# Fertility Outcomes and Well-being in Post-Reproductive Ages: Evidence from India

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Preliminary draft — please do not cite or circulate

#### Abstract

We study the effect of fertility outcomes on parental well-being in post-reproductive ages. The context is India, where the gender of the firstborn is plausibly random and parents demonstrate son-preferring fertility behaviors — parents with firstborn daughters end up having more children in an attempt to have the desired number of sons. For both women and men, we find that having a firstborn daughter leads to lower subjective life satisfaction and financial independence in post-reproductive years. For women, a firstborn daughter leads to greater labor force participation in post-reproductive ages. These results are plausibly driven by the facts that families with daughters face a greater financial burden on account of dowry, and that women in such families undergo a larger number of abortions over their reproductive years.

#### JEL Classification: I19, J13, J16

Keywords: elderly, post-reproductive, son preference, life satisfaction, fertility, gender

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### **1** Introduction

The birth of children constitute major life events one experiences over the course of one's reproductive years. In India, the context of the study, most couples bear more than one child (Anukriti et al. (2022b)). Indian parents are also known to have a preference for having sons — in a bid to have at least one son, parents with firstborn daughters have more children than their counterparts with firstborn sons (Alfano (2017), Milazzo (2018), Anukriti et al. (2022b)). Relatively little is known about how fertility outcomes affect parental well-being. A few recent papers focus on outcomes in reproductive ages, and find mixed evidence. Heath and Tan (2018) find that women with more daughters enjoy greater autonomy while contemporaneous works by Milazzo (2018) and Weitzman (2020) document that women with more daughters are likelier to be subjected to domestic violence and to be anaemic. However, the effect of fertility outcomes on parental well-being in post-reproductive ages remains unexplored.

In this paper, we study the effect of fertility outcomes on parental well-being in postreproductive ages. We exploit the fact that Indian parents do not appear to attempt to actively manipulate the gender of their firstborn child. Therefore, the gender of the firstborn child is determined by nature, and is completely random (Almond and Edlund (2008), Abrevaya (2009), Bhalotra and Cochrane (2010), Rosenblum (2013), Alfano (2017), Anukriti et al. (2022b)). Son preference manifests in subsequent fertility choices in the following way: Parents with firstborn daughters go on to have more children over their reproductive years, and end up, on an average, having more daughters. The exogeneity of the gender of firstborn child allows us to estimate the causal effect of having a firstborn daughter on parental outcomes in post-reproductive ages.

We use data from the first wave of the Longitudinal Ageing Study in India (LASI hereafter). Designed as a panel survey of the elderly, the first wave of the LASI (conducted in 2017-19) provides, for the first time in the Indian context, nationally representative data on a rich set of outcomes for women and men in their post-reproductive years. We find that having a firstborn daughter leads to lower subjective life satisfaction in post-reproductive years for both women and men. Both women and men with firstborn daughters report being less financially independent in older ages, possibly indicating higher burden of dowry to marry off daughters (Anukriti et al. (2022a)). Moreover, women with firstborn daughters report experiencing more abortions. Thus, greater financial stress associated with marrying off daughters, and, in the case of women, the long-term effects of abortion (Babu and Verma (1998), Singh et al. (2018)) are plausible channels driving our findings.

This paper is related to a rich literature that has studied parental preferences for children. This literature documents strong parental preference for having sons rather than daughters (Clark (2000), Jensen (2003), Basu and De Jong (2010)) in the Indian context. The parental preference for sons translates into discrimination against girls and women at every stage of life. As early as 1992, Sen (1992) pointed out that the population sex ratio was male-biased. Subsequent research has documented female disadvantage at each phase of life, starting as early as the prenatal stage (Bharadwaj and Lakdawala (2013), Bhalotra and Cochrane (2010)), continuing through early childhood (Jayachandran and Kuziemko (2011), Oster (2009), Rose (1999)), and persisting through reproductive and post-reproductive years (Ackerson and Sub-ramanian (2008), Jejeebhoy and Sathar (2001), Calvi (2020)).

Relatively little is known about the consequences of parental fertility choices on their own well-being, and the few studies that exist focus on women of reproductive age (Milazzo (2018), Heath and Tan (2018), Weitzman (2020)). While some of the consequences (like serial pregnancies) of bearing a firstborn daughter are gendered and disproportionately affect women, one can also think of consequences that are either gender-neutral or disproportionately affect men. To the extent that women and men hold the same religious beliefs, the socio-religious importance of having a son is likely to be somewhat gender-neutral. By contrast, the financial burden associated with having more daughters is likely to disproportionately affect men since they are typically regarded as the sole breadwinners in the Indian context. Surprisingly, little is known about the effect of fertility outcomes on indicators of men's well-being.

Further, given that the gender composition of children is not only imbued with socio-religious significance (Jayachandran and Pande (2017)) but also has salient financial ramifications (Alfano (2017), Bhalotra et al. (2020), Anukriti et al. (2022a)),<sup>1</sup> the consequences of fertility outcomes are likely to persist into the elderly years of of a couple. However, to the best of our knowledge, this question has not been studied in the existing literature.

The current paper speaks to this gap, and makes two contributions to the literature. First, this is, to the best of our knowledge, the first study that establishes a causal link between parental fertility choices in post-reproductive ages. Second, to the best of our knowledge, this is the first paper that documents effects of fertility outcomes on males. These findings are important for the design of policies relating to government transfers/pensions to the elderly. These findings indicate that there may be a case for conditioning transfers on fertility history. Further, elderly couples who have a larger number of daughters may stand in greater need for psychosocial support, and such resources should target this demographic.

The remainder of the paper is structured as follows: Section 2 describes the data. Section 3 details the empirical strategy. Section 4 discusses results. Section 5 concludes.

