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Author

Mishra, Ankita, Parasnis, Jaai

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Intentions for a third child: The role of parental sex composition preferences

Ankita Mishra[1] | Jaai Parasnis[2]

[1]Centre for International Development, School of Economics, Finance and Marketing, RMIT University, Australia

[2]Department of Economics, Monash Business School, Monash University, Clayton, Victoria, Australia

Correspondence
Jaai Parasnis, Department of Economics, Monash Business School, Monash University, Wellington Road, Clayton, Victoria, 3800, Australia.
Email: jaai.parasnis@monash.edu

Abstract

We investigate the effect of parents' sex composition preferences on intentions for a third child in India. Parents' preference for sex composition are balanced or mixed gender (a son and a daughter) or gender biased, commonly for a son, and are expected to change over time. Pooled sample of 22,290 couples with two children from the National Family Health Surveys (NFHS), conducted in 2005/6 and 2015/16 is used to analyze couples' sex composition preferences and its effect on third child intentions. Our results show that desire for a son dominates the preference for balanced sex composition over the ten-year period, as couples with two daughters are 7 to 9 times more likely to intend to have a third child. This intention for third child is moderated by women's education and media exposure. Parental preference for a male child continues to be a significant driver for couples exceeding the two children norm in India. Policies promoting women's education will have spillover effects on fertility intentions but would not fully close the gap caused by preference for son. Purposeful policy efforts for changing these preferences need to work synchronously with the broader efforts to address gender inequality.

1 | INTRODUCTION

During the last 25 years, India has undergone significant fertility transition. The total fertility rate in India declined from 3.4 children in 1992–93 to 2.2 children in 2015/16, just above the replacement rate of 2.1 (IIPS & ICF, 2017). In 2015/16, both men and women state an average of 2.2 children as their ideal family size and about 60% of women state their ideal family size as two children (with a further 11–12% stating a preference for fewer than two children) (IIPS & ICF, 2017). While declining fertility rate has been the general trend in many populations, the concentrated efforts by the government, aided by wider socio-economic changes, since the 1960s have succeeded in the establishment of a two children norm. Given the two children norm, what then prompts a couple's intention to have a third child? In this paper, we investigate whether preferences for the sex composition of their children play a role in couple's intentions for a third child in India.

Gender preference theories state that fertility is shaped not only by a preference for the number of children but also by the parents' preference for gender composition of their children. Studies have shown the prevalence of *balanced* or *mixed gender* preference (i.e. a preference to have one child of each sex) in the Western context (Hank & Kohler, 2000). Parents prefer a child of each sex and hence, are more likely to have a third child if the first two children are of the same sex. In contrast, a dominating *preference for a son* has been documented in many Asian countries. Recent evidence for son preference includes Zaidi and Morgan (2016) for Pakistan, Milazzo (2018) for India, Murphy et al. (2011) for China. In these contexts, parents are likely to have another child in their quest for a son. Both forms of sex composition preference are expected to weaken with economic development and social change driving sex equality. Given the changing fertility norms in India, we explore whether we can find evidence supporting either of the above propositions about sex composition preferences and whether the influence of parental preferences changes over time. Does the desire for a son influence fertility intentions in India? Or has the period of fertility transition and economic growth lead to a preference for a balanced sex family composition?

Studies have examined third birth intentions and behaviour for Western countries in different social settings (for example, Tian and Morgan (2015) for United States; Andersson et al. (2007) for Sweden and Finland among others). Evidence of sex composition preferences on parity in Asian context in general, and in Indian context in particular, remain scarce. India provides a particularly relevant setting to investigate the role of parental sex preferences. Since 1990s, India has undergone a rapid and dramatic demographic transition characterised by falling birth rates. At the same time, economic development has accelerated, with the economy growing by seven percent on average between 2007 and 2017 (World Bank, 2019). Progress on gender equity is mixed. Literacy and education levels have increased substantially over time; the proportion of women aged 15 to 49 years with no schooling has decreased from 41% in 2005/6 to 28% in 2015/16 (IIPS & ICF, 2017; IIPS & Macro International, 2007). However, overall female participation in the labour force remains low at 22.1% in 2018 (World Bank, 2019a) and the majority of employed women work in agriculture (IIPS & ICF, 2017). As documented in various studies, strong desire for son has manifested itself through sex ratios at birth and other channels such as health outcomes (Jayachandran & Pande, 2017) and resource allocation for children in the household (Anukriti et al., 2016; Aurino, 2017).

To our knowledge, we are the first to employ the deviation from two children norm to reveal information about parents' preference for family sex composition. We further investigate how these preferences change over time. Using data from the National Family Health Survey (NFHS) over a ten-year period, 2005/6 to 2015/16, we find that sex composition of the family is a significant driver of a couple's inclination for a third child. While the desire for a son can be expected in the Indian context and is documented widely in the literature, this study examines the sex preference hypothesis and show its effect on fertility intentions. We find support for both balanced sex preference and desire for a male child. However, the desire for a male child dominates; intentions for a third child are much higher for couples who have only daughters. This preference for male children, in fact, has increased in the ten years from 2005/6 to 2015/16, even though the proportion of couples intending to have a third child is falling. This shows the persistence of traditional gender norms during a period of an overall decline in fertility.

