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PDRC Discussion Paper Series

**長男の男性との結婚は女性の幸福度にどのような影響を及ぼすのか：
日本のデータを用いた検証**

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2022 年 12 月 2 日

DP2022-004

<https://www.pdrc.keio.ac.jp/publications/dp/8209/>



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2 December, 2022

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PDRC Keio DP2022-004

2022年12月2日

JEL Classification: J12; J13; I31

キーワード：長男；幸福度；出生順位

【要旨】

出生順位の影響はこれまで多くの経済学者が興味を持ち、分析を行ってきた。先進国では分析が進んでおり、出生順位が高いほど、学歴や所得が低下する傾向にあることがわかっている。近年では健康、IQ、そして世代間にわたる影響といったさまざまな面に対する出生順位の効果が明らかにされている。しかし、出生順位が家族の他のメンバー、特に配偶者に及ぼす影響については研究がまだない。本研究では Japanese General Social Surveys (JGSS) を用い、夫の出生順位が妻の主観的厚生に及ぼす影響を検証した。分析の結果、次の4点が明らかになった。1点目は、夫が長男の場合、妻の幸福度が低下していた。また、夫婦関係、余暇、家族生活に関する満足度も夫が長男である場合ほど低下する傾向にあった。2点目は、夫が一人っ子長男であったり、出生コーホートが近年であるほど、妻の満足度指標が低下する場合があった。3点目は、長男の夫ほど、年老いた両親を支援する義務があると考えており、実際に家事を支援する傾向があった。4点目は、長男の夫と結婚した女性ほど就業や子育ての選好にバイアスがあるかどうかを検証したが、そのような傾向は確認できなかった。

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謝辞：日本版General Social Surveys (JGSS) は、大阪商業大学JGSS研究センター（文部科学大臣認定日本版総合的社会調査共同研究拠点）が、大阪商業大学の支援を得て実施している研究プロジェクトである。JGSS-2000～2008は学術フロンティア推進拠点、JGSS-2010～2012は共同研究拠点の推進事業、JGSS-2015はJSPS科研費JP26245060、JP15H03485、JP24243057、大阪商業大学アミューズメント産業研究所、日本経済研究センター研究奨励金2014年度（岩井紀子）、労働問題に関する調査研究助成金2015年度（岩井八郎ほか）、JGSS-2017/2018は「特色ある共同研究拠点の整備の推進事業 機能強化支援」とJSPS科研費JP17H01007の助成を受けた。JGSS-2000～2005は東京大学社会科学研究所と共同で、JGSS-2006～2012は東京大学社

会科学研究所の協力を得て、JGSS-2017/2018は京都大学大学院教育学研究科教育社会学講座の協力を得て実施した。JGSS-2017/2018データの整備は、JSPS人文学・社会科学データインフラストラクチャー構築推進事業JPJS00218077184の支援を得た。本研究はJSPS科研費（17KT0037）の助成を受けたものである。

Does the marriage with the man who is the eldest son bring happiness to women?: Evidence from Japan[†]

Kazuma Sato*

Abstract

The effect of birth order is one of the interesting topics in economics. Most studies using data from developed countries show adverse birth order effects, demonstrating that individuals with higher birth orders are more likely to have lower educational attainment and earnings. In addition, a growing number of studies reveal adverse effects on other outcomes, such as health, IQ, intelligence, and intergenerational effects. However, no studies have focused on the impact of birth order on other household members, such as spouses. In this paper, we assess the birth order effect on spouses using SWB as the measure. In particular, using the Japanese General Social Surveys (JGSS), this study examines the impact of the marriage with the husband, who is the eldest son, on the wife's happiness. The study results reveal four findings. First, the wife marrying the husband of the eldest son is less happy than the wife marrying the husband of the second or younger. In addition, the wife marrying a man who is the eldest son is less satisfied with the relationship with their spouse, the non-work activities, and the family life. Second, several satisfaction declines in the case of the recent wife's birth cohort, such as the 1970s and onwards, and the marriage with the husband of the eldest son with no

[†]The Japanese General Social Survey (JGSS) is designed and carried out by the JGSS Research Center at Osaka University of Commerce (Joint Usage / Research Center for Japanese General Social Surveys accredited by MEXT) with support from the Osaka University of Commerce. JGSS-2000-2008 was funded by Gakujutsu Frontier Grant from the MEXT. JGSS-2010/2012 was supported by MEXT Promotion of Joint Research Center Program. JGSS-2015/2016 received funding from JSPS KAKENHI Grant Numbers JP26245060, JP15H03485, JP24243057, the Institute of Amusement Industry Studies at Osaka University of Commerce, Research Grant on Labor Issues 2015 (PI: Hachiro Iwai), and Japan Center for Economic Research 2014 (Noriko Iwai). JGSS-2017/2018 was funded by MEXT Promotion of Distinctive Joint Research Center Program and JSPS KAKENHI Grant Number JP17H01007. JGSS-2000-2005 was collaboration with the Institute of Social Science at the University of Tokyo. JGSS-2006-2012 was cooperation with the Institute of Social Science at the University of Tokyo. JGSS-2017/2018 was conducted in collaboration with the Division of Sociology of Education, Graduate School of Education, Kyoto University. The data curation of JGSS-2017/2018 was supported by JSPS Program for Constructing Data Infrastructure for the Humanities and Social Sciences Grant Number JPJS00218077184. This work was supported by JSPS Grants-in-Aid for Scientific Research (KAKENHI) in Japan (17KT0037).

