Ten facts about son preference in India

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Abstract

This article discusses son preference in India, including both greater investment in sons and the fertility preference for sons. Regarding differential investment, I focus on child health and show that gender gaps in inputs and outcomes have narrowed in recent years. Nonetheless, girls remain disadvantaged in important ways, and making health services free is unlikely to be enough to close these remaining gaps. In addition to gender gaps, there are also stark health gaps between eldest sons, whom parents favor, and other sons. Fertility preferences likewise center on eldest sons. The desire to have at least one son — who can fill that eldest son role in the family — drives the skewed sex ratio, and this preference shows little sign of abating. In fact, the downward trend in family size is exacerbating how the desire for a son translates into sex-selection. Families' quest for a son also imposes collateral damage on sisters' health. The policy challenge, particularly around reducing the desire for sons, is large. Empowering women is not a panacea, and offering financial incentives to have daughters risks further concentrating girls in poorer families. While we do not know which policies will erase the disadvantages girls face, some that might help are public pensions as an alternative to old-age support from sons, increased delivery of health services through schools, and norm-change interventions that aim to increase the intrinsic value that Indian families place on girls.

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Introduction

This article summarizes some key facts and recent evidence on son preference in India. I define son preference to encompass both greater investment in sons than daughters and a fertility preference to have sons. These two dimensions of favoritism have connections, yet the root causes, trends, and policy solutions differ in important ways. In my discussion of gender-biased investments, I focus on those related to health.

I organize the discussion around ten facts:

1. Gender gaps in child health inputs and outcomes have narrowed in recent years.
2. Nonetheless, girls remain disadvantaged in important ways.
3. Unfortunately, making health services free might not be enough to close the remaining gender gaps.
4. In addition to gender gaps, there are also stark health gaps between eldest sons, who tend to be favored, and other sons.
5. The desire to have a son — specifically to fill the eldest son role in the family — is what drives the skewed sex ratio.
6. Unlike gender gaps in child investment, the desire to have a son shows little sign of abating.
7. In fact, the downward trend in family size is exacerbating how the desire for a son translates into sex selection.
8. Families' quest for a son also imposes collateral damage on sisters' health.
9. Empowering women is not a panacea that will solve the problem of son preference.
10. Offering financial incentives to have daughters risks further concentrating girls in poorer families.

I close by discussing policies that seem promising to reduce son preference, in particular the desire for sons. While we do not know which policies will erase the disadvantages girls face in India, some that might help are public pensions, which serve as an alternative to old-age support from sons, increased delivery of health services through schools, and attitude- and norm-change policies that aim to increase the intrinsic value that Indian families place on girls.

Gender gaps in health inputs and outcomes

One dimension of son bias is providing more inputs, such as food and health care, to sons than daughters. Such behavior by parents could arise if they intrinsically care more about sons than daughters or because they perceive the instrumental benefit – the financial

return to the investment in the form of higher adult earnings, for example – to be higher for males. The returns hypothesis can be broken down further. There might be lower returns for girls after accounting for the benefits that accrue to everyone, perhaps because labor productivity is less dependent on health for the type of work that adult women tend to do. Alternatively, returns could be the same overall, but lower from the parents' point of view, for example because of India's system of patrilocal exogamy whereby females join their husband's family upon marriage.

It is useful to benchmark child health inputs and outcomes in India against other countries, first, because some gender differences in outcomes are biological so parity does not always correspond to lack of discrimination and, second, to the extent there is discrimination, it is useful to understand if it is related to India's stage of economic development or is anomalous among countries with similar GDP per capita. India being like other countries points to a full-returns-to-investment explanation, while India being anomalous is more consistent with preferences or the investment distortions created by exogamy.

Most of the original data analysis in this paper uses India's National Family Health Survey (NFHS), which is part of the Demographic and Health Survey (DHS) series of surveys fielded in low- and middle-income countries. The five rounds of the NFHS were in 1992-93, 1998-99, 2005-6, 2015-16, and 2019-21. The surveys collect information from a representative sample of women aged 15 to 49, with detailed data on fertility and maternal and child health. I show comparisons both across NFHS rounds and between India and other countries.

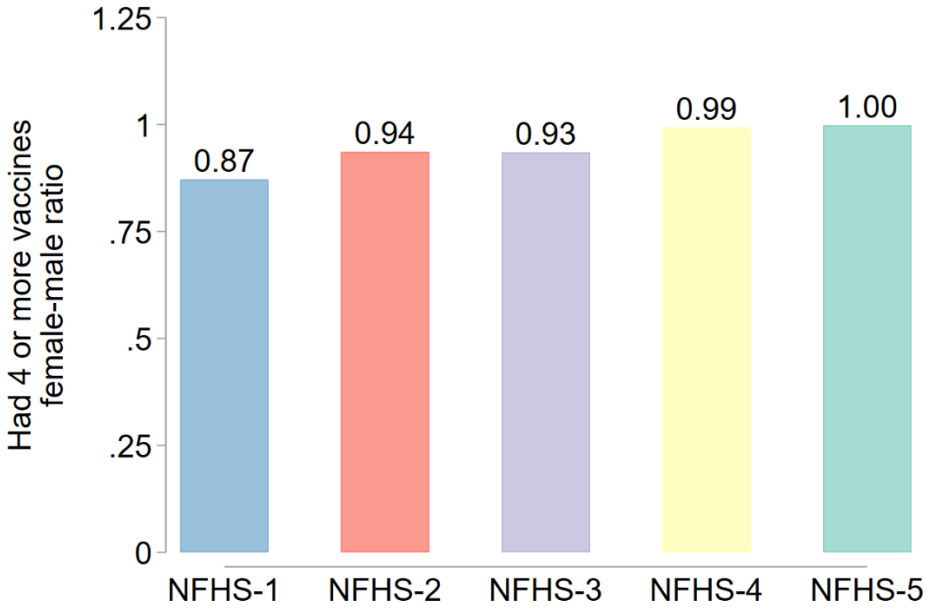
The first fact is a welcome one:

1. Gender gaps in child health inputs and outcomes have narrowed in recent years.

Figure 1 shows the girl-boy ratio of receiving at least 4 of the following nine vaccines recommended for infants: BCG, DPT dose 1 to 3, polio dose 0 to 3, and measles. Here as throughout the article, I construct variables so that a higher value is a better outcome and present female-male ratios; a higher value represents a relative improvement for girls. As seen in the figure, there was a gender gap in vaccinations that favored boys in the 1990s and 2000s, but it has closed.

