Financial Incentives and the Fertility-Sex Ratio Trade-off

By S Anukriti*

Can financial incentives resolve the fertility-sex ratio trade-off faced by countries with persistent son preference and easy access to sex-selection technology? An Indian program, Devi Rupak, that seeks to lower fertility and the sex ratio is unable to do so. Although fertility decreases, the sex ratio at birth worsens as high son preference families are unwilling to forgo a son despite substantially higher benefits for a daughter. Thus, financial incentives may only play a limited role in the resolution of the fertility-sex ratio conflict.
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Cheap technology for prenatal sex-determination has allowed parents that prefer sons over daughters to selectively abort girls, thereby increasing the male-female sex ratio at birth in Asia, Eastern Europe, and among Asian diasporas in North America and Western Europe.[1] For every female birth, 1.18 and 1.11 boys were born in China (2010) and in India (2006-08), respectively.[2] Relative to the "natural" sex ratio at birth (≈ 1.05), these numbers reflect a substantial demographic imbalance.

Bans on sex-selection are difficult to implement since abortion and ultrasound scans are, typically, not illegal in these countries. As a result, existing regulations have been largely unsuccessful and policymakers have turned to financial incentives instead. However, programs that seek to decrease the sex ratio by incentivizing parents to have more girls or, more generally, by improving the relative value of girls, may lead to higher fertility if parents respond by increasing the number of daughters without decreasing the number of sons equally. This may happen if sons and daughters are imperfect substitutes or if parents desire a minimum number of sons. Thus, fertility reduction and a gender-balanced popu-

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[1]The sex ratio at birth is male-biased in India, China, South Korea, Vietnam, Nepal, Azerbaijan, Armenia, Georgia, Albania, Kosovo, Macedonia, Montenegro, and among Asian populations in the United States, Canada, the United Kingdom, Greece, and Spain.

[2]Bhalotra and Cochrane (2010) estimate that nearly 4.8 million sex-selective abortions took place annually in India during 1995-2005 due to sex-detection technology. This number is about one-fourth of the number of female births in the United States in 2002.

lation often appear conflicting objectives as targeting one may worsen the other. In fact, fertility decline has been shown to be a *cause* of the rising sex ratios at birth,[3] with technology playing a facilitating role. Figure 1 displays the inverse trends in fertility and the child sex ratio for India and China.

Governments in India and China have introduced several programs that seek to resolve this fertility-sex ratio trade-off by rewarding parents that have fewer children and more girls.[4] Despite the proliferation of such dual-target policies in recent years, there is no evidence on their effectiveness. In general, little is known about factors that can decrease the sex ratio at birth,[5] either singly or jointly with fertility. The literature on the causal effect of financial incentives on fertility has been limited to pronatal policies in developed countries[6] and the One Child Policy in the context of developing countries.

This paper contributes to the literature by evaluating an Indian program *Devi Rupak* that seeks to resolve the fertility-sex ratio trade-off. Devi Rupak is a conditional cash transfer program announced in 2002 by the Indian state of Haryana. Devi Rupak seeks to decrease both fertility and the sex ratio at birth by rewarding couples that have either one child or two daughters and no sons. The benefit for two girls or one boy is the same and smaller than the benefit for one girl. These payments are disbursed on a monthly basis for a period of 20 years and their magnitude is substantial—the monthly benefit for couples whose only child is a girl is approximately half of Haryana's per capita monthly consumption expenditure (IHDS 2005). The total benefit received over 20 years by these parents is also sufficient to cover the average dowry expense. Section I describes the program in more detail.

I compare women in Haryana to their counterparts in similar neighboring states and employ the variation in incentives by the year of program implementation and the composition of older children to estimate the causal effect of Devi Rupak in a differences-in-differences (DD) framework. The data and the empirical strategy are discussed in Sections II and III.

I find that Devi Rupak increases the probability that a couple has only one child by 0.6 to 1 percentage points (p.p.). However, this fertility response is primarily driven by a 0.4 to 1 p.p. or a 5 to 11 percent increase in the probability that a couple has only one boy, from a baseline probability of 8.7 percent. Despite

[3]Park and Cho (1995), Das Gupta and Bhat (1997), Bhat and Zavier (2003), Ebenstein (2010), Kashyap and Villavicencio (2015), Jayachandran (2016).

[4]A detailed list of nine such programs is provided in Appendix Table A.1. The eligibility criteria of these programs vary along three key dimensions: (i) the maximum number of children (one to three), (ii) their gender mix, and (iii) the minimum number of girls. Some programs allow parents to have children of both sexes while others do not. In some cases, parents that have only sons and no daughters also receive benefits, as long as they satisfy the fertility limit. The benefits are provided either as direct cash transfers (periodically or in a lump-sum manner) or through subsidies for school fees or marriage-related expenses, for example. Typically, couples are required to adopt a permanent method of family planning to prevent future childbearing.

[5]Bedi and Srinivasan (2009) and Sinha and Yoong (2009) evaluate incentive programs targeted at reducing the sex ratio in India. However, none of the policies evaluated by these papers target both fertility and sex-selection.

[6]For example, Cohen, Dehejia and Romanov (2013), Laroque and Salanié (2014), and Milligan (2005).

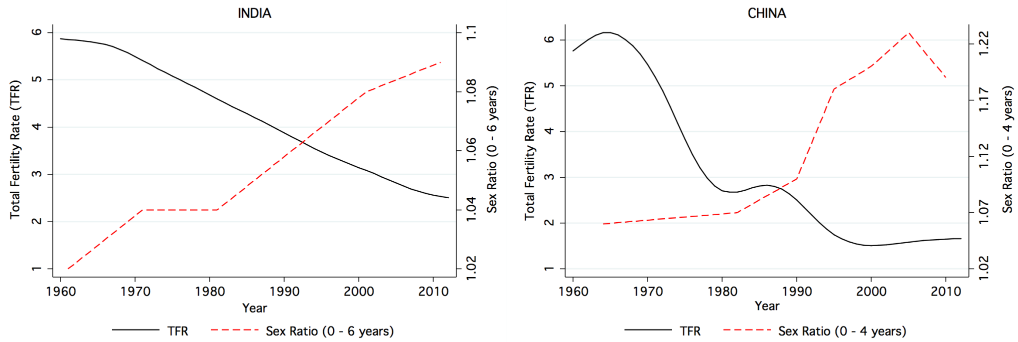

Figure 1. Trends in total fertility rate and child sex ratio in India and China

Note: The annual TFR data is from the World Bank Indicators for 1960-2012. The child sex ratio data is from the decennial Census of India (1961-2011) and the Census of China (1964, 1982, 1990, 1995, 2000, 2005, 2010).

one-girl being the most remunerative child composition, there is no increase in the share of couples with one daughter and no sons in the overall sample. There is a small increase in the likelihood that a couple has only two girls, but it is not consistently significant.

I also examine the impact of Devi Rupak on "transitional" couples, i.e., couples that had at least one child when the program was announced. Couples that already had a boy (and no girls) are less likely to have a second birth where as the probability of second birth increases for one-girl couples that had no sons. Second births to these transitional couples that already had one child are more likely to be a boy. The probability of a male second birth increases by 6 p.p. and 2 p.p., respectively, for couples with a first boy and a first girl. This is likely because couples that choose to forgo the one-child incentives and select into a second pregnancy have a stronger son preference and, hence, are more likely to sex-select.

Most strikingly, Devi Rupak also increases the sex ratio at first birth by 1 to 2.3 percent. While previous literature has found no evidence of sex-selection for first births in India (Bhalotra and Cochrane (2010)), Devi Rupak induces couples to make decisions about sex-selection at first parity as it only offers benefits for either one child or two girls. My results on birth spacing reinforce that Devi Rupak increases sex-selection for the first birth.[7] The differential stopping behavior of transitional couples by the gender of their first child and greater sex-selection at first parity by new parents both contribute to the increase in the proportion of one-boy couples.

[7] In comparison, the effects of the One Child Policy on the sex ratio at birth range from insignificant (Almond, Edlund and Milligan (2013)) to a 19 percent increase in the likelihood of a male birth following a single girl (Ebenstein (2010)).

My findings emphasize that the structure of programs like Devi Rupak must be carefully designed to avoid unintended consequences since key parameters such as the degree of son preference and the cost of children are largely unobservable. Back-of-the-envelope calculations suggest that a subsidy worth 10 months of average household consumption expenditure[8] is insufficient in inducing parents in Haryana to have only one daughter and no sons.[9] Unless even larger benefits are offered, it appears that financial incentives are unlikely to resolve the fertility-sex ratio trade-off if parents are expected to choose either sons or daughters.

In the neoclassical framework, demand for children responds to changes in their marginal price. While the decrease in the probability of a marginal birth for one-boy couples in this paper is consistent with this framework, one-girl couples (especially those with stronger son preference) do not decrease fertility despite an increase in the price of a second birth. Similarly, new parents are less likely to have a first-born girl despite a decrease in its relative price since, post-Devi Rupak, it implies giving up a son altogether. Thus, demand for sons appears to be less price-elastic than the demand for daughters. In a quantity-quality framework (Becker and Lewis (1974)) where quantity refers to the number of children and quality refers to the sex ratio, this implies that the price-elasticity of quantity exceeds the price-elasticity of quality.

Although Devi Rupak was implemented in only one Indian state, it is representative of the more recent programs along several dimensions. Moreover, its strengths and weaknesses, as highlighted by my results, can improve the design of programs with similar competing demographic priorities.

I. Devi Rupak

The Government of Haryana announced and implemented Devi Rupak on September 25, 2002.[10] Under this program, eligible couples that adopt a terminal method of family planning[11] receive monthly payments for a period of 20 years. The incentive amount varies with the number and the sex-composition of their children at the time of sterilization. Couples that choose sterilization after their first child receive a monthly benefit of Rs. 500 ($\approx$ USD 8) if they have a daughter and Rs. 200 ($\approx$ USD 3) if they have a son. Devi Rupak also provides Rs. 200 ($\approx$ USD 3) per month to parents of two children, but only if both are daughters. Couples with any other composition of children (including no children) are not eligible to

[8]I arrive at this number in the following manner. The differential monthly subsidy provided by Devi Rupak to parents of one daughter is Rs. 300. At the rate of 3 percent per annum, the 20-year present discounted value of this subsidy is Rs. 53,560. The annual household expenditure in Haryana is approximately Rs. 64,800 assuming that the average monthly per capita consumption expenditure is Rs. 1,080 (IHDS 2005) and the average household size is five (2001 Census of India). Thus, the subsidy represents about 10 months of household consumption expenditure.

