POLITICAL ECONOMY, GENDER AND THE GIRL CHILD IN INDIA

by

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(Under the Direction of Christopher Cornwell)

ABSTRACT

In India, a strong son preference and offspring sex selection undermines girls' survival in utero and early childhood. Though motivated by cultural factors, the bias against girls is strengthened by women's inferior socio-economic position and their under-representation in the public sphere. This dissertation studies how gender representation in political bodies and public policy affect girls' survival outcomes. First, I examine the impact of women's political victories on sex selection. Female representation in a male domain like politics can raise the status of women and also improve policy focus on women's needs. I examine whether increased female representation in state governments improves prenatal and postnatal survival of girls. I also explore the channels through which female politicians affect girls' survival. Second, I evaluate the impact of a financial incentive scheme aimed at lowering discriminatory treatment of girls. Introduced in 2008, the program offers cash benefits to couples for having and raising daughters. I investigate whether the program improves girls' prenatal and postnatal survival by altering the relative costs of daughters. Together, these studies highlight the role of the political economy in targeting gender bias and health issues for children.

INDEX WORDS: Sex selection, Prenatal selection, Postnatal selection, Discrimination, Son preference, Gender bias, Feticide, Infanticide, Female politician, Policy, Conditional Cash Transfer, Dhanlakshmi scheme, Dissertations

Political Economy, Gender and the Girl Child in India

by

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Dedication

For all my teachers

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Chapter 1

Introduction

India is widely noted for its gender gaps favoring males, in key areas of human capital development. Compared to men, women have low levels of education, lack economic freedom and have less personal autonomy and political voice. Most remarkable, however, are the gender disparities in health with fewer surviving women than men in all age groups. A strong cultural bias against women restricts their access to healthcare and nutrition from an early age, leading to disproportionately higher mortality of women than men. The survival gap is one of the highest observed in the world (World Economic Forum (2016)) with a total of 40 million 'missing women' (Sen (1990)). The gender-based prejudice and sex ratio imbalance are even more pronounced among the young. About a quarter of India's 'missing women' never took birth or succumbed to mortality in early childhood, before the age of seven years (Anderson and Ray (2010)). A strong cultural preference for sons and the subsequent selection of offspring sex has contributed to the large sex-ratio imbalance among children.

This dissertation studies the effects of gender composition of political structures and policies targeting sex selection, on girls' prenatal and postnatal survival. Women's under-representation in India's political office not only engenders a neglect of girls' issues in policy focus but also furthers the bias against girls by asserting an overall inferior status of women. Meanwhile, the inability of existing government programs in restoring the gender balance among children suggests a net failure of public policy in addressing this challenge. Accordingly, one part of the dissertation investigates whether increasing the number of women in elected government lowers the discrimination against girls. The other strand examines whether altering incentives for daughters through government transfers is an appropriate policy design to alleviate the bias against girls. The literature on sex selection has largely ignored both of these areas.

In Chapter 2, I examine whether increasing women's representation in elected offices lowers sex selection. I exploit changes in the gender composition of politicians in state governments over three decades and study its impact on the likelihood of female births and the health and survival of female infants. I find that an increase in the share of female politicians lowers the probability of girl births but improves postnatal survival of female infants relative to male. While the former effect is primarily driven by fertility declines in the presence of son preference, the latter ensues from a potential substitution between prenatal and postnatal survival. In addition, I find that the effect of female electoral success on girl births reverses after the introduction of nationwide political or legislative reforms for women, suggesting that the impact of individual victories depends on a broader based commitment to raise the status of women. Finally, I find present evidence that female politicians affect outcomes for girls through the dual channels of policy and perception.

In Chapter 3, I evaluate the impact of a conditional cash transfer (CCT) program, called *Dhan Lakshmi*, on girls' early childhood survival in India. The program promotes the birth of girls and seeks to raise their status by offering financial incentives to couples for having and raising daughters. The CCT was launched by the federal government in 2008 in select blocks of 7 states. Using village-level data from the Indian Census, I exploit a difference-in-difference framework to examine the program's effect on the share of girls in the population under the age of seven years. I find that the CCT program is most effective in Punjab, where son preference is historically strong. There it has increased the number of girls from 79 to 85 per 100 boys in the subpopulation of children. In the other states, the impact is smaller or even negative. I discusses the plausible explanations for the observed effects and the heterogeneity in program impact.

CHAPTER 2

WOMEN'S POLITICAL LIBERALIZATION AND SEX SELECTION IN INDIA

2.1 INTRODUCTION

In India, a strong cultural preference for sons, in combination with the introduction of ultrasound technology in the 1980s, has led to a dramatic rise in the sex ratio and millions of "missing" women (Bhalotra and Cochrane (2010), Jha et al. (2011)). Although India has banned the use of prenatal diagnostic technologies for sex determination, the ban is routinely ignored. Sex-selective abortion is not the only means for exercising a preference for a son, differential postnatal treatment raises the relative mortality of girls (Gupta (1987) and Kishor (1993)). The rising sex ratio has grossly distorted marriage markets, leaving millions of men without any prospect of finding a wife and leading to bride trafficking and other crimes against women.[1]

Son preference has its roots in culturally defined asymmetries in power and socio-economic value of men and women. Patriarchy and a patrilineal system of descent confer inheritance rights to men and establish family name through them. Meanwhile, economic factors such as dowry payments and women's ineligibility to financially support their parents after marriage make daughters economically burdensome relative to sons. The bias against girls is further strengthened by women's inferior position in the household and society. Low education levels and inferior labor market outcomes, relative to men, limit women's bargaining power. Meanwhile, their vast under-representation in the public domain causes a neglect of their needs in policy.

[1]A UNODC (2013) report documents large-scale bride trafficking in Punjab and Haryana based on primary field surveys. Anecdotal evidence points to rape and forced polyandry of the trafficked brides.(https://www.theguardian.com/global-development/2014/dec/17/india-bride-trafficking-foeticide). Similar phenomena are reported in China with Zhang (2010) linking the rising incidence of sex crimes against women to the gender imbalance in the population.

Women's political representation is considered an important means of protecting their rights and interests, particularly in societies where they constitute a disadvantaged or politically under-represented group. Studies reveal that their increased presence in India's elected offices weakens gender stereotypes and improves policy commitment towards women's issues (Beaman et al. (2012), Bhalotra and Clots-Figueras (2014)). Whether increasing their political role also affects prenatal sex selection and postnatal mortality of girls is largely unexplored in the literature. In this chapter, I examine the relationship between women's political representation and girls' survival outcomes, focusing on female victory in competitive district-level, state assembly elections. To my knowledge, it is the first study to link women's electoral success with sex selection in India.

Political representation in state assemblies matters because most decisions related to public health provision are made at this level. The district level is important because state legislators oversee policy administration in the districts from which they are elected. Evidence suggests that incremental changes to female membership in state legislatures influences policy choice and implementation. Clots-Figueras (2011) and Bhalotra and Clots-Figueras (2014) show that higher female representation in state assemblies is associated with public expenditure and health investments favoring women.

Female legislators in India are also symbols. As members of the highest decision-making body in a state and administrators in district councils, they are in position to shape society's perception of gender roles. Female election victories over male rivals challenge the established male hegemony and may more broadly affect the status of women in society. Hence, through their influence on both policy and perception, India's elected women can potentially improve health outcomes for girls.

I estimate the effect of female political representation on the likelihood of girl birth and postnatal mortality using the fertility history of 500,000 mothers from the District Level Household and Facility Survey (DLHS) matched to district election outcomes over the 1977-2004 period. Conducted in 2002-04, the DLHS covers 594 districts in 36 states and union territories, and provides detailed demographic information on each surveyed household. I compile the election data by mapping results from over 3,000 constituencies to districts for all elections during the sample period. I then match individual births to election outcomes in the year preceding birth, generating a mother-year panel comprising all years in which a mother gave birth. To address the potential endogeneity of female representation, I use “surprise” victories of women as an instrument, leveraging the plausible gender-randomness of the outcome in close man-woman races. The estimation sample consists of over a million births, representing 585 of the 594 districts that existed in India in 2005.

I find that an increase in female representation by one standard deviation lowers the likelihood of a female birth by 0.4 percentage points and the effect is statistically significant at the ten percent level. This translates into a decrease from an average of 92 to 90 female births for every 100 male births. At the same time, I show that greater female representation lowers overall fertility by 0.7 percentage points, without affecting the likelihood of male births. The combination of these findings imply that the increased prenatal selection of child gender is motivated both by son preference and the desire for fewer children. This is consistent with Jayachandran (2014), who attributes a large share of the decline in female births in India to falling fertility.

However, I find that female representation improves the postnatal survival of girls relative to boys. The opposing effects on prenatal and postnatal survival are consistent with the quality-quantity tradeoff documented in Hu and Schlosser (2015). Prenatal sex-selection lowers unwanted female births and therefore leads to reduced postnatal discrimination against the girls that are carried to term. The positive effect on postnatal survival appears to come through the influence of female representation on the relative parental investment in girls. I present evidence that breastfeeding durations and tuberculosis vaccinations rise following female electoral success.

While the overall effect of female representation on girls’ prenatal survival is negative, I show that the qualitative effect depends on the timing of nationwide initiatives intended to raise the status of women. In the 1990s, India created “reserved” seats for women in local governing bodies that are jointly known as the *Panchayati Raj* system. After this reform, the estimated effect of female political success reverses. “Post-reservation”, a one standard deviation increase in female representation leads to seven additional female births per 100 boys born. The heterogeneous impact of elected women before and after the political reform suggests a strengthening of their political voice owing to broad-based female representation at local levels through the reservation. It also highlights the relevance of women's overall political agency in improving outcomes for girls.[2]

The post-reservation increased likelihood of a female birth is consistent with Kalsi (2017), who finds that male births are less likely at higher birth parities following reservations. Her results suggest a potential role model effect of female leadership in local governments with the effect being limited to rural households. Despite the vast literature on sex selection and political liberalization in India Kalsi's is the only previous study that has linked the two.

Unlike Kalsi (2017), I focus on female politicians as members of a state legislative assembly (MLA) rather than as leaders of village or district councils. At this level, there are no quotas or other institutional initiatives to promote female representation. Women's political quotas only apply to legislative bodies at the village, block and district levels under the *Panchayati Raj* system. Thus, in my analysis, female political representation comes from competitive elections rather than appointments to reserved seats.

The issue of women's political representation has gained importance in India. Constitutional amendments have reserved seats for women in local governments, but not in state and national governments. The findings of this study strengthen the case for a proposed bill mandating the reservation of one third of state assembly seats for women. Female headcount in state assemblies influence policy adoption and administration that affect the status of girls and women. Female candidacy and success in state elections has remained low limiting their say in state policymaking and visibility in the political domain. Increasing their numbers can strengthen the overall political agency of women and shift policy focus towards the needs of their own gender.

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[2]Similar to reservation action, a nationwide ban on fetal sex diagnostic also reverses the effect of female legislators on girl births. Post-ban, a one standard deviation increase in the share of female representatives leads to six additional female births per 100 male births. The institutionalization of girls' cause through legislation activates mechanisms within the political economy that enable female politicians to improve girls' prenatal survival. The higher efficacy of the ban with more women in administration also highlights the relevance of female representation in implementing policies favoring girls.

The rest of the paper is organized as follows. Section 2.2 discusses the literature on sex selection and provides an overview of India's political structure and female representation at various levels of governance. Section 2.3 lays out the conceptual framework for the analysis. Section 2.4 explains the datasets and summarizes the variable under study. Section 2.5 describes the empirical strategy. Section 2.6-2.8 report the results, discuss the potential mechanisms and present robustness checks. Section 2.9 concludes.

2.2 Background

2.2.1 Sex selection and missing girls in India

India is one of a handful of Asian countries with an abnormally high ratio of boys to girls at birth. It is also the only country besides China, with a higher infant mortality rate for girls. Since 1981, India's child sex ratio (CSR), the ratio of boys to girls aged 0-6 years, has increased from 1.03 to 1.09. The natural CSR is about 1.03.[3] As remarkable as this increase is, the national CSR masks stark regional differences. Figure 2.1 shows the evolution of state-level CSR between 1981-2011. As the maps indicate, the overall rise in the sex ratio has been led by states in northern and western India, where the CSR approaches (and in some areas exceeds) 1.2. The northern and western states are generally the more economically developed, educated and urban, which suggests the problem of prenatal sex selection is not concentrated among the rural, uneducated population. In fact, the highest sex ratios are found in Punjab and Haryana, two of India's richest states.

Religion, caste and community partly explain state-level trends in the CSR. Sex selection is prevalent among Sikhs, high caste Hindus and small communities like the *Jat* found mostly in northern India. It is reported to be absent among Muslims, Christians and people belonging to low caste and tribes. While there is no clear north-south divide in religious, the Sikhs are concentrated in the state of Punjab, while, the *Jat* community largely resides in the northern states of Haryana, Punjab, Delhi, Rajasthan and Uttar Pradesh. The only exception to the overall pattern of rising

[3] Waldron (1983), Johansson and Nygren (1991) and Rodgers and Doughty (2001), show that this ratio is typical of Western countries, where there is no significant cultural preference for sons.

sex ratios, however, are the states of Kerala in the extreme south and the northeastern region of the country. Matriarchal kinship structure and the higher prevalence of Buddhists and Christians explain the persistence of normal CSRs in these areas.

Historically, studies have linked high CSRs to extensive post-birth sex-selection by parents (Miller (1981), Gupta (1987), Kishor (1993)). However, recent investigations of missing girls have revealed an increased use of prenatal sex selection among couples. Bhalotra and Cochrane (2010) and Jha et al. (2011) associate the girl shortage with fewer female births resulting from selective abortion of 500,000 female fetuses annually. Falling desired fertility and the availability of ultrasound facilities from 1980s has encouraged this trend, distorting sex ratios at birth (SRB) (Jayachandran (2014)). It has contributed to sharper increases in the CSR since 1980s.

India's abortion law of 1971 *The Medical Termination of Pregnancy Act*, legalized the termination of pregnancies that either endanger the mother's life or arise from contraceptive failure or rape. Abortions carried out for reasons other than those specified under the Act are prohibited. Yet, the spread of sex diagnostic techniques like ultrasounds and amniocentesis beginning in 1980s led to rampant abuse of this law for sex selection. By early 1990s, Illegal abortions surpassed legal abortions by an estimated 8-11 times through and were aided by a boom in cheap and unauthorized abortion services (Chhabra (1996), Jesani and Iyer (1995), Chhabra and Nuna (1993)).

Amniocentesis quickly became known as a method for prenatal sex determination and its use for that purpose became a penal offense from 1976 (Arnold et al. (2002)). On the other hand, ultrasound remained legitimate and gained popularity, being less invasive and relatively cheaper than amniocentesis (Portner (2015)). In addition, it began to be viewed as an investment for avoiding future dowry payments (Sudha and Rajan (1999)). Through 1990s numerous private fertility clinics offering ultrasound testing arose to cater to the increased demand.

In 1994, the central government passed the Pre-Natal Diagnostic Techniques (PNDT) Act prohibiting the use of modern prenatal diagnostic technology, like ultrasound, for sex determination. This nationwide ban came into force in 1996 and was further amended in 2003 to restrict the use of newer technologies like chorionic villus sampling. Unfortunately, the law is limited in its reach, applying only to government medical entities. It does not restrict private clinics from offering these services and the conviction rate under PNDT is very low (Sudha and Rajan (1999)). Hence, the common view is that the force of the ban is weak and it has been largely unsuccessful in curbing sex selection (Visaria (2007), Arnold et al. (2002)).[4]

It was largely assumed that lower fertility coupled with improvements in household's economic status, health and education levels would reduce bias against girls and improve overall girl survival. On the contrary, studies find increased gender selection in households with both a higher standard of living and better education levels for women (Basu et al. (1992), Basu and Stephenson (2005), Portner (2015)). Thus, son preference has prevailed, while the form of daughter discrimination has evolved over time, changing from selection at birth and early childhood to prenatal and preconception selection (Das Gupta et al. (2003)).

2.2.2 India's political structure and female representation

India is a parliamentary democracy, with systematic division of power at the state and central levels. There are 29 states and seven union territories, each divided into multiple, single member electoral constituencies (seats) that are represented in the state legislature. The boundaries of these constituencies are drawn to ensure approximately equal number of inhabitants in each constituency. Consequently, state assemblies vary in size according to the state's population and the number of assembly seats in a state ranges from 30 to 400. Districts are an intermediate level of local governance between state and village government. A district may contain anywhere between 1 and 37 electoral constituencies with no district overlap of any individual constituency. Figure 2.2 illustrates the district and state boundaries for all the states under study.

Elections are routinely held every five years in these constituencies and candidates are elected on a first-past-the-post system, so that the candidate earning the maximum votes wins the election. States may also hold mid-term elections at shorter intervals in the event of a political crisis where

[4]However, recent evidence points to some positive impact of this legislation. Nandi and Deolalikar (2013) find that the law prevented more than 100,000 abortions of female fetuses between 1991-2001. Unfortunately this is a small fraction of the estimated 500,000 girl abortions annually.

the governing coalition loses the confidence of majority of the state legislators and an alternative government cannot be formed, but none occur in my sample. All citizens above the age of 18 with a sound mind and no criminal record are eligible to vote in these elections. To compete in these elections one needs to be a registered voter above the age of 25 and a resident of the constituency.

India has a multi-party system with numerous political organizations distributed across the political spectrum. Accordingly, over one hundred parties participate in state elections making the political environment fairly competitive. These include national, regional and unregistered parties. Additionally, independent candidates, unassociated with any political party, may also run for office.

State governments are responsible for several key policy areas including law and order, health and education. Its primary legislative body is the Legislative Assembly (LA) or *Vidhan Sabha*, which is responsible for state planning and policy decisions. The constitution of India, however, allows for a bicameral structure at the state level and, therefore, some states may have an additional legislative unit, namely, the Legislative Council (LC) or *Vidhan Parishad*. Members of the LA are chosen through state elections, while members of the LC are appointed by the LA, the Governor and other sub-district local governing bodies. Currently, seven states have a bicameral structure, but even for these states, as for the rest, the LA has more legislative power than the LC.

Members of state assemblies are defacto members of the district council or *Zila Parishad* of the respective districts from which they are elected. The council also consists of elected representatives of other sub-district governing bodies that have separate elections, independent of the state elections. Figure 2.3 illustrates the political and administrative hierarchy within a state. Each circle denotes an independently elected administrative system and all administrative units within a circle follow the same election cycle. The block and village council are part of rural administration while the municipalities and city councils govern only urban areas within a district. The arrows indicate whether members of this system are represented in the district council.

Functioning as a link between the state and local administrative bodies, the district council performs multiple supervisory functions. It coordinates the activities and approves the budget of all local governing bodies within its jurisdiction. It is responsible for the maintenance of primary and secondary schools, hospitals, dispensaries, minor irrigation works. More importantly, it oversees the implementation of various development schemes and renders advice to the state governments on their execution. The council's budget primarily consists of the grants received from the state government as well as its share in the land revenue and other local taxes.

Women are significantly under-represented in India's elective offices. Between 1977-2004 women comprised less than 4 percent of the pool of contestants and about 4.5 percent of all winners in state elections. Nearly 30 percent of the district electoral years do not have female candidates and less than 25 percent are exposed to a female politician. Female representation in political parties was also low. Almost 50 percent of the female candidates competed independently, without any political backing. The 1993 constitutional amendment reserved one-third of all seats in village and district councils for women but there are no quotas for women in state assemblies. [5]

Despite the low average of female political participation over the period there has been a gradual increase in female candidates and election winners. Figures 2.4 and 2.5 show that the average share of female candidates and district seats won by women increased from from 3-4 percent in 1980s to about 7-8 percent in 2000s. My analysis exploits within district changes in the gender composition of politicians to study the impact of female representation on girl child outcomes. The underlying mechanism rests upon the gender identity of legislators and exploits the fact that women have different preferences than men. Besley and Case (2003), Edlund and Pande (2002) and Edlund et al. (2005) demonstrate a clear gender differential in policy preferences with women favoring redistributive policies more often than men. Consequently, these studies report a shift in policy focus towards women's issues with increased female presence in political office.

2.3 Conceptual framework

Political representation is an important means of protecting the rights and interests of disadvantaged and marginalized groups. In societies with established gender hierarchy favoring men and

[5] In 2010, a bill proposing to enact a one-third quota for women in national and state legislatures was passed by the upper house of parliament, but it has not yet been voted on in the lower house.

the ensuing socio-economic subordination of women, increasing the female voice in governance often entails higher marginal gains for women than men.

Studies focusing on women's political representation in India associate female representation with more redistributive policies that disproportionately benefit women. They find evidence of a gender differential in policy choice and implementation and argue that women's underrepresentation in public administration can partly explain the lack of policy commitment towards women's needs.[6] Chattopadhyay and Duflo (2004), Iyer et al. (2011), Ghani et al. (2013), Clots-Figueras (2012) and Bhalotra and Clots-Figueras (2014) link women's improved access to drinking water, justice system, healthcare and employment opportunities, to increased female representation in the political arena of India. Their results echo the findings of similar analyses using US data.[7]

Intuitively, there are two distinct channels through which increased female representation in state legislatures may affect girl survival (prenatal or postnatal). First, as members of the legislative assembly, female MLA may influence state policy, expenditures, or public good provision to prioritize the needs of women. Additionally, female MLAs from political parties belonging to the coalition in power may be able to influence policy implementation in their district to expedite programs or initiatives targeting women's issues (Persson et al. (2000); Grossman and Helpman (2004)).

Female MLAs may affect outcomes for girls by directing public funds into areas that are seemingly gender-neutral. For instance, if female participation in governance improves public health services that lower child and maternal mortality, then in the absence of any gender differential in healthcare access, girls stand to gain more because they are the marginal children. Conversely, superior healthcare might also mean easy access to modern reproductive technology and there-

[6]This is consistent with a larger literature on gender differences in preferences with regard to spending choice and priorities. Hoddinott and Haddad (1995) highlight the role of earning member's gender in explaining observed differences in children's health and nutritional outcomes across households. Thomas (1990) finds that mothers' control over household income tilts resource allocation towards daughters while fathers' towards sons.

[7]Thomas and Welch (1991), Besley and Case (1994), Case (2001), Besley and Case (2003) show that states with higher female representation are more likely to introduce and pass bills dealing with issues of women, children and families.

fore higher prenatal selection, unless accompanied by a tightening of the justice system and efficient crime reporting. Thus, the marginal gains to girls from improved public health provision are ambiguous.

Second, women legislators may weaken bias against girls through a role-model effect on households. In a society characterized by male dominance and narrow gender roles, female participation in a conventional male domain like politics challenges gender stereotypes. Beaman et al. (2012) find that this lowers parents' gender gap in aspirations for their children. Moreover, seeing more women in positions of power may alter women's perception of themselves, tilting intra-household balance of power in favor of women. Since women invest more in children and favor redistribution, their increased say in household decision making may improve health outcomes disproportionately for girls (Thomas (1990)). Hence, by altering social attitudes towards women, female MLA can presumably raise the value of daughters and reduce sex selection, unless it provokes a deliberate retaliation by men whose societal dominance may seem threatened.

2.4 Data and summary statistics

My analysis begins with the matching of the fertility histories of a large sample of Indian mothers to district election outcomes between 1977-2004.

2.4.1 Data on fertility and child care

I obtain the fertility histories from the second wave of District Level Household and facility Survey (DLHS). Conducted in 2002-04, the DLHS records the complete fertility history for over 500,000 married women, aged 15-44 years, whose marriage is consummated. For each live birth, it reports the child's gender, year of birth and birth order, whether a child is part of multiple births, and age at death if the child died. The survey also provides detailed information on demographic characteristics, such as each household member's age, education, caste, and religion, as well as data on household construction type, assets and fuel use. The DLHS sample is nationally representative, covering urban and rural areas in 593 districts across 36 states and union territories.[8] Each mother is geocoded to her district of residence.

