Effects of sex preference and social pressure on fertility in changing Japanese families

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Abstract. This study explored how social pressure related to parental preference for the sex of their children affects fertility. Pre-war and post-war generations were compared using individual level data previously collected in Japan in 2002. In the pre-war generation, if the first child was a daughter, the total number of children tended to increase not only when the mother preferred a son, but also when the mother did not have a preference for either gender. This tendency was not observed for the post-war generation. Results suggest that social pressure related to giving birth to a son led to high fertility in the pre-war generation; however, fertility was not influenced by social pressure in the post-war generation.

1. Introduction

It is widely acknowledged that parental preferences for the sex of their children exist (e.g., Ben-Porath and Welch, 1976, 1980; Behrman, 1988; Behrman et al., 1986; Leung, 1988). This topic has triggered a significant amount of research regarding the underlying reasons for these preferences and effects on family structure (e.g., Arnold and Liu, 1986; Arnold and Zhaoxiang, 1986; Dahl and Moretti, 2008; Das, 1987; Leung, 1991, 1994; Lundberg, 2005)[1]. The relationship between son preference and fertility is considered to be among the major issues. From the viewpoint of traditional economics, fertility is dependent on the female's decision (e.g., Becker, 1965; Cigno, 1991; Galor and Weil, 1996). For example, due to a substitution effect, an increase in female wages results in an increase in female labor supply and a reduction in demand for children (Becker, 1965). Within the framework of traditional theory, Ahn and Mira (2002) have posited that income effect prevails over substitution effect in the process of economic growth. If this is true, considering the stage of economic development is important when investigating fertility[2].

In the field of economics, researchers have focused not only on individual decision making but also on the attitudes of others when analyzing human behavior (Becker and Murphy, 2000). In pre-war Japan, family members were expected to subordinate their individual interests to those of the family as a whole (Hendry, 1981). "Women were taught from an early age that their prime duty should be obedience: first to their father, then to their husband and husband's parents, and finally when widowed, to their son" (Hendry, 1981, p. 21). If a female did not obey the males in a family, she would be informally sanctioned by family members. This was an informal rule within a family and thus the social norm. More broadly stated, if members of a tightly knit group went against the social norm formed through long term interpersonal relationships, they suffered social ostracism[3]. The cost of social ostracism was significant in the family or community, which were both characterized by continuous and intensive personal interaction (Hayami, 2001). In this paper, this cost is regarded as the degree of social pressure. Social pressure

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[1] The one-child policy instituted by the Chinese government resulted in sex-selective abortions (Ebenstein, 2010). Especially in the countryside of China, sex-selective abortion was commonly observed (Zeng et al., 1993; Chu, 2001).
[2] According to Qian (2008), an increase in female income leads to mitigation of the distortion of the sex ratio at birth in China.
[3] The social norm remains, to a certain extent, in effect in Japan, although formal rule plays an important role (Yamamura, 2008a, 2008b).

depends to a great extent on the sociocultural and anthropological background of society. Hence, fertility is influenced not only by individual preference but also by social pressure, which varies according to the sociocultural condition[4].

Sociocultural conditions play a critical role in determining economic behavior, but the importance of this role has gradually decreased over time as an outcome of economic development (e.g., Greif, 1994, 2002; Hayami, 1998). Social pressure seems to lessen as a result of the diffusion of market-based transactions. If this is the case, economic development decreases the social pressure effect on fertility. Kureishi and Wakabayshi (2011) provided evidence that parents of the pre-war generation preferred a son. However, the son preference disappeared in the post-war generation, indicating that son preference had weakened in Japan. However, the dynamic process involving the social pressure effect on fertility has not been sufficiently investigated in existing research. It is widely acknowledged that Japan has experienced rapid economic growth during the post-World War II years. Income level, family structure, and inter-personal relations within communities in Japan have changed significantly in this period (Hendry, 1981). Therefore, it is appropriate to explore changes in income and social pressure as related to fertility in modern Japan. This study used individual level data to examine how not only a mother's preference but also social pressure influence fertility, after controlling for a mother's job status and education[5]. Furthermore, changes in these effects were explored by comparing pre-war and post-war generations.

2. Change of Conditions in Japan

Before the World War II period, each member of a family was expected to subordinate his or her individual interests to those of the family. Until the mid-19th century, property was regarded as belonging to the family as a whole (Hendry, 1981). The affairs of the family were managed ultimately by its head. 'The principals were expected to agree with the choice of their elders, and it was not considered quite proper for a son, and particularly for a daughter, to express too strong an opinion on

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[4] Individual preference appears to be affected by family members' characteristics. Kawaguchi and Miyazaki (2009) found that men raised by full-time working mothers were less likely to have working wives.

[5] The social position and role of women have also changed remarkably in this period. In this regard, Spain is similar to Japan. For example, Gutierrez-Domenech (2008) has focused on the labor market when exploring marriage and fertility.

the selection of the parents (Hendry, 1981, p. 17). Primogeniture became predominant during the 18–19th century and was institutionalized in the Meiji Civil Code (Article 970). The law of inheritance stipulated that all household property and authority should pass to the eldest son. The successor, the eldest son, was accorded deferential treatment next only to that of the head of the house. Under such conditions, parents were thought to prefer sons so as to provide heirs for the succeeding generations.

