THE CENTRE FOR MARKET AND PUBLIC ORGANISATION

Health and the Political Agency of Women

Sonia Bhalotra and Irma Clots-Figueras

December 2011

Working Paper No. 11/280

Centre for Market and Public Organisation
Bristol Institute of Public Affairs
University of Bristol
2 Priory Road
Bristol BS8 1TX
http://www.bristol.ac.uk/cmpo/

Tel: (0117) 33 10952
Fax: (0117) 33 10705
E-mail: cmpo-admin@bristol.ac.uk

The Centre for Market and Public Organisation (CMPO) is a leading research centre, combining expertise in economics, geography and law. Our objective is to study the intersection between the public and private sectors of the economy, and in particular to understand the right way to organise and deliver public services. The Centre aims to develop research, contribute to the public debate and inform policy-making.

CMPO, now an ESRC Research Centre was established in 1998 with two large grants from The Leverhulme Trust. In 2004 we were awarded ESRC Research Centre status, and CMPO now combines core funding from both the ESRC and the Trust.

ISSN 1473-625X

CMPO Working Paper Series No. 11/280

Health and the Political Agency of Women

Sonia Bhalotra[1] and Irma Clots-Figueras[2]

[1]*CMPO, University of Bristol (UK)*

[2]*Universidad Carlos III de Madrid (Spain)*

December 2011

Abstract

We investigate whether politician gender influences policy outcomes in India. We focus upon antenatal and postnatal public health provision since the costs of poor services in this domain are disproportionately borne by women. Accounting for potential endogeneity of politician gender and the sample composition of births, we find that a one standard deviation increase in women's political representation results in a 1.5 percentage point reduction in neonatal mortality. Women politicians are more likely to build public health facilities and encourage antenatal care, institutional delivery and immunization. The results are topical given that a bill proposing quotas for women in state assemblies is currently pending in the Indian Parliament.

Keywords: political identity, gender, mortality, health, social preferences, India.

JEL Classification: H41, I18, O15

Electronic version: www.bristol.ac.uk/cmpo/publications/papers/2011/wp280.pdf

Acknowledgements

We have benefited from presenting this paper at the American Economic Association meetings, the Gender workshop, a CEPR/BREAD/AMID conference in London, the NEUDC, the Indian Statistical Institute Delhi, the Public Health Foundation Delhi and the Department of Economics and the Department of International Development at Oxford University.

Address for correspondence

CMPO, Bristol Institute of Public Affairs
University of Bristol
2 Priory Road
Bristol BS8 1TX
s.bhalotra@bristol.ac.uk
www.bristol.ac.uk/cmpo/

1. Introduction

This paper investigates whether women elected to state legislative assemblies are more effective than their male counterparts in providing public health services in India. It binds two streams of the literature, one concerned with political identity and the other with differences in preferences between the sexes. In the benchmark model of democracy, policy choices are independent of legislator identity (Downs 1957) but not in more recent citizen candidate models (Besley and Coate 1997, Levitt 1996, Osborne and Slivinski 1996). Overlaid on the hypothesis that the gender of politicians influences policy and thereby social outcomes is the hypothesis that women have different preferences and so make different choices from men. Establishing the empirical relevance of these differences is key to informing debates over quotas for women in government, debates which refer to representation as much as to principles of fairness and diversity (Squires 1996), but which suffer from a scarcity of causal evidence of the impact of representation on policy outcomes.

Preference differences between the sexes identified in numerous settings suggest that women are more likely than men to (i) invest in children and (ii) favour redistribution.[1] These findings suggest that women may be more likely to deliver public health improvements in developing countries where there are sharp positive age and income gradients in health and the essential policy challenge lies in addressing the early life health and survival of *children* in *poor* families.[2] Moreover, the benefits of interventions in this area flow differentially to women because they disproportionately bear the costs of weak reproductive and child health services. Women carry the burden of high fertility and child mortality: they care for the sick, witness their children die, have further births, and risk dying in child birth.[3] In line with our hypothesis, the enfranchisement of women in early 20th century America led to a sharp rise in state health expenditure and a steep drop in infant mortality (Miller 2008). And, strikingly, results of the

[1] On (i), see Thomas 1990, Thomas and Welch 1991, Hoddinott 1995, Lundberg, Pollak and Wales 1997, Case 1998, Svaleryd 2002, Besley and Case 2003). One possible explanation of this is paternity uncertainty (Alexander 1974). On (ii), see Besley and Case 2000, Andreoni and Vesterlund 2001, Edlund and Pande 2002, Edlund, Haider and Pande 2005, Warner and Steel 1999, Washington 2008, Oswald and Powdthavee 2010. This has been linked to women being, on average, less likely to pay taxes and more likely to receive benefits (e.g. Alessina and La Ferrara 2005).

[2] Early childhood death accounts for 30% of all deaths in poor countries compared with 1% in richer countries (Cutler et al. 2007). There are vast inequalities in health within poor countries and most childhood deaths occur in poor households.

[3] In the sample period, almost one in ten children died in India before the age of one. Structural estimates on data from the Indian state of Uttar Pradesh indicate that for every neonatal death (which we analyse here), women have an additional 0.37 births (Bhalotra and van Soest 2008). Maternal mortality as a fraction of births is estimated at 0.5% (UNICEF).

British Election Survey of 2001 show that the single most important concern for men is low taxes while, for women, it is the quality of the National Health Service (Campbell 2004).[4]

Most of the available evidence pertains to the agency of women as mothers and voters. But, even if women in society have different preferences from men it does not necessarily follow that female politicians will make different policy choices than male politicians. Under complete policy commitment, policy choices reflect voter preferences and not politician identity but recent models of democracy relax the assumption of complete policy commitment (Besley and Coate 1997, Osborne and Slivinski 1996). Hence evidence of the relevance of leader gender in politics is informative of which of alternative characterisations of the democratic process is more accurate. There is as yet only a small literature that delivers causal estimates of the political agency of women (Duflo and Chattopadhyay 2004, Rehavi 2007, Beaman et al. 2009, Svaleryd 2009, Iyer et. al. 2011, Deininger et al. 2011, Clots-Figueras 2011, Clots-Figueras *forthcoming*). We contribute to this literature in providing the first systematic analysis of the influence of women elected to state legislative assemblies on the provision and effectiveness of public health services for women and children.[5]

The failure of public health provision in developing countries is gaining increasing attention in the global arena (Black et al. 2003) and in India (DasGupta 2007). Poverty is not a compelling explanation for the scale of (maternal and) child death given that most deaths can be averted by low cost interventions (Cutler et al. 2006). The evidence points to political failure (Kiefer and Khemani 2003) but there is limited discussion of the potential significance of women's representation in improving the delivery of health services.

This is topical given that the Women's Reservation Bill proposing that a third of seats in state assemblies and parliament be reserved for women is currently under debate. The Bill was introduced in September 1996 and passed by the *Rajya Sabha* (Upper House) in March 2010 but is pending in the *Lok Sabha* (Lower House). Political reservations for women were successfully introduced in local government as part of a decentralisation package reflected in the 73rd Constitutional Amendment, effective 1993. This was a victory for India's women's movement, which emphasised the grassroots involvement of village women in village-level development programmes. The more limited support for the move to introduce reservations in state and national parliaments reflects, in part, a concern that women who claim those seats will tend to be

[4] At the turn of the century, fertility and infant mortality rates in America were similar to those in our estimation sample for India. In Britain in 2001, both were dramatically smaller. Even so, most women expect to engage with public health services at least once through pregnancy and this makes them heavier users, other conditions equal. The greater concern of women for public health in contemporary Britain may also reflect their representation of children and of the poor.

[5] We delineate further contributions of our work below and discuss earlier findings in section 2.

elite and therefore unlikely to represent the interests of the majority of women citizens ((Mishra 2000, Rai 2002). Here we effectively test the hypothesis that this implies their detachment from the interests of the common woman.

The available evidence of women's political agency in India (cited above) does not illuminate this question, as it largely pertains to women in village councils (*Gram Panchayats*). Also, most of this evidence concerns women's headship, while we investigate incremental changes in women's political representation. In particular we investigate whether the district-level share of state assembly constituencies in which a woman is elected influences individual health outcomes and village public goods in the district. This is an importantly different question. Women occupy a small share of seats in state assemblies and it is conceivable that incremental changes in their share will have limited policy influence even if their headship counts. Our focus on political representation in state assemblies is relevant since this is the level at which most decisions pertaining to public health provision were made until 1993 (Rao and Singh 1998). Even after 1993, when powers over the implementation of developmental projects were devolved to the district and village level, state legislators continued to have substantial say and to play a potentially important role in negotiation with and coordination across layers of local government. In the empirical analysis we allow for a break in the coefficient of interest in 1993, and a further contribution of our work is that it provides evidence of the policy relevance of women's political representation for a longer period of India's democratic history, prior to 1993.

Since the reservation of a third of the headships of village councils within each state was randomised (by dictate), studies of politician gender in Indian panchayats have exploited quasi experimental data to identify causal effects. However, as the authors recognise, reservation may have direct effects on policy outcomes by changing the nature of political competition (Franceschet *et al.* 2009). The current project investigates the policy influence of *competitively* elected women. This leads us to different identification issues.

The main identification challenge is that the gender of a competitively elected leader is potentially endogenous. For instance, more progressive electorates may be more likely to elect women and, independently, more likely to invest in child health. A further potential problem is that the composition of births is endogenous to the political regime. We address these problems using a fixed effects instrumental variables estimator that exploits constituency-level information on close elections between men and women on the one hand and information on siblings in a large sample survey on the other (section 4). The estimation sample contains more than 70000 individual births to some 18000 mothers that occur across 246 districts (in 16 states) over the 32 year period, 1967-1998 matched to electoral data.

We find that a one standard deviation increase in women's political representation in the birth year (and similarly in the two years preceding birth) results in a 1.5 percentage point (24%) reduction in neonatal mortality, which is a 0.06 standard deviation change. These changes in neonatal mortality drive similarly large impacts on infant mortality. To put this effect size in perspective, consider that the causal impact of democratization on infant mortality in sub-Saharan Africa in the post-Cold War period is estimated to be a 1.2% point drop in infant mortality, which is 12% of the sample mean (Kudamatsu *forthcoming*).

These estimates stand up to a battery of robustness checks and we report several extensions. We also identify mechanisms consistent with politician gender exerting an impact on both the health infrastructure and the information and encouragement that recent studies suggest is important in determining the demand for public health services. Using village level data and instrumenting as before using close elections, we find that women politicians are more likely to invest in the village level public health infrastructure while men are more likely to invest in the financial (and telecommunications) infrastructure. However public health facilities in India are often poorly staffed (Das and Hammer 2007, Banerjee, Deaton and Duflo 2003) and uptake of publicly provided services such as immunization low (Banerjee et al. 2011). So we also investigated a range of indicators of the utilization of publicly provided health inputs, all of which have established impacts on childhood mortality risk. Using a smaller sample of more recent births and a similar identification strategy to that in the main analysis, we find that raising female political representation results in substantially improved probabilities of attending antenatal care, taking iron supplements during pregnancy, giving birth in a government facility as opposed to at home (note: we establish no change in the probability of giving birth in a private facility), early initiation of breastfeeding, and full immunization by the age of one. We argue that impacts on early breastfeeding and antenatal care, for instance, are consistent with politician-led information campaigns.

Overall, we establish the effectiveness of women politicians in delivering public health. Our results reject the Downsian model in favour of more recent citizen-candidate models of political identity. They resonate with a diverse literature, different segments of which suggest that women exhibit a stronger propensity to invest in children and have more progressive social preferences.