#### 2 Data

This study employs data from the first wave of Longitudinal Aging Study in India (2017-19). Longitudinal Aging Study in India (LASI) is the first nation-wide population based survey of health, economic and social well-being of the Indian population aged 45 years and older. LASI is a nationally representative panel dataset in India. It is designed to be representative of India's older population. It is part of a network of studies on aging around the world like the Health and Retirement Study (HRS) in the United States and its sister surveys in Asia, Europe, Mexico, and other regions. The LASI is India's first and world's largest survey to understand social, economic, health and psychological dimensions of the ageing process. The

<sup>&</sup>lt;sup>1</sup>Households with more daughters have a lower lifetime income because of the customary obligation to pay large dowries upon daughters' marriage.

first wave of LASI conducted in 36 states/union-territories has a sample size of over 72,000 individuals, women aged 45 and above and their spouses irrespective of age. It is designed to provide comprehensive data on the key economic, social, and health characteristics like life satisfaction, quality of health and labour force participation of elderly people. We use data on women aged less than 100 years and their spouses who have at least one child ever born. Gender of first-born child to a mother was constructed from the birth history data. Table 1 provides summary statistics for the sample of elderly women and their spouses.

The primary analysis of this study utilises data from the wave-1 of LASI dataset, specifically focusing on measures related to life satisfaction, quality of health, and labour force participation. The outcome variables are both binary indicators and standardized measures. Standardized outcomes are the normalized indices created by aggregating multiple indicators of interconnected outcomes. These indices have a mean of zero and standard deviation of one.

We construct two outcomes related to life satisfaction using the available information from our dataset. One related to the satisfaction with life as a whole, and other related to satisfaction with current living arrangement. We use data on three indicators of better life quality condition of life is excellent, got important things that she/he want, and would like to live the same life gain — to compute a normalized index for quality of life. On the quality of health we have both binary indicator and a normalized index for better health condition. Our main analysis also has outcomes related to the labour force participation of these elderly individuals. These labour force participation outcomes are current working status and type of work he/she does — part-time or full-time. As individuals age, their financial dependence often increases, leading to increased reliance on family and other support networks. We use the available data to analyse the overall financial dependence, who provides this financial assistance and the purpose of this financial support.

Descriptive statistics on main variables for the elderly women and men are presented in Panel A and Panel B of Table 1, respectively. The average woman was born in 1960 and married in 1978 and the average man was born in 1958 and married in 1980. Men are more likely than women to have attended school (69% men and 41% women). About 50% women and 52% men are satisfied with their life as whole. On average, 43% of women and 50% of men have better health conditions. Men are slightly more likely to work in the older age (68% men and 60% women). About 41% of women and men have the first-born girl child and the average number of children is 3-4. About 75% elderly women and men belong to lower caste, and about 35% of sample is urban.

### **3** Empirical Strategy

Our empirical strategy aims to identify the causal effect of gender of first-born child on various economic, health and social well-being outcomes of elderly women and elderly men such as life satisfaction, better health conditions, quality of life and labour force participation. The identification assumption underlying our empirical strategy relies on the fact that the gender of a first-born child is random. The validity of this assumption that there is no selection in the sex of the first child is supported both by literature and empirical evidence (Gupta (1987), Dahl and Moretti (2008), Bhalotra and Cochrane (2010), Jha et al. (2011), Rosenblum (2013), Anukriti et al. (2022b), Heath and Tan (2018), Milazzo (2018)). First, we report the differences in the predetermined outcomes such as - education, residence, religion, caste, age at marriage, childhood health, father's education and mother's education — for the sample of elderly women and men by the sex of their first-born child. If the gender of first-born child is random, there should be no significant differences in these observable predetermined characteristics among women and men with first-born girls and first-born boys. Figure 1 reports these results. We find that women and men with a first-born girl or boy do not show any significant differences in the predetermined characteristics. Second, the advent of prenatal sex determination technologies in the late 1980s that facilitated the sex-selective abortions in India could make gender of first-born endogenous. Fortunately, there is no evidence of sexselective abortions at first birth and if there is any that is only at higher order births. When the sex-determination techniques (like ultrasound) started to become widespread in 1990s, the sex ratio for first births is in the biological range (equal to 0.514) and the sex ratio is above biological range only for the higher births (Heath and Tan (2018), Milazzo (2018)). Finally, we argue that gender of first born child is random, as major proportion of Indian parents want at least one daughter. National Family Health Survey (NFHS) dataset shows that about 75% of Indian women desire to have atleast one daughter (Milazzo (2018)).

To maintain the causal interpretation of our results our main analysis focuses on the gender of first-born child. To examine the causal effects of first-born daughter on the outcomes of elderly women, we estimate the following regression equation for women 'i' living in district 'j' who was born in year 'b' and got married in year 'm':

$$Y_{ijbm} = \alpha + \beta FirstGirl_i + X'_{ijbm} \Gamma + \theta_j + \gamma_b + \mu_m$$

$$+ \phi_j \times \lambda_b + \rho_j \times \omega_m + \epsilon_{ijbm}$$
(1)

Here,  $FirstGirl_i$  is an indicator for gender of first child of women *i* being female.  $X'_{ijbm}$  denotes a vector of rich individual and household characteristics.  $\theta_j$  denotes a vector of district fixed effects,  $\gamma_b$  denotes a vector of women's birth year fixed effects , and  $\mu_m$  denotes a vector of women's marriage year fixed effects. Further, in the stricter specifications we also control for the interactions of district fixed effects with women's birth year fixed effects ( $\phi_j \times \lambda_b$ ) and interactions of district fixed effects with women's year of marriage fixed effects ( $\rho_j \times \omega_m$ ). Under the assumption that there is no sex selection in the gender of first child, the estimated  $\beta$  from the equation 1 gives the causal effect of having a first-born girl on various outcomes of elderly women such as life satisfaction, health conditions and labour force participation. The regression equation 1 controls for district fixed effects, women's birth year and marriage year fixed effects and district specific time trends. Therefore, the coefficient of interest,  $\beta$  is identified based on within-district variation in the outcome variable not correlated with time. We estimate the specification presented in equation 1 for sample of elderly men as well.

