoral data are aggregated up to the district level. To assign constituencies to districts for each electoral year, we used the publication "State Elections in India", which lists the constituencies included in each district in each election year, together with the Constituency Delimitation orders, published by the Election Commission. Some districts have divided, others have been newly created or have disappeared during the time period under consideration. The 1991 census district definition is then used and only those districts that did not split or disappear were included. Those districts which were newly created between 1967 and 2001 and those which include constituencies belonging to another neighbouring district at the same time are not considered[5]. The idea is to have a panel of districts in which we know which constituencies are included in each district. With this procedure we can aggregate the electoral data into districts and obtain information on 286 districts that include more than 2600 electoral constituencies. We merge health and survival information on births in the NFHS with these political data by district and year, defining year as the year preceding the individual birth. This gives us a sample size of 172320 individuals. We loose 44383 individuals because we do not have political information for the districts where they live. However, these individuals are very similar to those included in the sample; in particular, they are similar in what respects to year of birth, education of the mother, caste and infant mortality[6].

We restrict the sample further because some births occurred when the mother was at a place other than her current residence and this is a potential problem if siblings are born in different constituencies. We do not have information on migration histories so we apply a stricter criterion than necessary, restricting the sample to mothers for whom all births occurred in the mother's current place of residence. With this procedure we loose 76817 individuals. For a discussion of other potential problems with retrospective fertility data including selectivity of the samples

[4] For further information on this survey, including sampling design, see IIPS and ORC Macro (2000).
[5] Some constituencies straddle a district bound.
[6] Results available from the authors on request.

of children and mothers and the manner in which we address or assess them, see Bhalotra (2007).

In contrast to the mortality data, which are available for *all* births to every surveyed mother in 1967-1998, the data on healthy behaviours are only available for children born in the four years preceding the survey, approximately 1994-1998.

3. Empirical Specification

The key identification challenge is to estimate the causal effect of the identity of politicians on health outcomes, by separating this effect from the effect of unobservable variables that drive both health outcomes and female representation. A likely omitted variable is electoral preferences in the district. Even if district fixed effects are included in the regression, these control only for permanent differences across districts. To deal with this potential problem, we exploit the existence of close elections between female and male candidates, that is, elections in which the vote difference between the winner and the runner-up is very small. In particular, we instrument the fraction of constituencies in the district won by a female politician with the fraction of constituencies in the district won by a woman in a close election against a man. The idea is that, in a close election, the identity of the leader can be assumed to be random. This identification strategy resembles a regression discontinuity design (as in Lee 2001, Rehavi 2003, Clots-Figueras 2007). Figure 3 shows that there is significant variation in the fraction of constituencies that had close elections between women and men in each district and electoral year by state. We define close elections as those in which the difference of the votes between the winner and the runner-up is less than 3.5% of the total votes in that particular constituency. Sensitivity checks on this threshold and further checks on the identification strategy are in Clots-Figueras (2007).

Although the gender of the winner in a close election may be considered random, the *existence* of close elections between women and men may not be a random event, for example, it may depend on the number of female candidates in the district. To allow for this, we control for the fraction of seats in the district that had close elections between female and male candidates in the first and second stage of the instrumental variables procedure.

The estimated model is

$$(1)\ M_{imdt}=\beta F_{dt-1} + \partial TC_{dt-1} + \alpha_m + \eta_t + f_s(t_{st}) + Z_{imst}\rho + \varepsilon_{imst}$$

$$(2)\ F_{imdt}=\varphi FC_{dt-1} + \psi TC_{dt-1} + \alpha_m + \eta_t + f_s(t_{st}) + Z_{imst}\pi + \varepsilon_{imst}$$

where M is an indicator for mortality of child *i* of mother *m* born in district *d* in year *t*, F is the fraction of constituencies in the district with an elected female leader in the preceding year. β is the parameter of interest and it measures the change in mortality associated with randomly having a woman rather than a man in power. Equation (2) is the first stage equation which instruments F with FC, the fraction of constituencies in the district won by a woman in a close election against a man. We control for TC, the fraction of constituencies in the district in which there were close elections between women and men.

The data are a micro panel of births within mother nested within a district level panel. Mother fixed effects are denoted α_m and are included to control for selectivity in the sample of births that may arise on account of either foetal mortality or heterogeneity across women in the timing of births in response to female leadership. In the initial specification, by construction, mother fixed effects include district fixed effects (this results in a loss of about 14% of births; we investigate whether these are a random 14% or not). These purge time-invariant characteristics including those of geography, institutions and political culture for the 286 districts in the analysis. The mother fixed effects specification is estimated on mothers with at least two children, so that we lose the 12% of births to mothers with one child. In the specifications that do not employ mother effects, we explicitly include district fixed effects.

To control for trended unobservables we include year dummies, η_t, and quartic state trends, denoted $f_s(t_{st})$. The year dummies control for aggregate time-variation associated with, for example, secular improvements in health technology, episodic shocks like famines, floods and epidemics and any aggregate economic or political regime changes. The state specific trends allow for omitted trends that vary by state, for example, in GDP or inflation.

The vector Z includes controls for the proportion of seats occupied by low caste candidates (of either sex) and by each of seven parties at the district level. Following Besley and Burgess (2002), seven party groups are constructed: Congress, Hard Left, Soft Left, Janata, Hindu, Regional parties, and independents together with

other small parties. Other district level controls include the proportions female, literate, urban and low caste. Since mortality and health-seeking are defined at the individual level, we control for the gender, religion and caste of the child and for the mother's education. Other relevant controls include maternal age at birth, birth order and birth month. As these are potentially endogenous (if endogenous fertility), we include them separately and primarily to assess whether the main results are robust to their inclusion (we find that they are).

We use a linear model since fixed effects probit estimates are inconsistent in short panels and the relevant panel in this case is the micro-panel, where T is the number of children per mother. Standard errors are robust to arbitrary forms of heteroskedasticity and clustered at the district-level to allow for correlation at any time and across time within district (e.g. Bertrand et al. 2004). This also allows for correlation of the standard errors across siblings because, by construction, siblings are all in the same district.

The analysis is conducted for mortality in the first month of life (neonatal), the first year (infant) and the first five years (under-5). We allow for full exposure to the relevant risk. For example, for neonatal morality, we drop children born less than a month before the date of the survey and for infant mortality we drop children born less than twelve months before the date of the survey. For this we use information on the month of birth, and the month (and year) of interview. The risk of death in developing countries is high until the age of five. It declines exponentially after birth and flattens out at a low level after the age of five. We also estimate the model for post-neonatal mortality which is mortality after the first and up to the twelfth month, recognising that survival up until the first month is endogenous (as is clear from the estimates for neonatal mortality) and therefore also presenting results for infant mortality which starts the counter at age zero. As in most studies of childhood mortality, our estimates are subject to selection up until birth. If women's leadership improves maternal health and child survival then it is likely to reduce foetal death. If survivors at birth are, on average, healthier then our estimates of the effects of female leadership on post-natal survival will tend to be conservative. As discussed, the mother fixed effects specifications are less vulnerable to this.

As discussed, data on health-related behaviours are only available for children born in the four years preceding the date of the survey. No more than a third of the mothers in our sample had two births in this time-span. Those that did are hardly

likely to be representative of all mothers since, for example, short birth intervals are associated with higher mortality. For these reasons, we do not use mother fixed effects for this part of the analysis. The standard errors are clustered by district and given that, by construct, mothers do not migrate across districts, this allows for non-independence of the standard errors by mother. Since the basic child immunizations are spread across the first year of life, immunization is studied for the sample of children who have survived to the age of one year.