[9]Ebenstein (2011) uses simulations to forecast that a potential subsidy worth 9 months of income for daughters-only parents may reduce the sex ratio by 3.5 percent (from 1.14 to 1.10) and lower fertility by 2.2 percent (from 1.81 to 1.77 births) in China.

[10]Website: http://hsprodindia.nic.in/listdetails.asp?roid=198

[11]Vasectomy or tubectomy (also known as male or female sterilization, respectively).

receive any benefits. The local Civil Surgeon's Office credits these payments into a beneficiary couple's joint-account on a monthly basis.

Prospective beneficiaries have to register themselves with their village council or the municipal committee. To be eligible, the husband and the wife should be less than 45 and 40 years old, respectively, on the date of sterilization. Further, neither of them should be an income tax payer. Registered couples are permitted to wait until their youngest child is 5 years old before undergoing sterilization, but they start receiving the benefits only after the surgical procedure has taken place. If their last-born child dies and a beneficiary couple undergoes re-canalization,[12] they are no longer entitled to future benefits, although past benefits do not have to be refunded. The rules mentioned thus far have been in place since November 24, 2003. The original set of rules was more complicated since eligibility was also dependent on the year of marriage and birth spacing.

Like other states in north and north-west India, Haryana has historically been a high son preference state and its sex ratio at birth has become increasingly more male-biased in recent decades. In 2013, Haryana had the highest child sex ratio in India. The average marital fertility in Haryana, though decreasing, also remains significantly above the replacement level.[13]

It is not unusual in India for women to adopt a terminal method of family planning. Female sterilization is the most prevalent modern method of contraception in India—34 percent of all currently-married women in the 15-44 age group are sterilized.[14] The surgery required for sterilization is performed for free at public health facilities and at a subsidized rate at private health centers across India. Most sterilized couples (84 percent) undergo the procedure at government facilities.[15]

II. Data

I use the 1998-99 and 2005-06 rounds of the National Family Health Survey of India (NFHS-2, 3) and the 2002-04 round of the District-Level Household Survey of India (DLHS-2). These are nationwide, repeated cross-sectional surveys, representative at the state-level. These datasets report complete birth histories for all interviewed women (including children's month, year, and order of birth, mother's age at birth, and the age at death for deceased children) and the year and the month of sterilization, if applicable. I combine the retrospective birth histories from these three cross-sections to construct an unbalanced woman-year

[12]Although sterilization is considered a permanent method of contraception, it is possible to surgically reverse it.

[13]In 2009, Haryana's average marital fertility was 4.4 births per woman (Source: Sample Registration System).

[14]The data source for all statistics on contraception in Section I is the DLHS-3 (2007-08).

[15]In all states, sterilization adopters are entitled to receive a *one-time* incentive payment as compensation for the income lost during the surgery. However, these one-time incentives (with a maximum of $22) are substantially smaller than the benefits offered by Devi Rupak and, unlike Devi Rupak, the temporal variation in these national incentives is common across all states and does not vary with the number and the sex-composition of children.

panel;[16] a woman enters the panel in her year of first marriage[17] and exits in her year of survey.

My empirical strategy (described in detail in Section III) uses Haryana's neighboring states from north- and north-west India as the control group (see left panel of Figure 2 for a map).[18] I exclude other states from my sample because they substantially and fundamentally differ from Haryana along dimensions that are considered important determinants of fertility and sex-selection decisions. These include potentially intertwined characteristics, such as son preference, kinship structures, female autonomy, marriage customs, and cropping patterns,[19] many

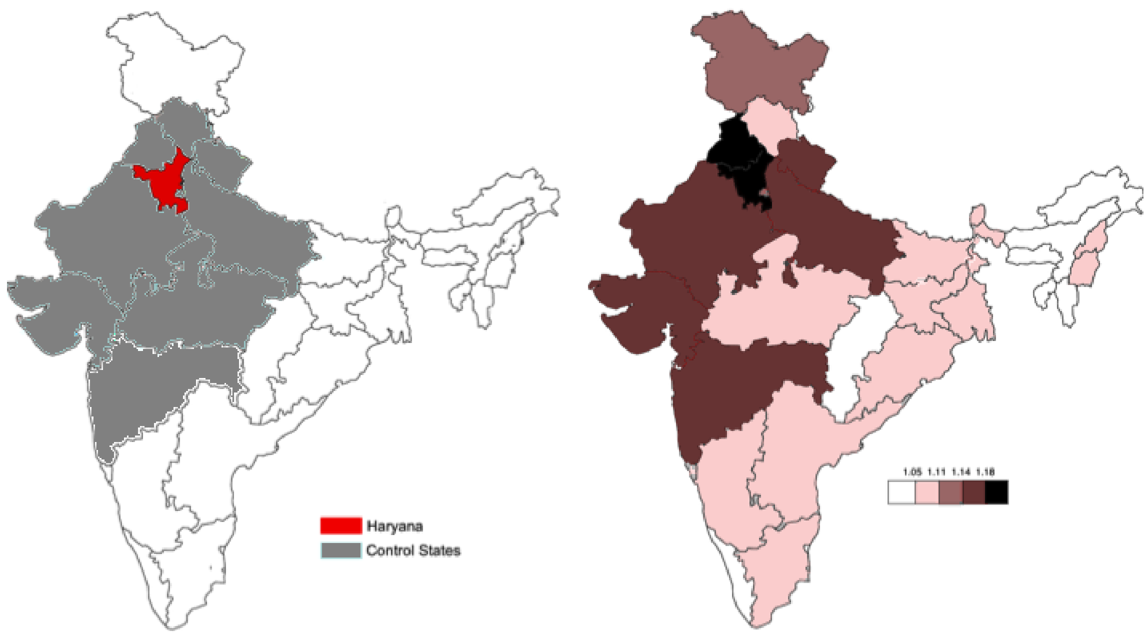

Figure 2. Child (0-6) sex ratio in treatment and control states

Note: The left panel shows Haryana and the control states included my sample. The right panel shows the state-wise distribution of the child (0-6) sex ratio using 2011 Census data of India.

[16]The DLHS and the NFHS are similar in terms of the selection of respondents, the conduct of interviews, and the questionnaires used. Sample sizes, however, are much larger for the DLHS since it is also representative at the district level.

[17]For consistency across rounds, I define the year of marriage as the year of consummation.

[18]These are Punjab, Rajasthan, Himachal Pradesh, Delhi, Gujarat, Uttar Pradesh (inclusive of Uttarakhand), Madhya Pradesh (inclusive of Chhattisgarh), and Maharashtra. Uttarakhand and Chhattisgarh were carved out of Uttar Pradesh and Madhya Pradesh, respectively, in 2000. With the exception of Jammu and Kashmir, for which data is not consistently available, my sample states cover all of north and north-west India.

[19]Boserup (1970), Bardhan (1974), Dyson and Moore (1983), Das Gupta and Shuzhuo (1999), Rahman and Rao (2004), Bhaskar and Gupta (2007), Das Gupta (2010), and Carranza (2015).

of which are either unobservable or do not have credible proxies. This regional divide is evident in the 2011 Census of India data on child sex ratios (right panel of Figure 2); Haryana and the control states have a systematically larger sex-imbalance than the rest of the country. In fact, the 1881 Census report mentions son preference and female infanticide in Punjab[20] and Rajasthan, suggesting that this divide has been persistent.

My sample comprises years from 1995 to 2005. I choose 1995 as the earliest year to ensure that my results are not affected by (1) an alternate program, *Apni Beti Apna Dhan*, implemented by the Government of Haryana in 1994,[21] and (2) the 1995 break-point in the long-term trend in the availability of sex-determination technology (Bhalotra and Cochrane (2010)). The post-Devi Rupak years are 2003, 2004, and 2005. I exclude the year 2006 to ensure that the results are not affected by a different program, *Ladli*, that also seeks to decrease the sex ratio in Haryana.[22] The lack of a large number of post-program years is a major limitation of this paper.[23] Other sample-selection criteria, that do not affect any results, are described in Section II.A of the Online Appendix.

III. Empirical Strategy

The goal of my empirical strategy is to estimate the causal effect of Devi Rupak. I exploit the quasi-experimental nature of Devi Rupak's implementation to estimate the impact of financial incentives on the number and the sex-composition of children, on birth spacing, and on contraceptive use. In particular, my identification strategy relies on three sources of variation: the year and the state of program initiation, and differences in future incentives by the composition of pre-existing children (born before Devi Rupak was launched).[24]

Table 1 describes how Devi Rupak's monthly incentives vary for couples in Haryana by the composition of their pre-existing children at any point in time.

[20]Haryana was a part of Punjab until 1966.

[21]Apni Beti Apna Dhan is a financial incentive program aimed at reducing the sex ratio. However, it does not target fertility.

[22]Ladli was introduced in Haryana in August 2005 and provides parents of two girls Rs. 5,000 per year for 5 years. However, unlike Devi Rupak, it does not restrict the total number of children. Despite Ladli's introduction in August 2005, I do not exclude births that took place during September-December 2005 since they were conceived before its announcement. The only way Ladli could have affected fertility or the sex ratios in 2005 is if it decreased the likelihood of conception or caused women that were in the first six months of their pregnancy (when sex-detection technology is most effective and safest (Epner, Jonas and Seckinger (1998))) in August 2005 to selectively abort during September-December 2005. Any such forgone conceptions or aborted pregnancies, if carried to term, would have resulted in births only next year and since I exclude 2006 from my sample period, ignoring them is not a concern for my empirical strategy.

[23]One way to capture the longer term effects of Devi Rupak is to use data from the 2007-08 round of the DLHS (DLHS-3). This survey, however, is not comparable to the other rounds and using it would require making strong assumptions.

[24]In Section I of the Online Appendix, I construct a stylized theoretical model in which couples differ in the degree of son preference and the cost of children, and make joint decisions about childbearing and sex-selection in a discrete-choice framework. Using this framework, I derive testable predictions for the effects of a Devi Rupak-like program that provides benefits for only one child, conditional on no second births, with a larger benefit for a girl relative to a boy.

Conditional on sterilization, childless couples receive no money if they remain childless, receive Rs. 500 if they have a daughter, and receive Rs. 200 if they have either a son or two daughters. One-girl couples receive Rs. 500 if they stop childbearing and receive Rs. 200 if they have a second girl and then become sterilized. The only way one-boy or two-girl couples can receive benefits is if they do not have any more children. For couples that are at different points in their fertility path in 2002, Devi Rupak can, thus, be considered an exogenous shock that differentially alters their incentives for subsequent births and sex-selection.