### 4 **Results**

#### 4.1 Main Results

Given that gender of first-born child is plausibly exogenous, we estimate equation 1 to show that first-born girl predicts various socio-economic outcomes of parents in their old age. Our main analysis focuses on life satisfaction, quality of life, and labour force participation of elderly women as well as elderly men. Results on life satisfaction and quality of life for the elderly women are presented in Table 2. The sample comprises the elderly women of the age 40-100 years. In columns 1,2 and 3 of Table 2, the outcome variable is an indicator for satisfaction with life as a whole. Column 1 estimates a version of equation 1 that controls for a set of rich individual and household characteristics such as urban residence, religion and caste of woman, number of children, indicators of woman has any schooling, watches TV and reads newspapers, and monthly per capita consumption expenditure (MPCE) quintile. Our coefficient of interest is -0.0186, and is statistically significant at 1%. Since the outcome variable is a binary indicator of life satisfaction, therefore this coefficient may be interpreted as: elderly women who have first-born girl child are 1.9 percentage point (about 4% of mean) less likely satisfied with their life (as a whole) as compared to the elderly women in the control group — women with first-born boy. Although the specification in column 1 controls for the above mentioned variables that co-vary with the treatment indicator, we include further restrictions for the omitted variables in column 2. In column 2 we add district fixed effects, woman's year of birth fixed effects, and woman's year of marriage fixed effects. These fixed effects absorb the unobservables that may vary by district, year of birth and year of marriage of elderly woman. The coefficient in column 2 remains stable and statistically significant at 1%. Therefore, this coefficient is identified based on exposure to treatment with a district, birth cohort and year of marriage of woman. Further, to control for differential time trends in each district we add two interactions of woman's year of birth and district fixed effects, and woman's year of marriage and district fixed effects in column 3. As column 3 of Table 2 show, this result is robust to the inclusion of district specific linear trends.

In columns 4, 5 and 6 of Table 2, the outcome variable is a standardized index of quality of life of elderly women. This index has a mean of 0 and standard deviation of 1 and has been created from three binary indicators of better life quality of woman — condition of her life is excellent, got important things that she wants and wishes to live the life again. We find that quality of life of elderly women with first-born girl (i.e., treatment group) declined by about 0.024 standard deviation relative to the corresponding measure of quality of life of elderly women with first born boy (i.e., control group). As columns 4, 5 and 6 show, this estimate is robust to the inclusion of controls for various individual and household characteristics, district fixed effects, woman's year of birth and year of marriage fixed effects, and district specific linear trends.

The main analysis of our paper not only focuses on elderly women, but we complete the analysis of the effects of son-preferences on various socio-economic outcomes of men as well. We document the estimated effects of first-born girl on the life satisfaction and quality of life for the elderly men of the age 40 to 100 years. Results are presented in Table 3. As columns 1, 2 and 3 of Table 3 show, that elderly men who have first-born girl child are 1.7 to 2.3 percentage point (about 3-4.5% of mean) less likely satisfied with their life (as a whole) as compared to the elderly men in the control group. These results are robust to the inclusion rich set of additional controls, district and time fixed effects, and district specific linear trends. We also report the results on quality of life in columns 4, 5 and 6 of Table 3. Across different specifications in columns 4-5, the coefficient on the first-born girl is negative. The estimated effect is statistically significant (at 10%) in column 4, indicating that that quality of life of elderly men with first-born girl declined by about 0.02 standard deviation relative to the corresponding measure of quality of life of elderly men with first-born boy. However, the coefficient in columns 5 and 6 are negative but statistically insignificant. Therefore we don not observe any meaningful effect of first-born girl on the quality of life for elderly men in columns 5 and 6 of Table 3.

We consider life satisfaction and quality of life of the older adults in India in Tables 2 and 3. It is also important to know how the son-preferences affect the health conditions and emotional well-being among the older adults. Fortunately, the LASI-1 contains information on the health conditions and outcomes related to emotional well-being such as depression. We use this information to study how the first-born girl predict these outcomes for both elderly women and elderly men. Results are presented in Tables A1 and A2. For the elderly women, results indicate a decline in subjective health conditions and some signs of increase in depression (see Table A1). Relative to the elderly women with first-boy, elderly women with first-born girl are 1.3 percentage points (about 3% of mean) less likely have better health conditions. Elderly women in the treatment group (i.e., with first-born girl) are about 1 percentage point (about 2.3% of mean) more likely to suffer from depression as compared to the elderly women in the control group (i.e., with first-born boy). For the sample of elderly men, results are statistically insignificant for the conditions of health and depression outcomes, except in column 2 (see Table A2). As the coefficient of interest in column 2 of Table A2 show, that the elderly men with first-born girl are 1.1 percentage point (about 2.3% of mean) less likely have better health conditions as compared to the elderly men with first-born boy.

Almost 75% of elderly persons in India are economically dependent on others in some way. This economic instability may push the older adults into the labour force in the stages of their later life. We study the effects of the son-preferences on the labour force participation among the older adults in India. We use the available information from the LASI-1 dataset on the outcomes related to labour force participation and report our analysis on two related outcomes: the current working status of older adult and status of part-time work of these older adults. Results for elderly women are presented in Table 4. Across different specifications in columns 1-3, the coefficient on first-born girl is positive and statistically significant, indicating that older women with first-born girl are more likely to be currently working as compared to the older women with first-born boy. Relative to the elderly women with first-boy, elderly women with first-born girl are 1.1 to 2.3 percentage points (about 2-4% of mean) more likely

to work in the later stages of their life. These women are also 2.3 percentage points more likely to work part-time as they get older (see columns 4, 5 and 6 of Table 4). Results on labour force participation of elderly men are presented in Table A3. These results are almost in line with the results we have for the labour force participation of elderly women. Older men with a first-born girl are more likely to be working in the later stages of their life as compared to older men with a first-born boy, and they are also more likely to work part-time as they age.