2. Background: Women and Politics in India

India is the largest and oldest democracy in the developing world. It is a federal country in which the constitution devolves significant control over their own government to the 28 states and 7 union territories and population health in particular falls under the purview of State

Legislative Assemblies. 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, state assemblies vary in size with the state population. Districts are an important level of local government between state and village governments.

Women are severely under-represented in politics the world over and India is no different (section 3a).[6] Using data from two states and comparing villages with and without reserved headship for women, Duflo and Chattopadhyay (2004) and Beaman et al. (2007) find that the composition of public infrastructure at the village level is a function of the gender of the leader, with women being more likely to invest in drinking water and roads. Other studies identify impacts of women's village council headship on political participation (Beaman et al. 2007, 2009, Deininger et al. 2011) and the willingness of women to report crimes against them (Iyer et al. 2011). The only previous analysis of women in state assemblies in India is in Clots-Figueras (2011), Clots-Figueras (*forthcoming*) who establishes impacts on state budgets and urban primary education respectively using close election data. We motivate a substantive focus on health and complement close election data with sibling data to account for mother-level unobserved heterogeneity in preferences, which can affect the timing of births. In the wider international domain the only related study that we are aware of is Rehavi (2007) who also uses close election data and finds that state health expenditure in the United States is increasing in the share of women in state legislatures. Since state health expenditure has a bad press in developing countries (Filmer and Pritchett 1999, Filmer, Hammer and Pritchett 2000), we investigate indicators of public health provision that more directly measure the effectiveness of state intervention, and at a more local level.

3. Data and Descriptive Statistics

***Political Variables*:** A detailed dataset on every constituency election to State Legislatures in India during 1967-2001 was gathered from publications of the Election Commission of India. From this we draw the gender of the winning candidate and the runner up and the number of votes obtained by each. The data contain information on 29686 politicians who contested in the 16 larger states.[7] This is aggregated to the district level to produce the

[6] There are improvements on this front and India's rank in a recent index of women's political empowerment was not much below that of the UK. India held the rank of 113 in 134 countries in the Global Gender Gap Index for 2008, averaging over gaps in education, health, economic participation and political empowerment. Isolating political empowerment, India ranked 28th. In contrast, the UK ranked 13th on average but 21st on political empowerment.

[7] 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,

district-level share of state assembly constituencies to which a woman was elected for each election year. This share persists till the following election. Elections are routinely every five years but states often hold mid-term elections at shorter intervals. Each district has between 1 and 37 electoral constituencies and the median is 9.

The mean of the proportion of seats in a district won by women is 3.6% (s.d. 7.4%). The median is zero and the 75th and 90th percentiles are, respectively, 5.5 and 14.3%. So the distribution is highly skewed (Figure A1 in the Appendix). At least one woman was elected in 26.4% of district-electoral years and in this sub-sample, the share of seats held by women is 13.8%. There is an upward trend in the share of seats held by women (Figure 1) and substantial differences in both the level and trend by state (Figure 2).

We define close elections as elections in which the winner and the runner-up are of opposite gender and the vote margin between them is less than 3.5%. Across the sample period, only 7.45% of district-years had at least one close election. They have become more common over time: Fewer than 1 in 400 seats had close elections between women and men in the 1960s and 1970s, but that figure jumped to more than 1 in 100 for the 1980s and 1990s.

***Health Outcomes and Facilities*:** Individual data on child survival are obtained from retrospective fertility histories reported in the second round of the Indian National Family Health Survey (NFHS) by a representative sample of ever-married women aged 15-49 in 1998-99.[8] This makes it straightforward to identify siblings. The histories provide information on the year of birth and death for births that occur across three decades, so these data can be matched to the time variation in the political data. The data indicate the district of current residence and the years that the mother has lived in her current location. We drop mothers who had births in a location other than the current residence, but we investigate this restriction. To allow for full exposure to neonatal [infant] morality risk we exclude children born less than a month [a year] before the date of the survey. The NFHS also provides information on health-seeking behaviours in the four years preceding the survey date and on village facilities at the time of the survey. These are defined in the data appendix and discussed further in the results section. The NFHS data are merged with the political data by district and (lagged) birth year to produce a micro panel of births within mother nested within a district level panel. There is an average of 3.8 births per mother, conditional on at least 2. Descriptive statistics are in Table 1. A non-parametric (lowess) plot of the relationship between neonatal mortality risk and the share of women leaders at the district level shows that for most of the range of the data, the

Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

[8] For further information, including sampling design, see IIPS and ORC Macro (2000).

unconditional relationship is negative (Figure A2). We now investigate whether a negative relationship persists after allowing for endogeneity and heterogeneity.

4. Empirical Specification

4.1 Identification

We are interested in the relationship between indicators of individual-level access to public health services and women's political representation at the district level. If common unobservables drive both electoral preferences for women and health-related behaviours then our estimates will be biased. To address this, we instrument the overall share of women politicians with the share of women who win in close elections against men, that is, elections in which the winner and the runner up are of opposite gender and the margin of victory is small. The premise is that the identity (gender) of the leader is quasi-random in close elections between the sexes. To see this, note that in a first-past-the-post electoral system, the probability of being elected is a function of the vote difference between the winner and the runner-up and this function has a discontinuity at zero. As the vote difference approaches the discontinuity, constituencies in which a woman wins by a small vote margin are increasingly similar to constituencies in which a man wins by a small margin (Lee 2001, Pettersson-Lidbom 2001). Since we use not a binary outcome (man/woman) at the constituency level but the share of women at the district level, our specification is similar to a fuzzy regression discontinuity (e.g. Angrist and Pischke 2008: chapter 6), but one in which we aggregate to the district level over discontinuities at the constituency level. We control for a polynomial in the constituency-specific margins of victory or defeat of each man-woman close election in the district.

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, 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.

Since we focus upon newborns, a further potential source of bias arises from endogenous heterogeneity in the timing of fertility. For instance, households may consciously advance or defer fertility in response to the policy [political] regime. Alternatively, selective foetal death [miscarriage or female foeticide] may vary with reproductive health facilities and campaigns discouraging foeticide.[9] These responses may vary across mothers. So, whether by selection into conception or into foetal survival, the composition of live births in the sample may vary

[9] Similar arguments concerning the conscious timing of fertility and selective survival of the foetus to birth in the context of booms and recessions are made in Dehejia and Lleras-Muney (2004) and Bhalotra (2010) respectively.

systematically with the gender composition of politicians. This will tend to bias the parameter of interest and the direction of this bias is, *a priori*, unclear. We limit this problem by using mother fixed effects. These will of course purge all fixed mother-level unobservables including the time-invariant component of their political preferences and any tendency they may have to compensate or reinforce state investments in children (crowding-out or crowding-in). This is a considerable improvement relative to using district fixed effects.

The first set of estimated models is

$$(1)\ mortality_{imdt} = a_m + \theta_t + \beta\, women_{dt-1} + \sum_{j=1}^{N} \partial_{1j} I_{jdt} * F(m_{jdt}) + \sum_{j=1}^{N} \partial_{2j} I_{jdt} + \lambda totalclose_{dt-1} + X_{imdt}\zeta + Z_{dt}\mu + \varphi_s t + \varepsilon_{imdt}$$

$$(2)\ women_{dt} = \chi_m + \omega_t + \tau\, womenclose_{dt} + \sum_{j=1}^{N} \partial_{3j} I_{jdt} * F(m_{jdt}) + \sum_{j=1}^{N} \partial_{4j} I_{jdt} + \psi totalclose_{dt} + X_{imdt}\rho + Z_{dt}\pi + \upsilon_s t + e_{imdt}$$

The subscripts denote the individual child *i* of mother *m* born in district *d* (in state *s*) in year *t*. *Mortality* is an indicator for the index child dying by the age of one month (neonatal), *women* is the district-level share of state assembly constituencies to which a woman was elected in the year before the child was born and β is the parameter of interest. The other variables in equation (1), in order, are mother and cohort fixed effects, a third-order polynomial (*F*) in the victory margin (*m*) between the winner and the runner up for the man-woman election *j*, interacted with I_{jdt}, an indicator for whether such an election exists, *totalclose* is the fraction of constituencies in the district that experienced a close election, X is a vector of child or mother-specific controls, Z is a vector of district-year varying controls and φ are state-specific trends. Equation (2) represents the first stage of the IV procedure. It shows the potentially endogenous regressor, *women,* regressed upon the instrument, *womenclose,* and the same set of controls. The instrument is the fraction of constituencies in the district in which a woman won against a man in a close election.

The cohort 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, GDP or trends in the status of women. The district level controls Z include the shares of the population that are female, urban and low caste and male and female literacy rates. Controls X include dummies for the gender, birth order, rural/urban location, religion, and caste of the child and an indicator for whether the child is one

of a multiple birth. We use a linear model since fixed effects probit estimates are inconsistent in short panels (Nickell 1982) 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.

In sum, the estimated specification delivers an estimate of the change in mortality risk across children of the same mother born at different times and so potentially under different political regimes, with the change in political regime constructed as a quasi-random assignment of the gender of politicians in the district of birth. We investigate the identifying assumptions that underlie the use of close elections. In view of our use of mother fixed effects, we check on the further identifying assumption that there are no omitted mother-specific trends the effects of which may load onto the variable of interest. We conduct a range of sensitivity checks including a placebo test and we explore the timing of effects and investigate heterogeneity in impact by individual characteristics and over time.

We then estimate equations that replace *mortality* in equation (1) with a vector of village public goods on the one hand and a vector of antenatal and early postnatal health inputs on the other. The identification strategies we use to analyse these further outcomes are similar and are detailed below, alongside the results.

5. Results

5.1. Survival Outcomes

Estimates of equations (1) and (2) are in Table 2; refer the richest specification in column (5). Raising the share of seats held by women at the district level (*women*) by one standard deviation (0.0740) is estimated to result in declines in neonatal [infant] mortality of 1.5 [1.4]%. This is 24[14]% of the mean rate in the sample, which is 6.3[9.8]% and it corresponds to a 0.063[0.048] change in the s.d. of neonatal [infant] mortality. Since the distribution of *women* is skewed (Figure A1), we consider the survival improvements brought about by electing one additional woman. The median district has nine constituencies and so nine seats. As it happens, close to 10% of districts in the sample have exactly nine seats and in this set the mean (0.034) and median (0) share of seats held by women is very similar to the sample mean (0.036) and median (0). If one additional woman wins, the median number of seats goes from 0 to 1 and the share from 0 to 1/9=0.11. If we plug this in to the estimated equations, we get even larger numbers. The predicted decline in neonatal [infant] mortality is now 2.3 [2.1]%. We investigate

this later (section 5.3) and find that the effects of politician gender on infant mortality are entirely determined by its effects on neonatal mortality.

Table 2 shows how the estimates for neonatal mortality evolve as the specification is enriched to improve identification. The OLS coefficient is small and insignificant and there is no significant change in it when the sample is restricted to mothers with at least two births. The 2SLS coefficient without mother fixed effects is larger by a factor of eight and borders on significance. It rises by about one standard deviation and becomes statistically significant once we introduce mother fixed effects. Introducing the household and district level controls listed earlier makes no significant difference although the coefficient is slightly larger.[10]

The OLS coefficient is expected to be biased by the endogeneity of voter preferences (or self-selection of women into political candidacy). Our finding that it is biased downwards is consistent with women being more likely to be elected (or to come forward) in districts with poorer baseline health. Another possibility is that women who run in close races against men are positively selected on characteristics. The relationship between the local average identified off close races and the average effect depends on the underlying theoretical model, and our findings are consistent with a citizen candidate model. The cost of a close race is higher than of non-close races so a candidate needs a higher payoff to play, suggesting that only candidates with far apart preferences will play (e.g. Rehavi 2007). In general IV coefficients will be larger when the variable of interest is measured with error but we expect that measurement error in counting women winners in Indian elections is small. Indeed if measurement error were important then, as this is exacerbated by differencing, we would expect attenuation of the coefficient upon introduction of mother fixed effects. Instead the coefficient is larger still. This may indicate that parents reinforce endowments in allocations across siblings, consistent with other evidence that points in this same direction (Datar et al. 2007, Aizer and Cunha 2010).