Using retrospective birth histories, I construct a panel of births across mothers whom I observe each year in which they gave birth between 1977 and 2004. The fertility history is merged with the electoral data, mapping each individual birth to the share of female politicians in the district in the year preceding the birth of the child. Table 2.1 reports descriptive statistics of the mothers in my sample. There are 443,111 mothers with an average of 3.02 live births per mother. Mothers with single birth are included and constitute 17.4 percent of the sample. The sample fertility rate is slightly lower than the population average, considering that the number of births per mother declined from 4.6 in 1981 to 2.9 in 2001, averaging around 3.8 during the sample period.

The birth order ranges from 1 to 16 with a median of 9 and a mean of 2.51. Less than 2 percent of the newborns are part of multiple births with female births constituting 48 percent of the sample. About 32 percent of the mothers are from urban households and 28 percent belong to lower caste or tribe. This is roughly representative of India given that 28 percent of the total population resided in urban areas as of census 2001 and about 24 percent of the total population belonged to scheduled caste or scheduled tribe.

2.4.2 Data on state assembly elections

I obtain constituency-level data on candidate gender and votes for every election to State Legislatures during 1977-2004 from the Election Commission of India (ECI).[9] The ECI provides the name, caste category and party affiliations of all participating candidates. I map each constituency to its parent district accounting for district boundary changes during the time period under study. Appendix section A.0.1 describes the mapping process. Since the district is the unit of analysis,

[8]For details of sampling, refer to Chapter 1 of the National Report of DLHS-2 available here: http://rchiips.org/pdf/rch2/National_Report_RCH-II.pdf.

[9]I am thankful to Datameet (a group of data enthusiasts) for compiling this data into a usable format from online pdfs available on the ECI website. Their online data repository may be found here: http://datameet.org/.

I aggregate all constituency-level information up to the district. The sample consists of all districts across 29 states and the union territory (UT) of Pondicherry.[10] Figure 2.2 shows the districts included in my sample.

My sample contains 3,949 district-election-year observations. A single district has anywhere between 1 and 37 constituencies (seats); the median is 9. For each election year, winners from individual constituencies are aggregated up to the district level, yielding the gender composition of elected representatives in the district. Table 2.2 reports the summary statistics for the political variables. In a typical district, women won 4.3 percent of seats and about 25 percent of the district-years produced at least one female victory.

The present analysis exploits female winners in close man-woman elections to identify the "surprise" victories of women. Close elections are defined as elections in which the vote margin between winner and runner-up is less than 3.5 percent. Between 1977-2004, 10 percent of the district-years witness a close election between a man and a woman, averaging 1.4 seats per district-year.

2.4.3 Data on district-level observables and institutional changes

I use the 1981, 1991 and 2001 censuses to obtain data on district-level sex ratios, male-female literacy rates and workforce participation. Because the sample period includes elections before and after the implementation of the women's quota in local governing bodies of the state, I use this institutional change to isolate the effect of female state legislators on sex selection. Although the constitutional amendment mandating the reservation was enacted in 1993, there is significant heterogeneity in the timing of its implementation across states. Using information from *Status of Panchayati Raj in the states and Union Territories of India (2013)*, I create indicators for the onset of this change in each district.

[10]The sample does not include the UT(s) of Andaman and Nicobar, Lakshadweep, Dadra and Nagar Haveli and Chandigarh since these provinces do not have a state legislature and are governed by the Central Government. Daman and Diu is also dropped from the sample since this region switches between the status of state and UT during the sample period, experiencing assembly elections only in the years for which it remained a state.

The mothers' fertility histories are matched to the election data by district and lagged (previous) election year. This creates a sequence of births for each mother, nested within a broader district-year panel. The final estimation sample consists of 1,334,327 births to 439,953 mothers across 585 districts in 29 states and one union territory of India. Figures 7a and 7b plot the relationship between SRB and the district-level share of female winners for each state over the sample period. While the state-level plots do not show a consistent pattern, it is worth pointing out that several districts with relatively high and rising rates of female political representation have considerably large and rising sex ratios (e.g. Punjab, Madhya Pradesh and Maharashtra).

2.5 Estimation strategy

This study focuses on girl child health outcomes and their response to female representation in district level elected bodies. The analysis begins with the estimation of prenatal and postnatal survival of girls. The basic empirical setup is a model of the form:

$$isgirl_{imdt} = \alpha_d + \pi_t + \beta_1 female_{dt-1} + X_{imdt}\omega + Z_{dt}\zeta + Y_{st}\delta + \varepsilon_{imdt} \tag{2.1}$$

where the $isgirl_{imdt}$ is an indicator for a female child at the ith birth to mother m in district d at time t; *female* is the share of state assembly seats in a district won by women in the election year immediately preceding the birth of the child; X contains observable mother and child characteristics that are considered important determinants of prenatal selection; Z contains district-year varying controls and; Y contains state-year indicators for female representation at other political tiers. In addition, I include year and district fixed effects to capture year-to-year changes in unobservables and time invariant district characteristics, respectively.

Though the district fixed effects purge all time-invariant differences across districts in female representation and child gender, there may still be omitted variables that vary over district and year and affect both female representation and the outcome variable. This raises potential endogeneity concerns in the specified econometric model and introduces bias in the OLS estimates. Thus, the effect of female representation on child gender may be not be identified in (1) .

The political regime may be correlated with time-invariant mother-level unobservables that also affect the outcome variable. District-level health variables that influence both child and fetal survival (possibly through improved reproductive health services), may vary systematically with female representation. This, in turn, may affect the timing of fertility, birth order or child gender through mother's unobserved but fixed fertility preferences. For example, some mothers may be more likely than others to advance or defer childbearing as per the status of district health provision or even practice sex selection to achieve her desired ratio of sons to daughters. Considering the unbalanced nature of the sample and substantial mother or household-level heterogeneity, this introduces a potential selection bias in the observed cohort of births in any given district-year. By altering district health variables, the political regime may influence mother's fertility decisions and the effect will differ from mother to mother. Thus, the political regime may introduce endogeneity in the composition of live births either through selection into conception or selection into fetal survival.

To address this identification challenge, I add mother fixed effects, which take care of all time-invariant preferences of the mother that move systematically with *female*. This specification controls any time-invariant role model effect or health effect of households' exposure to female representation. Improvements in district-level health services brought about by female politicians that lasts through the mother's reproductive period, including basic infrastructure facilities as well as reproductive health information, are effectively purged through the mother fixed effect. Hence, any movement in the probability of female births with female representation now captures time varying changes in role-model or health effects associated with the gender composition of district politicians.

A key underlying assumption of this model is that these mothers do not move across districts during the sample period. The absence of migration information in the household data does not allow me to control for inter-district movement of mothers. This is potentially a problem for two reasons. First the migration of mothers across district may lead to errors in her recorded exposure to female representation. Second, if migration occurs systematically with the political regime, then the results may suffer from selection bias. To assess the potential magnitude of this problem, I analyze population migration data from Census 1991-2001 and find that female migration across districts for purposes other than marriage remained low during the sample period. Only 13 percent of the total female population moved across districts and half of those moves were family relocations for employment purposes. Considering that the current sample also includes a significant proportion of mothers who married through 1970s and 1980s, when post-marriage migration was even lower among women, the potential bias from migration is not an immediate concern.

The ability of OLS to identify the effect of *female* may still be compromised if unobserved voter preferences are correlated with both politician gender and the probability of female births. While district or mother fixed effects control for voter characteristics that remain unchanged over time, it fails to capture the time-variant component of their gender preference for politicians. Since the analysis hinges on gender identity of politicians it is important to ensure gender neutrality of electorate preferences. If women are elected more often in constituencies where electoral preferences are biased towards female politicians, this may also be correlated with the outcome variable through the policy channel or even through societal attitude towards women.

To circumvent this issue, I use the share of women winning in close male-female elections as an instrument for the overall share of female winners in the district to capture that part of female representation that is independent of voter preferences. The idea is that the narrow victory margin indicates an outcome as good as random (Lee (2001)). Similarly, in cases of close elections between candidates of opposite gender, the winner's gender identity can be considered random. Female victory in such elections is not driven by voters' preference for female politicians. In other words, female representation through man-woman close elections is exogenous and found in constituencies that show no clear preference for women. Close elections are defined by the vote differences between the winner and runner-up of less than 3.5 percent of total votes cast. As a robustness check, I also repeat the analysis using winning margins of 2, 2.5, 3 and 4 percent.

Implementing the IV strategy leads to a slight revision of the structured model:

$$isgirl_{imdt} = \alpha_m + \pi_t + \beta_1 female_{dt-1} + \omega X_{imdt} + \zeta Z_{dt} + \delta Y_{dt} + \rho shareclose_{dt-1} + \varepsilon_{imdt} \quad (2.2)$$

where the district fixed effect in (1) is replaced by mother fixed effect α_m. Because mothers do not migrate across districts, the mother fixed effect subsumes the district fixed effect. Because the existence of close elections between men and women depends on the share of female candidates participating in the district, I include a variable *shareclose* to control for the fraction of seats in a district that saw a close man-woman election. While the outcome of close races is random, the existence of such may not be. The share of female candidates in a district or the party affiliation of candidates may determine whether a constituency experiences a close election.

The first stage for *female* is given by:

$$female_{dt} = a_m + \phi_t + \lambda femaleclose_{dt} + \rho shareclose_{dt} + \gamma X_{imdt} + \varphi Z_{dt} + \upsilon Y_{dt} + e_{imdt} \tag{2.3}$$

where *femaleclose* is the fraction of district seats won by women in close elections against men. I treat the first stage as a parametric regression discontinuity design that exploits any sudden jumps in the main political variable at the point where the vote margin is discontinuous. Here, the discontinuity exists at zero with the constituencies with male and female winners being aligned to the left and right of zero, respectively. Because I aggregate the discontinuities at the constituency level up to the district, this is effectively a fuzzy regression discontinuity framework (Angrist and Lavy (1997)). To enhance instrument precision I include a second order polynomial in the vote margin that controls for the relationship between endogenous variable and treatment indicator, vote margin.

I estimate equation (2.2) as a linear probability model, and report standard errors clustered at the district level. When studying post-birth mortality of the sample of children, I replace the *isgirl* with a binary indicator for the relevant mortality outcome. To capture differential impact of the political variable by child gender, I include an interaction of the political regime with the sex of the child.

Because the birth history is based on mothers' recollection of her fertility, one may expect an inaccuracy in recall, particularly from the older mothers who gave birth much before the interview year (2004). This introduces the possibility of a measurement error in the outcome variable. To address this problem I include the mother's age at birth, included in X, along with birth order, daughters born previously and whether child is one of multiple births. District-level characteristics, such as female population share or female literacy rates, may affect prenatal selection and child mortality. Accordingly, I control for district characteristics like population sex ratio, share of male and female literates and male-female workforce participation. To separate the effect of female MLAs from female representation at other tiers of the political structure, I control for the onset of women's political reservation in *Panchayat* bodies as well as female head of state. I control for the reservation implementation by state and year to account for the heterogenous timing of its adoption by states. Both political controls are included in Y.

2.6 Results

First, I present my findings on the overall impact of female political representation on prenatal and postnatal survival of girls. Then, I extend the analysis to examine how the estimated effect of female representation varies with introduction of the political quotas for women and the PNDT act against fetus sex detection. The question in this case is whether large-scale national efforts alter or amplify the impact of individual female victories.

2.6.1 Main results

Prenatal survival

The top panel of Table 2.3 reports estimated coefficient of *female* when the outcome variable is child gender at birth. The OLS coefficient estimate in column (1) is -0.02 with a t-ratio close to 1. However, the baseline 2SLS specification (column (2)) produces an estimated female coefficient of -0.050, which is significant at the 10-percent level. This result implies that the probability of a live female birth declines by 0.5 percentage-point in response to a 10-percentage point increase in the district share of female state legislators, roughly the effect of a one standard deviation (0.093) change in the share of district MLA seats held by women. This translates into a drop in the number of female births by 2 per 100 male births, from a baseline of 92. The bottom panel Table 2.3

(bottom panel) presents the first-stage coefficient estimates. Instrument strength is high with a statistically significant estimated coefficient of 0.94 and an F-statistic of 94.11 (column(2)). This confirms that female representation in the district is closely explained by female victories in close elections. Meanwhile, the negative estimated coefficient on *shareclose* implies that holding the share of female winners in man-woman close election constant, the remaining close elections have a male winner.

The estimates are also robust to the functional form of the vote margin polynomial. Table 2.3 (top panel) presents these coefficient estimates in columns (2) - (4). The estimates are qualitatively and quantitatively similar with the specification using third-order polynomial yielding a more precise estimate. The 2SLS coefficient estimates are also qualitatively robust to alternate definitions of close elections as shown in Table A2 of the Appendix.

To validate the results from my structural model, I use non-parametric regression methods outlined in Imbens and Kalyanaraman (2011) and Calonico et al. (2014) to estimate the reduced form effect of *female* on prenatal survival. Table 2.4 presents these results. The reduced form estimates in columns (1) and (2) are between -.02 and-.03 and statistically significant at the 5-percent level, lending further support to the 2SLS findings in Table 2.3. Both methods use data driven procedures to estimate the treatment effect and are robust to small and large bandwidths.

FERTILITY

The negative effect of female representation on girls' prenatal survival seems counter-intuitive. However, it could be the natural consequence of falling fertility interacted with a preference for sons and access to fetal sex diagnostic technology. A decline in desired family size encourages prenatal sex-selection as couples try to produce their preferred number of sons in fewer births. Table 2.5 reports the effects of female political representation on fertility and gender-specific probability of birth. Here, I extend the sample to include all reproductive years of the mother that is, each year in which she could have given birth that increases the number of observations from the original half million to over 6.6 million. The estimated coefficient of *female* in column (1) is -0.08

and is significant at the 5-percent level. Thus, a 10 percentage-point increase in the district share of female politicians lowers the fertility rate by 0.8 percentage point. This makes sense given that the district administration oversees the implementation of central and state-level development programs including maternal and child health services and family planning (FP) initiatives. The falling birth rate is accompanied by an almost equal reduction in the likelihood of a female birth with no impact on the probability of a male birth, as shown in columns (2) and (3).[11]

I also examine the impact of female political representation on fertility and prenatal selection between rural and urban districts, since desired fertility and the exercise of son preference tends to differ across rural and urban households. The underlying reasons are differences in demographic features and health variables across cities and villages.[12] Table 2.6 reports the effect of female political representation on fertility for rural and urban mothers. In column (2) the coefficient estimate of *female* is -0.072 and statistically significant at the 1-percent level. This implies that a 10 percentage-point increase in the district share of female politicians lowers the likelihood of a marginal birth to a woman by 0.72 percentage point. The result for urban women is 0.3 percentage points higher consistent with the rural-urban difference in fertility preferences. The steep fertility decline among urban mothers is a result of rapid increases in female education and employment levels in these areas, increasing the opportunity cost of having more children.

Table 2.7 reports the estimated effect of female political representation on girls' prenatal survival by rural-urban. The coefficient estimate for urban mothers in column (3) is robust and negative implying that a 10 percentage-point increase in the district share of female politicians lowers the likelihood of a female birth by 0.6 percentage point. There is no significant effect among rural

[11]The larger effect of the political regime on female births relative to the ratio of girls at live birth also indicates that the latter is only a conservative estimate of the degree of prenatal selection. Gender share of live births fails to account for the elimination of girls through more subtle forms of prenatal selection like differential stopping behavior. Considering that each pregnancy has a 50% chance of culminating into a girl, parents lower the overall likelihood of a female birth by stopping fertility after attaining their desired number of sons.

[12]Typically, the opportunity costs of childbearing are higher for the educated and working women in cities as opposed to the uneducated rural women engaged mainly, in household production. A rich and affluent urban population is also observed to exercise son preference through prenatal selection more often than their rural counterparts given better affordability and accessibility of fetus diagnostic techniques of the urban households.

mothers (column (2)). This indicates that the overall negative effect on girls' prenatal survival is primarily driven by urban mothers, consistent with a larger literature that points to more sex selection in urban areas than rural. The underlying factors are the low availability and affordability of sex selection techniques in rural areas. Overall, these results echo the findings of Jayachandran (2014), which highlights the importance of falling fertility in motivating prenatal sex-selection in India.

2.6.2 Postnatal survival

While higher female political representation may reduce prenatal survival for girls, it could improve their postnatal survival. I test this proposition by re-estimating the effect of female political representation on infant, neonatal and post neonatal mortality by child gender.[13] I use the empirical specification outlined in equation (2.2), replacing the outcome variable with the mortality indicators and adding the interaction term $female \times isgirl$ to the regressors. The latter captures the differential impact of female political representation on mortality of girls relative to boys. Table 2.8 presents these findings for each of the postnatal outcomes. The coefficient of interest is that associated with the interaction of *isgirl* and *female*.

As in the case of prenatal survival, OLS generally produces smaller and less precise results, albeit in the same direction as 2SLS. The 2SLS estimates in columns (2), (4) and (6) suggest that female representation indeed improves postnatal survival with the effect concentrated in the first month after birth. The estimated effect for infant mortality is -0.079 and is significant at the 1-percent level. This result implies that female infant mortality declines by 0.8 percentage points relative to boys in response to a 10-percentage point increase in the district share of female state legislators, which is roughly the impact of a one standard deviation (0.093) change in the share of district MLA seats held by women. The robust, positive estimate of *female* in column (2) indicates that the political regime lowers boys' survival chances in the first year after birth. In a

[13] Infant mortality and neonatal mortality refer to death of a newborn within the first 12 months and first 28 days, respectively. Meanwhile, post-neonatal mortality refers to infant death beyond the first 28 days but within 12 months after birth. Each mortality outcome is coded as a binary indicator for whether the child succumbed to mortality within the defined period.

society where sons are valued over daughters to the extent that parents allocate daughter's share of resources to sons, it is not plausible that exposure to female politicians encourages the neglect of sons. However, if the political regime causes a resource reallocation within the household such that sons and daughters now receive equal care then newborn sons may experience higher mortality, given the higher biological mortality risk of male infants relative to female. The negative estimated coefficient on *isgirl* indicates that female infants, on average, have better survival outcomes post birth relative to their male counterpart. However, the positive difference for girls is observed only in urban areas where postnatal selection is expected to be lower given high rate of sex-selective abortion of female fetuses. In case of neonatal mortality, the estimated coefficient is -0.06 and it is significant at the 5-percent level, and the corresponding estimate for post neonatal mortality is small and imprecise. Thus, the disproportionate improvement in girls' postnatal survival may be the result of the quality-quantity tradeoff identified by Hu and Schlosser (2015).

Further, I examine the impact of female political representation on girls' postnatal survival by rural-urban since the healthcare access differs between cities and villages and affect infant survival, particularly for girls because they are the marginal children. I find significant rural-urban difference in the impact of female political representation on girls' postnatal survival with the positive effect concentrated only in rural areas. Table 2.9 presents these findings. The estimated $isgirl \times female$ coefficient for rural children is -0.098 and it is significant at the 5 percent level. This result implies female infant mortality declines by 0.98 percentage points relative to boys in response to a 10-percentage point increase in the district share of female state legislators. The corresponding coefficient for urban children is small and imprecise.

I find support for the postnatal mortality result in the breastfeeding trends provided by the DLHS. Breastfeeding is considered critical for promoting sensory and cognitive development in infants and protecting them against infectious and chronic diseases. Exclusive breastfeeding is also shown to lower infant mortality due to diarrhea or pneumonia. Accordingly, the World Health Organization recommends exclusive breastfeeding of all infants starting at birth and up to the first six months. However, female infants in India are breastfed for shorter duration than boys and often less than the recommended minimum, accounting for roughly 14 percent of the excess mortality of girls in the country (Jayachandran and Kuziemko (2009)).

The DLHS survey carries detailed breastfeeding information for infants born in the three years preceding the survey date. It records the duration of breastfeeding and the initiation of breastfeeding post birth. The sample summary reveals that 28 percent, 44 percent and 55 percent of children were breastfed within two hours, one day and two days after birth. The empirical specification for the analysis of breastfeeding outcomes is same as equation (2.2). I estimate the impact of female political representation on the duration of breastfeeding in months.

Table 2.10 presents the results for breastfeeding duration by child gender. For the first six months (columns (1) and (2)), the estimated coefficient of *female* for girls is 0.5 that is significant at the 10-percent level, This result implies that the likelihood of a female infant being breastfed up to the first six months increases by 5.2 percentage points in response to a 10-percentage point increase in the district share of female state legislators. The result for boys is less precisely estimated, which may indicate that early childcare for boys is less dependent on external factors, because they are the wanted children. The political regime also prolongs breastfeeding of daughters beyond the prescribed minimum (columns (2) - (6)) present these findings. The coefficient estimates of *female* indicates that girls are more likely to be breastfed at least a year or two with increases in female representation. The estimated effect for boys (columns (4) and (6)) is 10 percent smaller and less precise. Taken together, the results on breastfeeding suggest that female political representation increases parental investment in post-birth care of girls, and thus improve their postnatal survival.

Similar to breastfeeding, girls are also neglected in immunization. Though parental input is an important determinant of the gender differential in child immunization rates, government provision of free vaccination camps and home visits and counseling by government workers may impact the receipt of this care, especially for the marginal children, or girls. Thus, improvement in childcare health service following an increase in female political representation may improve outcomes for girls more often than boys. Using immunization history of children from DLHS, I analyze the impact of female political victories on vaccination and immunization records.[14] However, I find no significant gender differential in the impact of female political representation on immunization. While in the overall sample female political representation seems to improve some of the vaccinations for girls relative to boys, the difference goes away when the sample is restricted to children with official proof of the administered vaccines. Refer to Appendix section A.0.2 for details.

2.6.3 The impact of national reforms

Though the overall impact of female political representation on girls' prenatal survival is negative, I find that the effect is sensitive to the policy environment and political regime. Nationwide reforms intended to raise the status of women and girls also influence how women's political representation affects outcomes for girls. This section considers the impact of two landmark initiatives that were implemented during the period under study: 1) PNDT Act and 2) political reservation for women. Recall that in 1996 the Indian government enacted the PNDT Act, which prohibits the use of ultrasounds and other fetal diagnostic techniques for detecting the sex of an unborn child. The law aims to protect girls against prenatal selection and institutionalizes their right to life. Meanwhile, the political quotas were the first broad-based national political reform for women. The 93rd and 94th Constitutional Amendments of 1993 mandates the reservation of one-third of the political seats for women in all local governing bodies in rural and urban areas.

To investigate how the interventions affect the impact of female political representation on girls' prenatal survival, I extend the empirical specification in equation (2.2) including a binary indicator $reform$, that captures the onset of each intervention, and the interaction term $reform \times female$. The coefficient on the latter is of interest because it measures the change in the effect of female political representation on girls' prenatal survival after the reform relative to the pre-reform period.

Table 2.11 reports the estimated impact of female political representation on girls' prenatal survival before and after the reforms. For *PNDT* in column(1), the estimated coefficient on the

[14] Similar to breastfeeding DLHS provides immunization record of children born in the three years preceding the survey date

interaction term is 0.11 and is statistically significant at the 5-percent level, indicating that post-PNDT, female political representation increases the likelihood of girl births relative to the pre-ban period. Meanwhile, the negative coefficient estimate of *female* suggests that the likelihood of female birth is decreasing in women's political representation in the pre-PNDT period. In case of political reservations (column (2)), the coefficient estimate is 0.21 and is statistically significant at the 1-percent level, indicating that post-quota, female political representation increases the likelihood of girl births relative to the pre-reform period. Meanwhile, the negative and statistically significant coefficient estimate of *female* suggests that the likelihood of female birth is decreasing in women's political representation in the pre-quota period.