Figure 2 shows a similar improvement for infant survival, i.e., the share of children who survive until at least their first birthday, using births within five years of the survey. Here I compare India to other countries, plotting the female-male ratio of infant survival versus the country's GDP per capita (in purchasing power parity terms), where each point

Figure 1. Female-male ratio of vaccinations across NFHS rounds



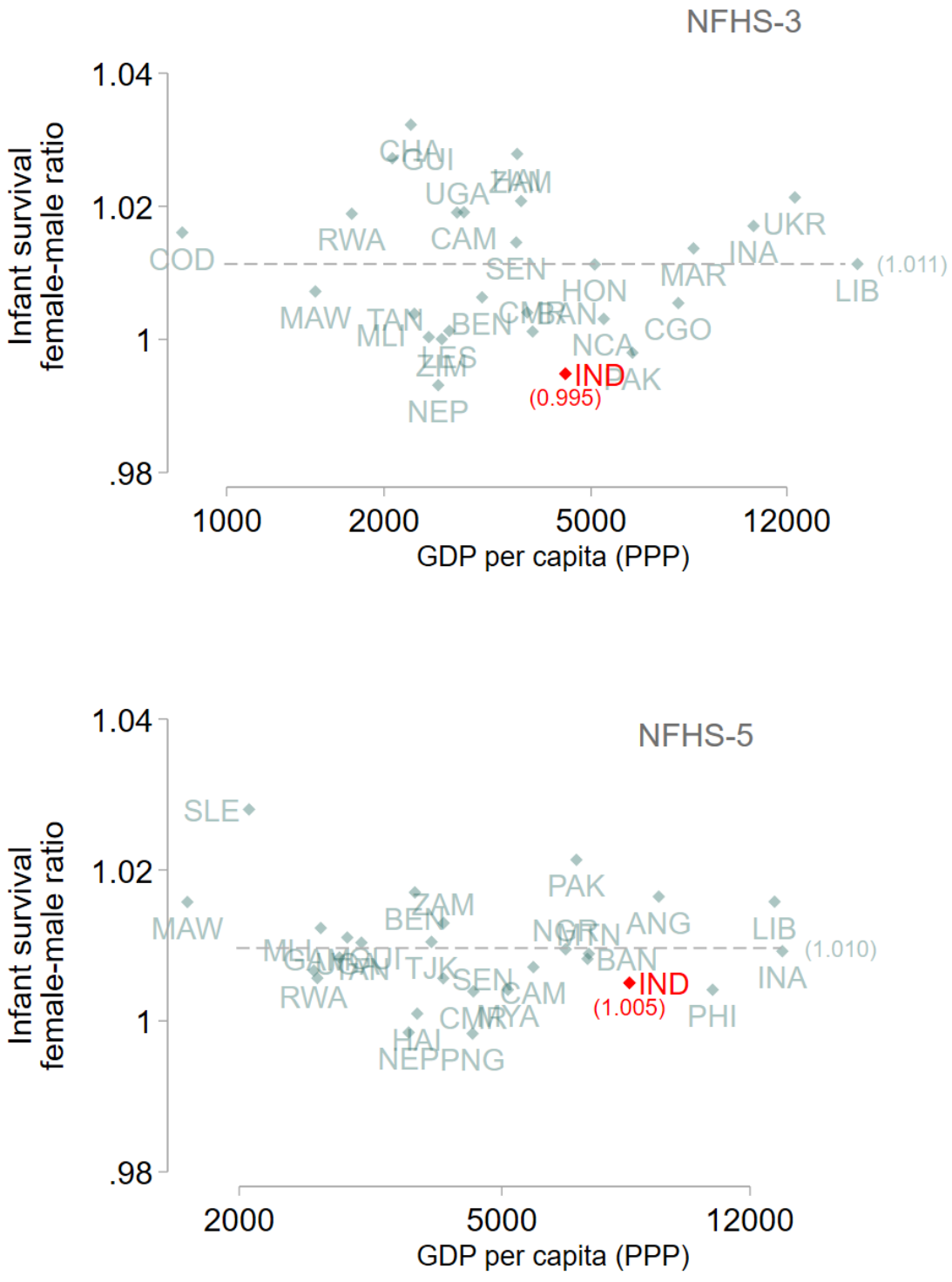
represents a country. India's improvement over time can be seen by contrasting the top panel, which uses NFHS-3, with the bottom panel, which uses NFHS-5. The comparison group for NFHS-3 are other DHS data sets collected from 2004 to 2007, while the comparison group for NFHS-5 are DHS data sets collected from 2016 to 2022.[1]

The gray line in Figure 2 marks the average female-male infant survival ratio for the comparison countries. The ratio of 1.01 means that the survival probability is 1% higher for girls than boys elsewhere. This advantage for girls is consistent with the well-known biological fragility of male infants (Kraemer, 2000). The top panel shows that for children born in the early 2000s in India, girls had an abnormally low survival rate below 1, equivalent to "excess mortality" for 1.6 out of every 100 girls born. The bottom panel shows that while India is still below the international average for low- and middle-income countries, it has closed most of the gap.

One plausible reason for the relative improvements in girls' inputs and outcomes is that

[1] The comparison countries for NFHS-3 are Armenia, Azerbaijan, Bangladesh, Benin, Cambodia, Cameroon, Chad, Colombia, Congo, Democratic Republic of Congo, Guinea, Haiti, Honduras, India, Indonesia, Jordan, Lebanon, Lesotho, Malawi, Mali, Morocco, Nepal, Nicaragua, Pakistan, Rwanda, Senegal, Tanzania, Uganda, Ukraine, Zambia, and Zimbabwe. The comparison countries for NFHS-5 are Albania, Angola, Armenia, Bangladesh, Benin, Cambodia, Cameroon, Colombia, Gambia, Guinea, Haiti, India, Indonesia, Jordan, Lebanon, Malawi, Mali, Mauritania, Moldova, Myanmar, Nepal, Nigeria, Pakistan, Papua New Guinea, Philippines, Rwanda, Senegal, Sierra Leone, South Africa, Tajikistan, Tanzania, Uganda, Zambia.

