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# A Tale of Two Choices: Son Preference and Reproductive Outcomes in Uzbekistan

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## **Abstract**

In this study, we use data from the recent round of the Multiple Indicator Cluster Surveys (MICS) to estimate the effect of son preference on reproductive behaviour in Uzbekistan. We find strong evidence of differential stopping and spacing behaviour among Uzbek women. Women are significantly less likely to have a subsequent birth if they have at least one son at a given birth order. The effect is particularly strong among rural women at higher birth orders. The likelihood of discontinuation of childbearing increases as the number of sons increases. However, the sex of the firstborn child, whether male or female, plays no role in women's decisions about having additional children. We find that the probability of a subsequent short or risky birth interval is lower among women with at least one son. In addition, women with at least one son are more likely to use contraceptives. These patterns persist regardless of women's age. The findings have important implications for policymakers and practitioners in helping to design targeted interventions and programs in the country to improve reproductive health outcomes, promote gender equality, increase access to family planning services, and support women's reproductive autonomy.

**Keywords:** Son Preference; Birth Spacing; Fertility; Uzbekistan.

**JEL Codes:** D13; J13; C13; Z10.

## 1. Introduction

Son preference is widespread and well-documented in developing world. In countries without robust social security systems or insurance markets, parents often view sons as valuable economic assets who contribute to household income and provide support in old age (Ben-Porath & Welch, 1976; Kadoya et al., 2016; Pong, 1994a). In contrast, daughters are often perceived as a financial burden. Parents not only invest in their education but are also, in some countries, expected to save for dowries (Bhalotra et al., 2020; Hu & Schlosser, 2015; Pande, 2003). Moreover, after marriage, daughters leave their parental home to join their husband's family, further reducing their perceived long-term value to their natal household. In these countries, son preference is evident through various practices, including sex-selective abortion (Guilmoto, 2009). In societies where access to sex-selection technology is limited, parents often continue childbearing until they have at least one son (Bongaarts, 2013; Channon, 2015; Javed & Mughal, 2022; Kim & Lee, 2020). Additionally, differential stopping behavior after the birth of a son contributes to population growth, while sex-selective abortions contribute to a skewed sex ratio.

Son preference in developing countries carries significant social and health-related consequences for women. Women who do not bear at least one male child often face severe social stigma and intense pressure from their in-laws. Those pregnant with female fetuses may face health risks due to pressure to undergo abortions or to continue childbearing until they have a son (Zou et al., 2023). The birth of a daughter as the first child can also impose emotional and financial stress on new mothers (Rong et al., 2023). Pandey et al. (2024) find a strong association between the birth of a female child and the onset of postpartum depression (PPD).

In contrast, having at least one male child is linked to increased maternal status and household influence. For example, mothers with sons often possess greater decision-making power in domains such as healthcare, consumption, and social engagement (Hammad & Rajoria, 2013; Javed & Mughal, 2019). Li and Wu (2011) find that Chinese mothers with firstborn sons exhibit improved nutritional intake and a lower likelihood of being underweight. Similarly, Kishore and Spears (2014) document that Indian women

with firstborn sons have, on average, higher body mass index (BMI) compared to those whose firstborns are daughters.

Existing studies on son preference have primarily focused on countries in Southern and Eastern Asia, largely overlooking the Central Asian region. Central Asian countries tend to have patriarchal societies, where men are often viewed as symbols of family continuity. In a recent study, Kazenin (2023) examined the impact of son preference on fertility behaviour in Kyrgyzstan, and found that the sex of the child is a key driver of subsequent births. For other Central Asian countries, research evidence remains scarce.

In this study, we analyze the role of son preference on reproductive outcomes in Uzbekistan, a Central Asian country. Uzbekistan is a double-landlocked and the most populous country in Central Asia. Historically, Uzbekistan has been the intersection of many civilizations and empires, including the Persian Empire, Alexander the Great's empire, the Mongol Empire, and the Timurid Empire. During the 19th and early 20th centuries, Uzbekistan was part of the Russian Empire and later the Soviet Union. During the Soviet period, Uzbekistan followed a pro-natalist policy that promoted high fertility through state incentives (Barbieri et al., 1996). During that period, family planning was not encouraged, and mothers who had born at least seven children were awarded the governmental distinction of 'mother-heroes,' which came with substantial financial and social benefits. Uzbekistan gained independence in 1990 following the collapse of the Soviet Union.

Since independence, Uzbekistan has experienced substantial economic, demographic, and social change, transforming itself from a low-income to a middle-income country. According to the World Bank (2022), Uzbekistan's GDP (current US\$) grew six times from \$13.36 billion in 1990 to \$80.39 billion in 2022, while GDP per capita increased from \$651 to \$2255 (World Bank, 2022). At the same time, population increased from 20.51 million in 1990 to 35.65 million in 2022, with an annual growth rate of over 2.1% (World Bank, 2022). The country's total fertility rate (TFR) was estimated at 4.1 in 1990, which declined to 3.2 in 2022, indicating a 22% reduction over three decades (World Bank, 2022). Similarly, in 1990, Uzbekistan had a crude birth rate of 34 per 1000, which decreased to 26 per 1000 by 2021 (World Bank, 2022).

Uzbekistan is a patriarchal and patrilineal society, where family lineage and inheritance are traditionally passed through the male line. Although recent legal reforms have promoted gender equality, deeply rooted customs continue to influence family dynamics. In Uzbek culture, sons are traditionally viewed as lifelong pillars of the family—responsible for carrying on the family name, inheriting property, and caring for aging parents. This cultural norm is reflected in this Uzbek proverb: “O’g’il – tayanch, qiz – mehmon” (A son is a support, a daughter is a guest).

This son preference is reflected in Uzbek couples’ reproductive outcomes. In Central Asia, Uzbekistan has the highest sex ratio at birth—108 boys per 100 girls—followed by Turkmenistan, Kazakhstan, Tajikistan, and Kyrgyzstan (Figure 1). This skewed ratio has persisted for over four decades and remains higher than that of neighboring countries.

Compared to South Asia, where son preference is well documented, Uzbekistan’s sex ratio at birth is higher than of Pakistan, Bangladesh, and Nepal, and is comparable to that of India (Figure 1). Given that the natural sex ratio at birth is approximately 105 boys per 100 girls, Uzbekistan’s consistently skewed ratio may indicate the potential presence of sex-selective abortion, female infanticide, or son-targeting fertility behaviors. According to Article 18 of the legislation titled “Ensuring the Preservation of Citizens’ Reproductive Well-being” induced abortion in Uzbekistan is permitted upon a woman’s request within the first 12 weeks of pregnancy. Beyond this period, termination is allowed on medical grounds, particularly when the pregnancy poses a risk to the woman’s life. Sex-selective abortion is often expensive and generally not accepted by Uzbek families due to religious beliefs. In Uzbekistan, where the majority of the population practices Islam, sex-selective abortion is considered a major sin (haram). However, reliable data on sex-selective abortion are scarce.

To fill the research gap in fertility impact of prevailing son preference, we analyze data from the recent round of the Uzbekistan Multiple Indicator Cluster Survey (MICS), conducted in 2021 and 2022. We study how son preference in Uzbekistan is reflected in reproductive behavior, as observed in differential stopping and spacing outcomes. We investigate whether the probability of shorter and riskier birth intervals increases with

higher son preference. Additionally, we explore whether the impact of son preference varies by birth order.

To the best of our knowledge, this is the first empirical research that examines the fertility impact of son preference in Uzbekistan. We employ various econometric techniques and find strong evidence for sex-specific birth-stopping behaviour among Uzbek women. Women are significantly less likely to have a subsequent birth if they have a son or at least one son at a given birth order. The effect is stronger at higher birth order. Besides, the likelihood of discontinuity of childbearing increases as the number of sons increases. We also find evidence of sex-specific birth spacing behavior. The probability of a subsequent shorter or risky birth interval is lower among women with at least one son. In addition, women having at least one son are more likely to use contraceptives. We find that the effect is particularly strong among rural women at higher birth orders. Our findings are robust to additional subgroup estimations.

This paper is structured as follows: the next section presents the relevant literature, followed by the data and methodology in section 3. Sections 4 and 5 contain the baseline findings and analysis of heterogeneity. Section 6 provides robustness checks. Finally, Section 7 concludes the study and discusses potential implications.

## **2. Related Literature**

There is a growing body of literature on the prevalence and consequences of son preference across developing countries. Empirical studies have identified son preference in a wide range of settings, including South Asia (Channon, 2017; Das, 1987; Javed & Mughal, 2020, 2022; Jayachandran & Kuziemko, 2011; Jayachandran & Pande, 2017; Milazzo, 2018), Southeast Asia (Abang Ali & Arabsheibani, 2020; Guilmoto, 2012; Pong, 1994b), East Asia (Arnold, 1987; Lin et al., 2014; Murphy et al., 2011; Yamamura, 2013) (Arnold, 1987; Murphy et al., 2011; Yamamura, 2013; Lin et al., 2014), the Middle East (Chakravarty, 2015; Sharaf et al., 2019), the Caucasus (Duthé et al., 2012), Western Balkans (Kumar & Sinha, 2019; Robitaille & Milla, 2024), and North Africa (Rossi & Rouanet, 2015).

Son preference manifests in various demographic behaviors, including skewed sex ratios at birth, sex-selective abortion, and differential investments in children. Skewed sex ratio at birth can often signal the presence of son preference in the country and it largely driven by sex-selective abortions and female infanticide (Guilmoto, 2012). In India, for example, Arnold et al. (2002) estimated that by the late 1990s, over 100,000 sex-selective abortions of female fetuses were occurring annually, while Bhalotra and Cochrane (2010) estimated this figure to be as high as 480,000 annually between 1995 and 2005. In China, the combination of the one-child policy and strong son preference led to a sharp rise in the sex ratio at birth, primarily driven by selective abortion (Chen et al., 2013).