For these specifications, the model to be estimated is:

$$(3)\ H_{imdt}=\beta F_{dt-1} + \partial TC_{dt-1} + \alpha_d + \eta_t + f_s(t_{st}) + Z_{imst}\rho + \varepsilon_{imst}$$

$$(4)\ F_{imdt}=\varphi FC_{dt-1} + \psi TC_{dt-1} + \alpha_d + \eta_t + f_s(t_{st}) + Z_{imst}\pi + \varepsilon_{imst}$$

where H is the health behaviour related to of child *i* of mother *m* born in district *d* in year *t*, and now α are district fixed effects. Descriptive statistics for the variables used in the regressions are shown in Tables 1 and 2, for the politics database and the NFHS, respectively.

4. Results

In the baseline specifications, survival and health are a function of female leadership in the district of birth in the year before birth. For antenatal care (which occurs in the year before birth), these automatically deliver what are more likely to be contemporary effects. Alternative lags are investigated in the next version of this paper. The discussion here is focused on the parameter of interest, namely the effect of women's leadership on the health outcome. First stage regressions for our preferred specification and for all samples used in the regressions are shown in Table 3.

Child Mortality

Regressions for the mortality variables are shown in Table 4. For each one of the variables used, we use different specifications: OLS (column 1), 2SLS with district and cohort fixed effects (column 2), 2SLS with mother and cohort fixed effects (column 3) and a 2SLS specification with mother and cohort fixed effects in which we add controls for birth order, maternal age at birth and month of birth.

In the preferred specification (columns 4, 8 and 12), we see that children are less likely to die in the neonatal period if born in districts with women leaders. The

coefficient is -0.15 (Table 4). A one standard deviation increase in female representation would decrease the probability that a child dies in the neonatal period by 1.1 percent. This effect is considerably large, given the mean neonatal mortality rate in the sample of 0.063. Their effect on infant mortality is -0.14, but this is statistically insignificant. We also investigated under-5 mortality, retaining the specification in which female leadership is recorded for the year preceding birth. We find no effect.

Consider now the insights gained by stepping discretely towards the favoured specification. The difference between the 2SLS and the OLS coefficients is consistent with the hunch that there are unobservables that affect both survival and the chances of a woman being elected to power. The introduction of mother fixed effects makes the coefficient larger, and controlling for mother's age at birth, birth order and birth month does not substantially change our results.

We then take advantage of the fact that some seats are reserved for SC/STs and investigate whether the politician's caste also matters by dividing our female representation variable according to whether female politicians contested for a SC/ST reserved seat or not. For these specification, the fraction of seats won by SC/ST(general) female politicians is instrumented with the fraction of seats won by SC/ST(general) female politicians in close elections against SC/ST(general) men.

First stage regressions for these specifications are shown in Table 5, while second stages are in Table 6. Now coefficients for both SC/ST and general female politicians are negative for neo-natal mortality, but none of them is significantly different from zero.

Healthy Behaviours

We investigated the effects of female leadership on antenatal care, place of delivery, breastfeeding and vaccinations using a bunch of alternative indicators of each. These effects are of direct interest and they also suggest mechanisms by which female leadership may create the observed effect on neonatal mortality.

We find a significant "improving" effect of female leadership for each of the antenatal behaviours considered, although not for every index of a given behaviour (Table 7). For example, in our preferred specification (columns 5 and 10) we only find a positive effect on number of antenatal visits sought although no significant effect on whether or not a visit was sought in the first trimester, which is what is

recommended to pre-empt problems. A 10 percentage points increase in female leaders causes antenatal visits during pregnancy to go up by 0.215 from a mean of 2.3 (s.d. 2.5).

As it is shown in Table 8, a 10 percentage points increase in female leadership significantly raises each of our indicators of immunization, namely full immunization (by 0.18), some non-zero immunization (by 0.1) and number of vaccinations (by 1.2). In the sample analysed which, for these equations, is the sample of births that have survived at least twelve months, 41% are fully immunized, 86% have some vaccinations and the average number of vaccinations had is 5.4. Female leadership has a further beneficial effect is raising the probability that a mother breastfeeds in the first 24 hours following birth by 1.18; on average 51% of mothers do this.

Results in Table 9 show that the probability of giving birth at home goes down by 0.083, relative to a mean of 0.69 (s.d. 0.46) and, at the same time, the probability of giving birth in a government facility increases by 0.077, relative to a mean of 0.16 (s.d. 0.37). It is notable that the probability of giving birth in a private facility also increases, by 0.06, but that this effect is insignificant. The distinction between births in government and private facilities is informative, and consistent with a role for female elected leaders in improving public facilities. The force of this result is even greater in view of the finding that positive state-level GDP shocks tend to reduce home deliveries but that the shift is, in this case, entirely into private facilities. This result holds whether or not state health expenditure is held constant. A 10% increase in state health expenditure is associated with a significant decrease in the probability of home delivery of 0.0036 and a corresponding increase in the probability of delivery in a government facility of 0.0046 (Bhalotra 2007). So, it seems that a very effective way of encouraging women to give birth in public facilities rather than at home is to put female politicians at the helm and also that a fairly ineffective way to proceed is to improve growth or to raise state health expenditure.

Improvements in antenatal care, place of delivery and immunization can all be generated by improving the effective supply of public services, even if there remain substantial issues of take up, for example, because the opportunity cost of time for poor mothers is high given the double burden created by work and high fertility. The breastfeeding effect contrasts with the others in that it relies more upon improving information. Women leaders may be more likely to actively promote breastfeeding through campaigns. There may also be complementarities in these effects (which we

have not yet explored); for example, one may imagine that mothers who give birth in a facility rather than at home are encouraged at the health facility to breastfeed.

For healthy behaviours, the OLS effects are much smaller than the IV effects and tend to be insignificant. As also found in our analysis of mortality, controlling for mother's education reduces the marginal effect substantially.

As before, we take advantage of the SC/ST reservations and divide female representatives according to whether they were contesting for a SC/ST reserved seat or not. Results are shown in Table 10.

Disaggregating by caste of the leader, we find that the significant effects of women's leadership on healthy behaviours are primarily of higher caste women leaders. It may be that they are better able than lower caste women leaders to achieve their goals, for example, because they have greater confidence and material support. However, in many cases, the effects for lower caste women leaders are equally large and it may be that we are unable to identify well-determined effects only because they are relatively scarce. An exception is that low caste women leaders increase the probability of having received some immunization by the age of one.

In particular, for antenatal care, even if SC/ST female politicians seem to be those who have the largest effect, none of the coefficients is significantly different from zero. However, for the largest sample used in these regressions we may have weak instruments, which is something we investigate in the next version of the paper.

General female politicians seem to encourage early breastfeeding, full vaccinations, and delivery in government institutions while discouraging home delivery. SC/ST female politicians increase the probability of receiving some of the vaccinations.