This paper contributes to the evidence on parental preferences and sex composition of children, as well as to the literature on fertility behaviour in India, with implications for other countries with similar sex preferences and/or fertility transitions. Firstly, we evaluate both, balanced sex preference and preference for sons, within the same context. While the literature has been focused on son preference; our approach enables more comprehensive analysis of sex composition preferences. Secondly, using two waves of a survey administered 10 years apart, we document the changes in parents' sex preferences and their influence on fertility intentions. This enables us to shed light on changes in sex preferences and fertility, thus extending the current focus of literature on parity levels and son preference at a point in time. Lastly, while studies in India focus on analysing overall fertility behaviour, in the present study we analyse the factors that motivate couples to deviate from the two-children norm. We employ couples' perspective, accounting for both the man's and woman's intentions and characteristics, analysing fertility intention as a *negotiated conduct* (Angin & Shorter, 1998). This is particularly germane in patrilineal Asian societies where the fertility behaviour of woman is strongly influenced by her husband's preferences (Mishra & Parasnis, 2017).

While developed countries have been the main focus in the literature on parents' preferences for the sex composition of their children, developing countries undergoing economic, social and fertility transitions provide a pertinent context to investigate the role of gender in family formation. For a given number of surviving children, Rahman and DaVanzo (1993) find that the probability of birth is always greatest for women with no surviving sons in Bangladesh. Particularly important for countries experiencing demographic transitions, they find that sex preference effects become more important when contraception is readily available and when a population has more control over fertility. This tension between the goal of the ideal family size of two children and a parents' desired sex composition of their family is the main focus of the present analysis.

In the following section 2, we review the literature to inform the hypotheses on sex preferences and fertility.

2 | SEX PREFERENCES AND FERTILITY

Parents care not only about the parity but also about the composition of their family. Parents might prefer one sex or for a balance of sex in their desired family composition. Theories suggest that sons and daughters are valued differently in different contexts and this shapes sex preferences. Social, economic and cultural factors interact and may lead to a difference in utility derived from girls and boys, or parents' preferences can result from the constraints they face (Lundberg, 2005). For example, sons could generate higher economic returns and could be valued for continuity of kinship in a patrilineal society while daughters might be able to take on more caring and emotional duties. Traditional societies have preferred a male child, due to a reliance on agriculture, division of labour and social systems favouring men (Hank, 2007). Attitudes that favour sons have been observed in East Asia, South Asia and some countries of the former Soviet Union (for example, see Fuse, 2010). Vu (2014) shows that families in Vietnam indicate a preference for one male offspring. Thus, parents are not indifferent to sex of their children and the preference for girls and boys are unlikely to be symmetric, leading to biased preferences for sex composition of children.

The gender differences in personality and their possible effects on parents' preferences are not captured by the data employed and are beyond the scope of the present paper. Our approach draws on theories showing son preferences as a result of the utility maximization framework of the household. These choices will be affected by systematic socio-cultural factors that affect economic incentives, such as dowry (Walsh, 2011), religious customs, continuation of family name and inheritance in the extended family (Allendorf, 2015).

Arnold and Kuo (1984) incorporate the value of daughters and sons as a determinant of parents' sex preference for offspring. Daughters were desired for their help in the household chores while sons were desired for family name continuation and economic reasons. However, results vary across countries (Karki, 1988) and background characteristics of the families (such as religion and socio-economic status) influence the 'value' placed on sons and daughters. We control for and investigate these channels in the present analysis.

While there seems to be no universal historical, cultural or theoretical foundation from which son preferences may emerge (Arnold, 1997; Bongaarts, 2013; Sen, 1990), strong son preferences are found in patriarchal social structures. We situate and interpret our results in context of India, where there is a strong and continuing evidence for parental preference for their family composition.

In the present analysis, evidence from Asia, particularly from India, in favour of male children guides the first hypothesis to be explored. Given the long held male bias in social, cultural and economic institutions; it is expected that parents want at least one son. Thus, in context of two-children families, couples with two daughters are more likely to intend to have a third child compared to couples who have at least one son. Consistent with the evidence for Asian countries, our first hypothesis is that the desire for a male child has a significant effect on fertility behaviour of Indian couples, supporting the sex biased preference for composition of children. However, this does not rule out the presence of balanced sex preferences.

The desire for balanced sex composition, parents' preference for a male *and* a female child, has been documented for Western countries (Tian & Morgan, 2015) and more recently, in Asian countries. Parental sex preferences are not static. Evidence suggests that societies transition towards a preference for balanced sex composition as they progress, and the perceived value of children changes. If the social institutions and cultural norms which lead to the perceived higher value of sons relative to daughters have changed, we expect a shift in preference from male child to balanced sex composition (Hank, 2007). Economic development is found to be negatively correlated with stated gender bias (Jayachandran, 2015). Thus, societies can transition to lower parity and reduced gender bias.

Sandström and Vikström (2015) show that German couples who married between 1825 and 1874 were more likely to have an additional child if they only had female children. However, those who married during the last quarter of the 19th century, that is, during the early stages of the fertility decline, show a move towards a balanced gender preference. In recent times, Fuse (2013) shows that over the past few decades, preference for children in Japan has progressively shifted from son preference to a discernible daughter preference. Similarly, evidence for South Korea indicates a decline in son preference (Chung & Das Gupta, 2007) and a move towards a preference for balanced gender composition (Park & Cho, 1995). Hence, it is possible that parents' attitudes in India have shifted towards gender balance. We empirically investigate balanced sex composition versus preference for sons by comparing third child intentions of couples with one son and one daughter to couples with both children of the same sex.