In the post-war period, legislation gave all sons and daughters equal rights to inherit. Opportunity for higher education for women had increased and so had opportunities to take on prestigious and lucrative employment. As stated in the Constitution, women have been given the legal status of full and equal partners in marriage. Given these changes, 'it seems that there is less emphasis on this successor's being the eldest son than there used to be, and other siblings usually receive a share of the inheritance in the form of education, financial help with a house or business, or a bridal trousseau (Hendry, 1981, p. 28–29).

The greatest single factor to have influenced the Japanese way of life was defeat in World War II, with the introduction of democracy and other Western ideals into the legal and educational systems (Hendry, 1981). Apart from change of law, unprecedented economic growth started after World War II. Hence, economic conditions such as income level were different between the pre-war and post-war generations, which appeared to change the structure of the family and thus relationships between family members. These drastic changes are thought to have had an impact on determinants of fertility.

3. Methods

Data

This paper used individual level data including information such as age, years of education, marital status, and number of children[6]. In addition, age and spouses' years of education were included. These data were compiled from the National Survey: "Trails of Families in Post-War Japan" (TFPWJ hereafter) conducted in all parts of Japan in 2002. Five thousand adult females (born between 1920 and 1969,

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[6] Data for this secondary analysis is from the National Survey: "Trails of Families in Post-War Japan." These data were designed by the Japan Society of Family Sociology. The research was subcontracted to Shin Joho Center Inc. and carried out in 2002. Data was provided by the Social Science Japan Data Archive, Information Center for Social Science Research on Japan, Institute of Social Science, The University of Tokyo.

aged 32 to 81 years) were invited to participate in a survey with stratified two-stage random sampling. The survey collected data on 3475 adults, with a response rate of 69.5%.

<Insert Table 1 here>

The construction of samples used in this research is shown in Table 1. The original sample contained 3475 observations. Among these observations, 3351 had experienced marriage. The sample size became 3189 when limited to those who had offspring. Hence, observations of infertile females were discarded. In addition, I omitted the observations without valid answers for respondents' and spouses' characteristics. Furthermore, the observations of those who were child-bearing age[7] were omitted, reducing the sample size to 2079. The sample was therefore restricted to females who had been fertile before their mid-40s, but could not bear a child in 2002. This sample was used for estimation, and results are reported in Tables 3 and 6.

Comparisons of variables used for estimation between pre-war and post-war generations are shown in Table 2. The dependent variable was the total number of children. Total number of children for the post-war generation was smaller than for the pre-war generation, reflecting a birth rate decline. Independent variables are also shown in Table 2. To measure preference for a son I used the following question: "For your first child, which did you want to have, a boy or girl?" Respondents could choose from a numbered list, which included "boy," "girl," "either," and "I didn't want a child." According to Dahl and Moretti (2008), a first-born son is more likely to be living with a father compared to a first-born daughter, leading fathers to prefer sons. Thus, the likelihood of living with a mother is thought to be associated with the mother's preference.

<Insert Figure 1 here>

Figure 1(a) reveals that the number of married children living with their mothers in the post-war generation was lower than in the pre-war generation. Figure 1(b) indicates that the eldest son was more likely than other children in the family to live with his mother, but this tendency was less in the post-war generation. The decline of the likelihood that the eldest son lived with his mother was

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[7] Furthermore, women of child-bearing age were defined as those who were born after 1955. That is, in 2002, they were younger than 47 years old.

consistent with the decline of preference for a son.

The key variable of sex of the first child was coded 1 if the first child was male; otherwise, it was 0. To control for the probability of pregnancy, respondents' and spouses' ages at marriage as well as dummy variables for divorce and husband's death were included. Economic condition of the household was indicated by dummy variables for a husband's having experienced bankruptcy or job loss, first professional job occupation[8], and husband's job[9]. Years of education for wives and husbands were incorporated to capture the human capital effect. Furthermore, cohort dummies were included to control for age effect[10].

<Insert Table 2 here>

For the purpose of examining the effect of changes in Japanese society on fertility, observations were divided into pre-war generation (husband born before 1945) and post-war generation (husband born after 1946), 1522 and 560 observations, respectively[11]. Divided observations were used for the regression estimation, and results are shown in Table 4. However, it was difficult to exactly divide the generation to capture the changes in perception and sociocultural condition because the generation born during the war possibly attended school in the post-war period[12]. Hence, alternative definitions regarding the generations were