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siblings. Third, married men who are the eldest sons are more likely to have the view that the eldest sons are responsible for caring for aging parents and tend to support their parents' housework. Fourth, women marrying men who are the eldest sons have no difference in their preference for work and parenting, with women marrying men who are the second sons and younger.

Key words: Eldest son; Happiness; Birth order

JEL Classification: J12, J13, I31

1. Introduction

In many developed countries, the relationship between birth order and education or earnings has attracted the attention of economists. Empirical studies on this topic typically report that higher birth order negatively affects education and earnings. For example, using Norwegian data, Black et al. (2005) indicate that firstborn children tend to have more years of education than later-born children. Similar results can be found by Bagger et al. (2018), who use the Denmark data, and by Barclay (2015), who use the Swedish data. In addition, Kantarevic and Mechoulan (2006) show that the earnings of firstborn children tend to be higher than later-born children using U. S. data. Bertoni and Brunello (2016) also indicate that firstborn males enjoy a wage premium using 11 European countries. Other than these, notable studies examine the association between birth order and education and cognitive development (Conley and Glauber, 2006; Gary-Bobo et al., 2006; Kristensen and Bjerkedal, 2007; Booth and Kee, 2009; De Haan, 2010), health outcomes (Black et al. 2016), IQ and intelligence (Black et al. 2011), and intergenerational effect (Havari and Savegnago 2022).

Although many studies examine the impact of birth order, few focus on its effect on other household members like spouses. As previous studies show, individuals with low birth order are more likely to have better education, labor market outcome, and health. Therefore, matching with individuals with low birth order, particularly the firstborn, may lead to a better marriage. However, the firstborn tends to be responsible for looking after the aging parents in some countries such as East Asia, leading to a long-term burden. Considering these points, the net effect of marriage to a low-birth-order individual on spouses is unclear and requires empirical analysis.

This study examines the effect of marriage with individuals of low birth order, especially firstborn, on spouses using subjective well-being (SWB) as a measure¹. More specifically, this study answers whether marrying a man who is the eldest son brings happiness to women. The data used in this study is the Japanese General Social Surveys (JGSS), one of the representative repeated cross-sectional data.

In Japan, the impact of birth order has been interested because of the influence of Confucianism and the *ie* system². Traditionally, the male child is valued more than the female child in Japanese households due to the influence of Confucianism. Furthermore, the first-born male child became the only heir of family property according to the provisions of the Civil Code before the Second World War. Although this provision about the heir was abolished under the postwar Civil Code, it is pointed out that the tradition of treating the eldest son specially continued mainly in rural areas (Fujimoto and

¹ This study uses SWB as a measure for two reasons. First, recent economic research using the SWB has increased because the empirical studies that examined the association between SWB and many objective measures confirmed the reliability of SWB (Ifcher and Zarghamee 2014; Krueger and Schkade 2008). Second, some studies showed the gap between economic indicators and SWB, suggesting that using SWB might lead to new insight (Diener and Seligman 2004).

² In the *ie* system in Japan, the head of the family, who is typically the eldest son, takes responsibility for the family and supports the family. In addition, the head of the family succeeds all family's property and sustains the *ie*. A more detailed description of the *ie* system can be found in Hayashi and Prescott (2008) and Fujimoto and Meng (2019).

Meng 2019).

Given these backgrounds in Japan, the firstborn child, especially the eldest son, may receive much human capital investment, leading to higher education and earnings. According to the analysis of Fujimoto and Meng (2019), who use JGSS, firstborn sons have higher educational attainments and earnings than later-born male siblings. In addition, Fujimoto and Meng (2019) point out the negative aspects of firstborn males, such as the responsibility to look after the aging parents and the family's real estate and cemetery. Wakabayashi and Horioka (2009) also indicate that parents are likely to live with the eldest sons, implying that eldest sons are responsible for caring for their aging parents, although it might lead to the restriction of geographical mobility. These responsibilities may trade off higher human capital investment for the eldest sons, and it can be a burden in the long term, not only for the eldest sons but also for their wives.