Gender and caste heterogeneity

We estimated alternative models for the mortality regressions that allow for different effects of female leadership for boys and girls and for low and high caste children (Table 11). We also investigated whether the caste of the elected leader influenced effectiveness (Table 12). Although the coefficient on female leadership in the neonatal mortality equation is almost two times as large for boys as for girls, the gender difference is not significantly different on this sample. Similarly, we find effects that are about 25% bigger for low caste than for other children but the

difference is not significant. It is notable that, absent mother fixed effects[7], the infant mortality equation shows some significant effects once we disaggregate children and leaders by caste. We find that women leaders of all castes have a significant protective effect but only for low caste children. Moreover, consistent with the prior that a leader is more likely to defend the interests of her own "type", this effect is twice as large when the leader is a low caste woman than when she is a higher caste woman. While the pattern of these effects fits with our priors, note that they become insignificant once we control for mother fixed effects.

We also explored heterogeneity in healthy behaviours by the gender and caste of the mother/child and by the gender (as before) and caste of the leader (Tables 11, 12).

The immunization and breastfeeding effects are larger for boys than for girls and this is most marked for full immunization by age one. This is consistent with other accounts of son preference in India. Although neonatal mortality is, on average, greater amongst boys, this reflects their initial vulnerability in nature. If not for their better treatment, they would be likely to exhibit higher neonatal mortality rates. If the sex of the child is not known pre-birth, it is not relevant to estimate the models for antenatal care and place of delivery by gender, this may explain why the results we obtain for boys and girls are similar.

Disaggregating by caste of the mother/child reveals that this beneficial effect of having a low caste woman leader obtains for higher and lower caste children, with larger effects for low caste children. The probability of being fully immunized by age one is only significantly affected by higher caste women leaders, and this effect is only significant for lower caste children. The positive effect of women's leadership on antenatal care resides with low caste mothers; higher caste mothers are unaffected. In terms of the caste of the leader, the coefficient sizes suggest that low caste women leaders are more effective than higher caste women leaders but only the latter effect is significant. For place of delivery too, coefficients on low caste women leaders are all insignificant. We find that higher caste women leaders are effective, reducing delivery at home. The fall in delivery at home is predominantly amongst low caste mothers but, strikingly, it is associated with an increase in delivery in private facilities. In parallel, higher caste women leaders seem to create an increase in delivery in

[7] This is not reported but available from the authors on request

government facilities primarily for higher caste mothers. These results suggest that low caste mothers may not have equal access to public facilities, for example, they may be stigmatised, rather like black mothers used to be in the USA (see Almond, Chay and Greenstone 2006, for example). Breastfeeding is encouraged by higher caste women leaders and the beneficial effects are unique to higher caste mothers.

Does the number or composition of births change when a woman leader is in power?

Female political representation could potentially affect the probability that a child is born, and the probability that, given that a child is born, the child is female. This may not be captured by the mother fixed effects if it is not related to mother's characteristics that do not change over time. In this section we take advantage of the fact that NFHS provides the whole fertility history for each mother and we analyse the probability of an individual birth and the conditional probability that the birth is female as a function of female leadership.

Results are shown in Table 13. We do not find a positive impact of female leadership on fertility. However, there seems to be an increase in the chances that the birth is a girl, which may explain evidence of selectivity once we divide the sample by gender. Why might girls be more likely to be born under women leaders? One possibility is that there is a reduction in female feticide, for example because women leaders are more likely to monitor this. Another is that less well-off mothers are over-represented amongst mothers increasing fertility.

In the next version of the paper we will extend this investigation to consider whether there is endogenous heterogeneity in the sample of births, with mothers of certain types (education, caste, religion, rural location) being more likely to give birth in the regime of a woman leader. Any such heterogeneity would tend to bias the health results above which, as discussed, cannot be estimated with mother fixed effects.

5. Conclusions

Female politicians reduce infant mortality. We find that a one standard deviation increase in female political representation results in a 1.1% reduction in neonatal

mortality, the average incidence of which is 6.3%. We find no effects on post-neonatal (or under-5) mortality and no significant difference in the effect for boys and girls.

Female politicians also affect health behaviours. We find that female political representation is associated with more antenatal care visits and with higher probabilities of breastfeeding in the first 24 hours following birth, giving birth in a government [and not private] facility rather than at home, and full immunization by the age of one. Improvements in post-natal investments are larger for boys. Other than for breastfeeding, outcomes for low caste mothers and children are more responsive to female leadership and especially low caste female leadership.

References

Almond, D., K. Chay and M. Greenstone (2006). Civil Rights, the War on Poverty, and Black-White Convergence in Infant Mortality in the Rural South and Mississippi, NBER Working Paper.

Banerjee, A., L. Iyer and R. Somanathan (2006), Public Action for Public Goods, *Handbook of Development Economics*, Vol. 4.

Banerjee, A., L. Iyer and R. Somanathan (2007), The political economy of public goods: Some evidence from India, *Journal of Development Economics*, Vol. 82 (2), pp. 287-314.

Banerjee, A. and R. Pande (2007), Parochial Politics: Ethnic Preferences and Politician Corruption, KSG Faculty Research Working Paper Series, Harvard University, July.

Banerjee, A., L. Iyer and R. Somanathan (2007), History, Social Divisions and Public Goods in Rural India, *Journal of the European Economic Association*, Vol. 3 (2-3), pp. 639-647.

Besley, T. & S. Coate (1997), An Economic Model of Representative Democracy, *Quarterly Journal of Economics*, 112(1).

Besley,Timothy, and Robin Burgess. 2002. "The Political Economy of Government Responsiveness: Theory and Evidence from India".Quarterly Journal of Economics, 117(4), 1415-1451.

Besley,T., Pande, R., Rahman, L. and Rao, V (2004), The Politics of Public Good Provision: Evidence from Indian Local Governments, *Journal of the European Economic Association,* Chapters and Proceedings, Vol. 2 (2-3)

Chattopadhay,R. & Duflo,E (2004), Women as Policy Makers: Evidence from a India-Wide Randomized Policy Experiment, *Econometrica*, 72(5).

Bhalotra, Sonia (2007), Fatal fluctuations: Cyclicality in infant mortality in India. IZA Discussion Paper 3086, Bonn.

Bhalotra, S. (2008) Sibling-Linked Data in the Demographic and Health Surveys. *Economic and Political Weekly*, Nov 29- Dec 5, 2008, Vol. XLIII(48), 39-44.

Bhalotra, S. and J-P. Schmid (2007), The political economy of health expenditure in India, Mimeograph, University of Bristol.

Clots-Figueras, Irma (2007), Are Female Leaders Good for Education? Evidence from India, Mimeograph, Carlos Madrid III.

Lee D.S.(2001), The Electoral Advantage to Incumbency and Voter's Valuation of Politician's Experience: A Regression Discontinuity Analysis of Elections to the U.S. House. NBER working paper 8441.

IIPS and ORC Macro (2000), *National Family Health Survey (NFHS-2) 1998-9: India*. Mumbai: International institute For Population Sciences (IIPS).

Pande,R.(2003), Can Mandated Political Representation Increase Policy Influence for Disadvantaged Minorities? Theory and Evidence from India, *American Economic Review*, 93(4).

Rehavi, M. (2003), When Women Hold the Purse Strings: the Effects of Female State Legislators on US State Spending Priorities, 1978-2000" . MSc in Economics and Economic History Dissertation. London School of Economics.

Data Appendix

Electoral data:

Collected from different volumes of the Statistical Reports on the General Elections to the Legislative Assemblies. The election commission of India publishes one report for every election in each state. There is data at the constituency level for the 16 main states in India for elections held during 1967-2001.

-Proportion of seats in the district won by women: defined as the total number of seats in which a woman won the election in the district divided by the total number of seats in the district.