I also investigate the impact of female political representation on girls' prenatal survival and fertility for the cohort of children born after each of the reforms. For this, I use the empirical model given in equation (2.2). Table 2.12 presents these results. I find large, positive and robust impact of female political representation on prenatal survival after the reform (top panel). Post PNDT (reservation), the likelihood of a female birth increases by 1.8 (2.3) percentage points in response to a 10 percentage point increase in female political representation. This translates into 6 (7) additional female births per 100 male births post PNDT (reservation). These effects are unaccompanied by any change in the likelihood of a marginal birth (bottom panel). Together, the results suggest that the proportion of girls in live births increases and there is a decline in son preference with female political representation.

The results indicate that broad-based reforms for women cause a reversal of the qualitative effect of female political representation on girls' prenatal survival. The analysis of PNDT shows that appropriate policies or legislation protecting girls and supporting their cause can lower their discriminatory treatment and enhance their well being. Such initiatives, however, are better implemented and enforced with greater female representation in the political domain. On the other hand, the borax-based representation of women through political quotas potentially strengthens the overall political agency of women. It enhances the visibility of women in the political domain and increases the political voice of the individual female MLAs in the district, enabling them to improve policy outcomes for girls.

2.7 Possible channels

I have shown that overall, female victories in district elections lower fertility and the likelihood of female birth but improve girls' postnatal survival and childcare. Further, the effect of female political representation on girls' prenatal survival is sensitive to nationwide reforms for women and girls, with measurable positive impact following such interventions. Next, I investigate how female electoral success may improve outcomes for girl children. In particular, I examine the three channels outlined in the conceptual framework of this study: provision of services, enforcement of laws and changing perceptions.

2.7.1 Public good provision

As discussed in the conceptual framework, female politicians, more than their male counterparts, tend to prioritize the provision of public goods that address the needs of women. Female MLA's effect on fertility and girls' improved postnatal survival can be attributed to their influence on the provision of women-friendly public goods.

Women, rather than men, bear the costs of childbearing. Frequent childbirths adversely impact women's health and nutrition, exposing them to high mortality risks during pregnancy and at childbirth. Meanwhile, the indirect costs include forgone employment and wages since women, instead of men, stay home to look after the children. It is plausible that female politicians leverage their position to lower fertility among women by strengthening the implementation of existing birth control programs. To test this proposition, I investigate the impact of female political representation on the outreach of fertility counseling to mothers and women's contraception use. I use the empirical specification outlined in equation (2.2) and drop the time dimension in the model (including time fixed effect) since the DLHS records the contraception information on mothers only for the survey year. Table 2.13 presents these results. The coefficient estimate in column (1) is 0.34 and statistically significant at the 1-percent level, indicating that the likelihood of contraception use among women increases 3.4 percentage points in response to a 10 percentage point increase (0.093) in female political representation. The coefficient estimate of 0.20 in column (2) shows that the likelihood of a mother receiving fertility advisement through government source increases by 2 percentage points in response to 10 percentage-point increase in female political representation. Thus, female legislators enhance the effectiveness of FP programs and it translates into higher contraception use among the resident mothers of the respective district.[15]

The effect of female representation on birth control programs is likely to be more pronounced among rural women, compare to urban. Rural women have high fertility, low awareness regarding the benefits of birth control and often, lack access to contraception methods. I investigate the rural-urban difference in the impact of female political representation on contraception use and FP programs. For this, I extend the empirical specification by adding a binary indicator *urban* for an urban households and the interaction term $female \times urban$. The outcome variables are contraception use and awareness, FP advisement and government health worker visit to mothers under FP programs. Table 2.15 reports these results. In column (1), the positive estimated coefficient on the interaction term indicates an overall higher contraception use among urban mothers compared to rural with an increase in female political representation. On the other hand, the large, positive and robust coefficient estimated on $female$ in columns (2) and (3) show that female MLAs improve the outreach of FP programs in rural areas compared to urban. There is an increase in the FP worker visits and fertility counseling of mothers in rural areas. The negative and statistically significant coefficients on *urban* in these columns indicate that urban areas are not the focus of FP programs given the already higher awareness and access to FP methods.

Similar to fertility, the improved breastfeeding outcomes for girls may also entail from female

[15]The channel underlying fertility decline and the overall deterioration of girls' prenatal survival suggests that political changes that favor women in general may not benefit girls, given son preference. A reduced birth rate that enhances women's wellbeing through improved reproductive health and increased productivity in other walks of life, including the labor market, effectively lowers girls' survival prospects. In a similar vein, Rosenblum (2015) finds that a legal amendment granting equal inheritance rights to daughters increased mortality of young girls in India. The underlying cause being parents' bequest motives that reduces health investment on female infants in order to maximize inheritance to sons.

MLA's influence on the provision of public goods. They may improve reproductive and child health provision in the district such that the dissemination of vital childcare information reaches more mothers. I test this hypothesis by investigating the impact of female representation on government provision of childcare advise to mothers.[16] I proceed with the empirical specification used for analyzing contraception use. The outcome variables are binary indicators for whether the mother received counseling on diet, delivery and newborn care from public health workers before or after the birth of her child. Table 2.14 presents these results. The positive and robust coefficient estimates in columns (1), (2) and (3) suggest that mothers are more likely to have received advice on these aspects of childcare with female political representation. Such health information can improve girls' survival by educating mothers about the importance of nursing and other critical care for newborns and infants. While son preference may continue to dominate parents' childcare decisions, especially those involving direct economic costs, girls may have better access to a low cost health input like breastfeeding.[17]

In addition, I rule out the possibility that female MLA(s) may affect fetus survival or girls' postnatal mortality through a direct expansion of prenatal and postnatal care services or by altering mothers' health seeking behavior around childbirth. I test this hypothesis by investigating how female political representation affects public health worker visits, provision of vital nutritional supplements and health checkup of mothers before and after childbirth. DLHS captures trends in these outcome variables only for a subsample of mothers who gave birth between January 2001-January 2004. I proceed with the empirical specification outlined in equation (2.2). Table A5 presents these results. None of the attributed coefficients are significantly different from zero.

[16] Under the Integrated Child Development Services (ICDS) program, government health workers visit women during pregnancy and after childbirth to provide vital information related to childcare and nutrition. The ICDS is a nationwide service launched in 1975.

[17] The marginal benefit to girls from the efficient distribution of childcare information would be highest in areas with declining trends in health such a rural pockets within the district, where girls are subject to greater neglect than boys with households attending less on their care. Considering that these are also the areas with limited access to fetal sex-diagnostic technology girls may be at higher mortality risk post-birth given that many of them are unwanted births. This supports my finding that female political representation lowers postnatal mortality of girls relative to boys only among rural households with no observable difference in urban areas. This highlights the fact that little interventions in health by female legislators yield substantial postnatal gains for girls and the impact is larger when girls are more deprived.

2.7.2 Enforcement of laws

The positive impact of female political representation on girls' prenatal survival after the PNDT Act suggests that female politicians may strengthen policies or legislation favoring girls. The findings are consistent with previous studies that show greater support for women-friendly laws among female politicians compared to their male counterpart (Clots-Figueras (2011)). First, the institutionalization of girls' cause through legislation enables female politicians to protect them against prenatal selection relative to the pre-ban period. Second, the greater force of the law in areas with a higher share of female MLAs suggests that the ban is more effective in delivering justice when there are more women in political office. Since the period following the ban is unaccompanied by any other reform for lowering prenatal selection, the post-PNDT increase in female births can largely be attributed to the enforcement of this law by female politicians.

2.7.3 Changing perception

I have shown that female MLAs lower fertility among women and increase breastfeeding of girls through their influence on the provision of public health services. Alternatively, it may be a potential role-model effect of female politicians on mothers. First, by raising women's self-aspiration it may increase their focus on career and therefore lower the desired number of children among mothers. Second, female politicians may increase households' aspirations from their daughters and thus, lower postnatal discrimination against female infants in nursing. Finally, household's exposure to female politicians may increase women's say in fertility and childcare decisions and result in both, reduced fertility and better care of girls.[18] The larger positive effect of women's political representation on nursing of female infants, relative to male also suggests that there may be a potential role-model effect of these politicians, either on the mothers or the household. Although the dissemination of childcare information can increase overall nursing of infants but it is not a sufficient explanation for the relatively larger health investment in girls than boys, more so because

[18] Women in India, typically, have low bargaining power in household decision-making. They also have less control on the desired number of children or childcare, both of which are dictated by the husband's or household's preference for the male child.

nursing is predominantly a maternal input and less influenced by district health variables. Unfortunately, the role model effect of female MLAs cannot be isolated using the current dataset.

My findings, however, suggest that the reservations may have increased the visibility of female MLAs as observed from their positive impact on female births post the political reform. While previous work (Kalsi (2017)) shows that the quotas itself were effective in lowering prenatal sex selection through a change in attitudes towards girls. The possibility that it may improve outcomes for girls even indirectly by raising the political voice or visibility of women at higher tiers of the government remains unexplored. To inspect this, I compare rural-urban patterns in the pre-post differential impact of female MLA(s) on prenatal survival. Evidently, the quotas enabled female MLAs to boost outcomes for girls only in rural areas as shown in Appendix Table A3. Intuitively, the marginal impact of quotas on politician visibility would be larger in rural areas compared to urban given the rural population's limited access to mass media and therefore, general unfamiliarity with political leaders at higher tiers of government. Although this does not rule out increased visibility of female politicians in urban areas post-quota but the impact is expected to be relatively smaller. Thus, a change in social attitude towards women ensuing from broad-based female representation maximizes benefits for girls when there are more women in higher levels of administration.

It may be argued that the post-reservation positive effect of female MLAs on girl births operates through the channel of law enforcement. More women in local governing enable female MLAs to strengthen the enforcement of PNDT Act locally. While it is impossible to rule out this possibility it is important to emphasize the fact that the violation of this law occurs mostly in urban areas with higher prenatal selection in cities than villages. If law enforcement is the channel underlying the post-reservation survival gain of girls then we would expect it to be more pronounced in urban areas. Instead, the gains are restricted to rural households thus, pointing to a change in perception following the quotas.

2.8 Robustness checks

2.8.1 Instrument validity

In a plurality voting system, there is discontinuity in the vote margin at zero. A positive vote difference represents female victory in a close election while a negative difference implies male victory. Thus, the probability of winning the election is a function of the vote margin. As the vote difference approaches zero, constituencies with female winners look exceedingly similar to constituencies with male winners. (Angrist and Lavy (1997); Clots-Figueras (2011), Clots-Figueras (2012), Bhalotra and Clots-Figueras (2014)). Figure 2.8 provides a graphical illustration of this approach. It is a non-parametric plot of the share of female politicians in a district on the vote margin from all man-woman close elections. I plot a non-parametric lowess smoothing line on each side of the discontinuity using 1 percentage point bins, generated using the regression discontinuity function outlined by (Imbens and Lemieux (2008)). The sharp jump at the point of discontinuity suggests that female victory in a close election increases the overall share of female politicians in the district.

Identification rests upon the randomness of gender outcomes from close man-woman elections. If district-level political or demographic characteristics predict the winner's gender in such elections, then the gender outcome of such elections is no more random. To validate the randomness assumption of close elections, I regress the proportion of district seats won by women in close contest against men on multiple political and demography characteristics. The sample consists of district-years that has at least one female winner in close man-woman elections. These include party type contesting close elections, the proportion of female population, male-female literacy rates, the incidence of close-man-woman elections in the past and the number of female victories in past close elections in that district. Table 2.16 reports the results from the regression. None of the estimated coefficients are significant, suggesting that the chosen instrument is as good as random.

In addition, I show that constituencies with female winners from close man-woman contest look similar to those with male winners. Table 2.18 reports the comparison of variable means for the two groups. Some of these include total candidates and votes polled in a constituency-year, whether the constituency seat is reserved for SC/ST, the type of party the winner is affiliated to and candidate incumbency, The constituency and candidate characteristics of women and men winning in close elections are largely same except for two party types of winner's affiliation. First, women contesting from national parties win more often in close election than men. This is intuitive considering that most women that win elections have a national party backing them. The party platform is an important determinant of female victory but the fact that these women still win by small victory margin shows that the electorate preferences in these constituencies are not biased towards a female politician. Second, women independent candidates are less likely to win elections than men contesting as independents. Thus, female winners in close elections are less likely to be independent candidates than men.

If districts that never experienced close elections looked significantly different than those that did then the results from this study would not be representative of the average district in India. Table 2.17 compares districts with and without close elections during the sample period. It shows descriptive statistics for gender composition of population, literates and workforce participation. It also compares political variables such as the total number of state assembly seats, the votes in a district electoral year, voter turnout and the female share of voters and electors. Variable means are comparable across the two groups indicating that districts that experienced close elections are similar in observables to those that did not. This asserts external validity of the results obtained.

To rule out possible manipulation of the assignment variable (vote margin) around the point of discontinuity, I check for continuity of vote margin density around the point of discontinuity. Figure 2.9 is a density plot (kernel fit) of victory margin from all man-woman elections in a district-year. It shows that the vote margin is continuous around zero. I also perform the McCrary's test, which checks for discontinuities in the density of observations of the assignment variable around the point of discontinuity. If there is a discontinuity at the threshold for treatment, then this may suggest that some agents are able to perfectly manipulate their treatment status. I estimate the difference in density of victory margin on either side of zero as shown in Figure 2.10. The estimated log difference in height is 0.095 with a SE of 0.106, implying that the difference is statistically insignificant.

2.8.2 Placebos

The specification in equation (2.2) investigates the influence of the district share of female politicians in the year immediately preceding birth *t-1* since fetus survival is primarily affected by occurrences during the nine months before birth. Also, neonatal mortality and infant mortality is closely linked to prenatal care, mother's health during pregnancy or postnatal care immediately after birth. However, there may be some persistence in impact of politician gender from years before the last and by not including them in the main model I might be overestimating the effect of the political regime. To test for such persistence, I re-estimate the baseline model using greater lags of the political variable up to *t-3* periods. I find no impact of female representation from two or three years before birth *t-2, t-3*. I also run placebo checks to mitigate concerns of erroneously capturing omitted trends. For this, I regress sex of children born in period t on forward lags of the political variable *t+1, t+2*. These coefficient estimates are insignificantly different from zero as shown in appendix table A4.

2.9 Conclusion

This study finds that female victory in political seats of authority advances the interests of women but an extension of its benefit to girls is limited by the cultural setting. Some part of this may be attributed to the embedded gender hierarchy in India's political sphere that limits women's political voice. It constrains them from leveraging their position to combat more severe forms of gender inequality like sex-selection. This is especially true for higher platforms of governance where women make up a small share of a collective administrative body like state legislatures. On the other hand, these female legislators may have an elitist outlook towards gender equality given that they compete against men for positions of power at a higher political tier. As a result, they may support the cause of privileged women by expanding female education and employment but overlook the more fundamental threats to survival of the disadvantaged ones.

In a male-dominated society with vast under-representation of women in the socio-economic and political spheres, the institutionalization of women's issues is critical for the political regime to advance their interests. The federal ban on prenatal sex determination is one such legislation that directly targets crime against daughters and also enables female politicians to improve outcomes for girls. This paper also provides evidence that increased female representation may strengthen the enforcement of this ban.

Female victory in competitive elections certainly challenges gender stereotypes by conveying gender equality in a male domain like politics. However, female candidates and winners in state elections are few and being part of a higher level of administration they have poor visibility at the local level. Thus, any role model effect of their political status is likely to be fairly limited in outreach and impact. Yet, their ability to make larger differences for girls appears to increase following mandated reservation of local political seats for women. The broad-based representation of women in local administration lends visibility to female representative at a higher platform of governance. This highlights the need for a comprehensive political agency of women for improving outcomes for girls. Not only their shares but representation across multiple tiers of administration can maximize benefits to girls.

Unlike local governing bodies where women make up one third of the administration due to reservations, female representation in state and national governments remains dismal, averaging at around 10 percent. A bill proposing the reservation of political seats for women at these higher platforms of governance was introduced in 1996 but still awaits clearance of the upper house of parliament. The findings of this paper strengthen the case for passing this bill and increasing female participation at all levels of the political framework.

Table 2.1: Household variables summary

	Mean	SD
Unit of observation: mother		
No. of live births	3.02	1.76
Girl	0.48	0.50
Birth order	2.51	1.63
Rural	0.68	0.47
Household standard of living index	1.82	0.81
Mother's age	30.6	7.12
Father's age	36.6	8.15
Mother's years of schooling	8.42	3.60
Father's years of schooling	9.07	3.86
Mother literate	0.50	0.50
Father literate	0.72	0.45
Age at consummation of marriage	17.3	3.11
Hindu	0.82	0.38
Muslim	0.12	0.33
Christian	0.024	0.15
Sikh	0.018	0.13
Buddhist	0.0074	0.086
Scheduled caste(ST)	0.19	0.39
Scheduled tribe(SC)	0.088	0.28
Other backward classes(OBC)	0.41	0.49
Observations	*443111*	

The sample consists of 1,427,714 births to these 443,111 mothers between 1977-2004 spanning 585 districts in all 29 states and one union territory(Pondicherry) of India.

Table 2.2: Election variables summary

	Mean	SD
Unit of observation: district-year		
Share of female winners	0.043	0.093
Share of female candidates	0.036	0.038
Fraction of votes won by female candidates	0.041	0.060
Proportion of district-years with at least one female candidate	0.71	0.45
Proportion of district-years with at least one female politician	0.25	0.43
Proportion of district-years with at least one man-woman election	0.39	0.49
Proportion of district-years with at least one close man-woman election	0.099	0.30
Proportion of district-years with at least one female winner in a close man-woman election	0.053	0.22
Observations	*3949*	

Table 2.3: Estimated effect of female district election victories on prenatal survival, 1977-2004

	isgirl	isgirl	isgirl	isgirl
	(1)	(2)	(3)	(4)
	OLS	2SLS	2SLS	2SLS
female	-0.019	-0.050*	-0.046*	-0.045***
	(0.017)	(0.029)	(0.029)	(0.016)
Control	x	x	x	x
Mother FE	x	x	x	x
Year FE	x	x	x	x
Vote margin polynomial		*1st order*	*2nd order*	*3rd order*
		First stage		
femaleclose		0.945***	1.051***	1.050***
		(0.089)	(0.108)	(0.105)
shareclose		-0.409***	-0.528***	0.515***
		(0.059)	(0.074)	(0.041)
F-statistic		*112.86*	*94.11*	*99.33*
Observation	*516971*	*516971*	*516971*	*516971*

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The richness of specification increases from (1)-(2). (1) is the OLS specification and (2) - (4) is the 2SLS model with varying degrees of polynomial on the vote margin. All specifications include mother fixed effect and time dummies. Controls include mother's age at birth, an indicator for twins or triplets, daughters born previously, district-level population sex ratio, male-female literacy and labor force participation. Dummies are added for female head of state, the onset of political reservations for women at sub-district level and the 1996 legislation banning on sex-diagnostics. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.4: Reduced-form effect of female district election victories on prenatal survival, 1977-2004

	isgirl (1)	isgirl (2)
	RD(CCT)	RD(IK)
female	-0.021**	-0.027**
	(0.009)	(0.012)
Controls	x	
Mother FE	x	
Time FE	x	
Polynomial on vote margin	x	
Observations	*516971*	*516971*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Column (1) and (2) are RD procedure outlined by Imbens and Kalyanaraman (IK) and Calonico, Cattaneo, and Titiunik (CCT), respectively. Controls include mother's age at birth, an indicator for twins or triplets, daughters born previously, district-level population sex ratio, male-female literacy and labor force participation. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.5: Estimated effect of female district election victories on fertility, male and female birth 1977-2004

	Fertility (1)	Female birth (2)	Male birth (3)
female	-0.080**	-0.062***	-0.018
	(0.034)	(0.015)	(0.012)
Observations	*6605781*	*6605781*	*6605781*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. The observations includes all reproductive years of the sampled mothers or each year in which the woman could have given birth. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.6: Estimated effect of female district election victories on fertility by rural-urban

	fertility (1)	fertility (2)	fertility (3)
	Overall	Rural	Urban
female	-0.080**	-0.072***	-0.096***
	(0.034)	(0.023)	(0.033)
Observations	*6605781*	*1755711*	*897457*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Column (1) is for the full sample while columns (2) and (3) separate the effect by rural and urban, respectively. All standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.7: Estimated effect of female district election victories on prenatal survival by rural-urban

	isgirl (1)	isgirl (2)	isgirl (3)
	Overall	Rural	Urban
female	-0.046*	-0.038	-0.064*
	(0.026)	(0.031)	(0.035)
Observations	*516971*	*355240*	*161654*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.8: Estimated effect of female district election victories on postnatal survival by child gender 1977-2004

	Infant mortality		Neonatal mortality		Postneonatal mortality	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	OLS	2SLS	OLS	2SLS
female	-0.002	0.057***	0.007	0.059***	0.003	-0.002
	(0.011)	(0.009)	(0.005)	(0.021)	(0.004)	(0.006)
isgirl	-0.007***	-0.007***	-0.016***	-0.011***	0.004***	0.004**
	(0.002)	(0.003)	(0.001)	(0.004)	(0.001)	(0.001)
$isgirl \times female$	-0.014**	-0.079***	-0.006	-0.060**	-0.007	-0.019
	(0.009)	(0.026)	(0.005)	(0.032)	(0.005)	(0.019)
Observations	*1334327*	*516971*	*1334327*	*516971*	*1334327*	*516971*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Columns (1), (3) and (5) report OLS coefficient estimates for infant, neonatal and post neonatal mortality using the specification in column (1) of Table 3. Columns (2), (4) and (6) report 2SLS coefficient estimates for infant, neonatal and post neonatal mortality using the specification in column (3) of Table 3. The sample size drops in moving from OLS to 2SLS as the latter only focuses on district-years that saw a close man-woman election. Standard errors are clustered at the district level and bootstrapping with 1000 draws is used to calculate the error variance-covariance matrix.

Table 2.9: Estimated effect of female district election victories on infant mortality by rural-urban 1977-2004

	Overall	Rural	Urban
	(1)	(2)	(3)
female	0.057***	-0.064**	-0.043
	(0.009)	(0.030)	(0.041)
isgirl	-0.007***	-0.003	-0.015**
	(0.003)	(0.004)	(0.008)
$isgirl \times female$	-0.079***	-0.098**	-0.033
	(0.026)	(0.041)	(0.075)
Observations	*516971*	*355240*	*161731*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.10: Estimated effect of female district election victories on breastfeeding by child gender

	first six months		at least one year		at least two years	
	(1)	(2)	(3)	(4)	(5)	(6)
	Girl	Boy	Girl	Boy	Girl	Boy
female	0.524*	0.768	1.921**	1.727*	1.973**	1.762*
	(0.308)	(0.488)	(0.950)	(0.909)	(0.974)	(0.920)
Year FE	x	x	x	x	x	x
District FE	x	x	x	x	x	x
Observations	*41020*	*46274*	*41020*	*46274*	*41020*	*46274*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. The sample consists of only last births to mothers who have eight or less children and whose last birth was between 1999-2004. The censoring is done to lower composition bias from mothers with significantly large family size. The sample also excludes children who died as nursing duration for those children would not precisely reflect mother's breastfeeding preference, especially if they died within the first three years after birth. Both columns control for birth order, mother's education and mother's age at birth.