The first stage of the 2SLS estimates is reported in the lower panel of Table 2. The instrument is powerful and the share of women who win across all elections moves proportionately to the share of women who win in close elections. With the share of women winners in close elections constant, the share of all women winners is negatively associated with the total share of close elections within a district since this now varies only with the share of male winners. We also report the reduced form of the equation system (1), (2) (see Table 3, panel B column 6).

[10] Table 2 reports only the coefficient on the regressor of interest. Appendix Table A7 reports the full set of coefficients. Given that the effect we find for infant mortality is mainly capturing the effect on neonatal mortality, from now own we will only report results for neonatal mortality. Robustness checks using infant mortality as a dependent variable are in appendix Tables A9 and A10.

5.2. Robustness Checks

We subjected the baseline specification to a number of checks (Table 3).

Specification of electoral variables: Since regression discontinuity underlies the close election IV approach, we investigate parameterisation of the vote margin between the winner and runner up. The baseline specification uses a third order polynomial but the coefficient of interest is not sensitive to replacing this with a first or second order polynomial (columns 1-2). The premise that the gender of the leader is random in a close election only holds in a small window around the point where the vote margin between the winner and the runner up is zero, but there is an efficiency-robustness trade off in deciding the width of the window. We therefore investigate the chosen threshold for identification of close elections, varying this downwards and upwards from the selected 3.5% to include the range 2 to 4%. The coefficient on women is almost identical when we use a 2% margin, and it is insignificantly different for the other choices (columns 3-6). We restricted the sample to district-year observations (41% of the baseline sample) in which there was at least one election between a man and a woman as these are the observations upon which identification rests, and we find this makes no significant difference (col. 7). To control for the possibility that certain political parties strategically appoint women candidates more than others (Rai 2002), we condition upon the district share of seats occupied by each of seven parties.[11] We also control for the district share of state assembly seats reserved for low caste candidates to allow for the possibility that women and men compete differently for these seats. These changes do not alter the coefficient of interest (column 8). Using the outer fence of the interquartile range, we removed outliers in women's representation above the 75th percentile. This amounts to removing the 1.45% of observations with *women* greater than 28%, and it corresponds to the visually evident outliers in Figure A2. The estimates are little changed (column 9).

Within-mother trends: In a model with mother fixed effects, identification of calendar time effects can only come from mothers having children at different moments in time but there is necessarily a trend in birth order and the mother's age at birth between siblings. This makes it important to isolate the effects of time-variation in women's political representation from the effects of birth-order and the age of the mother at each birth. We already control flexibly for birth order, using dummies for each order. We now introduce age at birth dummies and more flexible controls for mother's age at birth, namely, dummies for mother's cohort*child cohort (columns 1-2 of panel B, Table 3). This sort of nonparametric control allows for the functional

[11] Following Besley and Burgess (2002), seven party groups are constructed: Congress, Hard Left, Soft Left, Janata, Hindu, Regional parties, and Independents coupled with other small parties (data appendix).

relationship between survival and mother's age to have changed over time with improvements in the survival technology.[12]

Unobserved trends: We further investigated strengthening controls for unobservable trends in general. We extend the baseline specification to include state-specific quadratic trends, state*year dummies and district*mother's cohort dummies (columns 3-5, panel B). The last is important because a potential problem with using only district fixed effects is that different cohorts of mothers in different districts, having been exposed to different income and health conditions, are more or less likely to have children with lower survival chances.[13] To further mitigate concerns that we are capturing omitted trends, we implemented a placebo, modelling the neonatal mortality risk of cohorts born in *t* as a function of *future* politician gender (*t+1* to *t+9*). These coefficients are all essentially zero (Table 4)[14].

The estimates in Table 2 are on the sample of mothers that have had all their births in their current place of residence. This is a rather strong restriction. We relax it to include only children who were born in the current place of residence of the mother. In order to investigate the extent of any selectivity in migration, we also estimate the model with no restrictions. The coefficient of interest grows smaller as we successively lift restrictions on the sample but it remains significant and within two standard errors of the baseline coefficient (Table A8 in the Appendix). This puts aside any concern that our selection of a non-migrant mother sample is either creating a bias or producing results that may be altogether unrepresentative.

Close election data: Following the initial use of the close election identification strategy in the context of close elections between Democrats and Republicans in the US (Lee 2001), concerns have been raised that the outcomes of close elections may be biased in favour of incumbents or in favour of candidates from parties that have strategic control over the election process (Snyder 2005, Caughey and Sekhon 2010, Grimmer et al. 2011). We investigate incumbency and party affiliation in addition to other observables but find no evidence of this in the case of close elections between men and women in India. A simple regression shows that the

[12] Controls for mother's age at birth are also important in correcting for the fact that retrospective fertility (and mortality) data grow increasingly unrepresentative of mother's age as we go further back in time (Rindfuss et al. 1982).

[13] See Bhalotra and Rawlings (2010) on the importance of mother's birth year conditions for offspring health and see Kudamatsu (forthcoming) for a similar discussion in the context of mother fixed effects estimation of the impact of democratization on mortality.

[14] We investigated a further placebo, estimating our model on the sample of mothers that moved to the current location a year or more after the birth of their youngest child. Their births are effectively matched to politicians that they were never exposed to. Again, the coefficient on *women* is small and insignificant (Table A8 column 1). However, the problem with this test is that we do not know whether the previous location was in the same district or in a different one, which adds noise to the estimates.

proportion of women in a district who won in a close election against a man is independent of the history of close elections in the district, the history of women being elected, the share of seats that each of eight parties contested in close elections and a host of district-time varying demographic variables (Table A1). Candidate and constituency characteristics are also independent of the gender of the winner in close elections. This includes the number of other female candidates in the constituency, whether the winner was the incumbent, the number of close elections in the past, the votes received by the winner and the total votes in the constituency (Table A2). These results lend support to the identifying assumption that the gender of the winner in close elections between men and women is random.

Although district-specific unobservables are absorbed by mother fixed effects, we also show that districts that had a close election are matched on observables to districts that did not. The observables include district demographics, the share of villages with hospitals and schools and the share of seats won by each gender in elections that were not close (Table A3). Similarly, while we control in the regressions for the district-level vote-shares of each of eight parties, it is useful to observe that there are no systematic correlations between political party and the incidence of close elections (Table A4).

5.3. Extensions

Timing: The reported specification investigates the influence of the gender composition of politicians in the year before birth (let's call this *t-1*) since neonatal mortality is primarily determined by antenatal services and the health of the mother during pregnancy. We extend the model to allow for persistence in the impact of politician gender. Some persistence is built in by virtue of state elections typically taking place every five years.[15] We re-estimate the baseline model, allowing neonatal mortality to depend upon politicians in power as long as five years before birth (*t-5*). We find that politician gender in the two years before birth and in the birth year (*t-2, t-1, t*) has a similar sized significant impact but that the share of women in power more than two years before the index birth has no impact. (Table 4). This particular pattern of fading is consistent with, for instance, politicians targeting married women with information about antenatal behaviours. This is because the median duration between marriage and first birth in India is one to two years.

Timing, mechanisms and birth order: The evidence (below) suggests that women politicians enhance health facilities and disseminate information on healthy behaviours. Since both facilities and information are likely to persist within mother for the relatively short space of time between

[15] The gender mix of politicians elected in a given election year will, on average, persist through the next five years. So politicians in power at *t-5* will tend to exit before or in the birth year *t,* politicians in power in *t-4* will tend to exit before or in *t+1*, and so on.

births (mean of about two years), we may expect exposure to women politicians to have its largest impact on the health of first births. This is indeed what we find (see the first two columns of Table 5). In their analysis of women's social networks, Aizer and Currie (2004) adduce a similar distinction between first and higher order births, focusing on information diffusion.

Heterogeneity by other child characteristics: We allow the effects of politician gender to differ by the caste, gender and rural/urban location of the child for the following reasons. Differentiation by caste of the child is a crude test of the progressiveness of women politicians since low caste children are relatively poor. Earlier studies suggest that as women's power in decision making within the household increases marginal gains for girls exceed those for boys (e.g. Duflo 2003, Thomas 1990). So, if politician identity influences policy outcomes then it is plausible that women politicians make a larger difference for girls, for example, by campaigning against son preference or by encouraging immunization of girls. The scope for politicians to impact health is greater in rural areas since public services are weaker and health outcomes poorer. We find larger point estimates for boys, for low caste (SC and ST) children and for children born in urban areas, but in no case is the group difference statistically significant.

Pre/post devolution: We also investigated heterogeneity in the treatment effect in the time dimension. The 1993 Constitutional Amendment described in sections 1 and 2 devolved control over the implementation of development programmes to the *panchayat* level and this included aspects of health provision such as drinking water and immunization delivered through the Integrated Child Development Services programme. We therefore allow for a weakening of the influence of politicians in state assemblies post-devolution. The estimated coefficient is not significantly different pre/post-1993. This suggests that women's political representation mattered for the entire three decades in our sample and that the power of politicians elected to state assemblies to influence health services was not substantially eroded upon the empowerment of village councils.

We estimated the model for post-neonatal mortality and found no effects of politician gender (Table A6).[16] However these estimates are biased by endogenous selection into post-neonatal exposure to mortality risk because children only enter this sample if they have survived the neonatal period, and we have seen that neonatal survival is dependent upon politician gender. Our observation of larger impacts of women's representation on neonatal than on post-neonatal mortality is also consistent with the tighter identification of neonatal mortality with *state*-level investments in women (maternal health and place of delivery). As children age into the post-

[16] Mortality in the first month of life is neonatal and between the second and twelfth month is post-neonatal. Infant mortality is the sum of these. Mortality risk declines sharply with age, and neonatal mortality contributes two-thirds of infant deaths.

neonatal period, they are exposed to a more diverse set of *household*-level influences including for example income, nutrition and aspects of parenting behaviour like hygiene. It is therefore harder to attribute improvements in post-neonatal health to public provision and this weakens politician incentives.

The probability that a child is born, and the sex of the child conditional upon birth may depend upon women's political representation. As we have the entire fertility history of each mother, we expanded the data so that for every woman there is an observation for every year in which she is exposed to the risk of birth (starting with her age at marriage and stopping at age 49 or the date of interview). There is no significant fertility response. However, the probability that a birth is female is increasing in the share of women politicians (Appendix Table A11)[17].