Considering these points, marriage with men who is the eldest son have both advantage and disadvantage for women in Japan. While marrying firstborn males brings higher earnings, it also has burdens to care husband's family home and his parents. Therefore, the net impact of marrying men who are the eldest sons on women is unclear. We answer this question using SWB as a measure.

Compared with the other studies, this study contributes to the literature in several ways. First, to the best of my knowledge, this is the first study examining the association between marriage with men who are the eldest sons and their spouse's SWB. Previous studies have focused on the effect of the birth order of children on their education and labor market outcomes, whereas its impact on other household members has not been investigated. In addition, although empirical studies that examine the association between marriage and SWB show the positive effect of marriage on SWB (Argyle 2003; Diener et al. 2000; Tao 2019; Musick and Bumpass 2012; Myers 2003; Zimmermann and Easterlin 2006), no studies focus on the difference in the impact of marriage depending on the birth order of the spouse. Second, we explore the heterogeneity of the effect of marriage with men who are the eldest sons. We clarify whether the impact of marriage with men who are the eldest sons varies by the wife's birth cohort and the composition of siblings of the husband. Third, we check whether women marrying men who are the eldest sons have a bias in their preference about employment and parenting, which could affect the estimation results.

The study results reveal four findings. First, the result of ordinary least squares (OLS) and matching methods shows that the happiness of women marrying men who are the eldest sons is likely to decline. This result is the same even when controlling the husband's education, working status, and cohabitation with the husband's parents. In addition, women marrying men who are the eldest sons have lower satisfaction with the relationship with their spouse, the non-work activities, and the family life. Several satisfaction declines in the case of the recent wife's birth cohort, such as the 1970s and onwards, and the marriage with the husband of the eldest son with no siblings. Third, men who are the eldest sons are likely to have the view that the eldest sons have the responsibility for taking care of

aging parents and actually tend to support their parents' housework. This burden may be one of the reasons for the negative effect of marriage with the eldest sons. Fourth, women marrying men who are the eldest sons have no difference in their opinions for work and parenting, with women marrying men who are the second sons and younger. This result supports that the selection bias regarding the preference for work and parenting does not exist for women marrying men who are the eldest sons.

The remainder of this paper is organized in the following manner. Section 2 explains data, and Section 3 states the empirical strategy. Section 4 discusses the estimation results, and Section 5 provides the concluding remarks.

2. Data

We use the JGSS, the repeated cross-sectional data that began in 2000. JGSS is the Japanese version of the General Social Survey in the U.S.³ The JGSS conducts survey in 2000, 2001, 2002, 2003, 2005, 2006, 2008, 2010, 2012, 2015, 2016, 2017, and 2018. In the analysis, we used all the data except for 2003, which did not survey the sibling information. This survey investigates men and women aged between 20 and 89 in each survey year using a stratified two-stage sampling method. The JGSS investigates a wide variety of information from respondents, including basic individual attributes, employment status, household composition, opinions and basic values, and SWB. Some similar questions are investigated for spouses.

JGSS is suitable for the analysis because it surveys SWB such as happiness and other satisfaction, the educational attainment and the sibling composition of the spouse, and the information about people living together. These variables allow us to examine the difference in the impact of marrying men who are the eldest sons and men who are the second sons and younger and how the effect of marriage with the eldest sons varies when considering his education and cohabitation with his parents.

The analyzed sample comprises married women with husbands. We use happiness measures to assess SWB, which is available in all surveys. After eliminating missing variables used in the analysis, 8,121 married women are included for analysis.

3. Empirical strategy

This study uses JGSS to examine the impact of marriage with men who are the eldest sons on the wife's SWB. The following econometric model is estimated using OLS.

$$H_i = \alpha_0 + \alpha_1 ES_i + \alpha_2 HE_i + \alpha_3 HP_i + \alpha_4 X_i + \varepsilon_i$$

³ The JGSS and GSS are representative data used in social sciences and are commonly used in the analysis of SWB. For example, Lee and Ono (2008) used both data to examine the relationship between specialization and happiness in marriage in the U.S. and Japan. Stevenson and Wolfers (2009) investigated male and female happiness trends using the GSS over 35 years. Mitsuyama and Shimizutani (2019) also examined the male and female happiness trends using JGSS.

where H_i indicates the subjective rated happiness of married women i , ES_i indicates the eldest son dummy, HE_i indicates the husband's educational attainments and working status, HP_i indicates the status of cohabitation with the wife's parents and the husband's parents, X_i indicates the individual attributes of the wife, and ε_i indicates the error term. X_i includes the number of siblings, age, age squared, subjective rated health, number of children, educational attainments, working status, city size of living place, and year dummies.

Happiness is determined by the question, "Are you happy?" Respondents answer the question by selecting the five-point scale: "1=happy," "2=relatively happy," "3=neither happy nor unhappy," "4=relatively unhappy," and "5=unhappy." These figures are reversed in the analysis, and a higher number indicates better happiness.