Pollard and Morgan (2002) suggest that the overall effect of children's sex composition on parents' fertility decisions decreases as traditional gender norms weaken and parents become indifferent to sex composition of their children. However, there is not enough evidence in the literature, as yet, to arrive at a consensus. Tian and Morgan (2015) find no evidence of weakening of balanced sex preferences in the USA in recent decades. Hank (2007) suggests that given the lack of fully satisfying theoretical explanation, future developments in economically less developed countries in transition are difficult to predict. Fuse and Crenshaw (2006) show that economic development has a curvilinear effect on sex infant mortality ratio, with boys benefitting more than girls at intermediate levels of development.

In the context of social and economic developments in India during the 10-year period under study, we expect the significance of parents' sex composition preferences to decline. However, the direction and magnitude of changes in sex biases need to be empirically investigated. We examine this as the second hypothesis; sex composition of the first two children will have reduced effect on the intention to have a third child over time. Rapid change in fertility norms and high economic growth in India provide an ideal context to explore this proposition.

3 | METHODOLOGY

3.1 | Data

We employ data from a large-scale, multi-round National Family Health Survey (NFHS), conducted in a representative sample of households throughout India. We use the latest two rounds: NFHS 3, conducted in 2005/6, and NFHS 4, conducted in 2015/16. The survey provides detailed information on fertility for women aged 15 to 49. Further, a men's questionnaire was administered in a subsample of households selected for the state module, providing detailed information for the couple. While the survey covers all 29 states of India, we include 17 states in this present analysis. The 17 major states included in our analysis account for roughly 90% of India's population and make up around 87% of India's GDP. The remaining 11 states, not included in the analysis, were small with missing or unreliable data points.[1]

We restrict the sample to women aged 41 and below who currently have two children. In a survey of empirical studies, Hank (2007) points out that sex preferences are unlikely to be present at the lowest parities, where the main decision is whether or when to have a child. Thus, the desired sex composition becomes more apparent once the desired number of children is achieved. Andersson et al. (2006) find no evidence of sex preferences when the transition to parity two is considered, however, an analysis of third births shows a distinct and stable preference for one child of each sex. Further, social norms prescribing the acceptable family size exert considerable influence and deviation from fertility norms require notable personal considerations (Kodzi et al., 2012). Given the prevailing two-children norm in India, the decision about a third child reveals the parents' sex preferences.

All the women in the survey are asked, 'Would you like to have (a/another) child, or would you prefer not to have any (more) children?' The intention for a third child is constructed as a binary variable recoded from the responses to the question for our sample. If both partners in a couple express a desire to have another child, the intention for a third child variable is coded as 1 (0 otherwise). Those who said 'no' or were 'undecided' or were in 'disagreement with each other' or were 'sterilized' or declared 'infecund' were coded as 0.

3.2 | Empirical approach

We estimate the probability of intention for a third child using the following logit model.

$$Prob(y=1|x)=\Lambda(x\beta)=\frac{\exp(x\beta)}{1+\exp(x\beta)} \tag{1}$$

where y is equal to 1 if a couple intends to have a third child, and 0 otherwise. x includes controls for a woman's education, employment, media exposure, age and years of marriage; partner's age, education and employment; and social group, religion, economic status, region and rural location. We also control for woman's *son preference* by including a binary variable which is 1 if a woman wants more boys than girls in her ideal family size. A man's *son preference* is captured in a similar way. These variables capture the stated sex preference and are commonly employed in the literature.

The main explanatory variables of interest are *couples with both daughters* and *couples with both sons*. *Couples with both daughters* is a binary variable equal to 1 if both children are female and equal to zero otherwise. The effect of this variable captures the desire for a male child and enables us to estimate the intention to have a third child in a

[1]The states not included are Chhattisgarh, Jharkhand, Uttrakhand, Goa, Mizoram, Sikkim, Arunanchal Pradesh, Meghalaya, Manipur, Jammu& Kashmir and Nagaland.

quest for a son. The estimated effect of this variable is expected to be positive (hypothesis 1) but the magnitude is expected to decline over time (hypothesis 2). The variable *couples with both sons* is 1 if both children are male and 0 otherwise. A positive effect of this variable on intention for a third child would reflect a desire for balanced sex composition in the family. The change in the estimated effect over time will indicate if the sex bias has shifted away from sons and decreased over time.

Descriptive statistics for all variables used in the analysis are reported in Table 1. Details on the explanation and measurement of these variables are provided in appendix Table A1. The two-children family norm is apparent in the data, with only 5–6% of couples in our sample intending to have a third child. Among couples with two children, 16% have both daughters while 46% have one son and one daughter. Thirteen percent of women and 14% of men express a preference for a son, that is, they want more sons than daughters in their ideal family. Women, on average, are 30 years old and have seven years of education. About 30% are currently employed and a majority, about 80%, have some exposure to media. Men, on average, are 36 years old with 8.5 years of education and almost all are