-Proportion of seats reserved for SC/ST: defined as the total number of seats reserved for SC/STs in the district divided by the total number of seats in the district.

-Proportion of seats won by women in a close election against a man: defined as the number of women in the district who won by less than 3.5% of votes against a man over the total number of seats in the district.

-Proportion of seats in which a man and a woman contested in a close election: defined as the number of men and women in the district who won by less than 3.5% of votes against a candidate of the other gender over the total number of seats in the district.

-Proportion of seats won by SC/ST women in a close election against a SC/ST man: defined as the number of SC/ST women in the district who won by less than 3.5% of votes against a SC/ST man over the total number of seats in the district.

-Proportion of seats won by general women in a close election against a general man: defined as the number of general women in the district who won by less than 3.5% of votes against a general man over the total number of seats in the district.

-Proportion of seats won by each political party: number of seats won by the political party divided by total seats in the district. Congress parties include Indian National Congree Urs, Indian National Congress Socialist Parties, and Indian National Congress. Hard Left parties include the Communist Party of India and the Communist Party of India Marxist Parties. Soft Left parties include Praja Socialist Party and Socialist Party. Janata parties include Janata, Lok Dal, and Janata Dal parties. Hindu parties include the Bharatiya Janata Party. Regional parties include Telegu Desam, Asom Gana Parishad, Jammu & Kashmir National Congress, Shiv Sena, Uktal Congress, Shiromani Alkali Dal, and other state specific parties.

Definitions of Survival and Health Variables

Neonatal mortality refers to death in the first month of life .*Infant* mortality measures mortality in the first year of life. *Under-5* mortality measures mortality

between birth and the age of five. To allow for age-heaping in the data, which tends to occur at one, six, twelve months and sixty months, we define all of the mortality indicators as inclusive of the terminal date. The samples used for regressions are adjusted to allow every child full exposure to the relevant risk. For example, for analysis of under-5 mortality we drop children born less than 60 months before the date of the survey.

Place of delivery is classified as being either home or at a facility and facilities are further classified as government *vs* private. We construct three indicators corresponding to these place alternatives. *Breastfeeding* is very prevalent in India so we do not use an indicator for whether or not it occurs. The NFHS data contain detailed information on initiation of breastfeeding and its duration. Its duration is often interrupted by disease or death of the child or illness of the mother, so we do not use it. Instead, we define an indicator for whether or not the mother initiated breastfeeding in the first 24 hours following the birth. Indian and especially Hindu mothers often sacrifice the first milk, containing colostrum, to the earth as a matter of tradition. Colostrum contains nutrients and antibodies that are especially important in an environment where under-nutrition and disease are prevalent.

We use five measures of *antenatal care*. The first indicates complete care which is defined, in India, as at least 3 antenatal care visits, at least 1 tetanus shot & use of iron folic tablets. The second indicates whether a visit was made in the first trimester. This is recommended by professionals as it helps spot problems early. The third is the total number of antenatal care visits sought during pregnancy. The fourth is the number of visits received from a health worker and the fifth is the total number of visits.

We also use three measured of *child vaccinations*, all of which are analysed for the sample of children who have survived infancy, which means we exclude any children who died before the age of one but we also drop children born less than a year before the survey date. This is because a basic course of immunization is expected to be spread across the first year of life. Our first measure indicates full immunization and this is defined as 3 DPT, 3 Polio and 1 measles shot by the age of one year. The second is a dummy variable for some (non-zero) immunizations. The third is the total number of vaccinations had.

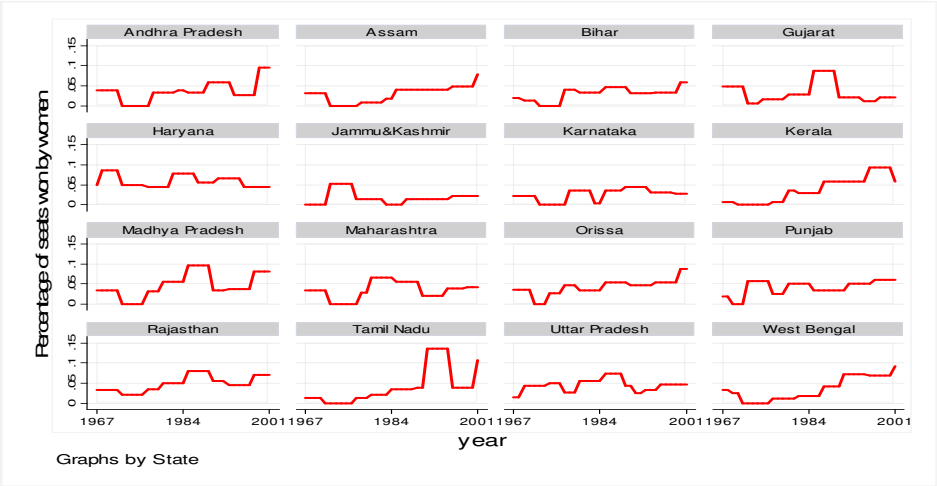

Figure 1: Female Political Representation by State 1967-2001

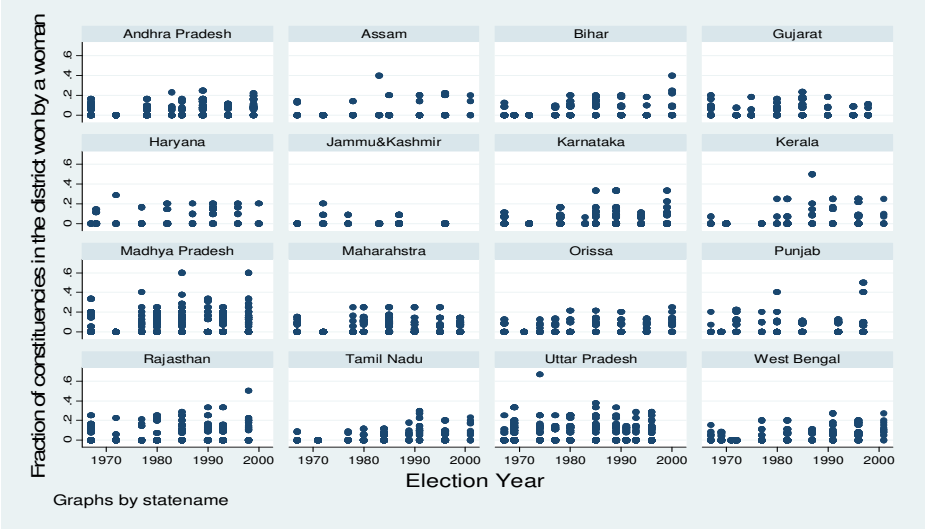

Figure 2: Female Political Representation in the Different Districts by State 1967-2001

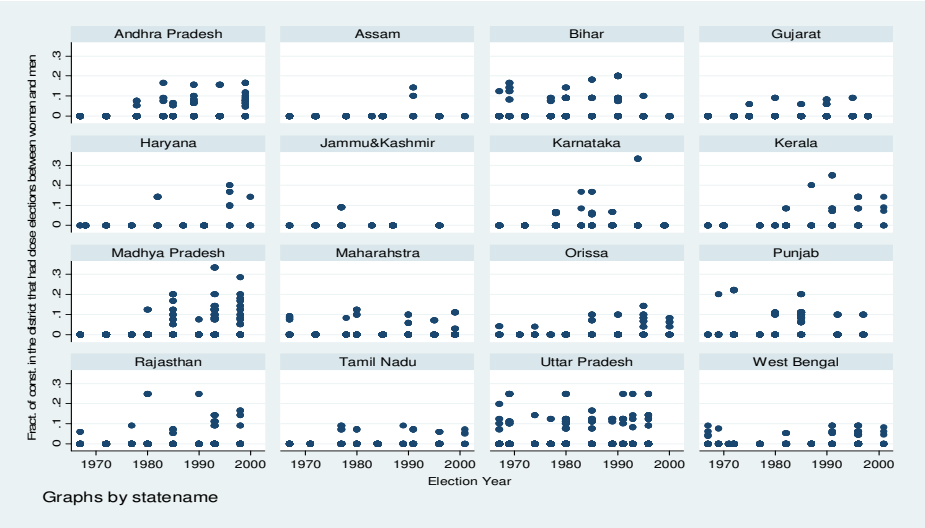

Figure 3: Fraction of Constituencies with Close Elections between Women and Men in the District by State and Year.