The eldest son dummy becomes 1 if the husband is the eldest son and becomes 0 otherwise. The definition of the eldest son includes (1) the eldest son with no siblings, (2) the eldest son with younger siblings, or (3) the eldest son with a younger sibling and older sister. The husband's educational attainments include three dummy variables: less than high school, junior college or specialized school, and university graduate or more. In addition, the husband's working status dummy becomes 1 if the husband is working and becomes 0 otherwise. The husband's educational attainments and his working status is used as the proxy showing the positive impact of the marriage with the husband of the eldest son. The dummy of the cohabitation status with the wife's parents or the husband's parents becomes 1 if respondents live with her or her husband's parents and become 0 otherwise. The cohabitation with husband's parents may include negative impact of the marriage with the husband of the eldest son.

In the analysis, the coefficient of the eldest son dummy is the key interest. The positive coefficient indicates that the happiness of the wife marrying a man who is the eldest son is more likely to be high. On the other hand, the negative coefficient suggests that the happiness of the wife marrying a man who is the eldest son is expected to be low. We estimate the coefficient using OLS. We also investigate how the coefficient of the eldest son dummy varies when adding the husband's attributes and the cohabitation status with the wife's or husband's parents. Furthermore, we use matching methods, such as propensity score matching (PSM) (Heckman et al. 1997)⁴, inverse-probability-weighted regression adjustment (IPWRA) (Imbens and Wooldridge 2009; Wooldridge 2007, 2010), and entropy balancing (EP) (Hainmueller 2011,2012), for the robustness check.

Table 1 shows the basic statistics of the variables used in the analysis. This result shows that 57% of the husband is the eldest son. In addition, the percentage of husbands whose educational attainment is less than a high school is the highest. However, the ratio of more than university graduates shows that the number of husbands who are the eldest son is higher than the number of husbands who are

⁴ Kernel matching is used in the PSM. We also use radius matching, and the result is the same as using kernel matching.

second sons and younger. This result indicates that the educational attainment of husbands of the eldest sons tends to be higher, which is consistent with Fujimoto and Meng (2019). The employment rate of husbands who are the eldest son is higher than that of husbands who are second and younger. Furthermore, the status of cohabitation shows that the percentage of living with the husband's parents is higher in the case of husbands of the eldest sons. On the other hand, the rate of living with the wife's parents is slightly higher in the case of husbands of the second sons and younger. The result of the individual attributes of the wife shows that the average age is 52.09, and the percentage of those with two children is the highest. The ratio of the wife whose educational attainment is less than high school is the highest. The employment rate of the wife is 53%, and the difference in the employment rate by the birth order of the husband is slight.

4. Empirical result

4.1 Base result: the effect of marriage with the husband of the eldest son on the wife's SWB

Table 2 shows the results of the OLS and ordered logit model. The dependent variables from columns 1–6 are the happiness measured from 5 points scale. The dependent variables from columns 7–9 are the high happiness dummy variables which become 1 if the wife selects "very happy=5" or "relatively happy=4" and become 0 otherwise. The dependent variables from columns 10–12 are the low happiness dummy variables which become 1 if the wife selects "very unhappy=1" or "relatively unhappy=2" and become 0 otherwise. In all estimates, individual attributes of the wife are used as the independent variable.

Column 1 of Table 2 presents the negative coefficient of the eldest son, indicating that the happiness of the wife marrying the husband of the eldest son is lower. In column 2, we add the husband's educational attainment and working status to the independent variables. The estimated result shows that the wife's happiness increases when the husband's educational attainment is junior college or specialized school or when the husband is working. The coefficient of the eldest son is still negatively significant at a 1% level, and the magnitude of the coefficient slightly increases in absolute value. This is because the husband's educational attainment and working status, which can be the cause of the positive impact of the husband of the eldest son, are controlled. In column 3, we add the cohabitation status with the wife's or husband's parents to the independent variables. The coefficient of living with the husband's parents is negatively significant, indicating that cohabitation with the husband's parents harms the wife's happiness. Again, the coefficient of the eldest son is negatively significant, although the magnitude of the coefficient declines slightly in absolute value. The decline of the coefficient may be because the cohabitation status with the husband's parents, which negatively affects the wife's happiness, is controlled.

Columns 4–6 show the result of the ordered logit model using the same independent variables as

columns 1-3 for the robustness check. The estimated impact hardly changes, which means that the coefficients of the eldest son are negatively significant in all estimates. In addition, the sign of the coefficient of the husband's education, working status, and cohabitation status is the same. Columns 7-9 indicate the result of the linear probability model (LPM) for whether wives take a high happiness value. The trend of the coefficients is the same as the estimates so far and the happiness of the wife marrying the husband of the eldest son is more likely to decline. Columns 10-12 indicate the result of the LPM for whether wives have low happiness. All coefficients of the eldest son are positively significant, meaning that the wife marrying the husband of the eldest son is more likely to have lower happiness⁵.