Beyond prenatal outcomes, son preference also influences fertility behavior. A substantial literature has documented the presence of gender-specific fertility stopping rules, whereby couples are significantly more likely to continue childbearing as long as one son or desire number of sons not born. Evidence for such behavior has been found in India (Das Gupta, 1987; Jayachandran & Pande, 2017), Pakistan (Channon, 2017; Javed & Mughal, 2022), Bangladesh (Chowdhury & Bairagi, 1990; Hoque & Boulier, 2020), Nepal (Karki, 1988), Indonesia and Malaysia (Abang Ali & Arabsheibani, 2020; Pong, 1994c). These patterns often result in larger family sizes and intended use of contraceptives (Channon, 2017). Son preference is also reflected in birth spacing behavior; women who do not have at least one son tend to have shorter subsequent birth intervals (Javed & Mughal, 2020; Robitaille & Milla, 2024).

Postnatal discrimination represents another channel through which son preference is reflected. A number of studies have reported unequal investments in health, nutrition, and education for daughters relative to sons. Girls tend to receive lower-quality healthcare, and face gender disparities in educational attainment within households (Arnold et al., 1998; Dercon & Singh, 2013; Hafeez & Domeque, 2018; Hervé et al., 2022; Jayachandran & Kuziemko, 2011; Kaul, 2018; Kingdon, 2005; Mishra et al., 2004).

### **3. Data and Methodology**

In this study, we employ data from the recent round of the Uzbekistan Multiple Indicator Cluster Survey (MICS), conducted between 2021 and 2022 by the State Committee of the

Republic of Uzbekistan on Statistics (SCS). This is a nationally representative survey carried out using a three-stage stratified sampling approach, that covers 15,627 households including 18,003 women aged 15–49. We exclude women without children, resulting in a final subsample of 3,585 women with at least one live birth.

**Subsequent birth model:** To examine the effect of son preference on the likelihood of proceeding to the next birth at birth order  $n$ , we estimated the following specification

$$SB_{ij} = \alpha + \beta (SP)_{ij} + \delta X_{ij} + \gamma Y_j + \mu_{ij} \quad (1)$$

Where  $SB_{ij}$  is a variable of subsequent birth at birth order  $n$  for the  $woman_i$  belonging to  $household_j$ .  $SP$  stands for son preference for woman  $i$  belonging to household  $j$ .  $X_{ij}$  represents the Individual characteristics of the woman  $i$  belonging to the household  $j$ .  $Y_j$  represents the characteristics of household  $j$ , and  $\mu_{ij}$  is the error term.

**Subsequent birth spacing model:**

$$SBS_{ij} = \alpha + \beta (SP)_{ij} + \delta X_{ij} + \gamma Y_j + \mu_{ij} \quad (2)$$

Equation 2 studies the effect of son preference on the subsequent birth spacing at birth order  $n$ . Where  $SBS_{ij}$  is a variable of subsequent birth space at birth order  $n$  for the  $woman_i$  belonging to  $household_j$ .  $X, Y$  and  $u$  are the control variables and error term, respectively.

$$SSBI_{ij} = \alpha + \beta (SP)_{ij} + \delta X_{ij} + \gamma Y_j + \mu_{ij} \quad (3)$$

$$SRBI_{ij} = \alpha + \beta (SP)_{ij} + \delta X_{ij} + \gamma Y_j + \mu_{ij} \quad (4)$$

Equation 3 studies the association between son preference and the subsequent short birth interval. Where  $SSBI_{ij}$  is a variable of subsequent short birth interval at birth order  $n$  for the  $woman_i$  belonging to  $household_j$ . Similarly, equation 4 studies the relationship between son preference and subsequent risky birth interval. Where  $SRBI_{ij}$  is a variable of subsequent risky birth interval at birth order  $n$  for the  $woman_i$  belonging to  $household_j$ .  $X$  and  $Y$  represent the control variables, with  $u$  capturing the error term.

$$C_{ij} = \alpha + \beta (SP)_{ij} + \delta X_{ij} + \gamma Y_j + \mu_{ij} \quad (5)$$

Subsequently, equation 5 examined the effect of having at least one son on the woman's reported contraceptive use, where  $C_{ij}$  is a variable of the current use of contraceptives for the *woman<sub>i</sub>* belonging to *household<sub>j</sub>*.

**Outcomes of interest:**

- 1) To examine the relationship between son preference and subsequent fertility, we use subsequent birth, a binary variable that takes the value 1 if a woman has a subsequent birth after the given birth at birth order  $n$ , and 0 otherwise.
- 2) To study the relationship between son preference and subsequent birth spacing, we use birth spacing (in days) between birth order  $n$  and  $n+1$ .
- 3) According to WHO (2005), a minimum interval of 24 months between a birth and subsequent conception is recommended to ensure a safe and healthy pregnancy for both the mother and the child. Accordingly, our third outcome variable is the short birth interval, a binary variable that takes the value 1 if the next pregnancy occurs within 24 months at birth order  $n$ , and 0 otherwise.
- 4) According to Janša et al. (2018) and Javed and Mughal (2020), a subsequent pregnancy occurring within 15 to 18 months of a previous childbirth poses significant health risks for both the mother and the child. The outcome variable risky birth interval is defined as a binary variable that takes the value 1 if the subsequent pregnancy occurs within 18 or 15 months of the previous birth at birth order  $n$ , and 0 otherwise.
- 5) Finally, the use of contraceptives is associated with a decrease in the probability of conception and a delay in the subsequent birth (Smith-Greenaway et al., 2019). The outcome variable, current use of contraceptives, is a binary variable that takes the value 1 if women currently use contraceptives and 0 otherwise.

**Variables of interest:** We employ three variables of interest: The first variable of interest is the sex of the current child, which is a binary variable that takes the value of 1 if the sex of the child is male at birth order  $n$  and 0 otherwise. The second variable of interest is at least one son, a binary variable that takes the value of 1 if a woman has at least one son at birth order  $n$ , 0 otherwise. The third variable of interest is the number of sons at birth order  $n$ . The first two variables observe the presence of son preference, while the third measures its strength.

**Control variables:** We account for various individual, household, and locational factors. The control variables include the woman's age at birth for each birth order, husband's age, education level, household size, family status, place of residence, region, and economic status.

[Table 1]

The definition and descriptive statistics of the variables used in our analysis are presented in Table 1. About 82% of women have a second birth after the first birth. The proportion of having a subsequent birth decreases at higher birth orders. For instance, at birth order 4, 29% of women have a subsequent birth after the fourth birth, while 71% of women stop their fertility. The average birth spacing between the 1st and 2nd birth is 1070 days, between the 2nd and 3rd child is 1606 days, between the 3rd and 4th child is 1561 days, and between the 4th and 5th child is 1500 days. Approximately 43% of women conceived their second child within 24 months of the first birth, while the proportion of short birth intervals ( $\leq 24$  months) declines progressively with each subsequent birth: 13% between the second and third, 5% between the third and fourth, and just 1% between the fourth and fifth births. Risky births are most prevalent after the first birth (24–30%) and decline sharply with higher birth orders. In our sample, 64% of women reported the utilization of contraceptives. At the first birth order, 49% are male children and 51% are female children. For the second birth order, the proportions shift to 47% male and 53% female. Similarly, for the third birth, 49% are male and 51% are female, while for the fourth birth, the distribution is 48% male and 52% female. There is higher proportion of women with at least one son at higher birth orders. For instance, at the first birth order, 49% of women have at least one son, while 51% do not. In contrast, at the fourth birth order, 90% of women have at least one son. The mean number of children ever born is 2.54, while for women aged 40 and above, it is 3.13.

The distribution of women's age at childbirth by birth order shows that for the first birth, 18% were aged 20 or younger, 81% were between 20-34, and 1% were 35 or older; for subsequent births, the majority were aged 20-34, with a small percentage aged 20 or younger or 35 and older. In our sample, only 10 % of women report having acquired higher education. The average household size is 3.15 members (excluding children), and

households are equally distributed between nuclear (50%) and non-nuclear (50%) family. Over half of the women (54%) reside in rural areas. One-third (30%) of the women in the sample reside in the Eastern region. The sample is evenly distributed across economic quintiles, with each group comprising roughly 20% of households.

### **3.1 Empirical framework**

The empirical analysis proceeds as follows: in the first step, we estimate the effect of son preference on the likelihood of subsequent birth at birth order  $n$ . In the second step, we estimate the relationship between son preference and the subsequent birth interval, including the likelihood of a shorter or risky subsequent birth interval. We present a birth order-wise analysis of the first four birth orders. In the third step, we estimate the impact of having at least one son on the woman's reported contraceptive use. Next, we also analyze heterogeneity based on women's socio-economic status. In the final step, we conduct a robustness check to examine the validity and reliability of our baseline estimation.

Given the binary nature of the dependent variable, we estimate Equation (1) using Probit regression. To interpret the effects meaningfully, we compute average marginal effects using the STATA command (`margins, dydx(*)`).

We estimate Equation (2) using the Cox Proportional Hazards (PH) model, which is appropriate when the outcome variable represents the duration ( $t$ ) until the event of interest occurs. In our case, the event of interest is the interval between a given birth and subsequent birth. The Cox estimation provides the hazard ratio (HR), indicating the likelihood of which group is more likely to experience the event earlier or delay its occurrence. If the hazard ratio (HR) is equal to 1, it suggests that both groups have an equal probability of experiencing the event, such as subsequent birth. On the other hand, a HR value greater than 1 suggests that individuals in the reference group have a greater likelihood of delaying the event of interest. Conversely, a value of less than 1 indicates a greater likelihood for individuals of the non-reference group. We test whether the Cox model satisfies the proportional hazards assumption to ensure the validity of the estimates. We use the test proposed by Grambsch and Therneau (1994), and the results suggest that the model meets the assumption. The survival curves are obtained through the Kaplan-Meier (KM) estimator following the Cox estimations (shown in Appendix).

We estimate equations 3-5 using Probit estimation, given the binary nature of the outcome variables. To ensure representativeness of the sample, we apply appropriate weights to all sets of estimations.

Our estimation strategy is consistent with prior studies on fertility behavior and son preference in developing country settings (Hoque & Boulier, 2020; Javed & Mughal, 2022; Jiang et al., 2016; Lambert et al., 2015; Mughal et al., 2023).

## **4. Findings**

This section presents empirical findings, structured into two subsections. The first subsection examines estimates of son preference and its role in differential birth-stopping behaviour. The second subsection investigates the association between son preference and differential birth-spacing behaviour.