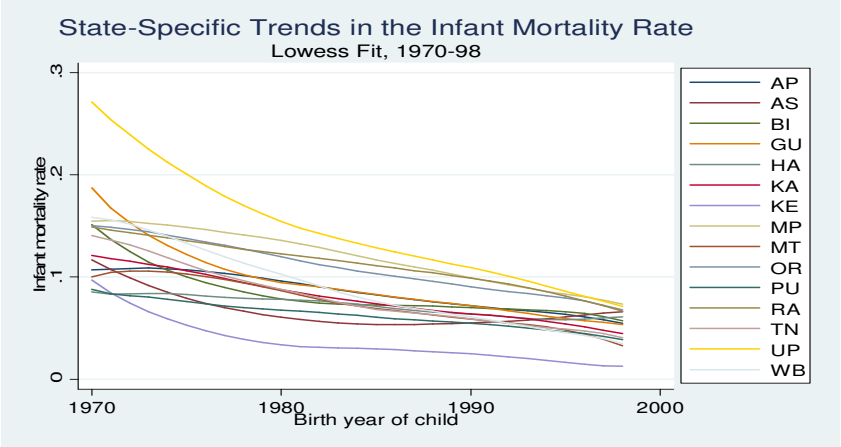

Figure 4: Differences in level and rate of decline in infant mortality by state. For state-codes, see Appendix Table 2.

Table 1: Descriptive statistics: District Political Dataset
Unit of observation: district in an electoral year

Variable (as a fraction of the total seats in the district) 2298 districts-electoral years	Mean	Sd
Proportion of seats won by women	0.0369	0.0738
Proportion of seats won by SC/ST women	0.0092	0.0386
Proportion of seats won by general women	0.0278	0.0626
Proportion of seats won by Congress	0.4418	0.3279
Proportion of seats won by Hard Left	0.0612	0.1483
Proportion of seats won by Soft Left	0.0259	0.0928
Proportion of seats won by Hindu	0.1311	0.2331
Proportion of seats won by Janata	0.1606	0.2699
Proportion of seats won by Regional	0.0761	0.2026
Proportion of seats won by Others	0.0455	0.1345
Proportion of seats won by Independent	0.0577	0.1060
Proportion of seats reserved for SC/ST	0.2335	0.1840
Proportion of seats won by women in a close election against a man	0.0043	0.0228
Proportion of seats who had close elections between men and women	0.0091	0.0345
Proportion of seats won by women in a close election against a man (SC/ST)	0.0009	0.0112
Proportion of seats won by women in a close election against a man (general)	0.0034	0.0200
Female literacy rate	0.2852	0.1720
Proportion of the population SC/ST	0.2540	0.1357
Proportion of the population urban	0.2057	0.1467

Unit of observation: district in an electoral year in districts where at least one female politician was elected

Variable (as a fraction of the total seats in the district) 613 districts-electoral years	Mean	Sd
Proportion of seats won by women	0.1384	0.0798
Proportion of seats won by SC/ST women	0.0344	0.0687
Proportion of seats won by general women	0.1040	0.0822
Proportion of seats won by Congress	0.4609	0.3273
Proportion of seats won by Hard Left	0.0746	0.1764
Proportion of seats won by Soft Left	0.0222	0.0913
Proportion of seats won by Hindu	0.0995	0.1825
Proportion of seats won by Janata	0.1485	0.2443
Proportion of seats won by Regional	0.0913	0.2191
Proportion of seats won by Others	0.0525	0.1513
Proportion of seats won by Independent	0.0505	0.0885
Proportion of seats reserved for SC/ST	0.2440	0.1832
Proportion of seats won by women in a close election against a man	0.0159	0.0420
Proportion of seats who had close elections between men and women	0.0214	0.0486
Proportion of seats won by women in a close election against a man (SC/ST)	0.0033	0.0215
Proportion of seats won by women in a close election against a man (general)	0.0126	0.0373
Female literacy rate	0.3174	0.1727
Proportion of the population SC/ST	0.2597	0.1399
Proportion of the population urban	0.2271	0.1704

Table 2: Descriptive statistics: NFHS
Unit of observation: child

Variable (mortality regressions)	Obs	Mean	Sd
Infant mortality	72370	0.0996	0.2995
Neonatal mortality	72370	0.0634	0.2438
Post Neonatal mortality	67779	0.0386	0.1927
After 5 mortality	72370	0.1268	0.3327
Female	72370	0.4765	0.4995
SC	72370	0.1957	0.3967
ST	72370	0.1070	0.3091
Hindu	72370	0.8486	0.3584
Muslim	72370	0.1068	0.3089
Christian	72370	0.0112	0.1053
Other religions	72370	0.0334	0.1796
Mother age 9-15	72370	0.0414	0.1993
Mother age 16-18	72370	0.1686	0.3744
Mother age 25-30	72370	0.2395	0.4268
Mother age 31-49	72370	0.0774	0.2673
Child birth order 1	72370	0.2971	0.4570
Child birth order 2	72370	0.2482	0.4320
Child birth order 3	72370	0.1829	0.3866
Child birth order 4+	72370	0.2718	0.4449
Mothers education: no education	72349	0.6726	0.4693
Mothers education: incomplete primary	72349	0.0964	0.2951
Mothers education: completed primary	72349	0.0690	0.2535
Mothers education: incomplete secondary	72349	0.0979	0.2971
Mothers education: completed secondary and higher	72349	0.0641	0.2449

Variable (health behaviour regressions)	Obs	Mean	Sd
Antenatal care			
Complete care (defined, in India, as at least 3 antenatal care visits, at least 1 tetanus shot & iron folic tablets)	9101	0.3444	0.4752
Visit made in first trimester	6011	0.7879	0.4088
Number of visits sought	8153	2.2915	2.5088
Number of visits received from a health worker	9184	0.1845	0.3879
Place of delivery is classified as being either home or at a facility and facilities are further classified as government vs private.			
Home	9160	0.6941	0.4608
Government facility	9160	0.1612	0.3678
Private facility	9160	0.1447	0.3518
First breast-fed during the first 24 hours	8768	0.4814	0.4997
Child vaccinations (exclude children <13 months at interview)			
1 if full set (3 DPT, 3 Polio and 1 measles shot) (sample age 1)	5461	0.3911	0.4880
Some immunizations (sample age 1)	5461	0.8444	0.3626
Number of vaccinations had (sample age 1)	5213	5.3649	3.0417
Female	9184	0.4831	0.4997
SC	9184	0.2074	0.4055
ST	9184	0.1216	0.3269
Hindu	9184	0.8456	0.3614
Muslim	9184	0.1113	0.3145
Christian	9184	0.0134	0.1150