6. Health Inputs

6.1 Village Public Goods

We now investigate how women's political representation influences tangible (and durable) supply-side investments. For this we use the under-exploited village facilities survey of the NFHS to look at rural infrastructure choices, similarly to Duflo and Chattopadhyay (2004). The estimation sample contains 1591 villages (in the 246 districts), 76% of which are surveyed in 1998 and the rest in 1997. So we do not have much time variation in these data but there is district variation. *Facility* is an indicator for a specified facility in village *v* in district *d* in year *t*. Using year and district fixed effects and instrumenting for the district share of women as before, we estimate this linear equation system using 2SLS-

$$(3)\ facility_{vdt} = a_d + \theta_t + \beta\, women_{dt-1} + \sum_{j=1}^{N} \partial_{1j} I_{jdt} * F(m_{jdt}) + \sum_{j=1}^{N} \partial_{2j} I_{jdt} + \lambda totalclose_{dt-1} + Z_{dt}\mu + \varepsilon_{imdt}$$

$$(4)\ women_{dt} = \chi_d + \omega_t + \tau\, womenclose_{dt} + \sum_{j=1}^{N} \partial_{1j} I_{jdt} * F(m_{jdt}) + \sum_{j=1}^{N} \partial_{2j} I_{jdt} + \psi totalclose_{dt} + Z_{dt}\pi + e_{imdt}$$

We find that village public facilities are a significant function of the share of women politicians in the district in which the village lies (Table 6). The estimates are sharp and consistent across categories. A 10% increase in *women* raises the probability that the village has a primary health

[17] A ready explanation of this would be that women politicians have been more committed to controlling female feticide. To test this hypothesis, we divided the sample at 1985, because ultrasound scanners started to be imported in 1987 and thereafter widely used for prenatal sex detection and it is only after the mid-80s that there is a significant trend departure of the sex ratio at birth from the biologically normal level (Bhalotra and Cochrane 2010). Our expectation was that we would see a positive impact of female political representation on the female-male ratio at birth after and only after 1985. However the post-85 coefficients are imprecise and we cannot reject the hypothesis that they are equal before and after 1985. We are therefore unable to nail down an explanation of this finding.

centre, a community health centre, a government dispensary and a government hospital by 0.22, 0.19, 0.18 and 0.057 respectively. With a view to identifying the sorts of village infrastructure that male politicians are more likely to provide, we ran the regressions reported in the lower panel of Table 6. A 10% increase in the share of women politicians (which decreases the share of male politicians) significantly lowers the probability that the village has a bank. We also observe sizeable negative coefficients on indicators for post offices and telephone facilities, although these are poorly determined. In sum, the evidence suggests that women politicians are significantly more likely to invest in the public health infrastructure while men are more likely to invest in the financial and telecommunications infrastructure. This ties in with our initial hypothesis.

6.2. Individual Indicators of Antenatal and Postnatal Care

With a view to identifying policy-amenable inputs to neonatal mortality, we investigated a range of prenatal and early postnatal health-seeking behaviours.[18] These data are only available for births that occur in the four years preceding the survey date (1994/5-1998/9). There are siblings in this sample (for 15.3% of mothers) but they are characterised by short intervening birth intervals and given the evidence that a short preceding birth interval compromises the health of a child (e.g. Bhalotra and van Soest 2008), this is a selected sample. So, while we use the close elections instrument as before, instead of mother fixed effects, we use fixed effects for finely defined mother-groups, an approach similar to that taken in Kudamatsu (*forthcoming*). We construct around 1000 fixed effects for groups defined on a multidimensional space of mother traits, namely height (above/below mean), education (above/below primary), caste (SC, ST, OBC or high caste), urban/rural location and the birth year of the mother. The estimated equation system looks similar to (1) and (2), the only differences being in the dependent variable and in mother group fixed effects replacing straightforward mother fixed effects.

The results are in Table 7 and the mean and s.d. of each dependent variable is in Table 1. As in Table 2, OLS estimates (not shown) are smaller than the IV estimates and tend to be insignificant. The table displays 2SLS estimates with and without the quasi- mother fixed effects. Here we discuss the richer specification and present effects flowing from a 10 percentage point increase in women's representation (which, we explained above, is the approximate change in share associated with moving the number of women politicians elected in the median district from 0 to 1).

[18] Since the samples we use for estimation of equations for survival and for health inputs are constrained to be different, we cannot conduct an accounting exercise measuring the contributions of the inputs to neonatal mortality but the association of the inputs we consider with neonatal mortality is widely documented.

Antenatal care, iron and tetanus: The Indian government defines a complete course of antenatal care as including at least 3 antenatal visits, a 3-month supply of iron tablets and two tetanus injections. Only 37% of women in our sample achieve a complete course. We find that women's political representation increases the number of antenatal visits a woman makes by 0.28, which is 12% of the mean. It raises the probability that iron supplements are taken by about 10% points, relative to a mean of 57%. This is important given the high prevalence of anemia amongst Indian mothers (NFHS data) and the fact that it is a risk factor for low birth weight offspring and child survival (Bhalotra and Rawlings (2011). The probability that a woman has at least one tetanus injection during pregnancy (which is important in lowering the risk of neonatal tetanus) is increasing in *women* but not significantly.

Breastfeeding: Women's political representation raises the probability of early breastfeeding by 13.4% points, which is a 28% increase. Although the vast majority of Indian women breastfeed and 77% of children are being breastfed at 20-23 months (UNICEF indicators), there are cultural inhibitions to breastfeeding immediately after birth and only 48% of Indian women in our sample initiate breastfeeding in the first 24 hours. This is when the benefits of breastfeeding are greatest, lowering the risk of contracting infectious diseases such as diarrhoea and pneumonia and, thereby, lowering neonatal mortality risk (Jones et al. 2003).

Place of birth: Some 69% of births to Indian women in our sample occur at home, while the remaining 31% are distributed equally between public and private facilities.[19] Since home births are typically unattended by professionals, they generate neonatal survival risks that can be averted in the presence of birth attendants trained in the management of sepsis (septicaemia, meningitis, pneumonia); see Bang et al. (1999).

We find that a 10% increase in women's political representation lowers home deliveries by 8.8% points. Moreover, there is evidence that this represents a shift of births into government hospitals: the same increase in *women* raises the probability of giving birth in a government facility by 11% points while there is no significant change in the probability of giving birth in a private facility. Contrast this with the impact of a 10% increase in state income: this similarly lowers home deliveries (by a more modest 1.1% points) but this arises entirely from a shift towards private sector deliveries; there is no change in the share of births in government hospitals (Bhalotra 2010). This suggests that putting women at the helm leads to improved access to government hospitals, consistent with the results in section 6.1.

[19] The share of home births is higher in rural areas, at 78%, compared with 33% in urban areas. The share of the residual births in public and private facilities is similar in rural and urban areas.

Immunization: A 10 percentage point increase in *women* increases the number of vaccinations a child has by 1.8, against a mean of 5.3 and a maximum of 8. In the estimation sample, only 41% are fully immunized and 12.5% have had no immunizations[20]

Since breastfeeding does not require public infrastructure, the impact of women's representation on breastfeeding suggests a role for information campaigns. This is probably also an important component of the other improvements we observe. The survey data we use (the NFHS) asked women what inhibited them in making antenatal care visits and an astounding 60% said that they did not think it was necessary. This suggests that information campaigns have the potential to generate large improvements in antenatal care.[21] A recent study of immunization in India concludes that uptake of publicly provided services is low because people do not seem to fully recognise their benefits (Banerjee et al. 2011). An advantage of studying outcomes (does a child survive, does a mother receive iron supplements, etc.) is that it captures the effects not only of infrastructure or expenditure choices but also of policy influences that are less often documented, including information campaigns. Information is particularly important in the health domain. For example, Miller (2008) finds that door to door campaigns advocating home hygiene played a critical role in the steep decline in infant mortality in American history.[22]

7. Conclusions

We investigated whether women politicians invest more in antenatal care and early child health because women incur the costs of reproduction and replacement fertility and they make greater investments in the early life health of their offspring. We identify significant causal impacts of women's political representation on neonatal survival, indicators of prenatal and early postnatal care, and the village level public health infrastructure. We control for voter (and mother) characteristics but are unable to control for politician characteristics. Therefore some part of the relationships that we identify may flow from women who win in close [political] races against men being positively selected.

As discussed, women's representation is a live issue in the Indian Parliament. On the wider international scale, quotas for women in government have been established in more than 100 countries in the last 15 years (Dahlerup and Francisco 2005). Even if competitively elected women are positively selected, our findings are relevant to debates concerning political

20 Since immunizations are spread across the first year of life, the sample upon which the immunization equations are estimated is the sample of (surviving) births aged 12-24 months.

21 Access to publicly provided care is clearly relevant too since the next highest frequency, 16%, was recorded for it costing too much. Only 3.5% said it was too inconvenient or too far and 1.6% said it was because a health worker did not visit.

22 There may be complementarities in the outcomes we look at and between provision of facilities and information, for example, mothers who give birth in a facility rather than at home are more likely to receive information and encouragement to initiate breastfeeding soon after birth.

reservations for women for two reasons. First, increasing the political representation of women may increase female voter turnout (a question we are currently exploring,) and so shift the preferences of the median voter in the direction of women's preferences. Second, there are likely dynamic effects or effects of having women in power that persist after they have gone, in particular, exposure to women may reduce voter bias against them (Beaman et al. 2009, Bhavnani 2009, Deininger et al. 2011).

References

Aizer, A., and J. Currie (2004). "Networks or neighborhoods? Correlations in the use of publicly funded maternity care in California." *Journal of Public Economics*, 88, 2573-2585.

Aizer, A., and F. Cunha (2010), "Child endowments, parental investments and the development of human capital." Mimeograph, Brown University.

Alesina, A., and E. Ferrara (2005). "Preference for redistribution in the land of opportunities." *Journal of Public Economics* 89, 897-931.

Alexander, R.D (1974). "The evolution of social behavior." *Annual Review of Ecology and Systematics*, 5, 325-383.

Andreoni, James, and Lise Vesterlund (2001). "Which is the Fair Sex? Gender Differences in Altruism." *The Quarterly Journal of Economics*, 2001, 116, 293-312.

Angrist, Joshua D., and Jörn-Steffen Pischke (2008). *Mostly Harmless Econometrics: An Empiricist's Companion* Princeton University Press.

Banerjee, A. L., Angus Deaton, and Esther Duflo (2003), "Health Care Delivery in rural Rajasthan." Mimeograph, MIT.

Banerjee, A. L., Duflo, E., Glennerster, R., and Kothari, D. (2010). "Improving Immunization Coverage in Rural India: A Clustered Randomized Controlled Evaluation of Immunization Campaigns with and without Incentives." *British Medical Journal*, 340, c2220.

Bang, Abhay, T., Rani A. Bang, Sanjay B. Baitule, M. Hanimi Reddy, Mahesh D. Deshmukh (1999), "Effect of home-based neonatal care and management of sepsis on neonatal mortality: field trial in rural India." *The Lancet*, 354, 1955-1961.

Black, R.E., Morris S.S., Bryce J. (2003). "Where and why are 10 million children dying every year?" *Lancet* 361:2226-2234.

Beaman, L., E. Duflo, R. Pande, and P. Topalova (2007). "Powerful Women Politicians, Gender Bias, and Policy-making in Rural India." Background Paper, The State of The World's Children, UNICEF.

Beaman, L., R. Chattopadhyay, E. Duflo, R. Pande, and P. Topalova (2009). "Powerful Women: Does Exposure Reduce Bias?" *Quarterly Journal of Economics,* 124, 1497-540.

Bertrand, M., E. Duflo, and S. Mullainathan (2004). "How much can we trust difference-in-difference estimators?" *Quarterly Journal of Economics*, 249-275.

Besley, T., and A. Case (2000). "A. Unnatural Experiments? Estimating the Incidence of Endogenous Policies. *The Economic Journal*, 110, 672-694.

Besley, T., and A. Case (2003). "Political Institutions and Policy Choices: Evidence from the United States." *Journal of Economic Literature*, 41, 7-73.

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

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

Bhalotra, S., and Arthur van Soest (2008). "Birth-Spacing, Fertility and Neonatal Mortality In India: Dynamics, Frailty and Fecundity." *Journal of Econometrics*, 143, 274-290.