Table 2.11: Estimated effect of female district election victories on girls' prenatal survival pre-post reforms

	isgirl (1)	isgirl (2)
female	-0.072*	-0.093***
	(0.041)	(0.014)
reform	0.010	-0.017*
	(0.008)	(0.010)
$reform \times female$	0.108**	0.205***
	(0.053)	(0.077)
Dummy	PNDT	Reservation
Observations	*516971*	*516971*

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Column (1) examines the effect pre/post the 1996 nationwide ban on fetal sex-determination. Column (2) measures the effect pre-post the 1993 political reservation for women at the sub-district level. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.12: Estimated effect of female district election victories on fertility and girls' prenatal survival post reforms

	isgirl (1)	isgirl (2)	isgirl (2)
	Overall	Post PNDT	Post Res
female	-0.046*	0.176 *	0.231***
	(0.026)	(0.102)	(0.049)
Observations	*516971*	*516971*	*516971*
	Fertility	Fertility	Fertility
female	-0.080**	-0.009	-0.016
	(0.034)	(0.050)	(0.035)
Observations	*2653168*	*1487491*	*1297852*

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Column (1) are estimates from the full sample, (2) and (3) reports post-PNDT and post-reservation effect of *female*. The sample consists of the cohort of children born after each of these reforms. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.13: Estimated effect of female district election victories on contraception use and family planning programs

	Use contraception	FP advice
female	0.338***	0.203**
	(0.110)	(0.085)
Observations	*79202*	*79202*

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. The sample consists of mothers whose last birth was between 1999-2004. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.14: Estimated effect of female district election victories on the delivery of health information to mothers

	Diet	Newborncare	Delivcare
	(1)	(2)	(3)
female	0.239**	0.201**	0.219**
	(0.12)	(0.09)	(0.10)
Observations	*86363*	*86349*	*86362*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. The sample consists of mothers whose last birth was between 1999-2004. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.15: Estimated effect of female district election victories on birth control by rural-urban

	useCONTR	advFP	visitFPworker
	(1)	(2)	(3)
female	0.184	0.200**	0.164*
	(0.123)	(0.094)	(0.083)
urban	-0.118***	-0.702***	-0.264***
	(0.022)	(0.020)	(0.099)
urban x fem	0.446**	0.013	-0.035***
	(0.197)	(0.172)	(0.018)
Observations	*79202*	*79202*	*79202*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Column (1) reports results for contraception use. Columns (3) and (4) measure the effect of the political variable on the delivery of family planning advice by public health workers and visits made by these worker, respectively. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table 2.16: Proportion of district seats won by women in close election against men

	(1)
Proportion of seats contesting close election National	0.0606
	(0.132)
Proportion of seats contesting close election Regional	0.0379
	(0.0809)
Proportion of seats contesting close election Independent	0.0718
	(0.113)
If the district never saw a close election in the past	-0.0554
	(0.0570)
Number of female winners in the past in the district	0.00406
	(0.00906)
Onset of political quotas for women	0.134
	(0.945)
Share of district population that is female	-1.397
	(3.152)
Share of district male population that are literate	-1.368
	(1.579)
Share of district female population that are literate	1.125
	(1.191)
Observations	211

Standard errors clustered in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws. The sample consists of district-years that has at least one female winner in close man-woman elections.

Table 2.17: Comparing districts with and without man-woman close elections

	Non-close election	Close election
Share of district population that is female	0.485	0.482
	(0.129)	(0.0153)
Share of district male population that are literate	0.535	0.504
	(0.139)	(0.157)
Share of district female population that are literate	0.336	0.311
	(0.218)	(0.173)
Share of district male population that are working	0.520	0.515
	(0.210)	(0.0531)
Share of district female population that are working	0.210	0.182
	(0.146)	(0.135)
Total dist-level seats in an election year	6.882	7.677
	(4.378)	(4.126)
Total votes cast in a district election year	517196.5	645106.4
	(462258.0)	(483548.6)
Voter turnout	0.617	0.639
	(0.140)	(0.113)
Female voter share	0.479	0.477
	(0.034)	(0.028)
Female elector share	0.436	0.477
	(0.056)	(0.047)
Observations	3558	391

mean coefficients, sd in parentheses

Table 2.18: Constituency and Candidate Characteristics: Man-woman close elections (vote margin cutoff 3.5 percent)

Group	Obs	Mean	SE
Total votes polled in an ac year			
Man won	213	87514.59	37120.2
Woman won	219	83028.00	37421.3
Difference		4486.591	3586.557
Total candidates			
Man won	213	9.769953	5.617
Woman won	219	9.876712	6.249
Difference		-0.1067593	0.5713033
Other female participants			
Man won	213	.3568075	0.804
Woman won	219	.4657534	0.808
Difference		-.1089459	.0775627
Winner is incumbent			
Man won	213	.2300469	0.28905
Woman won	219	.196347	0.0269041
Difference		.0336999	.0394566
Winner affiliated to a national party			
Man won	213	.6338028	0.483
Woman won	219	.7945205	0.405
Difference		-.1607177***	.0429381
Winner affiliated to a regional party			
Man won	213	.2159624	0.412
Woman won	219	.1689498	0.376
Difference		.0470127	.0379836
Winner is an independent candidate			
Man won	213	.084507	0.279
Woman won	219	.0228311	0.150
Difference		.061676**	.0216164
Constituency seat reserved for General			
Man won	213	.713615	0.453
Woman won	219	.7214612	0.449
Difference		-.0078462	.043426
Constituency seat reserved for SC			
Man won	213	.1830986	0.388
Woman won	219	.1643836	0.371
Difference		.018715	.0365463
Constituency seat reserved for ST			
Man won	213	.1032864	0.305
Woman won	219	.1141553	0.319
Difference		-.0108689	.0300125

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

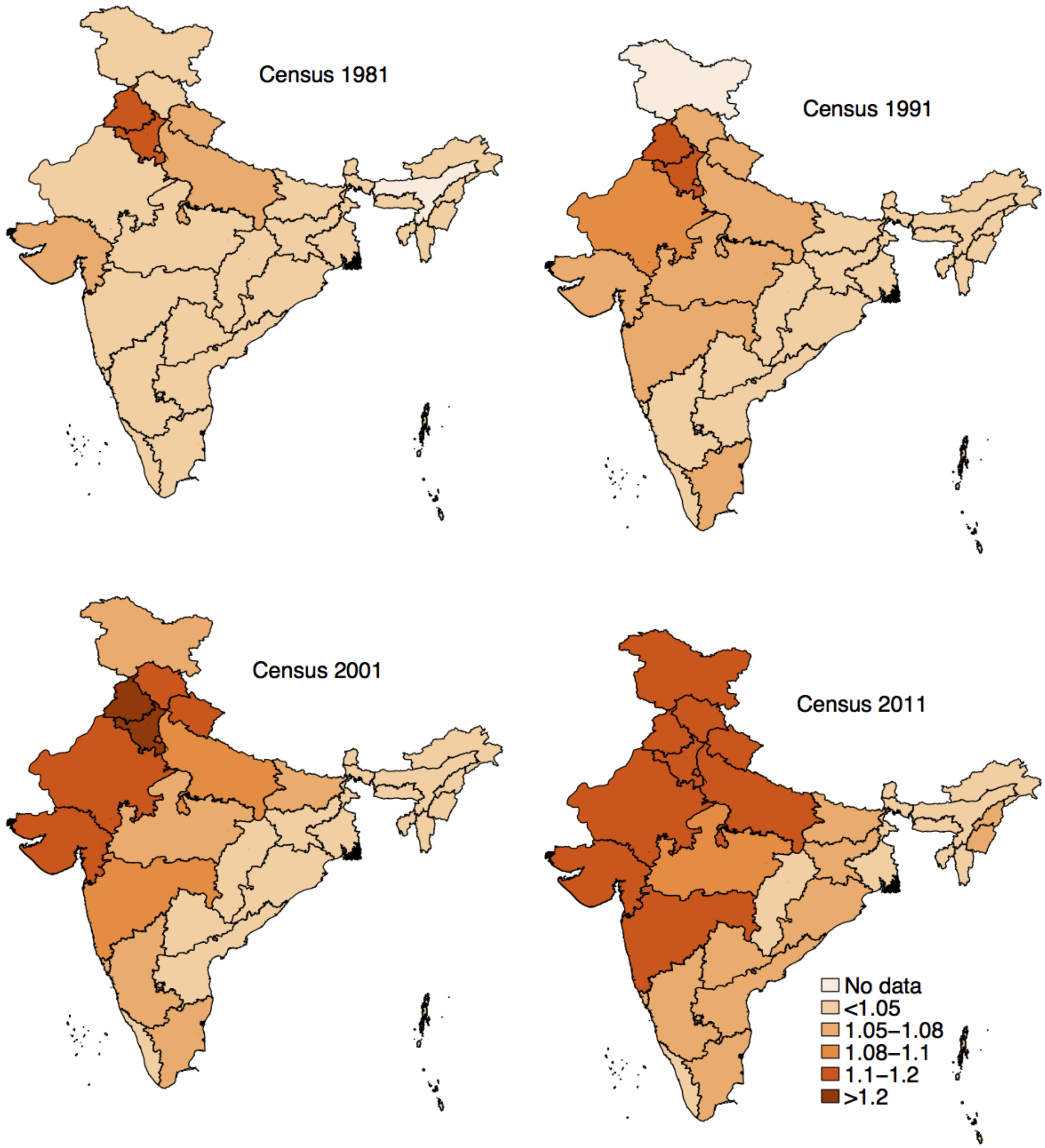

Figure 2.1: Child sex ratio 1981-2011

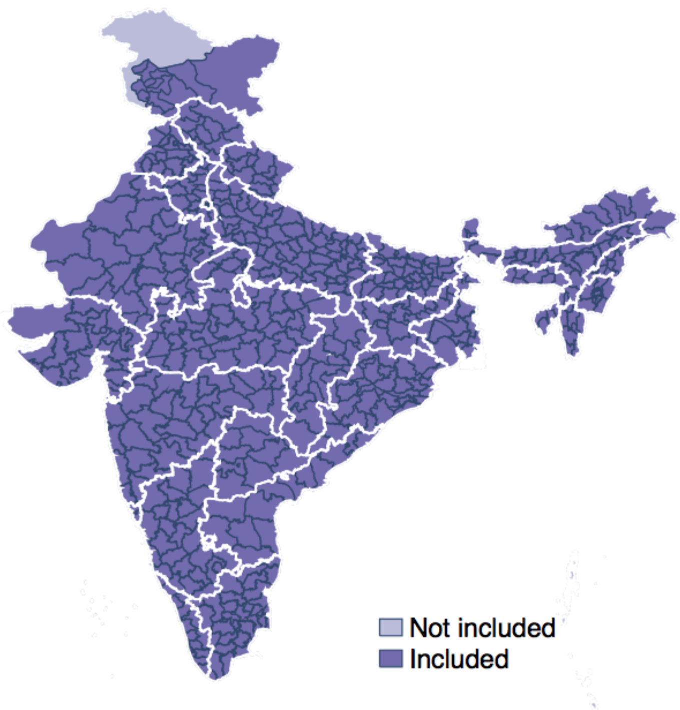

Figure 2.2: Districts covered in the study

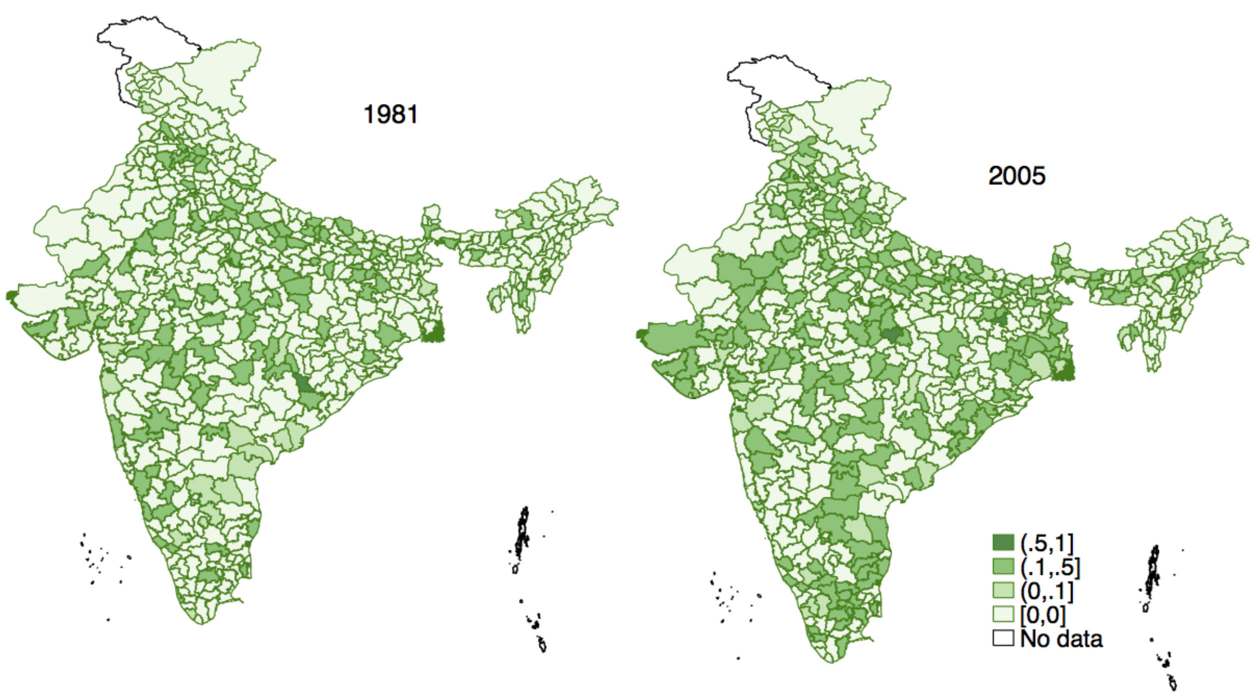

Figure 2.6: Share of district seats won by women 1981-2005

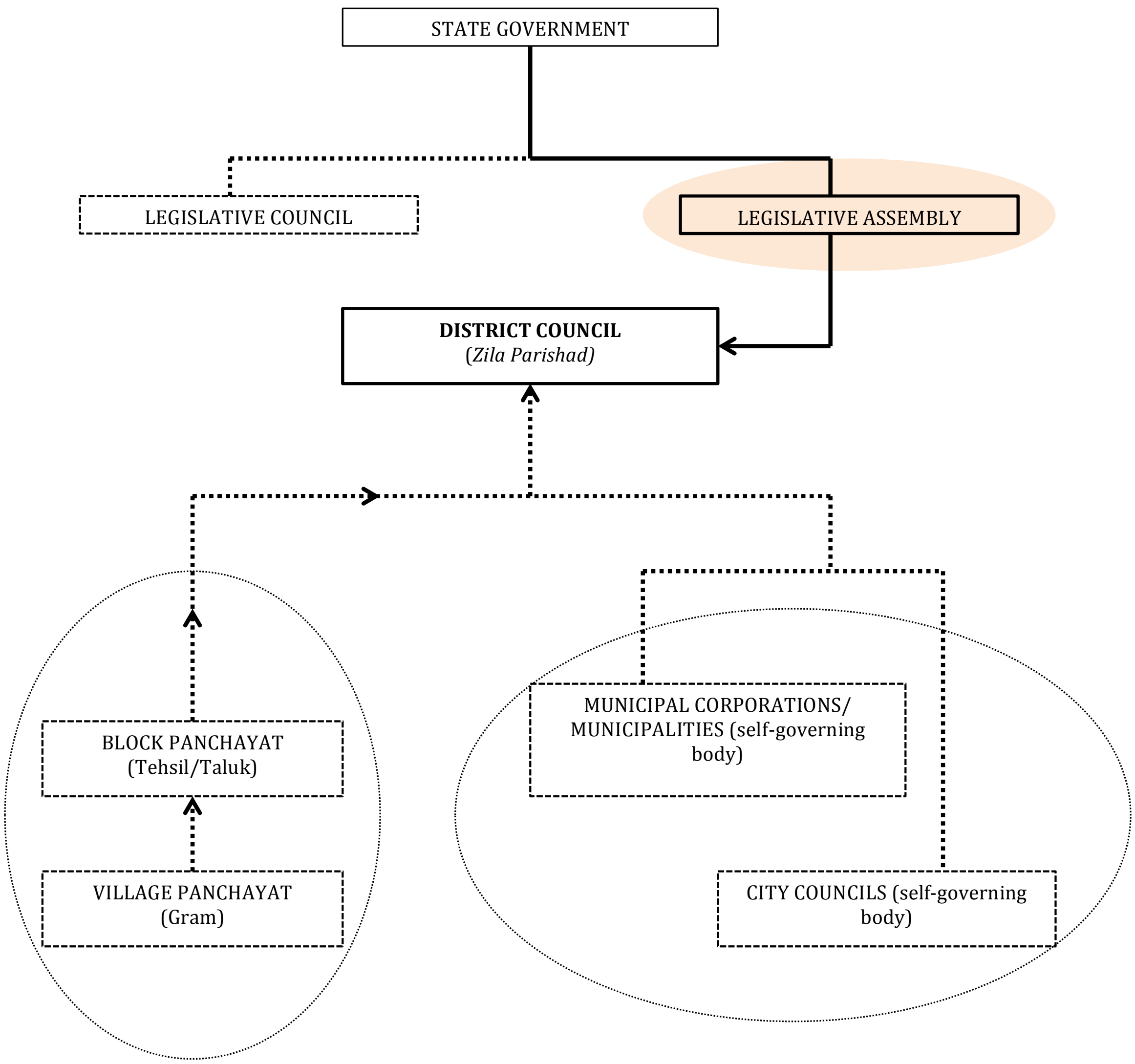

Figure 2.3: Political and administrative divisions of the state

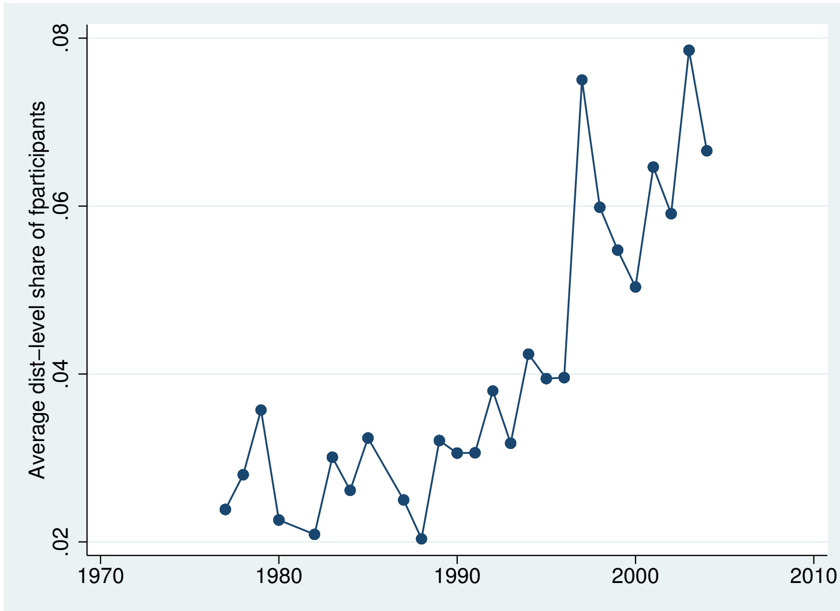

Figure 2.4: Women candidates in state elections:1977-2004

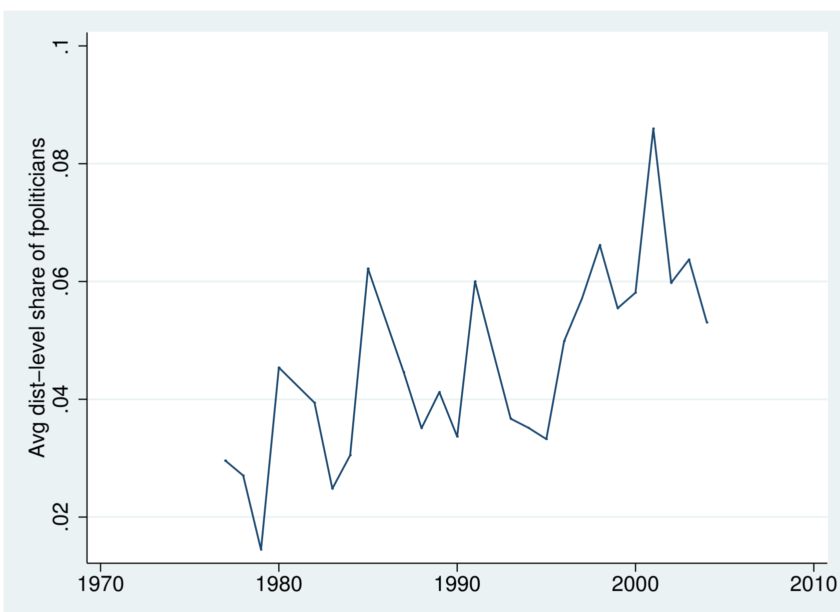

Figure 2.5: Women state legislators:1977-2004

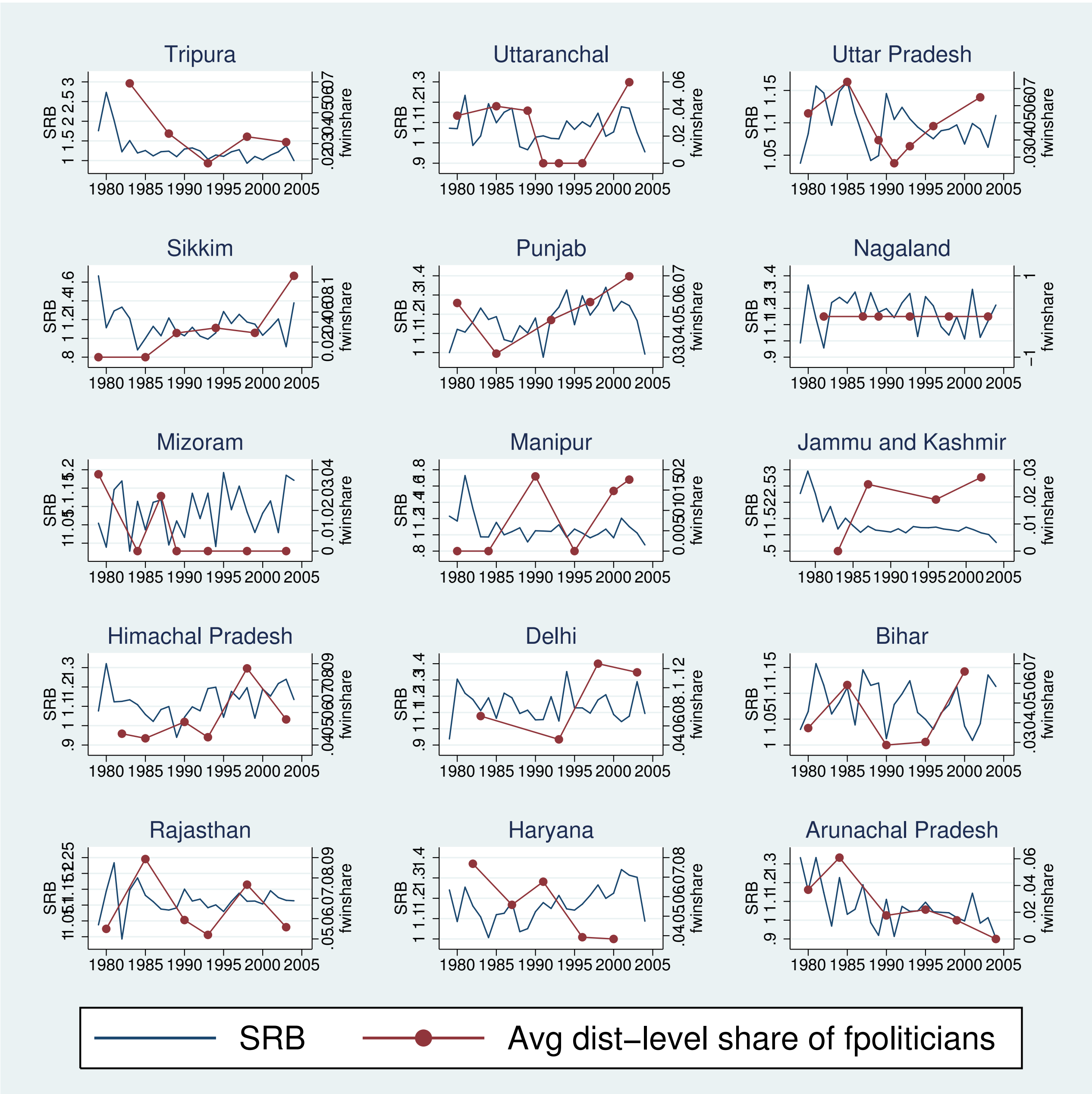

Figure 7a: Sex ratio at birth and district-level share of female winners: group of states I