### **4.1 Son Preference and Subsequent Birth**

We begin by showing the birth order-wise sex-specific progression to subsequent birth (Figure 2). Sex-specific progression to subsequent birth is not visible at the first birth order. More than 80% of women have a second birth irrespective of the sex of the firstborn child. The difference becomes visible at higher birth order. For instance, after the second birth, 73% of women with no sons have a third birth, whereas only 54-58% of women with one or two sons do so. Likewise, following the third birth, 61% of women with no sons have a fourth birth, whereas only 30% of women with three sons do.

[Figure 2]

Next, we empirically examine the effect of son preference on the probability of proceeding to subsequent birth. Table 2 shows the estimation results of the sex of the child at a given birth order and the likelihood of subsequent birth. Columns 1-8 report results of probit estimations, both with and without controls for the likelihood of subsequent birth after the first, second, third, and fourth birth, respectively. The marginal effect is reported at the bottom of the table. We found that the effect of the sex of the firstborn child on the likelihood of subsequent birth (second birth) is statistically insignificant (Columns 1-2). This suggests that the sex of the firstborn child, either male or female, plays no role in women's decisions about having additional children. In contrast, the results are statistically

significant and negative at the following birth orders. For instance, after the second birth, if the second-born child is male, women are up to 10% less likely to have a third birth (Columns 3-4). Similarly, after the third or fourth birth, women with the last born male child are up to 12 % less likely to have the fourth or fifth birth, respectively. The first set of findings reveals that Uzbek women are less likely to have the subsequent birth if the sex of the child is male at given birth order.

[Table 2]

In Table 3, we replace our variable of interest, the sex of the current child, to have at least one son at a given birth order and examine the effect of son preference on the subsequent birth. Again, we found that the role of son preference on the subsequent birth is statistically significant and negative at the second to fourth birth order. According to findings, at second birth, the probability of having a subsequent birth for women with at least one son is lower by 15.6 % (without controls) and 16.7 % (with controls) compared to the women without a son (Columns 3-4). The impact becomes more pronounced with increasing birth orders. The probit estimates for birth order 3 and 4 reveal a 32–37 percent less likelihood of continuing childbearing among women with at least one son (Columns 5-8).

[Table 3]

Table 4 provides the results of the number of sons at a given birth order and the probability of having subsequent birth. This approach primarily captures the size effect of son preference. According to the findings, after the second birth, women with one son among their first two children have a 15.8% lower likelihood of having a subsequent birth compared to those whose first two children are female. Similarly, women with first two sons are 18.4% less likely to have a subsequent birth compared to those whose first two children are female. The discontinuity of childbearing increases as the number of sons increases. The corresponding results for the third birth order indicate that women with one, two, or three sons are up to 33% less likely to have a fourth birth compared to women with the first three female children (Columns 5-6). After the fourth birth, women with one, two, three, or four sons are 28.6% to 38.5% less likely to have a fifth birth compared to those whose first four children are female (Columns 7-8).

[Table 4]

In the estimations thus far, we compared the number of sons, using women with only daughters as the reference category. We also isolate the effect of having one additional son at each birth order—for example, comparing outcomes for two sons versus one son after second birth, or three sons versus two sons after third birth—to assess how each additional son influences the likelihood of having another child (results shown in the appendix). However, the findings from this specification indicate that the marginal effects are not statistically significant (Table A1). For instance, at the second parity, the probability of a third birth among women with two sons is not significantly different from those with one son. Similar patterns are observed at higher birth orders.

Mixed-sex preference is common in many countries (Hank & Kohler, 2000; Jones et al., 2023), and it is likely to be present in Uzbekistan as well. By including this categorization, we are able to further investigate potential behavioral patterns and parental preferences related to family composition. Table A2 presents the relationship between the sex composition of children at birth order  $n$  and the likelihood of a subsequent birth. The estimates primarily examine whether having same-sex children—either all girls or all boys—relative to a mixed-sex composition influences continued childbearing.

The results indicate a strong and statistically significant association between same-sex composition and higher fertility. At the second parity, women whose first two children are of the same sex are about 5.4% more likely to have a third birth than those with one boy and one girl (Column 2). The effect becomes stronger at higher parities: at the third parity, women with three same-sex children are 17.2% more likely to have a fourth birth, and at the fourth parity, the likelihood of a fifth birth increases by about 28.5% (Column 6).

When we isolate the type of same-sex composition, a clearer picture of gender preference appears. Having all girls significantly increases the likelihood of continued childbearing compared to a mixed-sex composition. Specifically, at the second parity, women with two daughters are 15.6% more likely to have a third child; at the third parity, women with three daughters are 32.1% more likely to proceed to a fourth birth; and at the fourth parity, having four daughters raises the likelihood of a fifth birth by 36.1% (Columns 14, 16, 18). All these effects are statistically significant. In contrast, having all boys does not

significantly affect the likelihood of another birth. Across all parities, the coefficients for all-boy compositions are negative or close to zero and statistically insignificant (Columns 7-12).

All in all, these findings provide substantial evidence of son preference, as reflected in a higher incidence of sex-differential birth stopping.

## **4.2 Son Preference and Subsequent Birth Spacing**

Table 5 presents averages for subsequent birth spacing and the prevalence of short and risky birth intervals. On average, women without sons have shorter birth intervals compared to those with at least one son. For example, at the first birth order, 47% of women without a son experience a short birth interval, whereas the corresponding figure for women with a first-born son is 40%. The prevalence of short birth intervals declines progressively with higher birth orders. Risky birth intervals are also more common among women without sons. However, following the first and second births, the incidence of risky intervals steadily decreases as birth order increases.

[Table 5]

We use Cox estimation to analyse the birth-order-wise effects of son preference on subsequent birth spacing. We examine the first four intervals: intervals between first and second birth, second and third birth, third and fourth birth and fourth and fifth birth, respectively. The Cox estimation results are presented in Tables 6 to 8. Table 6 shows the results for sex of the child at given birth order and subsequent birth space. We found that the sex of the child at the time of birth significantly impacts the subsequent birth spacing (Columns 1-6). The significant effect is visible at the first three births. The hazard ratios below 1 indicate a lower likelihood of having a subsequent childbirth earlier for women who have a male child at a given birth order. The findings show that after the first birth, women with a firstborn son have a 14% longer subsequent birth interval (hazard ratio: 1 - 0.86). Similarly, having a male second-born child is associated with a 23% higher likelihood of delaying the subsequent birth (hazard ratio: 1 - 0.77). After the third birth, women who have a male child as their third-born experience a 18% to 19% delay in the subsequent birth compared to women with a female child at the third birth. However, the effect of the sex of the child is not visible at the fourth birth (Columns 7-8).

[Table 6]

In Table 7, we show the Cox estimation of the effect of having at least one son on the waiting time span among Uzbek women. The findings are not dissimilar with our previous estimation. For instance, the hazard ratio for women for whom at least one of two children is a son is significantly below one compared to women with no sons (HR = 0.65). This implies that women with at least one son have a 35% longer interval between the second and third birth than their no-son counterparts among two-child women (Column 4). Likewise, after the third birth, women with at least one male child out of three children experience 28-32% longer subsequent birth interval (Columns 5-6). The results for the duration between the fourth to fifth childbirth remain statistically insignificant, as observed previously (Columns 7-8).

[Table 7]

Table 8 presents the Cox estimates of subsequent spacing behavior with respect to the number of sons born at a given birth order. Similar to previous findings, women with one, two, or three sons at birth orders 1, 2, and 3 exhibits significantly lower hazard ratios. For example, a women whose first two children are both sons is found to have a 35% longer interval to the third birth compared to those whose first two children are female (Columns 3-4). In the same vein, after the third birth, women with all sons have 28-32% longer interval to fourth birth compared to those whose first three children are female (Columns 5-6).

[Table 8]

In addition to the Cox estimation, the Kaplan-Meier survival curves (shown in Appendix Figures B1–B3) provide a graphical representation of how quickly the next birth occurs. The survival curve for women with no sons is steeper and shorter, implying that they have a subsequent birth earlier than do their counterparts with one or more sons at a given birth order.

Next, we study the association between son preference and the likelihood of shorter birth intervals. We define a shorter birth interval as a pregnancy that occurs within 24 months of the previous birth. We estimate this association using Probit estimation, considering the

binary nature of the outcome variable. Table 9 reports the results of son preference and subsequent shorter birth intervals. The findings reveal a significant and negative association between son preference and shorter birth intervals. According to the findings, women with at least one son at birth orders 1, 2, and 3 are up to 10.9% less likely to conceive within 24 months compared to women without a son (Columns 1-6).

[Table 9-11]

Table 10 examines whether having at least one son influences the likelihood of a risky birth interval, defined as a subsequent pregnancy occurring within 15 or 18 months. The results suggest that son preference is associated with a lower likelihood of risky birth spacing. Specifically, women who had at least one son at the first or second birth were significantly less likely to conceive again within these short intervals compared to those without sons. For instance, at the second birth order, having a son reduced the probability of a risky birth interval by approximately 3.8 to 4.2%, and at the third parity, by about 5.3 to 6.6% (Columns 4 and 6).

The use of contraception helps in delaying subsequent births. The Probit estimation results presented in Table 11 indicate a significant and positive association between son preference and current contraceptive use among married women in Uzbekistan. Women who have at least one son are more likely to utilize contraception compared to those who do not have a son. Specifically, the presence of at least one son increases the probability of contraceptive use by 18.2% (without control) and 8.9 % (with controls).

In all, these finding underscores the influence of son preference on reproductive behaviour and contraceptive decision-making among women in Uzbekistan.

## **5. Heterogeneity Analysis**

The findings above suggest that son preference significantly influences reproductive behavior. Women with at least one son are less likely to have a subsequent birth and tend to experience longer intervals before the next birth. However, it is possible that the impact of son preference varies across different socioeconomic groups. To explore this, we examine the relationship between son preference and reproductive behavior by household location and income groups.

Table A3 presents the results of the heterogeneity analysis by place of residence—urban versus rural—across successive birth orders. Panel A reports the likelihood of having a subsequent birth at each birth order, while Panel B presents the duration between births  $n$  and  $n+1$ . Each pair of columns contrasts urban and rural areas, first without and then with a full set of controls. The estimates in Panel A indicate that the presence of at least one son substantially reduces the likelihood of a subsequent birth. The effect is particularly strong among rural women at higher birth orders. For example, at birth order 2, the probability of having another child falls by 12.4% for urban women and 20.2% for rural women (Columns 7 and 8). Similarly, at birth order 3, the likelihood of having a subsequent birth is 26.6% lower for urban women and 35.8% lower for rural women if they have at least one son.