Table 1—Devi Rupak's incentives by the composition of prior living children

	Monthly benefits (in Rupees) receivable upon sterilization if:			
↓ *Prior living children*	**No more births** (1)	**One more girl** (2)	**One more boy** (3)	**Two more girls** (4)
Childless		500	200	200
One girl	500	200		
One boy	200			
Two girls	200			

Note: This table shows the monthly incentive receivable by couples that are childless (first row), have one girl (second row), have one boy (third row), or have two girls (fourth row) if they become sterilized without any more births (1), after giving birth to one more girl (2), to one more boy (3), or to two more girls (4). No benefits are available to the others.

For a woman i in state s in year t, I adopt the following DD estimation framework:

$$Y_{ist} = \alpha + \beta Hry_s * Post_t + \mathbf{X}_{it}^{'}\delta + \gamma_s + \theta_t + \phi_s * t + \epsilon_{ist} \tag{1}$$

where Y_{ist} is the outcome of interest, such as an indicator for having only one child in year t; Hry_s is an indicator for residence in Haryana;[25] $Post_t$ equals one if $t > 2002$, and is zero otherwise; and $\mathbf{X}_{it}$ is a vector of covariates that comprises woman i's years of schooling, indicators for her religion, caste, residence in an urban area, age in year t, and the household standard of living. Specification (1) also includes fixed-effects for state (γ_s) and year (θ_t), as well as state-specific linear time trends ($\phi_s * t$). The coefficient of interest, β, measures the effect of Devi Rupak on the outcome of interest for women in Haryana relative to other states before and after 2002.[26]

However, even though I have microdata on individuals, the effective sample size for this analysis is the number of state-year combinations since the regressor of

[25]Since the survey only provides information about the state of residence at the time of interview, I am assuming that a woman lived in the same state for the entire duration of her marriage. This might seem like an unreasonable assumption, but in practice, inter-state migration in India is low and mostly consists of women relocating as a result of marriage. I would expect migration to be even lower for women that have already given birth to their first child.

[26]All regressions are unweighted.

interest, $Hry_s * Post_t$, varies at the state-year level; ignoring this aspect of the data can lead to misleading standard errors (Moulton (1986), Moulton (1990)). Additionally, although the number of observations within each state-year cell is quite large, the number of states in my sample is relatively small and only one state is treated.[27] I follow three approaches to deal with these issues.

First, I aggregate microdata to the state-year level and estimate a version of equation (1):

$$Y_{st} = \alpha + \beta Hry_s * Post_t + \mathbf{X}_{st}^{'}\delta + \gamma_s + \theta_t + \phi_s * t + \epsilon_{st} \quad (2)$$

where Y_{st} and X_{st} are, respectively, the means of Y_{ist} and X_{it} in a state-year cell. For instance, the Hindu dummy in (1) is replaced in (2) with a control for the fraction of women that are Hindu in a state-year cell. The standard errors from this grouped estimation are likely to be more reliable than clustered standard errors in samples with few clusters (Angrist and Pischke (2009)).

Second, I estimate β using the two-step method suggested by Donald and Lang (2007) ("DL method"). In step 1, I construct covariate-adjusted state-year effects by regressing Y_{ist} on $\mathbf{X}_{it}$ and a full set of state-year dummies. The estimated state-year effects are thus group means adjusted for differences in microcovariates. In step 2, I regress the estimated state-year effects on $Hry_s * Post_t$, state dummies, year dummies, and state-specific linear time trends. Step 2 is estimated using feasible generalized least squares (FGLS) incorporating a heteroskedastic error structure with cross-sectional correlation and panel-specific AR(1) autocorrelation process. Inference is based on a t-distribution with eight degrees of freedom.

Third, I use the *synthetic control method* proposed by Abadie and Gardeazabal (2003) and Abadie, Diamond and Hainmueller (2010) to construct a *synthetic*-Haryana that best approximates the relevant characteristics of Haryana during the pre-treatment period. I then use the post-intervention outcomes for this synthetic control state to approximate the outcomes that would have been observed for Haryana in the absence of Devi Rupak. The "donor pool" comprises 17 major Indian states.[28] In order to conduct the analysis at an aggregate level, I collapse the individual-level panel data into a state-year panel. To predict the outcome variables at the state-year level, I use the average years of schooling, age, and age at marriage for women along with the proportion of women that reside in an urban area, are Hindu, Muslim, Christian, SC, ST, and that belong to low- and high-SLI households. This method is considered suitable for impact evaluation of a treatment that affects only a few observational units (Cameron and Miller (2014)).

The first set of outcome variables comprises the number of living children, sons,

[27]Despite few states, under certain conditions, β may still be precisely estimated by using state-level clustering since there are many observations per state (Bester, Conley and Hansen (2011), Cameron and Miller (2014)).

[28]In terms of the current classification of states, these represent 20 states.

and daughters, as well as indicators for specific child compositions, i.e., only one child, only one boy, only one girl, only two girls, and other compositions. One advantage of using indicators like "only one son" as outcomes (as opposed to separate dummies for birth and child's sex conditional on birth) is that they capture Devi Rupak's combined effect on fertility and sex-selection since these decisions are jointly made.

Besides estimating the effects on the "stock" of children, I also examine how Devi Rupak impacts "flow" variables, such as the probability of a marginal birth and its sex (conditional on birth), differentially by the child composition of a couple at Devi Rupak's announcement. I assign each woman in year t to one of the following five groups based on the number and the sex composition of her surviving children in $t-1$: *No living children* ($g_{i,t-1} = 1$); *One boy only* ($g_{i,t-1} = 2$); *One girl only* ($g_{i,t-1} = 3$); *Two girls only* ($g_{i,t-1} = 4$); and *Other compositions* ($g_{i,t-1} = 5$). Then, I estimate the effect of Devi Rupak on the probability of birth and the likelihood of a male birth in year t using specification (2), separately for each of these five groups. To ensure that group affiliation is defined using a couple's child composition in a pre-Devi Rupak year and is free of any change that takes place due to the program, I restrict the sample to $t \leq 2003$.[29] For instance, the β coefficient from the birth regression for the $g_{i,t-1} = 1$ sub-sample measures the effect of Devi Rupak on the likelihood of a first birth in 2003 for couples in Haryana that were childless last year (i.e., 2002), relative to similar couples in control states and in pre-Devi Rupak years.

Identifying assumption: The coefficient β is identified under the assumption that, in the absence of Devi Rupak, the outcomes of women in Haryana would have followed the same trend as that of similar women in control states. To test if Haryana and the control states had similar pre-Devirupak trends, Figure 3 shows the evolution of total fertility rate and child sex ratio in these states using data from the Census and the Sample Registration System of India. The trends appear broadly parallel.[30] Additionally, in Table 2, I test for the presence of significant socioeconomic differences between Haryana and the control states in the pre-program years. Column (3) of Table 2 shows that the control group of states is, on average, well-matched with Haryana in terms of almost all socioeconomic characteristics that are likely to matter for fertility outcomes. Women in the control states are, relative to women in Haryana, slightly more likely to have only one girl before Devi Rupak, but they are not significantly different in terms of

[29]This is because Devi Rupak introduces a *sequence* of treatments as opposed to multiple static treatments. Consequently, conditioning on past fertility can bias the estimates of treatment effect (Lechner and Miquel (2010)). To illustrate, if Devi Rupak causes couples to be more or less likely to select the sex of their first child, then comparing higher birth order outcomes of women whose first child was born before and after Devi Rupak in Haryana will lead to biased estimates. More generally, this problem arises because the variable $g_{i,t-j}$ is affected by the program when $t-j > 2002$. To ensure that my estimates are not biased by this selection that occurs *due to* the treatment itself, I compare the marginal fertility outcomes in t separately by group affiliation in $(t-1)$ only for $t \leq 2003$.

[30]Appendix Figure A.1 plots the differences between the trends for Haryana and the control states. Appendix Figure A.2 replicates Figure 3 for the estimation sample.

the number of living children (boys and girls) and the probability of having only one boy in a given year.

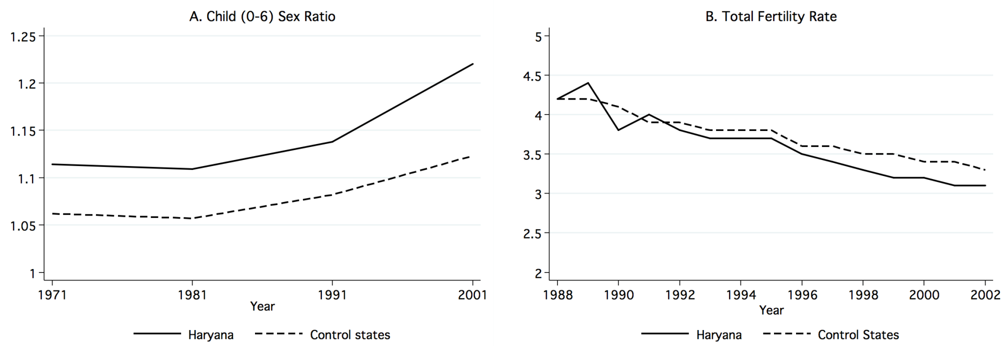

Figure 3. Pre-trends in fertility and child sex ratio in Haryana and control states

Note: For control states, a simple average of state-level total fertility rates or child sex ratios has been plotted. Source: Census and Sample Registration System of India.

Nevertheless, to ensure that my estimates of the effects of Devi Rupak are not confounded by any pre-existing differences in socioeconomic characteristics between the Haryana and the non-Haryana samples, I control for variables such as religion, caste, standard of living, years of schooling, and residence in an urban area in my regressions. To take into account state-specific time-invariant factors, I include state fixed-effects and also control for state-specific time trends. Later, I show that the results do not change when I exclude one control state at a time or use the synthetic control method to construct a *synthetic*-Haryana that closely matches Haryana in terms of pre-intervention characteristics relevant for my outcome variables.

Before I proceed to the results, a few points must be noted. First, although I know the month in which Devi Rupak was introduced (September 2002), I define $Post_t$ at the year level as $t > 2002$. This is because births that took place during October-December 2002 were conceived before the program was initiated and are unlikely to have been affected by it. It is improbable that mothers aborted late-term pregnancies in these months due to the health risks involved. Second, one of the eligibility conditions of Devi Rupak is that neither the husband nor the wife should be an income-tax payer. Unfortunately, my data does not provide information on income, and hence there is no direct way of determining the taxpayer status of a couple. However, the number of income-tax payers in India is small due to several exemptions.[31] Moreover, tax evasion is widespread. For these reasons, it is unlikely that the income-tax status of a

[31] According to Banerjee and Piketty (2005), incomes below the top 1 percent are largely exempt from taxation in India.

couple is a strictly enforced or a binding condition for eligibility. Lastly, Devi Rupak also requires that the husband and the wife should be less than 45 and 40 years old, respectively, on the date of sterilization, presumably to target couples that are still in their fertile years. Since more than 80 percent of sterilized couples undergo the operation before the wife is 30 years old, and 93 percent of births in my sample take place before the mother is 31 years old, age is also unlikely to be a binding criterion. Later, I analyze heterogeneity in the effects by woman's age instead.