Figure 2. Female-male ratio of infant survival (NFHS-3 and NFHS-5)



There was more room for improvement for girls than boys, and as families' incomes rose, parents provided more basic inputs to girls that helped them survive. Such catch-up was not a foregone conclusion, as families might instead use extra resources to let boys pull further ahead, for example by giving them more expensive inputs like protein-rich food.

Policy also likely played a role in girls' catch-up. Importantly, these policies need not have been gendered in their design. A striking finding in syntheses of education interventions is that gender-neutral policies that reduce the barriers to education tend to have larger impacts on girls because they are disadvantaged to begin with (J-PAL, 2017; Evans and Yuan, 2022). The same pattern is likely to be true of health interventions. Gender-blind policies that have increased childbirth in health facilities and provided postnatal checkups through home visits might disproportionately help girls, narrowing gender gaps.

2. Nonetheless, girls remain disadvantaged in important ways.

Despite the positive trends along important dimensions, several recent studies document that girls continue to fare worse than boys in health inputs, such as dietary diversity and receipt of healthcare.

Dutta et al. (2022) document gender gaps in infant and young child feeding practices using NFHS-4 data. They find that girls under the age of 6 months are less likely to be exclusively breastfed than boys, and then, from age 6 to 23 months, they are less likely to be fed high-protein foods. Aurino (2016) uses the Young Lives data set that has dietary data through adolescence for a sample in Andhra Pradesh and Telangana. That study finds that boys enjoy a more diverse diet starting at young ages, and the pro-boy gap significantly widens between age 12 and 15 years old, by which time girls consume fewer protein- and vitamin-rich foods such as eggs, legumes, root vegetables and fruit.

Turning to healthcare uptake, Vilms et al. (2017) test for gender gaps in neonatal illness, care-seeking for neonatal illness, hospitalization, facility-based postnatal visits, immunizations, and postnatal home visits by health workers in a representative sample of households with infants in Bihar in 2014. Girls had a lower rate of neonatal illness and hospitalization than boys, consistent with the greater biological precariousness of males in infancy. However, in terms of care-seeking, girls were less likely to receive care if they were ill and less likely to receive a post-birth home checkup. However, there was no gender gap in vaccinations, consistent with what Figure 1 showed.

Dupas and Jain (2023) analyze claims data from Rajasthan's Bhamashah Swasthya Bima Yojana Health Scheme (BSBY) health insurance program that offers enrollees free care in public and private hospitals. They find that females account for only 45% of all hospital

visits, with especially large gaps among children under 10 years (33% of visits in this age range are for girls). This gap is particularly large for care in private hospitals and higher-value tertiary care.

These choices parents make collectively can lead to excess female mortality. In the absence of a universal civil registration system, the census of population offers a useful data source for measuring mortality, arguably better than NFHS because of the universal coverage. Guilmoto et al. (2018) use 2011 Census data to quantify excess female mortality before the age of 5 years. The study uses as a benchmark 46 countries with no known excess female mortality or sex selection and that have relatively similar mortality rates to India. The comparison countries allow one to calculate what female mortality one would expect if there were no son bias, given the observed rate of male mortality. The study finds that excess female mortality, averaged from 1996 to 2011, is 1.85 per 100 live births, with more than 90% of districts exhibiting excess female mortality. The five states and union territories with the highest rate of excess female under-5 mortality were Hindi Belt states: Uttar Pradesh, Bihar, Delhi, Rajasthan, and Madhya Pradesh. It would be valuable to augment this analysis to examine trends over the study period and to update it when more recent Census data become available. NFHS-5 analysis analogous to Figure 2 but for child mortality shows about 1 excess female death per 100 live births.

3. Unfortunately, making health services free might not be enough to close the remaining gender gaps.

Gender gaps in health inputs exist even when the health services are free to families. This suggests that policies need to go beyond making healthcare free. Offsetting parents' time and hassle costs might be necessary to close gender gaps in health care.

The Dupas and Jain (2023) study on Rajasthan found a gender gap despite free medical care for insurance enrollees. Travel costs or time costs are likely to be a major factor. Tandon et al. (2016) similarly find a gender gap in a context of free medical care: The male-to-female ratio of patients who received cardiac intervention, after being recommended for tertiary care through screenings at school, is 1.66, while the male-female prevalence ratio for congenital heart disease is only 1.1 to 1.25. The needed surgery was free for patients. Much of the gender gap seems to enter at the stage of who is being referred for care by the diagnosticians and cannot be explained by gender gaps in school enrollment. It is possible that girls opt out of the screenings or those doing the screenings are gender-biased in their screenings.

In an earlier study, Ramakrishnan et al. (2011) found that for children identified at the All India Institute of Medical Sciences in New Delhi as needing surgery to correct a congenital heart condition, a year later 70 percent of the boys but only 44 percent of the girls had undergone surgery. Financial concerns are one issue, but qualitative interviews suggested that marriageability was also a factor: Parents thought that the scar from surgery might hurt her marital prospects.

Other health inputs without a direct monetary cost also show gender gaps, such as breastfeeding (Jayachandran and Kuziemko, 2011; Vilms et al., 2017). Another example is that, among families with one child at the time, households with an infant boy spend roughly 60 minutes more per day (about 30% more time) on childcare than households with an infant girl (Barcellos et al., 2014).

