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Seeing is Believing – Can Increasing the Number of Female Leaders Reduce Sex Selection in Rural India?

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Abstract

Cultural values and traditional views regarding gender roles encourage gender discrimination and the practice of sex selection in India. Increasing political and work force participation of women in India challenges such norms. Exploiting the implementation of an Indian law that required one-third of local political seats to be reserved for women, I investigate the impact of female leadership on sex selection in rural India. I find that higher birth order children are less likely to be male if political seats at the local level have been reserved for women. Additionally, I find that higher birth order female child mortality rates decline once states implement female reservations. After ruling out alternative hypotheses, I argue the underlying mechanism is a change in attitudes due to exposure to female leaders.

(*JEL* J13, J16, I18, O20)

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1 Introduction

While sex selection is a known problem in many Asian countries, most policies designed to prevent it either outright fail or lead to postnatal sex selection and discrimination. Despite the implementation of a ban on ultrasound testing in 1996, sex ratios in India remain skewed. Moreover, improved ability to prenatally sex select has been shown to increase prenatal sex selection while reducing postnatal sex selection suggesting that families substitute between forms of sex selection depending on what is available to them (Lin et al., 2008). One argument is that to reduce sex selection, the underlying son preference must be targeted. To investigate this claim, I examine the case of increased female leadership in rural India that has led to a reduction in sex selection at the highest birth order in rural India.

Son preference in India is generally attributed to the fact that girls leave home after marriage and do not contribute to the family later in life. In a traditional sense, a daughter's contribution to the family is limited to helping with the household chores. Deeply embedded cultural views regarding female roles are challenged as increasing political and work force participation of women in India begin to define the new norm. Increasing the status of women and the exposure to them in leadership roles challenges traditional suppressive beliefs and practices against them.

In 1993, India executed drastic measures at the national level to increase female political representation. The 73rd and the 74th Amendments to India's constitution first established nationally recognized local governments at levels smaller than the state for the first time, and second required that these newly developed local governments reserve one-third of political positions, including those of chairpersons, for women. Within a short window of time following the Amendment's passage, India experienced a large influx of female leaders at the local level. The 73rd Amendment established local governance at the rural level, while the 74th Amendment did so at the urban level. This analysis focuses on governments established under the 73rd Amendment, and as a result, studies rural populations. The 73rd Amendment also established a three-tier system of local governance for which the traditional name for local government, the Panchayat, was adopted. The tiers, in the order of the smallest locality to the largest, were local governments at the village (Gram Panchayat), the block (Panchayat Samiti), and the district level (Zilla Parishad).

Exploiting the timing of elections that reserved seats for women following the 73rd Amendment, I investigate whether an increased political role for women reduces sex selection in rural India. Beaman et al. (2012) suggests that exposure to female leaders improves parents' stated aspirations for female children. In the same vein, I consider whether increasing female visibility and power outside of the household could reduce male preference, and hence sex selection. Currently, there is no study that considers whether female political leadership changes sex selection.

The 73rd Amendment provides a unique opportunity to study the impact of exogenously increased female governance. Even though women in India occasionally serve as state governors, comparing sex selection across states with female governors and states with male governors will not reveal a causal effect of female governance. Of the nine female governors appointed since 1990, six have been in South Indian states that are known for low gender discrimination. This imbalance suggests that female governors are appointed in areas with an already low gender bias. Instead of just comparing states with male governors to states with female governors, I rely on a change in national policy that arguably exogenously increased the number of local government positions held by women.

Intuitively, the implementation of the 73rd Amendment could either increase or decrease sex selection. Frustrations from female leadership in a society where heads of households are typically men could lead to a backlash against women and increase sex selection. It is also possible that female leaders improve access to fertility services and reduce costs of ultrasound and other fertility controlling services, which could also increase sex selection. Alternatively, it could be that female leaders provide better overall health care, from which the marginal children (girls) would have the most to gain, thus improving survival rates for girls. In addition to reserving seats for women, the 73rd Amendment also devolved powers of the government to the local level. If the newly established local governments are more responsive to their constituents' health needs, then this could also lead to an overall health improvement that benefits female children more and reduces sex ratios. The answer might also lie in a mechanism that is more complicated. It could be that being exposed to women leaders changes the underlying beliefs regarding female roles in the family and the perceived return from a daughter, which would decrease male preference.

I study the impact of female leadership on sex selection by exploiting variation in both the timing of when a state has Panchayat elections following the 73rd Amendment (effectively the time that seats for women are first reserved) and in birth order of child to estimate a difference-in-difference (DD) model. The model investigates birth order specific effects, because sex selection is known to occur disproportionately more at higher birth orders.[1] I find that higher birth order children born after a Panchayat election abiding with the 73rd Amendment-that is, after female seats have been reserved-are less likely to be male in rural India. Robustness checks verify that high birth order girls born after reservations for women are less likely to die by age 5, relative to high birth order boys.

With the exception of a few states that have an election in line with the 73rd Amendment *prior* to its coming into force, states have elections at all three levels of Panchayats at the same time. As a result, a methodology that relies purely on timing of Panchayat elections will not reveal which level of female seat reservations (district, block, or village) is most responsible for the effect. To directly explore the source of the effect, I use data on randomly assigned female chairperson reservations at the district level from several states. I study whether a high birth order child born in a district while the chairperson seat was reserved for a woman is less likely to be a boy. Although the district Panchayats govern rural areas of a district, they are most visible in urban areas due to the location of their offices in district headquarters. Additionally, local newspapers often report on activities occurring at the district Panchayat, and readership of newspapers is much more common in urban areas making the members of the district Panchayat better known in urban towns. To test

[1] Chu (2001), Ebenstein (2007), Lin et al. (2008), and Kalsi (2013) also report that sex selection is greatest for higher birth orders. Das Gupta (1987) provides evidence that higher birth order girls are more discriminated against in rural Punjab, India.

whether visibility alone could impact sex selection, I also study the impact of reservations at the district Panchayat for the urban population. In fact, I find that district level Panchayat reservations differentially impacts rural and urban areas, with urban areas exhibiting a decline in sex selection while rural areas have no change. This evidence, coupled with the aforementioned results on rural areas, suggests that in rural Indian communities, the lower level Panchayats at the village or the block level are driving the main results. This is consistent with previous literature, as Iyer et al. (2012) similarly shows that the impact of female leadership on female reporting of crime is through reservations at lower level Panchayats. In contrast to previous findings, my research suggests that researchers studying the effect of district Panchayat reservations should look at urban and rural populations separately, as urban populations may be affected through district level reservations.

Finding that district Panchayat chairperson reservations for women decrease the share of boys in urban areas and not in rural areas also speaks to the underlying mechanism. Since the district Panchayat is responsible for development projects in rural India, there is no reason why an urban population should feel the effect of female reservations at the district Panchayat, except if the mechanism is purely exposure to powerful women.

This paper begins with an overview of existing literature on political seat reservations for women in India in Section 2. Section 3 presents the historical context. Section 3.1 discusses the availability of different methods of sex-selection in India. Section 3.2 provides important background information on the policy change. The timing of when states in the sample have an election is explicitly discussed, and the choice of states in the most preferred sample is explained in Section 3.3. The data sets are explained in Section 4, and Section 5 provides summary statistics. The methodology relies on variation in the timing around when a state has a relevant election reserving seats for women and the birth order of children. The corresponding estimating equation is introduced in Section 6. Other methodologies that exploit data on geographical reservation status of the district level Panchayats is also introduced in Section 6. Section 7.1 presents the main results. Evidence that the estimated difference-in-difference model is valid is shown in both graphs and equations in Section 7.2.

Various robustness checks are studied in Section 8. Section 9 reviews possible mechanisms consistent with the results. Section 10 concludes.

2 Relevant Literature

An extensive literature shows that cultural preferences for boys is associated with a higher ratio of boys (Anderson and Ray, 2010; Das Gupta, 1987; Goodkind, 1996; Lin et al., 2008; Qian, 2008). A large and recent literature also investigates the impact of increased female political roles in India on various economic and behavioral changes. Exploiting the 73rd Amendment, various studies support different effects of female government on economic and behavioral outcomes in rural India. Using data on the randomization of female head assignment of village Pancahayats from Rajasthan and West Bengal, Chattopadhyay and Duflo (2004b) finds that village leaders invest more in infrastructure more closely related to the needs of their own gender. More specifically, female leaders in West Bengal invest more in water and road constructions and less in education, while female leaders in Rajasthan invest more in water and less in roads. Ban and Rao (2008) extends the findings of Chattopadhyay and Duflo (2004b) to South Indian states, where gender disparity is a lesser concern. They find that village Panchayats with female chairs are no better or worse than those with male chairs. Moreover, they do not find evidence supporting Chattopadhyay and Duflo (2004b)'s finding for South Indian states, and chairs are not found to be more likely to serve the needs that more directly impact their own gender.

Beaman et al. (2011) finds that female reservations increased female citizen participation at local political meetings. While there is no impact on the gender of the attendees at the meetings, women are significantly more likely to speak at the village Panchayat meetings when the village Panchayat chair is also a woman. Beaman et al. (2009) finds voters are more likely to elect women as leaders once females have served as the chair of the village Panchayat in West Bengal. The authors argue that the mechanism underlying the effect is a shift in voters' beliefs regarding the effectiveness of female politicians. A different study, Beaman et al. (2012), reports that female political reservations in India increases girls' aspirations and educational attainment. Additionally, the authors find that the gender gap in parents' aspirations for their children closes by 20 percent if the head of the village Panchayat is also a woman. The underlying mechanism is shown to be a role model effect where exposure to successful women reduces gender bias, rather than an institutional change benefitting females. Although previous research suggests that increasing female visibility and power through an increased role in the government affects various behavioral and economic outcomes, to my knowledge there is no research that studies the impact of a female role in government on fertility outcomes in rural India. While researchers have found evidence of increased parental aspirations for their daughters, I investigate whether this also translates into a decreased gender bias at birth and a reduction in sex selection.