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[8] In the questionnaire, professional occupation was defined as a job that requires highly specialized knowledge, such as doctor, lawyer, researcher, engineer/technical expert, reporter, writer, artist, teacher, nurse, pharmacist, child caretaker, and social worker.
[9] The husband's job was considered the professional occupation. Therefore, for the purpose of constructing husband's job dummies, I used the question "Which of the following describes your spouse's occupation when you married him?" Respondents chose from among a list, which included "regular employee of a large corporation (500 or more employees)," "regular employee of a small/medium corporation (less than 500 employees)," "self-employed in agriculture," "self-employed in areas other than agriculture," "non-regular employee," "He did not have a job." Husband's job dummies were included when estimations were conducted but not reported in Tables 3, 4, or 5.
[10] Cohorts were divided into 5 groups based on those who were born in (1) 1920–1929, (2) 1930–1939, (3) 1940–1949, (4) 1950–1959, and (5) 1960–1969.
[11] The family head, ordinarily the husband, played an important role in household decision making in the pre-war period. The role of the husband changed, and his influence declined in the post-war period. It is important to consider such changes in environment when birth of children is considered. Hence, pre-war and post-war generations were divided based on the husband's birth year.
[12] Kureishi and Wakabayshi (2011) used the same data set as this study to compare the sex preference among different generations. They divided the sample into 1920–1939, 1940–1954, and 1955–1969 cohort groups.

used when I conducted the estimation reported in Tables 5 and 6[13]. As seen in Table 2, respondents' average age at marriage in the post war-generation was higher than in the pre-war generation, whereas the age of husbands in the post-war generation was lower than in the pre-war generation. This suggests that female work opportunities increased in the post-war period, resulting in marriage postponement. The divorce rate was approximately 3% for both the pre-war and post-war generations, considered to be low. Death rate for husbands in the pre-war generation was 16.3%, distinctly higher than the 3.1% for the post-war generation. This finding might reflect that husbands born in the pre-war period were older than age 57 in 2002 when the survey was conducted; therefore, likelihood of death was higher than in the younger generation. Regarding bankruptcy or job loss, there was little difference between the pre-war generation (16.0%) and post-war generation (18.3%). I found it interesting that the percentage of professional occupations in the post-war generation was approximately one and a half times higher than in the pre-war generation, 16.4% and 11.2%, respectively. This suggests that post-war generation females were more likely than pre-war generation females to enter the labor market as specialists. Data on average years of education revealed that post-war generation females were more educated than pre-war generation females. Thus, the increase of specialists among females was due to the fact that females obtained highly specialized knowledge through education. Furthermore, rate of preference for a son (30.6%) was distinctly higher than preference for daughter (17.8%) in the pre-war generation, suggesting that son preference existed for the pre-war generation. The rate of preference for a son decreased to 23.9%, while that for a daughter increased to 22.8%. As a result, there was little difference between preference for a son or daughter in the post-war generation. This change in sex preference is in line with Kureishi and Wakabayashi (2011).

3.2. Analyses

I examined the relationship between the social pressure of preference for the birth of a son with fertility. I focused on the effect of the sex of the first child on total number of children. The estimated function takes the following form:

(Total number of children-1) $_{im}$ = α_0 + α_1 *(first male)* $_{im}$ + α_2 *(age at marriage)* $_{im}$ +

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[13] In the definitions for Table 5, pre-war and post-war generations are defined as husbands born before 1935 and husbands born after 1936, respectively. In the definitions for Table 6, pre-war and post-war generations are defined as husbands born before 1925 and husbands born after 1926, respectively.

α_3(*husband's age at marriage*)$_{im}$ + α_4 (*divorce*)$_{im}$ + α_5 (*husband's death*)$_{im}$ + α_6(*bankruptcy*)$_{im}$ + α_7 (*professional*)$_{im}$ + α_8 (*education*)$_{im}$ + α_9 (*husband's education*)$_{im}$ + e_m + u_{im}

where (*Total number of children -1*) $_{im}$ represents the dependent variable for individual *i* and spouse *m*. The sample comprised females who had at least one child. The number of children born after the first child was examined. Hence, the dependent variable takes 0 if the female did not bear a child after the first child. α's represents regression parameters, e_m captures spouse's job, represented by dummy variables, and u_{im} represents the error term.

This study aimed to examine how parents make a decision about number of children after the first child is born. Hence, observations of infertile females were discarded. This paper used count data, thus the dependent variable did not take negative values. Furthermore, the data used in this paper has two characteristics: 'there is no natural a priori upper bound, and the outcome will be zero for at least some members of the population' (Wooldridge 2002, p. 645). In this case, as suggested by Wooldridge (2002), the Poisson model is more appropriate than the OLS model. Hence, I conducted the Poisson estimation. The key variable was *First male,* given a value of 1 if the first child was male, otherwise it was 0. The sample was divided into three groups including (1) mother's preference for a son, (2) mother's preference for a daughter, and (3) either. Regarding preference for a son, the expected sign for *First male* was negative mainly due to the mother's preference. That is, the mother has no incentive to have a baby if she preferred a son and the first child was male. As for preference for a daughter, the expected sign for *First male* was positive because the mother preferred a daughter. The mother has an incentive to have a baby if she preferred a daughter and the first child was male. With respect to the 'either' group, the negative sign for *First male* implies that social pressure leads to fewer children by birth of a son since the mother did not prefer either a son or daughter.