In summary, the estimate of Table 2 shows a consistent result. The wife marrying the husband of the eldest son is less happy than the wife marrying the husband of the second son and younger. This result suggests that the negative effect of marriage with the husband of the eldest son outweighs the positive impact. In the analysis, although we used the husband's educational attainment, working status, and cohabitation status with the wife's or the husband's parents, which can be the cause of the eldest son's effect, the negative impact of the marriage with the eldest continued. This result suggests the existence of other potential variables which may cause the negative eldest son's effect.

4.2 The robustness check and additional analysis

In this section, we conduct a robustness check using matching methods and additional analysis using other satisfaction measures. Table 3 shows the result of matching methods of PSM, IPWRA, and EB. We use the wife's attributes as covariates in columns 1, 4, and 7. The husband's education and working status are added to the covariates in columns 2, 5, and 8. Furthermore, we add the cohabitation status with the wife's or the husband's parents to the covariates in columns 3, 6, and 9. The coefficients of the eldest son are negatively significant in all estimates in Table 3, indicating that the happiness of the wife marrying the husband of the eldest son declines. This result suggests that a negative association between the wife's happiness and marriage with the husband of the eldest son can be found even if we change the estimation method.

Table 4 shows the result using other satisfaction measures. In panel (A) in Table 4, we use the satisfaction of relationship with spouse, the place you live in, and non-work activities as the dependent variables. In panel (B) in Table 4, we use the satisfaction of family life, the current financial situation of households, and friendships as the dependent variables⁶. All these satisfaction measures are on 5 points scale, and a higher number indicates a higher value. Columns 1-3 in panel (A) of Table 4 show

⁵ We also use the probit model in columns 7-12 in Table 2, and the estimated results are almost the same as using the LPM.

⁶ The surveyed period of the satisfaction measures is shorter than that of happiness. Satisfaction measures except for the relationship with spouse are available in 2001, 2002, 2005, 2006, 2008, 2010, 2012, 2015, 2016, 2017, and 2018. Meanwhile, the satisfaction of relationship with spouse can be used in 2005, 2006, 2008, 2010, 2012, 2015, 2016, 2017, and 2018.

significantly negative coefficients of the eldest son, demonstrating that wife marrying the husband of the eldest son has worse satisfaction in the relationship with the spouse. As the eldest son tends to support his parents, this burden is also placed on wives, which may reduce marital satisfaction. In columns 4-6, we cannot find a significant association between marriage with the husband of the eldest son and satisfaction with the living place. On the other hand, in columns 7-8, the coefficients of the eldest son are negatively significant, meaning that the wife marrying the husband of the eldest son is less satisfied with non-work activities. However, in column 9, the significance of the coefficient disappears when adding the cohabitation status with parents to the independent variables. This result indicates that cohabitation with parents can be the cause of an adverse impact of the husband of the eldest son. Columns 1-2 of the panel (B) in Table 4 indicate that the coefficients of the eldest son are negatively significant, showing that the wife marrying the husband of the eldest son has lower satisfaction with family life. However, the negative impact on satisfaction with family life vanishes when adding the cohabitation status with parents. In columns 4-6, the coefficients of the eldest son are not significant, meaning that marriage with the husband of the eldest son does not affect the satisfaction with the current financial situation of the household. As the earnings of the husband of the eldest son tend to be high, the wives are less likely to have dissatisfaction with the financial situation. In columns 7-9, the coefficients of the eldest son are negative, but only the coefficient in column 8 is significant. This result indicates that the wife marrying the husband of the eldest son is less satisfied with friends. Considering that the effect disappears when adding the cohabitation status of parents, the wife finds it difficult to see her friends due to the cohabitation with the parents, which can lead to lower satisfaction with friends.

4.3 The heterogeneity of the eldest son's effect

In this section, we explore the heterogeneity of the eldest son's effect by the birth cohort and the sibling composition⁷. In Japan, it is pointed out that the value of treating the eldest son as special was substantial in the past (Fujimoto and Meng 2019). So, the eldest son's effect may decline with time. On the other hand, the likelihood of matching with the man who is the eldest son may increase because of the consistent decrease in the number of siblings due to the low birthrate⁸. Therefore, the net impact of the eldest son by birth cohort is unclear and requires empirical analysis. The estimated result using the interaction terms between the eldest son's dummy and the wife's birth cohort dummies is presented

⁷ The heterogeneous effect of the eldest son due to the ruralness of the living place is an interesting topic because the tradition of treating the eldest son as special may continue in rural areas. However, JGSS does not survey the site where the husband or his parents lived for a long time. Therefore, we gave up examining the difference in the eldest son's effect by the living place.