Table 2—Sample means before Devi Rupak using state-year panel

	Non-Haryana (1)	Haryana (2)	Difference (3) = (1)-(2)
Birth dummy	0.162	0.154	0.008
First birth is male	0.517	0.524	-0.007
# Living children	2.495	2.520	-0.025
# Living boys	1.308	1.348	-0.040
# Living girls	1.187	1.172	0.014
# Only one boy	0.092	0.087	0.006
# Only one girl	0.077	0.071	0.005*
Sterilized	0.436	0.470	-0.034
Wife's age at survey	32.463	32.213	0.250
Husband's age at survey	33.449	32.934	0.516
Wife's age at marriage	17.742	17.610	0.132
Scheduled Caste	0.191	0.214	-0.023
Other Backward Castes	0.293	0.295	-0.003
Hindu	0.809	0.898	-0.088
Muslim	0.078	0.040	0.038*
Sikh	0.083	0.059	0.024
Urban	0.403	0.296	0.107
Wife's years of schooling	4.557	4.238	0.319
Husband's years of schooling	7.307	7.423	-0.115
Low HH Standard of Living	0.314	0.169	0.145*
High HH Standard of Living	0.355	0.388	-0.033
Ideal number of children	2.404	2.399	0.005
Ideal number of boys	1.206	1.287	-0.081
Ideal number of girls	0.876	0.888	-0.012
Mother's age at birth	23.510	22.826	0.684**
N	64	8	72

Note: The sample is restricted to years $\leq$ 2002. The ideal number of children, schooling, standard of living index, and sterilization rates are measured at the time of survey. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

IV. Results

A. Effects on Child Composition

First I estimate the effect of Devi Rupak on the "stock" of a couple's children. The theoretical model in the Online Appendix predicts that women in Haryana should be more likely to have only one child due to Devi Rupak. This effect is predicted to be driven by (a) a decrease in marginal fertility of one-child transitional couples and (b) a higher likelihood of couples that were childless in 2002 to stop childbearing after their first birth since remaining childless or having more than one child yield lower benefits. If one-boy transitional couples experience a larger decline in marginal fertility and if sex-selection at first birth increases, then the increase in one-child outcome should also coincide with a larger increase in the proportion of one-boy couples relative to one-girl couples. Indeed, this is what I find.

Table 3—Effects on child composition

Dependent Variables →	One child	One boy	One girl	Two girls	No children	Other compositions
	(1)	(2)	(3)	(4)	(5)	(6)
A: Micro data						
$Hry * Post$	0.0058	0.0036	0.0022	0.0009	-0.0044	-0.0024
	[0.0016]***	[0.0011]**	[0.0008]**	[0.0006]	[0.0017]**	[0.0026]
	(0.0057)	(0.0035)	(0.0022)	(0.0010)	(0.0044)	(0.0032)
N			2,146,857			
B: Aggregate data						
$Hry * Post$	0.0115***	0.0095***	0.0021	0.0042**	-0.0130***	-0.0028
	[0.0049]	[0.0035]	[0.0028]	[0.0020]	[0.0048]	[0.0068]
N			99			

Note: This table reports the β coefficients from specification (1) in panel A and from specification (2) in panel B. Each cell corresponds to a different regression. Each regression includes fixed effects for states and years, a vector of socioeconomic and demographic covariates, and state-specific linear time trends. Individual-level data is collapsed to the state-year level for panel B and regressions are weighted by cell size. Robust standard errors are in brackets and are clustered by state in panel A. Wild cluster bootstrapped standard errors clustered by state are in parentheses in panel A. Other compositions comprise more than two children or two children with one boy and one girl. Covariates are (state-year averages in panel B) woman's age and years of schooling, indicators for residence in an urban area, household's religion (Hindu, Muslim, Sikh, Christian), caste (SC and ST) and standard of living index (Low and High). *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3 reports the β coefficients from specifications (1) and (2), in panels A and B respectively, using indicators for specific child compositions as the outcome variables. In each regression, I control for socioeconomic covariates, for state and year fixed-effects, and for state-specific linear time trends. Column (1) shows that Devi Rupak significantly increased the proportion of one-child couples by 0.6 to 1 p.p.. In columns (2) and (3), the coefficients for one-boy and one-girl outcomes are also positive; however, the magnitude is larger and more significant for the one-boy outcome. The coefficients in panel B imply that while the proportion of one-boy couples significantly increased by 1 p.p. (an 11 percent increase from a baseline of 8.7 percent), the rise for one-girl couples was 0.2 p.p. and insignificant. The coefficient for the two-girls outcome is small relative to the one-boy coefficient, insignificant in panel A but significant in panel B, suggesting that the Rs. 200 incentive is not as effective in inducing couples to have only two daughters. Since Devi Rupak provides no incentives for a couple to remain childless or to have any other composition of boys and girls, the coefficients in columns (5) and (6) are consistent with negative effects.

In Table 4, I estimate the effect of Devi Rupak on child composition using the DL method described earlier. The results are broadly consistent with Table 3. I find that the proportion of one-child and of one-boy couples significantly increases. The coefficients for one-girl and two-girl outcomes are also positive and significant, albeit much smaller in magnitude than the effect on the one-boy outcome. As before, the likelihood of childlessness and of other compositions significantly declines. The coefficient magnitudes from the DL method (that uses microdata in step 1 and aggregate data in step 2) are similar to those estimated using microdata in panel A of Table 3 and are, in general, smaller than the coefficients in panel B of Table 3 that are estimated using only aggregated data.

Table 4—Effects on child composition, Donald-Lang (DL) method

Dependent Variables →	One child	One boy	One girl	Two girls	No children	Other compositions
	(1)	(2)	(3)	(4)	(5)	(6)
$Hry * Post$	0.0038**	0.0027**	0.0012*	0.0012***	-0.0037***	-0.0012**
	[0.0018]	[0.0009]	[0.0006]	[0.0003]	[0.0008]	[0.0005]
N			99			

Note:
This table reports the β coefficients estimated using the two-step DL procedure described in Section III. Each cell corresponds to a different regression. In step 1, I construct covariate-adjusted state-year effects by regressing Y_{ist} on $X_{it}^{'}$ and a full set of state-year dummies where the covariates are woman's age fixed effects, years of schooling, indicators for residence in an urban area, household's religion (Hindu, Muslim, Sikh, Christian), caste (SC and ST) and standard of living index (Low and High). In step 2, I regress the estimated state-year effects on $Hry_s * Post_t$, state dummies, year dummies, and state-specific linear time trends. Step 2 is estimated using feasible generalized least squares (FGLS) incorporating a heteroskedastic error structure with cross-sectional correlation and a panel-specific AR(1) autocorrelation process. Inference is based on a t-distribution with eight degrees of freedom. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Next I conduct a graphical event-study analysis in Figure 4 to further analyze the effect of Devi Rupak on the likelihood that a woman reports a particular child composition in a year. For this analysis, I replace the $Hry_s * Post_t$ dummy in specification (2) with interactions of Hry_s with year dummies while everything else remains the same.[32] The plotted coefficients show the trends in the child

[32]Specifically, Figure 4 plots the β_k coefficients from the following regression, with 2002 as the omitted year: $Y_{st} = \sum_{k=1995}^{2005} \beta_k Hry_s * 1[Year_t = k] + X_{st}^{'}\delta + \gamma_s + \theta_t + \phi_s * t + \epsilon_{st}$.

composition of married couples in Haryana relative to other states, after controlling for socioeconomic characteristics, for state and year fixed-effects, and for state-specific linear trends. The outcome variables are indicators for only one boy and only one girl. The separate event-study graphs for Haryana and the control states are presented in Appendix Figure A.3.

FIGURE 4. DIFFERENTIAL TRENDS IN CHILD COMPOSITION, HARYANA VS NON-HARYANA, PRE- VS POST-2002

Note: This figure plots the β_k coefficients from the following regression, with 2002 as the omitted year: $Y_{st} = \sum_{k=1995}^{2005} \beta_k Hry_s * 1[Year_t = k] + \sum_{k=1995}^{2005} \theta_k 1[Year_t = k] + X'_{st}\delta + \gamma_s + \phi_s * t + \epsilon_{st}$. Dashed lines are the 95 percent confidence intervals. The dependent variables are indicators for a woman having only one girl and only one boy in a year.

There are no noticeable trends in the differential likelihood of a particular child composition immediately before 2002.[33] This lack of significant differences in the years prior to Devi Rupak provides an important test for the validity of the identifying assumption; the trends in outcomes across comparison groups evolve smoothly except through the change in incentives in 2002. After 2002, there is an increase in the likelihood that a woman has only one boy; but the change in the one-girl outcome is not as large or as persistent despite the higher incentive for one-girl couples. Appendix Figure A.3 confirms that the rise in the proportion of one-boy couples is driven by a relatively larger increase in Haryana during the post-2002 years, and not by any change in the control states. These graphs are thus consistent with the results presented in the previous tables.

The effects on child composition also translate into a decline in fertility. The coefficients in Table 5, estimated using the DL method, show that Devi Rupak led to a significant decline in the number of children that is primarily driven by a significant decline in the number of living girls. There is no concurrent decline in the number of living boys according to this specification. Consequently, the proportion of boys among living children also significantly increases. The

[33]The same is true for the two-girls outcome, the graph for which is available upon request.

coefficients in columns (3) and (4) translate into a 0.3 percent decline in fertility and a 0.2 percent increase in the proportion of sons among living children in Haryana. Although these effects appear small in magnitude, note that these estimates are based on specifications that include the entire sample, i.e., both women that are likely to have been affected by Devi Rupak, as well as women that had pre-existing child compositions (such as a boy and a girl) that were not treated by the program. Therefore, in the next section, I estimate the impacts on marginal fertility and on the sex ratio of marginal births for the sub-samples of women that were in fact treated by Devi Rupak.