The results using observations of both the pre-war and post-war generations are reported in Table 3. The sample was divided into pre-war and post-war generations. Results are shown in Tables 4, 5, and 6. The Poisson estimations were then conducted to compare social pressure effects between pre-war and post-war generations. The preference of surrounding people such as family and relatives on fertility seemed to be more influential for the pre-war generation than for the post-war generation in Japan. To put it another way, social pressure was greater for the pre-war generation than for the post-war generation. Hence, *First male* is

expected to take the negative sign, and its absolute value is larger for the pre-war generation than for the post-war generation when mothers preferred a son. Furthermore, *First male* is anticipated to take the negative sign for the pre-war generation but is ambiguous for the post-war generation when mothers preferred either gender. Apart from *First male,* as explained earlier, various control variables were included to control for age at marriage, marital status, incidents after marriage, job, and education.

4. Results

Estimation results using all samples are reported in Table 3. Results of pre-war and post-war generations are exhibited in Tables 4, 5, and 6.

I will discuss results of Table 3 and focus on results of *First male,* shown in the first row. As anticipated, as shown in column (1), signs for *First male* were negative and statistically significant at the 1% level when respondents preferred a son. In column (2), *First male* was positive when respondents preferred a daughter, but statistically insignificant. This suggests that son preference has a critical effect on fertility, but daughter preference does not influence fertility. I interpret this as suggesting that the social pressure to bear a boy reinforced the incentive to bear a boy and reduced the incentive to bear a girl. It is interesting to observe that *First male* takes a significant negative sign for the 'either' group as presented in column (3). The absolute value of *First male* is 0.20 in column (1). This implies that those who had a daughter as the first child have a 0.20 larger number of children than those who had a son as the first child when the sample is restricted to the 'son preference' group. The absolute value of *First male* is 0.06 in column (3). This implies that those who had a daughter as the first child have a 0.06 larger number of children than those who had a son as the first child when the sample is restricted to the 'either' group. It follows from this that social pressure significantly increases number of children when the first child is a daughter.

<Insert Table 3 here>

In Table 3, regarding *age at marriage* and *husband's age at marriage,* signs were negative in all estimations. *Age at marriage* is statistically significant in columns (1) and (2). It follows that the older women were, the fewer children they had. This is because number of children is limited by the child-bearing age of

women. On the other hand, *husband's age at marriage* is statistically significant only for the daughter preference group, as shown in column (2). Concerning the husband's age, the sexual desire and stamina needed to have a baby decrease as men become older even if there is no strict age limitation as there is for women. However, the incentive to have a child possibly neutralizes the negative effect of the husband's age. Therefore, results for *husband's age at marriage* reflect the degree of incentive to have a child. Husbands in the son preference and 'either' groups are considered to have a greater incentive to have a child than those in the daughter preference group. This seems to neutralize the negative effect of *husband's age at marriage.*

Divorce yielded significant negative signs only for the 'daughter preference' group[14]. This suggests that divorce after birth of the first child reduces the likelihood that females bear children, resulting in a decline in fertility only when women prefer a daughter. However, this does not hold when women prefer a son or do not have a sex preference. I interpret this as meaning that a son preference and also social pressure to have a son leads to a higher incentive to bear a child, and thus children are born before unexpected incidents.

It is very interesting that *education* produced positive signs in all estimations and is significant in column (1). Typically, years of education is positively correlated with rise in wages. The data revealed that a rise in female wages led to increased fertility, which is contrary to fundamental theory (Becker, 1965). This is, however, consistent with the argument of Ahn and Mira (2002): at sufficiently high female wage levels, a wage increase leads to an increase in fertility as the income effect supersedes the substitution effect. Signs for other variables were not stable, and their effect on fertility was ambiguous.

4.2. Comparison between pre-war and post-war generations

Tables 4, 5, and 6 are used to compare the determinants of fertility between pre-war and post-war generations. These tables show the results of pre-war and post-war generations in columns (1)–(3) and columns (4)–(6), respectively. Here, I concentrate focus on *First male,* regarded as the key variable.

<Insert Table 4 here>

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[14] In Western countries, there are many unmarried mothers, so it is important to consider them (Dahl and Moretti, 2008). In TFPWJ data, however, unmarried mothers were very rare (only 3 cases were observed), so they were omitted.

First male produced significant negative signs for son preference and 'either' groups in the pre-war generation, while it did not produce significance for any groups in the post-war generation. It appears that the social pressure for birth of a son existed in the pre-war generation but disappeared in the post-war generation. On the other hand, daughter preference did not influence fertility, implying that daughter preference did not provide sufficient incentive to bear a daughter, or the incentive to bear a daughter was neutralized by the social pressure to bear a boy. I interpret the findings in son preference and 'either' groups as suggesting that interpersonal relationships within a family or between neighbors became weaker, resulting in decreased social pressure on decision making. Changes in interpersonal relationships and family structure have been reported by anthropologists (Hendry, 1981) and can be explained by social pressure from the viewpoint of economics. In the pre-war generation group, the absolute value of *First male* was 0.19 and 0.09 for son-preference and 'either' groups, respectively. This suggests that social pressure to have a son decreased the incentive to bear a child in the pre-war generation when the first child was a son, although the social pressure effect was smaller than the son-preference effect.