We examine the effect of first-born daughter on various socio-economic outcomes for the women and men in their post-reproductive ages. Gender of the first-born is random and is a post-marital event in the Indian context. To discern the true causal effects of fertility outcomes, we conducted a placebo test. We analyse to uphold the principle that placebo outcomes should remain independent of the treatment, facilitating more accurate assessments of causal effects and contributing to the credibility and robustness of our results. We consider outcomes of the pre-marital events such as childhood health and childhood economic conditions of elderly women, and labour force participation before marriage. Table 6 reports the results. As columns 1-9 of Table 6 show, that we do not observe any significant and meaningful effects of the having a first-born girl on these placebo outcomes. This eliminates the bias and confirms the validity of our findings.

#### 4.2 Mechanisms

As we show, son-preferring fertility behaviours in India reduced the life satisfaction and quality of life, and increased labour fore participation of older adults ( both women and men). Fertility outcomes, also reduced the subjective health conditions of elderly women, but could not predict the health conditions of elderly men. There may be two sets of channels through which we can explain the effects of son-preferences on above socio-economic outcomes of older population in India. First, women with first-born daughters are more likely to be subjected to domestic violence as compared to the women with first-born sons (Milazzo (2018), Weitzman (2020)). Son-preferences in India have been linked with women's status with in the household by qualitative literature as well (Gupta (1987), Puri et al. (2011)). The sonpreferring behaviours in India is credited to the persistent social norms and religious beliefs (Bhat and Zavier (2003), Jayachandran and Pande (2017)). Also well documented is the fact that the eldest son usually takes care of aged parents and inherits their property (Dyson and Moore (1983), Gupta (1987)). Consequently, as parents age, they are likely to become financially dependent on their sons, which motivates son-preferring behaviors in India. Financial dependence reduces your chances of being satisfied with your life. Measures of financial dependence of an individual make a direct contribution to her/his happiness or life satisfaction (Diener and Oishi (2000), Diener and Biswas-Diener (2002), Johnson and Krueger (2006)). Consistent with this literature, we find that women and men with first-born daughters are more financially dependent in the older age as compared to women and men with first-born sons. Columns 1-3 and 7-9 of Table 5 report the results. Relative to the women with first-born son, elderly women with first-born daughter are 1.43 percentage points more likely to be financially dependent on others. For the elderly men we do not see any significant effects of son-proffering behaviours on their financial dependence in general. However, we have disaggregated our analysis to examine the extent of financial dependence across other dimensions, specifically focusing on the sources from which older women and men seek this financial support. We use the information from the LASI dataset and examine whether the source of financial dependence are sons or daughters. Results are reported in Tables A4 and A5. Parents in India with first-born daughters end up having more number of children and higher number of daughters as compared to the parents with first-born sons. Hence, it is plausible that parents who have an eldest daughter and a higher number of girls may experience greater financial reliance on their daughters in comparison to their sons. Consistent with this, we find that both elderly mothers and fathers with first-born girl child are more likely to be financially dependent on daughters and less likely to be financially dependent on sons (see Table A4 and A5). Elderly people with firstborn daughters report less financial independence as they age, probably due to the increased burden of dowry to marry off daughters (Anukriti et al. (2022a)). This

rise in financial dependence may possibly explain our findings of decreased life satisfaction and quality of life in post-reproductive ages of older women and men.

Second, a rich literature at the intersection of economics and health has studied the link between abortions and reproductive health of women, both globally and specifically within the context of India.(Dhall and Harvey (1984), Babu and Verma (1998), Duggal and Ramachandran (2004), Ganatra et al. (2017), Singh et al. (2018), Yokoe et al. (2019)). Between 2010 and 2014, approximately 55.7 million abortions were performed worldwide, with 30.6 million being safe and 25.1 million being unsafe. It is important to note that 97% of these unsafe abortions occurred in developing countries (Ganatra et al. (2017)). Particularly in the Indian context, 15.6 million abortions were performed in 2015, with around 1 million of these abortions being unsafe, for the women aged 15-49 years (Singh et al. (2018)). Abortions is the cause of various risk factors like maternal death in India (Yokoe et al. (2019)). Despite the progress and reforms in the abortion laws from 1970s onwards, abortions lead to the mortality of more than a half-million Indian women each year (Dhall and Harvey (1984)). Consistent with the results reported in these studies, we find that elderly women with first-born daughters are more likely to have undergone for abortions as compared to the older women with first-born sons (see columns 4-6 of Table 5). Relative to the elderly women with first-born son, elderly women with first-born daughter exhibit a higher prevalence of abortions, with an average increase of 0.014 abortions (about 9% of mean). The increase in the prevalence of abortions is a plausible channel through which fertility preferences may affect the health outcomes of elderly women. We don not find a significant effects of fertility preferences on the health conditions of elderly men. This finding lends further support for abortion being a plausible channel of health outcomes for elderly women  $^2$ .

<sup>&</sup>lt;sup>2</sup>Financial dependence among the elderly is another possible channel that explains the decline in subjective health outcomes of women in their post-reproductive ages (Roy and Chaudhuri (2008), Banerjee and Gogoi (2023)

#### 4.3 Heterogeneity Analyses

This section conducts the heterogeneity analysis to understand how the effects of son-preferring behaviours among the elderly population in India is distributed across different groups. We investigate heterogeneity of our main results of life satisfaction across two different dimensions both for men and women. First, we estimate the specification presented in equation 1 separately for Non-Muslims and Muslims in the case of both elderly women and elderly men. Tables A6 and A7 report the results. Columns 1-4 in Tables A6 and A7 show that decline in the life satisfaction is driven by Hindu majority - who practice and emphasize more son-preference, traced back in patrilocal and patrilineal Hindu kinship system, as well in the religious texts (Gupta (1987), Arnold et al. (1998), Jayachandran and Pande (2017)) - not by the Hindu minority (i.e, Muslims). Our results of heterogeneity-by-religion are also robust to the inclusion of district fixed effects and district specific linear trends. Prevalence of the son-preference among Muslims is weak, mostly due to the fact that Islam focuses less stress on the necessity of having a son for religious rituals and observances. This fact is validated by many empirical observations like gender gap in child mortality is smaller among Muslims and sex ratio is less skewed (Borooah and Iyer (2005), Bhalotra et al. (2010)). Consistent with this, we don not find any significant effects of son-preferring fertility behaviours in the case of Muslims for both elderly women and men.