⁸ According to the Annual Population and Social Security Surveys conducted by the National Institute of Population and Social Security Research, the number of children born to wives aged 45-49 has decreased. For instance, although the average number of children born to wives was 2.33 in 1977, it declined to 2.13 in 1997 and 1.86 in 2015. In the meantime, the share of only children rose to 11% (1977), 12.4% (1997), and 19.4% (2015).

in Table 5. We use three wife's birth cohort dummies: before 1949 (reference group), 1950-1969, and 1970 onwards. In columns 3, 5, and 6, the interaction terms between the eldest son dummy and the post-1970 birth cohort dummy are negatively significant. This result indicates that the wives, who married the husband of the eldest son and were born after 1970, are less satisfied with their living place, family life, and current financial situation. This result is interesting because the negative impact of the eldest son is more prominent in the later birth cohort. This result suggests that the impact of increasing matching with the husband of the eldest son outweighs the effect of the declining tendency to emphasize the eldest son.

Next, we explore the difference in the impact of the type of eldest son. The eldest son can be classified into three types; (1) the eldest son with no siblings, (2) the eldest son with younger siblings, or (3) the eldest son with a younger sibling and older sister. We examine how the impact of the marriage with the husband of the eldest son varies by these types. In particular, we focus on (1) the eldest son with no siblings. This is because the eldest son of this kind has to support his aging parents alone as he has no siblings, and the burden on his wife may also increase. The estimated result using OLS is presented in Table 6. Happiness and other satisfaction measures are used as dependent variables in Table 6. In columns 1-2, the coefficients of the eldest son with no siblings and the eldest son with younger siblings are negatively significant. This result indicates that satisfaction with the relationship with the spouse and happiness is likely to decline when the husband is the eldest son with no siblings or the eldest son with younger siblings. In addition, looking at the magnitude of the coefficient, the value of the eldest son with no siblings is the largest. In columns 3, 4, and 6, all coefficients of the eldest son are not significant, indicating that the birth order of the husband does not affect the wife's satisfaction with the living place, the non-work activities, and the current financial situation of the household. In columns 5 and 7, the coefficients of the eldest son with no siblings are negatively significant. This result shows that the wife's satisfaction with family life and friendships is more likely to decline when the husband is the eldest son with no siblings. The result of Table 6 indicates that the wife marrying the husband, who is the eldest son with no siblings, is less happy. This result is consistent with the hypothesis that the eldest son with no siblings may have to support his old parents on his own, placing a burden on their wives as well. This result also suggests that if the eldest son with no siblings increases due to the low birth rate, the negative eldest son's effect may persist.

The estimated results in Tables 5 and 6 demonstrate the heterogeneity of the eldest son's effect. The eldest son's effect was stronger in the later-born birth cohort. In this background, the likelihood of matching with the husband of the eldest son may rise owing to the decreasing number of siblings, which is caused by the low birth rate. In addition, the eldest son's effect is more substantial when the husband is the eldest son with no siblings. The cause of this effect is that wife may have to take the burden of supporting her husband's parents. The result of Tables 5 and 6 leads us to presume that demographic change of a low birth rate can affect a wife's happiness through changes in the husband's

sibling composition. If the number of the male-only child increases due to the declining birthrate, there is a possibility that the adverse effects of marrying the eldest son will continue.

4.4 The mechanism of the eldest son's effect

This section investigates the mechanism of the negative eldest son's effect. In the main analysis in Table 2, we supposed the husband's education and working status as the positive eldest son's effect and cohabitation with the husband's parents as the negative effect. However, as the negative eldest son's effect continued even when taking into account these variables, it is possible that other factors harming the wife's SWB still exist. One of the other factors harming the wife's SWB can be the burden of supporting the husband's parents. To check this point, we examine the difference in the tendency to help the husband's parents between husband of the eldest son and husband of the second or younger.

First, we investigate whether the husband of the eldest son is more willing to support his aging parents than the husband of the second or younger. More specifically, we examine the difference in the view on the responsibility for taking care of old parents between the husband of the eldest son and the husband of the second or younger. In this regard, JGSS surveys the following question in 2017 and 2018; "Which child (and/or his/her family) do you think is most responsible for taking care of old parents? Choose only one which applies." Respondents answer the question from the following options; "1=eldest son," "2=any son," "3=any daughter," "4=any son or daughter," "5=all children," and "6=children are not responsible." By using this answer, we investigate the eldest son's husband's view about the care for the aged parents.

The estimated result using the probit model is presented in Table 7. In the analysis, we restrict the sample to married men. For ease of interpretation of the estimated result, we use the dummy variable as the dependent variable. The estimated coefficients in Table 7 are marginal effects. The coefficients of the eldest son are positively significant in column 1 and negatively significant in column 3. This result indicates that married men, who are the eldest sons, are more likely to believe that the eldest son, not all children, should take care of the old parents. As we explained, parents tend to invest resources in the eldest son, and the eldest son is more likely to take care of the parents in return. The result of Table 7 supports this relationship.