3 Background

3.1 Sex Selection Availability

While in the rest of the world, women outnumber men by three to five percent, the 2001 Indian census revealed that men outnumbered women by seven percent in India (Patel, 2007). This distortion in the share of men is attributed to sex selection in India. Families achieve the desired sex ratio of children using various methods. These methods can be summarized to occur either prior to conception, during pregnancy, at birth, or during early childhood (Das Gupta et al., 2003). More specifically, parents can choose to stop childbearing after a birth of a male, use sex-selective technology like ultrasound and abort a female fetus, kill a female infant at the time of her birth, or neglect a daughter which results in her death later in life (Das Gupta et al., 2003).

India legalized abortion in 1971 under the medical termination of pregnancy (MTP) Act (Visaria, 2007). Legal abortion was allowed in cases when pregnancy carried health risks to a woman, endangered her mental health, resulted from rape, or resulted from contraception failure (Visaria, 2007). Due to the many restrictions under which abortion was allowed to be carried out legally and also because of the limited availability of clinics that offered legal abortions, illegal abortions have been estimated to be carried out between 8 to 11 times more often than legal abortions (Chhabra and Sheel, 1993). While illegal providers include non-medical personnel, illegal providers also include medical professionals and gynecologists who are not registered to provide the service (Arnold et al., 2002). According to government statistics, approximately 2.7 in 100 known pregnancies results in an abortion in India (Arnold et al., 2002).

Ultrasound became common in India only after the early 1990s (Clark, 2000). The use of ultrasound and increasing sex-selective abortions led to a feminist movement that demanded the practice of sex-detection to be banned. The Government of India responded with the passage of the Pre-Natal Diagnostic Techniques (PNDT) Act of 1994, which came into force in January of 1996 (Government of India, 2006). The PNDT Act did not ban the use to ultrasound for prenatal care, but prohibited the sex of the child to be revealed. Since the Act, there has been no evidence of a decline in prenatal sex selection (Visaria, 2007), and the enforcement of the law has been practically nonexistent (Arnold et al., 2002). Retherford and Roy (2003) highlights the many loopholes in the law. For example, government clinics are monitored much more closely than private clinics, and private clinics are only required to register if they perform ultrasound (Retherford and Roy, 2003). Moreover, doctors now reveal the sex of the child verbally instead of in writing (Retherford and Roy, 2003). Also, focus group discussions with over 400 women of diverse socio-economic and educational groups in Haryana and Gujarat revealed that while women were aware that sex detection is not available at a public hospital, they knew of private clinics where they could receive a test and how much the test would cost (Visaria, 2007). Anecdotal evidence suggests that competition in the provision of illegal ultrasound has even led to a decline in its price (Visaria, 2007). Ultrasound use has been heterogeneus in India; Mainly, its use to perform sex selective abortions is more prevalent in the urban parts of India (Retherford and Roy, 2003).

While the normal sex ratio is said to be 105 boys per 100 girls for children between the ages 0 and 6, sex ratios in India worsened from 105.8 in 1991 to 107.8 in 2001, and then further worsened to 109 by 2011 (The Economist, 2011). Jha et al. (2011) use all three rounds of the Indian National Family Health Survey (NFHS) and presents the weighted averages of sex ratios at birth for each birth year using two overlapping data points. The trends from Jha et al. (2011) also find a steady worsening of the sex ratios in the 1990 to 2004 period. The next section provides background for the 73rd Amendment.

3.2 Historical Context of the 73rd Amendment

Prior to the adoption of the 73rd and the 74th Amendments, the states were the smallest units of government recognized by the Indian constitution.[2] Public debate over the national government's failure to deliver public services, infrastructure, and alleviate poverty led to a general consensus among politicians that devolving powers to the local level was the solution (Chaudhuri, 2003). The effort to devolve powers have origins dating back to 1989 when earlier versions of the bill were proposed. While earlier incarnations of the legislation were generally well received, they were eventually defeated because the states did not have enough discretion in the implementation of the bill (Chaudhuri, 2003). Allowing states flexibility in design and implementation, the 73rd and the 74th Amendments were re-introduced in the Parliament and were eventually passed in December of 1992. The 73rd Amendment went into effect in April of 1993, whereas the 74th Amendment went into effect in June of 1993 (Chaudhuri, 2003).

The 73rd Amendment established a pyramid structure for local rural government, with the village level Panchayat at the base. The Gram Sabha, or the people, elect members of the village Panchayat and also help to hold elected members accountable and ensure funds are being properly used. The block level Panchayat are next up in the hierarchy of local Panchayats. They provide the link between the village Panchayats and the highest unit of local governance at the district level Panchayat. The district Panchayat provides the direct link between the state and local governments. A graphic representation of the

[2] This section draws heavily from Chaudhuri (2003) and Vyasulu and Vyasulu (1999).

structure of localized government in rural India is shown in Figure 1. On average, there are 28 members of the district Panchayat with each member representing an average of 47,556 people. Similarly, average number of officials at the block level is 22 and each member represents an average of 4,735 people. Village level Panchayat has on average 12 members with each member representing an average of 281 people. The task of the new local government bodies was to implement development plans based on local needs for rural areas. Responsibilities included land improvement, infrastructural and ecological development, poverty alleviation, and development of women, children, scheduled and backward castes in rural areas.

The 73rd Amendment included both mandatory and discretionary provisions. The mandatory provisions called for the establishment of local Panchayats at the village, the block, and the district levels. Further requirements were direct elections, mandatory every 5 years, for Panchayats at all three levels. Seats in Panchayats at all three levels, including those of chairpersons, were to be reserved for historically disadvantaged castes in proportion to their populations. Additionally, one-third of total seats, including those of chairpersons, were to be reserved for women at Panchayats at all three levels. For the most part, elections at all three levels were scheduled at the same time. Note that the law did not require any reservations at the state level, but only at the three tiers of the Panchayat Raj Institutions. The states were given one year to pass conformity acts by either amending existing laws or by passing entirely new laws in line with the 73rd Amendment (Chaudhuri, 2003). Additionally, states were given two years to complete decisions on the new Panchayats and failing to do so posed the risk of losing central government's assistance (Jain, 1996).

In short, the discretionary provisions of the Amendment were those that allowed these local bodies to self-govern. For example, devolution of powers and responsibilities in planning of schemes for development, poverty alleviation, development of women and children were discretionary (Chaudhuri, 2003). While the Amendments set up local bodies of governments, how effective these local bodies were in delivering goods and services to local needs depended on how much power the states bestowed on them. While most states have taken mandatory actions regarding elections, not surprisingly, the level of devolution of power varied across states.

These Amendments were not driven by a grassroots movement, but were instead initiated and implemented due to efforts at higher levels of government (Vyasulu and Vyasulu, 1999). As a result, women were suddenly brought into politics, and most women were somewhat unprepared for the new task (Vyasulu and Vyasulu, 1999). The first round of elections between 1993 and 1994 alone brought in about 800,000 women to work for local governments in a nation where there was very little female involvement in politics initially (Vyasulu and Vyasulu, 1999).

One may wonder in what ways do women serving in local Panchayats interact with the local people. Direct interaction between the people and the Panchayats is greatest at the village level Panchayat. In general, village level Panchayats hold two to three meetings which are led by the chairperson per year. These meetings are open to the public and provide direct interaction between the villagers and the members of the local governments. Through their interactions with the local people as leaders, women serving as Panchayat members have reported enhancement in their status amongst the community, and many even mention that their husbands and families have also gained in status (Jayal, 2006). Even in states with high levels of patriarchy, women report status gains. For example, 72 percent of female members of Panchayats in Madhya Pradesh and 90 percent of women in Rajasthan report an increase in status (Jayal, 2006).

While in rural areas, interaction of the locals with the new Panchayat leaders is greatest at the village level, the same is not true for urban areas. In fact, urban areas are exposed to female leadership at the highest level of the Panchayat, or at the district level. As district Panchayats have offices that are located in the district centers, they are physically more exposed in urban towns. Additionally, newspapers often report on developments occuring at the district Panchayat, and given that readership of newspapers in India is much higher in urban versus rural areas, exposure to female leaders at the district Panchayat is also greater due to newspaper readership in urban areas. Although the district Panchayat is set up under the 73rd Amendment, hence its duties are to serve the rural population, its leaders are more visible to the urban population.

3.3 State Elections

India currently has 28 states, of which three were carved out from existing states after the year 2000. Table 1 provides the most complete list of relevant elections for 18 Indian states I was able to construct. According to the 2011 census, 90.42 percent of the nation's population lives in one of these 18 states. For each state, I report when the state had an election following the 73rd Amendment. For the first election in which the state reserved seats for women, I report both the month and the year of election. States were required to hold elections every 5 years following the first election, and I report the year the state had a second election or third election after the law change. I only report election years up to the year 2004 because the DLHS II was conducted in 2004, and as a result, my main sample only includes children born up to 2004. When possible, I report the last Panchayat election the state had prior to the constitutional establishment of the PRIs.[3] Additionally, I report the state's share of boys born in 1992, a year prior to the law change.