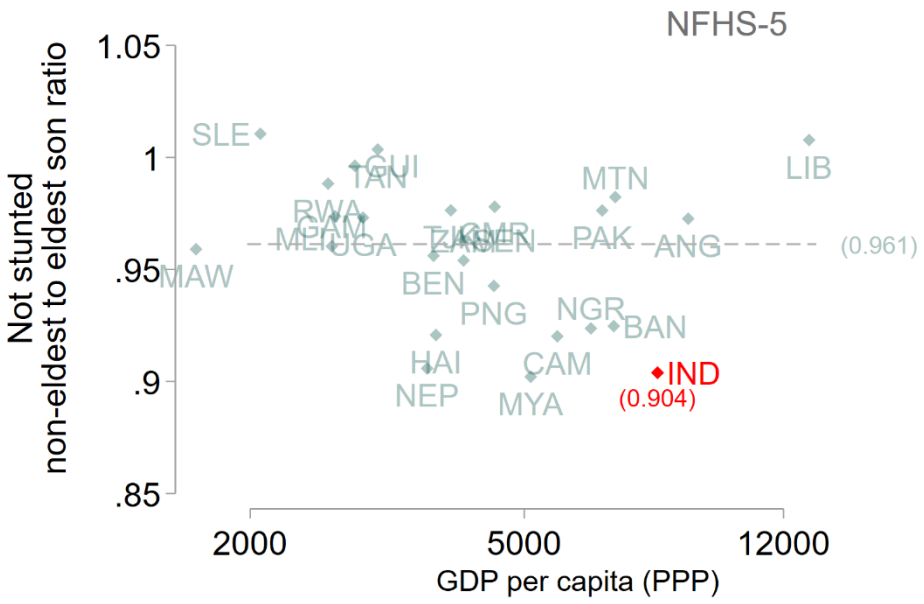
How can policy offset parents' time and hassle costs to obtain health care for their daughters? In the case of medical care, policy options include reimbursement for travel costs. One could also offer incentives for follow-up care once a referral has been made; the after-a-referral provision addresses the concern that incentives could encourage overuse of medical care, but it is also possible to loosen this restriction. An alternative is to reward the outcome: payments for having healthy girls, for example as measured by anthropometrics or anemia levels. This kind of policy has the advantage that it indirectly incentivizes pro-girl choices within the home such as time spent caring for children, breastfeeding, or food given to the child, which policy makers cannot directly observe so cannot directly intervene on.

Eldest son preference and fertility patterns

While favoritism toward sons over daughters receives more attention, favoritism toward eldest sons relative to other sons is also an important phenomenon in India. Hinduism and patrilocal norms give eldest sons special roles in funeral rites and old-age support for parents. This centrality that eldest sons play in their parents' life leads to greater investment in them.

A 2022 Pew opinion poll shows the strong gender norms for these familial roles, though without being specific about birth order. 63% of respondents said that sons should have the primary responsibility for parents' funeral rites, while only 1% said daughters should; the remaining 35% said responsibility should be shared (Pew Research Center, 2022). Regarding the responsibility for caring for parents in old age, the majority thought it should be shared between sons and daughters, yet a large minority of respondents —39% —said that sons bear this responsibility compared to only 2% who said daughters.

Figure 3. Not-stunted non-eldest to eldest son ratio (NFHS-5)



4. In addition to gender gaps, there are also stark health gaps between eldest sons, who tend to be favored, and other sons.

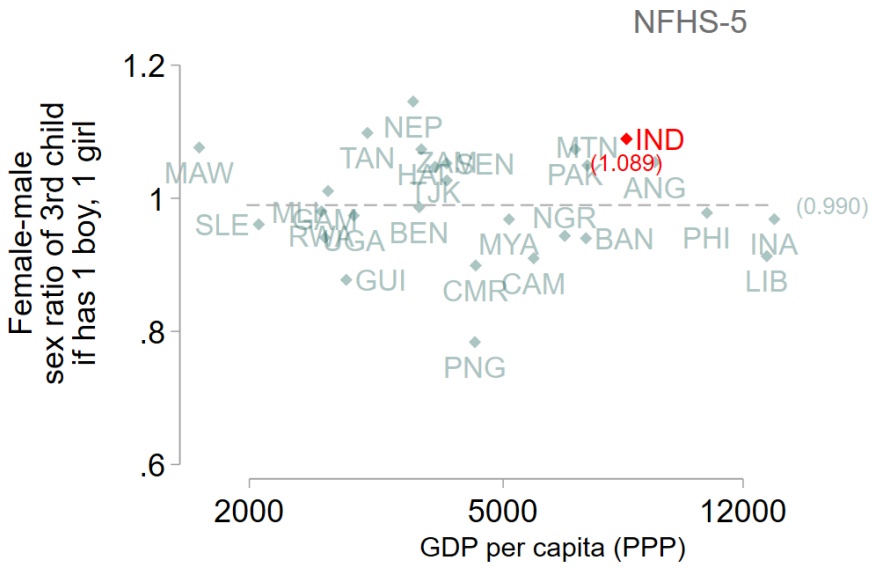
Jayachandran and Pande (2017) show that the anomalously high rate of stunting in India is related to eldest son preference. India's stunting problem is almost as stark among non-eldest sons as among daughters, with eldest sons as the exception. These patterns are less pronounced among Muslims, who do not have strong eldest son preference compared to Hindus, and in matrilineal parts of India where son preference is weaker.

This pattern of eldest sons doing better than non-eldest sons continues to be true in more recent data. Figure 3 shows the non-eldest to eldest son ratio of not being stunted. Lower values map to more favoritism toward eldest sons, and India is a negative outlier.

5. The desire to have a son — specifically to fill the eldest son role in the family — is what drives the skewed sex ratio.

The skewed sex ratio is concentrated at last births in the family, in cases where the previous children are daughters (Jayachandran, 2015). A family that wants two children might have two daughters, try again, and use sex selection to ensure their third child is a boy.