Next, we investigate whether wives marrying the husband of the eldest son are more likely to support their husband's parents than wives marrying the husband of the second or younger. The estimated result using the probit model is presented in Table 8. In columns 1-2, we use the dummy variable of the frequency of providing support for household chores (cleaning, meal preparation, shopping, running errands, etc.) to the husband's parents as the dependent variable. This variable becomes 1 if the wife answers that she frequently or often supports household chores to the husband's

parents and becomes 0 otherwise⁹. In columns 3-4, we use the dummy variable of the frequency of providing financial support for the husband's parents as the dependent variable. This variable becomes 1 if the wife answers that she frequently or often provides financial support to the husband's parents and becomes 0 otherwise¹⁰. In columns 1-2, the coefficients of the eldest son are positively significant. This result indicates that the wife is more likely to support for household chores of the husband's parents when her husband is the eldest son. In Japan, where the gender role division remains strong (Lee and Ono 2008), as the wife mainly conducts the household chores, the burden of supporting the household chores of the husband's parents may be disproportionately borne by the wife. Meanwhile, we cannot find a significant association between the eldest son dummy and financial support to the husband's parents. These results indicate that intergenerational support for parents-in-law is provided through non-monetary means.

The estimated result of Tables 7 and 8 showed another potential path of negative eldest son's effect. The husbands, who are the eldest son, tend to have a view that they are responsible for caring for the aging parents, and they actually provide support for them. The burden of support for the husband's parents is likely to fall primarily on the wife, which may reduce her SWB.

4.5 The bias in the wife's preference for employment and parenting

In this section, we check whether the wife is biased in her preference for employment and parenting. If the wife marrying the husband of the eldest son has a bias in her preference for employment and parenting, the estimated result of her SWB can be affected. For instance, if the wife marrying the husband of the eldest son is more likely to fit the gender role division and also be able to support the husband's parents, the negative eldest son's effect may be underestimated. To check this point, we examine the difference in the preference for employment and parenthood between the wife marrying the husband of the eldest son and the wife marrying the husband of the second or younger.

We use eight dependent variables created from the responses to the following questions¹¹; "If a husband has sufficient income, it is better for his wife not to have a job," "Without a doubt, a woman's happiness lies in a marriage," "Men should cook and look after themselves," "A husband's job is to earn money; a wife's job is to look after the home and family," "A preschool child is likely to suffer if his/her mother works," "It is not necessary to have children in a marriage," and "It is more important for a wife to help her husband's career than to have one herself." Respondents answer these questions by selecting the four-point scale: "1=agree," "2=somewhat agree," "3=somewhat disagree," and "4=disagree." We use the eight dummy variables, which become 1 if the respondents answer "1=agree"

⁹ The answers to this question are as follows: "1=very frequently," "2=often," "3=sometimes," "4=seldom," and "5=not at all." The answer options are the same for financial support for the husband's parents.

¹⁰ As the question about the frequency of providing support for the husband's parents is only available in 2017 and 2018, the sample size is limited.

¹¹ As these questions are available in 2001, 2002, 2005, 2006, 2008, 2010, 2012, 2015, and 2016, the sample size is smaller than the number in Table 1.

or "2=somewhat agree" and become 0 otherwise, as the dependent variables.

The estimated result using the probit model is presented in Table 9. The analyzed sample is married women. All estimated marginal effects of the eldest son are not significant, indicating no differences in the wife's preference for employment and parenthood by the birth order of the husband. This result suggests that selection bias for employment and parenthood is negligible. Furthermore, we also conduct the analysis that adds these wives' preferences to the independent variables, and it is worth noting that the negative eldest son's effect for happiness persists. The estimated result is presented in the Appendix.

5. Conclusion

The effect of birth order is one of the interesting topics in economics. Most studies using data from developed countries show adverse birth order effects, demonstrating that individuals with higher birth orders are more likely to have lower educational attainment and earnings. In addition, a growing number of studies reveal adverse effects on other outcomes, such as health, IQ, intelligence, and intergenerational effects. However, no studies have focused on the impact of birth order on other household members, such as spouses. In this paper, we assess the birth order effect on spouses using SWB as the measure. In particular, using data from Japan, this study examines the impact of the marriage with the husband, who is the eldest son, on the wife's happiness.