Panel B presents hazard ratios from duration models estimating the effect of having at least one son on the timing of the next birth. Overall, we do not observe substantial differences in birth spacing between rural and urban women. At birth order 2, urban women with a son have a hazard ratio of 0.656, which corresponds to a 34.4% lower hazard of a subsequent birth compared to women without a son—indicating 34.4% longer spacing. In rural areas, the hazard ratio is 0.665, suggesting a 33.5% longer birth interval. Similar patterns are observed at higher birth orders. At parity 3, urban women with at least one son have a 34.3% longer interval (hazard ratio = 0.657), while rural women experience a 24.4% longer interval (hazard ratio = 0.756).

Table A4 explores the heterogeneity in reproductive behavior associated with son preference across household income groups. Panel A reports the probability of having a subsequent birth at birth orders 1 through 4, separately for poor and non-poor women, first without and then with controls. The results show that son preference has a stronger negative effect on subsequent births. For instance, at birth order 3, poor women with at least one son are 30.2% less likely to have another child compared to those without a son, while the reduction is 34.3% among non-poor women (Columns 11-12). However, at birth order 4, poor women with at least one son are 45.3% less likely to have another child, while non-poor women with at least one son are 36.7% less likely. Panel B presents hazard ratios from duration models that estimate the time between successive births. Hazard ratios below one indicate longer birth spacing for women with at least one son. At birth order 2,

for example, poor women with a son have a hazard ratio of 0.650, implying 35% longer birth intervals, compared to 33.3% longer intervals for non-poor women (hazard ratio = 0.667). These patterns suggest that while son preference suppresses higher-order fertility across income groups, its effect on birth spacing is broadly similar among poor and non-poor women.

## 6. Robustness Checks

Our baseline result could be challenged on the basis of the incomplete fertility of women in our sample. In our sample, the average age of women is 35, implying that many of the women may have children later. We account for this possibility by restricting our sample to women 40 and above. We assume that at this age, women have completed their fertility and are very close to the age of menopause. In our sample, only 1% of women had their first or second birth at age 35 or older, and 5% had their third birth at age 35 or older. Overall, just 3% of all recorded births occurred when the mother was aged 35 or above.

Table A5 presents estimation results using this restricted sample. The findings are in line with our baseline results and highlight the presence of son preference in fertility behaviour among Uzbek women. The sex of the child plays a statistically significant role in the likelihood of having a subsequent birth. For example, 40+ women whose second child is male are approximately 10 % less likely to have a third birth compared to those whose second child is female. The magnitude of this negative association increases at higher birth orders. After the third birth, having a male child reduces the likelihood of a fourth birth by about 7 %. The effect persists when we change our variable of interest to at least one son at birth order  $n$ . According to estimates, at the third birth order, for instance, 40+ women with at least one son are 41.8 % less likely to have a fourth birth compared to those with no sons. Similarly, after the fourth birth, women with at least one son are 46.3 % less likely to continue childbearing. Finally, we examine the effect of son preference by considering the number of sons at each birth order. The findings show a strong and statistically significant negative association between the number of sons and the probability of subsequent birth. At higher birth orders, the likelihood of continued childbearing decreases steadily as the number of sons increases. For example, after the third birth, 40+ women with three sons are nearly 37.5 % less likely to have a fourth birth than those with no sons.

## 7. Conclusion

Son preference is widespread in many parts of the developing world. Despite its significance in shaping reproductive behavior, son preference among married women in Uzbekistan has been overlooked in the literature. This study fills this gap by investigating the effect of son preference on reproductive behavior among married women in Uzbekistan. Our analysis is based on the recent round of Uzbekistan Multiple Indicator Cluster Survey (MICS) conducted in 2021 and 2022. We employ various econometric techniques and specifications to examine the effect of son preference on reproductive outcomes. Our findings provide a substantial evidence of son preference in Uzbekistan.

Women are less likely to have a subsequent birth if they have a son or at least one son at a given birth order. The effect is stronger at higher birth order. The likelihood of discontinuity of childbearing increases as the number of sons increases. In addition, we found evidence for differential birth spacing behavior among Uzbek women. Women who have a boy are more likely to experience a longer subsequent birth interval and there is less likelihood of having a subsequent shorter or risky birth interval. Besides, we found a significant association between son preference and the contraceptive use. Women with at least one son are more likely to use contraceptives. We find that the effect is particularly strong among rural women at higher birth orders. Our findings are robust to additional subgroup estimations.

Our findings are comparable with other studies on Asian countries (Channon, 2017; Hoq, 2019; Hoque & Boulier, 2020; Javed & Mughal, 2020, 2022; Jiang et al., 2016; Zaidi & Morgan, 2016). This study's findings align with those of a recent study on Uzbekistan's neighboring country, Kyrgyzstan (Kazenin, 2023).

To sum up, our research provides the first evidence of son preference in Uzbekistan. Son preference significantly influences Uzbek couples' fertility intentions and behaviors. There is continuity in childbearing as long as at least one male child is not born. There are important implications of our findings for policymakers and practitioners in helping to design the targeted interventions and programs in the country to improve reproductive health outcomes, promote gender equality, increase access to family planning services, and support women's reproductive autonomy. Finally, addressing son preference directly aligns

with SDG 5 of the UN's Sustainable Development Goals, which focuses on achieving gender equality and empowering all women and girls, underlining the broader global relevance of our research.

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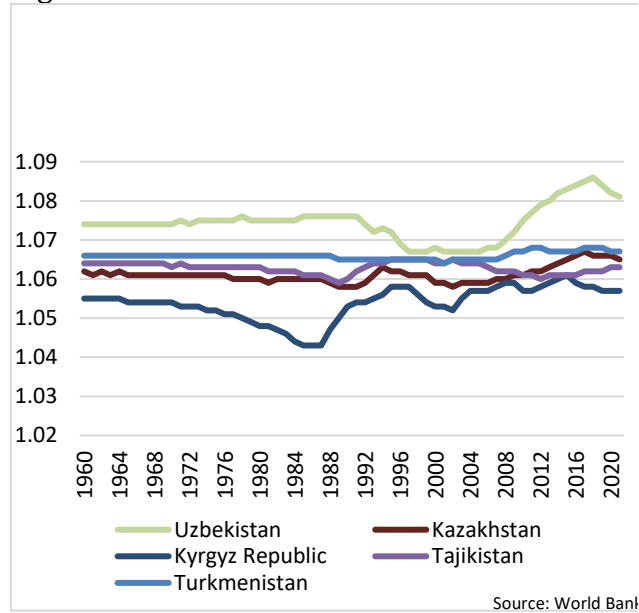
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## Tables and Figures:

Figure 1: Sex ratio at birth



Source: World Bank (2024)

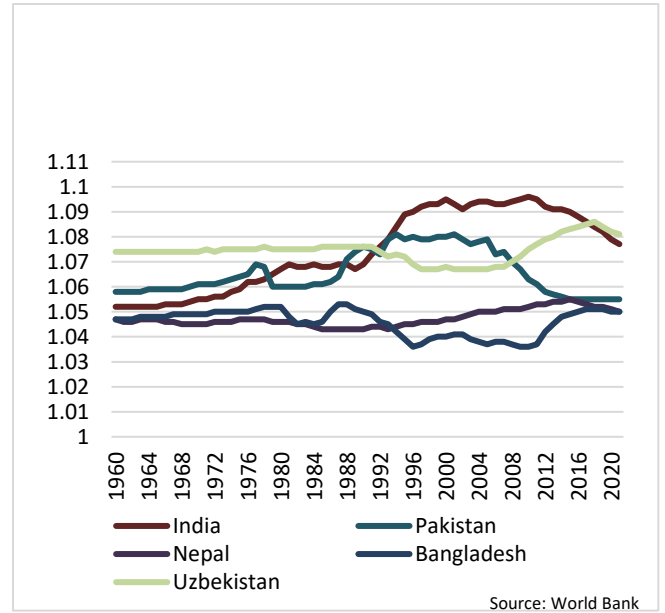
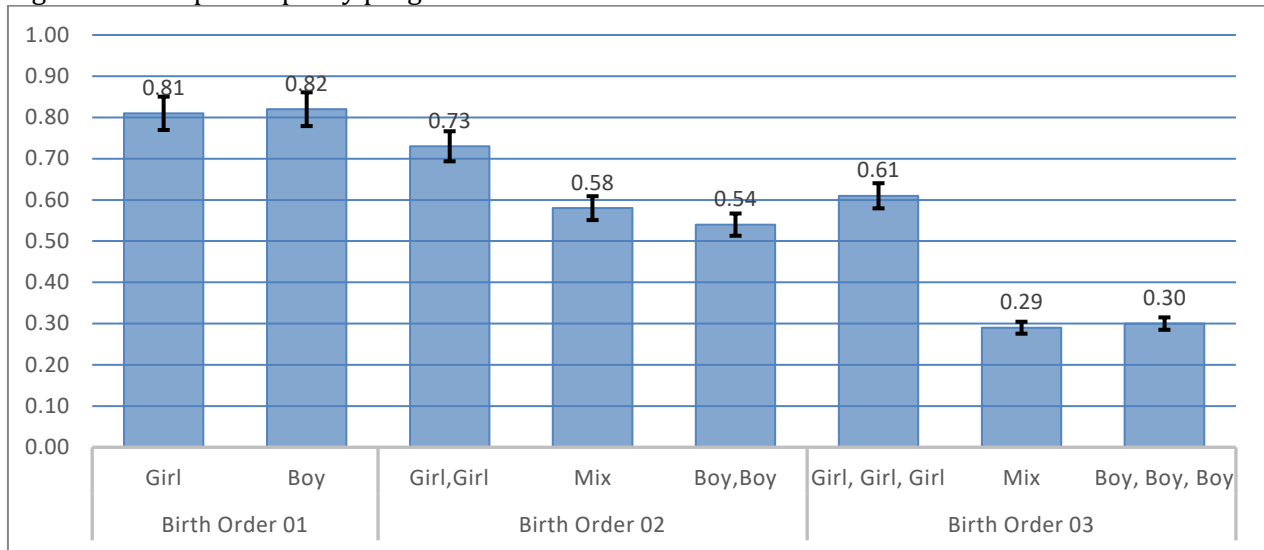


Figure 2: Sex-Specific parity progression



Source: Authors' calculations using Uzbekistan MICS 2021–2022.