Table 5—Effects on fertility and child sex ratio, Donald-Lang (DL) method

Dependent Variables →	# Living boys	# Living girls	# Living children	Proportion of boys
	(1)	(2)	(3)	(4)
$Hry * Post$	0.0017	-0.0107**	-0.0073**	0.0033**
	[0.0011]	[0.0038]	[0.0025]	[0.0010]
N		99		

Note: This table reports the β coefficients estimated using the two-step DL procedure described in Section III and Table 4. Each cell corresponds to a different regression. Robust standard errors are in brackets. Inference is based on a t-distribution with eight degrees of freedom. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Lastly, I use the synthetic control method to construct Figure 5. The outcome variables are the proportion of couples that have only one boy, have only one girl, or have only two girls and the number of living children, of living boys, and of living girls per couple in a state-year. The graphs show that *synthetic*-Haryana closely resembles Haryana in terms of pre-2002 prevalence of various child compositions and the number of children.[34] For each outcome, the estimate of the effect of Devi Rupak is given by the difference between the solid line and the dashed line after 2002. Similar to my earlier findings, there is a noticeable divergence in the two lines after 2002 for the "only one boy" outcome, but not for the one or two girls outcomes. Similarly, there is a noticeable decline in the number of living children, that is driven by a larger decline in the number of living girls than in the number of living boys.[35]

B. Effects on Marginal Births

Table 6 presents estimation results for two outcome variables: in columns (1) and (2), the dependent variable is an indicator that equals one if a woman gives birth in a year and zero otherwise; in columns (3) and (4), the sample is restricted

[34]Consistent with my empirical strategy, northern and north-western control states receive the most weight in the construction of *synthetic*-Haryana.

[35]Note, however, that the divergence of the trend in Haryana from the trend in synthetic-Haryana begins a little before 2002 in panels A and E.

to years when a birth takes place and the outcome variable is an indicator for the birth being male. The estimates in this table compare the change in the probability of a marginal birth (or the likelihood of a marginal birth being male) in year t, before and after 2002, in Haryana and non-Haryana separately for couples that differ by the composition of children in year $(t-1)$. The sample is restricted to years until and including 2003, i.e., the coefficients measure the effect of Devi Rupak in the first year of implementation, conditional on the child composition in year $(t-1)$ which is pre-determined. For each outcome, I present results from two specifications. Columns (1) and (3) include fixed-effects for states and years, and in columns (2) and (4), I also control for state-specific linear time trends.

According to the theoretical model, couples in Haryana that had one child when Devi Rupak was implemented should be less likely to have subsequent births. The same result is expected to hold for couples with two daughters, although the model does not explicitly solve for this case. The first row of columns (1) and (2) shows that, conditional on having only a son in year $(t-1)$, couples in Haryana are less likely to have another child in year t after Devi Rupak relative to the control group. The coefficients are negative, significant, and imply that Devi Rupak decreased the likelihood of a subsequent birth by 1 to 2 p.p. or by 4 to 7 percent from a baseline probability of 28 percent for one-boy transitional couples. Although it is possible that this decrease merely reflects a postponement of higher parity births and not necessarily a decrease in completed fertility, in Section IV.D, I show that this decline is also accompanied by an increase in the probability of sterilization, which is consistent with a decrease in completed fertility for one-boy families.

However, for one-girl couples in the second row and childless couples in the third row, the effect on marginal births is positive. For the remaining parents, the coefficients are either insignificant or positive in the last row.[36] The positive effect on the likelihood of birth for couples that were childless when Devi Rupak was implemented is consistent with the decline in the proportion of childless couples in Tables 3 and 4. A lack of incentive to remain childless may encourage: (a) couples that would have remained childless in the absence of incentives to have at least one child, and (b) those that had not started childbearing by 2002 to have their first birth relatively earlier in order to start receiving the benefits sooner. Both these channels are consistent with the positive effect in the third row of columns (1) and (2), although there are very few couples in the data that desire to remain childless, making (b) a more likely explanation. The higher likelihood of birth for one-girl couples is puzzling, however. It can potentially be explained by the presence of incentives for two girls since, at the margin, the availability of two-girl incentives lowers the cost of a second pregnancy without sex-selection (in

[36] In this table I have pooled the two-girl couples ($g_{i,t-1} = 4$) with those that had other compositions ($g_{i,t-1} = 5$). This is because the two-girl group is quite small, and as a result, STATA is unable to estimate β when fixed effects are included in the specification.

Table 6—Effects on marginal births, Donald-Lang (DL) method

	Outcome in t:			
	Birth = 1		**Male Birth = 1**	
Composition in $t-1\downarrow$	(1)	(2)	(3)	(4)
One boy	-0.0234***	-0.0115**	0.0590***	0.0645***
	[0.0030]	[0.0044]	[0.0068]	[0.0079]
N		72		
One girl	0.0079***	0.0177***	0.0194*	0.0188***
	[0.0017]	[0.0047]	[0.0096]	[0.0008]
N		72		
No children	0.0137**	0.0329***	0.0120***	0.0049*
	[0.0056]	[0.0004]	[0.0035]	[0.0026]
N		81		
Rest	0.0006	0.0041***	-0.0729***	-0.0911***
	[0.0016]	[0.0005]	[0.0063]	[0.0020]
N		81		
Linear state trends		x		x

Note: This table reports the β coefficients estimated using the two-step DL procedure, described in Section III and Table 4, separately for subsamples based on the child composition at the end of $(t-1)$. The sample is restricted to $t \leq 2003$. Each cell corresponds to a different regression. Robust standard errors are in brackets. Inference is based on a t-distribution with eight degrees of freedom. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

terms of the "risk" of a second girl) for one-girl couples, thereby increasing the probability of a second birth. But this explanation is inconsistent with the effect on the sex ratio of second birth for one-girl couples that I describe below.

Thus, the results in columns (1) and (2) of Table 6 show that one-boy couples are significantly more likely to stop childbearing as compared to one-girl couples despite a higher incentive to stop for the latter. This finding suggests that couples in Haryana, on average, have a strong son preference and their cost of children is high relative to the cost of sex-selection.

My theoretical model also predicts that, conditional on having one child before the program, couples that choose to have another child after the program should be more likely to practice sex-selection, i.e., if there is a marginal birth for one-child couples, it is more likely to be male. This is because couples that choose to forgo the one-child incentives and select into a second pregnancy have a stronger son preference and, hence, are more likely to sex-select. This finding is also borne out by the results in columns (3) and (4) of Table 6. The coefficients for one-boy and one-girl couples are positive and significant. However, the increase is smaller for one-girl couples relative to one-boy couples. This pattern reflects that at least some one-girl couples experience a smaller increase in the use of ultrasound technology for second pregnancies due to the availability of two-girl incentives. The second pregnancy is, respectively, 6 p.p. and 2 p.p. more likely to be male for transitional one-boy and one-girl couples.

The third row of columns (3) and (4) in Table 6 shows that births to couples that were childless at the start of Devi Rupak are more likely to be male even as early as the first year of implementation. The coefficients are positive, significant, and imply that first births are about 0.5 to 1.2 p.p. or 1 to 2.3 percent more likely to be male. Prior literature (Bhalotra and Cochrane (2010)) finds that sex-selective abortions in India take place at higher parities and the sex ratio at birth for first-borns is not significantly above normal. But Devi Rupak's incentive structure, in an attempt to promote a one-child norm, makes the sex-selection decision salient at first birth for couples that have strong preference for sons, thereby increasing the sex ratio at first birth.

To the extent that there is greater sex-selection due to Devi Rupak among first births, I expect the time interval between marriage and first birth to increase simply because conception, abortion, and re-conception take time. Each abortion delays the next birth, at the minimum, by a year (Bhalotra and Cochrane (2010)). On the other hand, couples may start planning births sooner in order to hasten the receipt of benefits. To examine which of these effects dominates, I compare the interval between marriage and first birth before and after 2002 in Haryana, relative to other states, using a version of specification (2). To prevent any composition bias, I exclude women whose age at marriage was less than 13 years or whose first child was born more than ten years after marriage. The results are presented in Appendix Table A.2. Panel A uses microdata and panel B uses aggregate data. The dependent variables are indicators for first birth in the j^{th} year of marriage, where $j = 0, 1, 2, 3$.[37] Before Devi Rupak, 20, 34, and 21 percent of first births in Haryana took place in the first, second, and third year of marriage, respectively. After Devi Rupak, first births are significantly less likely to take place in the first year of marriage and more likely to take place in the second year. The delay becomes larger when I exclude women that were married before 2002 but gave birth to their first child after 2002 (panel A1). These results lend support to the findings from Table 6 that imply an increase in the practice of sex-selection for first-borns.

The coefficients for the sex ratio of marginal births for the remaining couples are surprisingly large, however. There appears to be a small increase in the probability of childbearing for this group in the first year post-Devi Rupak that seems to be driven by an increase in female births in columns (3)-(4).[38]

On the whole, my results suggest that Devi Rupak has caused couples to have fewer children, but mainly in order to have just one son. The decrease in the

[37]The reason I measure the gap in years is because DLHS-2 does not report the month of marriage, making year the finest level at which the timing of first birth can be measured.

[38]A selection-based explanation—wherein two-girl families that continue on to another birth by giving up the two-girl incentives have a stronger son preference than those that do not—would imply positive coefficients in columns (3)-(4) and not negative effects. An alternate explanation for this pattern could be selection in terms of fertility preferences if two-girl families that continue childbearing have a higher desired fertility rate but not a stronger son preference than those that stop childbearing.

number of children is driven by a decline in the number of daughters. As described in Section III, estimation using data aggregated at the state-year level is superior to woman-year level estimation since Devi Rupak is a state-year level policy intervention. Having shown that both methods yield qualitatively similar results, henceforth I focus only on estimation using aggregated data, i.e., using specification (2).

C. Heterogeneity

I start by examining heterogeneity in the effects of Devi Rupak by a woman's age. I divide my sample into three age-groups and estimate specification (2) separately for each of them. The main findings from Appendix Table A.3 are as follows. Firstly, the overall increase in the one-boy outcome is being mainly driven by women 21-30 years old. The coefficient in the first row of column (2) is positive and highly significant. On the other hand, the effect is small and insignificant for women younger than age 20 or older than age 30. This seems reasonable since Devi Rupak's incentives are available only for the first two births and most women in India give birth to their first child before they are 30 years old. Secondly, women nearing the end of their fertile years (30-44 age group) are significantly less likely to remain childless and are more likely to have one or two girls. This suggests that, at the margin, the one-girl and the two-girls options induce women that would have always aborted female fetuses in the absence of incentives to have one or two daughters instead. However, since only a small percentage of women are childless, especially due to repeated sex-selective abortions, by the time they are 30-44 years old, this increase is insufficient to result in a large rise in the proportion of one-girl or two-girl couples overall.