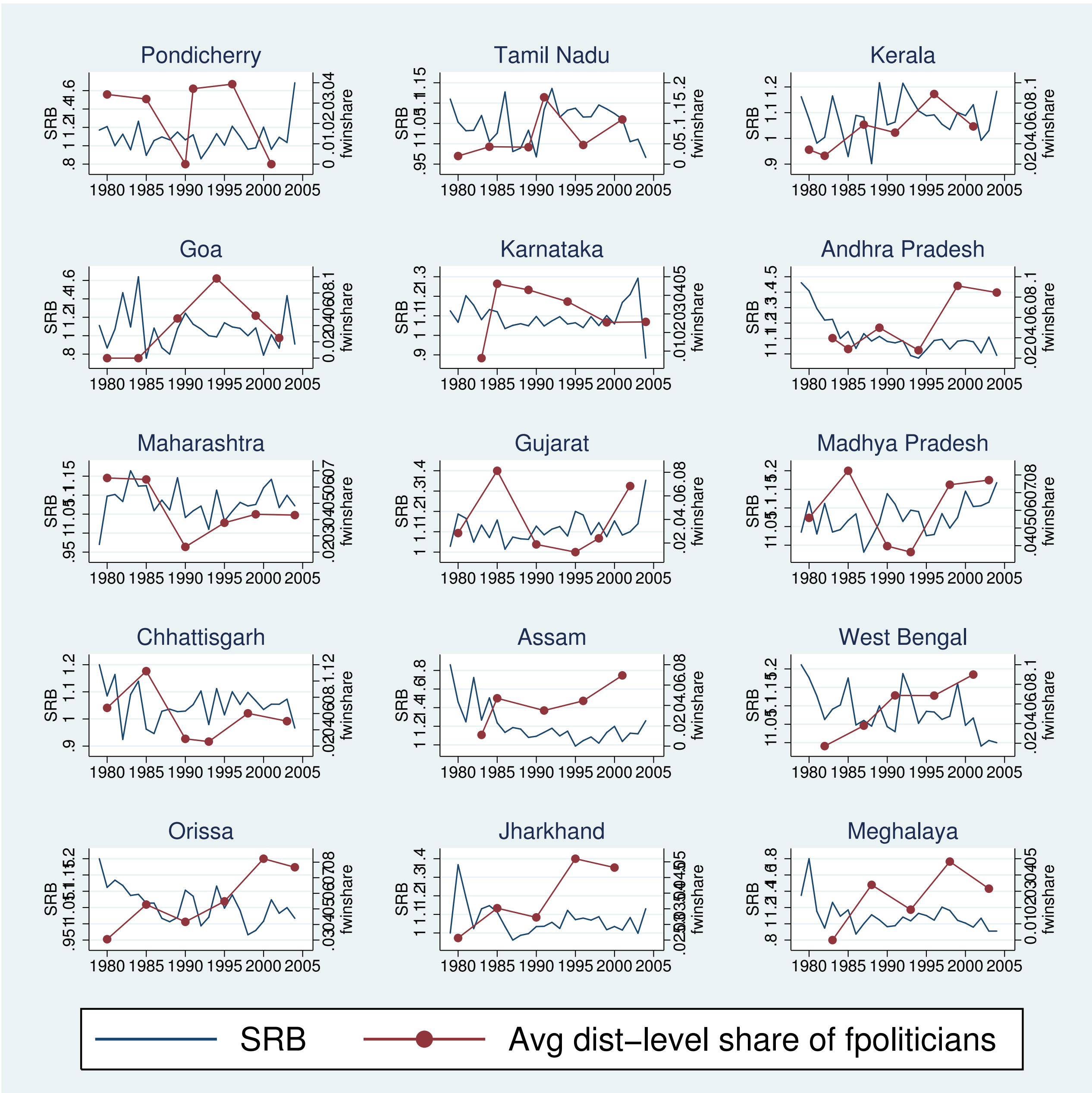

Figure 7b: Sex ratio at birth and district-level share of female winners: group of states II

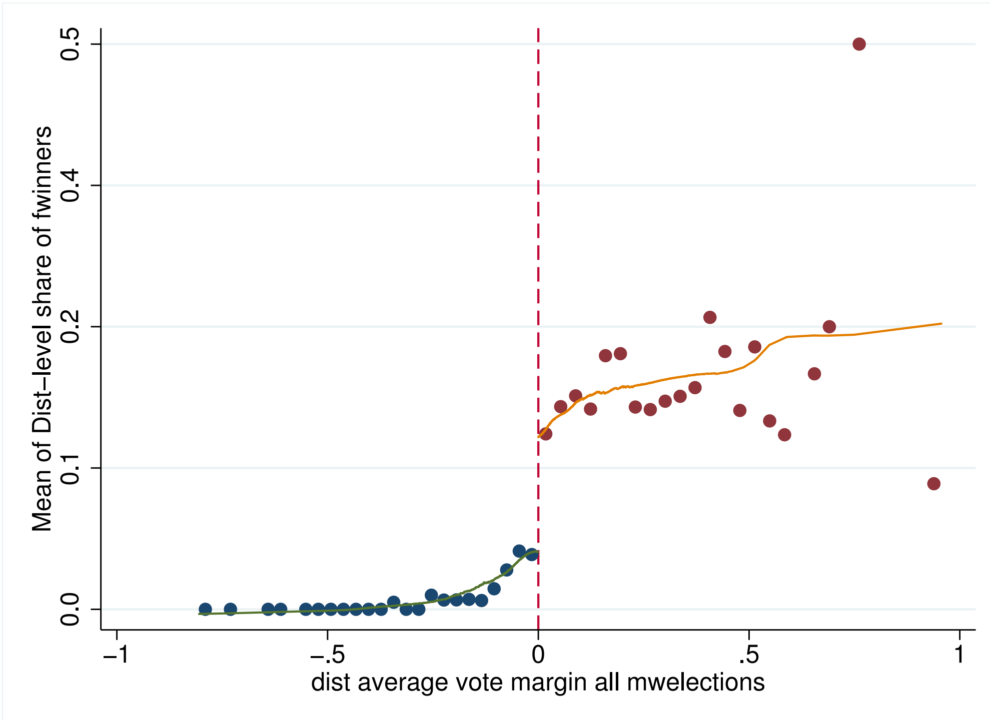

Figure 2.8: RD plot of the share of female politicians on vote margin

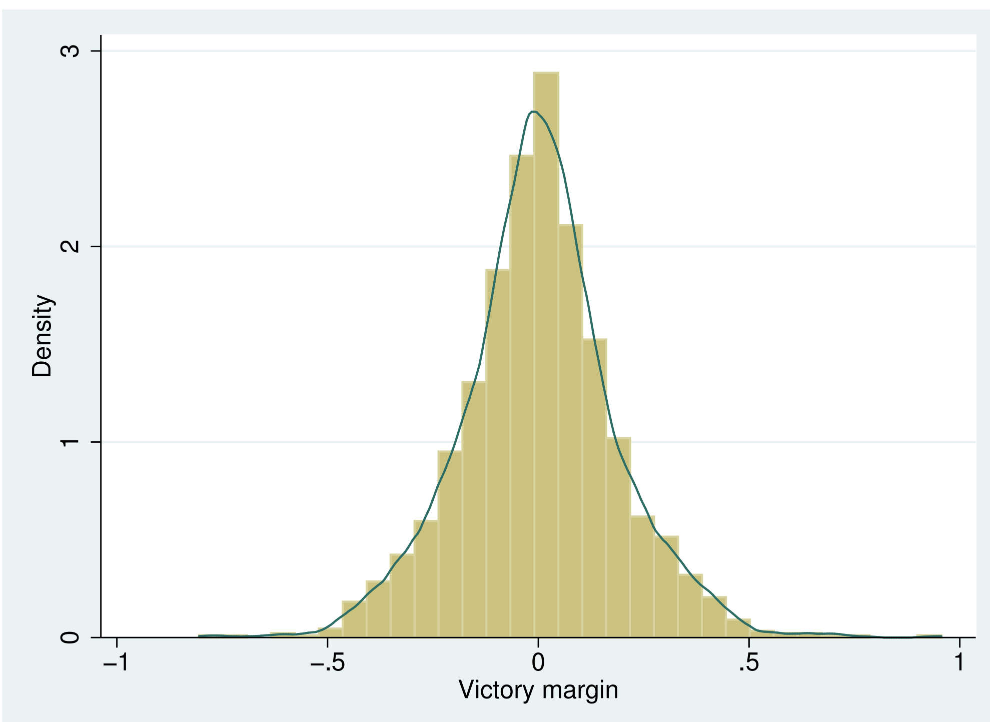

Figure 2.9: Kernel plot for continuity of density around the point of discontinuity

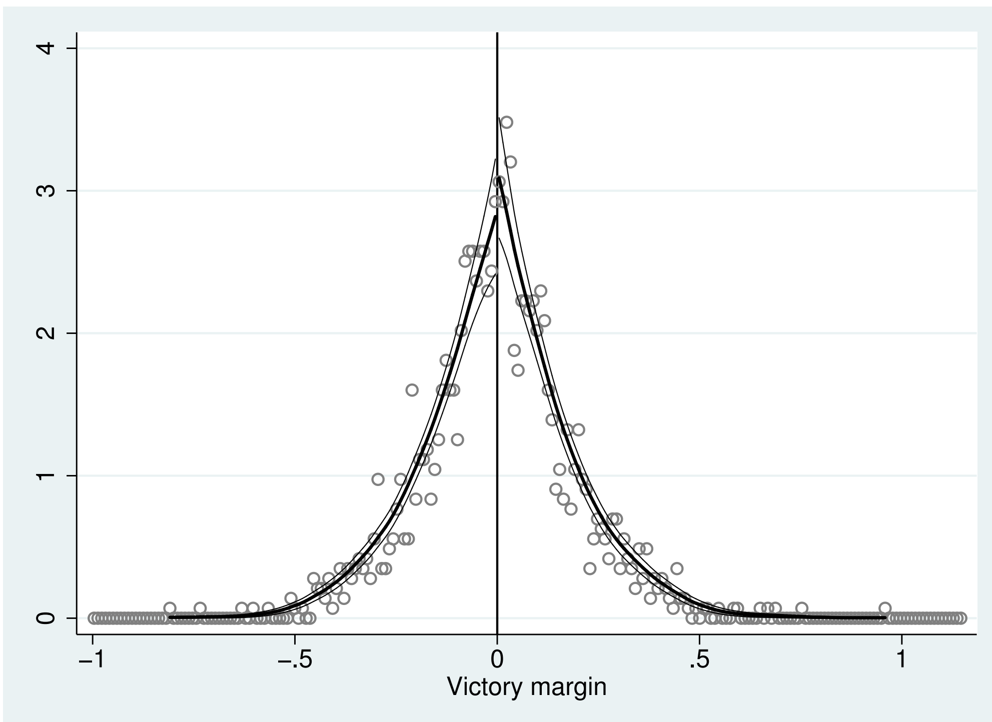

Figure 2.10: McCrary's plot for continuity of density of vote margin

CHAPTER 3

FINANCIAL INCENTIVE SCHEME AND DAUGHTER CARE IN INDIA

3.1 INTRODUCTION

A strong cultural preference for sons in India leads to discrimination against girls in key areas of human capital development. Wide gender disparities are noted in education and health outcomes of children and adolescents. The female disadvantage is more prominent in early childhood years when the neglect of female infants in preventive childcare and nutrition leads to higher mortality of girls than boys (Barcellos et al. (2014), Jayachandran and Kuziemko (2009)). Girls are also discriminated against in utero, with selective abortion of female fetuses. The access to cheap fetal diagnostic techniques since 1980s and steady fertility decline have rapidly increased the sex ratio at birth (SRB). The national child sex ratio (CSR) - ratio of boys to girls under the age of seven years - climbed from 1.02 to 1.09 between 1981 and 2011, with CSRs approaching 1.19-1.21 in northern India.[1] These CSRs are among the highest in the world, leading to a deficit of 7 million girls (Jha et al. (2011)).

The adverse consequences of such extraordinary sex-ratio imbalances are being felt in the marriage and labor markets with a rise in trafficking of young women and girls and sex crimes against them. Despite these growing concerns, and a 1994 nationwide ban on fetus sex detection, an estimated 500,000 girls were annually aborted until 2005 (Bhalotra and Cochrane (2010)).[2] This prompted policymakers to intervene with special financial incentives for having and raising

[1]The natural ratio is 1.03-1.05 boys per girl. It is typical of countries where there is no clear preference for sons.

[2]The force of the ban is weak with few convictions under the law since its inception. The enforcement of such a law is difficult since both abortions and ultrasounds are legal and it is hard to verify the use of fetal diagnostics for detection of sex of the unborn child.

girls. While India has introduced a number of such conditional cash transfer (CCT) programs, little is known about their impact on the sex-ratio imbalance among children.

This paper fills this gap by evaluating the *Dhan Lakshmi scheme* (DLS), a federal initiative introduced in 2008 in select blocks of seven states. The scheme offers cash benefits to families of girls starting at birth and continuing until her eighteenth birthday. The aim is to protect girls against sex selection, increase investment in their health and education and prevent their under-age marriage. To ensure that the funds are spent on girls, the cash grants accompany certain conditions including registration of the girl's birth, her enrollment and retention in school and delaying her marriage until the eighteenth birthday.

CCTs target the economic reasons for son preference. For example, sons inherit and add to family wealth and provide financial support to parents in old age while, daughters represent an economic burden owing to dowry costs and their lack of economic contribution to parent's households after marriage. Consequently, household investments in children favor boys to the extent that it undermines girls' survival before or after birth (Jensen (2003), Qian (2009)). In the absence of financial incentives, couples can achieve their desired sex composition of children in two ways. First, they can stop fertility once they achieve the desired number of sons, which often results in girls having more siblings than boys as childbearing continues until the optimal number of sons is realized (Clark (2000)). Gender gaps and early childhood mortality of girls' will emerge even in the absence of active discrimination, simply because girls are raised with lower per capita resources. Second, female births can be eliminated through abortions and surviving female infants can be subject to deliberate post-birth neglect, resulting in their mortality within the first few years after their birth (Gupta (1987), Bhalotra and Cochrane (2010)). In this paper, I examine whether the DLS increases girl survival unto birth and in the first six years after birth.

Studies of other Indian CCT generally find that they lower postnatal discrimination against girls, but provide no evidence of gains in prenatal survival. Srinivasan and Bedi (2009) report that Tamil Nadu's Girl Child Protection Scheme (GCPS) lowered female infanticide, while Sinha and Yoong (2009) find that Haryana's *Apni Beti Apna Dhan (ABAD)* scheme lowered the sex ratio of surviving children. On the other hand, Anukriti (2014) explores Haryana's *Devirupak* scheme and finds that it increased the SRB.

The DLS differs from these programs in important ways. First, it extends the benefits to families from all socio-economic backgrounds, unlike GCPS and ABAD that focused only on low-income families. This allows the DLS to target wealthy households where prenatal selection is higher, driven mainly by cultural motives (Basu and Stephenson (2005), Portner (2015)). Second, unlike *Devirupak*, the DLS has no accompanying restrictions on fertility that can offset the positive incentives from such programs even among families with relatively low degrees of son preference. Given the broad program eligibility, the study of the DLS is important for an understanding of how CCTs alter the relative value of daughters in households that are economically well off as opposed to those that are credit constrained.

The DLS is unique in its geographical coverage, including states that vary widely in the degree of sex selection and its causes. Among these, prenatal sex selection is mainly concentrated in the economically developed, educated and urban state of Punjab in the north. A strong cultural preference for sons motivates large-scale abortion of female fetuses in the state (Arnold et al. (2002)). On the other hand, the relatively uneducated and economically backward states in eastern India exhibit low levels of prenatal and postnatal sex selection. Consequently, the discrimination against girls in these states is visible at later stages of upbringing through girls' school enrollment and education outcomes. Finally, the southern state of Andhra Pradesh has a relatively balanced sex composition of children. It is an odd choice for the program given that the state has its own pre-existing initiative similar in scope and design to the DLS.

I examine the effect of the DLS on girls' survival in early childhood using village-level data from the 2001 and 2011 rounds of the Indian Census. I identify the effect of the program by comparing the difference in the share of girls under the age of six years in villages exposed to the CCT, before and after the introduction of the DLS, with a set of control group villages over the same period. I conduct the analysis separately for Punjab, the eastern states of Bihar, Jharkhand, Chhattisgarh and Odisha and finally, Andhra Pradesh in the south. I drop the state of Uttar Pradesh from my analysis since the state entered the program in 2011, which is the post treatment period in my sample.

The study reveals significant heterogeneity in program impact across states. As anticipated, I find a large, positive and robust effect of the DLS in Punjab. Post-program, the share of girls in the under six population is 2.2 percentage points higher in the treated villages of Punjab compared to its untreated counterparts. It translates into 6 more girls per 100 boys among children under the age of six. The program has a relatively smaller impact on girls' early childhood survival in the eastern states with 0.2 - 1.6 percentage point increase in the share of girls in states like Odisha and Bihar. Finally, I find no statistically significant effect of the program on girls' early childhood survival in Andhra Pradesh. I discuss plausible explanations for the cross-state differences in my findings.

The rest of this chapter is organized as follows: Section 3.2 elaborates on the features and implementation design of *Dhan Lakshmi Scheme*; Section 3.3 discusses the hypotheses; Section 3.4 explains the datasets and summarizes the variables under study; Section 3.5 describes the empirical strategy; Section 3.6-3.7 presents and discusses the results and; Section 3.8 concludes.

3.2 The Context

3.2.1 The Dhan Lakshmi scheme

In November 2008, the Ministry of Women and Child Development (MWCD) launched the *Dhan Lakshmi* cash transfer scheme for girls. The program promotes the birth of girls, prevents their neglect in healthcare and education and deters their early marriage by offering financial incentives to households. Couples receive an immediate cash reward on birth of a girl and subsequent monetary benefits for their daughters' immunization and schooling. The terminal benefit is an insurance maturity cover redeemable at the girl's eighteenth birthday. Table 3.1 lists the grants corresponding to each phase of upbringing. Such long-term compensation for girls is intended to offset the higher economic costs of raising daughters relative to sons and thus, lower sex selection and other forms of discrimination against girls. To ensure that the money is spent on the beneficiary girls, DLS grants are conditional upon proof of girls' well being with the first installment being provided only upon registration of birth. The subsequent grant amounts require proof of immunization, school enrollment and retention in school till the eighth standard and finally, a confirmation that the girl is unmarried until her eighteenth birthday.

The DLS is administered in seven states: Punjab (PB) and Uttar Pradesh (UP) in the north, Bihar (BH), Jharkhand (JH), Chattisgarh (CH) and Odisha (OD) in the east and Andhra Pradesh (AP) in the south. Figure 3.1 depicts the states on the map of India. Though son preference is observed in each of these states, the predominant form of girl child discrimination differs significantly across the regions. Sex selection and early childhood discrimination against girls is concentrated mainly in the north as indicated by the large sex-ratio imbalance among children in this region. Table 3.2 reports the CSR for each state between 1981-2011. Punjab shows the highest male bias in the child population. The state's predominantly rich and educated population with strong bequest motives and easy access to fetal sex-detection technology leads to high rates of abortion among female fetuses (Arnold et al. (2002)). The problem is less severe in the other northern state of Uttar Pradesh, which has large sections of poor and low-caste populations that have weaker motives and limited means of choosing child gender. The eastern states, on the other hand, are widely noted for their differential treatment of girls in school education and early marriage of girls. Though child and maternal mortality is high in these states, given large sections of poor and uneducated population, sex selection is low with little or no survival disadvantage observed among young girls. Finally, Andhra Pradesh in the south also shows less discriminatory treatment of girls in early childhood primarily achieved through a pre-existing state-level CCT for girls that is similar in design to DLS.

The program targets 1-2 select blocks in each state. Table 3.3 lists the DLS blocks for each state and Figure 3.2 maps them. The chosen blocks mostly belong to socio-economically and educationally backward districts, which were identified based on the proportion of district population that comprises disadvantaged sections of the society, including low caste and tribes.[3] The rationale

[3]Districts are administrative sub-divisions of a state while blocks are sub-divisions of districts. A state has anywhere between 2-70 districts each of which are divided into multiple blocks. The number of blocks per district may range between 1- 66 blocks with the average district having about 30 blocks.

is that girls are at greater risk of discrimination in families that are credit constrained. Accordingly, the selected blocks in eastern and southern states have a significant proportion of tribal population that are backward and lack access to healthcare and education. However, sex selection is low in these areas, where on average, there are more girls than boys under the age of six (Guilmoto (2008)).[4] The chosen blocks are also predominantly rural, with the exception of Sirhind in Punjab. Sihrind was included mainly for its high sex-ratio imbalance among children and the preponderance of prenatal selection in urban areas of Punjab.[5]

The DLS was implemented in the selected states in 2008-09 except Bihar and Uttar Pradesh that were exposed to the scheme in the years 2009 and 2010, respectively. Since Uttar Pradesh hardly received exposure to treatment before census 2011, which is the post treatment period in my study, I drop the state from my analysis. The DLS is one of many ongoing CCTs in India but its scope and choice of geographical coverage make it one of the largest experiments within the domain of CCTS. Given the wide variation in the form of daughter discrimination across states, the scheme is designed to fulfill different objectives in each state and in particular, its impact on girls' early childhood survival is expected to vary significantly across states.

3.2.2 Distinguishing features of the DLS

Girl-child CCTs in India have evolved over time and vary in scope, conditions, eligibility criteria and geographical coverage. Appendix **??** compares features of all ongoing programs and provides some background on the evolution of Indian girl-child welfare schemes. Table A1 gives a comprehensive listing of the programs. The DLS belongs to an advanced class of CCTs that, in addition to increasing girls' survival, also focus on their human capital development. Accordingly the program has a broad scope, covering multiple aspects of girls' well-being and phasing out the cash benefits

[4] The higher preponderance of girls is a consequence of poor healthcare access in areas inhabited by tribes. Consequently, child mortality rates are high for both sexes with slightly higher incidence of male child mortality owing to natural selection. The only exception to this are some tribal communities of Rajasthan where female child mortality rate exceeds that for males.

[5] Typically, the CSR tends to be higher in urban areas than rural because both prenatal and postnatal selection is observed to be higher among the rich and educated. Besides, the availability of ultrasounds to perform sex selective abortions is higher in urban areas than rural (Retherford and Roy (2003)).

over a long term. This induces parents to invest in girls' health and education, as opposed to programs like Haryana's *Devirupak*, which pays a one-time reward on birth of a girl with no follow-up incentives. Similar to state-level programs like Haryana's ABAD, Delhi's *Ladli* and Karnataka's *Bhagyalakshmi*, the DLS focuses on lowering discriminatory treatment of girls at early and later stages of their upbringing.[6] However, the cash benefits under DLS are marginally higher than its counterparts, being adjusted for a higher cost of living as of 2008.

Though similar in benefits and design to some of its predecessors, the DLS surpasses them in its eligibility criteria. First, it covers households from all socio-economic backgrounds, whereas CCTs typically target financially weak households under the justification that discrimination against girls is highest when economic resources are scarce.[7] Sex selection, on the other hand, is more prevalent among the wealthy, guided by strong inheritance motives and better access to advanced medical technology (Basu et al. (1992), Basu and Stephenson (2005), Portner (2015)). Cash incentives may not be sufficient to offset the strong cultural preference for sons in such households but long-term subsidies for the girl child may lower the opportunity costs of raising daughters by leaving household resources available for sons. Hence, by relaxing the income restriction, the DLS is more likely to reach households where girls are most vulnerable.