<Insert Table 5 here>
<Insert Table 6 here>

Regarding a robustness check of results presented in Table 4, I will discuss Tables 5 and 6. In Table 5, *First male* continued to yield a significant negative sign for son preference and 'either' groups in the pre-war generation, but it did not yield a significant sign in the post-war generation. Table 6 shows similar results, although, as suggested in column (4), *First male* yielded a significant negative sign in the post-war generation. Considering the statistical analysis based on the individual data as a whole, the social pressure of bearing a son affected fertility in the pre-war generation, but hardly influenced it in the post-war generation. This is probably due to the change in interpersonal relationships as a result of economic development in Japan.

5. Conclusion

As discussed in existing literature, the decision to have a child is made by

parents and is an individual issue. Anthropological works suggest, however, that close relationships with family and neighbors are associated with the various facets of individual decision making. Hence, fertility appears to be influenced by social pressure. On the other hand, social pressure within a tightly knit society based on long-term intensive personal interaction seems to lessen due to the diffusion of market based transaction and economic growth. If this is the case, the role played by social pressure changes over time in the long-term economic development process. Little is known, however, about the dynamic process of the effect of social pressure on fertility. This paper explored this process in the post-World War II period of Japan by using individual level data. The major finding was as follows: If the first child was a daughter, the number of children tended to increase not only when the mother preferred a son but also when the mother did not have a preference for either gender. This was observed in the pre-war generation but not in the post-war generation. Social pressure makes an impact on fertility. However, social pressure has decreased as a consequence of economic development.

Compared to the existing literature, the main innovation of this paper involves understanding how not only individual sex preference but also social pressure are related to fertility in the process of economic development. This paper, however, does not define social pressure. That is, social pressure might come from a spouse, other members of the family, a relative, or neighbors. In order to clarify how social pressure is generated and how it affects fertility, a definition of social pressure is needed. The present research focused on the relationship between sex of the first child and total number of children. It would be of interest in future studies to examine the probability of parents having additional children, given the sex of the children already in their families.