Figure 4. Sex ratio of 3rd child when family has 1 boy and 1 girl

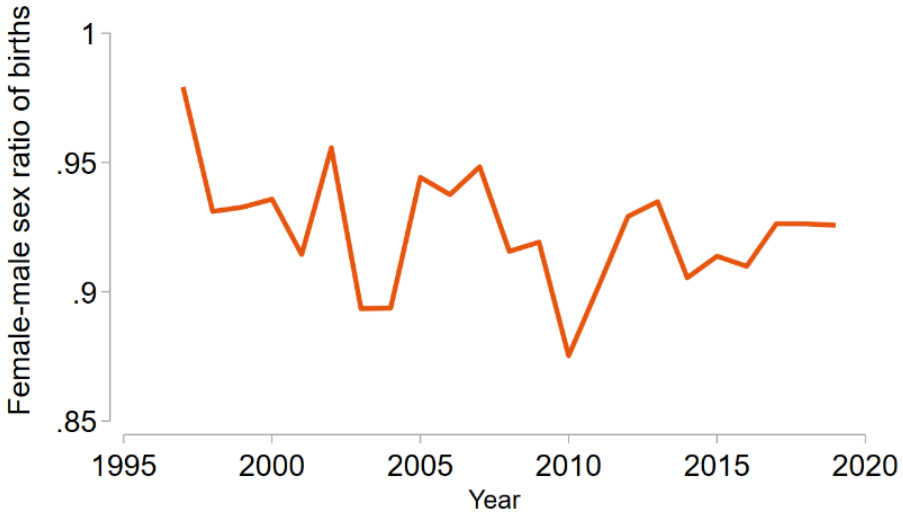


This pattern is consistent with a premium on having at least one son, which differs from a general aversion to having daughters (for example because of dowry expenses), which might lead to a high rate of sex selection even for first births. Jayachandran (2017) surveys parents in Haryana about fertility preferences and finds that they strongly want at least one son, but conditional on achieving that, prefer a balanced sex composition; they do not have a general preference to always have sons rather than daughters.

Indeed, when families with one boy and one girl give birth to a third child, there is no indication they engage in sex-selection to ensure that most of their children are boys. Figure 4 plots the female-male ratio of third-born children in families who already have a boy and a girl. India's ratio is comparable to other countries' and, in fact, is above 1.

Another way to see the link between eldest son preference and sex selection comes from studying patrilocality. Many cultures including India practice patrilocality, whereby a married couple joins the husband's family and resides near or with his parents. This cultural system creates the strong perceived need for a couple to have a son so that he can support and care for them in old age. Ebenstein (2014) shows the strong association between the practice of patrilocality and the male-skewed sex ratio. Using Census micro-data and Demographic and Health Survey Data from several countries, he quantifies how often older men (age 60-plus) reside with an adult son, which provides a measure of de facto patrilocality. He finds that this measure is strongly correlated with the sex ratio at birth. As he writes, "patrilocality is the single feature common to the social norms of

Figure 5. Female-male sex ratio in India



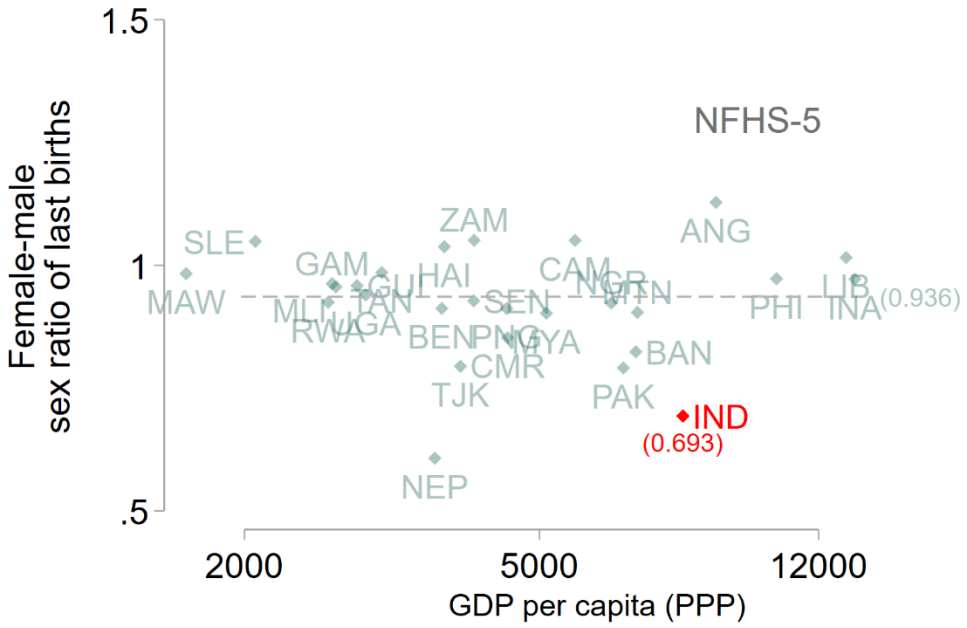
Christians in Armenia, Muslims in Azerbaijan, Hindus in India, and Buddhists in China – all live with their sons when they are old," (pg. 3). These groups all exhibit a male-skewed sex ratio. The correlation also holds when comparing ethnic or religious groups within a country. For example, within India, Sikh and Jain elderly men are most likely to co-reside with a son, and these groups have especially male-skewed sex ratios at birth.

In addition to patrilocality, religious roles and the passing down of lineage and property also play a role, though it is worth noting that sex ratio is skewed even in patrilocal societies without the attendant religious premium put on sons.

6. Unlike gender gaps in child investment, the desire to have a son shows little sign of abating.

Figure 5 shows that India continues to have an abnormally low female-male sex ratio at birth. The figure plots the sex ratio of births reported in NFHS, pooling the third to fifth waves and including births up to eight years before the survey. This enables a retrospective panel from the late 1990s to 2019. (I exclude 2020 and 2021 because the composition of states surveyed, year-by-year for NFHS-5, makes births in these years unrepresentative of all-India.)