Second, we carry out a heterogeneity by education of older adults. Tables A6 and A7 present the results. Columns 5-7 in Tables A6 and A7 show that first-born daughters affects the life satisfaction of more educated women and men. A possible explanation for this finding is that more educated people practice more son-preference than less educated people (Abrevaya (2009), Alfano (2017)). Practice of dowry is more prevalent among the better educated (Chiplunkar and Weaver (2023)), which may possibly explain why the more educated exhibit more son-preferring tendencies. Therefore, our result of heterogeneity-by-education is consistent with this stand of literature.

#### 4.4 Additional Results and Robustness Checks

#### 4.4.1 Alternate Measurements and Outcomes

Our main analysis on the life satisfaction of older women and men (in Tables 2 and 3) use the information on one subjective outcome of life satisfaction (i.e, if she/he is satisfied in her/his life). However, LASI dataset has collected the information related to the life satisfaction on alternate measurements. For the sake of completeness we report out analysis on other alternate measurements of life satisfaction for both elderly women and elderly men. First, we created a binary indicator for the satisfaction with the current living arrangement. Second, we use information on 4 binary indicators of life satisfaction: satisfied in life, satisfied with current living arrangement, over all satisfied in life, and thankful for what she/he has in her/his life. We compute the standardized life satisfaction outcome from these four indicators with a mean of 0 and standard deviation of 1. Results are presented in Tables A8 and A9. Results are stable and statically significant across different specification from column 1-6. These results show that older women and men with first-born daughters are less likely to be satisfied with their current living arrangement and the decline in life satisfaction is about 0.04 standard deviations. Therefore, this indicates that our results are robust to the alternative measures of life satisfaction.

Our results on subjective health outcome is a binary indicator for condition of health being good, very good or excellent. LASI has some other additional information on the subjective health conditions of elderly people. We combine the available information and compute an alternate measure of health conditions of elderly women and men. This alternate measure is standardized health outcome index from 2 binary indicators of better health conditions. Table A10 and A11 reports the results. As columns 1-3 of Table A10 show, a significant decline in the better health conditions of women in the reproductive ages on account of son-preferring fertility behaviors, and we do not see any significant effects of fertility outcomes on this alternate measure of health outcome for the sample of elderly men (see columns 1-3

of Table A11). These findings are in line with our main results on subjective health outcomes reported in Tables A1 and A2. Therefore, this help us eliminate the concern that our results on health outcomes are sensitive to the alternate measures.

Son-preferring fertility behaviors also effected the depression outcome of older women, but no significant effects on depression were found for men (see columns 4-6 of Tables A1 and A2). To validate these results of depression to the alternative measures, we construct a standardized index of depression from the two indicators of depression measures using LASI dataset. Results are presented in Tables A10 and A11. Columns 4-6 of Table A10 shows, older women with first-born daughters are more depressed (an increase of about 0.025 standard deviations) as compared to their counterparts. Column 4 of Table A11 shows that son-preferring fertility behavior in men leads them to be less depressed, but as we can see in columns 5 and 6 this result is not robust to the inclusion of additional restrictions. These results on the alternative measures of depression are in line with the results we presented in Tables A1 and A2.

#### 4.4.2 Additional Mechanisms

As India undergoes demographic and health transformations, it becomes imperative to closely observe the manner in which informal networks from familial ties persist in providing assistance to elderly individuals in the country. Almost all older Indian men and women live with their families, and it is their preferred living arrangement. Therefore, in the absence social insurance institutions, India's older population is likely to rely on family and social networks (Gupta et al. (2009), Berkman et al. (2012). These networks are valuable resources in the lives of the elderly people, and hence contribute to their mental health. Thus, familial relationships may be a plausible channel through which the son-preferring behaviours may affect welfare of individuals in their post-reproductive ages. From our dataset, we provide evidence that this channel is in operation. We use information on two outcomes of familial ties from LASI dataset and show that women and men with first-born girl are more likely to have a close

relationship with their daughters and not with their sons. Tables A12 and A13 present the results. Older Women (and men) with fisrt-born daughters are 14 (and 7) percentage points more likely to share close relationship with their daughters and about 9 (and 7) percentage points less likely to share close relationship with their sons. Close relationships with daughters in India can lead to reduced welfare for parents in their old age, primarily due to traditional societal norms where daughters are expected to leave their parental home upon marriage. In the absence of this care-giving support, elderly parents may experience emotional isolation , which can lead to a decline in their overall well-being. On the other hand, sons traditionally serve as primary caregivers and financial providers for their aging parents. Reduced parent-son closeness and emotional connection will lead to parental emotional isolation, financial stress, and restricted healthcare and social services. As a result, this may adversely affect parental well-being.

In the main analysis on mechanisms, we provide evidence that abortions is a plausible channel through which son-preferring behaviours impact the subjective health outcomes of women in their post-reproductive ages. We produce estimates that women with first-born daughters are more likely to have abortions as compared to women with first-born sons. We check the sensitivity of this mechanism to an alternative measure of abortion. The number of abortions in our dataset varies from 0 to 10. We standardize this measure to have a mean of 0 and standard deviation of 1. Table A14 reports the results for this alternative measure of abortion. Women with first-born daughters have more abortions by 0.024 standard deviations as compared to the women with first-born sons. These results are in line with the results presented in Table 5, therefore providing evidence that our results on abortions are robust to the alternative measures.

## 5 Conclusion

In this paper, we study the effect of fertility outcomes on the well-being of older population in India. We exploit the fact that the gender of the firstborn is random and that parents with firstborn daughters end up having more children in an attempt to have the desired number of sons. Using India's first nationally representative dataset for elderly people, we show that having a firstborn daughter leads to lower subjective life satisfaction in post-reproductive years for both women and men. We show that both women and men with firstborn daughters are less financially independent in older ages. Our results are most plausibly driven by lower financial independence and more experience of abortions on account of son-preferring behaviours. Heterogeneity results reveals that decline in life satisfaction was more pronounced among non-Muslims and more educated older adults. Our study contributes to the literature on fertility behaviours and to the dynamics of aging in India.