TABLE 1 Descriptive statistics

Variables	NFHS3 Mean (Std Dev)	NFHS4 Mean (Std Dev)	Pooled Mean (Std Dev)
Couples intending to have third child	0.062 (0.241)	0.054 (0.227)	0.057 (0.232)
Sex Composition			
Couples with two daughters	0.165 (0.371)	0.155 (0.362)	0.159 (0.366)
Couples with one daughter and one son	0.467 (0.498)	0.454 (0.497)	0.459 (0.498)
Son preference			
Women	0.122 (0.327)	0.130 (0.336)	0.127 (0.333)
Men	0.130 (0.336)	0.145 (0.352)	0.139 (0.346)
Women's characteristics			
Age (in years)	29.92 (5.78)	30.82 (5.54)	30.48 (5.65)
Education (in years)	6.66 (5.13)	7.06 (4.87)	6.91 (4.97)
Marital years	11.41 (5.61)	11.96 (5.76)	11.75 (5.71)
Currently working	0.343 (0.474)	0.249 (0.432)	0.284 (0.451)
Exposure to media: No Exposure (%)	20.33	20.84	20.65
Men's characteristics			
Age (in years)	35.65 (6.61)	35.81 (6.85)	35.75 (6.76)
Education (in years)	8.56 (7.66)	8.55 (6.11)	8.55 (6.74)
working	0.991 (0.095)	0.965 (0.183)	0.974 (0.156)
Household Characteristics			
Ethnicity: Belonging to Scheduled Class or Tribe (%)	21.78	29.53	26.60
Wealth status: Poor-Poorest (%)	20.77	30.31	26.69
Rural (%)	46.49	68.08	59.90
Sample Characteristics			
Religion: Hindu (%)	83.84	84.94	84.53
Region (%)			
North	30.63	50.02	42.68
South	58.89	30.65	41.35
East	10.47	19.33	15.98

currently employed. Socio-economic background characteristics of the households are reported in the bottom panel. There are differences in the NFHS 3 and NHFS 4 samples in terms of rural and regional distribution. We control for rural and regional distributions in all estimations to account for these differences. We further analyse the two waves separately to check the consistency of pooled estimations.

4 | RESULTS

The effect of parents' sex composition preferences is estimated by comparing couples with two sons and couples with two daughters with the control group, couples with one son and one daughter. If parents prefer balanced sex composition, couples with both sons and couples with both daughters would be more likely to state intentions for another child. The magnitude of the effect would be similar across those who have daughters and those who have sons. Differences in intentions of these two groups reveal sex bias in parental preferences. The results of the logit estimations are reported in Table 2, those for NFHS 3 in the top panel and those for NFHS 4 in the bottom panel. The table reports odds ratios for the couple's intention for a third child.

Column (1) reports the baseline specification with sex composition of the first two children as the only explanatory variables. The odds of third child intention are 6 times higher (NFHS 3) and 9 times higher (NFHS 4) for couples with two daughters; indicating that the desire for a male child as the main driver behind couple's intention to have a third child. If these intentions mainly reflect the characteristics of a woman, man or the household, controlling for these characteristics should decrease the magnitude and/or significance of the effect. However, the odds to intend to have a third child in specification (2) controlling for couples' individual and socio-economic characteristics, are in fact higher. The odds ratios increase further when the stated son preferences are accounted for in column (3). Controlling for background characteristics and stated preferences reveals the influential role of *actual sex composition* of existing children in parity decisions.

Parental preference for sons is further corroborated by the estimated odds ratio for couples who have both sons. If parents' desire to balance the sex composition of their family is the main driver of intention for a third child, the odds ratio for couples with both sons would be comparable to the estimated odd ratio for couples with both daughters. The estimated odds ratio for couples with both sons is less than 1 and statistically insignificant (except for specification 3 in NHFS 4). Thus, couples who already have 2 sons are less likely to have another child. This evidence supports hypothesis 1; even in 2015/16, parents in India show a strong preference for sons. On the other hand, we do not find evidence for balanced sex preference.

Specification in column (3) additionally controls for the son preferences as stated by the woman and man in the context of questions about their ideal family. Both a woman's and man's stated son preference significantly influences their intention for a third child. The odds for a third child for women who want more sons than daughters in their ideal family are three (in NFHS 3) to four (in NFHS 4) times higher than for women who do not state such a preference. Husbands' son preferences have a similar effect. As shown in Figure 1, for an otherwise average women with two daughters who states son preference, the intention for third child is around 18 percentage points higher compared to the women who has stated no such preferences. The results are similar for men. However, the effect of the *actual* sex composition of the first two children remains statistically significant and the odds ratio in specification 3 is even higher. This shows the strong effect of having two daughters on the intention for a third child. Stated preferences about the ideal number of sons relative to daughters capture sex preferences as indicated by the respondents in a hypothetical ideal setting, but it is noteworthy that the actual sex of the first two children is the main driver of the intention for a third child. For comparison, we calculated odds ratio (OR) for couples with two daughters relative to the couples with both sons.[2] Our results suggest that in all the model specifications, as well as for both

[2]Odds ratio (OR) for couples with two daughters relative to the couples with both sons is calculated by forming the linear combination of coefficients using ‘lincom’ command after running logit estimations in Stata.