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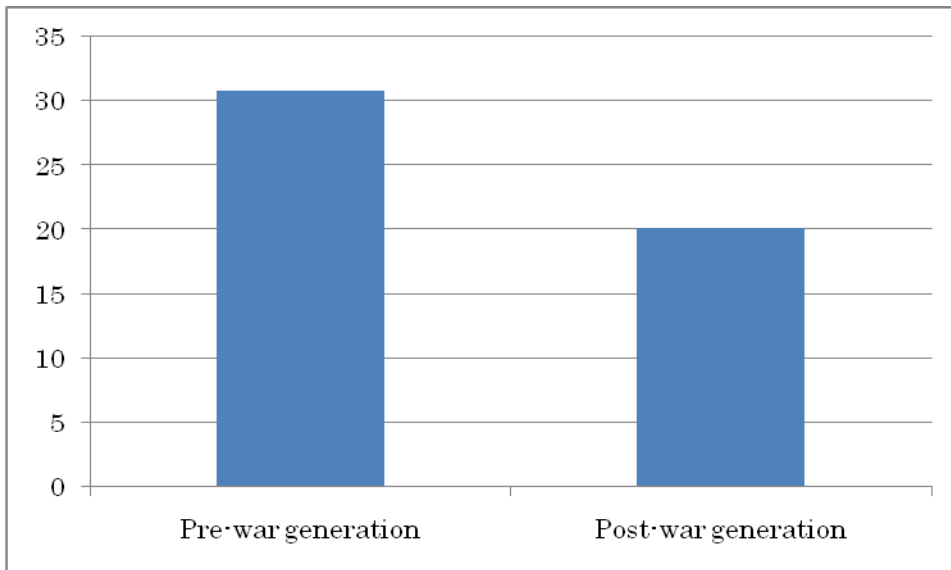
(a) Percentages of married children living with their mothers
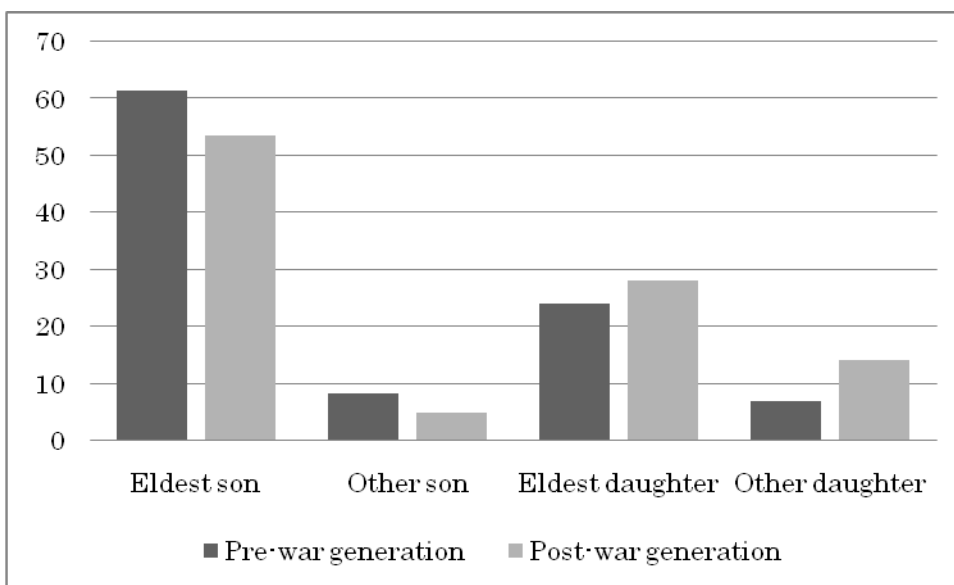
(b) Percentage of married children living with their mothers by gender
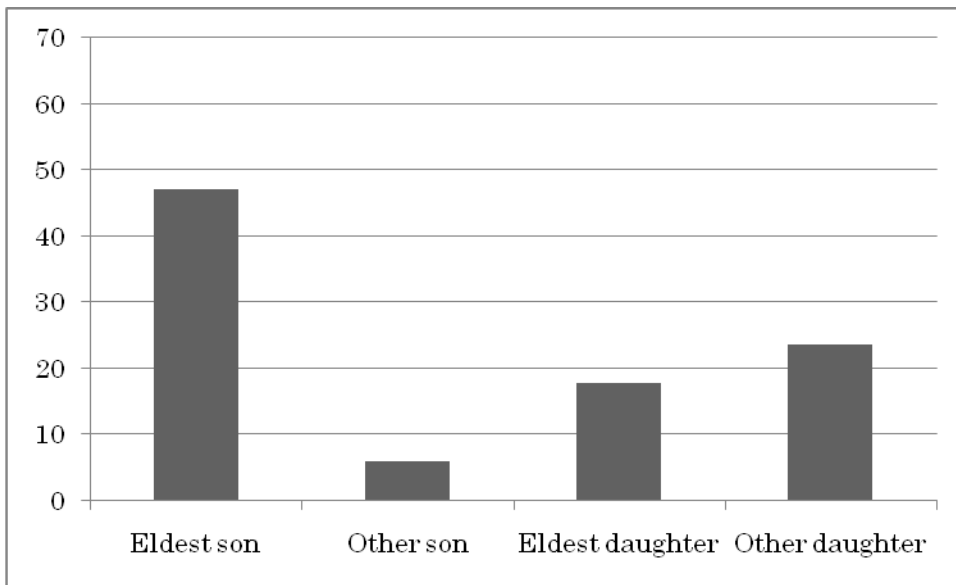
(c) Percentage of married children living with divorced mothers by gender

Fig.1 Probability of married children living with their mothers.

Note. Panel (b) shows the composition of Panel (a).

Table 1.   Construction of Research Sample

Description	Number in Sample
Original Sample	3475
Respondent has been married [a]	3351
Respondent has offspring	3189
Characteristics about self and spouse supplied by respondent. Furthermore, women of childbearing age, who were born after 1955, are omitted (variables appear in Table 2).	2079 [b]

Note.

a.   The 3 samples for unmarried mothers were omitted.

b. (I) Sample was used for estimations reported in Tables 3, 4, 5, and 6.

Table 2. Comparison of Variables Between Pre-war and Post-war Generations [a]

Variables	Pre-war	Post-war
Total number of children [b]	2.4	2.2
First child was male (%)	52.0	50.9
Average age at marriage	24.4	25.4
Average age of husband at marriage	28.1	26.8
Experienced divorce after birth of first child (%)	2.9	2.7
Experienced husband's death after birth of first child (%)	16.3	3.1
Husband experienced bankruptcy or job loss during marriage (%)	16.1	18.3
First job was a professional occupation[c] (%)	11.2	16.4
Average years of education	11.0	12.1
Husband's average years of education	11.5	12.6
Preference for a son (%)	30.6	23.9
Preference for a daughter (%)	17.8	22.8

Note.

a. Pre-war and post-war generations are defined as husbands born before 1945 and husbands born after 1946, respectively.

b. Total number of children was the dependent variable.

c. In the questionnaire, professional occupation was defined as a job that requires highly specialized knowledge, for example, doctor, lawyer, researcher, engineer/technical expert, reporter, writer, artist, teacher, nurse, pharmacist, child caretaker, or social worker.

Table 3. Comparison of Fertility Determinants Among Preferences for a Son, Daughter and Neutral (Poisson estimation)

Dependent variable: Number of children born after the first child.