Table 1 shows that there is a great degree of variation in the timing of elections. This could present potential issues of endogeneity in an analysis that relies on the timing of state elections. For example, it is possible that states with delayed elections are simply buying time before they have to adapt to female leadership, in which case the timing of elections will be correlated with male preference. Since the law required that states pass conformity laws in line with the 73rd Amendment within a year and also required that the states complete decisions on their new Panchayats within two years, states that have an election by 1995 are abiding the law. Hence the preferred sample consists of states that have their first election by 1995, or approximately within two years following the law change. This effectively reduces the analysis to 12 states in total. These states are shown in Figure 2.

[3]Local Panchayats have operated prior to the establishment of the 73rd Amendment in some states, albeit enshrining them in the constitution required a three tier system of Panchayats and regularity in elections.

A few states were quite progressive in their adoption of the 73rd Amendment and reserved seats prior to its coming into force. The state of Orissa, for example, held village and block level Panchayat elections between May and June of 1992. These were held according to the provisions of the 73rd Amendment prior to its coming into effect in April of 1993. Similarly the state of Maharashtra also reserved seats for women for Panchayat elections at the district and the village level in November of 1992, prior to the law change. The eagerness of Orissa and Maharashtra to adopt the law *prior* to its coming into force could be correlated with state unobservables that are correlated with the state's male preference. Thus, Orissa and Maharashtra should arguably be excluded from the preferred sample. Additionally, to reduce sex selection, the state of Haryana offered a financial incentive to eligible parents with daughters in 1994.[4] This policy was introduced in the state in October of 1994, while the state had its first election that reserved seats for women in June of 1994. With coinciding timing of these two events, and with treatment determined by timing, it is difficult to distinguish which policy underlies the effect for the state of Haryana. Thus, I also exclude Haryana from the main sample. Limiting the states to those who have their first election by 1995 while excluding Orissa, Maharashtra, and Haryana reduces the analysis to 9 Indian states in total.[5] Although the preferred sample consists of only 9 states, according to the 2011 Indian census, nearly 56 percent of the nation's population resided in one of these states. The location of these 9 states within India is shown in Figure 3. As male preference in India varies by region (e.g. South Indian states do not exhibit a strong male preference), it is reassuring to find that the main sample has states from the northern, eastern and southern regions of India. Because of the spatial variation in the location of the states in the preferred sample, the results are arguably representative of India as a whole.

[4] Haryana is one of the wealthiest states in India with one of the most distorted sex ratios in the nation. To reduce male preference, the state introduced the *Apni Beti Apna Dhan* (ABAD) program in October of 1994. The program provided families with daughters a monetary award within 15 days of her birth, and each girl was also endowed with an additional reward redeemable at the age of 18 (Sinha and Yoong, 2009). Another attempt to reduce sex ratios in Haryana was implemented in September of 2002. *Devirupak* provided monthly cash transfers to couples who chose to be sterilized after the birth of their first child, with a larger transfer paid to families who chose to be sterilized after a birth of a daughter (Anukriti, 2013).

[5] West Bengal has elections that reserve seats for women in May of 1993, which was only 1 month following the 73rd Amendment. Thus, one could argue that the state of West Bengal is behaving progressively as well. The omission of West Bengal from the preferred sample yields similar results.

4 Data

The main specification uses two data sets. First, I use data from the District Level Health and Facility Survey (DLHS), which were purchased from the International Institute for Population Sciences (IIPS) in Mumbai, India. These data include detailed information on a woman's fertility history. For each pregnancy, I have information on the child's date of birth, birth order, gender, and information on whether the child is still alive. The data also provide information on household and mother's characteristics. The finest level of location identified in the DLHS is at the district level. In addition to the fertility survey, I construct a data set on when the new policy of reserving female seats in each state became effective. Because states in India have control over when local elections for Panchayats are held, female seats were not reserved until a state had its first Panchayat election. I collect information on when each state had Panchayat elections following the passage of the 73rd Amendment. Most states have elections at all three levels of PRIs at the same time. States that diverge from having a collective election are generally those that have an election prior to the 73rd Amendment, in which they only had elections at some of the levels during their first round of elections.

The data on election timing are mostly collected from a textbook titled *Status of Panchayati Raj in the States and the Union Territories of India 2000*. I also rely on states' Panchayat websites to provide information on the timing of the first election that reserved seats for women. Linking the fertility and state election data sets together, I define treatment as whether a child is born after his/her state had its first election that reserved seats for women.

A key feature of the 73rd Amendment is that female seat reservations were assigned at random in most states. Since fertility data from the DLHS provide district level information, I also make use of data on district Panchayat reservations of chairpersons. The data on district Panchayat chairperson reservations allow me to explore whether reservations at the highest PRI level explain the effect. If district level Panchayats reservations do not affect sex selection in rural India, it is implied that reservations at lower levels of PRIs, the block or the village, explain the reduction in sex selection observed in this analysis.

5 Summary Statistics

Table 2 provides summary statistics for mothers in the preferred sample using the DLHS. I split the table between mothers in the sample with at least one child who is born after their state reserved seats for women and mothers with no children born following reservations. In general, mothers with at least one child born after their state reserved seats are younger, less likely to be able to read and less likely to come from houses that are made of strong construction. While they have more children born, they have fewer children who have died. While there are no more or less boys born to mothers with at least one child born after reservations, there are significantly more girls born to them.

Tables 3 and 4 provide summary statistics in line with the main estimating equation. Table 3 shows the change in the birth order-specific share of boys for children born in law abiding states that had an election by 1995, while excluding Orissa, Maharashtra, and Haryana. I find that 53.4 percent of the children born at birth order 3 or greater before reservations for women go into effect are male and that this ratio declines to 52.1 percent for children post-reservations. The share of boys at birth order 1 increases from 51.7 percent to 52.1 percent following reservations, but this change is not statistically significant. The summary difference-in-difference estimate finds an overall decline of 1.7 percentage points in high birth order share of boys, and it is statistically significant at the 1 percent level.

Table 4 shows that the share of boys decreases from 52.2 percent to 52.1 percent for birth order 2 children, but this decline is not statistically significant. These summary statistics provide evidence that share of boys declines for the highest birth order children, but it is not implied that all sex selection is eliminated as mean sex ratios remain above the normal share of boys at 51.2 percent.

Similarly, Table 5 shows that both boys and girls are less likely to be reported dead by the age of 5 if they are born following the reservation of female seats. This effect could be explained by health improvements over time. However the drop in death rate by age 5 is greater for girls than for boys by 0.9 percentage points. This difference-in-differences estimate is statistically significant at the 1 percent level. These summary statistics are provided in the spirit of the main methodologies, which I discuss next.

6 Methodologies

6.1 Sex Ratios

The main specification is a difference-in-difference model described in Equation (1). In this model, the first difference is across time, looking before and after an election that reserves seats for women, and the second difference is across birth order of child.

$$\begin{aligned} Boy_{ics} = \beta_1 I(Order \geq 3)_i \times Post\ Reserve_{cs} + \beta_2 I(Order = 2)_i \times Post\ Reserve_{cs} \\ + \beta_3 Post\ Reserve_{cs} + \beta_4 I(Order \geq 3)_i + \beta_5 I(Order = 2)_i + \gamma_s + \theta_c + \Gamma X_{ics} + \epsilon_{ics} \end{aligned} \tag{1}$$

The dependent variable is an indicator variable for whether or not child i, of birth cohort c, born in state s, is a boy. $Post\ Reserve_{cs}$ is an indicator variable for whether the child is born after his/her state had its first Panchayat election following the Amendment, or equivalently after the first time the child's state reserved seats for female leaders. As families tend to sex select the most at the highest birth orders, I interact the effect of being born after reservations were adopted, $Post\ Reserve_{cs}$, with indicators for both birth order 2 and birth order 3 or greater separately. Although my results indicate that most sex selection in India occurs at birth orders 3 or greater, by including separate effects for birth order 2, I am able to explore any changes that may occur at the second birth order as well. Children of birth order 1 are the omitted category, and β_1 and β_2 are the parameters of interest. They compare changes in the likelihood that a child born at high birth orders after reservations for women are made is a boy with changes in the likelihood that a child born at the first birth order after reservations is a boy. Also included are fixed effects for birth orders 3 or greater and birth order 2. To increase the precision of how the treatment is defined, I use both month and year variation to code birth and post-reservation dates. Also included in the regression are state fixed effects that control for state-specific differences in the ratio of boys. Fixed effects for birth year of the child are also included to help control for annual trends in the ratio of boys in rural India.[6,7] Note that the coefficient on $Post\ Reserve_{cs}$ is estimated using variation in the timing of elections across states, so it is still identified even with the inclusion of birth year fixed effects. I also control for factors that affect a mother's fertility and her son preference, such as age at the time of the child's birth, literacy, and religion. The type of house the family resides in (whether the construction of the house is considered weak, semi-strong, or strong) is included as a proxy for household income. I cluster the standard errors at the state level. The number of clusters in the most preferred sample is small (9 states) and clustering underestimates standard errors when there are such few groups (Cameron et al., 2008). To deal with this issue, I also present p-values testing the null of zero effect using wild bootstrap-t methods discussed in Cameron et al. (2008). The validity of a DD design assumes that once all other variables are controlled for, trends in high and low birth order ratios are identical and that they would remain identical in absence of the law change. Evidence supporting this assumption is presented in Section 7.2.

While the law change could be viewed as exogenous, a state's ability to choose when to have an election following the law introduces issues of endogeneity. Since the timing of the first election and sex selection within a state may be correlated, Equation (1) may not reveal a causal effect. To deal with this issue of endogeneity I limit the analysis to states that are behaving in a law abiding manner and have elections by 1995. For reasons mentioned already, I also exclude Orissa, Maharashtra and Haryana from the preferred sample. Nevertheless, I present results for all states for comparison.