TABLE 2 Intention for a Third Child

	Intention for third child		
	(1) Odds Ratio	(2) Odds Ratio	(3) Odds Ratio
NFHS 3			
Couple with both daughters (=1 if both daughters)	6.095*** (0.633)	7.937*** (0.947)	9.894*** (1.267)
Couple with both sons (=1 if both sons)	0.942 (0.125)	0.956 (0.134)	0.760* (0.114)
Women Son preference			3.351*** (0.426)
Men Son preference			4.022*** (0.489)
	(0.2021)	(0.2188)	(0.2304)
Observations	8,449	8,431	8,431
Pseudo R-Square	0.091	0.297	0.357
Controls	No	Yes	Yes
NFHS 4			
Couple with both daughters (=1 if both daughters)	9.245*** (0.808)	9.943*** (0.959)	12.261*** (1.281)
Couple with both sons (=1 if both sons)	0.785* (0.099)	0.794* (0.103)	0.587*** (0.080)
Women Son preference			4.219*** (0.434)
Men Son preference			3.326*** (0.340)
Couple with both daughters Vs Couple with both sons	1.982*** 0.1825	2.066*** (0.1910)	1.973*** (0.2002)
Observations	13,859	13,859	13,859
Pseudo R-Square	0.144	0.305	0.369
Controls	No	Yes	Yes

Notes: The dependent variable, intention for a third child, is equal to 1 if a woman intends to have a third child, 0 otherwise. *Couple with both daughters* is equal to 1 if both children are girls, equal to 0 otherwise. *Couple with both sons* is equal to 1 if both children are boys, equal to 0 otherwise. Standard error in parentheses, Specifications in columns (2), and (3) include controls for woman's education, employment, media exposure, age and years married; man's age, education and employment; and social group, religion, economic status, region and rural location.
***$p < 0.01$,
**$p < 0.05$,
*$p < 0.1$.

the NFHS rounds including the pooled sample, this relative odds ratio is around 2. This implies that couples with both daughters are around two times more likely to intent to have a third child relative to the couples with both sons.

Parents sex preferences are expected to change over time (hypothesis 2). We formally investigate the shifts in sex composition preferences and intention for a third child by pooling NFHS3 and NFHS4 data and estimating the effect over time. These results are reported in Table 3 and the full set of results is reported in Appendix Table A9. The estimated odds ratio for intention of a third child confirm the conclusions from the cross-section analysis. Focusing on time trends reveal two important aspects of intentions for a third child. The odds ratio for time effect is less than 1 and statistically significant ($p < 0.01$). The odds of intending to have a third child in 2015/16 are 0.66 times the odds in 2005/06; confirming the overall decline in fertility and a move towards two children or even one child. While the intention to have a third child has declined over 10 years from NFHS 3 to NFHS 4, the desire for a son acts as a dominant force against the preference for smaller families. In 2005/6, having two girls raised the odds of the intention to have an additional child by a factor of 9.42, increasing to a factor of 12.62 in 2015/16 (calculated as odds ratio for *couples with both daughters* in specification (3) multiplied by odds ratio for interaction effect (*couples*

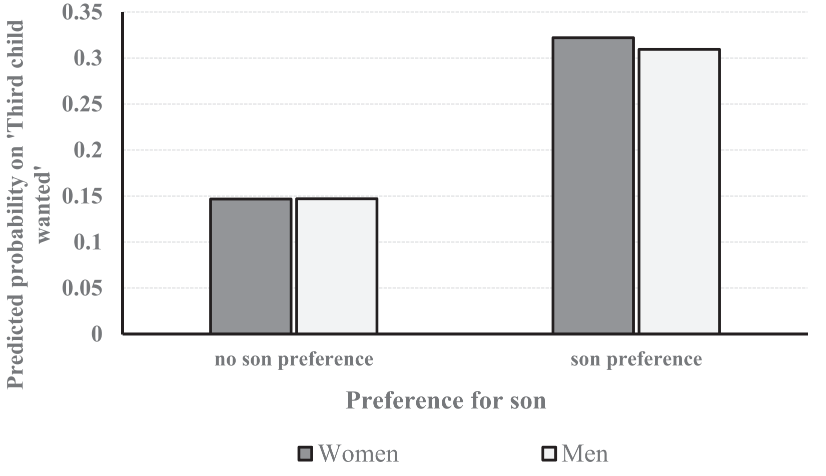

FIGURE 1 Average Adjusted Predictions (AAPs) for 'Couples with Daughters' by Son preference of women and men. *Note*: These average adjusted predictions (AAPs) are computed from Model 3 (as in Table 3). The dependent variable, intention for a third child, is equal to 1 if a woman intends to have a third child, 0 otherwise. *Couple with both daughters* is equal to 1 if both children are girls, equal to 0 otherwise. *Couple with both sons* is equal to 1 if both children are boys, equal to 0 otherwise. All the AAPs that are graphed are significant at <1% significant level. Son preference for women (men) is measured as a binary variable taking value 1 if women (men) stated higher number of boys than girls in their ideal family and 0 otherwise. More details on the construction of this variable is available in appendix Table A1.

TABLE 3 Intention for a third child: pooled estimations

VARIABLES	(1) Odds Ratio	(2) Odds Ratio	(3) Odds Ratio
Couples with both daughters (=1 if both daughters)	6.095*** (0.633)	7.389*** (0.852)	9.423*** (1.154)
Couples with both sons (=1 if both sons)	0.942 (0.125)	0.966 (0.135)	0.755* (0.112)
Time effect	0.744*** (0.078)	0.611*** (0.069)	0.666*** (0.080)
Couples with both daughters × time effect	1.517*** (0.206)	1.411** (0.209)	1.337* (0.207)
Couples with both sons × time effect	0.833 (0.153)	0.815 (0.155)	0.777 (0.155)
Women Son preference			3.880*** (0.309)
Men Son preference			3.624*** (0.282)
Couple with both daughters Vs Couple with both sons	1.748*** (0.2021)	1.965*** (0.2154)	1.962*** (0.2274)
Observations	22,308	22,290	22,290
Pseudo R-Square	0.123	0.299	0.362
Controls	No	Yes	Yes