Variables	(1) Preference for a son	(2) Preference for a daughter	(3) Either
First child was male (Yes = 1): dummy	-0.20*** (-3.43)	0.03 (0.57)	-0.06* (-1.70)
Age at marriage	-0.02** (-2.18)	-0.02** (-2.33)	-0.01 (-1.25)
Age of husband at marriage	-0.006 (-0.70)	-0.02* (-1.75)	-0.001 (-0.12)
Experienced divorce after birth of first child (Yes = 1): dummy	0.08 (0.52)	-0.38** (-2.32)	-0.16 (-1.00)
Experienced husband's death after birth of first child (Yes = 1): dummy	0.07 (1.09)	-0.21 (-1.59)	-0.05 (-0.81)
Husband experienced bankruptcy or job loss during marriage (Yes = 1): dummy	-0.01 (-0.26)	0.10 (1.19)	0.05 (1.04)
First job was a professional occupation (Yes = 1): dummy	0.10 (1.52)	0.18 (1.64)	0.0009 (0.02)
Years of education	0.02* (1.73)	0.003 (0.14)	0.002 (0.17)
Husband's years of education	-0.01 (-1.27)	-0.007 (-0.48)	-0.001 (-0.20)
Constant	1.21*** (4.39)	1.43*** (4.05)	0.88*** (4.14)
Observations	634	432	1013
Log pseudo-likelihood	-835	-536	-1305

Note. Values in parentheses are t-statistics calculated by robust standard errors. * ,** and *** denote significance at the 10%, 5% and 1% levels, respectively. In all estimations, husband's job dummies, cohort dummies are included, but not reported.

Table 4. Comparison of Fertility Determinants Among Preferences for a Son, Daughter and Neutral (Poisson estimation)
Dependent variable: Number of children born after the first child.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-war generation (Year of husband's birth < 1945)			Post-war generation (Year of husband's birth ≥ 1945)		
	Preference for a son	Preference for a daughter	Either	Preference for a son	Preference for a daughter	Either
First child was male (Yes = 1): dummy	-0.19***	0.03	-0.09**	-0.15	-0.01	0.02
	(-2.81)	(0.42)	(-2.28)	(-1.52)	(-0.13)	(0.37)
Age at marriage	-0.03**	-0.02	-0.006	-0.02	-0.02	-0.04***
	(-2.35)	(-1.31)	(-0.47)	(-1.21)	(-1.01)	(-2.67)
Age of husband at marriage	-0.0008	-0.03**	-0.005	0.007	-0.01	0.003
	(-0.08)	(-2.03)	(-0.50)	(0.36)	(-0.80)	(0.21)
Experienced divorce after birth of first child (Yes = 1): dummy	-0.08	-0.42**	-0.20	0.47***	-0.59*	0.03
	(-0.39)	(-2.11)	(-0.95)	(2.91)	(-1.65)	(0.20)
Experienced husband's death after birth of first child (Yes = 1): dummy	0.09	-0.20	-0.03	0.04	-0.79	-0.31
	(1.21)	(-1.45)	(-0.46)	(0.27)	(-1.53)	(-1.34)
Husband experienced bankruptcy or job loss during marriage (Yes = 1): dummy	-0.03	0.23**	0.07	0.01	-0.19	0.002
	(-0.38)	(2.12)	(1.09)	(0.18)	(-1.35)	(0.03)
First job was a professional occupation (Yes = 1) : dummy	0.13	0.21	-0.08	0.10	0.16	0.14*
	(1.49)	(1.36)	(-1.22)	(0.95)	(1.01)	(1.67)
Years of education	0.02	0.01	-0.006	0.01	-0.003	0.03
	(1.21)	(0.67)	(-0.41)	(0.60)	(-0.11)	(1.57)
Husband's years of education	0.02	-0.02	0.004	0.006	0.01	-0.01
	(1.21)	(-0.98)	(0.41)	(0.28)	(0.52)	(-0.84)
Constant	1.34***	1.50***	0.82***	0.55	1.19**	1.01***
	(4.15)	(3.22)	(3.41)	(1.07)	(2.24)	(2.60)
Observations	481	288	753	153	145	262
Log pseudo-likelihood	-635	-359	-979	-196	-174	-323

Note. Values in parentheses are t-statistics calculated by robust standard errors. * ,** and *** denote significance at the 10%, 5% and 1% levels, respectively. In all estimations, husband's job dummies, cohort dummies are included, but not reported.