As the country grapples with an aging population, it is imperative that policymakers prioritize initiatives that promote the well-being, healthcare, and social inclusion of older citizens. The multifaceted approach encompassing healthcare access, financial security, social engagement, and elder rights protection can contribute to a more equitable and sustainable future for India's elderly population. By fostering an age-friendly environment and continuously adapting policies to evolving demographics, India can ensure that its older citizens can age with dignity, respect, and a high quality of life. In conclusion, the policy-making interventions for older people in India hold immense significance in addressing the unique needs and challenges faced by this rapidly growing demographic.

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#### Tables 6

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Dev. Min	Max								
n									
5 0	1								
04 0	1								
-0.927	1.58								
96 0	1								
91 0	1								
98 0	1								
5 0	10								
92 0	1								
1850	2018								
99 1917	2001								
-	-								
8 0	1								
85 0	1								
88 0	1								
34 0	1								
70 0	1								
79 0 D2 0	1								
92 0	1 10								
9 I 427	18								
Observations = 3/42/									
5 0	1								
	1								
0.06	1 5 2 9								
-0.90	1.520								
5 0 57 0	1								
0	1								
$92 \qquad 0$	1								
$\frac{95}{27}$ $\frac{1974}{1974}$	1								
·3/ 10/4	2017								
1917	1980								
-	-								
/0 U	1								
	1								
89 U	1								
<b>3</b> 4 0	1								
74 0	1								
63 0	1								
51 1	14								
	74     0       53     0       51     1       145								

Table 1: Summary Statistics

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		Satisfied		Quality of Life Standardize			
	(1)	(2)	(3)	(4)	(5)	(6)	
First Girl	-0.0186***	-0.0159***	-0.0160***	-0.0253**	-0.0217**	-0.0239**	
	(0.006)	(0.005)	(0.005)	(0.011)	(0.011)	(0.011)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE	No	Yes	Yes	No	Yes	Yes	
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE × District FE	No	No	Yes	No	No	Yes	
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	
N	35646	33758	33758	35550	33683	33683	
$R^2$	0.039	0.146	0.183	0.034	0.119	0.153	

#### Table 2: Life Satisfaction, Quality of Life and First-born Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Satisfied is a dummy that equals 1 if woman is satisfied in her life, and is 0 otherwise. Quality of Life Standardized is an index from 3 binary indicators of better life quality of woman: condition of her life is excellent, got important things that she wants, and wishes to live the life again. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

		Satisfied		Quality	of Life St	andardized
	(1)	(2)	(3)	(4)	(5)	(6)
First Girl	-0.0234***	<sup>*</sup> -0.0177***	·-0.0170**	-0.0204*	-0.00044	-0.00758
	(0.006)	(0.007)	(0.007)	(0.012)	(0.014)	(0.014)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE × District FE	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes
N	27731	21615	21615	27655	21564	21564
$R^2$	0.046	0.159	0.203	0.036	0.132	0.18

Table 3: Life Satisfaction, Quality of Life and First-born Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Satisfied is a dummy that equals 1 if man is satisfied in his life, and is 0 otherwise. Quality of Life Standardized is an index from 3 binary indicators of better life quality of man: condition of his life is excellent, got important things that he wants, and wishes to live the life again. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

	Curre	ntly Wor	·king	Pa	rt-time W	ork
	(1)	(2)	(3)	(4)	(5)	(6)
First Girl	0.0234***	*0.0115*	0.0118*	0.0260***	0.0218***	0.0235***
	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE × District FE	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes
N	18745	17656	17656	18745	17656	17656
$R^2$	0.042	0.285	0.33	0.017	0.12	0.174

Table 4: Labour Force Participation and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Currently Working is a dummy that equals 1 if the woman is working at the time of survey, and is 0 otherwise. Part-time Work is a dummy that equals 1 if the employment is part-time, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

			Wom	en			Men		
	Fir	ancial Supp	ort	Num	ber of Abo	rtions	<b>Financial Support</b>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
First Girl	0.0143***	0.0149***	0.0143***	0.0147**	0.0132**	0.0141**	0.00118	0.0024	0.00318
	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.005)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Birth Year $FE \times District FE$	No	No	Yes	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	No	No	Yes
$N_{\parallel}$	35899	33966	33966	35023	33337	33337	27964	21795	21795
$R^2$	0.012	0.086	0.124	0.008	0.054	0.094	0.009	0.081	0.139

Table 5: Financial Dependence, Abortions and Firstborn Girl [Elderly Women and Men]

*Notes*: The sample comprises the women and men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Financial Support is a dummy that equals 1 if the woman and man has received any financial support, and is 0 otherwise. Abortions is the total number of abortions that the woman has had in her lifetime. Additional controls include dummy for urban residence, religion and caste, number of children, if the woman and man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Childhood Health			Econ	Childhoo omic Con	d dition	Worked Before Marriage		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
First Girl	-0.00227	-0.00354	-0.00224	0.00235	-0.00347	-0.0029	0.00118	-0.00008	-0.00081
	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Birth Year $FE \times District FE$	No	No	Yes	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	No	No	Yes
$N_{\perp}$	35637	33752	33752	35910	33981	33981	35941	34003	34003
$R^2$	0.009	0.066	0.103	0.094	0.201	0.232	0.006	0.056	0.099

#### Table 6: Placebo Outcomes and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Childhood Health is a dummy that equals 1 if the status of health of woman in her childhood was better, and is 0 otherwise. Childhood Economic Condition is a dummy that equals 1 if the family of the woman were well-off in her childhood, and is 0 otherwise. Worked Before Marriage is a dummy that equals 1 if the woman had worked before marriage, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

## 7 Figures



Figure 1: Balance Test: Randomness of gender of first-born child

Source: Authors' calculations from LASI-1

## Appendices

## **A** Appendix Tables

	]	Better Heal	th	]	Depressio	n
	(1)	(2)	(3)	(4)	(5)	(6)
First Girl	-0.00748	-0.0132**	-0.0139**	0.00132	0.0107*	0.00998*
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE × District FE	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes
N	35944	34006	34006	35538	33661	33661
$R^2$	0.02	0.147	0.18	0.01	0.082	0.119