**Table 01: Data description**

Variable	Description	Mean/ Proportion	95% CI
<b>Outcomes of Interest</b>			
Subsequent birth at birth order			
1	Dummy variable, takes value 1 if the woman has had a second birth (i.e., a subsequent birth after the first child), and 0 otherwise	0 0.18	0.16 0.19
2	Dummy variable, takes value 1 if the woman has had a third birth (i.e., a subsequent birth after the second child), and 0 otherwise	0 0.40	0.37 0.42
3	Dummy variable, takes the value 1 if the woman has had a fourth birth (i.e., a subsequent birth after the third child), and 0 otherwise	0 0.67	0.64 0.69
4	Dummy variable that takes the value 1 if the woman has had a fifth birth (i.e., a subsequent birth after the fourth child), and 0 otherwise	0 0.71	0.66 0.75
Birth spacing between			
1st and 2nd child	Succeeding birth space in days between 1st and 2nd birth	1070.63	1042.77 1098.48
2nd and 3rd child	Succeeding birth space in days between 2nd and 3rd birth	1606.68	1555.78 1657.57
3rd and 4th child	Succeeding birth space in days between 3rd and 4th birth	1561.29	1470.13 1652.43
4th and 5th child	Succeeding birth space in days between 4th and 5th birth	1500.40	1342.40 1658.39
Short birth interval between			
1 <sup>st</sup> birth and 2nd conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 24$ months, 0 otherwise	0 0.56	0.54 0.58
2nd birth and 3rd conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 24$ months, 0 otherwise	0 0.86	0.85 0.87
3rd birth and 4th conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 24$ months, 0 otherwise	0 0.94	0.93 0.95
4th birth and 5th conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 24$ months, 0 otherwise	0 0.98	0.98 0.99
Risky birth Interval 01			
1 <sup>st</sup> birth and 2nd conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 18$ months, 0 otherwise	0 0.69	0.67 0.70
2nd birth and 3rd conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 18$ months, 0 otherwise	0 0.91	0.90 0.92
3rd birth and 4th conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 18$ months, 0 otherwise	0 0.96	0.95 0.97
4th birth and 5th conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 18$ months, 0 otherwise	0 0.99	0.98 0.99
Risky birth Interval 02			
1 <sup>st</sup> birth and 2nd conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 15$ months, 0 otherwise	0 0.75	0.74 0.77
2nd birth and 3rd conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 15$ months, 0 otherwise	0 0.94	0.93 0.94
3rd birth and 4th conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 15$ months, 0 otherwise	0 0.97	0.96 0.97
4th birth and 5th conception	Dummy variable, takes value 1 if the interval between given birth and next conception is $\leq 15$ months, 0 otherwise	0 0.99	0.98 0.99
Contraceptive	Dummy variable, takes the value of 1 if the current use of contraceptive, 0 otherwise	0 0.36	0.33 0.38
<b>Variables of Interests</b>			
Sex of the child at birth order			
1	Dummy variable, takes the value of 1 if first child is male, 0 otherwise	0 0.49	0.46 0.50
2	Dummy variable, takes the value of 1 if second child is male, 0 otherwise	0 0.47	0.44 0.49
3	Dummy variable, takes the value of 1 if third child is male, 0 otherwise	0 0.49	0.46 0.51
4	Dummy variable, takes the value of 1 if fourth child is male, 0 otherwise	0 0.48	0.43 0.52
At least one son at birth order			
1	Dummy variable, takes the value of 1 if woman has at least one son at birth order 1, 0 otherwise	0 0.49	0.46 0.50

2	Dummy variable, takes the value of 1 if woman has at least one son at birth order 2, 0 otherwise	0	0.23	0.21	0.24
		1	0.77	0.75	0.78
3	Dummy variable, takes the value of 1 if woman has at least one son at birth order 3, 0 otherwise	0	0.13	0.11	0.15
		1	0.87	0.84	0.88
4	Dummy variable, takes the value of 1 if woman has at least one son at birth order 4, 0 otherwise	0	0.10	0.07	0.12
		1	0.90	0.87	0.92
Number of sons at birth order					
1	Number of sons out of 1 child	0	0.49	0.46	0.50
		1	0.51	0.49	0.53
2	Number of sons out of 2 children	0	0.23	0.21	0.24
		1	0.49	0.47	0.51
		2	0.27	0.25	0.29
3	Number of sons out of 3 children	0	0.13	0.11	0.15
		1	0.37	0.34	0.39
		2	0.39	0.35	0.41
		3	0.11	0.09	0.13
4	Number of sons out of 4 children	0	0.10	0.07	0.12
		1	0.31	0.26	0.35
		2	0.33	0.29	0.37
		3	0.23	0.18	0.26
		4	0.03	0.02	0.05
<b>Controls</b>					
Woman's age at birth at birth order					
1	Categorical variable, takes value of 1 if woman's age at first birth was 20 or younger, 2 if woman's age at first birth was between 20 and 34, 3 if woman's age at first birth was 35 or older	1	0.18	0.16	0.20
		2	0.81	0.79	0.82
		3	0.01	0.003	0.012
2	Categorical variable, takes value of 1 if woman's age at second birth was 20 or younger, 2 if woman's age at second birth was between 20 and 34, 3 if woman's age at second birth was 35 or older	1	0.02	0.015	0.026
		2	0.97	0.96	0.97
		3	0.01	0.007	0.016
3	Categorical variable, takes value of 1 if woman's age at third birth was 20 or younger, 2 if woman's age at third birth was between 20 and 34, 3 if woman's age at third birth was 35 or older	1	0.001	0.0006	0.005
		2	0.95	0.93	0.96
		3	0.05	0.037	0.059
4	Categorical variable, takes value of 1 if woman's age at fourth birth was 20 or younger, 2 if woman's age at fourth birth was between 20 and 34, 3 if woman's age at fourth birth was 35 or older	2	0.87	0.83	0.89
		3	0.13	0.10	0.16
Husband age	Husband's current age in completed years		38	37.65	38.25
Education	Dummy variable, takes value of 1 if woman has higher education, 0 otherwise	0	0.90	0.88	0.90
		1	0.10	0.09	0.11
Household size	Number of family members in one household (excluding total number of children)		3.15	3.00	3.30
Family status	Dummy variable, takes the value of 1 if the family is nuclear, 0 otherwise	0	0.50	0.47	0.52
		1	0.50	0.47	0.52
Place of residence	Dummy variable, takes value of 1 if households live in urban area, 0 if in rural area	0	0.54	0.51	0.56
		1	0.46	0.43	0.48
Region	Categorical variable, takes value of 1 if geo-economic region is Western region, 2 if Central, 3 if Southern, 4 if Central-Eastern, 5 if Eastern, 6 if Tashkent city	1	0.11	0.10	0.11
		2	0.15	0.13	0.17
		3	0.17	0.15	0.18
		4	0.21	0.18	0.22
		5	0.30	0.27	0.32
		6	0.06	0.05	0.07
Economic status	Categorical variable, takes the value 1 if household in poorest, 2 if household is poorer, 3 if household is middle, 4 if household is rich, richest otherwise 5	1	0.20	0.18	0.22
		2	0.21	0.18	0.22
		3	0.20	0.18	0.22
		4	0.19	0.16	0.21
		5	0.20	0.17	0.22

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Sample weights are used.

**Table 02: Sex of the child at given birth order and subsequent birth– Probit estimation**

Variables	Subsequent birth at birth order 1		Subsequent birth at birth order 2		Subsequent birth at birth order 3		Subsequent birth at birth order 4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sex of first child (ref: female)	-0.010	-0.004						
Male	(0.055)	(0.064)						
Sex of second child (ref: female)			-0.257***	-0.307***				
Male			(0.050)	(0.058)				
Sex of third child (ref: female)					-0.223***	-0.253***		
Male					(0.071)	(0.073)		
Sex of fourth child (ref: female)							-0.367***	-0.360**
Male							(0.128)	(0.139)
Marginal effect	-0.002	-0.008	-0.099***	-0.100***	-0.080***	-0.081***	-0.124***	-0.103**
	(0.014)	(0.012)	(0.019)	(0.018)	(0.026)	(0.024)	(0.043)	(0.040)
Constant	0.925***	-0.812**	0.399***	1.336**	-0.337***	0.901*	-0.379***	1.799**
	(0.037)	(0.391)	(0.040)	(0.566)	(0.054)	(0.546)	(0.085)	(0.842)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	3,585	3,310	2,926	2,754	1,758	1,682	584	557

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for subsequent birth at nth birth order, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 03: At least one son at given birth and subsequent birth– Probit estimation**

Variables	Subsequent birth at birth order 1		Subsequent birth at birth order 2		Subsequent birth at birth order 3		Subsequent birth at birth order 4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Birth order 01 (ref: no son) At least one son	-0.010 (0.055)	-0.004 (0.064)						
Birth order 02 (ref: no son) At least one son			-0.425*** (0.062)	-0.536*** (0.077)				
Birth order 03 (ref: no son) At least one son					-0.843*** (0.107)	-0.941*** (0.106)		
Birth order 04 (ref: no son) At least one son							-0.984*** (0.212)	-1.141*** (0.234)
Marginal effect	-0.002 (0.014)	-0.008 (0.012)	-0.156*** (0.021)	-0.167*** (0.022)	-0.323*** (0.040)	-0.321*** (0.036)	-0.371*** (0.079)	-0.359*** (0.074)
Constant	0.925*** (0.037)	-0.812** (0.391)	0.592*** (0.057)	1.568*** (0.579)	0.273*** (0.096)	1.379** (0.579)	0.314 (0.195)	2.645*** (0.866)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	3,585	3,310	2,926	2,754	1,758	1,682	584	557

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for subsequent birth at nth birth order, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 04: Number of sons at given birth and subsequent birth– Probit estimation**