Next I analyze heterogeneity in the effects of Devi Rupak on the one-child outcomes by mother's caste, religion, urban residence, education, and employment status (Appendix Table A.4). The proportion of one-child couples significantly increases among Hindus, among OBCs, among women that have 1-5 years of education, and among women that are employed. However, there is variation in whether this increase in one-child status is driven by a rise in the one-boy or the one-girl outcome. Hindus and women that have 1-5 years of education exhibit a higher likelihood of only one boy. These effects are consistent with stronger son preference among Hindus and the greater awareness of and access to ultrasound and abortion clinics among relatively more educated women. In terms of caste status, all groups experience an increase in the one-boy outcome, with the largest effects on OBCs that also show an increase in the one-girl outcome, albeit of a smaller magnitude than the one-boy increase. The proportion of one-girl couples also increases for urban women and women that are employed. Haryana is a predominantly agricultural state, hence it is not surprising that urban households exhibit outcomes more favorable to women as agricultural employment in north India is relatively unfavorable to female labor (Carranza (2015)) and sons are more valuable to rural families that own agricultural land.

I also examine heterogeneity by a woman's self-reported "ideal" proportion of sons to further assess the role played by son preference in determining the effectiveness of incentives.[39] Self-reports of the desired number of sons and daughters may be highly correlated with actual fertility to avoid cognitive dissonance. Unfortunately, I only have access to ex-post information on this variable from the year of survey since my dataset is a retrospective panel.[40] Nevertheless, in the absence of better alternate measures, recent literature (Jayachandran and Kuziemko (2011)) has used reported ideal number of children and of sons as proxies for fertility and son preference. Only a negligible fraction of women in my sample would ideally remain childless, while most prefer to have two children. Among women that desire at least one child, the average ideal proportion of sons is greater than half, reflecting positive son preference. The results in Appendix Table A.5 show that the increase in the one-boy outcome is larger for women that want more than half of their children to be sons, although the coefficients are insignificant in both columns. Moreover, the two-girl outcome increases for women in column (1) that have a relatively weaker son preference, further highlighting the role of son preference in explaining my findings.

D. *Effects on Contraceptive Use*

Since the receipt of Devi Rupak's benefits is conditional on no further births, next I examine its effect on contraceptive use. To the extent that couples start receiving the benefits only after they are sterilized, I expect sterilization rates to increase after Devi Rupak.[41] However, if the risk of mortality for infants and children is high enough, couples may now wait longer to ensure that their only child survives. The under-five child mortality rate in Haryana is about 60 deaths per 1000 live births suggesting that the survival of an only child may be an important concern for couples deciding on when to become sterilized. This is probably why Devi Rupak allows couples to wait for up to five years from the birth of their last child before getting operated, despite the fact that almost every sterilization procedure before 2002 took place within a year of last birth. Therefore, I examine the impact of Devi Rupak on both sterilization and any modern method of contraception; the latter captures couples that have changed their fertility behavior due to Devi Rupak but are potentially waiting to get sterilized and are meanwhile using the pill or condoms, for example.

[39] Ideal proportion of sons = $\frac{ideal_{boys}+(0.5*ideal_{either})}{ideal_{kids}}$ if $ideal_{kids} > 0$, where $ideal_{boys}$ is the ideal number of boys, $ideal_{either}$ is the ideal number of children of either sex, and $ideal_{kids}$ is the ideal number of total children as reported by a woman.

[40] DLHS-2 did not collect this information.

[41] Sterilization is a widely prevalent method of contraception in India and most couples that adopt this method do so at an early age. An average woman is 26 years old, has 3.3 children, and 1.8 sons at the time of sterilization. More than 80 percent of sterilized couples get operated before the wife is 30 years old. Couples are less likely to become sterilized if they do not have sons—only 5 percent of sterilized couples have no sons, whereas 19 percent have no daughters. The average gap between last birth and sterilization is 1.6 months.

I assess the effect of Devi Rupak on contraceptive use by comparing women interviewed before and after 2002 in Haryana, relative to other states, conditional on their child composition. Instead of using the woman-year panel, now I have one observation per woman and three repeated cross-sections that I aggregate up to the state-year-group level as earlier. The outcome variables are indicators for the couple being sterilized or using any modern method of contraception at the time of survey.[42] If Devi Rupak increases the probability of contraceptive use for couples with eligible child compositions, then women interviewed in Haryana after 2002 should display a higher likelihood of being sterilized as compared to similar women interviewed before 2002 in Haryana, relative to other states.

To examine these effects, I modify specification (2) by interacting the $Hry_s * Post_t$ variable with four indicators for child composition at the time of survey: one boy only, one girl only, two girls only, and two boys only. Women with any other ineligible composition are the omitted group. In addition to the triple-interaction terms, I include fixed-effects for state-group, state-year of survey, group-year of survey, state, year of survey, group, and controls for socioeconomic characteristics, woman's age, and her marital duration in the year of survey. Columns (1) and (2) in Appendix Table A.6 suggest that one-boy couples surveyed in Haryana after 2002 are 10 p.p. more likely to be using a modern contraceptive method and are 5 p.p. more likely to be sterilized relative to the control group. The coefficients for one-girl couples and two-girl couples are insignificant, however. These results are consistent with my earlier findings according to which one boy couples are the ones that decrease their marginal fertility and it is the proportion of one-boy couples that rises due to Devi Rupak. Reassuringly, the last row shows that there was no significant impact on two-boy couples, that were not treated by the program; this serves as a robustness check and confirms that my results are capturing the effect of Devi Rupak.

V. Robustness

So far, my analysis has used 2002 as the treatment year. However, Devi Rupak's rules underwent a revision in November 2003, so it is possible that 2003 is the more relevant cut-off for defining $Post$. To test this and to compare the effects before and after the revision, I define 2003 as the "transition" period and define $Post-Transition$ as $year > 2003$. Then I re-estimate specification (2) by replacing $Hry*Post$ with $Hry*Transition$ and $Hry*Post-transition$. Table 7 presents the results. Column (2) shows that couples are significantly more likely to have only one son not just during the transition period, but also after that. The other coefficients are also similar to previous findings.

Another concern about my empirical strategy may be that states like Delhi and Punjab are, for various reasons, not good controls for Haryana; e.g., Delhi

[42]Modern methods of contraception comprise, male or female sterilization, pills, condoms, intrauterine devices, diaphragms, and injections.

TABLE 7—EFFECTS USING DIFFERENT CUT-OFF DATES

Dependent Variables →	No children	One Boy	One Girl	Two Girls	Other combinations
	(1)	(2)	(3)	(4)	(5)
$Hry * Transition$	-0.0155***	0.0119***	0.0025	0.0033	-0.0022
	[0.0048]	[0.0031]	[0.0028]	[0.0020]	[0.0073]
$Hry * Post - transition$	-0.0113***	0.0078**	0.0017	0.0049**	-0.0031
	[0.0048]	[0.0033]	[0.0027]	[0.0020]	[0.0070]
N	99	99	99	99	99

Note: This table reports the coefficients for a version of specification (2) that replaces $Hry * Post$ with $Hry * Transition$ and $Hry * Post - transition$. Each column corresponds to a separate regression. $Transition$ indicates the year 2003. $Post - transition = 1$ if $year > 2003$, and zero otherwise. Robust standard errors are in brackets. All regressions are weighted by cell size. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

is largely an urban state, while Punjab's population is predominantly Sikh. Although I control for several socioeconomic characteristics that might systematically vary across states in all regressions, to ensure that the inclusion of any particular control state is not driving my results, I re-estimate specification (2) by dropping one control state at a time. Table 8 presents these results for the state-year aggregated data that are comparable to the estimates in panel B of Table 3. I continue to find an increase in the one-boy outcome that is significant in all columns except one. Moreover, in all cases I do not observe a significant effect on the one-girl outcome.

Next I conduct two placebo tests by first reassigning the intervention to alternate control states and then to pre-2002 years within Haryana.[43] If my results are truly capturing the causal effect of Devi Rupak, I should not find significant effects in these placebo regressions. Table 9 presents the results from the first placebo test. Since these laws are fictitious, a significant "effect" at the 5 percent level may be found roughly 5 percent of the time. There is only one cell for the one-boy outcome and one cell for the two-girls outcome where I find positive and significant effects like my main results in panel B of Table 3, which seems reasonable. Similarly, when I reassign the intervention to an alternate year before 2002 in Haryana (Table 10), there is one cell for the one-boy outcome and one for the one-girl outcome with a positive and significant effect.[44] These tests also lend support to my estimation strategy and make a causal interpretation more credible.

While I control for state-specific time trends, one might worry that my estimates are capturing the effect of other government programs that also target fertility and sex ratios. Since I include year fixed-effects in all regressions, my results are not driven by any programs implemented by the national government in 2002. However, it is still possible that alternate programs specific to a control state are

[43]I drop post-Devi Rupak years from the sample while conducting the second test.

[44]Note, however, that there are other significant coefficients in Tables 9 and 10 albeit, reassuringly, their signs are the opposite of what I find for the effects of Devi Rupak in Haryana.

Table 8—Robustness check: Control states excluded

	Control State Excluded							
	HP	MP	UP	Punjab	Rajasthan	Delhi	Gujarat	Maharashtra
Dependent Variables ↓	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Only one boy = 1	0.0104***	0.0096***	0.0115***	0.0047	0.0062*	0.0085**	0.0115***	0.0102**
	[0.0036]	[0.0034]	[0.0041]	[0.0036]	[0.0035]	[0.0038]	[0.0042]	[0.0047]
Only one girl = 1	0.0022	0.0027	0.0036	0.0001	0.0026	0.0019	0.0002	0.0008
	[0.0032]	[0.0026]	[0.0034]	[0.0029]	[0.0027]	[0.0026]	[0.0031]	[0.0047]
Only two girls = 1	0.0061***	0.0040***	0.0047***	0.0053***	0.0052***	0.0032*	0.0007	0.0006
	[0.0020]	[0.0015]	[0.0018]	[0.0025]	[0.0020]	[0.0017]	[0.0022]	[0.0036]
No children = 1	-0.0145**	-0.0100*	-0.0100*	-0.0193***	-0.0207***	-0.0148***	-0.0094*	-0.0076
	[0.0058]	[0.0052]	[0.0056]	[0.0046]	[0.0054]	[0.0054]	[0.0052]	[0.0073]
Other compositions = 1	-0.0043	-0.0063	-0.0099	0.0092*	0.0067	0.0013	-0.0030	-0.0040
	[0.0085]	[0.0080]	[0.0091]	[0.0046]	[0.0081]	[0.0067]	[0.0073]	[0.0100]
N	88	88	88	88	88	88	88	88

Note: This table reports the DD coefficients from specification (2) when control states are excluded one at a time. Each cell corresponds to a separate regression. Each regression includes fixed effects for states and years, a vector of socioeconomic and demographic covariates, and state-specific linear time trends. Robust standard errors are in brackets. Other compositions comprise more than two children or two children with one boy and one girl. Covariates are state-year averages for woman's age and years of schooling, indicators for residence in an urban area, household's religion (Hindu, Muslim, Sikh, Christian), caste (SC and ST) and standard of living index (Low and High). All regressions are weighted by cell size. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

confounding my results. There are two reasons why this is unlikely. First, my sample includes only years up to 2005 while most of the Devi Rupak-like programs in other states were introduced after 2008, e.g., Punjab's *Balri Rakshak Yojana* began in 2009. Secondly, I have already shown that my results are robust to the exclusion of any particular control state.