Bhalotra, S. (2010). "Fatal Fluctuations: Cyclicality in Infant Mortality in India." *Journal of Development Economics*. 93, 7-19

Bhalotra, Sonia, and Tom Cochrane (2010). "Where Have All the Young Girls Gone? Identification of Sex Selection in India." IZA Discussion Paper #5381.

Bhalotra, S, and S. Rawlings (2010). "Intergenerational persistence in health in developing countries: The

penalty of gender inequality?" *Journal of Public Economics*, 95, 286-299.
Bhavnani, R. R. (2009). "Do Electoral Quotas Work after They Are Withdrawn? Evidence from a Natural Experiment in India." *American Political Science Review,* 103, 23-35.
Campbell, R. (2004). "Gender, Ideology and Issue Preference: Is There Such a Thing as a Political Women's Interest in Britain?" *British Journal of Politics and International Relations*, 6, 20–46.
Chattopadhay,R., and E. Duflo (2004). "Women as Policy Makers: Evidence from a India-Wide Randomized Policy Experiment." *Econometrica*, 72, 1409–1443.
Clots-Figueras, Irma (2007). "Are Female Leaders Good for Education? Evidence from India." *American Economic Journal: Applied Economics*. Forthcoming, January 2012.
Clots-Figueras, I., (2011). "Women in Politics. Evidence from the Indian States". *Journal of Public Economics Economics*, 95, 664-690.
Cutler, David, Angus Deaton, Adriana Lleras-Muney, (2006). "The Determinants of Mortality," *Journal of Economic Perspectives*. 20, 97-120.
Dahlerup, D., and J. Francisco (2005). "Gender, Governance and Democracy: Women in Politics." (1) 5-48 Isis International-Manila and Women and Gender Institute (WAGI) Manila.
Das, Jishnu, and Hammer, Jeffrey (2007). "Money for nothing: The dire straits of medical practice in Delhi, India." *Journal of Development Economics*, 83, 1-36.
DasGupta, M. (2007). "Public Health in India: An Overview", in Kaushik Basu, ed., *The Oxford Companion to Economics in India*. Oxford University Press.
Datar, A, A., Ghosh, and Neeraj Sood (2007). "Mortality Risks, Health Endowments, and Parental Investments in Infancy: Evidence from Rural India." NBER Working Paper 13649 November.
Dehejia, R., and A. Lleras-Muney (2004). "Booms, busts and babies' health." *Quarterly Journal of Economics* 119, 1091-1130.
Deininger, Klaus, Songqing Jin, Fang Xia, and Nagarajan, Hari (2011). "Can political reservations improve female empowerment?"Evidence from local Panchayat elections in rural India. Mimeograph, The World Bank.
Del Bono, E, and Rabe, B. (2011). "Estimating the causal effects of breastfeeding on early child outcomes." Working paper, Institute for Social and Economic Research.
Downs, A. (1957). *An Economic Theory of Democracy*. Harper Collins, New York.
Duflo, Esther (2003). "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa." *The World Bank Economic Review,* 17, 1-25.
Edlund, Laila Haider, and Rohini Pande (2005). "Unmarried Parenthood and Redistributive Politics." *Journal of the European Economic Association,* 3, 95-119.
Edlund, Lena, and Rohini Pande (2002). "Why Have Women Become Left-Wing? The Political Gender Gap And The Decline In Marriage." *The Quarterly Journal of Economics*, 117, 917-961.
Franceschet, S., M. L. Krook, and J. M. Piscopo (2009). "The Impact of Gender Quotas: A Research Agenda." MPSA Conference Paper. Chicago: Midwest Political Science Association National Conference.
Filmer, D., and L. H. Pritchett (2000). "The impact of public spending on health: does money matter?" *Social Science & Medicine*, 49, 1309-1323.
Filmer, D. J. S. Hammer, and L. H. Pritchett (2000). "Weak Links in the Chain: A Diagnosis of Health Policy in Poor Countries." *World Bank Research Observer*, 15, 199-224.
Hoddinott, John (1995). "Does female income share influence household expenditures? Evidence from Côte d'Ivoire." *Oxford Bulletin of Economics and Statistics*.
IIPS, and ORC Macro (2000). "National Family Health Survey (NFHS-2) 1998-9: India." Mumbai: International institute For Population Sciences (IIPS).
Iyer, L., A. Mani, P. Mishra, and P. Topalova (2011). "Political representation and crime: Evidence from India." Draft paper. Harvard Business School.
Jones G., Steketee R. W., Black R. E., Bhutta Z. A., Morris S. S. (2003). The Bellagio Child Survival Study "How Many Child Deaths Can We Prevent This Year?" *Lancet*, 362, 65–71.
Kiefer, Philip, and Stuti Khemani (2003). "Democracy, Public Expenditures and the Poor." World Bank Policy Research Working Paper Series no. 3164.
Kudamatsu, M. (2007). "Has Democratization Reduced Infant Mortality in Sub-Saharan Africa? Evidence from Micro Data." *Journal of the European Economic Association*, forthcoming.
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.
Levitt, S. (1996). "How do senators vote? Disentangling the role of voter preferences, party affiliation and senator ideology." *The American Economic Review*, 86, 425–441.
Lundberg, S., Pollak, R., Wales, T. (1997). "Do husbands and wives pool their resources? Evidence from the United Kingdom Child Benefit." *The Journal of Human Resources,* 32, 1132–1151.
Miller, G., (2008). "Women's suffrage, political responsiveness, and child survival in American history." *Quarterly Journal of Economics,* 123, 1287–1327.
Miller, G., and P. Urdinola (2010). "Cyclicality, Mortality, and the Value of Time: The Case of Coffee Price Fluctuations and Child Survival in Colombia," *Journal of Political Economy* 118, 113-155.
Mishra, R.C. (2000). *Role of Women in Legislatures in India. A Study.* Anmol Publications PVT, LTD.
Osborne, M.J., Slivinski, A. (1996). "A model of political competition with citizen candidates." *Quarterly Journal of Economics,* 111, 65–96.
Oswald, A., and N. Powdthavee (2010). "Daughters and Left-Wing Voting." *The Review of Economics and Statistics*, 92, 213–227.
Pettersson-Lidbom, P. (2001). "Do Parties Mater for Fiscal Policy Choices? A Regression- Discontinuity Approach." Mimeo, Stockholm University.
Rai, Shirin (2002). "Class, Caste and Gender – Women in Parliament in India." International IDEA, Women in Parliament, Stockholm. http://www.idea.int.
Rao, Govinda, M., and N. Singh (1998a). "The Assignment of Taxes and Expenditures in India, http://eac.gov.in/aboutus/mempro1.htm
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.
Rindfuss, R. R., Palmore, J. A., and Bumpass, L. L. (1982). "Selectivity and the analysis of birth intervals from survey data." Asia Pacif. Census Forum, 8, no. 3, 5–16.
Squires, Judith (1996). "Quotas for Women: Fair Representation?" Parliamentary Affairs.
Svaleryd, H. (2009). "Women's Political Representation and Public Spending*European Journal of Political Economy*, 25(2): 186-98.
Thomas, Duncan (1990). "Intra-household resource allocation: An inferential approach." *Journal of Human Resources,* 25, 635-664.
Thomas, S., and S. Welch (1991). "The Impact of Gender on Activities and Priorities of State Legislators." *The Western Political Quarterly*. 44, 445-456.
Warner, R. L., and B. Steel (1999). "Child Rearing as a Mechanism for Social Change: The Relationship of Child Gender to Parents' Commitment to Gender Equity." *Gender and Society,* 13, 503–517.
Washington, Ebonya (2008). "Family Socialization: How Daughters Affect Their Legislator Fathers' Voting on Women's Issues." *American Economic Review*. 98, 311–332.

Figure 1: Female Political Representation: All India

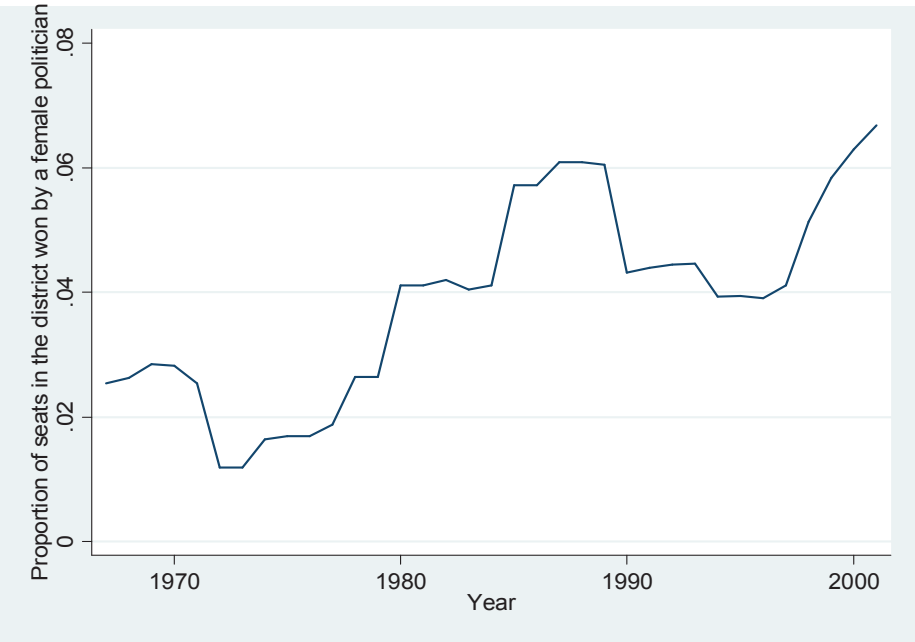

Figure 2: Female Political Representation by State

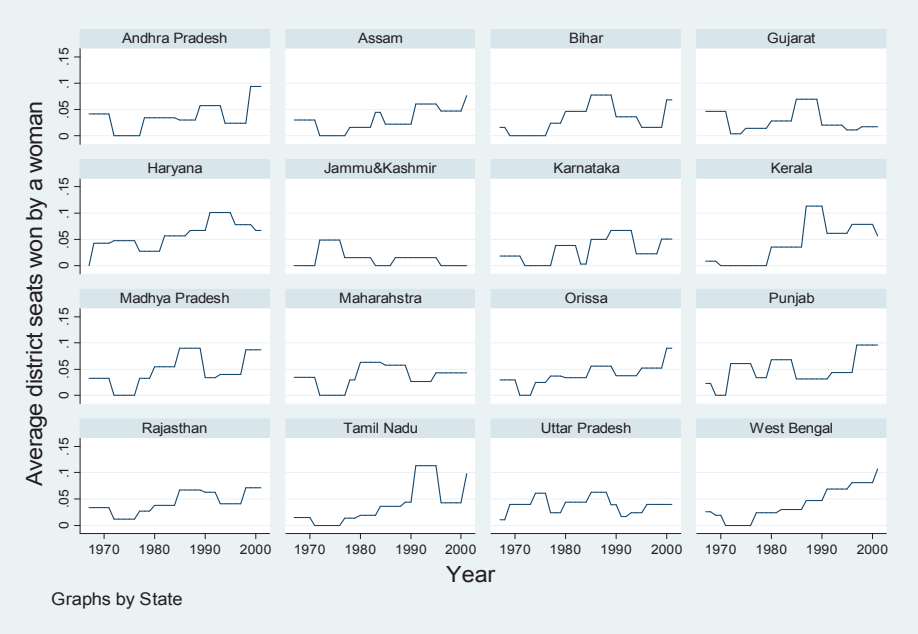

TABLE 1A: DESCRIPTIVES

Unit of Observation: Individual (child), cohorts 1968-1999 in 246 districts

	mean	sd
Neonatal mortality	0.0627	0.2423
Infant mortality	0.0980	0.2973
Birth order	2.7561	1.8099
Multiple birth	0.0138	0.1166
Girl	0.4770	0.4995
Scheduled Caste (SC)	0.1959	0.3969
Scheduled Tribe (ST)	0.1080	0.3104
Muslim	0.1070	0.3092
Christian	0.0113	0.1057
Other religion	0.0332	0.1791
Rural	0.7816	0.4131
Age of the mother at birth	22.7412	5.0420
Observations	75339	
Unit of Observation: Individual (child) in the four years before the survey date (1998/9)	mean	sd
Number of antenatal visits	2.3190	2.4403
Delivery at home	0.6920	0.4617
Delivery in a government institution	0.1618	0.3683
Delivery in a private institution	0.1462	0.3533
Breastfed in the first 24 hours	0.4816	0.4997
Number of vaccines per child	5.3617	3.0431
Took iron and folic acid supplements during pregnancy	0.5714	0.4949
Received a tetanus injection during pregnancy	0.7361	0.4408
Observations	8853	