Table A1: Health, Depression and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Better Health is a dummy that equals 1 if the woman reports the condition of her health is good, very good or excellent, and is 0 otherwise. Depression is a dummy that equals 1 if the woman feels sad, blue or depressed for two or more weeks in a row or feels depressed often, most or all of the time, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	В	etter Heal	th	]	Depressior	1
	(1)	(2)	(3)	(4)	(5)	(6)
First Girl	-0.00604	-0.0117*	-0.00945	-0.00788	-0.00711	-0.00626
	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE × District FE	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes
Ν	27989	21809	21809	27620	21530	21530
R2	0.019	0.155	0.202	0.013	0.099	0.152

Table A2: Health, Depression and Firstborn Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Better Health is a dummy that equals 1 if the man reports the condition of his health is good, very good or excellent, and is 0 otherwise. Depression is a dummy that equals 1 if the man feels sad, blue or depressed for two or more weeks in a row or feels depressed often, most or all of the time, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Curre	ntly Wor	king	Pa	rt-time Wo	ork
	(1)	(2)	(3)	(4)	(5)	(6)
First Girl	0.0355***	0.00808	0.00898	0.0177***	0.00884*	0.00975**
	(0.006)	(0.006)	(0.006)	(0.004)	(0.005)	(0.005)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE × District FE	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes
$N_{\parallel}$	26742	20763	20763	26742	20763	20763
$R^2$	0.031	0.368	0.406	0.02	0.093	0.144

Table A3: Labour Force Participation and Firstborn Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Currently Working is a dummy that equals 1 if the man is working at the time of survey, and is 0 otherwise. Part-time Work is a dummy that equals 1 if the employment is part-time, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Finan	icial Suppo	rt Son	Financia	l Support	Daughter	
	(1)	(2)	(3)	(4)	(5)	(6)	
First Girl	-0.0175***	-0.0141***	-0.0148***	0.0181***0.0184***0.0175***			
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE	No	Yes	Yes	No	Yes	Yes	
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE × District FE	No	No	Yes	No	No	Yes	
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	
N	35899	33966	33966	35899	33966	33966	
$R^2$	0.015	0.08	0.121	0.013	0.056	0.096	

## Table A4: MechanismsWho provides financial support and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Financial Support Son is a dummy that equals 1 if the woman has received any financial support from her son, and is 0 otherwise. Financial Support Daughter is a dummy that equals 1 if the woman has received any financial support from her daughter, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Finar	icial Suppo	rt Son	Financial	Support I	Daughter
	(1)	(2)	(3)	(4)	(5)	(6)
First Girl	-0.0175***	*-0.0106***	-0.0106***	0.00927***	0.0109***	0.0112***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE × District FE	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes
$\overline{N}$	27964	21795	21795	27964	21795	21795
$R^2$	0.015	0.09	0.146	0.012	0.058	0.119

#### Table A5: Mechanisms Who provides financial support and Firstborn Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Financial Support Son is a dummy that equals 1 if the man has received any financial support from his son, and is 0 otherwise. Financial Support Daughter is a dummy that equals 1 if the man has received any financial support from his daughter, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Non-M	Iuslim	Mus	slim	Any Edu	ucation	No Education	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
First Girl	-0.0151*** (0.006)	-0.0161*** (0.006)	-0.0179 (0.018)	-0.014 (0.021)	-0.0195** (0.008)	-0.0158* (0.009)	-0.0121* (0.007)	-0.0115 (0.007)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Marriage Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth Year FE × District FE	No	Yes	No	Yes	No	Yes	No	Yes
Marriage Year FE × District FE	No	Yes	No	Yes	No	Yes	No	Yes
N	30133	30133	3508	3508	13925	13925	19763	19763
$R^2$	0.15	0.189	0.249	0.383	0.166	0.237	0.145	0.201

## Table A6: Heterogeneity by Religion and EducationLife Satisfaction and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Dependent variable is an indicator for life satisfaction of woman. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Non-Muslim		Mus	Muslim		Any Education		No Education	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
First Girl	-0.0195***	-0.0178**	-0.00856	-0.0148	-0.0204***	-0.0167**	-0.0109	-0.0215	
	(0.007)	(0.007)	(0.022)	(0.028)	(0.008)	(0.008)	(0.013)	(0.015)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Birth Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Marriage Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Birth Year FE × District FE	No	Yes	No	Yes	No	Yes	No	Yes	
Marriage Year FE × District FE	No	Yes	No	Yes	No	Yes	No	Yes	
$N_{\perp}$	19384	19384	2097	2097	15484	15484	6028	6028	
$R^2$	0.163	0.21	0.272	0.447	0.158	0.219	0.211	0.339	

#### Table A7: Heterogeneity by Religion and Education Life Satisfaction and Firstborn Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Dependent variable is an indicator for life satisfaction of man. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Sat	isfied Curi	rently	Satisfied Standardized			
	(1)	(2)	(3)	(4)	(5)	(6)	
First Girl	-0.0130**	*-0.0117**	*-0.0125***	-0.0398**	*-0.0360***	*-0.0376***	
	(0.004)	(0.004)	(0.004)	(0.011)	(0.011)	(0.011)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE	No	Yes	Yes	No	Yes	Yes	
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	
Birth Year $FE \times District FE$	No	No	Yes	No	No	Yes	
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	
N	35643	33757	33757	35518	33646	33646	
$R^2$	0.04	0.118	0.156	0.079	0.185	0.221	