VI. Conclusion

This paper explores whether financial incentives can simultaneously decrease fertility and the sex ratio at birth. When son preference is strong, rewarding couples that have only one boy may increase the sex ratio through differential stopping behavior and sex-selection at first and second parities, *despite higher incentives for a girl relative to a boy.* I find, empirically, that this is indeed what happens in the case of Devi Rupak. The program lowers fertility, but increases the sex ratio at birth despite proactively attempting to lower both. The one-boy incentives being offered by Devi Rupak are sufficient to make couples forgo unwanted daughters, but the higher incentive for one-girl is insufficient to forgo a son. The demand for sons is, thus, less price-elastic than the demand for daughters in this context where sons are perceived as "better-quality" children.

In terms of policy implications, my results suggest that removing the one-

TABLE 9—PLACEBO TEST: REASSIGN INTERVENTION TO ALTERNATE STATES

Dependent Variables →	*No Children* = 1	*One boy* = 1	*One girl* = 1	*Two girls* = 1	*Other compositions* = 1
	(1)	(2)	(3)	(4)	(5)
$HP * Post$	-0.0056	-0.0063**	-0.0010	0.0011	0.0119
	[0.0052]	[0.0030]	[0.0020]	[0.0011]	[0.0071]
$MP * Post$	0.0115***	0.0033	-0.0006	-0.0038***	-0.0104***
	[0.0019]	[0.0017]	[0.0021]	[0.0012]	[0.0033]
$UP * Post$	-0.0004	0.0011	-0.0004	0.0018*	-0.0021
	[0.0029]	[0.0016]	[0.0013]	[0.0010]	[0.0042]
$Punjab * Post$	0.0151*	0.0159**	0.0044	-0.0037	-0.0317***
	[0.0087]	[0.0038]	[0.0038]	[0.0032]	[0.0082]
$Rajasthan * Post$	-0.0016	-0.0048**	0.0015	0.0009	0.0040
	[0.0036]	[0.0019]	[0.0022]	[0.0011]	[0.0054]
$Delhi * Post$	-0.0110	-0.0094**	0.0013	-0.0087***	0.0279***
	[0.0109]	[0.0039]	[0.0063]	[0.0029]	[0.0100]
$Gujarat * Post$	-0.0065	-0.0041*	-0.0048**	0.0018	0.0136**
	[0.0071]	[0.0023]	[0.0019]	[0.0026]	[0.0064]
$Maharashtra * Post$	-0.0047	-0.0016	0.0010	0.0004	0.0049
	[0.0029]	[0.0018]	[0.0017]	[0.0011]	[0.0040]
N	99	99	99	99	99

Note: This table reports the coefficients for $State * Post$ from specification (2) where $State$ is an indicator for residence in a comparison state and $State * Post$ replaces $Hry * Post$. Each cell corresponds to a separate regression. Each regression includes fixed effects for states and years, a vector of socioeconomic and demographic covariates, and state-specific linear time trends. Robust standard errors are in brackets. Other compositions comprise more than two children or two children with one boy and one girl. Covariates are state-year averages for woman's age and years of schooling, indicators for residence in an urban area, household's religion (Hindu, Muslim, Sikh, Christian), caste (SC and ST) and standard of living index (Low and High). All regressions are weighted by cell size. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

boy option from Devi Rupak will avoid the unintended increase in the sex ratio at first birth, but may also adversely affect the fertility decline.[45] Ultimately, the fertility-sex ratio trade-off will persist unless son preference weakens. As previously mentioned, the underlying reasons behind son preference could be many. If discrimination against girls is primarily cost-based, financial incentives can potentially be more effective than the results of this paper suggest, and the design of an optimal program is worthwhile to explore. In general, however, it is unclear whether economic development completely eliminates son preference. As Dahl and Moretti (2008) show, parents in the United States too prefer boys over girls and families with first-born daughters have inferior outcomes in terms of marital status, family structure, and fertility. On the other hand, if son preference is mainly taste-based, public policy interventions might need to focus on changing

[45]I utilize my theoretical model to derive predictions about the effects of two alternate incentive structures that have been adopted by more recent programs. I examine programs that do not reward parents that have only sons and instead provide benefits to those that have both a son and a daughter. Broadly, I find that, as compared to Devi Rupak, these alternatives are likely to be less effective in reducing fertility but may perform better in terms of avoiding the unintended increases in the sex ratio. Further details are in the Online Appendix.

Table 10—Placebo test: Reassign intervention to alternate years

Dependent Variables →	*No Children* = 1	*One boy* = 1	*One girl* = 1	*Two girls* = 1	*Other compositions* = 1
	(1)	(2)	(3)	(4)	(5)
$Hry * Post1995$	-0.0056***	-0.0017	-0.0002	-0.0004	0.0078**
	[0.0021]	[0.0027]	[0.0025]	[0.0013]	[0.0035]
$Hry * Post1996$	0.0006	-0.0061***	-0.0046**	0.0012	0.0090**
	[0.0041]	[0.0021]	[0.0014]	[0.0014]	[0.0036]
$Hry * Post1997$	0.0039	-0.0063***	-0.0029	-0.0018	0.0070
	[0.0044]	[0.0023]	[0.0023]	[0.0014]	[0.0049]
$Hry * Post1998$	0.0088***	-0.0031	0.0004	-0.0013	-0.0048
	[0.0023]	[0.0033]	[0.0025]	[0.0015]	[0.0058]
$Hry * Post1999$	0.0041	0.0015	0.0033***	-0.0018*	-0.0071
	[0.0047]	[0.0031]	[0.0012]	[0.0011]	[0.0048]
$Hry * Post2000$	0.0012	0.0046*	0.0021	-0.0008	-0.0072**
	[0.0040]	[0.0024]	[0.0017]	[0.0011]	[0.0035]
N	99	99	99	99	99

Note: This table reports the DD coefficients from specification (2). The sample is restricted to years before Devi Rupak, i.e. $year < 2002$. $PostT = 1$ if $year > T$, and zero otherwise. Each cell corresponds to a separate regression. Each regression includes fixed effects for states and years, a vector of socioeconomic and demographic covariates, and state-specific linear time trends. Robust standard errors are in brackets. Other compositions comprise more than two children or two children with one boy and one girl. Covariates are state-year averages for woman's age and years of schooling, indicators for residence in an urban area, household's religion (Hindu, Muslim, Sikh, Christian), caste (SC and ST) and standard of living index (Low and High). All regressions are weighted by cell size. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

social norms. Das Gupta et al. (2003) suggest that the recent decline in sex ratios in South Korea can be explained by a change in social norms. Lastly, to what extent these programs directly affect son preference (i.e., whether extrinsic incentives are complements or substitutes for intrinsic preferences) also remains an open question (Bowles and Polania-Reyes (2012)).

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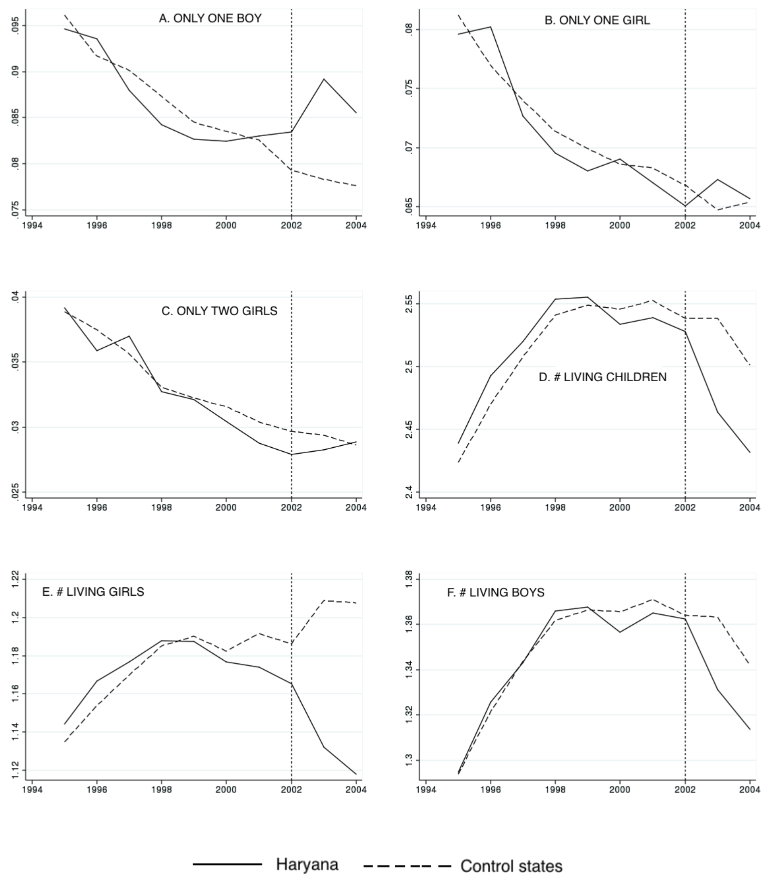

Figure 5. Trends in fertility and child composition, Haryana vs synthetic-Haryana, pre- vs post-2002

Note: This figure displays trends for Haryana and its synthetic counterpart during 1995-2005. The outcomes are the share of women that have only one boy, only one girl, only two girls, and the number of living children, boys, and girls per couple in any state-year. The predictor variables are average years of schooling, age, and age at marriage for women, and the proportion of urban, Hindu, Muslim, Christian, SC, ST, low-SLI and high-SLI women. The corresponding weights assigned to each state in the donor pool are available upon request.

Appendix: Figures and Tables

Figure A.1. Differential pre-trends in Haryana and the control states

Note: These figures plot the differences between the pre-Devirupak child (0-6) sex ratio (Panel A) and total fertility rate (Panel B) in Haryana and the control states, as graphed in Figure 3. Source: Census and Sample Registration System of India.