Other religions	9184	0.0297	0.1698
Mother age 9-15	9184	0.0187	0.1356
Mother age 16-18	9184	0.1280	0.3342
Mother age 25-30	9184	0.2737	0.4459
Mother age 31-49	9184	0.1145	0.3185
Child birth order 1	9184	0.2931	0.4552
Child birth order 2	9184	0.2436	0.4293
Child birth order 3	9184	0.1802	0.3844
Child birth order 4+	9184	0.2831	0.4505
Mothers education: no education	9184	0.5992	0.4901
Mothers education: incomplete primary	9184	0.0866	0.2812
Mothers education: completed primary	9184	0.0711	0.2570
Mothers education: incomplete secondary	9184	0.1356	0.3423
Mothers education: completed secondary and higher	9184	0.1076	0.3099

Notes to Table 2: Mortality data are available for children born between 1968-1998 while data on health seeking behaviours are available for children born in 1994-1998. In the analysis, we restrict the samples to allow for full exposure to the risk of mortality. For the immunization regressions, we restrict the sample to children who have survived the first year of their life (see text). These are unweighted means.

Table 3: First stage regressions for our preferred specifications. Dependent variable: fraction of seats in the district won by a female politician

	Infant Mortality sample	Neonatal Mortality sample	Under 5 Mortality sample
	1	2	3
Fraction of constituencies in the district won by a woman in a close election against a man	1.0350***	0.9937***	0.9916***
	(0.1206)	(0.1208)	(0.1586)
Fraction of constitituencies in the district that had close elections between women and men	-0.3247***	-0.2838***	-0.2780**
	(0.0944)	(0.0945)	(0.1258)
district fixed effects			
year of birth fixed effects	yes	yes	yes
mother fixed effects	yes	yes	yes
F first stage	73.61	67.66	39.1
Observations	68648	71479	56326

	Complete AC sample	Visits 1st T sample	Visits sought sample	Visits received sample	Breast fed 24h sample	Full vacc sample	Some vacc sample	Nº vacc sample	Deliv gov sample	Deliv home sample	Deliv private sample
	4	5	6	7	8	9	10	11	12	13	14
Fraction of constituencies in the district won by a woman in a close election against a man	0.8845***	0.8236***	0.8744***	0.8909***	0.8807***	0.8719***	0.8719***	0.8595***	0.9021***	0.9021***	0.9021***
	(0.1713)	(0.1668)	(0.1735)	(0.1718)	(0.1723)	(0.2498)	(0.2498)	(0.2441)	(0.1696)	(0.1696)	(0.1696)
Fraction of constitituencies in the district that had close elections between women and men	-0.0618	-0.1559	-0.0510	-0.0567	-0.0425	0.0222	0.0222	0.0235	-0.0603	-0.0603	-0.0603
	(0.2102)	(0.1661)	(0.2213)	(0.2113)	(0.2180)	(0.2530)	(0.2530)	(0.2401)	(0.2111)	(0.2111)	(0.2111)
district fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
year of birth fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
mother fixed effects											
F first stage	26.66	24.37	25.4	26.9	26.12	12.18	12.18	12.4	28.31	28.31	28.31
Observations	9107	6017	8159	9184	8775	5487	5487	5220	9167	9167	9167

Table 4: Infant mortality

	OLS	2SLS	2SLS	2SLS	OLS	2SLS	2SLS	2SLS	OLS	2SLS	2SLS	2SLS
	Infant Mortality				**Neonatal Mortality**				**Under 5 Mortality**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Fraction of constituencies in the district won by a woman	-0.0094	-0.0720	-0.1610*	-0.1594	-0.0169	-0.0932	-0.1531**	-0.1542**	-0.0156	0.0325	0.0347	0.0404
	(0.0217)	(0.0860)	(0.0966)	(0.0970)	(0.0187)	(0.0623)	(0.0768)	(0.0764)	(0.0261)	(0.1093)	(0.1205)	(0.1204)
Fraction of constitituencies in the district that had close elections between women and men		0.0195	0.0049	0.0040		0.0453	0.0368	0.0374		0.0130	-0.0954	-0.0976
		(0.0515)	(0.0589)	(0.0589)		(0.0303)	(0.0349)	(0.0344)		(0.0658)	(0.0638)	(0.0639)
district fixed effects	yes	yes			yes	yes			yes	yes		
year of birth fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
mother fixed effects			yes	yes			yes	yes			yes	yes
Observations	72370	72370	68665	68648	75339	75339	71498	71479	59714	59714	56342	56326
Number of mothers			18003	18000			18754	18750			14862	14859

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1,5 and 9 are OLS regressions. The rest are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions in columns 1,2,5,6 and 9,10 include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, district fixed effects, year fixed effects and time trends. Columns 3, 7 and 11 add mother's fixed effects. Columns 4, 8 and 12 also add controls for mother's age at birth, birth order and month of birth.

Table 5: Politician's gender and caste: First stages

Panel A: First stage regressions for our preferred specifications. Dependent variable: fraction of seats in the district won by a female politician

	Infant Mortality sample		Neonatal Mortality sample		Under 5 Mortality sample	
	General seats	SC/ST seats	General seats	SC/ST seats	General seats	SC/ST seats
Fraction of constituencies in the district won by a SC/ST woman in a close election against a SC/ST man	0.0779	0.7652***	0.0528	0.7481***	0.0709	0.7646***
	(0.1081)	(0.1001)	(0.1042)	(0.1005)	(0.1096)	(0.1004)
Fraction of constituencies in the district won by a general woman in a close election against a general man	1.073***	0.0856	1.0480***	0.0663	1.0627***	0.0883
	(0.1211)	(0.0782)	(0.1201)	(0.0746)	(0.1225)	(0.0817)
year of birth fixed effects	yes	yes	yes	yes	yes	yes
mother fixed effects	yes	yes	yes	yes	yes	yes
F first stage	42.68	30.97	41.64	29.42	41.39	30.81
Observations	68648	68648	71479	71479	56326	56326

Table 6: Politician's gender and caste: Second stages	Infant Mortality	Neonatal Mortality	Under 5 Mortality
	1	2	3
Fraction of constituencies in the district won by a SC/ST woman	-0.1838	-0.1804	-0.0671
	(0.1371)	(0.1259)	(0.1898)
Fraction of constituencies in the district won by a gen. woman	-0.1288	-0.1210	0.0943
	(0.1022)	(0.0879)	(0.1441)
year of birth fixed effects	yes	yes	yes
mother fixed effects	yes	yes	yes
Observations	68648	71479	56326

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. All columns are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, mother fixed effects, year fixed effects, time trends, controls for mother's age at birth, birth order and month of birth.