Notes: Standard error in parentheses,
***p < 0.01,
**p < 0.05,
*p < 0.1.
The dependent variable, intention for third child, is equal to 1 if a woman intends to have a third child, 0 otherwise. *Couple with both daughters* is equal to 1 if both children are girls, equal to 0 otherwise. *Couple with both sons* is equal to 1 if both children are boys, equal to 0 otherwise. Time effect is taken into account by including a dummy variable taking value 1 for NFHS4 and 0 for NFHS3. Specifications in columns (2) and (3) include controls for woman's son preference, education, employment, media exposure, age and years married; man's son preference, age, education and employment; and social group, religion, economic status, region and rural location.

with both daughters × time effect)). Rather than declining, we find that parental desire for a son has a stronger effect in the recent years.

5 | ROBUSTNESS AND FURTHER ANALYSIS

5.1 | Sex Composition and Second Child Intentions

The main analysis focuses on the intention to have another child for couples who already have 2 children. This estimation approach is informed by two factors. Firstly, for the period under analysis, the fertility rate, as well as the ideal family size, on an average, is 2.2 children. Data suggests that, in terms of fertility, having 2 children has become the norm. It then becomes pertinent to investigate why couples deviate from this norm. Secondly, studies of parental preferences of the sex of the child (such as Hank, 2007 and Andersson et al., 2006) show that at lower parities, couples' decision is centred on the number of children (whether to have a child and how many) rather than revealing sex preferences.

These two arguments suggest that the sex preferences may not play a dominant role in the decision to have first two children. However, in context of India, it is possible that the sex composition of first 2 children is not random. In our sample (as reported in Table 2), 47% in NFHS 3) and 45% (in NFHS 4) of the couples have 1 daughter and 1 son. Of the remaining, more couples have 2 sons (37% in NFHS 3 and 39% in NFHS 4) than 2 daughters (16% in NFHS 3 and 15% in NFHS 4). We investigate the sensitivity of our results, in particular, the possibility that third child intention may underestimate preference for son.[3] For this robustness check, we use the sample of couples with only 1 child and investigate their intention for another (second) child. These results are reported in Table 4. Appendix Table A2 reports the descriptive statistics for this sample. In this sample of couples with one child, 46% in NFHS 3 and 43% in NFHS 4 have a girl. Around 46% of couples show inclination to have another child.

Note that while the samples are different, estimations in Table 4 follow the specifications reported in Table 3. The estimated odds ratio reported in the first row in Table 4 shows that couples whose only child is a daughter have 1.5 times the odds for intention for a second child compared to couples who have a son. For comparison, having first two children as girls increases the probability of intention to have a third child by 6 times, compared to couples who have at least one son (Table 3). Thus, couples with one daughter are more likely to have another child but the effect of children's sex is much smaller for intention to have another child when the parity is equal to 1 than when the parity is equal to 2. We also find evidence supporting the 2 children norm. The time effect is not statistically significant, unlike the noticeable decline in intention for a third child from 2005/06 to 2015/16, we do not observe a change in intention for a second child.

In this sample of couples with 1 child, 14.5% women and 13% men state a preference for son in NFHS 3, increasing to 15% and 18% for women and men respectively in NFHS 4. Odds ratio in column 4 of Table 4 show that couples with son preference are less likely to go for a second child if their first child is male. This observation is further strengthened when we interact son preference with sex of first child. Couples who have a daughter and express a preference for son have higher odds of intention for a second child. Thus, there is evidence that couples' preference for son has an influence on intention for a second child. The effect of sex composition of children on both, the intention to have a second child and the larger effect on intention to have a third child, should be considered.

5.2 | Women Characteristics and Third Child Intentions

We further explore how individual characteristics of women shape the intentions for a third child.

[3]Similarly, the gap between second and third child would relevant, for families which have 3 (or more) children. Mishra and Parasnis (2021) show how son preference affects *actual* fertility behaviour.

TABLE 4 Intention for a second child: pooled estimations

VARIABLES	(1) Odds Ratio	(2) Odds Ratio	(3) Odds Ratio	(4) Odds Ratio
Couples with daughter	1.5162*** (0.087)	1.499*** (0.0966)	1.447*** (0.094)	1.269*** (0.085)
Time effect	0.960 (0.047)	1.070 (0.063)	1.067 (0.063)	1.076 (0.063)
Couples with daughter × time effect	1.119 (0.081)	1.026 (0.084)	1.026 (0.084)	1.007 (0.083)
Women Son preference			0.765*** (0.045)	0.641*** (0.046)
Men Son preference			0.802*** (0.045)	0.654*** (0.046)
Couples with daughter × son preference				1.724*** (0.217)
Couples with daughter × husband son preference				1.778*** (0.211)
Observations	13,320	13,316	13,316	13,316
Pseudo R-Square	0.011	0.176	0.179	0.181
Controls	No	Yes	Yes	Yes

Notes: Standard error in parentheses,
***$p < 0.01$,
**$p < 0.05$,
*$p < 0.1$.
The dependent variable, intention for third child, is equal to 1 if a woman intends to have a third child, 0 otherwise. *Couple with daughter* is equal to 1 if the first child is a girl, equal to 0 otherwise. Time effect is taken into account by including a dummy variable taking value 1 for NFHS4 and 0 for NFHS3. Specifications in columns (2), (3) and (4) include controls for woman's son preference, education, employment, media exposure, age and years married; men's son preference, age, education and employment; and social group, religion, economic status, region and rural location.