Second, the DLS has no accompanying sterilization clause nor an emphasis on fertility control. Several CCTs require beneficiary couples to restrict their total number of children. Such schemes with the dual objectives of birth control and increasing girl births often have undesired negative consequences. They increase sex selection among families either wanting to be program eligible or already enrolled as beneficiaries in a bid to achieve the desired number of sons through fewer

[6]There is emphasis on delaying marriage because it is both a cause and a consequence of girls dropping out of school early (Brown (2012)). Once married or pregnant, girls rarely make it back to education. They tend to have increased economic dependence on their husbands leading to a life of servitude, discrimination and low status. As per the National Family Health Survey 2005-06, about 50 percent of the women got married before the legal age of 18 years. While under-age marriages also affect boys, the impact is more severe on girls. Child brides are forced to quit school, exposed to higher risk of domestic violence and are victims of teenage pregnancy.

[7]ABAD and other programs like Delhi's *Ladli Yojana*, Gujarat's *Balika Samridhi Yojana*, Bihar's *Mukhya Mantri Kanya Suraksha Yojana*, Karnataka's *Bhagyalakshmi Scheme* only cover below poverty line households.

births. An example is Haryana's *Devirupak* scheme, which provides economic support to girls only in single child families. Anukriti (2014) finds that the program increased the SRB due to the accompanying fertility control clause. She finds that families are unwilling to forgo a son even if there are financial gains to be realized from having a daughter.

Finally, the DLS covers all girls within a family. A major flaw with most CCTs is the limit on the number of girl beneficiaries per family. ABAD and the schemes in Bihar, Karnataka and Delhi cover up to two girls per couple, tacitly promoting the idea of small families. However, poor families tend to have more children and often more girls due to limited access to prenatal sex selection. Daughter discrimination in such households typically increases with the total number of girls as each additional girl represents a higher cost burden especially if sons are born towards the end of the fertility period. Consequently, these schemes fail to protect the girls that are at highest risk of discrimination among poor households.

Also unique to the DLS is its use of print media to raise social awareness about daughter discrimination and its implications for society. As part of the scheme, state governments are required to print messages related to female feticide, infanticide, child marriages and dowry in newspapers and railway passes, highlighting the legal and social consequences of such acts. While the direct objective is to protect girls against discriminatory treatment, the subtle aim is to change societal attitude towards them by targeting a deep rooted cultural preference for sons. The DLS is the first girl child CCT to include publicity as tool for raising the value of women and girls.

3.2.3 How the program works

The DLS is available to all girls with proof of domicile in the selected blocks. For girls born on or after November 19, 2008 the scheme covers each phase of upbringing from birth until marriage. Additionally, since the financial grants for each phase like birth, immunization and school enrollment are independent of each other, girls born before the program can enroll as beneficiaries as per their phase of upbringing at the start of the program. However, they are not eligible for retrospective fulfillment of conditions or the corresponding grant amounts.

The DLS grants are modest but sufficient for supporting the costs of individual items stipulated under the scheme. Refer to Table 3.1. The initial Rs 5,000 ($80) is a joint reward for delivering a girl and registering her birth. Since registration is free, the money can help couples recover prenatal care or delivery costs in part or full.[8] Alternatively, they can be used for postnatal care of mother and child. Next, the Rs 1,250 ($19) for immunization payments simply adds to the household's disposable income, because immunization is costless under the central government's Universal Immunization Program (UIP).[9]

For education, DLS pays Rs 3,500 ($54) for primary school and Rs 3750 ($58) for secondary school. It amounts to yearly inflows of Rs 700 ($11) for the first five years and 1250 rupees for the next three years. Given free education for all children up to the eighth grade at government schools, DLS benefits need not be utilized for school fees.[10] Finally, the marriage benefit of Rs 100,000 is sufficient to cover marriage costs and average dowry expenditures.[11] Despite the free provision of immunization and education, DLS grants may fall short of compensating families for the direct and opportunity cost of having girls, but may provide an important deterrent against prenatal sex selection.

An annual budget of Rs 100,000,000 ($1.5 million) is allotted for the scheme and the funds are

[8]In India, the registration of birth of all infants is mandatory under the Registration of Births and Deaths Act, 1969. It is a service provided by the government and can be accessed even in remote areas. All children delivered at a medical facility (public/private) are registered by default and the service is free of cost if done within the first 21 days after birth.

[9]Under the UIP, vaccines are administered free of cost to all infants as per the National Immunization Schedule. It covers all mandatory dosages for infants and children for the prevention of Diphtheria, Pertussis, Tetanus, Polio, Measles, Childhood Tuberculosis and Hepatitis B, Haemophilus Influenza Type b (Hib) and Diarrhea. Details of the coverage can be found here `http://www.nrhmhp.gov.in/content/immunisation`. UIP beneficiaries can get themselves vaccinated at the nearest Government/Private health facility or at designated immunization posts (*Anganwadi* centres) near their village or town on specific days.

[10]The nationwide program of *Sarva Shiksha Abhiyan* is designed to make education free and compulsory for all children between the ages of 6 to 14 years or up to the eighth standard. Launched in the year 2000 it aims to universalize education up to middle school as mandated by the 86th Amendment to the Constitution of India.

[11]According to the Indian Human Development Survey (IHDS), in 2004-05 the average wedding expenditure for the bride's family was about Rs 90,000 ($1360) and among households in the lowest income quintile, the expenditure was about Rs 64,000 ($1100).

provided by the federal government and other national agencies.[12] The donors transfer the funds to the state government, which is the nodal agency for implementing the program. The district administration plays an important role in the scheme's implementation, acting as a link between the state government and the program beneficiaries. It identifies the eligible households through surveys conducted in selected blocks and assists the state in the selection of authorities that can certify the fulfillment of conditions under the scheme.[13] The state government, on the other hand, oversees the overall functioning of the scheme and is responsible for ensuring timely provision of benefits and redressing public grievances related to the DLS. Factors affecting administrative efficiency of the village, district or state governments or the cooperation between them can adversely impact DLS delivery.

Compared to the target of 100,000 girls per year, the actual enrollments under the program has been lower. The year 2010-11 saw the highest number of new registrations at 97,393 followed by 79,555 in 2008-09. Both program uptake and the amount and timing of the funds released vary across states. Tables 3.4 and 3.5 report the enrollments and funds released by year and block. Punjab has the highest number of program beneficiaries, with enrollments at regular intervals as compared to the other states. The state has also received the maximum amount of funds under the program.

The parallel operation of state-level CCTs for the girl child may affect the implementation of DLS in some states. In Andhra Pradesh the contemporaneous operation of a popular state-level CCT similar to DLS puts the state in a special category.[14] On the other hand, in states like Punjab and Bihar, the state-level programs differ significantly in scope and eligibility from the

[12]The Life Insurance Corporation of India (LIC) covers the insurance and maturity components. Meanwhile, Ministry of Women and Child Development and the Ministry of Human Resources Development jointly fund the monthly grants for school enrollment until standard 12.

[13]Village governing bodies or *Gram Panchayat* verify proof of residence, birth registration and the marital status of the girl until her eighteenth birthday. Meanwhile, government health workers and the headmaster of the village school check immunization and school enrollment and attendance records, respectively.

[14]The Girl Child Protection Scheme has the same set of objectives as DLS and is operating in the state since 1996. The scheme was originally administered in all blocks of the state but following DLS it was withdrawn only from the DLS blocks.

DLS thereby, interfering less with DLS.[15]

From April 2013, the DLS stopped enrolling new beneficiaries following the introduction of new and more attractive schemes in the chosen states. However, the program's design and implementation design provide a unique context for assessing the effectiveness of girl-child CCTs. First, because the benefits are available through the girls' upbringing and have accompanying conditions, it is likely to increase early childhood health investments in children thereby, improving their postnatal survival. Second, by including rich households the scheme is likely to reach the girls at highest risk of prenatal sex selection. Third, the absence of implicit or explicit fertility restriction eliminates threats to girls' prenatal and postnatal survival from beneficiary couples trying to meet program eligibility. Fourth, since the treated blocks and states differ significantly in the degree of sex selection and its demographic determinants, the effect is likely to vary across states. Finally, the present value of the benefits under this program are larger than other similar programs making the financial incentives meaningful in deterring early childhood discrimination against girls.

3.3 State heterogeneity and the program's effect

The DLS seeks to address the differential treatment of girls arising out of both cultural and economic preference for sons. While cultural reasons encourage prenatal and postnatal elimination of girls, economic preferences manifest itself in more subtle ways like non-enrollment of girls in school or their early drop out rates compared to boys as well as their early marriages. Accordingly, the scheme can potentially affect girls in different ways in different households. In households with a strong cultural demand for sons, the DLS can induce couples to keep the girl. In households preferring sons for economic reasons, but without a prominent cultural need for boys, the program can lower discrimination against girls by offsetting the higher economic costs associated with girls

[15]Punjab's *Balri Rakshak Yojana* of 2005 targets sex selection in low-income households, providing benefits at birth and up to five years of age to girls in all blocks of the state. However, the program has had a limited 306 beneficiaries until 2010. Meanwhile, Bihar's *Mukhya Mantri Suraksha Yojana* and *Mukhya Mantri Vivah Yojana* of 2006 and 2008, respectively, pay directly towards girls' marriage expenses but targets only low income households with up to two girls.

relative to boys. The states exposed to the DLS differ in their predominant reasons for son preference, and generally fall into one or the other of these categories described above.

In the rich state of Punjab, economic motives are not nearly as strong as those in the poorer states of eastern India. However, cultural pressures to have sons are strong and together with a significantly large share of the economically well off in the state, bulk of the discrimination against girls occurs either before or at birth. This justifies the choice of an urban block in Punjab with a rich and urban population disposed to prenatal selection.

In contrast, the eastern states have a sizeable proportion of credit constrained households where cultural motives are not as strong and the discrimination against girls stems from economic considerations. Since boys, instead of girls, represent the future earning hands of a family, household spending on health and education favors the male child and if resources are scarce girls are denied these investments. As a result, the discrimination against girls for economic reasons is observed at later stages of upbringing and not in the early childhood years when childcare is less dependent on economic resources. This explains the choice of tribal blocks in this region given that tribes are among the poorest groups and show low rates of immunization and school enrollment among children.

Based on the differences in the causes and manifestations of son preference across regions, Punjab is predisposed to have the largest gains in girls' early childhood survival from the DLS. Meanwhile, in the eastern states the program is expected to improve immunization and school enrollment of girls and prevent them from dropping out of school earlier than boys. The DLS is also expected to reduce early marriages among girls in this region.

3.4 Data

I base my analysis on data from the 2001 and 2011 rounds of the decennial Indian Census covering the DLS-treated states. The village-level demographic information comes from the Primary Census Abstract (PCA) of each round. These can be accessed on the Census of India website that uploads the data by state and district. The data is collected through extensive surveys that are conducted in two phases. The first phase is carried out in the later half of the preceding year followed by a second phase in the early months of the census year.

The primary census abstracts contain details of population composition by age, gender, caste and tribe. It also carries information on the share of literates, size of the labor force and the composition of workers by agricultural and non-agricultural activities. Both census rounds identify the parent block and district for each sub-block unit (village and town).[16] Since the treatment occurs at the block-level, the villages and towns are matched across the two years with blocks as the identifying unit.[17] This creates a block-level panel dataset with information on all sub-block entities.

3.4.1 Analysis sample

The sample consists of 2,719 blocks and 545,856 sub-block units (villages and towns). A total of 11 blocks are exposed to the DLS. My baseline analysis compares the share of girls among children under the age of six years in the treated blocks before and after the introduction of the DLS with the pre/post shares in the state's untreated blocks. I repeat the difference-in-difference (DD) analysis with the village as the unit of observation, controlling for the share of low caste (scheduled caste), tribal (scheduled tribe) and rural population, and the proportion of literates and workers by gender in each village.

Table 3.6 reports the block-level summary statistics of the variables used in the analysis by census round and for all states combined. The overall mean share of girls in the under-six population in both years is below the biological proportion of 0.49 that is based on the natural probability of a fetus being female. However, the share increased from 0.46 to 0.48 between 2001 and 2011. The 2001 figure is below the national average of 0.47 for that round while the share in 2011 matches the national average. The proportion of low-caste population remained unchanged with

[16]While there are no boundary changes in DLS districts between the two time periods, block divisions have occurred. New blocks have been carved out of some of the larger blocks of 2001 to enhance administrative efficiency. The Census administrative atlases map the block boundary changes enabling the identification of the parent block for each of the child blocks of 2011.

[17]The states of Jharkhand and Chhattisgarh were carved out of Bihar and Madhya Pradesh, respectively in the year 2000. However, the census allows exact mapping of the villages and towns in the states that were split in between the two time periods, thus avoiding any complications arising from the division of the states.

the shares matching the national level figures in both rounds. The share of tribal population registered a marginal decline from 2001-2011, with the figures from both rounds being higher than the respective national averages. The share of literate men and women show an increase over the time with the figures from individual rounds being much smaller than the national estimates. The fraction of working men and women also records a marginal increase. While the shares for men are representative of India in each round, those for women exceed the national average by 2-3 percentage points due to sates like Andhra Pradesh and Chhattisgarh that report significantly higher workforce participation among women compared to the national average. Finally, the fraction of rural population declined from 0.9 to about 0.8 showing a trend towards urban agglomeration.

Tables 7a - 7f provide the summary statistics at the state level, reporting the mean for treated and control blocks, before and after the DLS and the simple DD estimate. Columns (1) and (3) compare the pretreatment demographic features across DLS and non-DLS blocks. Consider the Punjab data in table 7a first. The pre-treatment mean share of girls under the age of six years is 0.44 with a negligible difference between the treated and control blocks of the state. This share is the lowest among all states with proportions close to the biological normal or even higher in others, suggesting that a program for improving early childhood survival of girls is most needed in Punjab. The state also reports a high share of literate women, exceeding the national average by 16 percentage points and a greater proportion of these women in the treated block than control. Meanwhile, the mean proportion of working women is lower by 10 percentage points compared to the national average with treated blocks reporting an even lower share than control blocks. These demographic features and a predominantly rich and urban population in the treated block suggest that young and unborn girls in this block are at high risk of sex selection prior to treatment.

In contrast, the data for the eastern states of Bihar, Jharkhand, Odisha and Chhattisgarh in Tables 7b - 7d show a normal mean proportion of girls before the treatment, with a relatively higher share in the treated blocks than control. This indicates a low degree of sex selection in these states and even lesser in the blocks chosen for the program, suggesting a low relevance of DLS for girls' early childhood survival in these states. In addition, other population features that are highly correlated with sex selection, including the preponderance of rich and wealthy, are also absent in these states. Bihar, Jharkhand and Odisha have low shares of literate women, 15-28 percentage points below the national average, and a relatively lower share in the treated blocks before DLS. The states are also among the poorest in the country with low levels of per capita income. Chhattisgarh, also a poor state, has a high share of tribal population, particularly in the treated blocks. This partly explains the pretreatment higher share of girls in the DLS blocks of the state compared to the rest and suggests that DLS may be less important for girls' early childhood survival in the state.

Table 7f for the southern state of Andhra Pradesh shows a pretreatment share of girls higher than the biological normal in DLS and non-DLS blocks. The state also has a significant proportion of tribal population in the treated blocks compared to the non-treated and reports a high share of working women, 10 percentage point higher than national average. The shares across the treated and control blocks are also comparable. These demographic facts together with the pre-existing program highlight the redundancy of the DLS for increasing the share of girls in the under-six population.

Based on the demographic differences in the treated blocks, including the sex ratio imbalance among children in these blocks, the program's influnce in raising the share of girls among children is expected to be large in Punjab followed by relatively smaller effects in the other states. Column (5) of Tables 7a - 7f report the simple DD estimate of the under-six share of girls. In Punjab, the estimate is positive and statistically significant at the 1-percent level, as hypothesized. A positive effect is also observed in Bihar with zero or negative effects in the remaining states. These block level estimates of the program's effect are based on small sample sizes, aggregating the share of girls over a large number of heterogeneous villages. Therefore, to enhance precision of these results I proceed to conduct the analysis at a more disaggregated level using village as the unit of observation.

3.5 Empirical Strategy

I identify the effect of the *Dhan Lakshmi* transfer scheme on survival of girls up to six years after birth, using a straightforward DD strategy. The first level of difference is the spatial variation in the exposure to treatment using villages and towns in the non-DLS blocks within a state as the control group. The second level of difference is time with 2001 and 2011 serving as the pre-intervention and post-intervention periods, respectively. The strategy can be represented in a regression framework as follows:

$$sharegirls06_{ibt} = \beta treatpost_{ibt} + X_{ibt}\omega + \alpha_b + \pi_t + \varepsilon_{ibt} \tag{3.1}$$

where, *sharegirls06* is the proportion of girls in the under-six population of the *i*th village in block *b* in the year *t*, *treatpost* is a binary indicator for the treated villages following the onset of the DLS, and *X* is a vector of village-level observable demographic characteristics. I also control for block (α_b) and time (π_t) fixed effects.[18] The coefficient of interest is β, which captures the DD between the treated villages relative to their counterparts in the control blocks. I estimate (3.1) by OLS and report standard errors clustered at the block level.

3.6 Results

Table 3.8 reports the estimated effect of the DLS on the share of girls in the population under the age of seven years for each state. As hypothesized, there is a large positive impact of the program in Punjab (column (1)) with smaller or no effect in the other states. The results show significant qualitative and quantitative heterogeneity in the program's impact across the states. The next subsections discuss the results for Punjab, the eastern states and the special case of Andhra Pradesh.[19]

[18] Village-level fixed effects are not included due to concerns of imprecise village mapping across the two census rounds. There are considerable changes in village boundaries and village names between the two periods without proper documentation of the change. As a results, several villages in 2011 cannot be mapped to their 2001 counterpart. For the purposes of my analysis, the block level effects are sufficient for identifying the treatment effect.

[19] Recall that the state of Uttar Pradesh has been excluded from the analysis sample for its short exposure to treatment before 2011. I report the results for this state separately in the appendix section B.0.4.

3.6.1 PUNJAB

The coefficient estimate for Punjab is 0.022 and it is statistically significant at the 1-percent level. It implies that post-DLS the share of girls in a treated village of the state is 2.2 percentage points higher than the corresponding share in its untreated counterpart. Prior to the intervention, this share was 0.2 percentage points lower than that in control villages. Thus, starting from a baseline of 0.44 the proportion of girls increases to 0.46 in the treated blocks of the state following the DLS. A natural question then is whether this increase in the share of girls is due to their improved prenatal or postnatal survival. [20] To shed some light on the source of survival gains, I investigate how the program impacts the survival of female fetuses in Punjab. For this I turn to the District Level Household Survey that captures birth histories of mothers.

Using fertility histories of women from the District Level Household Survey (DLHS) rounds of 2007-08 and 2013-14, I study the program's impact on the likelihood of a girl at the marginal birth. Appendix section B.0.5 provides the details of the data, analysis sample and empirical strategy for the district-level analysis. I compare children born to mothers in the district exposed to the DLS with those born in the other districts of the state.[21] To estimate the effect, I use the specification in equation (3.1) replacing the outcome variable with a binary indicator for the marginal birth (*isbirth* and again a binary indicator for a girl birth). I report standard errors clustered at the district for this analysis. Table 3.9 presents these results. The large, positive and statistically significant estimate in column (1) indicates the likelihood of a newborn being a girl is 3.4 percentage points higher in the treated district of Punjab than what it would have been without the DLS. Children born before the program in the treated district were only 1.1 percentage points more likely to be a girl, indicating a

[20] A positive and statistically significant program effect suggests that the program increased the proportion of girls in the under-seven population in the treated block above what it would have been otherwise. Any gain ascribed to the DLS could be due to improved prenatal survival or reduced postnatal mortality up to age six.

[21] In the DLHS survey mothers are geocoded up to their district of residence with no identification of the blocks in which they are located. As a result, the analysis using this survey data can only compare children across districts instead of the more disaggregated level of blocks. The district containing the treated block has five other blocks that are not exposed to the DLS. However, these blocks report more balanced sex composition of children before the DLS compared to the treated block.

fall in prenatal sex selection post treatment. Meanwhile, the small, positive and imprecise estimate in column (2) suggests that there is no change in the probability of a marginal birth because of the DLS. Together, the findings suggest that the intervention lowers son preference among households leading to increased survival of female fetuses.

To further test the proposition of declining prenatal selection, I examine whether the improved survival of female fetuses is occurring at the first birth parity or later since sex selection is observed to increase with the birth order.[22] I modify specification (3.1) to include separate binary indicators for the second birth order (*bo2*) and third or higher birth orders (*bo3*) and interaction of these dummies with the regressor of interest, *treatpost*. The outcome variable is *isgirl* and the coefficients of interest are *treatpostbo2* and *treatpostbo3*. Table 3.10 presents the results. The coefficient estimate on *treatpostbo2* is 0.069 that is statistically significant at the 1-percent level, implying that post the DLS a female birth is 6.9 percentage points more likely at the second birth parity in the treated district compared to its untreated counterparts. The small positive, but statistically insignificant estimated coefficient on *treatpost* indicates that the program does not increase the likelihood of female births at the first birth parity. Finally, the statistically insignificant coefficient estimate on *treatpostbo3* suggests that there is no change in the probability of a female birth at the third or higher birth orders. This is intuitive given that the birth rate has dropped to 2.4 as of 2011 with the median woman having two children. Thus, the DLS lowers prenatal selection and improve female fetus survival at the second birth parity.

3.6.2 The eastern states

Compared to Punjab, DLS has a relatively smaller impact on girls' early childhood survival in the eastern states. Table 3.8 (columns (2) - (5)) report the coefficient estimate for the eastern states of Bihar Jharkhand, Chhattisgarh and Odisha. Of these, Bihar and Odisha in columns (2) and (5) are the only states that show a positive and statistically significant effect of the DLS on the share

[22] Junhong (2001) and Ebenstein (2007) find that sex selection is greatest for larger birth orders in China. Gupta (1987) provides evidence that girls at higher birth orders in Punjab are at higher risk of prenatal selection as fertility declines.

of girls in the under-seven population. However, the estimates are smaller than the effect size in Punjab. Part of the reason for the small effect in Bihar is the late adoption of the scheme exposing the state to a short duration of treatment before 2011. The treated block in fact, reported a higher share of girls relative to control (0.1 percentage point higher) in the pre-treatment period. Lastly, beneficiary and fund allocation statistics show that there is a low and irregular rate of program enrollment in the state and delays in budgetary allocations for the scheme. Odisha, on the other hand, entered the program with a higher share of girls in the treated blocks relative to control. The blocks chosen for the program also had large concentrations of tribal population compared to the untreated block raising doubts about their suitability as a comparison group. Meanwhile, in Jharkhand and Chhattisgarh the estimates lack precision.

3.6.3 ANDHRA PRADESH

Finally, in Andhra Pradesh, the DLS has no significant impact on the share of girls under the age of seven years. The estimated coefficient in column (6) is small, negative and statistically insignificant. One of the possible reasons may be the neglect of DLS due to the pre-existing and well known CCT for girls in the state. Moreover, since the state-level CCT was also operating in the treated blocks of DLS prior to its launch, it may have created ground level confusion in the implementation of DLS.