[6] As sex selection does not generally occur at birth order 1, an argument for comparing birth order 2 to birth order 3 and greater can be made to better capture trends in sex selection. Results in this analysis are robust to comparing birth order 2 children to birth order 3 or greater children.

[7] Results are also robust to including state-specific linear time trends.

6.2 District Panchayat Reservations

A key feature of the 73rd Amendment is that female seat reservations were assigned at random in most states. Since fertility data from the DLHS provide district level information, I exploit the random assignment of female chairpersons at the district Panchayat. I present results from using district Panchayat reservation status from Rajasthan, West Bengal, Gujurat, Andhra Pradesh, and Kerala. These are the states for which I have district Panchayat reservation status on the first election, and those that did not reserve seats at the district level prior to the passage of Amendment 73. Using district level data, I estimate a DDD model described in Equation (2). It is analogous to Equation (1) in that it interacts treatment with birth order and a post election variable. Additionally, Equation (2) exploits variation in district chairperson reservation status. As such, the DD terms are also interacted with the main effect of whether the district was reserved for a woman chairperson in the first election. I estimate the equation for a sample of children born between 1990 and before the second round of elections that reserved seats for women. This allows me to cleanly identify the effect of the district Panchayat chairperson reservation on the likelihood that the child is male, as the control group have never been reserved before. As mentioned above, district Panchayat offices are located in urban district headquarters, but do not control services or spending in those areas. Additionally, local newspapers often report developments at the district Panchayat. Given that readership of newspapers is much greater in urban areas, access to newspapers also increases exposure to district Panchayat leaders in urban vs rural areas.[8] Then if the underlying mechanism of the effect of female reservations on sex ratios is simply exposure to women leaders and not a change in access to services, urban populations could be affected by reservations. Hence, I estimate Equation

[8]The 2005-2006 NFHS data reveal that 70 percent of the men in rural areas who were 20 years of age or older in 1995 read a newspaper with less frequency than once a week. The analogous ratio for men of the same age distribution was only 30 percent in urban areas. Similar estimates for women age 20 or older in 1995 reveals that 85 percent of them in rural areas read a newspaper with less frequency than once a week. However, amongst women that were of age 20 or older in 1995, 57 percent of them read a newspaper with less frequency than once a week in urban areas. This suggests that readership of newspapers around the law change was much more prevelent in urban areas making urban areas more aware of the female leaders at the district level Panchayat.

(2) for both urban and rural populations separately.

$$\begin{aligned} Boy_{idc} = {} & \beta_1 I(Order \geq 3)_i \times Reserved_d \times Post_{dc} + \beta_2 I(Order = 2)_i \times Reserved_d \times Post_{dc} \\ & + \beta_3 Reserved_d \times Post_{dc} + \beta_4 I(Order \geq 3)_i \times Reserved_d + \beta_5 I(Order = 2)_i \times Reserved_d \\ & + \beta_6 I(Order \geq 3)_i \times Post_{dc} + \beta_7 I(Order = 2)_i \times Post_{dc} + \beta_8 I(Order \geq 3)_i \\ & + \beta_9 I(Order = 2)_i + \beta_{10} Post_c + \gamma_c + \rho_d + \Gamma X_{idc} + \epsilon_{idc} \end{aligned} \tag{2}$$

The dependent variable is an indicator for whether the child is a boy, and it is regressed on the interaction of whether the chairperson seat at the district Panchayat was reserved for a woman, $Reserved_d$, with whether the child is born after the district reservations were made, $Post_{dc}$, and the birth order of the child. The double interactions, and the main effects of the DDD model are also included. The model includes birth year and district fixed effects. Note that the main effect of reservation drops out because the model includes district fixed effects. Additional controls for mother's age at time of birth, mother's literacy, mother's religion, and the type of house the household resides in are also included in X_{idc}. Assuming randomization occurs successfully, a causal effect of a female leader at the district Panchayat on the likelihood that the child is a boy can be determined. Randomization would entail that the districts with chairperson seats that were eventually reserved for women did not exhibit differential sex selection at higher birth orders before the reservations actually went into place. That is, randomization requires that β_4 and β_5 are not statistically different from zero. I find this to be the case.

7 Results

7.1 Sex Ratios

Table 6 presents the main results that estimate Equation (1). Column 1 reports the results from estimating the equation for all eighteen of the states in Table 1. For the entire sample, a child born at the third or higher birth order after a state reserved seats for women is about 0.81 percentage points less likely to be a boy, while children born before the law change were

0.64 percentage points more likely to be a boy if they were born at the highest birth order. This decline in high birth order sex ratio for the entire sample is statistically significant at the 12 percent level. Column 2 limits the sample to states that were law abiding and had their first election by 1995. For the set of law abiding states, children born at the highest birth order prior to the law change are 0.91 percentage points more likely to be a boy in comparison to first birth order children. The likelihood that the child is a boy at the highest birth order declines by 1.34 percentage points if the child is born after the state had elections that reserved seats for women in compliance with the 73rd Amendment. Column 3 limits the sample to law abiding states and excludes the states of Orissa, Haryana, and Maharashtra for reasons discussed above. This leads to a larger reduction in high birth order sex selection (1.88 percentage points). While children of the highest birth order born prior to female seat reservations were nearly 1.17 percentage points more likely to be male, the reduction of the likelihood that the child is a boy by 1.88 percentage points more than offsets the excess higher birth order sex selection. Finally, Column 4 further restricts the sample and compares changes in sex ratios for children born right around the law change, or those born between 1991 and 1995. When looking for an effect right around the law change, I find that high birth order children are 2.95 percentage points less likely to be a boy. Finding a similar effect in a such a narrow window is reassuring as it can more plausibly be argued that changes in unobservables following reservations for women are not explaining the effect. Although previous literature finds that the Indian ban on ultrasound did not deter prenatal sex selection, finding an effect within the birth year window of 1991 and 1995 is also evidence that the enforcement of the ban in 1996 does not explain the effect.

In Columns 3 and 4, the number of states reduces to 9 states. Bertrand et al. (2004) shows that clustering yields over-rejection of the null hypothesis of no effect when the number of clusters falls below 10. Cameron et al. (2008) proposes a solution and presents wild bootstrap-t technique for when the number of clusters is small. I present the p-value for the coefficient of interest using the wild bootstrap-t techniques of Cameron et al. (2008).[9] However due to computational limitations, the full model of Equation (1) is not estimated. Instead, the p-values are estimated for a model identical to Equation (1) but which replaces birth year fixed effects and mother's age fixed effects with linear time trends for birth year of child and mother's age at the time of birth respectively.[10] This method rejects the null of a zero effect at the 0.4, and 10.1 percent level in Columns 3 and 4 respectively when the number of clusters are reduced to 9.

These results are consistent with the prior that the involvement of females into politics could reduce gender preference and sex selection. In general, I find that children born at the highest birth order are less likely to be a boy if they are born after the state requires local Panchayat positions to be held by women. To validate these results, next, I rule out the claim that there was a pre-existing trend of declining high birth order sex selection before reservations for women went into effect.

7.2 Trends

7.2.a Falsification Tests

A difference-in-difference estimation relies on the assumption that in the absence of a policy change, trends between the treatment and the control groups would have remained identical. I provide supporting evidence for this claim by testing whether the trends in the ratio of boys at birth order 1 is identical to that of higher birth order children before reservations for women were made. Table 7 presents results from performing falsification tests that investigate whether the estimation of Equation (1) yields an effect for placebo-treatment years prior to the law change. If trends prior to the law change are not different across birth order, I expect the effect of a "treatment" year prior to the law change to be zero. Table 7 estimates Equation (1) for a sample of children born between 1987 and 1992 in states

[9] I use the Stata program cgmwildboot.ado written by Judson Caskey.

[10] Although the model produces nearly identical results, in comparison to the full model, clustering standard errors at the state level yields slightly larger standard errors when birth year fixed effects and mother's age at the time of child's birth fixed effects are replaced with linear time trends for each.

that had their first election reserving seats for women by 1995 while excluding Orissa, Maharashtra, and Haryana. Specifically I test for whether there are statistically significant changes in the share of boys across different birth order children born in or after 1988, 1989, 1990 and 1991 separately in Columns 1 through 4 respectively. Since seats for women have not yet been reserved for a sample of children born between 1987 and 1992, I expect that the birth order-specific share of boys does not vary over time. Results of Table 7 show that within the set of children born prior to when reservations for women went into effect, higher birth order children are not statistically less likely to be a boy if they are born in or after different placebo-treatment years. Finding no effect in a time period we do not expect one suggests that the main results are not just capturing a pre-existing decline in higher birth order male preference.[11]

7.2.b Decomposing the Effect by Years-Since the First Election

Although Table 7 helps establish that there was no downward trend already occurring in high birth order sex selection, treatment defined in the main specification does not occur at a fixed time, but at various times that states have relevant elections. To investigate a trend more in line with the DD design, I investigate heterogeneous effects across time since election. Figure 4 presents the coefficient estimates from Equation (1) for children born at birth orders 3 or greater, while allowing the effect to vary depending on how many years since the election the child is born. These coefficient estimates are provided for the preffered sample which includes states that have elections by 1995, while excluding Orissa, Maharashtra, and Haryana. The graph shows coefficient estimates of changes in sex ratios for children born 6 years prior to the election up to children born 8 years following the election. Also shown are the 95 percent confidence intervals for each point estimate. The omitted category identifies low birth order children born 7 years prior to a relevant

[11] Although the number of clusters is small, I do not estimate p-values using wild bootstrap-t methods as in the main results of Table 6. Since clustering when the number of groups is smaller than 10 underestimates standard errors, not finding an effect when clustering at the state level is more conservative in ruling out a pre-existing trend.

election. The graph shows that the estimated change in the likelihood of a high birth order male born prior to when reservations are made are boys fluctuates around -0.02, however immediately following seat reservations for women went into effect, this estimate begins to fluctuate around -0.04. This suggests the likelihood that a high birth order child is male declined within one year following reservations for women, and that the decline in sex ratios remained relatively persistent until 8 years following the time seats for women were reserved. Additionally, it can be seen that a 95 percent confidence does not reject a zero effect for children born prior to reservations. However, the decline reported for children born 1, 2, 3, 5, and 8 years following reservations is statistically different from zero with 95 percent confidence.