Figure 6. Female-male sex ratio at last birth (NFHS-5)

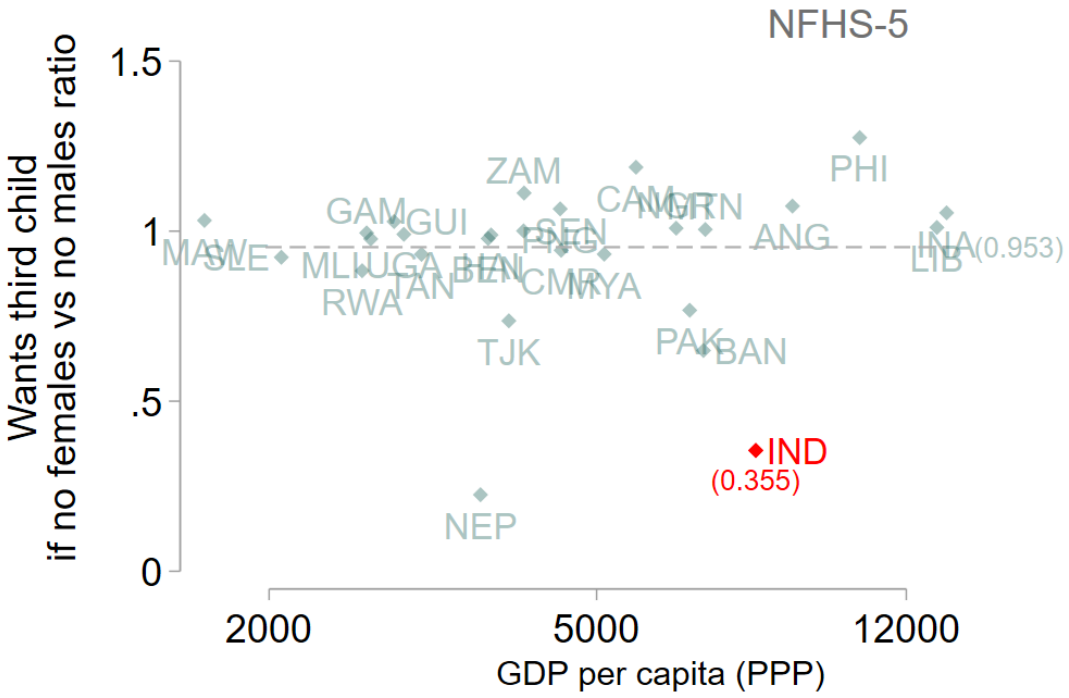


The quest to have at least one son leads parents to engage in sex selection at the point when they no longer are willing to enlarge their family size to try for a son. This means, first, that the population sex ratio skews male and, second, the last child in the family is especially skewed toward sons.

Even when a family does not resort to sex selection, the sex ratio of the last child in the family becomes skewed through "stopping rules" (though the overall population sex ratio does not). If families keep trying to have a son, stopping once they have their sought-after son, then the son is their youngest child. Thus, the sex ratio at last birth is another metric of the desire to have a son, one that encompasses both sex selection and "trying again" as the means to obtain a son. Figure 6 shows the sex ratio of last births in India versus other countries. India's ratio is 0.69 girls per boy, compared to 0.94 as the average among other countries.

Indian parents articulate their stronger preference to keep having children to obtain a son than a daughter. Figure 7 shows India's exceptionalism, comparing NFHS-5 respondents to comparison-country DHS respondents. The figure focuses on those who have either two boys or two girls, using their response to a question about wanting to have another child. The variable along the vertical axis is the share of those with only boys who want another child (presumably to obtain a daughter) divided by the share of those with only girls who

Figure 7. Wants third child if no daughters yet versus no sons yet



want to have another child (presumably to obtain a son). India's male-biased mean of 0.36 is drastically below the comparison-group average of 0.95.

7. The downward trend in family size is exacerbating how the desire for a son translates into sex selection.

Returning to sex-selection specifically, one reason this practice has not abated is that the technology of sex selection has become more widely available and affordable. Another factor in sex selection is declining fertility.

The fertility squeeze is the term for the phenomenon that when family size is smaller, fewer families will have at least one son naturally (Das Gupta and Mari Bhat, 1997). When parents want to have three or four children, the likelihood of naturally ending up with no sons is fairly low, but this scenario becomes more likely when couples want only two or even just one child. Therefore, as couples' desired family size gets smaller, they are more likely to resort to sex-selective abortions to obtain their desired son. Jayachandran (2014),

using survey data from Haryana, documents this pattern that the desired sex ratio is more male-skewed at low fertility levels.

8. Families' quest for a son also has collateral damage on his sisters' health.

The beginning of this article discussed intentional (even if subconscious) underinvestment in girls relative to boys. Girls can also receive fewer inputs than boys as a by-product of fertility choices around obtaining a son.

One reason this arises is due to total family size. A couple whose first two children are both sons, by chance, is more likely to stop having children than if the first two children are girls. The second family will keep trying to have a son. Girls, on average, grow up in larger families because of this type of fertility behavior (Yamaguchi, 1989; Clark, 2000). Given fixed financial resources, girls will grow up in families that have fewer resources to spend on each child. Thus, even if, within the family, boys and girls receive equal inputs, because of cross-family differences, girls will receive fewer resources.

Another phenomenon, shown by Jayachandran and Kuziemko (2011), is that because women in India want to and are more likely to become pregnant again after a daughter is born, they stop breastfeeding girls sooner to regain their fecundity or because of the new pregnancy. This is detrimental to girls because of the health benefits of breastfeeding. In this case, the gap arises without parents having an explicit preference to provide more health inputs to sons. Dutta et al. (2022) similarly finds a link with family composition consistent with plans for further fertility as the driver. Specifically, the lower rate of exclusive breastfeeding of girls and worse dietary diversity is especially large if the family already has two or more daughters and smaller if the family already has sons.

The desire to have an eldest son also increases girls' stunting in India. Part of the collateral damage to girls' health is that they are in larger families and competing with their favored brother for resources. A more subtle pattern is that later-born girls are harmed more by competition from brothers than their older sisters are (Jayachandran and Pande, 2017). This arises partly because an earlier-born girl is less likely to have a brother yet, so she is less likely to be competing with him, for example over parental time, during the critical early stage of life. In addition, the birth of a second daughter after the first child was also female often triggers parents to adjust upward the number of children they plan to have so that they can obtain a son. This realization requires them to re-budget, and the spending cutbacks, even if spread equally across the two daughters, especially harm their second daughter because she is at the younger, more critical stage of child development. Thus, another harmful aspect of competition with the eldest son is that parents cannot anticipate their fertility perfectly (of course), and this makes outcomes for their daughters less equal.