3.6.4 ROBUSTNESS CHECKS

The validity of the difference-in-difference strategy rests on the assumption of identical counterfactual trends in treatment and control groups. To test this assumption for the district level DD analysis in Punjab, I re-estimate the baseline model with leads and lags of the treatment. Table 3.11 presents coefficient estimates for leads and lags of the DLS. The leads are not significantly different from zero, except in the pre-treatment year of 2004, and that coefficient estimate is negatie. However, the absence of any statistically significant positive effect in the pre-treatment years rules out any anticipatory effect of the program. Meanwhile, the lags show that the likelihood of a female birth increases in the first year after the program in 2009 and then again in the year 2011. The uneven program effect can explained through the year-to-year variation in program enrollments and irregular disbursement of funds. In Punjab, the highest number of registrations under the DLS took place in 2009 and 2011 and is consistent with the release of funds under the program.

3.7 Discussion

The results from this study indicate that the program had a robust, measurable positive effect on the share of girls under the age of seven years in Punjab. The number of girls in this subpopulation of children increased by 6 per 100 boys. Part of the increase is due to improved survival of female fetuses unto birth pointing to a reduction in prenatal selection. The program increased the number of female births by 10-11 per 100 male births starting from a baseline of 73.3 female births per 100 male births.[23] The program's success in Punjab is manly due to the state's demographic features including the pre-existing sex ratio imbalance among children. According to a 2013-14 qualitative survey of a subsample of program beneficiaries, the DLS also received abundant publicity in the state.[24] Beneficiaries reported being informed about the program's existence through print and mass media.

The effect of the DLS on girls' early childhood survival in the eastern states was positive but small relative to Punjab. It increased the number of girls by 1-3 per 100 boys in states like Bihar and Odisha with no discernible effect in Jharkhand and Chhattisgarh. Given a balanced sex composition of children in this region the program is more relevant for enhancing girls' education or delaying their marriage. As per the qualitative survey, program beneficiaries in this region find the DLS particularly beneficial for supporting girls' schooling and marriage costs. Thus, the program fulfills different objectives in each region.

[23]Rajan (2017) reports that the SRB in Punjab in 2005 was 734 girls per 100 boys. Their estimate is based on the National Family and Health Survey of 2005-06.

[24]The Indian Institute of Population Sciences conducted a qualitative survey in 2013-14. A total of 2,150 beneficiary and 1,806 non-beneficiary families were interviewed across Punjab, Bihar, Odisha, Andhra Pradesh and Jharkhand.

3.8 CONCLUSION

This study evaluates the impact of the DLS cash transfer program on girls' early childhood survival and finds that the program has the largest positive impact in Punjab with smaller or no effect in the other states. The gain in girls' early childhood survival is mainly due to reduced prenatal selection following the introduction of DLS. These findings suggest that long-term cash transfers are a viable means of correcting the sex ratio imbalance among children in India. Even modest cash incentives are sufficient to deter prenatal and postnatal sex selection in areas with a historically strong cultural preference for sons. However, the success and outreach of such programs depends upon the program's design, cooperation among implementing agencies, monitoring mechanism and timely provision of funds to the beneficiaries.

India has several operational girl child schemes, most of which are of recent origin. Many of the schemes are politically motivated and are identified with political leaders and governments. Consequently, the implementation and continuation of such schemes depends on the government or leader in power. Often, such schemes are a publicity tool, launched with the intent of reaping electoral rewards. Regardless of the intent with which such programs are launched, they are beneficial for the girl child in India.

3.9 FIGURES AND TABLES

Table 3.1: DLS cash grants with conditions for each phase

Conditions	Grant amount (Indian Rupees)
Girls born after Nov 19, 2008 with birth registered	5000
Immunization	
Within first 6 weeks	200
Between 6 - 14 weeks	200
Between 4 - 9 months	200
Between 9 - 16 months	200
Between 16 - 24 months	200
On completion of immunization	250
Education	
On enrollment in Primary school	1000
1st grade + attendance	500
2nd grade + attendance	500
3rd grade + attendance	500
4th grade + attendance	500
5th grade + attendance	500
On enrollment in Middle school	1500
6th grade + attendance	750
7th grade + attendance	750
8th grade + attendance	750
Marriage	
18 years old and unmarried	100,000

There are additional cash benefits for grades 9 - 12 that are borne by the Ministry of Human Resource Development.
The terminal benefit is paid through an insurance maturity cover initiated at the time of birth

Table 3.2: Child sex ratio 1991-2011 by state

State	1991	2001	2011
	North		
Punjab	1.14	1.25	1.18
Uttar Pradesh	1.08	1.09	1.11
	East		
Bihar	1.05	1.06	1.07
Jharkhand	1.02	1.04	1.05
Chhattisgarh	1.02	1.03	1.03
Odisha	1.03	1.05	1.06
	South		
Andhra Pradesh	1.03	1.04	1.06

Table 3.3: States, blocks and districts exposed to the DLS

S.No.	State	District	Block
North			
1.	Punjab	Fatehgarh Sahib	Sirhind
2.	Uttar Pradesh	Rae Bareilly	Shivgarh
East			
3.	Bihar	Jamui	Sono
4.	Jharkhand	Giridih	Tisri
		Kodarma	Markachor
5.	Chhattisgarh	Baster	Jagdalpur
		Bijapur	Bhopalpattnam
6.	Odisha	Malkangiri	Kalimela
		Koraput	Semiliguda
South			
7.	Andhra Pradesh	Khammam	Aswaraopeta
		Warangal	Narsampet

Table 3.4: Enrollment of beneficiaries under the DLS by year and block

S.No.	State	District	Block	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
North									
1.	Punjab	Fatehgarh Sahib	Sirhind	12,119	7,840	18,016	8,107	8,147	-
2.	Uttar Pradesh	Rae Bareilly	Shivgarh	-	-	10,384	-	4,483	4,483
East									
3.	Bihar	Jamui	Sono	-	10,324	-	-	-	25,500
4.	Jharkhand	Giridih	Tisri	2,825	-	8,538	5,331	5,833	-
		Kodarma	Markachor	-	2,606	6,415	8,165	-	-
5.	Chhattisgarh	Baster	Jagdalpur	19,853	-	-	-	30,220	-
		Bijapur	Bhopalpattnam	4,640	-	-	-	7,832	-
6.	Odisha	Malkangiri	Kalimela	7,699	15,754	15,675	-	-	-
		Koraput	Semiliguda	2,917	6,582	10,067	8,615	-	-
South									
7.	Andhra Pradesh	Khammam	Aswaraopeta	13,781	-	15,309	-	-	-
		Warangal	Narsampet	15,721	-	12,989	-	-	-
Total				*79,555*	*43,106*	*97,393*	*30,218*	*56,515*	*29,983*

Table 3.5: Budgetary allocations under the DLS by year and block (Indian Rupees)

S.No.	State	District	Block	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
North									
1.	Punjab	Fatehgarh Sahib	Sirhind	9,131,647	14,239,250	-	-	3,3180,325	-
2.	Uttar Pradesh	Rae Bareilly	Shivgarh	-	-	14,558,688	-	-	10,502,250
East									
3.	Bihar	Jamui	Sono	-	10,272,535	-	-	-	16,530,965
4.	Jharkhand	Giridih	Tisri	2,157,762	-	-	-	6,139,794	-
		Kodarma	Markachor	-	3,168,805	3,743,128	-	5,539,474	-
5.	Chhattisgarh	Baster	Jagdalpur	15,375,365	-	-	-	21,999,115	-
		Bijapur	Bhopalpattnam	3,299,345	-	-	-	-	-
6.	Odisha	Malkangiri	Kalimela	5,051,096	14,490,743	-	-	10,843,684	-
		Koraput	Semiliguda	2,203,612	7,828,667	-	-	-	-
South									
7.	Andhra Pradesh	Khammam	Aswaraopeta	10,066,132	-	-	-	21,281,337	-
		Warangal	Narsampet	12,231,384	-	-	-	17,109,246	-
Total				*59,516,343*	*500,000,000*	*18,301,816*	*116,092,975*	*56,515*	*27,033,215*

Table 3.6: Block-level summary of variables

	Mean	SD
Census 2001		
Share of girls under six	0.46	0.01
Share of low caste pop	0.17	0.08
Share of tribal pop	0.11	0.19
Share of rural pop	0.90	0.20
Share of literate women	0.45	0.16
Share of literate men	0.68	0.13
Share of working women	0.28	0.17
Share of working men	0.52	0.06
Observations	*2,719*	
	Mean	SD
Census 2011		
Share of girls under six	0.48	0.01
Share of low caste pop	0.17	0.09
Share of tribal pop	0.12	0.21
Share of rural pop	0.82	0.27
Share of literate women	0.58	0.13
Share of literate men	0.76	0.10
Share of working women	0.29	0.16
Share of working men	0.53	0.06
Observations	*2,719*	

Table 7a: Summary statistics for treated and control blocks, before and after the DLS - Punjab

	Treated		Control		
Variables	Pre	Post	Pre	Post	DD
	(1)	(2)	(3)	(4)	(5)
Share of girls under six	0.442	0.462	0.444	0.458	0.006***
			(0.001)	(0.001)	(0.001)
Share of low caste pop	0.216	0.220	0.288	0.317	-
			(0.008)	(0.097)	
Share of literate women	0.752	0.793	0.648	0.712	-
			(0.113)	(0.091)	
Share of literate men	0.839	0.873	0.765	0.808	-
			(0.006)	(0.075)	
Share of working women	0.127	0.134	0.178	0.134	-
			(0.088)	(0.043)	
Share of working men	0.525	0.549	0.530	0.548	-
			(0.024)	(0.024)	
Observations	1		72		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

No SD reported for the single treated blocks

SD reported for controls

SE clustered at the block level for the DD

Pre and Post refer to the pre-treatment and post-treatment years of 2001 and 2011, respectively. The last column calculates the difference-in-difference of the means for the treated and control blocks before and after the treatment.

Table 7b: Summary statistics for treated and control blocks, before and after the DLS - Bihar

	Treated		Control		
Variable	Pre	Post	Pre	Post	DD
	(1)	(2)	(3)	(4)	(5)
Share of girls under six	0.490	0.500	0.485	0.483	0.012***
			(0.007)	(0.007)	(0.000)
Share of low caste pop	0.141	0.140	0.157	0.159	-
			(0.063)	(0.066)	
Share of tribal pop	0.033	0.016	0.009	0.012	-
			(0.029)	(0.035)	
Share of literate women	0.176	0.389	0.343	0.529	-
			(0.129)	(0.101)	
Share of literate men	0.492	0.680	0.607	0.724	-
			(0.005)	(0.003)	
Share of working women	0.444	0.425	0.184	0.182	-
			(0.095)	(0.083)	
Share of working men	0.509	0.505	0.471	0.461	-
			(0.038)	(0.024)	
Observations	1		532		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
No SD reported for the single treated blocks
SD reported for controls
SE clustered at the block level for the DD

Pre and Post refer to the pre-treatment and post-treatment years of 2001 and 2011, respectively. The last column calculates the difference-in-difference of the means for the treated and control blocks before and after the treatment.

Table 7c: Summary statistics for treated and control blocks, before and after the DLS - Jharkhand

	Treated		Control		
Variables	Pre	Post	Pre	Post	DD
	(1)	(2)	(3)	(4)	(5)
Share of girls under six	0.495	0.490	0.490	0.487	-0.001
	(0.006)	(0.005)	(0.008)	(0.009)	(0.001)
Share of low caste pop	0.128	0.126	0.118	0.124	-
	(0.012)	(0.016)	(0.094)	(0.101)	
Share of tribal pop	0.122	0.123	0.312	0.294	-
	(0.150)	(0.140)	(0.270)	(0.271)	
Share of literate women	0.202	0.451	0.378	0.547	-
	(0.043)	(0.060)	(0.174)	(0.123)	
Share of literate men	0.577	0.748	0.655	0.761	-
	(0.110)	(0.067)	(0.138)	(0.091)	
Share of working women	0.303	0.326	0.281	0.300	-
	(0.015)	(0.147)	(0.147)	(0.143)	
Share of working men	0.456	0.472	0.485	0.499	-
	(0.034)	(0.046)	(0.050)	(0.039)	
Observations	2		208		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
SD reported for controls
SE clustered at the block level for the DD

Pre and Post refer to the pre-treatment and post-treatment years of 2001 and 2011, respectively. The last column calculates the difference-in-difference of the means for the treated and control blocks before and after the treatment.

Table 7d: Summary statistics for treated and control blocks, before and after the DLS - Chhattisgarh

	Treated		Control		
Variables	Pre	Post	Pre	Post	DD
	(1)	(2)	(3)	(4)	(5)
Share of girls under six	0.496	0.487	0.491	0.492	-0.010***
	(0.010)	(0.009)	(0.008)	(0.011)	(0.001)
Share of low caste pop	0.041	0.049	0.120	0.112	-
	(0.023)	(0.026)	(0.069)	(0.079)	
Share of tribal pop	0.557	0.528	0.276	0.330	-
	(0.345)	(0.241)	(0.249)	(0.268)	
Share of literate women	0.557	0.617	0.413	0.613	-
	(0.144)	(0.009)	(0.288)	(0.218)	
Share of literate men	0.629	0.790	0.804	0.805	-
	(0.230)	(0.141)	(0.112)	(0.125)	
Share of working women	0.348	0.313	0.358	0.368	-
	(0.193)	(0.182)	(0.159)	(0.148)	
Share of working men	0.538	0.538	0.517	0.554	-
	(0.049)	(0.053)	(0.047)	(0.038)	
Observations	2		95		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
SD reported for controls
SE clustered at the block level for the DD

Pre and Post refer to the pre-treatment and post-treatment years of 2001 and 2011, respectively. The last column calculates the difference-in-difference of the means for the treated and control blocks before and after the treatment.

Table 7e: Summary statistics for treated and control blocks, before and after the DLS - Odisha

	Treated		Control		
Variables	Pre	Post	Pre	Post	DD
	(1)	(2)	(3)	(4)	(5)
Share of girls under six	0.500	0.501	0.487	0.484	0.005
	(0.004)	(0.010)	(0.011)	(0.014)	(0.003)
Share of low caste pop	0.203	0.218	0.161	0.170	-
	(0.122)	(0.119)	(0.073)	(0.081)	
Share of tribal pop	0.263	0.253	0.498	0.516	-
	(0.252)	(0.257)	(0.016)	(0.126)	
Share of literate women	0.180	0.367	0.496	0.634	-
	(0.067)	(0.055)	(0.184)	(0.162)	
Share of literate men	0.413	0.563	0.740	0.809	-
	(0.007)	(0.078)	(0.152)	(0.005)	
Share of working women	0.254	0.266	0.450	0.466	-
	(0.158)	(0.154)	(0.088)	(0.040)	
Share of working men	0.567	0.568	0.523	0.556	-
	(0.038)	(0.010)	(0.040)	(0.034)	
Observations	2		396		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

SD reported for controls

SE clustered at the block level for the DD

Pre and Post refer to the pre-treatment and post-treatment years of 2001 and 2011, respectively. The last column calculates the difference-in-difference of the means for the treated and control blocks before and after the treatment.

Table 7f: Summary statistics for treated and control blocks, before and after the DLS - Andhra Pradesh

	Treated		Control		
Variables	Pre	Post	Pre	Post	DD
	(1)	(2)	(3)	(4)	(5)
Share of girls under six	0.498	0.479	0.490	0.484	-0.013***
	(0.017)	(0.013)	(0.008)	(0.010)	(0.005)
Share of low caste pop	0.115	0.124	0.175	0.179	
	(0.016)	(0.018)	(0.072)	(0.077)	
Share of tribal pop	0.256	0.222	0.084	0.088	
	(0.175)	(0.160)	(0.148)	(0.151)	
Share of literate women	0.461	0.589	0.454	0.550	
	(0.014)	(0.124)	(0.140)	(0.118)	
Share of literate men	0.645	0.755	0.673	0.724	
	(0.107)	(0.124)	(0.105)	(0.086)	
Share of working women	0.388	0.418	0.404	0.406	
	(0.020)	(0.171)	(0.137)	(0.132)	
Share of working men	0.572	0.550	0.574	0.574	
	(0.064)	(0.076)	(0.039)	(0.034)	
Observations	2		1107		

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
SD reported for controls
SE clustered at the block level for the DD

Pre and Post refer to the pre-treatment and post-treatment years of 2001 and 2011, respectively. The last column calculates the difference-in-difference of the means for the treated and control blocks before and after the treatment.

Table 3.8: Estimated effect of the DLS on the share of girls (0-6 years) by state

	PB (1)	BH (2)	JH (3)	CH (4)	OD (5)	AP (6)
treatpost	0.022*** (0.001)	0.002*** (0.0001)	0.003 (0.0012)	-0.010* (0.006)	0.016*** (0.001)	-0.008 (0.015)
Year FE	x	x	x	x	x	x
Block FE	x	x	x	x	x	x
Covariates	x	x	x	x	x	x
Observations	*24,705*	*78,235*	*58,873*	*39,562*	*94,897*	*53,528*

Standard errors clustered at the block-level in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The covariates include village level share of low caste and tribal population and the share of literates and workers by gender.

Table 3.9: Estimated effect of the DLS on fertility and the likelihood of female births in Punjab

	isgirl (1)	isbirth (2)
treatpost	0.034** (0.008)	0.002 (0.003)
Year FE	x	x
District FE	x	x
Mother and child controls	x	x
Observations	13,113	13,113

Standard errors clustered at the district in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns include district and year of birth fixed effect. Mother and child controls include time-invariant characteristics like mother's caste, religious affiliation and her years of schooling and other time varying variables like mother's age at birth of the child and the child's birth order.

Table 3.10: Estimated effect of the DLS on female births by birth order in Punjab

	isgirl
	(1)
treatpostbo2	0.069***
	(0.022)
treatpostbo3	-0.015
	(0.026)
treatpost	0.009
	(0.015)
bo2	-0.022
	(0.015)
bo3	-0.110***
	(0.015)
Observations	*13,003*

Standard errors clustered at the district level in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.11: Effect of the DLS on female birth with leads and lags of the treatment

	Punjab
	(1)
treat2004	-0.065**
	(0.028)
treat2005	-0.021
	(0.026)
treat2006	0.040
	(0.025)
treat2008	0.022
	(0.019)
treat2009	0.065***
	(0.019)
treat2010	-0.026
	(0.018)
treat2011	0.120***
	(0.018)
treat2012	0.018
	(0.019)
Observations	*12662*

Standard errors clustered at the district in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

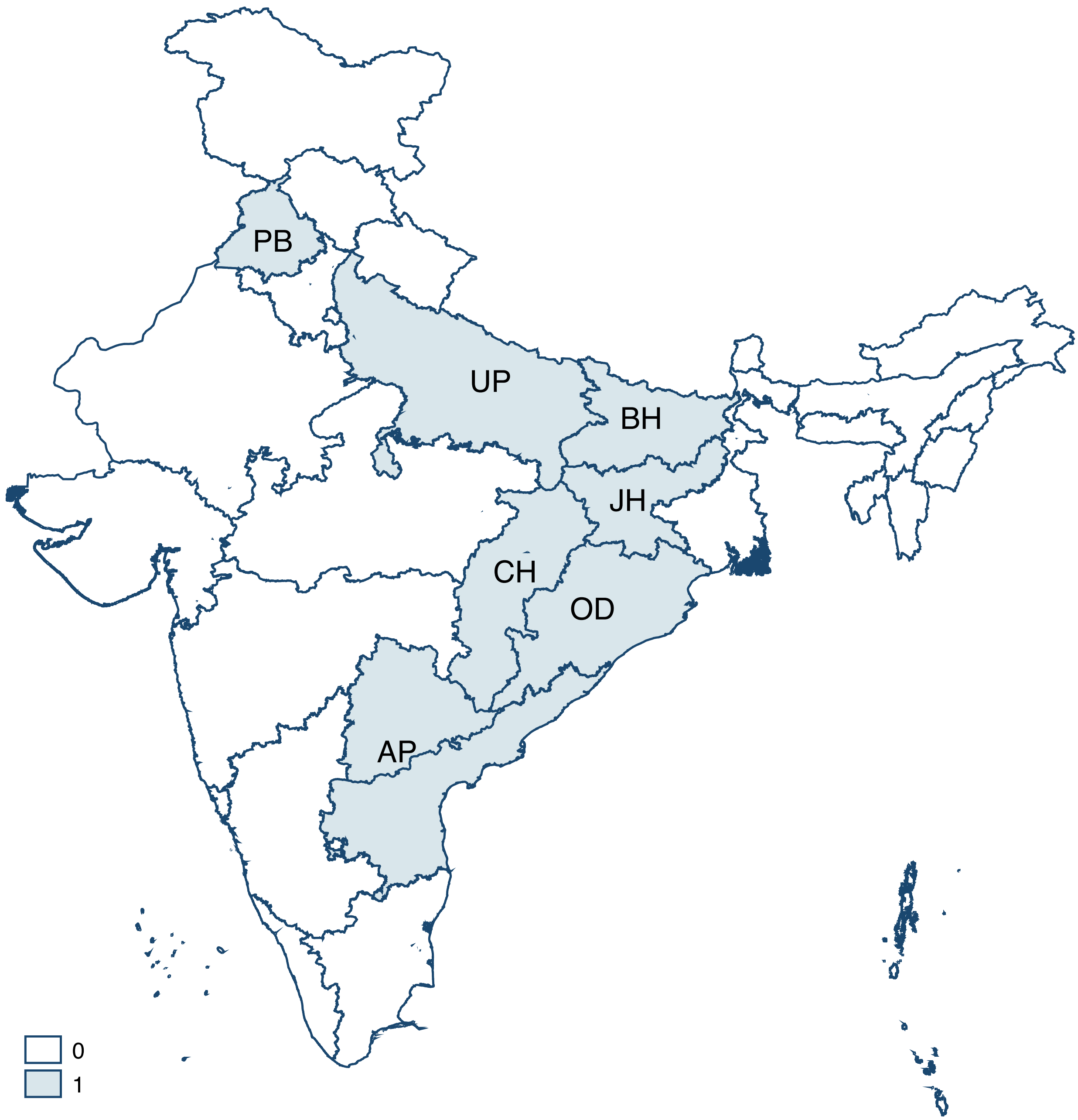

Figure 3.1: States exposed to the DLS

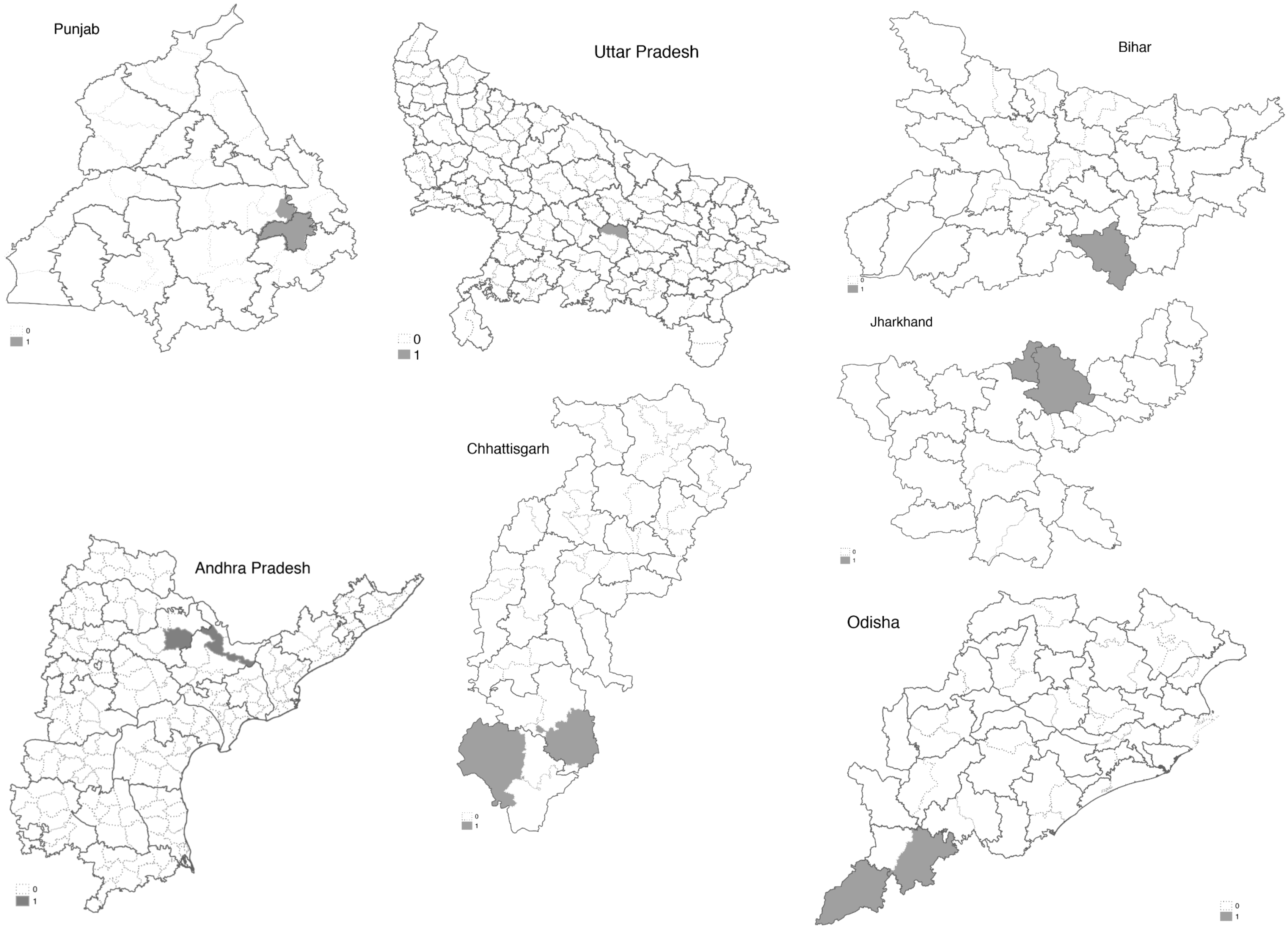

Figure 3.2: Blocks exposed to the DLS

Chapter 4

Conclusion

I have shown that increasing women's political role weakens discrimination against girls and improves their survival in early childhood. Even small increments in female representation in elected offices leads to large survival gains for girls. Female politicians influence both policy implementation and the provision of public goods in ways favorably for women and girls. A boost in women's status through nationwide reforms or strengthens the political voice of individual female winner in elections. These findings highlight the need for expanding gender role in India's political domain. It is important for addressing the issues facing women and girls and also raising the overall status of women in the Indian society. Given the vast under-representation of women at higher tiers of government, my findings support the case for an institutionalization of women's representation at these levels through government decree.