Variables	Subsequent birth at birth order 1		Subsequent birth at birth order 2		Subsequent birth at birth order 3		Subsequent birth at birth order 4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Birth order 01 (ref: 0)	-0.010 (0.055)	-0.004 (0.064)						
Marginal effect	-0.002 (0.014)	-0.008 (0.012)						
Birth order 02 (ref: 0)			-0.392*** (0.063)	-0.508*** (0.078)				
1								
2			-0.484*** (0.080)	-0.585*** (0.094)				
Marginal effect								
1			-0.143*** (0.021)	-0.158*** (0.022)				
2			-0.180*** (0.029)	-0.184*** (0.028)				
Birth order 03 (ref: 0)					-0.811*** (0.117)	-0.906*** (0.115)		
1								
2					-0.868*** (0.114)	-0.977*** (0.117)		
3					-0.863*** (0.145)	-0.934*** (0.146)		
Marginal effect								
1					-0.312*** (0.044)	-0.311*** (0.038)		
2					-0.332*** (0.042)	-0.332*** (0.039)		
3					-0.330*** (0.052)	-0.319*** (0.047)		
Birth order 04 (ref: 0)							-0.891*** (0.234)	-1.040*** (0.255)
1								
2							-1.071*** (0.226)	-1.241*** (0.255)
3							-0.982*** (0.239)	-1.178*** (0.262)
4							-1.032*** (0.387)	-0.886** (0.444)
Marginal effect								
1							-0.341*** (0.086)	-0.331*** (0.079)
2							-0.399*** (0.082)	-0.385*** (0.078)
3							-0.371*** (0.086)	-0.369*** (0.080)
4							-0.387*** (0.127)	-0.286** (0.136)
Constant	0.925*** (0.037)	-0.812** (0.391)	0.592*** (0.057)	1.559*** (0.580)	0.273*** (0.096)	1.388** (0.577)	0.314 (0.195)	2.655*** (0.870)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	3,585	3,310	2,926	2,754	1,758	1,682	584	557

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for subsequent birth at nth birth order, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 05: Subsequent birth spacing by birth order**

		Birth spacing (days)		Short birth Interval			Risky birth interval					
Birth order		Mean	Lin. Std. Err.	≤ 24 Months (between birth-to-conception)			≤ 18 Months (between birth-to-conception)			≤ 15 Months (between birth-to-conception)		
				(%)	95% CI		(%)	95% CI		(%)	95% CI	
1	No Son	1033.71	19.01	0.47	0.44	0.49	0.33	0.30	0.35	0.26	0.24	0.28
	At least one son	1105.97	18.69	0.40	0.37	0.43	0.28	0.26	0.31	0.22	0.20	0.24
2	No Son	1372.62	37.99	0.22	0.19	0.26	0.13	0.10	0.16	0.10	0.07	0.12
	At least one son	1697.77	31.75	0.14	0.12	0.16	0.09	0.07	0.10	0.06	0.05	0.07
3	No Son	1411.65	75.54	0.19	0.14	0.26	0.14	0.10	0.20	0.11	0.07	0.17
	At least one son	1610.99	54.32	0.09	0.07	0.11	0.06	0.04	0.08	0.04	0.03	0.06
4	No Son	1529.97	122.49	0.14	0.07	0.26	0.04	0.01	0.16	0.04	0.009	0.16
	At least one son	1492.36	94.80	0.07	0.05	0.10	0.05	0.03	0.07	0.03	0.02	0.06

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Sample weights are used

Table 06: Sex of the child at given birth order and subsequent birth space– Cox estimation

Hazard ratio	(1) Duration 1 to 2	(2) Duration 1 to 2	(3) Duration 2 to 3	(4) Duration 2 to 3	(5) Duration 3 to 4	(6) Duration 3 to 4	(7) Duration 4 to 5	(8) Duration 4 to 5
Sex of first child (ref: female) Male	0.875*** (0.033)	0.865*** (0.033)						
Sex of second child (ref: female) Male			0.787*** (0.038)	0.774*** (0.039)				
Sex of third child (ref: female) Male					0.810** (0.069)	0.820** (0.073)		
Sex of fourth child (ref: female) Male							1.042 (0.179)	1.152 (0.212)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	2,887	2,720	1,722	1,646	559	533	141	133

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for interval between n'th and n+1'th birth, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 07: At least one son at given birth order and subsequent birth space– Cox estimation

Hazard ratio	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Duration	Duration	Duration	Duration	Duration	Duration	Duration	Duration
	1 to 2	1 to 2	2 to 3	2 to 3	3 to 4	3 to 4	4 to 5	4 to 5
Birth order 01 (ref: no son)	0.875*** (0.033)	0.865*** (0.033)						
At least one son								
Birth order 02 (ref: no son)			0.662*** (0.036)	0.657*** (0.037)				
At least one son								
Birth order 03 (ref: no son)					0.686*** (0.068)	0.727*** (0.075)		
At least one son								
Birth order 04 (ref: no son)							0.942 (0.187)	1.031 (0.220)
At least one son								
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	2,887	2,720	1,722	1,646	559	533	141	133

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for interval between n'th and n+1'th birth, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 08: Number of sons at given birth order and subsequent birth space– Cox estimation

Hazard ratio	(1) Duration 1 to 2	(2) Duration 1 to 2	(3) Duration 2 to 3	(4) Duration 2 to 3	(5) Duration 3 to 4	(6) Duration 3 to 4	(7) Duration 4 to 5	(8) Duration 4 to 5
Birth order 01 (ref: 0)	0.875*** (0.033)	0.865*** (0.033)						
1								
Birth order 02 (ref: 0)			0.661*** (0.038)	0.656*** (0.039)				
1								
2			0.664*** (0.045)	0.657*** (0.046)				
Birth order 03 (ref: 0)					0.704*** (0.079)	0.754** (0.088)		
1								
2					0.657*** (0.076)	0.712*** (0.086)		
3					0.720** (0.113)	0.689** (0.114)		
Birth order 04 (ref: 0)							0.863 (0.202)	0.967 (0.243)
1								
2							0.948 (0.237)	0.946 (0.251)
3							1.274 (0.326)	1.315 (0.363)
4							0.445 (0.221)	0.690 (0.385)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	2,887	2,720	1,722	1,646	559	533	141	133

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for interval between n'th and n+1'th birth, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 09: Son preference and short birth spacing– Probit estimation

Variables	Subsequent birth space at birth order 1		Subsequent birth space at birth order 2		Subsequent birth space at birth order 3		Subsequent birth space at birth order 4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Birth order 01 (ref: no son)	-0.173***	-0.158***						
At least one son	(0.049)	(0.051)						
Birth order 02 (ref: no son)			-0.323***	-0.326***				
At least one son			(0.070)	(0.076)				
Birth order 03 (ref: no son)					-0.496***	-0.495***		
At least one son					(0.118)	(0.127)		
Birth order 04 (ref: no son)							-0.397*	-0.285
At least one son							(0.238)	(0.237)
Marginal effect	-0.068***	-0.060***	-0.085***	-0.084***	-0.109***	-0.098***	-0.071*	-0.050
	(0.019)	(0.019)	(0.020)	(0.021)	(0.030)	(0.029)	(0.050)	(0.046)
Constant	-0.069**	-0.513**	-0.745***	0.270	-0.843***	-0.263	-1.065***	0.557
	(0.034)	(0.239)	(0.065)	(0.413)	(0.103)	(0.722)	(0.210)	(1.047)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	3,585	3,310	2,926	2,754	1,758	1,682	584	480

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for short interval between n'th and n+1'th birth, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 10: Son preference and risky birth interval– Probit estimation

Variables	Subsequent birth space at birth order 1		Subsequent birth space at birth order 2		Subsequent birth space at birth order 3		Subsequent birth space at birth order 4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: ≤ 18 months								
Birth order 01 (ref: no son)	-0.133***	-0.120**						
At least one son	(0.049)	(0.050)						
Birth order 02 (ref: no son)			-0.226***	-0.233***				
At least one son			(0.078)	(0.083)				
Birth order 03 (ref: no son)					-0.481***	-0.429***		
At least one son					(0.136)	(0.148)		
Birth order 04 (ref: no son)							0.041	0.241
At least one son							(0.341)	(0.296)
Marginal effect	-0.046***	-0.041**	-0.042***	-0.042***	-0.083***	-0.066***	0.004	0.022
	(0.017)	(0.017)	(0.015)	(0.0166)	(0.027)	(0.027)	(0.033)	(0.024)
Constant	-0.431***	-0.733***	-1.112***	-0.426	-1.053***	-0.385	-1.680***	-1.392
	(0.035)	(0.238)	(0.070)	(0.464)	(0.113)	(0.757)	(0.316)	(1.084)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	3,585	3,310	2,926	2,754	1,758	1,682	584	480
Panel B: ≤ 15 months								
Birth order 01 (ref: no son)	-0.132***	-0.121**						
At least one son	(0.049)	(0.052)						
Birth order 02 (ref: no son)			-0.248***	-0.258***				
At least one son			(0.081)	(0.088)				
Birth order 03 (ref: no son)					-0.478***	-0.410***		
At least one son					(0.143)	(0.156)		
Birth order 04 (ref: no son)							-0.030	0.170
At least one son							(0.371)	(0.319)
Marginal effect	-0.041***	-0.037**	-0.037***	-0.038***	-0.070***	-0.053***	-0.002	0.013
	(0.015)	(0.015)	(0.013)	(0.014)	(0.025)	(0.024)	(0.032)	(0.023)
Constant	-0.631***	-1.026***	-1.279***	-0.523	-1.182***	-0.730	-1.738***	-1.535
	(0.035)	(0.239)	(0.071)	(0.506)	(0.119)	(0.768)	(0.344)	(1.146)
Controls	NO	YES	NO	YES	NO	YES	NO	YES
Observation	3,585	3,310	2,926	2,754	1,758	1,682	584	480

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for short interval between n'th and n+1'th birth, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 11: Son preference and current contraceptive use – Probit estimation

Variables	(1) Use of contraceptive	(2) Use of contraceptive
At least one son (ref: no son)	0.471*** (0.063)	0.253*** (0.073)
Marginal effect	0.182*** (0.024)	0.089*** (0.026)
Constant	-0.027 (0.059)	-0.112 (0.182)
Controls	NO	YES
Observation	3,349	3,077

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–2 present results for current contraceptive use, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), total number of children, husband's current age and household characteristics (family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Appendix:**