FIGURE 2 **Average Adjusted Predictions (AAPs) by Women's education**. *Note*: These average adjusted predictions (AAPs) are computed from Model 3 (as in Table 3). The dependent variable, intention for a third child, is equal to 1 if a woman intends to have a third child, 0 otherwise. *Couple with both daughters* is equal to 1 if both children are girls, equal to 0 otherwise. *Couple with both sons* is equal to 1 if both children are boys, equal to 0 otherwise. All the AAPs that are graphed are significant at <1% significance level.

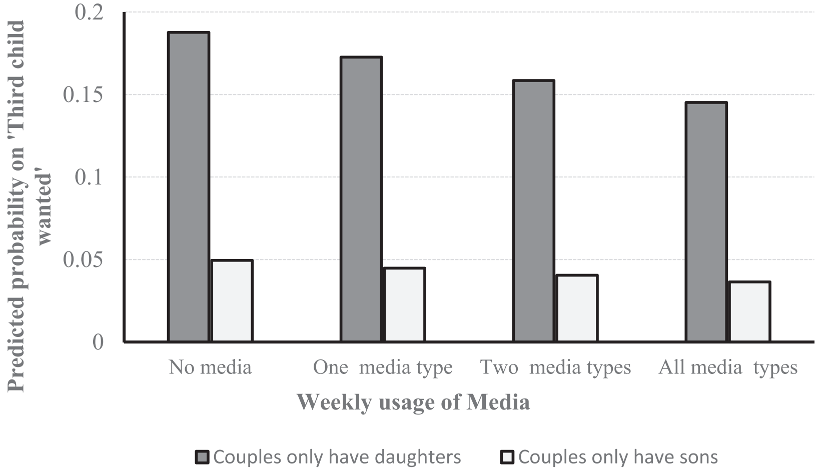

FIGURE 3 **Average Adjusted Predictions (AAPs) by Women' s media usage**. *Note*: These average adjusted predictions (AAPs) are computed from Model 3 (as in Table 3). The dependent variable, intention for a third child, is equal to 1 if a woman intends to have a third child, 0 otherwise. *Couple with both daughters* is equal to 1 if both children are girls, equal to 0 otherwise. *Couple with both sons* is equal to 1 if both children are boys, equal to 0 otherwise. All the AAPs that are graphed are significant at <1% significance level.

As shown in Figure 2, the predicted probability of having a third child is lower for the couples with two sons compare to the couples with two daughters at all education levels. Women's education has a clear negative effect on their desire for third child. To put things in perspective, for an otherwise average couple with two daughters where woman has no education, probability of third child intention is 22%. This probability drops by 5 percentage points if the woman has 6 years of education and by 9 percentage points if the woman has 12 years of education.

In Figure 3, we plot the predicted probabilities of 'third child intention' for couples with both daughters and couples with both sons by the types of media woman engages in a week. The results are similar as women's education years; though education of woman has a much stronger influence on the desired family size of the couples compared to the types of media women are exposed to. In addition to these we also explore the heterogeneity by religion and household's economic status. These results, in Appendix Figure A1 and A2, show that the intentions for third child are lower for Hindu households and richer households. However, son preference is clearly evident across all households.

We show that the effect of the actual sex of the first two children overrides the stated son preference. Brunson (2010) surveys young mothers from Nepal and found that these women reluctantly admit to needing a son, revealing a discrepancy between their initially stated reproductive ideals and their ultimate behaviour. The desire for a son and its influence on reproductive behaviour is salient, although changing social context may be prompting moderation in parents stating their sex preferences. There is no such moderation in son preference revealed by parents' fertility intentions in response to having two daughters. While the economic imperatives for a son might decline with development but cultural preferences of a son remain (Vu, 2014).

5.3 | Sensitivity checks

In the analysis so far, couples are identified as having an intention for a third only if both partners agree. To check the sensitivity of our results to definition of third child intentions, we estimate in specification reported in Table 3 (pooled sample) with an alternative definition. For this exercise, the dependent variable is defined as: if *either* of the parents express a desire to have another child, the intention for a third child variable is coded as 1 (0 otherwise). The results, as reported in the Appendix Table A3, are qualitatively similar to our original specification. The odds ratio of intention for a third child for couples with two daughters and the influence of son preference of the mother on the intention for third child are stronger, compared to results from original specification in Table 3.

The cross-section nature of employed data is one possible limitation of the study. Since we observe the couples at a point in time, there is a possibility of under-sampling of the couples with two daughters. Couples who had two daughters as their first two births (around 16% of couples in the sample) may progress to a third child at a faster rate, and so they are less likely to be captured in our sample. The average age gap between first two children if the first child is a daughter is 3.25 years while it is 3.17 years if the first child is boy. This indicates that the age gap between two children does not differ much (less than a month) based on the sex of the first child. Formally, we also run a regression including age gap between the first two children as an additional variable in our most general specification, i.e., Model 3(as in Table 3). These results (reported in Appendix Table A4) suggest that with an increase in gap, couple are more likely to intend to have a third child. However, inclusion of this variable does not affect our findings or change the effect of sex composition variables on "intentions for third child".