Policy implications

In this section, I discuss policy responses to the challenge of son preference, first, offering a cautionary assessment of two potential approaches and, second, discussing some tentative ideas for more promising approaches.

9. Empowering women is not a panacea that will solve the problem of son preference.

The fact that the skewed sex ratio is exacerbated when family size is smaller upends some standard intuitions about what might solve the problem. For example, educating girls so that they grow up to be empowered mothers might perversely worsen the sex ratio. This is because while women's education is associated with less son preference, it is also linked with lower desired and actual fertility (Pande and Astone, 2007, Dreze and Murthi, 2001). This link between female empowerment and smaller family sizes means that the sex ratio could become either more or less skewed with female empowerment.

To walk through this logic, Table 1 examines the association between maternal education and the preferences that feed into the sex ratio, following Jayachandran (2014). The key independent variable is a dummy variable for the mother having at least 8 years of education (which 40% of mothers in the Haryana survey sample have). The regressions control for the husband's level of education and an extensive set of income and wealth proxies, but the results should be interpreted cautiously as unobservable factors correlated with mother's education could be playing a role.

Column 1 examines the effect of female education on the sex ratio (defined as percent of children who are sons) that the respondent desires at a family size specified by the surveyor. The data are from a survey conducted in Haryana. Because family size is exogenous to the respondent in this hypothetical scenario, the outcome variable is a "pure" measure of son preference, rather than a measure of how son preference manifests in the sex ratio. The negative coefficient indicates that education reduces women's son preference, as most people would conjecture. Column 2 examines the effect of education on desired family size. The outcome is based on the standard DHS-type fertility preference question which elicits the ideal family size. As has been documented often in the literature, more education is associated with a smaller desired family size.

Table 1: Mother's education does not decrease the desired or actual sex ratio

	Haryana data from Jayachandran (2017)			Data from NFHS-3	
	% sons desired at specified family size	Desired family size	Actual % sons desired at desired family size	Actual % sons	Actual % sons
	(1)	(2)	(4)	(4)	(5)
Mother finished class 8+	-0.039***	-0.087***	0.005	-0.023***	0.002
	[0.011]	[0.017]	[0.006]	[0.005]	[0.005]
Actual family size dummies	No	No	No	Yes	No
Observations	2,883	2,597	2,597	35,091	35,091

*Notes: Standard errors, clustered by school, are in brackets. Asterisks denote significance: * p < :10, ** p < :05, *** p < :01. All regressions control for dummy variables for whether the father has completed primary school, grade 8, or grade 10+, and a cubic polynomial in the first principal component of several wealth. The NFHS-3 sample is restricted to women age 35+ with at least 1 living child.*

These two results lay out offsetting effects: Education reduces son preference at any given family size, which should decrease the desired sex ratio, but it also decreases desired family size, which increases the desired sex ratio if people want to still have at least one son. The net effect is shown in column 3, where the outcome is the percentage of sons desired at the desired family size using the standard DHS-type question. The two effects almost exactly offset each other. The coefficient is small and statistically indistinguishable from zero. This null result is noteworthy: A progressive force like female education need not improve a woman's desired sex ratio.

NFHS-3 data corroborate these patterns. Here, I analyze the actual sex ratio. Educated women have a less skewed sex ratio among their children, conditional on family size, suggesting they have weaker son preference (or, alternatively, more power in their marriage to realize their preferences), as shown in column 4. But the total effect of female education on the sex ratio, unconditional on family size, appears to be zero, as shown in column 5. Female education does not make the sex ratio less skewed.

This analysis is consistent with the findings of Chhibber et al. (2021) who analyze the 2001 and 2011 Census and find that the sex ratio at birth is more skewed among more educated mothers. They also find that the survival rate of girls is higher among educated mothers, but this second force is not enough to offset the first force, so educated mothers end up with fewer surviving girls. This phenomenon also means that girls are disproportionately in families with less educated mothers, a point I return to below.

To be clear, empowering women is worthwhile per se and seems to narrow some gender gaps affecting children, but it is far from clear that it will ameliorate the male-skewed sex ratio.

10. Offering financial incentives to have daughters risks further concentrating girls in poorer families.

A widely used approach to address the skewed sex ratio is to offer financial incentives to have daughters. While one of the early schemes evaluated, Devi Rupak in Haryana, backfired by simultaneously trying to incentivize families to have more girls but fewer children overall, thereby worsening the sex ratio (Anukriti, 2018), most policies now focus simply on the policy goal of encouraging daughters. These policies likely have increased the number of girls who are born. Biswas et al. (2023) evaluate the Government of India's Dhanlakshmi scheme that was piloted in 11 blocks from 2008 to 2013. A family received 5000 rupees for showing proof of the birth's registration (roughly equivalent to monthly household expenditures in the study sample), plus 1250 rupees for immunizing the girl, with further payments for schooling and remaining unmarried until 18. The study focuses on Sirhind block in Fatehgarh Sahib district in Punjab and finds an increase in girls born. It is worth noting that some of the subsequent payments, such as to keep a girl in primary school, will be inframarginal to families' behavior, i.e., the family would have made this choice for their daughter anyway. Thus, the subsequent payments should also be thought of as partly just increasing the financial reward for giving birth to a daughter.

There are at least three limitations of policies that offer financial rewards for having daughters. First, they can be an expensive solution to the problem because most of the payments are inframarginal. Suppose a program increases the share of newborns who are girls from 45% to 50%, as the Biswas et al. (2023) roughly found. This means that for every 50 girls who were born, 45 of them would have been born absent the incentives, or only 10% of the payments were changing behavior. Moreover, 10% is an upper bound on how much of the program expenditure worked toward the goal of changing the sex ratio of births, as a smaller payment would have been sufficient to motivate some of those families that did change their behavior because of the reward. While the inframarginal payments are not wasted money – the families who receive it are likely poor, and the family can use the money to invest more in their daughter – this approach is not the most targeted way to achieve either the goal of providing anti-poverty transfers or to ensure that families invest more in their daughters.