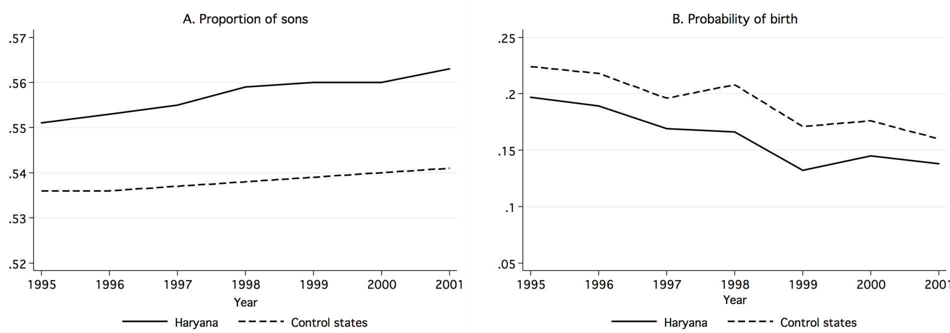

Figure A.2. Pre-trends in fertility and sex ratio in Haryana and control states

Note: These figures plot the pre-Devi Rupak trends in the yearly average of the proportion of sons and the probability of birth in a given year for the 1995-2001 sample period for Haryana and the group of control states.

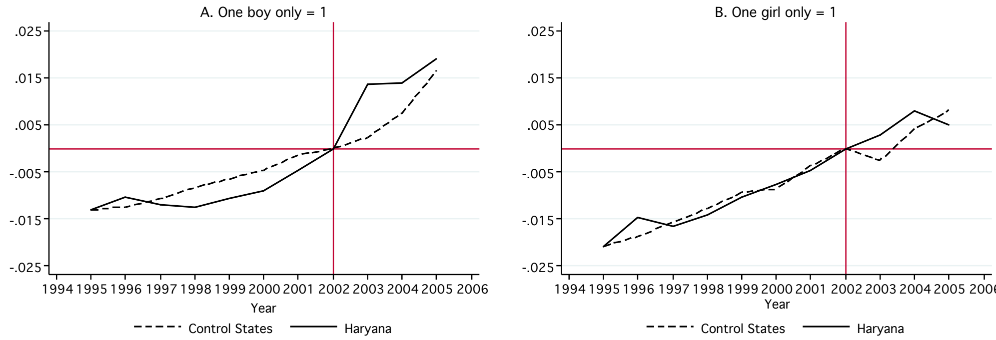

FIGURE A.3. TRENDS IN CHILD COMPOSITION, HARYANA VS NON-HARYANA, BEFORE AND AFTER 2002

Note: This figure plots the θ_k and $\beta_k + \theta_k$ coefficients from the following regression, with 2002 as the omitted year:
$Y_{st} = \sum_{k=1995}^{2005} \beta_k Hry_s * 1[Year_t = k] + \sum_{k=1995}^{2005} \theta_k 1[Year_t = k] + X'_{st}\delta + \gamma_s + \phi_s * t + \epsilon_{st}$. The dependent variables are indicators for a woman having only one girl and only one boy in a given year.

TABLE A.1—FINANCIAL INCENTIVE PROGRAMS TARGETING BOTH TOTAL FERTILITY AND SEX RATIO

Scheme	Country	State	Year	Eligible compositions
Devi Rupak	India	Haryana	2002	G, B, GG
Girl Child Protection Scheme	India	Andhra Pradesh	2005	G, GG
Balri Rakshak Yojana	India	Punjab	2005	G, GG
Care for Girls Campaign	China	Nationwide	2005	G, B, GB, GG
(in conjunction with the OCP)				
Dikari Yojana	India	Gujarat	2006	G, GG
Bhagya Lakshmi Scheme	India	Karnataka	2006-07	G, GG, BGG, BBG
Ladli Laxmi Scheme	India	Madhya Pradesh	2007	G, GG, BG
Indira Gandhi Balika Suraksha Yojana	India	Himachal Pradesh	2007	G, GG
Majoni	India	Assam	2009	G, GG, BG

Note: More details on some of the above programs are available in Sekher (2012). G and B stand for a daughter and a son, respectively.

Table A.2—Effects on the timing of first births

Years b/w marriage & 1st birth =	**0**	**1**	**2**	**3**
A. Micro data				
$Hry * Post$	-0.0175*	0.0310**	-0.0158**	-0.0003
	[0.0083]	[0.0095]	[0.0062]	[0.0029]
N		87,564		
A1. Drop if $YOM \leq 2002$ **&** $YOB > 2002$				
$Hry * Post$	-0.0175	0.0044	0.0242**	0.0104*
	[0.0196]	[0.0142]	[0.0077]	[0.0050]
N		81,043		
B. Aggregate data				
$Hry * Post$	-0.0126	0.0603**	-0.0396**	-0.0188
	[0.0218]	[0.0266]	[0.0183]	[0.0171]
N		99		

Note: This table reports the β coefficients from specifications (1) and (2). Each coefficient is from a different regression. The outcome variables are indicators for the number of years between marriage (YOM) and first birth (YOB). All regressions include fixed effects for states, years, age at marriage, and age at first birth, covariates, and state-specific linear time trends as controls. Robust standard errors are in brackets and are clustered by state in panels A and A1. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A.3—Effects on child composition, by woman's age

Woman's age in years:	**≤ 20**	**21-30**	**30-44**
	*Coefficients of Hry * Post*		
↓ *Dependent Variables*	(1)	(2)	(3)
Only one boy = 1	-0.0013	0.0225***	0.0007
	[0.0129]	[0.0064]	[0.0028]
Only one girl = 1	0.0204*	-0.0140***	0.0096***
	[0.0118]	[0.0047]	[0.0010]
Only two girls = 1	0.0066	0.0011	0.0016*
	[0.0062]	[0.0034]	[0.0009]
No Children = 1	0.0174	-0.0018	-0.0020***
	[0.0224]	[0.0060]	[0.0008]
Other Compositions = 1	-0.0431***	-0.0078	-0.0099***
	[0.0116]	[0.0116]	[0.0033]
N	99	99	99

Note: This table reports estimates corresponding to panel B of Table 3, estimated separately for women in different age groups using state-year level aggregate data. All regressions include fixed effects for states, years, covariates, and state-specific linear time trends as controls. Robust standard errors are in brackets. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A.4—Heterogeneous effects on child composition

Dependent variable →	*Only one child* = 1	*Only one boy* = 1	*Only one girl* = 1
	Coefficient of $Hry * Post$:		
Sub-sample ↓	(1)	(2)	(3)
Hindu	0.0102**	0.0071**	0.0031
	[0.0040]	[0.0034]	[0.0019]
Muslim	0.0040	0.0009	0.0031
	[0.0200]	[0.0114]	[0.0100]
Sikh	-0.0090	0.0118	-0.0207
	[0.0316]	[0.0143]	[0.0236]
Rural	0.0027	0.0013	0.0014
	[0.0068]	[0.0048]	[0.0035]
Urban	0.0066	0.0031	0.0035*
	[0.0052]	[0.0040]	[0.0021]
SC	0.0064	0.0118*	-0.0054
	[0.0079]	[0.0069]	[0.0040]
OBC	0.0208***	0.0135***	0.0073**
	[0.0052]	[0.0028]	[0.0032]
General caste	0.0075	0.0086*	-0.0011
	[0.0046]	[0.0045]	[0.0026]
Uneducated mother	0.0044	0.0055	-0.0011
	[0.0060]	[0.0047]	[0.0039]
1-5 years of education	0.0349***	0.0323***	0.0026
	[0.0117]	[0.0091]	[0.0082]
Mother employed	0.0237***	0.0038	0.0199**
	[0.0072]	[0.0053]	[0.0094]
Mother unemployed	-0.0009	0.0029	-0.0038
	[0.0099]	[0.0062]	[0.0054]
N	99	99	99

Note: This table reports estimates corresponding to panel B of Table 3, estimated separately for women in different socioeconomic groups using state-year level aggregate data. All regressions include fixed effects for states, years, covariates other than the one used to define the subsample, and state-specific linear time trends as controls. Robust standard errors are in brackets. General caste refers to women that are not SC or ST or OBC. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A.5—Effects by ideal proportion of sons reported at survey

	Ideal Proportion of Sons	
↓ *Dependent Variables*	≤ 0.5	> 0.5
	(1)	(2)
Only one boy = 1	0.0030	0.0094
	[0.0046]	[0.0145]
Only one girl = 1	0.0014	0.0074
	[0.0031]	[0.0139]
Only two Girls = 1	0.0044*	-0.0006
	[0.0024]	[0.0067]
No children = 1	-0.0012	-0.0196
	[0.0062]	[0.0149]
Other compositions =1	-0.0076	0.0035
	[0.0078]	[0.0200]
N	99	99

Note: This table reports estimates corresponding to panel B of Table 3, estimated using state-year level aggregate data. Each cell corresponds to a separate regression. Sample is restricted to NFHS-2,3. Ideal proportion of sons = $\frac{ideal_{boys}+(0.5*ideal_{either})}{ideal_{kids}}$ if $ideal_{kids} > 0$, where $ideal_{boys}$ is the ideal number of boys, $ideal_{either}$ is the ideal number of children of either sex, and $ideal_{kids}$ is the ideal number of total children, as reported by a woman. All regressions control for covariates, state-specific linear trends, and fixed-effects for state and year. Robust standard errors are in brackets. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A.6—Effects on contraceptive use

	Any modern method	**Sterilization**
	(1)	(2)
*Hry*Post*One boy*	0.1000***	0.0465*
	[0.0287]	[0.0281]
*Hry*Post*One girl*	0.0599	0.0422
	[0.0430]	[0.0327]
*Hry*Post*Two girls*	-0.0112	0.0173
	[0.0344]	[0.0370]
*Hry*Post*Two Boys*	0.0639	0.0520
	[0.0388]	[0.0433]
N	315	315

Note: This table reports the coefficients from a version of specification (2) estimated using data from repeated cross-sections of women that is aggregated to the state-year-group level. Modern methods of contraception comprise, male or female sterilization, pills, condoms, intrauterine devices, diaphragms, and injections. YOS stands for the year of survey. Each column corresponds to a separate regression. All regressions include fixed-effects for state-group, state-year of survey, group-year of survey, state, year of survey, group, and controls for socioeconomic characteristics, woman's age, and her marital duration in the year of survey as controls. Robust standard errors are in brackets. $Post = 1$ if *year of survey* > 2002, and zero otherwise. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.