The use of sex selective abortions is a potential concern affecting both the composition and size of a family (see Anukriti et al., 2016; Arnold et al., 2002). While we cannot completely account for its effect, the focus of the present paper is how existing family composition (or in other words, realized family composition) affect the intention for third child. NFHS 3 and NFHS 4 surveys have a question on whether ultrasound was conducted during pregnancy if a birth or termination is registered. In the full sample, this variable is available for 36% of women in NFHS 3 and 32% of women in NFHS 4. Ultrasound use began to emerge during 1980s and use of this technology for sex selection became feasible much later (Anukriti et al., 2016). Thus, sex selective abortions are more of a concern for relatively younger women in our sample. To the extent family size is affected by sex selective abortions, our results estimate the lower bound of the effect of parents' son preference on intentions for the family size.

We also check the sensitivity of results to sample by including all states of India (Appendix Table A5), all age groups from 15 to 49 years (appendix Table A6) and using couples' joint preference (appendix Table A7). The results from these supplementary analyses are in line with the main findings. In further analysis, we estimate two different models where the main independent variable 'gender composition' conforms to different theories. This analysis is reported in Appendix 2.

We check for selection on unobservables using the approach proposed by Oster (2019). We estimate the specification reported in Table 3 using the linear probability estimations. The results from Oster tests are reported in Table A8. These suggest that effect of the variable "couples with both daughters" is likely to suffer from omitted variable bias only in model specification 1 when sufficient observed controls are not included. This is unlikely to be a concern after inclusion of relevant controls ($\delta > 1\, in\, Model\, 3$). However, same cannot be said for the effect of "couples with both sons" whose estimates are likely to suffer from omitted variable bias and are marginally significant at 10%. Our main finding that couples with both daughters have higher intention of third child remains robust to selection on unobservables.

6 | CONCLUSION

This analysis investigates parental preferences of their children's sex composition and its effect on family size. In the context of changing fertility behaviour in India, we explore the balanced sex preferences versus a biased preference for a male child and examine if these preferences have changed over time. Couples are strongly influenced by the desire for a male child in India. Despite overall changes in the period from 2005/6 to 2015/16, the desire for a male child is dominant and continues to exert significant influence on fertility intentions. While couples intend to have another child if their first two children are of the same sex (balanced sex preference), this effect is insignificant if the couple already has a son. Parents preferred sex composition of their children has neither shifted away from sons towards balanced sex composition, nor has it declined over time.

This study shows the persistence in the desire for a male child during a period of rapid fertility decline. While parents show a desire to adhere to the contemporary norm of limiting fertility to two children, they are nevertheless willing to have another child to fulfil their desire for a son. These conflicting trends, of an overall decline in fertility but the persistence of son preference, pose a challenge for policy makers in achieving any further reductions in fertility.

Economic development has led to improvements in women's education, employment and exposure to the wider world through the media. These factors are associated with women's empowerment and are significant in the move towards smaller families. However, we find that their effect on the intention for a third child are small and cannot counteract the fertility response of exceeding the two children norm to fulfil the desire for a male child. Policy response, hence, has to directly focus on changing sex preferences, rather than relying on overall improvements in the country and/or in women's education and employment to balance the preferences for the sex of their children.

However, it has to be acknowledged that preferences are shaped by incentives built in the socio-economic structures. For example, discrimination against women in labour market, in financial sphere, in inheritance laws and cultural practices skew the parents' preferences in favor of a son (Das Gupta et al., 2010). Norms may not respond to direct policy messages or actions, but policies can change the general environment in which people act. Any attempts to change these preferences need to work synchronously with broader efforts to address gender inequality.

Our results show that while couples with both daughters are more likely to intend to have a third child, this effect is moderated by women's education and media exposure. Women's education has a particularly strong effect, with each year of education lowering the third child intentions especially for couple with both daughters. This suggests that policies promoting women's education will have spillover effects on fertility intentions but it does not fully close the gap caused by preference for a son. Den Boer and Hudson (2017) show the importance of multi-pronged approach of changes in patrilineal laws, pressure from civil society along with addressing gender inequality.

Fertility preferences in India have moved towards smaller families, with two children families becoming the standard. Only 5–6% of couples (aged between 15 and 49) with two children intended to have a third child over ten years to 2015/16. We find that *desire for male child* is the main driver of the intention for a third child and its effect is increasing, rather than decreasing, with time. Gains in women's education and employment are not enough to counteract the fertility response to their preference for a son. Government and non-government sectors are trying to promote girl children through incentives and through media campaigns. Our finding that the desire for a male child is the main reason couples deviate from the two children norm supports these measures as well as the need for a direct policy focus on changing deep-rooted male child biased preferences. Given the importance of gender norms and their implications, further research on factors shaping and changing these norms would help inform such policies.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from HYPERLINK "https://urldefense.com/v3/__http://www.dhsprogram.com/__;!!N11eV2iwtfs!oTZygtBBqWkRdVkJnzXxc7Fe_p1QrBFEUeCwYKsUl61sLIz-fw0abcpky7FgjQT9I_s1jxj2tVTNbPP_aSfGTQ$" www.DHSprogram.com. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the authors with the permission of HYPERLINK "https://urldefense.com/v3/__http://www.dhsprogram.com/__;!!N11eV2iwtfs!oTZygtBBqWkRdVkJnzXxc7Fe_p1QrBFEUeCwYKsUl61sLIz-fw0abcpky7FgjQT9I_s1jxj2tVTNbPP_aSfGTQ$" The Demographic Health Survey Program.

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