TABLE 1B: DESCRIPTIVES

Unit of Observation: District in an electoral year , elections between 1967-1998 in 246 districts

	mean	sd
Proportion of seats won by women (*women*)	0.0364	0.0740
Proportion of districts that had at least one woman politician	0.2640	0.4409
Proportion of seats that had close elections between women and men, close: 3.5% margin (*totalclose*)	0.0084	0.0333
Proportion of districts that had at least one election between a woman and a man	0.4025	0.4905
Proportion of districts that had at least one close election between a woman and a man (3.5%)	0.0745	0.2626
Proportion of seats won by women in close elections against men (3.5%) (*womenclose*)	0.0041	0.0227
Proportion of districts that had at least one woman politician who won in a close election against a man (3.5%)	0.0383	0.1921
Dummy for the first election between a woman and a man (*I_j*)*	0.4025	0.4905
Dummy for the second election between a woman and a man	0.1292	0.3356
Dummy for the third election between a woman and a man	0.0389	0.1934
Dummy for the fourth election between a woman and a man	0.0071	0.0841
Dummy for the fifth election between a woman and a man	0.0044	0.0661
Dummy for the sixth election between a woman and a man	0.0011	0.0331

Vote margin for the first election between a woman and a man (m_j)**	0.0142	0.1820
Vote margin for the second election between a woman and a man	0.0307	0.2499
Vote margin for the third election between a woman and a man	0.0024	0.3002
Vote margin for the fourth election between a woman and a man	0.0115	0.3105
Vote margin for the fifth election between a woman and a man	-0.0241	0.3827
Vote margin for the sixth election between a woman and a man	0.0092	0.4649
Proportion of seats reserved for SC/ST candidates	0.2366	0.1785
Proportion of seats won by Congress parties	0.4519	0.3317
Proportion of seats won by Hard Left parties	0.0589	0.1512
Proportion of seats won by Soft Left parties	0.0231	0.0901
Proportion of seats won by Janata parties	0.1661	0.2727
Proportion of seats won by Hindu parties	0.1280	0.2290
Proportion of seats won by Regional parties	0.0772	0.2027
Female literacy rate	0.2844	0.1720
Male literacy rate	0.5352	0.1559
Proportion of SC/STs	0.2524	0.1344
Proportion of urban population	0.2041	0.1409
Proportion of female population	0.4811	0.0167
Observations	1826	

*The first, second, etc. election refer to the number of constituencies within a district that have a man-woman election.
So 40% of districts have at least one constituency (seat) that was won in a man-woman election, 13% of districts have at least two, and so on.
**The vote margins are ordered by absolute value in districts with more than one election and now first, second, etc. margin refer to the first, second etc constituency.

TABLE 1C DESCRIPTIVES

Unit of observation: village	mean	sd
Primary health subcentre	0.3517	0.4777
Primary health center	0.1418	0.3490
Community health centre	0.0815	0.2737
Government dispensary	0.1252	0.3310
Government hospital	0.0353	0.1846
Electricity	2.1797	0.6976
Post office	0.3755	0.4844
Telegraph	0.2015	0.4013
STD (telephone) booth	0.1958	0.3969
Bank	0.2831	0.4506
Observations	1558	

TABLE 2: BASELINE RESULTS	Neonatal mortality					Infant mortality				
	OLS	OLS	2SLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS	2SLS
	1	2	3	4	5	6	7	8	9	10
Fraction of seats in district won by female politicians (*women*)	-0.0050	-0.0148	-0.1176	-0.1942**	-0.2061***	0.0081	0.0029	-0.0540	-0.1645	-0.1916*
	(0.016)	(0.018)	(0.074)	(0.079)	(0.078)	(0.019)	(0.022)	(0.098)	(0.107)	(0.104)
District FE	x	x	x			x	x	x		
Cohort FE	x	x	x	x	x	x	x	x	x	x
Mother FE				x	x				x	x
Controls					x					x
Vote Margins			3rd order polynomial	3rd order polynomial	3rd order polynomial			3rd order polynomial	3rd order polynomial	3rd order polynomial
Observations	95,016	71,498	71,498	71,498	71,498	91,169	68,665	68,665	68,665	68,665
Number of mothers				18,754	18,754				18,003	18,003

FIRST STAGE REGRESSIONS
Dependent variable: Fraction of seats in the district won by female politicians

	1	2	3	4	5	6
Fraction of seats in district won by female politicians in close elections against male politicians (*womenclose*)	0.8939***	0.9011***	0.8964***	0.9202***	0.9302***	0.9255***
	(0.0714)	(0.0785)	(0.0789)	(0.0982)	(0.0744)	(0.0752)
Fraction of seats in district that had close elections between female and male candidates (*totalclose*)	-0.4303***	-0.4514***	-0.4495***	-0.4575***	-0.4818***	-0.4797***
	(0.0528)	(0.0559)	(0.0559)	(0.0507)	(0.0537)	(0.0540)
F First Stage	156.27	131.6	129.1	187.6	156.3	151.3

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Close elections are defined as elections in which the winner won against the runner up by less than 3.5% of votes. All regressions include district and cohort fixed effects (FE); the third and fourth columns replace district FE with mother FE. Controls at the district level include the fraction of the district population that is female, urban and SC/ST and the male and female literacy rates. Controls at the individual level include dummy variables for gender, caste, religion, birth order, rural/urban location and for whether the birth is one of a multiple birth. All regressions shown also include as a control the fraction of constituencies in the district that had close elections between women and men (*totalclose*).

TABLE 3: ROBUSTNESS

PANEL A	**Neonatal mortality**								
	1	2	3	4	5	6	7	8	9
Fraction of seats in district won by female politicians	-0.1902***	-0.1984***	-0.1969**	-0.2616***	-0.2611***	-0.1422**	-0.2289**	-0.1988**	-0.2212**
	(0.073)	(0.073)	(0.091)	(0.088)	(0.077)	(0.072)	(0.091)	(0.079)	(0.086)
Cohort FE	x	x	x	x	x	x	x	x	x
Mother FE	x	x	x	x	x	x	x	x	x
Controls	x	x	x	x	x	x	x	x	x
Margins	1st ord pol	2nd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.
Robustness checks	*vote margin*	*vote margin*	*2%*	*2.50%*	*3%*	*4%*	*at least one w-m ele*	*political controls*	*outliers*
Observations	71,498	71,498	71,498	71,498	71,498	71,498	29,979	71,498	70,581
Number of mothers	18,754	18,754	18,754	18,754	18,754	18,754	9,989	18,754	18,591

PANEL B	**Neonatal mortality**					
	1	2	3	4	5	6
Fraction of seats in district won by female politicians	-0.2091***	-0.1886**	-0.2001***	-0.2079**	-0.1670**	
	(0.079)	(0.076)	(0.076)	(0.082)	(0.080)	
Fraction of seats in district won by female politicians in close elections against male politicians						-0.1847***
						(0.070)
Cohort FE	x	x	x	x	x	x
Mother FE	x	x	x	x		x
Controls	x	x	x	x	x	x
Margins	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.
Robustness checks	*age mother FE*	*mother cohort* child birth yr FE*	*quad trends*	*state*year dum*	*district*mother cohort FE*	*reduced form*
Observations	71,498	71,498	71,498	71,498	71,498	71,498
Number of mothers	18,754	18,754	18,754	18,754		18,754

See Notes to Table 2. Here we show robustness checks on the specification in column 5 of Table 2. Columns 1-2 vary the functional form for the constituency-level vote margins, columns 3-6 vary the definition of close elections upwards and downwards from the baseline definition of a (constituency-level) vote margin that is less than 3.5%. Column 7 estimates the model on the sub-sample of districts that had at least one election between a woman and a man, column 8 includes controls for the share of votes won by each of seven political parties (see the data appendix) and the share of seats reserved for the low caste (SC/ST) population. Column 9 removes outliers in *women* (see the text). In panel B, columns 1 and 2 include increasingly flexible controls for mother's age at birth. Column 3 replaces linear with quadratic state trends and column 4 with state*year dummies. Column 5 adds district-mother's birth year fixed effects. Column 6 shows the reduced form of the 2SLS equation in col. 5 Table 2.

Table 4: Timing of the effects and Falsification Exercise

Coefficient: Fraction of seats in the district won by female politicians		
	Neonatal Mortality	
Child's age when politician was in power	coeff	se
-5	0.1067	0.0840
-4	0.0069	0.0780
-3	-0.0983	0.0900
-2	-0.2257**	0.0990
-1	-0.2061***	0.0780
0	-0.1975**	0.0840
1	-0.0417	0.0830
2	-0.0338	0.0820
3	-0.0121	0.0810
4	-0.0114	0.0760
5	0.0676	0.0700
6	0.0247	0.0860
7	0.0200	0.0860
8	0.0410	0.0950
9	-0.0801	0.0940

See Notes to Table 2. The baseline specification in column 5 of Table 2 uses the first lag (-1) of the gender mix of politicians at the district level because neonatal mortality is largely determined by the foetal environment and birth conditions. That equation is re-estimated with alternative lags (-5 to 0) to investigate how persistent the impact of the gender of politicians is. Some persistence is built in by the fact that elections (typically) occur every five years. We also investigate leads (1 to 9) of politician gender as a placebo (see the text).

Table 5: Heterogeneous Effects

	Neonatal mortality								
	1	2	3	4	5	6	7	8	9
Fraction of seats in district won by female politicians	-0.2604*	-0.0701	-0.1427*	-0.5839**	-0.2802*	-0.1963**	-0.1469	-0.2326**	-0.2043**
(women)	(0.152)	(0.079)	(0.081)	(0.259)	(0.143)	(0.098)	(0.138)	(0.115)	(0.083)
Fraction of seats in district won by female politicians interacted with a dummy for years after 1993									-0.0119 (0.119)
Cohort FE	X	X	X	X	X	X	X	X	X
Mother FE			X	X	X	X	X	X	X
Controls	X	X	X	X	X	X	X	X	X
Sample	*first child*	*subsequent children*	*rural*	*urban*	*lower caste SC/ST*	*higher caste*	*girls*	*boys*	*post-93 interaction*
Observations	18,562	52,936	56,273	15,225	21,827	49,671	27,886	31,871	71,498
Number of mothers			14,401	4,353	5,416	13,338	9,845	11,797	18,754

See notes to Table 2. Columns 1-8 separate first and higher birth orders, rural and urban births, lower and higher caste births and girls and boys. We do not use mother fixed effects in the first two columns since, for example, a mother has only one first born child by definition. In column 5, we interact a post-1993 dummy with the variable of interest (*women*). The point estimates are indicative of differential effects but

TABLE 6: Village Public Goods

PANEL A

VARIABLES	(1) Primary Health Subcentre	(2) Primary Health Centre	(3) Community Health Centre	(4) Government Dispensary	(5) Government Hospital
Fraction of seats in district won by female politicians	3.4769	2.2365**	1.8871**	1.7857**	0.5682*
(women)	(2.215)	(1.120)	(0.849)	(0.900)	(0.311)
Year dummies	x	x	x	x	x
District dummies	x	x	x	x	x
Observations	1,558	1,558	1,558	1,558	1,558
R squared	0.326	0.342	0.354	0.370	0.210

PANEL B

VARIABLES	(1) Electricity	(2) Bank	(3) Post Office	(4) Telegraph	(5) STD (Telephone) Booth
Fraction of seats in district won by female politicians	0.9865	-2.4616*	-2.1704	0.6037	-0.9293
(women)	(1.225)	(1.494)	(2.218)	(1.241)	(1.589)
Year dummies	x	x	x	x	x
District dummies	x	x	x	x	x
Observations	1,558	1,558	1,558	1,558	1,558
R squared	0.455	0.280	0.306	0.231	0.238

See Notes to Table 2. As in Table 2, *women* is instrumented with *womenclose*. All regressions include the district controls included in Table 2. The means of the dependent variables are in Table 1.