**Table A1: Comparative fertility outcomes for k vs. k-1 sons by birth order**

VARIABLES	Subsequent birth at birth order 1		Subsequent birth at birth order 2		Subsequent birth at birth order 3		Subsequent birth at birth order 4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Birth order 01 (ref: no son) one son	-0.010 (0.055)	-0.004 (0.064)						
Birth order 02 (ref: one son) Two Sons			-0.092 (0.065)	-0.080 (0.069)				
Birth order 03 (ref: Two sons) Three Sons					0.005 (0.117)	0.058 (0.125)		
Birth order 04 (ref: Three sons) Four Sons							-0.050 (0.359)	0.276 (0.392)
Marginal Effects	-0.002 (0.014)	-0.000 (0.012)	-0.036 (0.025)	-0.027 (0.023)	0.001 (0.039)	0.017 (0.037)	-0.015 (0.110)	0.083 (0.124)
Constant	0.925*** (0.037)	-0.812** (0.391)	0.199*** (0.041)	1.137* (0.610)	-0.595*** (0.057)	1.519* (0.907)	-0.669*** (0.131)	-3.514*** (1.283)
Observations	3,585	3,310	2,237	2,124	860	825	152	128
Controls	NO	YES	NO	YES	NO	YES	NO	YES

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–8 present results for subsequent birth at nth birth order, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A2: Sex composition of children and subsequent fertility by birth order

VARIABLES	Subsequent birth at birth order 2		Subsequent birth at birth order 3		Subsequent birth at birth order 4		Subsequent birth at birth order 2		Subsequent birth at birth order 3		Subsequent birth at birth order 4		Subsequent birth at birth order 2		Subsequent birth at birth order 3		Subsequent birth at birth order 4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Same-Sex composition (Ref: Mixed-Sex)	0.121**	0.163***																
	(0.050)	(0.056)																
Same-Sex composition (Ref: Mixed-Sex)			0.455***	0.515***														
			(0.083)	(0.087)														
Same-Sex composition (Ref: Mixed-Sex)					0.725***	0.917***												
					(0.182)	(0.190)												
All boys (Ref: Mixed-Sex)							-0.092	-0.080										
							(0.065)	(0.069)										
All boys (Ref: Mixed-Sex)									-0.024	-0.001								
									(0.114)	(0.121)								
All boys (Ref: Mixed-Sex)											-0.165	0.135						
											(0.344)	(0.384)						
All girls (Ref: Mixed-Sex)													0.392***	0.510***				
													(0.063)	(0.079)				
All girls (Ref: Mixed-Sex)															0.840***	0.937***		
															(0.108)	(0.108)		
All girls (Ref: Mixed-Sex)																	0.982***	1.156***
																	(0.214)	(0.237)
Marginal effect	0.046**	0.054***	0.170***	0.172***	0.270***	0.285***	-0.036	-0.027	-0.008	-0.000	-0.053	0.040	0.143***	0.156***	0.322***	0.321***	0.371***	0.361***
	(0.019)	(0.018)	(0.031)	(0.029)	(0.069)	(0.061)	(0.025)	(0.023)	(0.038)	(0.037)	(0.106)	(0.117)	(0.022)	(0.022)	(0.040)	(0.036)	(0.079)	(0.074)
Constant	0.199***	1.162**	-	0.377	-	1.600*	0.199***	1.137*	-	0.707	-	1.633*	0.199***	0.777	-	0.478	-	1.903**
	(0.041)	(0.566)	0.566***	(0.577)	0.668***	(0.877)	(0.041)	(0.610)	0.566***	(0.641)	0.554***	(0.854)	(0.041)	(0.711)	0.566***	(0.603)	0.668***	(0.879)
Observations	2,926	2,754	1,758	1,682	584	557	2,237	2,124	1,520	1,461	584	557	2,132	1,996	1,555	1,489	561	535
Controls	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–18 present results for subsequent birth at nth birth order, first without and then with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A3: Son preference and reproductive behavior by household location

VARIABLES	Subsequent birth at birth order 1				Subsequent birth at birth order 2				Subsequent birth at birth order 3				Subsequent birth at birth order 4			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(ref: no son)	Urban 0.072 (0.073)	Rural -0.095 (0.082)	Urban 0.076 (0.082)	Rural -0.085 (0.097)												
At least one son (ref: no son)					-0.317*** (0.092)	-0.523*** (0.084)	-0.395*** (0.117)	-0.657*** (0.102)								
At least one son (ref: no son)									-0.742*** (0.137)	-0.929*** (0.164)	-0.771*** (0.149)	-1.076*** (0.149)				
At least one son (ref: no son)													-1.027*** (0.357)	-0.949*** (0.265)	-1.307*** (0.375)	-1.067*** (0.301)
At least one son Marginal effect	0.019 (0.019)	-0.023 (0.020)	0.016 (0.017)	-0.016 (0.018)	-0.118*** (0.033)	-0.190*** (0.028)	-0.124*** (0.035)	-0.202*** (0.027)	-0.281*** (0.053)	-0.357*** (0.059)	-0.266*** (0.050)	-0.358*** (0.047)	-0.377*** (0.134)	-0.363*** (0.097)	-0.389*** (0.121)	-0.347*** (0.095)
Constant	0.826*** (0.051)	1.024*** (0.054)	-0.869* (0.521)	-1.046* (0.608)	0.507*** (0.078)	0.670*** (0.083)	1.618* (0.839)	1.486* (0.813)	0.129 (0.134)	0.396*** (0.142)	1.711** (0.697)	1.342 (0.855)	0.225 (0.320)	0.371 (0.248)	2.199* (1.254)	2.972** (1.149)
Observations	1,735	1,850	1,554	1,756	1,393	1,533	1,282	1,472	837	921	789	893	250	334	233	324
Controls	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
	Duration 1 to 2				Duration 2 to 3				Duration 3 to 4				Duration 4 to 5			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(ref: no son)	Urban 0.908* (0.049)	Rural 0.842*** (0.043)	Urban 0.886** (0.050)	Rural 0.846*** (0.045)												
At least one son (ref: no son)					0.670*** (0.053)	0.652*** (0.049)	0.656*** (0.055)	0.665*** (0.051)								
At least one son (ref: no son)									0.636*** (0.102)	0.733** (0.093)	0.657** (0.112)	0.756** (0.100)				
At least one son (ref: no son)													1.673 (0.556)	0.649* (0.165)	2.387** (1.002)	0.773 (0.221)
At least one son Observations	1,376	1,511	1,270	1,450	822	900	774	872	238	321	222	311	55	86	49	84
Controls	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES

Source: Authors' calculations using Uzbekistan MICS 2021–2022. The table presents results from two panels. Panel A (Columns 1–16) shows the probability of a subsequent birth at each birth order (1 through 4), separately for urban and rural areas, first without and then with controls. Panel B (Columns 1–16) reports the duration between birth n and birth n+1, separately by urban and rural areas, first without and then with controls. Sample weights are used where applicable. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A4: Son preference and reproductive behavior by household income

VARIABLES	Subsequent birth at birth order 1				Subsequent birth at birth order 2				Subsequent birth at birth order 3				Subsequent birth at birth order 4			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
At least one son (ref: no son)	Poor -0.070 (0.096)	Non-poor 0.030 (0.067)	Poor -0.035 (0.105)	Non-poor 0.044 (0.082)												
At least one son (ref: no son)					-0.473*** (0.104)	-0.381*** (0.078)	-0.611*** (0.132)	-0.500*** (0.091)								
At least one son (ref: no son)									-0.738*** (0.164)	-0.936*** (0.136)	-0.947*** (0.172)	-0.971*** (0.136)				
At least one son (ref: no son)													-1.190*** (0.299)	-0.774** (0.317)	-1.424*** (0.342)	-0.904*** (0.336)
Marginal effect	-0.017 (0.023)	0.008 (0.018)	-0.006 (0.020)	0.008 (0.016)	-0.167*** (0.034)	-0.144*** (0.028)	-0.179*** (0.034)	-0.161*** (0.027)	-0.285*** (0.062)	-0.356*** (0.050)	-0.2*** (0.051)	-0.343*** (0.048)	-0.446*** (0.095)	-0.273** (0.122)	-0.453*** (0.091)	-0.267*** (0.110)
Constant	1.015*** (0.065)	0.865*** (0.047)	0.223 (0.584)	-1.679*** (0.456)	0.713*** (0.092)	0.497*** (0.072)	2.452*** (0.881)	0.752 (0.733)	0.226 (0.145)	0.321** (0.130)	1.953** (0.806)	1.378* (0.809)	0.698** (0.269)	-0.068 (0.298)	2.504* (1.285)	2.181* (1.295)
Observations	1,392	2,193	1,302	2,008	1,173	1,753	1,115	1,639	755	1,003	725	957	282	302	270	286
Controls	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES

VARIABLES	Duration 1 to 2				Duration 2 to 3				Duration 3 to 4				Duration 4 to 5			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
At least one son (ref: no son)	Poor 0.832*** (0.049)	Non-poor 0.906** (0.044)	Poor 0.826*** (0.050)	Non-poor 0.888** (0.045)												
At least one son (ref: no son)					0.637*** (0.051)	0.690*** (0.051)	0.650*** (0.054)	0.667*** (0.051)								
At least one son (ref: no son)									0.710** (0.097)	0.715** (0.103)	0.746** (0.107)	0.726** (0.109)				
At least one son (ref: no son)													0.645* (0.163)	1.365 (0.454)	0.724 (0.195)	1.772 (0.676)
Observations	1,159	1,728	1,101	1,619	742	980	712	934	277	282	266	267	87	54	82	51
Controls	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES

Source: Authors' calculations using Uzbekistan MICS 2021–2022. The table presents results from two panels. Panel A (Columns 1–16) shows the probability of a subsequent birth at each birth order (1 through 4), separately for poor and non-poor sample, first without and then with controls. Panel B (Columns 1–16) reports the duration between birth n and birth n+1, separately by poor and non-poor sample, first without and then with controls. Sample weights are used where applicable. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A5: Son preference and differential birth stopping – Sample Selection (Age ≥40)