Table 7: Health Behaviours: Ante-natal visits

	OLS	2SLS	2SLS	2SLS	2SLS	OLS	2SLS	2SLS	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Complete Antenatal Care					**Visit made in first trimester**				
Fraction of constituencies in the district won by a woman	-0.3338***	0.3187	0.1150	0.1033	0.1033	0.2040	0.1890	0.3844	0.4962	0.4962
	(0.1283)	(0.2909)	(0.3082)	(0.3084)	(0.3358)	(0.1378)	(0.4483)	(0.4274)	(0.4259)	(0.4770)
Fraction of constitituencies in the district that had close		0.4325**	0.4174**	0.3693**	0.3693*		-0.2113	-0.1458	-0.1367	-0.1367
elections between women and men		(0.1876)	(0.1895)	(0.1834)	(0.1987)		(0.3748)	(0.3934)	(0.3616)	(0.3975)
Observations	9110	9110	9107	9107	9107	6019	6019	6017	6017	6017
	Number of visits sought					**Number of visits received from a health worker**				
Fraction of constituencies in the district won by a woman	0.2914	3.9304***	1.9581*	2.1456*	2.1456*	-0.0482	0.0383	0.0639	0.0121	0.0121
	(0.7023)	(1.2825)	(1.1259)	(1.2013)	(1.1355)	(0.1005)	(0.3627)	(0.3548)	(0.3253)	(0.4081)
Fraction of constitituencies in the district that had close		-0.2485	-0.1870	-0.4272	-0.4272		-0.4729**	-0.4602**	-0.4771**	-0.4771*
elections between women and men		(0.8850)	(0.8377)	(0.7784)	(0.8300)		(0.2293)	(0.2262)	(0.2268)	(0.2516)
Observations	8162	8162	8159	8159	8159	9187	9187	9184	9184	9184

Robust standard errors clustered at the district-year level (columns 1-4 and 6-9) and at the district level (columns 5 and 10) are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1 and 6 are OLS regressions. The rest are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions in columns 1,2 and 6,7 include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, district fixed effects, year fixed effects and time trends. Columns 3 and 8 add controls for mother's education. Columns 4 and 9 add controls for mother's age birth order and month of birth. Columns 5 and 10 are the same as columns 4 and 9 but with standard errors clustered at the district level.

Table 8: Health Behaviours: Breast-feeding and immunization

	OLS	2SLS	2SLS	2SLS	2SLS	OLS	2SLS	2SLS	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Breast-fed in the first 24 hours					**Full set of vaccinations (3 DPT, 3 Polio and 1measles shot)(sample age 1)**				
Fraction of constituencies in the district won by a woman	0.2724*	1.2656**	1.1707**	1.1766**	1.1766***	0.0839	1.6490***	1.6966***	1.7871***	1.7871**
	(0.1589)	(0.5426)	(0.5237)	(0.5097)	(0.3632)	(0.2090)	(0.5470)	(0.5993)	(0.5992)	(0.8198)
Fraction of constitituencies in the district that had close		-0.0380	-0.0625	-0.0415	-0.0415		0.8534	0.8470	0.8865	0.8865
elections between women and men		(0.3778)	(0.3670)	(0.3603)	(0.3974)		(0.6592)	(0.6945)	(0.6960)	(0.8756)
Observations	8778	8778	8775	8775	8775	5489	5489	5487	5487	5487
	Some vaccinations (sample age 1)					**Number of vaccinations had (sample age 1)**				
Fraction of constituencies in the district won by a woman	-0.1349	0.9829**	1.0036**	1.0344**	1.0344*	-1.1667	10.9762***	11.7307***	11.9742***	11.9742**
	(0.2638)	(0.4568)	(0.4419)	(0.4415)	(0.5737)	(1.8976)	(4.1468)	(4.4058)	(4.4339)	(6.0177)
Fraction of constitituencies in the district that had close		-0.5155	-0.5057	-0.5120	-0.5120		-0.6139	-0.4978	-0.6148	-0.6148
elections between women and men		(0.6406)	(0.6585)	(0.6492)	(0.7455)		(6.0586)	(6.3698)	(6.3403)	(7.4075)
Observations	5489	5489	5487	5487	5487	5222	5222	5220	5220	5220

Robust standard errors clustered at the district-year level (columns 1-4 and 6-9) and at the district level (columns 5 and 10) are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1 and 6 are OLS regressions. The rest are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions in columns 1,2 and 6,7 include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, district fixed effects, year fixed effects and time trends. Columns 3 and 8 add controls for mother's education. Columns 4 and 9 add controls for mother's age birth order and month of birth. Columns 5 and 10 are the same as columns 4 and 9 but with standard errors clustered at the district level.

Table 9: Health Behaviours: Delivery

	OLS	2SLS	2SLS	2SLS	2SLS	OLS	2SLS	2SLS	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Delivery at a government institution					**Delivery at home**				
Fraction of constituencies in the district won by a woman	0.2136**	0.8166***	0.7518**	0.7667***	0.7667**	-0.0242	-1.0339***	-0.7952***	-0.8255***	-0.8255***
	(0.0896)	(0.3050)	(0.3071)	(0.2883)	(0.3253)	(0.1202)	(0.3538)	(0.3059)	(0.2677)	(0.3046)
Fraction of constitituencies in the district that had close		0.0333	0.0522	0.0278	0.0278		-0.0423	-0.0227	0.0230	0.0230
elections between women and men		(0.2326)	(0.2322)	(0.2247)	(0.2692)		(0.2197)	(0.2009)	(0.1934)	(0.2313)
Observations	9170	9170	9167	9167	9167	9170	9170	9167	9167	9167
	Delivery at a private institution									
Fraction of constituencies in the district won by a woman	-0.1894**	0.2173	0.0434	0.0588	0.0588					
	(0.0934)	(0.2171)	(0.1996)	(0.1959)	(0.2250)					
Fraction of constitituencies in the district that had close		0.0090	-0.0295	-0.0508	-0.0508					
elections between women and men		(0.1393)	(0.1373)	(0.1335)	(0.1310)					
Observations	9170	9170	9167	9167	9167					

Robust standard errors clustered at the district-year level (columns 1-4 and 6-9) and at the district level (columns 5 and 10) are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1 and 6 are OLS regressions. The rest are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions in columns 1,2 and 6,7 include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, district fixed effects, year fixed effects and time trends. Columns 3 and 8 add controls for mother's education. Columns 4 and 9 add controls for mother's age birth order and month of birth. Columns 5 and 10 are the same as columns 4 and 9 but with standard errors clustered at the district level.

Table 10: Politician's gender and caste: health behaviours

Panel A: First stage regressions for our preferred specifications. Dependent variable: fraction of seats in the district won by a female politician

	Largest sample		Smallest sample	
	General seats	SC/ST seats	General seats	SC/ST seats
Fraction of constituencies in the district won by a SC/ST woman	-0.3239	0.5808**	-0.1733	1.0178***
in a close election against a SC/ST man	(0.2861)	(0.2437)	(0.2893)	(0.1319)
Fraction of constituencies in the district won by a general woma	0.9669***	0.0306	0.8572***	0.0044
in a close election against a general man	(0.1883)	(0.0855)	(0.3208)	(0.1136)
district fixed effects	yes	yes	yes	yes
year of birth fixed effects	yes	yes	yes	yes
Observations	9184	9184	5220	5220

	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Panel B: second stages	**Complete AC**	**Visits 1st T**	**Visits sought**	**Visits received**	**Breast fed 24h**	**Full vacc**	**Some vacc**	**Nº vacc**	**Deliv gov**	**Deliv home**	**Deliv private**
	1	2	3	4	5	6	7	8	9	10	11
Fraction of constituencies in the district won by a SC/ST woman	0.1351	1.5721	2.9261	0.1585	1.8694	-1.1469	2.5143***	12.1821	-0.6216	1.3505	-0.7290
	(0.9157)	(4.0381)	(3.5149)	(0.7969)	(2.5165)	(1.2045)	(0.9287)	(9.0613)	(1.3028)	(1.2956)	(0.6255)
Fraction of constituencies in the district won by a gen. woman	0.0316	0.4982	1.8791	-0.0094	1.0733***	2.3188*	0.7662	11.9387	0.9567***	-1.1232***	0.1665
	(0.3358)	(0.4880)	(1.2350)	(0.4323)	(0.3243)	(1.2898)	(0.5689)	(7.4853)	(0.3698)	(0.4070)	(0.2735)
district fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
year of birth fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	9107	6017	8159	9184	8775	5487	5487	5220	9167	9167	9167

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. All columns are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, district fixed effects, year fixed effects, time trends, controls for mother's age at birth, birth order and month of birth.