TABLE 7: Health Seeking Behaviours

Panel A	1 Number of antenatal visits	2	3 Iron & folic supplements	4	5 Tetanus injection in preg.	6	7 Breastfed first 24 hrs	8
Fraction of seats in district won by female politicians	3.6524**	2.7745*	1.0663***	0.9518**	0.1798	0.3113	1.2758***	1.3406**
(women)	(1.783)	(1.662)	(0.364)	(0.429)	(0.320)	(0.376)	(0.462)	(0.535)
District FE	x	x	x	x	x	x	x	x
Cohort FE	x	x	x	x	x	x	x	x
Mother Group FE		x		x		x		x
Observations	7,448	7,448	8,429	8,429	8,383	8,383	8,062	8,062

Panel B	1 Delivery at home	2	3 Delivery gov. institution	4	5 Delivery priv. institution	6	7 Number of vaccines per child	8
Fraction of seats in district won by female politicians	-0.8698**	-0.8768*	1.0344***	1.0904***	-0.1646	-0.2136	8.3516	18.1244**
(women)	(0.433)	(0.522)	(0.346)	(0.394)	(0.344)	(0.350)	(5.581)	(7.8488)
District FE	x	x	x	x	x	x	x	x
Cohort FE	x	x	x	x	x	x	x	x
Mother Group FE		x		x		x		x
Observations	8,408	8,408	8,408	8,408	8,408	8,408	4,831	4,831

See Notes to Table 2. As in Table 2, *women* is instrumented with *womenclose*. Means of the dependent variables are in Table 1. Mother group FE are defined in the text, they are FE defined over multiple dimensions of mother-level observables.

APPENDIX- NOT FOR PUBLICATION

Appendix Figures and Tables

Figure A1: Fraction of seats in the district won by a female politician.

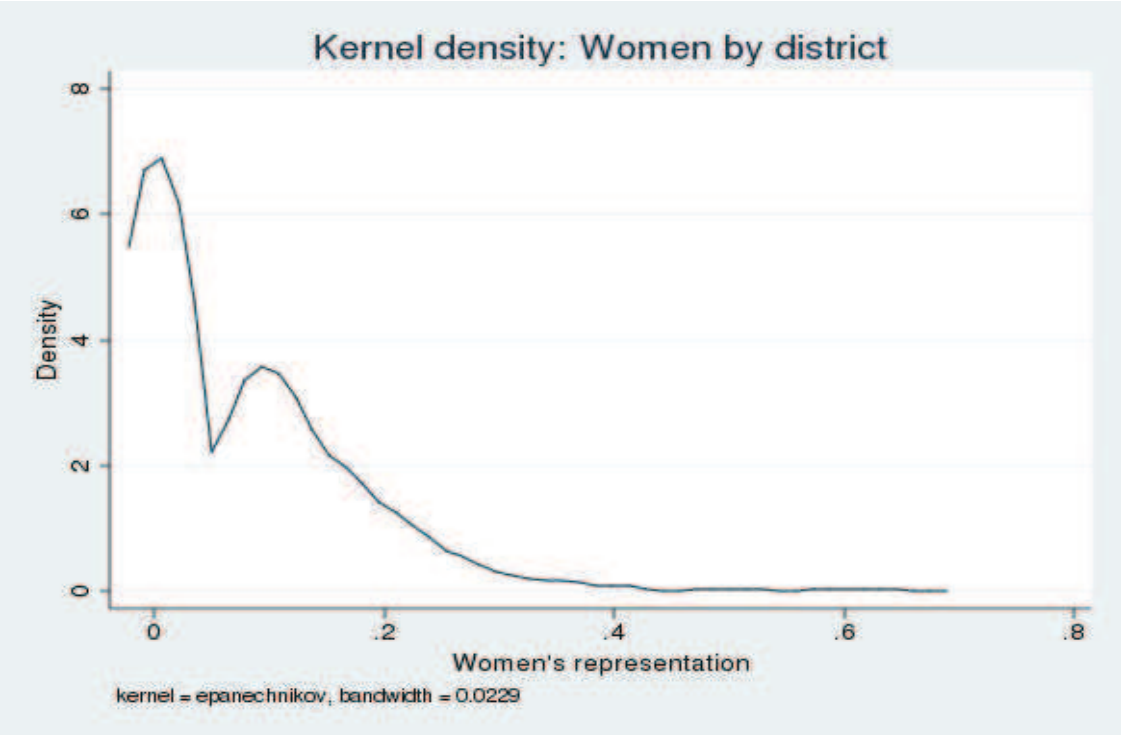

Figure A2: Lowess plot of neonatal mortality risk against the share of women politicians in the district of birth

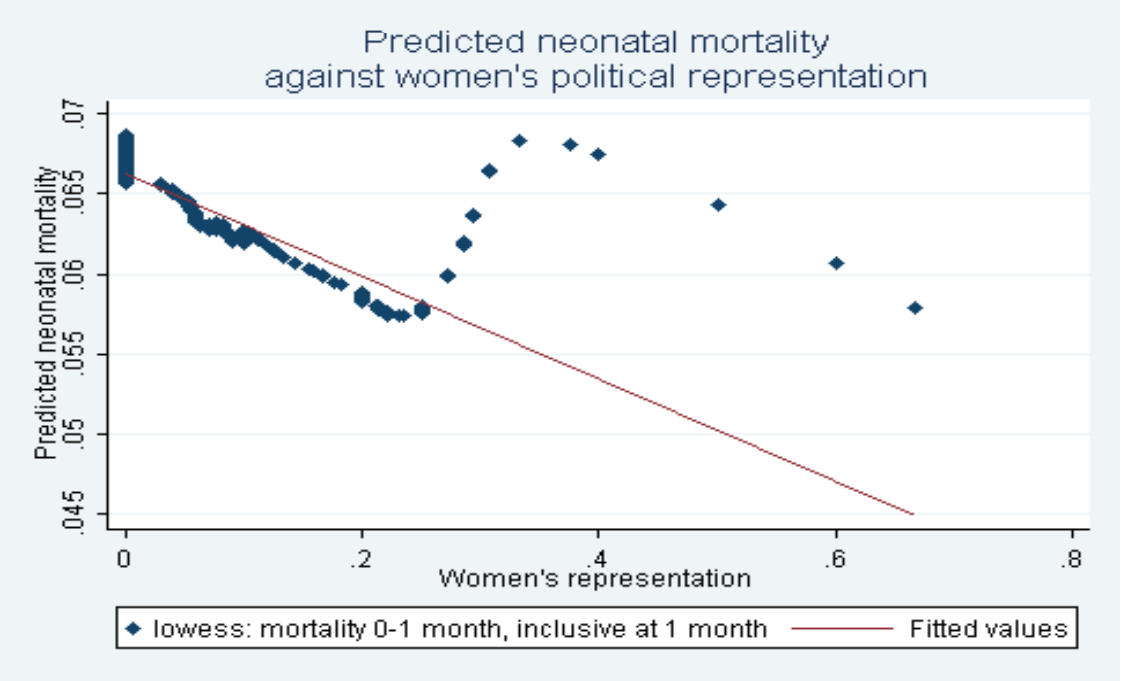

Table A1: Probability that a Woman Wins in a Close Election against a Man

Dependent variable: proportion of women who won in close elections against a man per district and electoral year. Sample 1967-2001.	1
Proportion of seats contesting close elections Congress	-1.412
	(2.607)
Proportion of seats contesting close elections Regional Parties	-3.332
	(4.882)
Proportion of seats contesting close elections Hindu	-1.247
	(2.706)
Proportion of seats contesting close elections Janata	-1.81
	(2.075)
Proportion of seats contesting close elections Others	-0.433
	(2.389)
Proportion of seats contesting close elections Independent	-1.546
	(2.303)
Dummy=1 if the district never had close elections before	0.241
	(0.635)
Proportion of urban population	12.587
	(12.85)
Number of times that a woman has won an election in the district in the past	-0.006
	(0.051)
Proportion of SC/ST population	18.497
	(19.496)
Proportion of population that is female	-15.535
	(27.662)
Male literacy rate	-1.923
	(10.817)
Female literacy rate	-0.494
	(7.249)
Proportion of seats reserved for SC/ST's	-2.931
	(5.313)
Observations	164
Adjusted R-squared	-0.059

Robust standard errors clustered at the district level. District and year fixed effects are included in the regression.

Table A2

Constituency and Candidate Characteristics: Close Elections between Women and Men

Unit of observation: candidate. Sample 1967-2001.

Group	Obs	Mean	Std. Err.
Other female candidates in the constituency			
Man won in close election	120	0.1083	0.0370
Woman won in close election	110	0.2000	0.0480
Difference		-0.0917	0.0601
Winner was the incumbent			
Man won in close election	120	0.2167	0.0378
Woman won in close election	110	0.2182	0.0396
Difference		-0.0015	0.0547
Number of close elections in the past			
Man won in close election	120	1.0750	0.0241
Woman won in close election	110	1.0727	0.0249
Difference		0.0023	0.0347
Votes received by the winner			
Man won in close election	120	31894.1700	1328.4220
Woman won in close election	110	33596.4500	1330.2330
Difference		-1702.2880	1883.4150
Total votes in the constituency			
Man won in close election	120	80188.3300	2769.9040
Woman won in close election	110	80947.2700	2655.8640
Difference		-758.9394	3851.7720

Table A3

Comparison: Districts with and without Close Elections

(District in an electoral year, sample 1967-2001)		Close elections	No close elections
Urban population (prop)	mean	0.2149	0.1947
	sd	0.0052	0.0039
	observations	968	1124
Male literacy rate	mean	0.5241	0.5454
	sd	0.0054	0.0049
	observations	946	1098
Female literacy rate	mean	0.2878	0.2865
	sd	0.0059	0.0054
	observations	946	1098
SC/ST population (prop)	mean	0.2618	0.2443
	sd	0.0047	0.0038
	observations	968	1124
SC/ST seats proportion	mean	0.2564	0.2178
	sd	0.0055	0.0054
	observations	1223	1323
Seats total	mean	10.8397	7.9426
	sd	0.1382	0.1259
	observations	1223	1323
Any educational institution	mean	0.8212	0.7932
	sd	0.0079	0.0084
	observations	316	348
Hospitals	mean	0.0290	0.0262
	sd	0.0025	0.0025
	observations	736	812