Besides the high degree of inframarginality, a second risk with this approach is that "extrinsically motivating" people to have daughters, by offering payment, could crowd out the intrinsic valuation of daughters.

The third and perhaps most worrisome limitation of such programs is that most of the increase in female births will be in poor families. Many of the state schemes limit participation to the poor, for example to those with a below the poverty line (BPL) card. But even without such a restriction, a payment of 5000 rupees is more likely to influence fertility choices for a poor family than a rich one. Thus, those who respond to the incentives will be poorer. As is, girls are disproportionately in poor families. One reason is that richer families have a smaller desired family size, and they can more readily afford ultrasound tests and abortions. Thus, they "need" and can engage in sex selection more. In addition, the scarcity of brides in the marriage market gives poorer families an incentive to have daughters who have an opportunity to "marry up" (Edlund, 1999). Girls systematically growing up in poorer families creates societal-level gender gaps even absent within-family discrimination. Financial incentives to have daughters, which poor families are more responsive to, exacerbates this problem. While decreasing sex-selection among the poor is valuable, it is important that improvement happens across the income distribution.

We are then left with the question of what policies can effectively solve this problem.

We do not know which policies will erase the disadvantages girls face in India, but there are several policies that warrant pursuing or testing.

To address the skewed sex ratio, a key component of policy going forward must be to continue to robustly enforce the Pre-Conception and Pre-Natal Diagnostic Techniques Act, which bans sex selection. Enforcement is only becoming more challenging as ultrasound technology becomes cheaper and more mobile, but enforcement needs to continue to be a key part of the policy response.

Other policies that could address son bias include ramping up delivery of health services through schools, a public pension system, and policies that strengthen the intrinsic value that families place on girls.

Using schools to deliver health inputs and health care

As mentioned earlier, universal programs might disproportionately benefit girls. One example of gender gaps being narrowed through a universal program is iron supplementation through schools. Krämer et al. (2021) find that making the mid-day meals iron-fortified in Bihari schools (by providing iron-and-iodine double-fortified salt to

schools to cook with) decreased anemia by 10 percentage points, or 22%, after 1 year of treatment. The point estimates suggest larger effects for girls (12 percentage point decline) than boys (8 percentage point decline), likely because girls' baseline anemia rate is higher.

This example also highlights the importance of schools as a delivery vehicle for health interventions. India has made tremendous progress in closing education gender gaps, and this positions schools, as well as anganwadis, as a place to deliver health interventions. Using schools is valuable because it removes the "hassle cost" of a special trip to the health facility, which seems to be a surprisingly large barrier to girls' health care.

Already this is happening. Child nutrition was a key motivation for setting up anganwadis, schools now provide mid-day meals, and health screenings at schools are common. Some recent studies have studied gender differences in the effects of these schemes. Ravindran (2021) found that the ICDS program, which encompasses anganwadis, had larger effects on girls' height, weight, and education than boys'. Ganimian et al. (forthcoming) finds larger benefits on cognitive outcomes for girls than boys of adding a worker to anganwadis, but, in this case, the health effects are similar across genders.

Another existing program in this vein is the weekly iron and folic supplementation (WIFS) program. While causal evidence on the effects of WIFS is scarce, various studies document implementation problems (Kapil et al., 2019). Fixing implementation problems in school-based health programs (or similarly in ASHA home visit programs that reduce time costs for parents to get health check-ups for children) will likely differentially help girls. Thus, strengthening implementation of existing gender-blind programs is likely to be helpful in closing gender gaps in health outcomes.

Government-provided old-age support

One type of policy that could attenuate the skewed sex ratio is a formal system for income support in old age. A government pension scheme offers older adults a substitute for support from sons, lessening the need to have a son. While the problem of the skewed sex ratio should not be the impetus for instituting a pension scheme, a decision that entails many other considerations, the key point is that such a program could have a secondary benefit related to sex-selection.

Evidence supporting this idea exists for China. Ebenstein and Leung (2010) analyze the introduction of the Rural Old-Age Pension Program, and show, first, that households without sons are more likely to participate in the pension program and, second, having access to the pension program is associated with a less male-skewed sex ratio. Guo et al. (2023) report similar results in their analysis of the more recent New Rural Pension

Scheme in China, finding that the sex ratio became less skewed among those with access to the pension scheme.

The success story of a country that overcame its problem of male-skewed births is South Korea. While the keys to South Korea's turnaround are multi-faceted, one factor may have been pensions. In 1995, the government pension scheme in South Korea was expanded to cover self-employed workers in rural areas. Ebenstein (2014) tests the prediction that this group should experience a decline in sex selection. In a difference-in-difference design, the sex ratio indeed becomes less skewed for self-employed workers relative to salaried workers, who were already covered by the pension and experienced no change in 1995.

While none of the existing evidence is airtight, the combination of evidence from other contexts and theory suggests that alternatives to eldest-son support for Indian parents might lessen the centrality of having a son.

Changing hearts and minds

The desire for sons goes beyond pragmatic reasons like old-age support and takes on a life of its own as a conferrer of status. Ultimately, the status associated with having sons must dissipate to fully close gender gaps. The Government of India's Beti Bachao Beti Padhao ("Save girls, educate girls") scheme that began in 2015 includes awareness campaigns, celebration of daughters, and other policies to raise the status of girls. While we do not have reliable evidence on the impacts, such efforts to "change hearts and minds" seem essential to fully solve this problem.

Here, too, schools could be a powerful venue, as seen in Dhar et al.'s (2022) evaluation of a gender equality curriculum added to Haryana secondary schools. The program, designed and run by the non-profit Breakthrough, succeeded in instilling more support for equality among students, including around fertility preferences.

Beyond schools, media campaigns and messaging embedded in films seem important avenues for more innovation and effort. Testimonials from politicians and celebrities about their satisfaction with their daughter-only families seem promising too. As two-child families become typical in India, a quarter of families will be daughter-only naturally, and making this a satisfying outcome is the only way to fully address India's sex imbalance.

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