Figure 5 shows similar years-from-election point estimates of Equation 1 for birth order 2. There is no obvious decline in the estimated effect for boys born at birth order 2 following the law change. The graph appears nearly symmetric, verifying the findings of Table 6 that reservations for women did not lead to a decline in the likelihood that a child is a boy at the second birth order. Additionally the null hypothesis of a zero effect cannot be rejected for children born in the entire window between 6 years prior and 8 years since the timing of election.

7.3 District level Reservations

Table 8 shows the estimates from Equation (2) that studies the impact of actual reservations at the district Panchayat for urban and rural areas. Despite the fact that the district Panchayat is responsible for rural and not urban development, district Panchayat offices are located in urban district headquarters, and as such it is possible that reservations at the district Panchayat could also affect urban populations through increased exposure to female leaders. Additionally, media coverage of developments at the district Panchayat are reported in local news papers. Due to higher readership of newspapers in urban areas, newspaper coverage also makes the district Panchayat more visible in urban areas. Thus, unlike all of the other estimation results in this study thus far that only study rural areas, when studying the direct effect of district Panchayat reservations, I look at both urban and rural communities. Column 1 presents the estimation results for rural areas, and I do not find that district chairperson reservations for women had a statistically significant impact on the likelihood that a child is a boy. In urban areas, however, female district reservations lead to a 6.52 percentage point decline in the share of boys for children born at the highest birth order (Column 2). While other studies confirm that the root of the effect of female reservations in line with the 73rd Amendment most likely lies in female reservations at lower level Panchayats, here I find evidence that the district Panchayat reservations had heterogenous effects across urban and rural areas.

Note that the coefficients on $I(Order \geq 3) \times Reserved$ and $I(Order = 2) \times Reserved$ are statistically indistinguishable from zero. This suggests that district Panchayat chairperson reservations were as good as random, because the share of boys at high birth orders were not statistically different in districts that eventually reserved seats for women prior to when reservations were made.

8 Robustness Checks

8.1 Sex Selective Death by Age 5 Rates

Sex selection in India often still occurs after birth and prenatal choices such as sex-selective abortions are less common (Das Gupta et al., 2003). Thus, I expect to find that some of the changes in sex ratios are explained by changes in death rates. As high birth order girls experience higher levels of discrimination, any decline in death rates by age 5 for all girls will likely be disproportionately greater for girls born at high birth orders. Equation (3) studies the impact of Panchayat elections following the 73rd Amendment on gender and birth order-specific reported death by age 5 rates.

$$
\begin{aligned}
Died_{ics} = {} & \beta_1 I(Order \geq 3)_i \times Post_{cs} \times Girl_i + \beta_2 I(Order = 2)_i \times Post_{cs} \times Girl_i \\
& + \beta_3 Post_{cs} \times Girl_i + \beta_4 I(Order \geq 3)_i \times Post_{cs} + \beta_5 I(Order = 2)_i \times Post_{cs} \\
& + \beta_6 I(Order \geq 3)_i \times Girl_i + \beta_7 I(Order = 2)_i \times Girl_i + \beta_8 Post_{cs} + \beta_9 Girl_i \\
& + \beta_{10} I(Order \geq 3)_i + \beta_{11} I(Order = 2)_i + \gamma_s + \theta_c + \Gamma X_{ics} + \epsilon_{ics}
\end{aligned} \tag{3}
$$

I estimate a difference-in-difference-in-difference (DDD) model with the three differences being across birth order, whether the child is born before or after reservations are made, and the gender of child. $Died_{isc}$ is a dummy variable indicating that child i, of birth cohort c, in state s, has died by 5 years of age. It is regressed on the interaction of whether the child is born after the state had a relevant election with a dummy variable for whether the child is a girl and also interacted with whether the child is born at a high birth order. Here, β_1 indicates the additional change in the probability (in percentage points) of death for high birth order females relative to that of high birth order males after reservations for women are made. Additional controls are as described in Equation (1).

Table 9 presents the results from estimating Equation (3). I find that in comparison to higher birth order boys born after the law change, higher birth order girls are significantly less likely to be reported dead by age 5 by 1.38 percentage points if they are born after their state had an election that reserved Panchayat seats for women. Applying method of wild bootstrap-t to account for a small amount of clusters yields a p-value of 0.15. As before, due to computational difficulties, birth year and mother's age at the time of birth fixed effects are replaced with their respective linear trends when bootstrapping techniques are applied.

Results in Table 9 show that girls in general are less likely to be reported as dead, as the coefficient on *Girl* is negative and statistically significant. High birth order girls, however, are significantly more likely to be reported as dead. While one may suspect that this is just a fertility effect and that high birth order children come from larger families so they are more likely to die, the same is not true for boys. Since first birth order boys are the omitted category, the estimated coefficient on $I(Order \geq 3)$ and $I(Order = 2)$ provide the differential in death by age 5 rates for high birth order boys in comparison to boys born at birth order 1. Negative and statistically significant coefficients on high birth order fixed effects indicate that high birth order boys are less likely to be reported dead by age 5 than their low birth order counterparts. Both high death rates for high birth order girls and low death rates for high birth order boys are consistent with high birth order sex selection.

Also, note that coefficients on $I(Order \geq 3) \times Post$, $I(Order = 2) \times Post$ and $Post$ are not negative. This is important because it implies that the reduction in sex ratios is not likely explained by improved health care for all children provided by female leaders. If this were the case, then health improvements should also be observed for boys. Instead, I find that reported deaths for higher birth order boys increased after female leaders are brought into power. This may appear somewhat shocking, but since higher birth order boys were 1.5 percentage point less likely to die by age 5, the increase in death rates following reservations by 0.5 percentage points implies that the disproportion that existed in the death rates for high birth order boys declines. Overall, it does not appear that differential investments in health or public goods associated with the involvement of women in politics explain the results.

8.2 Ultrasound ban in 1996

India's ban on ultrasound was enforced starting in January of 1996 (Arnold et al., 2002). Column 4 of Table 6 finds an effect for children born prior to the enforcement of the ban, suggesting that the ban does not explain the effect reported in this analysis. Here, I provide further evidence that the effect of reduced sex selection in the main analysis is not explained by the enforcement of the ban on ultrasound. I estimate the differential in high birth order sex ratios for children born in or after 1996 while controlling for the time when reservations for women were made. These results for the preferred sample of states that have an election by 1995 excluding Orissa, Maharashtra, and Haryana are presented in Table 10. In fact, once the effect for being born following reservations is controlled for, the legal ban in 1996 appears to be associated with an increase in sex ratios. This is consistent with the literature suggesting that sex ratios in India have continued to rise regardless of the ban.[12] Note that since the sample is states that have an election that first reserves seats for women by 1995, *Post* 1996 does not coincide with timing of first election that reserved seats for women in this specification.

While Table 10 verifies that the enforcement of the ban did not deter sex selection, and hence does not explain the effect, some may question that the passage of the Act in 1994 (prior to the enforcement) explains the effect of reduced sex ratios. If the knowledge of the Act itself in 1994 results in a decline in ultrasound provision, then one could argue that the finding of reduced share of boys in the analysis is explained by the knowledge of the ban which correlates with the timing of reservations for the main sample between 1993 and 1995. To verify that providers did not respond to the knowledge of the act prior to its enforcement in 1996, I investigate whether the treatment as defined in Equation (1) has an impact in urban areas where ultrasound use is most prevalent. As *Post Reserve* is a dummy variable indicating that a child is born following a Panchayat election that applied to rural areas only, I expect that urban areas do not experience a statistically significant change in share of boys. Table 11 presents evidence that the policy change is likely not explained by a decline in the provision of ultrasound due merely to the passage of the bill banning ultrasound in 1994, because urban areas do not experience a decline in sex ratios following the timing of reservations of Panchayats even though ultrasound use is more prevalent there.[13]

[12] While 1996 is associated with an increase in the share of boys, the effect of seat reservations does not dissipate entirely after 1996 and the sum of the two effects is statistically different from zero at the five percent level.

[13] Table 11 presents results for the birth year window in the main analysis, 1987 to 2004, but narrowing the window 1987 to 2000 yields similar results and the policy change has no statistically significant impact in urban areas.

8.3 Change in Sex Ratios for Surviving Children

The main sample in this analysis constructs sex ratios from all reported children. As discussed in Rose (1999), one potential issue present in survey data may be that deaths of girls are disproportionately underreported. Greater underreporting of deaths of female children biases measures of reported sex ratios. To specifically show that disproportional "forgetting" of female children is not driving the main effects shown in Table 6, I estimate Equation (1) for the most preferred sample of states for a sample of surviving children. Table 12 presents these results. For a sample of surviving children, I find that high birth order children are 2.5 percentage points less likely to be boys. Accounting for children who have died is useful because not all deaths are sex selective, and as such, results using only live children may be biased. Nevertheless, finding an effect for a sample of surviving children is evidence that changes in underreporting of high birth order female deaths is not driving the effect.