Table A4

Proportion of Seats Won by Parties

	Close Elections	No close elections
Party	Percent	Percent
Congress	40.43	41.16
Hard Left	7.83	8.17
Hindu	11.74	11.44
Independents	6.96	5.81
Janata	9.57	13.98
Regional	12.61	10.38
Soft Left	3.91	2.31
Others	6.96	6.75
Total	100	100

Sample 1967-2001

Table A5: District Characteristics: Close Elections between Women and Men

Unit of observation: district- electoral year. Sample 1967-2001

Differences in the proportion of urban population	-0.0102
(Districts in which more men than women won compared to districts in which more women than men won)	0.0179)
Differences in male literacy rate	-0.0292
(Districts in which more men than women won compared to districts in which more women than men won)	0.0255)
Differences in female literacy rate	-0.0282
(Districts in which more men than women won compared to districts in which more women than men won)	(0.0296)
Differences in the proportion of villages with educational institutions	0.0147
(Districts in which more men than women won compared to districts in which more women than men won)	(0.0342)
Differences in the proportion of villages with hospitals	0.0055
(Districts in which more men than women won compared to districts in which more women than men won)	(0.0107)
Differences in the proportion of SC/ST reserved seats	-0.0038
(Districts in which more men than women won compared to districts in which more women than men won)	(0.0272)
Differences in the proportion of seats won by women who won in elections that are not close	-0.0013
(Districts in which more men than women won compared to districts in which more women than men won)	(0.0083)
Differences in the proportion of seats won by men who won in elections that are not close	-0.0123
(Districts in which more men than women won compared to districts in which more women than men won)	(0.0103)
Number of districts with election-years	201

TABLE A6: Post-neonatal mortality

	OLS 1	2SLS 2	2SLS 3	2SLS 4
Fraction of seats in district won by female politician	0.0155	0.0483	0.0219	0.0104
	(0.014)	(0.059)	(0.074)	(0.074)
District FE	X	X		
Cohort FE	X	X	X	X
Mother FE			X	X
Controls				X
Margins		3rd ord pol.	3rd ord pol.	3rd ord pol.
Full sample				
Observations	63,876	63,876	63,876	63,876
Number of mothers			17,647	17,647

See Notes to Table 2. The dependent variable neonatal moratality is replaced with post-neonatal mortality. The absence of any effects may be because (a) postneonatal mortality is necessarily conditional upon (endogenous) survival through the neonatal period, (b) attribution of neonatal mortality to state policy interventions that improve antenatal and early postnatal care is clearer than is the case for post-neonatal mortality, which is more sensitive to household-level variables including nutritional investments in children and the hygiene, sanitation and pollution levels in the household, or (c) neonatal mortality is more sensitive to investments in mothers (as opposed to children) than post-neonatal mortality.

Table A7: Full set of covariates for baseline regression (column 5, Table 2)

VARIABLES	neonatal mortality
Fraction of seats in district won by female politician	-0.2065***
	(0.078)
Fraction of seats in the district that had close elections between	0.0258
women and men	(0.037)
Female literacy rate	-0.1384
	(0.119)
Male literacy rate	0.0263
	(0.139)
Proportion of SC/STs	-0.1526
	(0.120)
Proportion of the population that is urban	-0.0245
	(0.119)
Female dummy	-0.0096***
	(0.002)
Birth order 2	-0.0312***
	(0.003)
Birth order 3	-0.0573***
	(0.006)
Birth order 4	-0.0817***
	(0.008)
Birth order 5	-0.0999***
	(0.011)
Birth order 6	-0.1142***
	(0.014)
Birth order 7	-0.1186***
	(0.016)
Birth order 8	-0.1292***
	(0.020)
Birth order 9	-0.1454***
	(0.023)
Birth order 10	-0.1887***
	(0.029)
Birth order 11	-0.1089***
	(0.040)
Birth order 12	-0.2282***
	(0.079)
Birth order 13	-0.0064
	(0.230)
Birth order 14	-0.2419***
	(0.086)
Multiple birth	0.3011***
	(0.019)
Observations	71,498
Number of mothers	18,754

Table A8: Further robustness checks: migration and politician caste

	1	2	3	4
VARIABLES	Neonatal mortality			
Fraction of seats in the district won by a woman	0.0592	-0.1089*	-0.1703**	
	(0.2364)	(0.0640)	(0.0728)	
Fraction of seats in the district won by low caste (SC/ST) women				-0.1106
				(0.084)
Fraction of seats in the district won by higher caste women				-0.1353*
				(0.077)
Robustness	*migrant placebo*	*No restriction*	*Child born current loc*	*gender*caste*
Cohort FE	X	X	X	X
Mother FE	X	X	X	X
Controls	X	X	X	X
Margins	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.
Observations	9921	129417	102748	71,498
Number of seqid	2951	33779	27633	18,754

See Notes to Table 2. Using the specification in column 5 of Table 2, column 1 runs the placebo on migration described in the text, effectively matching children to the "wrong" set of politicians. Column 2 removes the baseline restriction which resulted in using only the sample of mothers who had never migrated. Column 3 uses the weaker restriction which is that we include only children who were born in their current place of residence- so we definitely have them correctly matched to politician gender but we exclude any siblings they may have for whom the match is uncertain. In column 4, we interact the variable of interest (*women*) with the caste of women politicians.

TABLE A9: Robustness Checks for Infant Mortality

PANEL A	Infant mortality								
	1	2	3	4	5	6	7	8	9
Fraction of seats in district won by female politician	-0.1724*	-0.1779*	-0.1420	-0.1911	-0.2505**	-0.1210	-0.2390*	-0.2235*	-0.2067**
	(0.097)	(0.098)	(0.155)	(0.145)	(0.116)	(0.094)	(0.130)	(0.123)	(0.103)
Cohort FE	x	x	x	x	x	x	x	x	x
Mother FE	x	x	x	x	x	x	x	x	x
Controls	x	x	x	x	x	x	x	x	x
Margins	1st ord pol	2nd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.	3rd ord pol.
Robustness	*vote margin*	*vote margin*	*2%*	*2.50%*	*3%*	*4%*	*at least one w-m ele*	*outliers*	*political controls*
Observations	68,665	68,665	68,665	68,665	68,665	68,665	28,502	67,793	68,665
Number of mothers	18,003	18,003	18,003	18,003	18,003	18,003	9,522	17,848	18,003

PANEL B	Infant mortality					
	1	2	3	4	5	6
Fraction of seats in district won by female politician	-0.1908*	-0.1763	-0.1357	-0.1925*	-0.1842*	
	(0.099)	(0.109)	(0.100)	(0.106)	(0.103)	
Fraction of seats in district won by female politician in a close election against a male politician						-0.1773*
						(0.097)
Cohort FE	x	x	x	x	x	x
Mother FE	x	x		x	x	x
Controls	x	x	x	x	x	x
Margins	3rd ord pol.	3rd ord pol.			3rd ord pol.	3rd ord pol.
Robustness	*quadratic trends*	*state*year dum*	*district*mother cohort fe*	*age mother*	*mother cohort* child birth yr*	*reduced form*
Observations	68,665	68,665	68,665	68,665	68,665	68,665
Number of mothers	18,003	18,003		18,003	18,003	18,003

See notes to Table 3. Neonatal mortality is now replaced with infant mortality.

Table A10: Timing of Effects and Falsification Exercise for Infant Mortality

Coefficient: Fraction of seats in the district won by female politicians

	Infant mortality	
Child's age when politician was in power	coeff	se
-5	0.0640	0.1100
-4	0.0003	0.1010
-3	-0.1460	0.1050
-2	-0.2383**	0.1100
-1	-0.1916*	0.1040
0	-0.2154*	0.1130
1	-0.0573	0.1110
2	-0.0494	0.0960
3	-0.0893	0.1120
4	-0.0953	0.1020
5	-0.0106	0.0930
6	-0.0349	0.1010
7	-0.0471	0.0960
8	-0.0215	0.0980
9	-0.0461	0.1100

See Notes to Table 4. Here we replace neonatal with infant mortality as the dependent variable.

Table A11: Effect of Female Politicians on Births: Fertility and Gender of Birth

	1	2	3	4	5	6	7	8
Dependent variable:	birth	birth	birth	birth	female	female	female	female
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Fraction of seats in the district won by a female	0.0913	0.0800	-0.0058	0.0100	0.2997**	0.3008**	0.2533*	0.2217
politician	(0.057)	(0.059)	(0.101)	(0.082)	(0.125)	(0.127)	(0.147)	(0.143)
District FE	x	x			x	x		
Cohort FE	x	x	x	x	x	x	x	x
Mother FE			x	x			x	x
Controls		x		x		x		x
Observations	379,584	379,584	379,584	379,584	71,873	71,873	71,873	71,873
Number of seqid			25,171	25,171			18,842	18,842

See Notes to Table 2. As discussed in the text, we expand the data to include for every mother a panel of every year at which she was at risk of birth. We then estimate the probability of continuing fertility (1 if birth, 0 if not, in each year, for each woman) in columns 1-4 and the probability that the birth is female conditional upon birth in columns 5-8. Since columns 1-4 suggest that there is no endogeneity in birth, the conditioning on birth in columns 5-8 is unlikely to create any significant selectivity. The four columns in each set of regressions parallel columns 2-5 in Table 2 in the specifications that they use. We instrument with close election outcomes as in the baseline specifications for mortality and inputs to health and survival. There is no evidence of politican gender impacting fertility. There is some evidence that politican gender impacts the sex of births, with the probability that the birth is female increasing in the share of female politicians in the district of birth.

Data Appendix

Electoral data are collected from different volumes of the Statistical Reports on General Elections to State Legislative Assemblies. The election commission of India publishes a report for every state election. We have data at the constituency level for the 16 main states for elections held during 1967-2001. For aggregation of constituency data to the district level we use *State Elections in India,* a publication of the Election Commission which lists the constituencies included in each district in each election year together with Constituency Delimitation orders. Some districts have divided, some have been newly created and others have disappeared during the sample period. We use the 1991 census district definition and include only those districts that were intact over time. We dropped from the political data 196 districts that had changed boundaries since 1967. We lose a further 21 districts in merging the political data to the electoral data. The included and excluded districts have similar infant and neonatal mortality rates, health-seeking behaviours, year of birth, education of the mother and caste. Results are available from the authors on request. Most terms are defined in the text. Amongst controls we include the proportion of seats in the district won by each political party. Following Besley and Burgess (2002) we construct the following party groups. 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.

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. To allow for age-heaping in the data at one and twelve months, we define 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 neonatal mortality we drop children born less than a month 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 a 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. *Antenatal care* is measured as the number of visits sought from a health worker. Immunization is measured as the total number of vaccinations had by the age of one because the basic course of immunization is spread across the first year of life. This means that it does not exactly match up to neonatal mortality but it does to infant mortality and is an independent indicator of the influence of the gender composition of politicians on state investments in child health. *Migration and other sample restrictions*- Some births in the sample occurred when the mother was at a place other than her current residence. As we do not have the date of migration, 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.

A well-known problem with retrospective fertility data is that they are wedge-shaped. The upper limit on the age of women at the time of interview implies that older birth cohorts in the data are born disproportionately of women who were young at the time of birth (Rindfuss et. al. 1982). We control for the age of the mother at birth and we expect this issue to have limited relevance in the mother fixed effects specifications. To the extent that some women do not survive to the date of interview, we again have a select sample of births. This will not bias our estimates. In principle it will limit their external validity but maternal mortality, the most likely

cause of attrition of the mother cohorts, is not a large percentage: it was estimated at 540 per 100,000 births in 2000 (World Bank Health, Nutrition and Population Data).