Table 5. Comparison of Fertility Determinants Among Preferences for a Son, Daughter and Neutral (Poisson estimation)
Dependent variable: Number of children born after the first child.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-war generation (Year of husband's birth < 1935)			Post-war generation (Year of husband's birth ≥ 1935)		
	Preference for a son	Preference for a daughter	Either	Preference for a son	Preference for a daughter	Either
First child was male (Yes = 1): dummy	-0.34***	0.20	-0.12**	-0.05	-0.01	-0.03
	(-3.87)	(1.49)	(-2.00)	(-0.80)	(-0.25)	(-0.77)
Age at marriage	-0.02*	0.01	-0.03**	-0.03**	-0.04***	-0.02**
	(-1.74)	(0.39)	(-2.48)	(-2.54)	(-2.82)	(-2.33)
Age of husband at marriage	0.007	-0.04*	0.01	-0.01	-0.01	-0.0006
	(0.53)	(-2.01)	(1.54)	(-1.30)	(-0.78)	(-0.08)
Experienced divorce after birth of first child (Yes = 1): dummy	-0.37	-0.75	-0.48	0.18	-0.31*	-0.02
	(-1.14)	(-1.39)	(-1.18)	(1.12)	(-1.83)	(-0.18)
Experienced husband's death after birth of first child (Yes = 1): dummy	0.08	-0.19	-0.08	0.04	-0.22	0.03
	(0.96)	(-0.89)	(-1.17)	(0.49)	(-1.42)	(0.27)
Husband experienced bankruptcy or job loss during marriage (Yes = 1): dummy	0.06	0.27**	0.02	-0.04	0.01	0.04
	(0.60)	(2.17)	(0.31)	(-0.63)	(0.10)	(0.94)
First job was a professional occupation (Yes = 1): dummy	-0.07	-0.12	-0.09	0.15*	0.32***	0.05
	(-0.58)	(-0.45)	(-0.98)	(1.92)	(2.65)	(0.82)
Years of education	0.01	-0.007	-0.01	0.03	0.008	0.01
	(055)	(-0.21)	(-0.77)	(1.59)	(0.34)	(1.00)
Husband's years of education	-0.01	-0.04	0.009	-0.007	0.004	-0.006
	(-0.62)	(-1.35)	(0.51)	(-0.50)	(0.24)	(-0.59)
Constant	1.01**	1.76***	0.99***	1.32***	1.36***	2.03***
	(2.42)	(2.77)	(2.76)	(3.80)	(3.34)	(3.54)
Observations	247	116	379	387	316	634
Log pseudo-likelihood	-335	-143	-499	-491	-387	-795

Note. Values in parentheses are t-statistics calculated by robust standard errors. * ,** and *** denote significance at the 10%, 5% and 1% levels, respectively. In all estimations, husband's job dummies, cohort dummies are included, but not reported.

Table 6. Comparison of Fertility Determinants Among Preferences for a Son, Daughter and Neutral (Poisson estimation)
Dependent variable: Number of children born after the first child.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-war generation (Year of husband's birth < 1925)			Post-war generation (Year of husband's birth ≥1925)		
	Preference for a son	Preference for a daughter	Either	Preference for a son	Preference for a daughter	Either
First child was male (Yes = 1): dummy	-0.40***	0.55	-0.38***	-0.16**	0.01	-0.01
	(-3.52)	(1.42)	(-3.00)	(-2.20)	(0.26)	(-0.30)
Age at marriage	-0.01	-0.04	-0.04*	-0.03**	-0.03**	-0.007
	(-0.68)	(-0.96)	(-1.91)	(-2.63)	(-2.50)	(-0.59)
Age of husband at marriage	-0.0005	-0.26	0.03**	-0.01	-0.01	-0.01
	(-0.03)	(-1.13)	(2.36)	(-1.00)	(-1.21)	(-1.32)
Experienced divorce after birth of first child (Yes = 1): dummy	-0.29	____	-0.04	0.09	-0.39**	-0.15
	(-1.50)		(-0.06)	(0.61)	(-2.40)	(-1.05)
Experienced husband's death after birth of first child (Yes = 1): dummy	0.15	0.27	-0.22*	0.01	-0.19	-0.04
	(1.25)	(0.35)	(-1.85)	(0.18)	(-1.58)	(-0.60)
Husband experienced bankruptcy or job loss during marriage (Yes = 1): dummy	-0.02	-10.1***	-0.10	-0.007	0.11	0.07
	(-0.17)	(-2.99)	(-0.64)	(-0.10)	(1.28)	(1.32)
First job was a professional occupation (Yes = 1): dummy	0.34	1.59	-0.23	0.09	0.22**	0.03
	(1.52)	(1.22)	(-1.35)	(1.26)	(2.02)	(0.71)
Years of education	0.03	0.01	0.08**	0.02	0.007	-0.005
	(0.91)	(0.06)	(2.07)	(1.56)	(0.34)	(-0.44)
Husband's years of education	-0.08**	-0.47**	-0.03	-0.006	0.002	0.001
	(-2.17)	(-1.96)	(-1.18)	(-0.51)	(0.17)	(0.14)
Constant	1.47***	12.2**	0.29	1.37***	1.26***	0.91***
	(2.66)	(2.23)	(0.49)	(4.48)	(3.67)	(4.42)
Observations	82	24	112	552	408	901
Log pseudo-likelihood	-114	-22	-161	-716	-377	-1136

Note. Values in parentheses are t-statistics calculated by robust standard errors. * ,** and *** denote significance at the 10 %, 5% and 1% levels, respectively. In all estimations, husband's job dummies, cohort dummies are included, but not reported. In column (2), results for the dummy of experienced divorce after birth of the first child cannot be reported because its effect is completely captured by the cohort dummies. 'Experienced divorce after birth of first child' is omitted because of perfect collinearity with cohort dummies.