I have shown that financial incentive schemes are an effective way of correcting the sex ratio imbalance among children. Modest cash incentives can deter prenatal and postnatal sex selection even in areas with a historically strong cultural preference for sons. While such programs can prevent direct assault on girls they may not raise girls' status or alter social attitudes towards them. Further investigation is needed to understand how such programs alter households' view towards daughters and whether they lead to long-term investments in girls such as schooling and education.

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APPENDIX A

A.0.1 MAPPING ELECTORAL CONSTITUENCIES

All assembly constituencies (AC) over the sample period are mapped to 2001 census districts using the State Assembly Constituency Delimitation Act of 1976. The new districts, that were formed after 1976, are incorporated using the 2008 AC Delimitation Act. Potential mapping errors owing to changes in AC boundaries over the sample period are ruled out because constituency boundaries remain unchanged in between the two delimitation orders. However, district boundary changes between 1977-2004 can also lead to erroneous mapping of constituencies to districts. Since constituencies do not overlap across districts, district boundary changes mostly involve transfer of AC from one district to another. New districts are either clean or complex (carved out from more than one parent district) partitions of previous districts and so mapping as per 2001 census district makes each AC part of a smaller group at the district-level than their 1976 counterparts. Kumar and Somanathan (2009) provides a complete account of district boundary changes between 1971-2001 while Election Commission of India's Delimitation Acts of 1976 and 2008 map the constituencies to their parent districts.

Unlike previous studies, I include the relatively newer states of Uttaranchal, Jharkhand and Chhattisgarh that were formed in 2001. These were carved out of the bigger states of Uttar Pradesh, Bihar and Madhya Pradesh, respectively. Of these, the partition of Bihar into Jharkhand and Madhya Pradesh into Chhattisgarh simply involved a transfer of several districts from the parent state to the newly formed ones, keeping district boundaries intact. Consequently, mapping these transferred districts retrospectively to their new states for the entire sample period does not affect my analysis, which is primarily at the district-level.

One may argue that the creation of new states throw up challenges for assigning state controls to the districts within, considering that the states did not exist prior to 2001. However, the only state controls used in the analysis are indicators for women's political reservation at state or sub-district levels and I assign these correctly to the individual districts using information from parent(child) states before(after) 2001. This removes any potential threat to the validity of my result arising from an erroneous assignment of state characteristics to these districts. On the other hand, the inclusion of Uttaranchal compromises the accuracy of my analysis because the creation of this state involved complex changes to district boundaries. Therefore, as a robustness check I carry out the estimation with and without Uttar Pradesh and Uttaranchal.

The mapping of 1976 constituencies to their parent districts as of 2001 throughout the study period can potentially overestimate or underestimate the district-level political participation of women. However, since constituencies represent a higher level of disaggregation than districts in India's political structure the gender of constituency head is likely to have a more direct and immediate impact on household-level outcomes than the overall gender composition of politicians in the district.

I also control for district boundary changes over the sample period, assigning each district into one out of three categories: 1) unchanged; 2) clean partition (single parent district) and; 3) complex partition (more than one parent district). The overall sample consists of all three district division categories and for robustness checks I limit the sample to only unchanged districts.

A.0.2 Immunization outcomes

Table A1 reports the results from a regression of the vaccination outcomes on politician gender. The coefficient of interest is that associated with the interaction term $isgirl \times female$. For majority of the outcomes, the coefficient estimate is imprecise suggesting that there are no larger immunization gains for girls relative to boys with an increase in female political representation. The positive coefficient estimates in columns (4) and (9) suggest a positive difference for girls in the receipt of tuberculosis vaccine BCG and folic acid supplements. Unfortunately, the results are sensitive to how vaccination is measured, based on mother's report or from the information recorded on vaccination cards. Investigation of the health effects for the subset of children with official documentation of immunization records, reveals poorer outcomes for girls than boys with female representation in the receipt of BCG and polio. Although it covers births to 108,127 children or roughly 56% of the sample the sensitivity of results to a potential measurement error introduces concerns of sample selection bias (Barcellos et al. (2014)).

Table A1: Estimated effect of female district election victories on child vaccination

	Health card	Polio 0	Polio 1	BCG	DPT	Measles	Hepatitis B	Vitamin A	Folic acid
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
female	-0.007	0.020	-0.144	-0.223	-0.238	-0.234	-0.074	-0.004	-0.081**
	(0.12)	(0.07)	(0.22)	(0.14)	(0.42)	(0.37)	(0.20)	(0.24)	(0.03)
isgirl	-0.021***	-0.017***	-0.062***	-0.062***	-0.072***	-0.138***	-0.035***	-0.069***	-0.003***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
isgirl x female	0.039	0.009	0.029	0.071**	0.049	0.022	0.029	0.025	0.020**
	(0.03)	(0.02)	(0.04)	(0.03)	(0.06)	(0.10)	(0.03)	(0.05)	(0.01)
Controls	x	x	x	x	x	x	x	x	x
Mother FE	x	x	x	x	x	x	x	x	x
Time FE	x	x	x	x	x	x	x	x	x
Observations	*226007*	*226001*	*225801*	*225992*	*225978*	*225825*	*225864*	*217859*	*218936*

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws. The sample consists of births to 108,127 mothers.
Health card is a government issued card that maintains official record of vaccinations.
Polio 0 and Polio 1 record the administering of initial and higher doses of polio, respectively.
BCG or Bacillus Calmette-Guerin is the tuberculosis vaccine.
DPT is the Diphtheria, pertussis and tetanus vaccine.
Vitamin A and Folic acid are indicators for whether the child was administered these post-birth.

Table A2: Varying definition of vote margin cutoff

	isgirl (1)	isgirl (2)	isgirl (3)	isgirl (3)
female	-0.172	-0.226	-0.172	-0.041**
	(0.145)	(25.72)	(1.629)	(0.021)
Control	x	x	x	x
Mother FE	x	x	x	x
Year FE	x	x	x	x
Vote margin cutoff	*2%*	*2.5%*	*3%*	*4%*
Observation	*472566*	*472566*	*472566*	*472566*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table A3: Estimated effect of female district election victories on girls' prenatal survival pre/post reservation by rural-urban

	isgirl (1)	isgirl (2)	isgirl (3)
	Overall	Rural	Urban
female	-0.093***	-0.110**	-0.053
	(0.014)	(0.02)	(0.090)
reform	0.017*	0.028***	0.010
	(0.010)	(0.00)	(0.018)
$reform \times female$	0.205***	0.300***	-0.057
	(0.077)	(0.020)	(0.205)
Observations	*516971*	*355240*	*161731*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. *Reform* is a binary indicator for all years following the onset of women's reservation. Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table A4: Estimated effect of female district election victories on girls' prenatal survival using leads and lags of the political variable

	isgirl
t-3	-0.014
	(0.028)
t-2	-0.011
	(0.025)
t-1	-0.046*
	(0.026)
t+1	0.051
	(0.036))
t+2	0.114
	(0.078)
t+3	-0.024
	(0.068)

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Standard errors are clustered at the district-level and the error variance-covariance matrix is calculated using bootstrapping with 1000 draws.

Table A5: Estimated effect of female district election victories on Public Health Provision

	Prenatal ANM visit (1)	Antenatal checkup (2)	Postnatal ANM visit (3)	Folic acid (4)	Tetanus (5)
femle	-0.0807	0.119	0.117	0.174	0.076
	(0.140)	(0.0948)	(0.130)	(0.168)	(0.107)
Controls	x	x	x	x	x
Year FE	x	x	x	x	x
District FE	x	x	x	x	x
Observations	*83598*	*83598*	*83598*	*83598*	*83598*

Robust SE clustered at the district level in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: All columns report 2SLS coefficient estimates using the specification in column (3) of Table 3. The sample consists of mothers whose last birth was between 1999-2005. Column (1) and (3) capture the effect of *female* on prenatal and postnatal visits by public health workers, also known as Auxiliary nurse midwife (ANM). Column (2) refers to antenatal checkup performed by ANM. Columns (4) and (5) record whether the ANM administered folic acid and tetanus injection to the mother in the prenatal stage.

Appendix B

B.0.3 Evolution of financial incentive schemes for girls in India

Gender-based CCTs have particularly gained ground in South Asia as a means to protect the needs of women in patriarchal societies. These programs aim to lower gender inequality by positively discriminating in favor of the disadvantaged gender. The focus is on women and girls' development in the areas of health, education and employment. In India, gender targeted CCTs explicitly address the persisting intra-household disparity in education and health care of boys and girls and the growing sex ratio imbalance among children.

The view that sons are superior to daughters is deeply embedded in traditional Indian culture and has survived decades of socio-economic change. Legal prohibition of female feticide and infanticide unaccompanied by any change in beliefs have proved to be futile tools for addressing sex selection. Federal and state governments have responded with economic incentives for having daughters. Through programs known as *Ladli-Laxmi* schemes the government provides cash transfers to families with girls. The first cash installment is paid at the time of birth while the remaining are phased out across different stages of the girl's life depending on the program scope. The primary objective is to lower the sex ratio at birth while some have more long term goals such as increasing girls' school education and their age at marriage. Typically, the beneficiaries are low-income households and the cash flows are contingent upon conditionalities like proof of immunization and school enrollment of girls. Such CCT schemes work on the assumption that low-income families are the main perpetrators of discrimination against girls, and that cash incentives will motivate them to change.

Rajasthan and Tamil Nadu became the first states to adopt girl child CCT programs with their

Rajalakshmi Yojana and *Girl Child Protection Scheme* (GCPS), respectively. Launched in 1992, these programs aimed to reduce female infanticide and protect girls against post-birth discrimination. At the time, both states was experiencing a high rate of newborn deaths among girls despite strict laws against infanticide. Hence, the schemes were designed to be a government sponsored long-term savings bond initiated at the time of birth of the girl and redeemable by parents at their daughter's eighteenth birthday, provided the girl survived unto adulthood. The schemes were first of their kind, well targeted and became popular over the years. In Rajasthan, the number of beneficiaries increased from 4,917 in 1992-93 to 11,664 in 1997-98 whereas the program uptake in Tamil Nadu remained dismal at only 2,039 beneficiaries over this time period.[1]

While there is no formal appraisal of the *Rajalakshmi Yojana*, Srinivasan and Bedi (2009) evaluate the GCPS. They find sharp decline in infant mortality of girls between 1992 and 2000s, but their study reveals that GCPS failed to target the districts with a high prevalence of female infanticide. Moreover, the accompanying sterilization clause discouraged families with only daughters to enroll in the scheme in their desire to realize at least one son. Despite their shortcomings, these programs set the stage for similar schemes in other states.

The next prominent initiative is Haryana's (ABAD) scheme launched in 1994. Taking cue from Rajasthan's CCT program, the Haryana government conceptualized a program to lower SRB and prevent under-age marriage of girls. Though the child sex ratio in India as a whole has climbed sharply since 1980s, the increase is particularly dramatic in Haryana. Apart from the acute survival disadvantage of young girls, the state also experiences a high incidence of under-age marriages among girls. The ABAD scheme pays a modest cash amount to families at the time of birth of a girl child as well as a lump sum cash amount once the girl attains age 18 and is unmarried. The initiative targets below poverty line (BPL) and lower caste families where girls are more likely to be eliminated or married at younger ages.[2]

ABAD had a positive impact on the sex ratio at birth and also improved postnatal health and

[1]The *Rajalakshmi Yojana* was terminated in the year 2000 due to lack of adequate financial resources while GCPS is still operational. The scheme was restructured in 2001 to increase the financial benefits.

[2]After the 2001 census revealed that child sex ratios are often lower among the educated and wealthy, ABAD was revised in 2005, expanding program eligibility to include families from all income groups. It

school enrollment of girls. Sinha and Yoong (2009) find that it increased parental investment in health and human capital development of daughters. However, their results indicate that the program remained largely unsuccessful in raising the value of girls with no change in couple's preference for sons.[3] They cite poor implementation and the lack of effective communication about the program's intent as the underlying causes.

In contrast, the *Dhan Lakshmi* scheme is a more evolved CCT program and differs from its predecessors in both scope and implementation. The focus is on prenatal sex selection but the broader goal is to reduce all forms of daughter discrimination post-birth. Accordingly, the cash grants are phased out covering various stages of a girl's life, starting from birth and until marriage. At each checkpoint, the release of funds is conditional upon proof of the girl's well being. Unlike its counterparts, the DLS supports households from all socio-economic backgrounds as well as all girls within a family. It is a federal government initiative and the cash grants provided are relatively higher than any other girl child CCT scheme currently active. The next section discusses the salient features of DLS.

was renamed *Ladli* and the monetary support was also increased. However, the benefits only extended to the second girl child within a family.

[3]It is consistent with similar findings from qualitative surveys by Krishnan et al. (2014) and the International Center for Research on Women that reveal no program impact on household's negative perception of daughters.

Table A1: Comprehensive listing of girl child CCTs in India

S.No.	Scheme	Year	Spatial coverage	Scope	Income restriction	Children per family	Fertility clause
1.	Rajalakshmi	1992	Rajasthan	Birth, Marriage	All	2	Single or two children family Sterilization
2.	Girl Child Protection Scheme	1992	Tamil Nadu	Education Marriage	BPL	1 (only second girl child)	None
3.	Apni Beti Apna Dhan (later modified in 2005)	1994	Haryana	Birth, Education Marriage	BPL	1 (only second girl child)	None
4.	Kunwarbainu Mameru Vivah Yojana	1995	Gujarat	Marriage	Annual family income <= Rs.21,206	2	Max 2 children in the family Sterilization
5.	Girl Child Protection Scheme	1996	Andhra Pradesh	Birth, Education Marriage	Annual family income <= Rs. 24,000	2	Single or two girl child families only
6.	Balika Samriddhi Yojana	1997	Gujarat	Birth, Education Marriage	BPL	2	None
7.	Devirupak	2002	Haryana	Birth	BPL	1	Single child family Sterilization
8.	Rakshak Yojana	2005	Punjab	Birth, Education Marriage	BPL	2	Max 2 children in the family Sterilization
9.	Bhagyalakshmi	2006	Karnataka	Birth, Education Health Insurance Marriage	BPL	2	Max 3 children in the family Sterilization
10.	Mukhya Mantri Kanyadan Yojana	2006	Madhya Pradesh	Marriage	Economically backward	-	Max 3 children in the family
11.	Ladli Lakshmi Yojana	2007	Madhya Pradesh	Birth, Education Marriage	All	2	Sterilization
12.	Mukhya Mantri Suraksha Yojana	2007	Bihar	Marriage	BPL	2	Max 2 children in the family Sterilization
13.	Indira Gandhi Balika Suraksha	2007	Himachal Pradesh	-	-	2	Single or two girl child families only Sterilization
14.	Mukhya Mantri Vivah Yojana	2008	Bihar	Marriage	Annual family income <= Rs.60,000	2	Max 2 children in the family Sterilization
15.	Ladli	2008	Delhi	Birth, Education Marriage	Annual family income <= Rs.100,000	2	None
16.	Beti Hai Anmol	2010	Himachal Pradesh	Birth, Education Marriage	BPL	2	None

B.0.4 A2

Uttar Pradesh had a short exposure to treatment before 2011 compared to the other states. Table B.2 reports summary of block-level variables for the state. The pre-intervention share of girls under the age of seven is higher in the treated blocks than the untreated by 0.4 percentage points. This is intuitive given a high concentration of low caste population in the treated block compared to the rest of the state. Sex selection is observed to be low among lower caste with no clear cultural preference for sons noted among these groups.

Table B.3 reports the estimated effect of the DLS on the share of girls under the age of seven years in Uttar Pradesh. The coefficient estimate is small, negative and statistically significant at one percent. It indicates that post treatment the share is 0.5 percentage point lower for a treated village relative to the comparison group. However, the effect size is small reducing the proportion of girls to 0.477 from a baseline share of 0.482. The state is an outlier in the current analysis because its treatment time coincides with the post treatment year in the analysis. Therefore, not much can be inferred about the program's impact from the results for Uttar Pradesh.

Table B.2: Summary statistics for treated and control blocks, pre and post DLS - Uttar Pradesh

	Treated		Control		
Unit of observation: block	Pre	Post	Pre	Post	DD
	(1)	(2)	(3)	(4)	(5)
Share of girls under six	0.482	0.478	0.477	0.474	-0.001**
	(0.001)	(0.006)	(0.000)	(0.010)	(0.009)
Share of low caste pop	0.302	0.299	0.186	0.183	-
	(0.126)	(0.128)	(0.084)	(0.082)	
Share of tribal pop	0.000	0.000	0.000	0.005	-
	(0.000)	(0.000)	(0.003)	(0.022)	
Share of literate women	0.522	0.648	0.466	0.594	-
	(0.210)	(0.148)	(0.140)	(0.102)	
Share of literate men	0.760	0.819	0.709	0.778	-
	(0.131)	(0.083)	(0.107)	(0.082)	
Share of working women	0.153	0.176	0.136	0.147	-
	(0.096)	(0.068)	(0.095)	(0.075)	
Share of working men	0.489	0.511	0.458	0.474	-
	(0.032)	(0.004)	(0.038)	(0.031)	
Observations	2		299		

SD in parentheses for columns 2-4 and SE clustered at the block-level in column 5
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Pre and Post refer to the pre-treatment and post-treatment years of 2001 and 2011, respectively. The last column calculates the difference-in-difference of the means for the treated and control blocks before and after the treatment.

Table B.3: Estimated effect the DLS on the share of girls (0-6 years) in Uttar Pradesh

	Uttar Pradesh (1)
treatpost	-0.005*** (0.000)
Year FE	x
Block FE	x
Observations	*196,056*

Standard errors clustered at the block-level in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The covariates include village level share of low caste and tribal population and the share of literates and workers by gender.

B.0.5 District-level analysis

Data

I obtain data from the 2007-08 and 2012-13 rounds of the District Level Household Survey. These nationally representative cross section surveys capture fertility history of ever married women in the 15-49 age group, recording all pregnancies and their outcomes in the four years preceding the survey date. For each live birth, it reports the year of birth, child gender, birth order, if child is part of multiple births and age at death if the child died. It also records newborn care information for the most recent birth. Of these, immunization history is particularly relevant for the current study.

In addition to the health variables, DLHS contains detailed information on demographic characteristics such as household members' age, education, caste, and religion as well as data on household construction type that allow me to control for household types that determine sex selection. The data is comparable to the National Family and Health Survey (NFHS), another popular health data. However, DLHS is the obvious choice given that the completed NFHS rounds do not cover the post-scheme period. The first wave is purchased from IIPSC, the nodal agency for conducting the survey, while the later round is downloaded from the website of the Ministry of Health and Family Welfare (MHFW). Although DLS is a block-level treatment, the analysis is performed at the district-level since surveyed households under DLHS are not identified to their residential block.

The analysis sample is a district-year panel comprising 13,113 individual live births to 6236 mothers. The births took place between 2004-2012 and cover all 20 districts of the state. The sampled infants are spread across multiple birth parities, ranging from 1 to 12 with roughly 45%, 36% and 13% belonging to the first, second and third birth orders, respectively. The overall share of girls in the sample is 0.45 with the share declining at higher birth parities. Tables B.4 provide a summary of the DD estimates for the sample of births in Punjab. The estimates include mother and child controls and time and year fixed effect. The DD estimate is 0.027 and is statistically significant at the 5-percent level. positive implying an increase in the likelihood of female births. The post-treatment difference in the share of girls between the treated and control groups is also positive and statistically significant but there appears to be no significant treatment effect on the treated district.

Table B.4: Estimated difference in means for births in Punjab

	Pre CCT	Post CCT	Diff
Treated	0.620	0.668	0.048
			(0.063)
Control	0.615	0.632	0.016
			(0.067)
Diff	-0.036***	-0.009	0.027 **
	(0.007)	(0.006)	(0.013)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Sample consists of children born between 2004-2012 in the state of Punjab. The control and treated groups consist of 12,346 and 768 observations, respectively. Estimates are adjusted for birth order, mother's age and education. Standard errors are clustered at the district-level.

EMPIRICAL STRATEGY

I use the following empirical specification for estimating the impact of DLS

$$isgirl_{idt} = \beta_1 treated \times post + \beta_2 treated_d + \beta_3 post_t + X_{idt}\gamma + \alpha_d + \theta_t + \varepsilon_{idt} \qquad \text{(B.1)}$$

where, the outcome variable is a binary indicator for a female child at the ith birth in district d in the year t. Among the regressors, *treated* is a binary indicator for the treated districts while *post* is a dummy capturing the onset of treatment i.e. it takes the value one for all years following 2008.[4]Our main coefficient of interest is β_1 from the interaction term that estimates the treatment effect for the treated relative to the control group. It measures the change in likelihood that a live birth in the treated districts, post-CCT is a girl with changes in the likelihood that a live birth in the control districts post CCT is a girl. Meanwhile, X captures observable mother and child characteristics that are considered important determinants of son preference and prenatal sex-selection. It includes variables like birth order, mother's age at birth, religion, caste and level

[4]To enhance precision of the treatment time I use the month of birth to assign each birth to the post-CCT group.

of education. Also included are district fixed effect α to control for district-level differences in the ratio of girls while fixed effects for year of birth θ adjust for annual trends in the ratio of girls in India.