Table 11 Allowing Different Effects of Women's Leadership for Boys and Girls

	Infant Mortality		Neonatal Mortality		Under-5 mortality		complete AC		1st Trim		Visits sought		Visits received	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Fraction of constituencies in the district won by a woman	-0.1761	-0.0893	-0.0983	-0.1654	0.2178	0.2354	0.6799	-0.4431	-1.5406	2.5479**	5.5089**	-1.3041	0.5425	-0.4817
	(0.1868)	(0.1296)	(0.1273)	(0.1077)	(0.2563)	(0.1852)	(0.5467)	(0.9487)	(0.9559)	(1.2278)	(2.6601)	(3.3103)	(0.4318)	(0.3754)
Fraction of constitituencies in the district that had close elections between women and men	0.0057	-0.1400**	-0.0041	0.0500	-0.3011**	-0.2781***	0.6837	0.2076	0.6330	-0.4414	1.3333	-3.0031	-0.8566**	-0.3192
	(0.1022)	(0.0693)	(0.0666)	(0.0509)	(0.1464)	(0.0943)	(0.4422)	(0.4751)	(0.9004)	(0.6987)	(2.4890)	(2.3157)	(0.3913)	(0.2702)
district fixed effects	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes
year of birth fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
mother fixed effects	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no	no	no
Observations	26709	30672	27876	31864	21785	25264	4399	4708	2871	3146	3925	4234	4437	4747

	Full vacc		Some vacc		Nº vacc		Deliv home		Deliv gov		Deliv private		First brfed	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Fraction of constituencies in the district won by a woman	1.5881*	2.4694**	1.0593*	1.4575	10.6939**	15.2335	-0.8757***	-0.9972*	0.9233**	0.7629*	-0.0477	0.2342	1.0304**	1.5160***
	(0.8398)	(1.2526)	(0.6250)	(1.2700)	(5.2513)	(9.9919)	(0.3126)	(0.5581)	(0.4258)	(0.4435)	(0.3543)	(0.4677)	(0.4203)	(0.5209)
Fraction of constitituencies in the district that had close elections between women and men	1.7001*	-0.4104	-0.6801	-0.4897	0.5627	-2.6247	0.1502	-0.1768	0.0111	0.3354	-0.1613	-0.1586	0.3638	-0.3144
	(0.9331)	(1.0621)	(0.7908)	(1.0953)	(7.1658)	(9.4652)	(0.3760)	(0.3432)	(0.3654)	(0.3893)	(0.2578)	(0.2604)	(0.5394)	(0.4154)
district fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
year of birth fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
mother fixed effects	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Observations	2621	2866	2621	2866	2494	2726	4427	4740	4427	4740	4427	4740	4252	4523

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. All columns are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, district fixed effects (care regressions), mother fixed effects (mortality regressions), year fixed effects, time trends, controls for mother's age at birth, birth order and month of birth.

Table 12. Health Care: Allowing Different Effects of Women's Leadership & Caste for Low and High Caste Children

	Infant Mortality		Neonatal Mortality		Under-5 mortality		complete AC		1st Trim		Visits sought		Visits received	
	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids
Fraction of constituencies in the district won by a SC/ST woman	-0.3158	-0.1888	-0.2994	-0.1738	-0.0084	-0.1145	-4.7651	0.8585	23.0886	2.6329	-8.2690	1.7497	7.2165	-0.7180
	(0.2709)	(0.1613)	(0.2499)	(0.1127)	(0.4522)	(0.1935)	(6.4794)	(1.8832)	(267.7704)	(2.8182)	(22.3668)	(5.1947)	(8.5022)	(0.9873)
Fraction of constituencies in the district won by a general woman	-0.3832**	-0.0223	-0.2047	-0.1004	-0.0496	0.1454	1.2777	-0.5356	-1.4025	0.6329	7.4037**	-2.8206	-0.6645	-0.4457
	(0.1851)	(0.1175)	(0.1464)	(0.1006)	(0.2754)	(0.1435)	(1.0326)	(0.6911)	(31.4305)	(0.6297)	(3.7312)	(3.2062)	(1.4527)	(0.5542)
district fixed effects	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes
year of birth fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
mother fixed effects	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no	no	no
Observations	20849	47799	21827	49652	16820	39506	3000	6107	1821	4196	2675	5484	3022	6162

	Full vacc		Some vacc		Nº vacc		deliv_home		deliv_gov		deliv_pvt		firstbfed2	
	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids	SCST kids	gen kids
Fraction of constituencies in the district won by a SC/ST woman	-0.8548	-1.3265	2.7080**	2.4963***	10.7350	11.9142	3.7547	1.1939	-1.8033	-1.2192	-1.9515	0.0253	9.7396	1.3437
	(1.1445)	(1.1873)	(1.0618)	(0.9165)	(10.0026)	(8.7955)	(8.3360)	(1.1432)	(5.1761)	(1.7090)	(4.2025)	(0.7064)	(10.5877)	(2.0876)
Fraction of constituencies in the district won by a general woman	1.5341	1.8421	0.8271	0.7260	9.1009	10.7831	-2.4824**	-0.6018	0.9943	1.1230**	1.4881**	-0.5212*	-1.1107	1.4815***
	(1.0144)	(1.3117)	(0.6814)	(0.5596)	(7.1702)	(7.1199)	(1.2025)	(0.4165)	(0.8652)	(0.4870)	(0.6306)	(0.2891)	(1.7072)	(0.4324)
district fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
year of birth fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
mother fixed effects	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Observations	3724	5487	3724	5487	3538	5220	3015	6152	3015	6152	3015	6152	2903	5872

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. All columns are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, district fixed effects (care regressions), mother fixed effects (mortality regressions), year fixed effects, time trends, controls for mother's age at birth, birth order and month of birth.

Table 13: Births

	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	All	SC/ST	General	All	SC/ST	General
	Births			**Probability girl born conditional on birth**		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of constituencies in the district won by a woman	0.0321	0.0494	0.0071	0.4371*	-0.1990	0.5931*
	(0.0603)	(0.1273)	(0.0678)	(0.2369)	(0.5108)	(0.3477)
Fraction of constitituencies in the district that had close elections between women and men	-0.0394	0.0264	-0.0573	-0.0333	0.3427	-0.1217
	(0.0423)	(0.0829)	(0.0408)	(0.1320)	(0.2957)	(0.1889)
Observations	214438	52341	162097	37594	10047	27547

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. All columns are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include the fraction of seats won by each political party, the fraction of SC/ST reserved seats, female literacy, urban population and SC/ST population in the district, dummies for gender, caste and religion, mother fixed effects, year fixed effects, time trends, controls for mother's age at birth, birth order and month of birth.