Variables	(1)	(2)	(3)	(4)
	Subsequent birth at birth order 1	Subsequent birth at birth order 2	Subsequent birth at birth order 3	Subsequent birth at birth order 4
<b>Sex of the child at given birth order and subsequent birth</b>				
Sex of child (ref: female)	0.207	-0.391***	-0.205**	-0.474**
Male	(0.219)	(0.105)	(0.104)	(0.188)
Marginal effect	0.016	-0.099***	-0.072*	-0.142**
	(0.017)	(0.026)	(0.036)	(0.054)
Constant	4.108***	6.374***	1.897*	2.054
	(1.193)	(1.057)	(0.968)	(1.526)
Controls	YES	YES	YES	YES
Observation	963	925	722	318
<b>At least one son at given birth and subsequent birth</b>				
At least one son (ref: no son)	0.207	-0.533***	-1.307***	-1.560***
	(0.219)	(0.150)	(0.171)	(0.320)
Marginal effect	0.016	-0.118***	-0.418***	-0.463***
	(0.017)	(0.028)	(0.043)	(0.076)
Constant	4.108***	6.623***	2.924***	2.913*
	(1.193)	(1.099)	(0.999)	(1.614)
Controls	YES	YES	YES	YES
Observation	963	925	722	318
<b>Number of sons at given birth and subsequent birth</b>				
Number of sons (ref: 0)	0.207			
1	(0.219)			
Number of sons (ref: 0)		-0.470***		
1		(0.155)		
2		-0.686***		
		(0.172)		
Number of sons (ref: 0)			-1.276***	
1			(0.180)	
2			-1.369***	
			(0.188)	
3			-1.188***	
			(0.237)	
Number of sons (ref: 0)				-1.478***
1				(0.341)
2				-1.631***
				(0.349)
3				-1.587***
				(0.350)
4				-1.377**
				(0.599)
Marginal effect				
1	0.016	-0.101***	-0.406***	-0.439***
	(0.017)	(0.030)	(0.047)	(0.085)
2		-0.162***	-0.439***	-0.484***
		(0.038)	(0.050)	(0.084)
3			-0.375***	-0.472***
			(0.072)	(0.088)
4				-0.409***
				(0.174)
Constant	4.108***	6.657***	2.921***	2.970*
	(1.193)	(1.095)	(1.007)	(1.636)
Controls	YES	YES	YES	YES
Observation	963	925	722	318

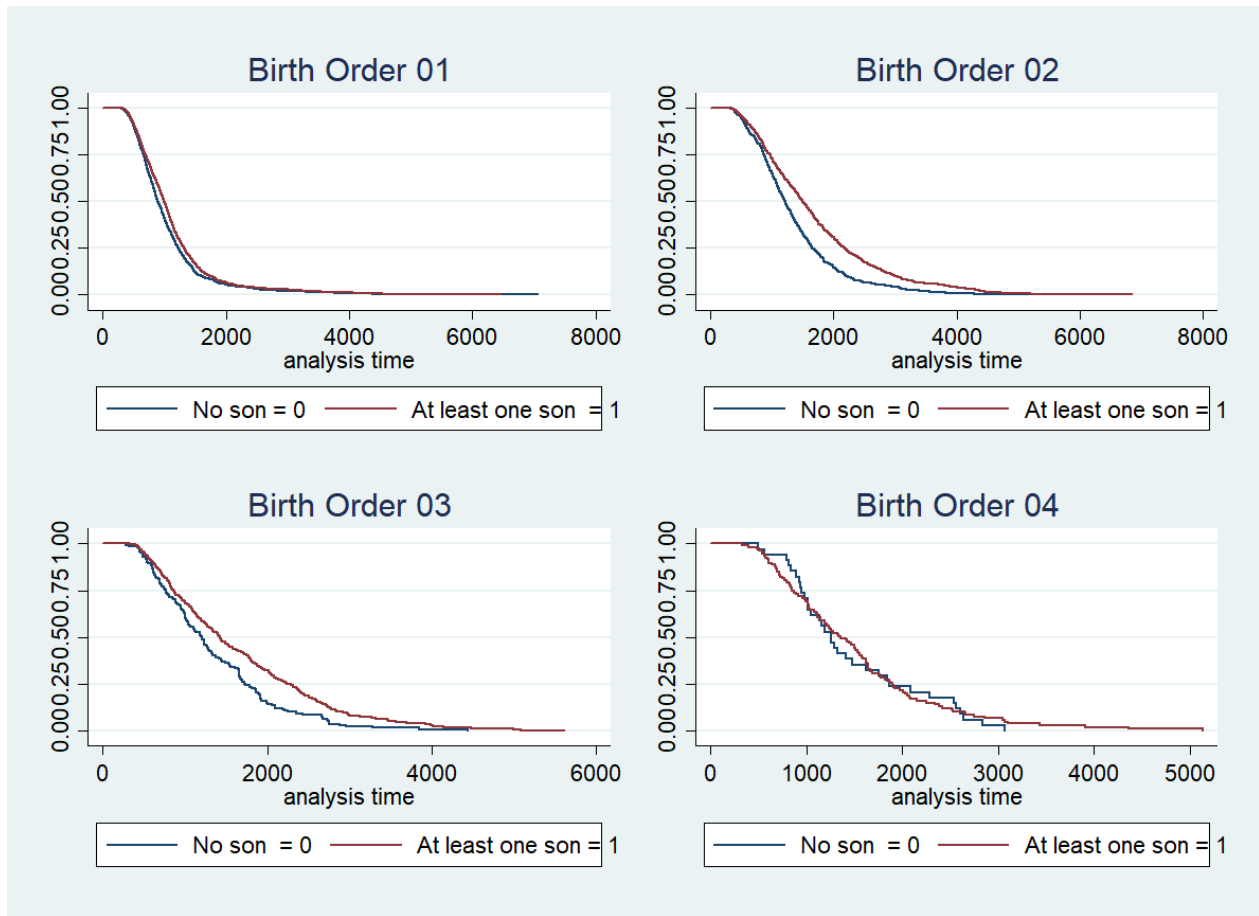
Source: Authors' calculations using Uzbekistan MICS 2021–2022. Columns 1–4 present results for subsequent birth at nth birth order, with the set of controls. Controls include woman's characteristics (age at given birth order, education), husband's current age and household characteristics (household size, family status, place of residence, region, wealth index). Sample weights are used. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Figure B1: Sex of the child at given birth order and subsequent birth space– Kaplan-Meier cumulative survival curve



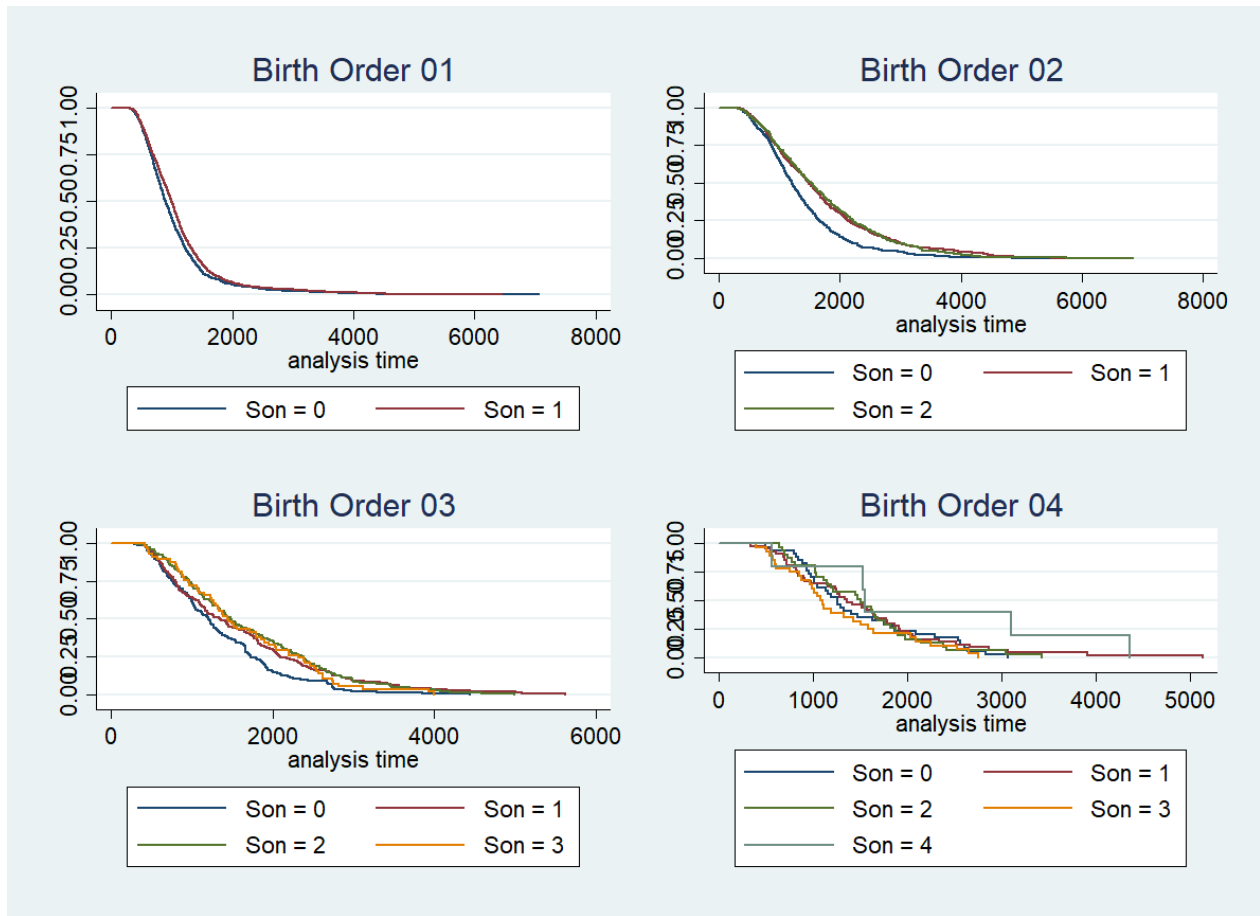
Source: Authors' calculations using Uzbekistan MICS 2021–2022.

Figure B2: At least one son at given birth order and subsequent birth space – Kaplan-Meier cumulative survival curve



Source: Authors' calculations using Uzbekistan MICS 2021-2022.

Figure B3: Number of sons at given birth order and subsequent birth space – Kaplan-Meier cumulative survival curve



Source: Authors' calculations using Uzbekistan MICS 2021-2022.