8.4 The West Bengal Case

An additional robustness check considers the impact of reservations in West Bengal, the single state in which Panchayat elections have operated in a regular fashion. The state has held a Panchayat election every 5 years since 1978 and its election following the 73rd Amendment was also 5 years after its previous election. Thus, timing of the state of West Bengal's election can be more confidently argued to be exogenous. Table 13 presents the estimation of Equation (1) for the state of West Bengal alone. Within the state of West Bengal, children born at birth orders 3 or greater after reservations are 4.98 percentage points less likely to be a boy. There is also a reduction in second order sex ratios following reservations by 3.74 percentage points. The model includes birth year fixed effects and standard errors are clustered at the district level.[14]

[14] Treatment occurs in May 1993 for West Bengal. With the inclusion of birth year fixed effects, while still identified because treatment is defined at both month and year, the meaning of the coefficient on *Post Reservation* is not that of a typical difference-in-difference model. The estimate on *Post Reservation* can be interpreted as the difference in the likelihood of having a boy if the child is born after the month of May in 1993. It can be seen that, of the children born in 1993, children are nearly 6 percentage points

8.5 South Indian States

India has a considerable amount of geographical variation regarding son preference. For example, South Indian states are known not to exhibit such a strong male preference. The region of South India consists of the states of Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu. In fact, the data show that these states have a relatively normal ratio of boys at 51.9 percent for children born in rural areas between 1987 and 1992. Since these states already have low sex ratios and male preference, reservations of seats for women should not impact sex ratios. I present results from estimating Equation (1) for a sample limited to South Indian states in Table 14. As expected, I find that for these states, reservations of seats for women did not reduce sex ratios, as the coefficient estimate for high birth order children is a small negative (half a percentage point) and it is statistically indistinguishable from zero.

9 Possible Mechanisms

I argue that the underlying mechanism behind these results is exposure to female leaders, which shifts parent's beliefs regarding what their daughters can achieve. I provide direct evidence supporting this claim and refute alternative hypotheses. For example, one might argue that investments in public health associated with female leadership would disproportionately help the health of marginal children (high birth order girls), and this could be driving the results. However, it can be seen in Table 9 that reservation of women did not result in an overall improvement of health for other children. There is no evidence that the timing of elections improves overall health of boys at any birth order. Furthermore, estimates for the effect of reservations on higher birth order-specific death rates for boys are positive, suggesting that reservations did not lead to better overall health for all children.

Another potential mechanism refuted by these results is that the movement to decentralize power to local governments led to improved provision of health services at the local

more likely to be boy if the are born in the months after May. This suggests this effect is likely driven by seasonality. Results in this paper are robust to the inclusion of month fixed effects.

level. While reservations for women and the devolution of powers coincide in most states, the West Bengal case establishes that the latter is not driving the change in sex selection. West Bengal devolved powers and established a functioning Panchayat system of government at the local level well before the passage of the 73rd Amendment, however reservations for women were not made until after the passage of the Amendment. Finding an effect for a state that had already set up a form of local governments suggests that the mechanism is not solely explained by devolving government power to the local level.

Additional support for the mechanism being exposure to female leaders lies in the results from investigating the impact of district level Panchayat reservations on sex ratios. The duties of the district Panchayat focused on development of rural populations, however, the main offices of the district Panchayat are located in the district headquarters, which are largely urban areas. Moreover readership of newspapers, in which activities of the district Panchayat are often reported, is much greater in urban areas, suggesting that exposure to women leaders is higher in urban areas. I find reservations at the district Panchayat did not impact the rural population, but led to a decrease in high birth order share of boys for the urban population. This implies that changes in sex ratios were not a part of a particular development strategy, otherwise rural and not urban areas would be impacted. Finding that urban and not rural areas are affected by district Panchayat reservations is suggestive that the underlying mechanism is increased exposure to important female leaders that would have been more directly visible in urban areas. Altogether, evidence in this article suggests that the likely mechanism is exposure to female leaders, and neither a change in spending that disproportionately helps high birth order females or devolution of powers to the local government likely explains the effect.

10 Conclusion

This paper shows that the share of boys at high birth order declines for children born following seat reservations for women. I also find that reported death rates for higher birth order girls decline. My findings are consistent with the prior that female political empowerment can reduce gender bias, and hence sex selection. The results in this analysis are also robust to various tests. The source of the effect in rural areas appears to be reservations for women closest to home, at the village level or the block level Panchayat. This is indicative that exposure to female leaders is important. In addition, I find that reservations at the district level decreased sex ratios in urban India and not in rural India. These results further validate the idea that visibility of female leaders is of greatest importance in the relationship between sex selection and female reservations, as the female leaders of the district level Panchayat are more visible to the urban population due to newspaper readership and the location of the district Panchayat buildings. I also rule out that other mechanisms, such as improvements in health services or devolving of powers to the local government are driving the effect.

These results also shed light on previous findings in the literature on sex selection. Kalsi (2013) shows that sex selection in Taiwan is more prevalent following the legalization of abortion, and that girls born at high birth orders are more likely to attend a university if they are born following the legalization of abortion. This result is consistent with the hypothesis that prenatal and postnatal discriminations are substitutes (Lin et al., 2008; Goodkind, 1996) and implies that bans on prenatal sex selection could lead to increased postnatal sex selection, postnatal female discrimination, and the prevalence of dangerous illegal abortions. A better way to deal with the issue would be to target the underlying son preference that leads to sex selection by addressing the status of women directly. This research provides an example of one such policy, the reservation of local seats for women, that is shown to reduce the prevalence of sex selection.

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Table 1: Panchayat Election Dates

	Post Reservation				Pre Amendment	Share of Boys
	Election 1		Election 2	Election 3	Election	1992
State	Month	Year	Year	Year	Year	
Orissa	May	1992	1997	2002	1992	0.486
Maharashtra	Nov	1992	1997	2002	1992	0.509
West Bengal	May	1993	1998	2003	1988	0.544
Karnataka	Dec	1993	2000			0.518
Haryana	June	1994	2000		1991	0.519
Madhya Pradesh	June	1994	2000		1982	0.521
Tripura	August	1994	1999	2004		0.547
Rajasthan	March	1995	2000		1988	0.537
Andhra Pradesh	March	1995	2001		1970	0.504
Uttar Pradesh	April	1995	2000			0.541
Gujarat	June	1995	2002		1975	0.532
Kerala	Sept	1995	2000			0.525
Tamil Nadu	Oct	1996	2001		1986	0.520
Goa	Jan	1997	2002		1991	0.477
Manipur	Jan	1997	2002		1978	0.515
Punjab	June	1998	2003		1993	0.537
Assam	Nov	2000			1992	0.581
Bihar	April	2001			1978	0.523

Election dates up to 2004 for every state. The last pre-Amendment Panchayat election date is reported.

Table 2: Summary statistics for mothers in the sample

At least 1 child born after reservations?	No	Yes	Diff
Age	32.98	25.95	-7.03***
Mother is Literate	0.48	0.40	-0.08***
Total Children Dead	1.87	1.78	-0.09***
Total Children Born	2.34	2.70	0.36***
Total Boys Born	1.39	1.39	0.00
Total Girls Born	0.96	1.32	0.36***
Have a Strong House	0.33	0.21	-0.13***
Age at First Birth	18.81	18.37	-0.44***
Observations	9,497	89,530	

Sample weights used. Sample restricted to mothers with children born between 1987 and 2004 in states that have elections that reserve seats for women by 1995. Haryana, Maharashtra, and Orissa excluded from sample.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3: Birth Order 3 or Greater: Differences in mean share of boys

	Pre Reservation	Post Reservation	Diff
$Order \geq 3$	0.534	0.521	-0.013***
$Order = 1$	0.517	0.521	0.004
Diff	0.017***	0.000	-0.017***

Sample weights used. Sample restricted to children born between 1987-2004 in states that reserve seats for women by 1995. Haryana, Maharashtra, and Orissa excluded from sample.
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Birth Order 2: Differences in mean share of boys

	Pre Reservation	Post Reservation	Diff
$Order = 2$	0.522	0.521	-0.001
$Order = 1$	0.517	0.521	0.004
Diff	0.005	0.000	-0.005

Sample weights used. Sample restricted to children born between 1987-2004 in states that reserve seats for women by 1995. Haryana, Maharashtra, and Orissa excluded from sample.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Mean differences of gender-specific death by age 5 rates

	Pre Reservation	Post Reservation	Diff
	Pre	Post	
Girl	0.076	0.056	-0.02***
Boy	0.072	0.061	-0.011***
Diff	0.004**	-0.005***	-0.009***

Sample weights used. Sample restricted to children born between 1987-2004 in states that reserve seats for women by 1995. Haryana, Maharashtra, and Orissa excluded from sample.
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Birth Order-specific change in share of boys

VARIABLES	(1) boy	(2) boy	(3) boy	(4) boy
$I(Order \geq 3) \times Post\ Reserve$	-0.00805	-0.0134**	-0.0188**	-0.0295**
	(0.00498)	(0.00591)	(0.00593)	(0.00916)
$I(Order = 2) \times Post\ Reserve$	0.000424	-0.000999	-0.00554	-0.0189
	(0.00550)	(0.00680)	(0.00804)	(0.0193)
$Post\ Reserve$	0.00607	0.00766	0.0184	0.0250
	(0.00765)	(0.0122)	(0.0160)	(0.0192)
$I(Order \geq 3)$	0.00643*	0.00910*	0.0117**	0.0115
	(0.00328)	(0.00422)	(0.00397)	(0.00859)
$I(Order = 2)$	0.000911	0.000948	0.00328	0.00610
	(0.00346)	(0.00485)	(0.00510)	(0.00819)
Reservations by 1995?	No	Yes	Yes	Yes
Orissa, Maharashtra & Haryana Included?	Yes	Yes	No	No
Birth Years	1987-2004	1987-2004	1987-2004	1991-1995
N States	18	12	9	9
Wild Bootstrap-t p-value on $I(Birth\ Order \geq 3) \times Post$	0.17	0.07	0.004	0.101
Observations	589,224	437,667	339,286	166,075

Sample weights used. State clustered standard errors. All specifications include birth year, state, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects.