#### Table A8: Robustness (Alternate Measurements) Life Satisfaction and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Satisfied Currently is a dummy that equals 1 if woman is satisfied with the current living arrangement, and is 0 otherwise. Satisfied Standardized an index from 4 life satisfaction binary indicators of woman: satisfied in her life, satisfied with the current living arrangement, over all satisfied in life and thankful for what she has in her life. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Satis	fied Curr	ently	Satisfied Standardized			
	(1)	(2)	(3)	(4)	(5)	(6)	
First Girl	-0.0139***	*-0.0103**	*-0.0111**	-0.0557**	*-0.0444**	*-0.0451***	
	(0.005)	(0.005)	(0.005)	(0.012)	(0.013)	(0.014)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE	No	Yes	Yes	No	Yes	Yes	
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE × District FE	No	No	Yes	No	No	Yes	
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	
N	27731	21615	21615	27628	21541	21541	
$R^2$	0.041	0.122	0.172	0.082	0.2	0.243	

#### Table A9: Robustness (Alternate Measurements) Life Satisfaction and Firstborn Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Satisfied Currently is a dummy that equals 1 if man is satisfied with the current living arrangement, and is 0 otherwise. Satisfied Standardized is an index from 4 life satisfaction binary indicators of man: satisfied in his life, satisfied with the current living arrangement, over all satisfied in life and thankful for what he has in his life. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01Source: Authors' calculations from LASI-1

	He	alth standar	dized	Depression Standardized			
	(1)	(2)	(3)	(4)	(5)	(6)	
First Girl	-0.0193*	-0.0303***	-0.0316***	0.00499	0.0268**	0.0242**	
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE	No	Yes	Yes	No	Yes	Yes	
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE × District FE	No	No	Yes	No	No	Yes	
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	
N	35944	34006	34006	35538	33661	33661	
$R^2$	0.024	0.165	0.199	0.014	0.09	0.129	

#### Table A10: Robustness (Alternate Measurements) Health, Depression and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Health Standardized an index from 2 good health binary indicators of woman: her self-related health is good or very good, and her self-related health is very good or excellent. Depression Standardized an index from 2 binary indicators of depression of woman: she feels sad, blue or depressed for two or more weeks in a row, and she feels depressed often, most or all of the time. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Healt	h standa	rdized	Depression Standardized			
	(1)	(2)	(3)	(4)	(5)	(6)	
First Girl	-0.0181	-0.022	-0.0173	-0.0239*	-0.0137	-0.0122	
	(0.012)	(0.014)	(0.014)	(0.012)	(0.014)	(0.014)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE	No	Yes	Yes	No	Yes	Yes	
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE × District FE	No	No	Yes	No	No	Yes	
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	
N	27989	21809	21809	27620	21530	21530	
$R^2$	0.022	0.174	0.221	0.016	0.099	0.152	

Table A11: Robustness (Alternate Measurements) Health, Depression and Firstborn Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Health Standardized an index from 2 good health binary indicators of man: his self-related health is good or very good, and his self-related health is very good or excellent. Depression Standardized an index from 2 binary indicators of depression of man: he feels sad, blue or depressed for two or more weeks in a row, and he feels depressed often, most or all of the time. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Clo	se Relation	n Son	Close Relation Daughter		
	(1)	(2)	(3)	(4)	(5)	(6)
First Girl	-0.0973***	*-0.0936**	*-0.0939**	*0.140***	0.137***	0.136***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE	No	Yes	Yes	No	Yes	Yes
Marriage Year FE	No	Yes	Yes	No	Yes	Yes
Birth Year FE × District FE	No	No	Yes	No	No	Yes
Marriage Year FE × District FE	No	No	Yes	No	No	Yes
N	35938	34000	34000	35938	34000	34000
$R^2$	0.036	0.109	0.144	0.04	0.089	0.125

#### Table A12: Additional Mechanisms Close Relationship and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Close Relation Son is a dummy that equals 1 if the woman has close relationship with her son in the family, and is 0 otherwise. Close Relation Daughter is a dummy that equals 1 if the woman has close relationship with her daughter in the family, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01Source: Authors' calculations from LASI-1

	<b>Close Relation Son</b>			<b>Close Relation Daughter</b>			
	(1)	(2)	(3)	(4)	(5)	(6)	
First Girl	-0.0792***	-0.0703***	*-0.0678***	*0.0755***	0.0746***	0.0729***	
	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	
District FE	No	Yes	Yes	No	Yes	Yes	
Birth Year FE	No	Yes	Yes	No	Yes	Yes	
Marriage Year FE	No	Yes	Yes	No	Yes	Yes	
Birth Year $FE \times District FE$	No	No	Yes	No	No	Yes	
Marriage Year FE × District FE	No	No	Yes	No	No	Yes	
N	27984	21817	21817	27984	21817	21817	
$R^2$	0.034	0.13	0.176	0.024	0.093	0.143	

#### Table A13: Additional Mechanisms Close Relationship and Firstborn Girl [Elderly Men]

*Notes*: The sample comprises the men who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Close Relation Son is a dummy that equals 1 if the man has close relationship with his son in the family, and is 0 otherwise. Close Relation Daughter is a dummy that equals 1 if the man has close relationship with his daughter in the family, and is 0 otherwise. Additional controls include dummy for urban residence, religion and caste of man, number of children, if the man has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level.

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

	Abortion Standardized					
	(1)	(2)	(3)			
First Girl	0.0266**	0.0239**	0.0255**			
	(0.011)	(0.011)	(0.012)			
Additional Controls	Yes	Yes	Yes			
District FE	No	Yes	Yes			
Birth Year FE	No	Yes	Yes			
Marriage Year FE	No	Yes	Yes			
Birth Year FE × District FE	No	No	Yes			
Marriage Year FE × District FE	No	No	Yes			
N	35023	33337	33337			
$R^2$	0.008	0.054	0.094			

#### Table A14: Additional Mechanisms Abortions and Firstborn Girl [Elderly Women]

*Notes*: The sample comprises the women who are 40 to 100 years of age at the time of survey. First Girl = 1 if the gender of firstborn to a mother is female, and is 0 otherwise. Abortion Standardized is the standardized outcome of total number of abortions. Additional controls include dummy for urban residence, religion and caste of woman, number of children, if the woman has any schooling, reads newspapers and watches TV, and MPCE Quintile. Standard errors in the parentheses are clustered at PSU level. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01