P-value reported for $I(Order \geq 3) \times Post\ Reserve$ using wild bootstrap-t methods as discussed in Cameron et al. (2008) with 1000 repetitions. Methods using wild bootstrapping could not be applied to the full model with all of the fixed effects, p-value is from identical model except birth year fixed effects and mother's age fixed effects are replaced with linear trends for birth year and mother's age respectively.
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Falsification Tests: Birth Order-specific change in share of boys

VARIABLES	(1) boy	(2) boy	(3) boy	(4) boy
$I(Order \geq 3) \times Post$	0.00471	-0.00574	1.92e-05	-0.00347
	(0.0160)	(0.00638)	(0.00710)	(0.0111)
$I(Order = 2) \times Post$	-0.00696	-0.000347	0.000507	0.00306
	(0.0175)	(0.00875)	(0.00656)	(0.00767)
$I(Order \geq 3)$	0.0138	0.0220***	0.0179**	0.0192**
	(0.0110)	(0.00622)	(0.00621)	(0.00816)
$I(Order = 2)$	0.00954	0.00378	0.00326	0.00239
	(0.0162)	(0.00884)	(0.00668)	(0.00361)
Post Year	1988	1989	1990	1991
Observations	99,728	99,728	99,728	99,728

Sample weights used. State clustered standard errors. All specifications include birth year, state, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects. Sample restricted to states that reserve seats for women by 1995, excluding Haryana, Maharashtra, and Orissa. Sample of children born between 1987-1992.
*** p<0.01, ** p<0.05, * p<0.1

Table 8: The effect of first district level Panchayat election

VARIABLES	(1) boy	(2) boy
	Rural	Urban
$I(Order \geq 3) \times Reserved_d \times Post$	-0.0152	-0.0652**
	(0.0258)	(0.0303)
$I(Order = 2) \times Reserved_d \times Post$	-0.0272	0.00535
	(0.0225)	(0.0525)
$Reserved_d \times Post$	0.0147	-0.0102
	(0.0174)	(0.0444)
$I(Order \geq 3) \times Reserved_d$	0.0125	0.0241
	(0.0159)	(0.0194)
$I(Order = 2) \times Reserved_d$	-0.0171	-0.00864
	(0.0154)	(0.0240)
$I(Order \geq 3) \times Post$	-0.0197*	0.0426**
	(0.0112)	(0.0171)
$I(Order = 2) \times Post$	-0.00830	0.0307
	(0.0131)	(0.0227)
$Post$	0.0194	-0.0639*
	(0.0149)	(0.0333)
$I(Order \geq 3)$	0.0108	0.0126
	(0.0106)	(0.0168)
$I(Order = 2)$	0.0199**	-0.00394
	(0.00878)	(0.0137)
N Districts	108	108
Observations	79,975	31,976

District clustered standard errors. All specifications include district, birth year, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects. Sample restricted to children born after 1990 until first district reservations were in effect.
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Gender-specific change in death by age 5 rates

VARIABLES	(1) died by age ≤ 5
$I(Order \geq 3) \times Post \times Girl$	-0.0138*
	(0.00618)
$I(Order = 2) \times Post \times Girl$	-0.00119
	(0.00561)
$Post \times Girl$	-0.00318
	(0.00336)
$Post$	0.00366
	(0.00359)
$I(Order \geq 3) \times Post$	0.00529**
	(0.00224)
$I(Order = 2) \times Post$	0.00490
	(0.00477)
$I(Order \geq 3) \times Girl$	0.0340***
	(0.00431)
$I(Order = 2) \times Girl$	0.0121***
	(0.00357)
$Girl$	-0.0134***
	(0.00252)
$I(Order \geq 3)$	-0.0153***
	(0.00294)
$I(Order = 2)$	-0.0135***
	(0.00385)
Wild Bootstrap-t p-value on $I(Birth\ Order \geq 3) \times Post \times Girl$	0.152
Observations	339,283

Sample weights used. Sample restricted to states that reserve seats for women by 1995, excluding Haryana, Maharashtra, and Orissa. Sample of children born between 1987-2004. State clustered standard errors. All specifications include birth year, state, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects.

P-value reported for $I(Birth\ Order \geq 3) \times Post \times Girl$ using methods of wild bootstrap-t, as discussed in Cameron et al. (2008), with 1000 repetitions. Methods using wild bootstrapping could not be applied to the full model with all of the fixed effects, p-val is from an identical model except birth year fixed effects and mother's age fixed effects are replaced with linear trends for birth year and mother's age respectively.
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Differential effect after ultrasound ban in 1996?

VARIABLES	(1) boy
$I(Order \geq 3) \times Post\ Reserve$	-0.0315**
	(0.00997)
$I(Order = 2) \times Post\ Reserve$	-0.0177
	(0.0195)
$Post\ Reserve$	0.0272
	(0.0193)
$I(Order \geq 3) \times Post$ 1996	0.0145*
	(0.00683)
$I(Order = 2) \times Post$ 1996	0.0139
	(0.0176)
$I(Order \geq 3)$	0.0117**
	(0.00397)
$I(Order = 2)$	0.00324
	(0.00509)
Observations	339,286

Sample weights used. State clustered standard errors. All specifications include state, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects. Sample restricted to states that have elections within 2 years of the 73rd Amendment, excluding Haryana, Maharashtra, and Orissa. Sample of children born in rural areas between 1987-2004.

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Birth Order-specific change in ratio of boys: Urban areas only

	(1)
VARIABLES	boy
$I(Order \geq 3) \times Post\ Reserve$	0.00865
	(0.0155)
$I(Order = 2) \times Post\ Reserve$	0.0208
	(0.0179)
Post Reserve	-0.0291*
	(0.0152)
$I(Order \geq 3)$	0.0159**
	(0.00587)
$I(Order = 2)$	-0.00290
	(0.00761)
Observations	136,607

Sample weights used. State clustered standard errors. All specifications include state, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects. Sample restricted to states that have elections within 2 years of the 73rd Amendment, excluding Haryana, Maharashtra, and Orissa. Sample of children born in urban areas between 1987-2004.

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Birth Order-specific change in ratio of boys: Surviving children only

	(1)
VARIABLES	boy
$I(Order \geq 3) \times Post\ Reserve$	-0.0251***
	(0.00559)
$I(Order = 2) \times Post\ Reserve$	-0.00702
	(0.00814)
$Post\ Reserve$	0.0166
	(0.0181)
$I(Order \geq 3)$	0.0263***
	(0.00371)
$I(Order = 2)$	0.00979
	(0.00524)
Wild Bootstrap p-value on $I(Birth\ Order \geq 3) \times Post$	0.004
Observations	266,387

Sample weights used. State clustered standard errors. All specifications include state, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects. Sample restricted to states that have elections within 2 years of the 73rd Amendment, excluding Haryana, Maharashtra, and Orissa. Sample of children born between 1987-2004.

P-value is reported for $I(Order \geq 3) \times Post\ Reserve$ using methods of wild bootstrap-t, as discussed in Cameron et al. (2008), with 1000 repetitions. Methods using wild bootstrapping could not be applied to the full model with all of the fixed effects, p-value is from an identical model except birth year fixed effects and mother's age fixed effects are replaced with linear trends for birth year and mother's age respectively.

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Birth Order-specific change in ratio of boys. West Bengal only

	(1)
VARIABLES	boy
$I(Order \geq 3) \times Post\ Reserve$	-0.0498***
	(0.01095)
$I(Order = 2) \times Post\ Reserve$	-0.0374***
	(0.0123)
$I(Order \geq 3)$	0.0287**
	(0.0118)
$I(Order = 2)$	0.0099
	(0.0114)
Post Reserve	0.0593**
	(0 .0278)
Observations	20,264

Sample weights used. Sample of children born between 1987-2004. District clustered standard errors. All specifications include district, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects.
*** p<0.01, ** p<0.05, * p<0.1

Table 14: Birth Order-specific change in ratio of boys: South Indian states only

VARIABLES	(1) boy
$I(Order \geq 3) \times Post\ Reserve$	-0.00579
	(0.00509)
$I(Order = 2) \times Post\ Reserve$	-0.00689
	(0.00656)
$Post\ Reserve$	0.0135
	(0.0177)
$I(Order \geq 3)$	0.00144
	(0.00728)
$I(Order = 2)$	0.00460
	(0.0101)
Observations	83,072

Sample weights used. Sample restricted to South Indian states of Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu. Sample restricted to children born between 1987-2004. State clustered standard errors. All specifications include state, mother's age at time of birth, mother's literacy, mother's religion, and type of house fixed effects.

*** p<0.01, ** p<0.05, * p<0.1

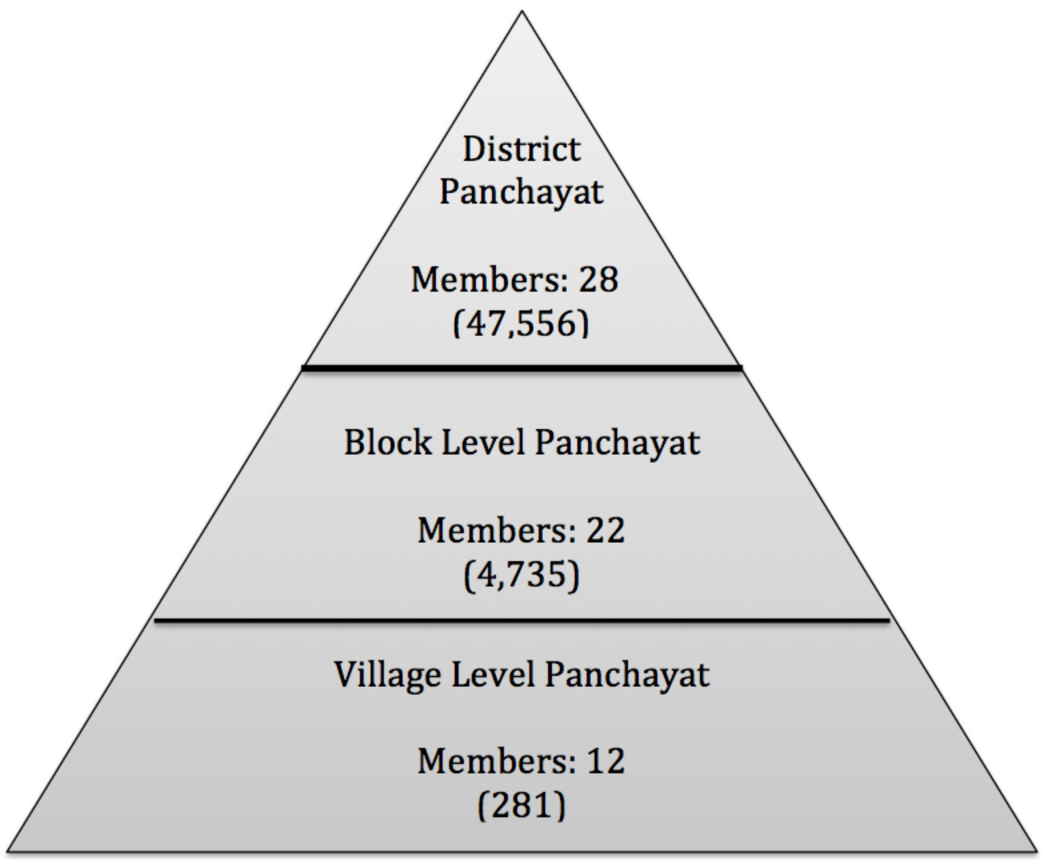

Figure 1: Panchayat Raj Institutions: Three-tier structure of local rural government. Average number of elected members give. Average population served per elected official is reported in parenthesis. Source: (Alok, 2011)

Figure 2: States with elections within 2 years following the implementation of 73rd Amendment

Figure 3: States with elections within 2 years following the implementation of 73rd Amendment: excluding states that had elections prior to the reform and Haryana.

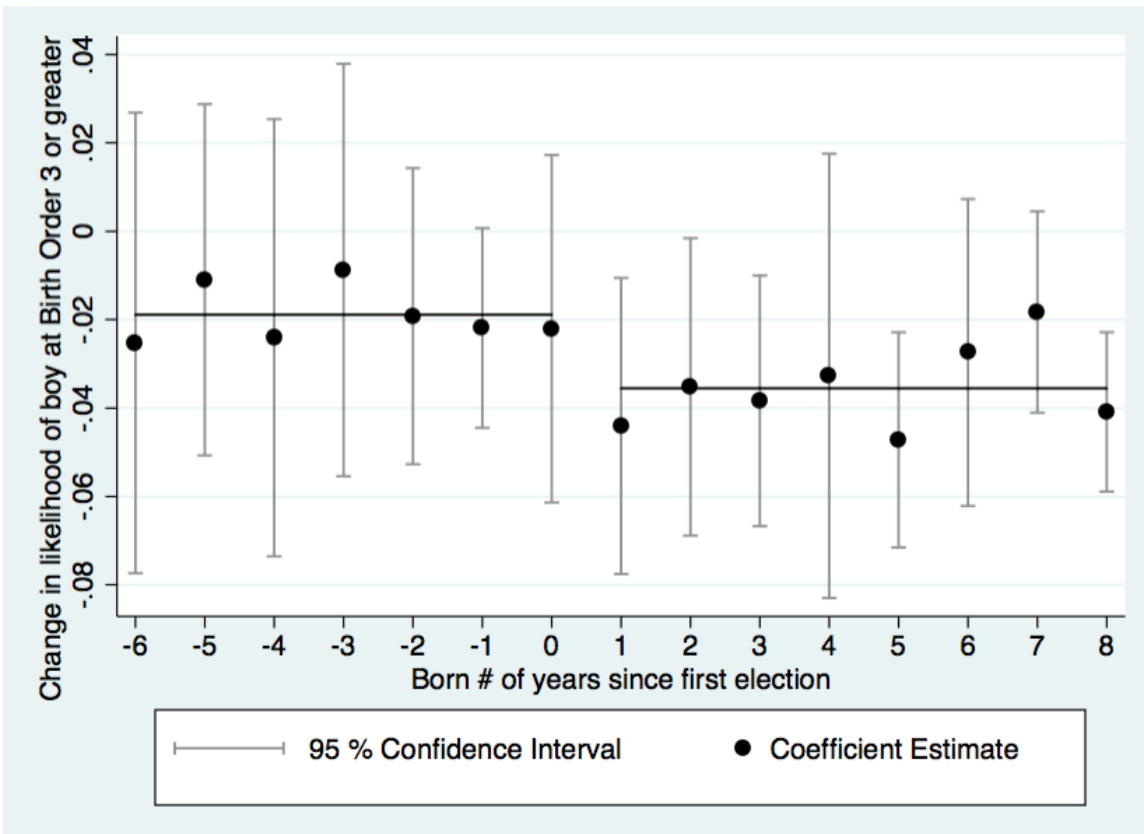

Figure 4: Sample restricted to states that reserved seats by 1995, excluding Haryana, Orissa, and Maharashtra.

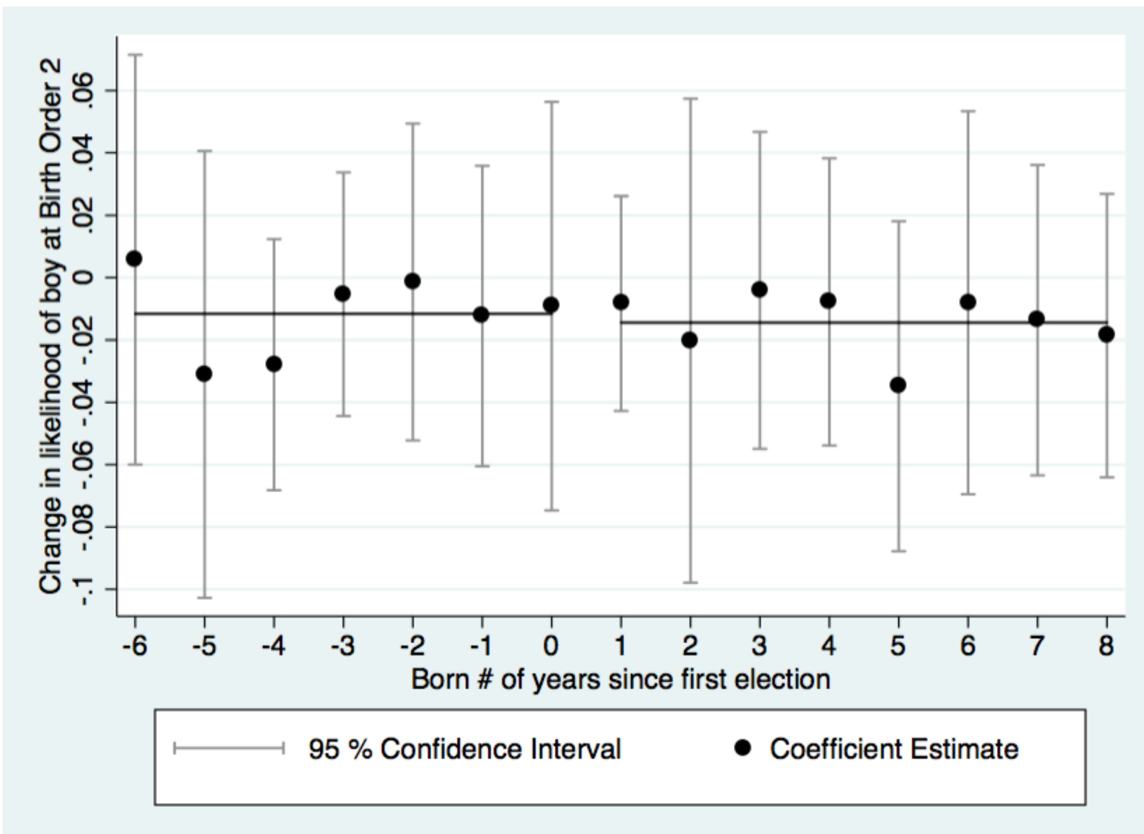

Figure 5: Sample restricted to states that reserved seats by 1995, excluding Haryana, Orissa, and Maharashtra.