The study results reveal four findings. First, the wife marrying the husband of the eldest son is less happy than the wife marrying the husband of the second or younger. In addition, the wife marrying a man who is the eldest son is less satisfied with the relationship with their spouse, the non-work activities, and the family life. Second, we confirmed the heterogeneous impact of the eldest son's effect. Several satisfaction declines in the case of the recent wife's birth cohort, such as the 1970s and onwards, and the marriage with the husband of the eldest son with no siblings. Third, we investigate the mechanism of the eldest son's effect and find that married men who are the eldest sons are more likely to have the view that the eldest sons are responsible for caring for aging parents and tend to support their parents' housework. Fourth, women marrying men who are the eldest sons have no difference in their preference for work and parenting, with women marrying men who are the second sons and younger.

Although previous studies using data from developed countries show positive firstborn child effects, the result of this study indicates adverse firstborn child effects. This contrasting result is interesting. The difference in the result is attributed to the following two reasons. First, this study examined the firstborn child effect on a spouse's SWB, which has not been examined. Second, this study used data from Japan. In Japan, parents tend to invest resources in their firstborn children, especially the eldest son, in return for care in old age. As a result, marriage with the eldest son can enjoy a higher income but entails the responsibility to take care of parents-in-law. Therefore, when the burden outweighs the

financial merit of marrying the eldest son, the wife's happiness can decline. This study provided empirical evidence for this relationship.

The interesting result of this study can be found in the heterogeneous effect of the eldest son. We found the negative eldest son's effect in the recent wife's birth cohort. The persistence of the eldest son's effect in birth cohorts is surprising, and this effect is caused by the demographic changes in Japan, such as the decreasing number of siblings due to the low birthrate.

Although this study focuses on the Japanese case, different results may be found in countries with other cultural backgrounds. For example, in a country where the firstborn child is not responsible for the care of old parents, marriage with the spouse of the firstborn can have a positive impact, leading to an increase in the spouse's SWB. Thus, analysis using samples from countries other than Japan remains an interesting topic. In addition, the intergenerational effect of the father, who is the eldest son, on the children's SWB is another interesting future topic. As the earnings of the father, who is the eldest son, are relatively high, the intergenerational effect can be positive. However, the effect may vary depending on the country and the gender or birth order of the child. For example, in the case of Japan, the negative impact may be substantial due to the burden of the responsibility to take care of parents. Thus, a future empirical study is required to identify the net intergenerational effect.

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Table 1. Basic statistics

| Variables | Total | | Husband: eldest son | | Husband: other than eldest son | |
|---|---------|---------|------------------------|---------|-----------------------------------|---------|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| SWB | | | | | | |
| Wife's happiness | 4.01 | 0.91 | 4.00 | 0.91 | 4.02 | 0.91 |
| Husband's educational attainments and working status | | | | | | |
| Husband: eldest son | 0.57 | 0.50 | 1.00 | 0.00 | 0.00 | 0.00 |
| Husband's education | | | | | | |
| Less than high school | 0.62 | 0.48 | 0.57 | 0.49 | 0.69 | 0.46 |
| Junior college or specialized school | 0.15 | 0.36 | 0.16 | 0.36 | 0.14 | 0.35 |
| University graduate or more | 0.23 | 0.42 | 0.27 | 0.44 | 0.17 | 0.38 |
| Husband is working | 0.76 | 0.43 | 0.80 | 0.40 | 0.70 | 0.46 |
| Status of cohabitation | | | | | | |
| Living with husband's parents | 0.08 | 0.27 | 0.12 | 0.33 | 0.03 | 0.16 |
| Living with wife's parents | 0.05 | 0.22 | 0.04 | 0.20 | 0.07 | 0.26 |
| Individual attributes of the wife | | | | | | |
| Number of wife's siblings | 2.45 | 1.79 | 2.29 | 1.69 | 2.66 | 1.90 |
| Age | 52.09 | 14.18 | 50.31 | 14.16 | 54.46 | 13.87 |
| Age squared | 2914.62 | 1511.80 | 2731.04 | 1493.28 | 3158.58 | 1501.93 |
| Subjective rated health | 3.68 | 1.10 | 3.71 | 1.10 | 3.64 | 1.11 |
| Number of children | | | | | | |
| 0 | 0.08 | 0.27 | 0.09 | 0.28 | 0.07 | 0.25 |
| 1 | 0.16 | 0.36 | 0.16 | 0.37 | 0.15 | 0.36 |
| 2 | 0.51 | 0.50 | 0.49 | 0.50 | 0.53 | 0.50 |
| 3+ | 0.26 | 0.44 | 0.26 | 0.44 | 0.25 | 0.43 |
| Wife's education | | | | | | |
| Less than high school (Ref) | 0.69 | 0.46 | 0.65 | 0.48 | 0.73 | 0.44 |
| Junior college or specialized school | 0.23 | 0.42 | 0.24 | 0.43 | 0.20 | 0.40 |
| University graduate or more | 0.09 | 0.29 | 0.11 | 0.31 | 0.07 | 0.25 |
| Wife is working | 0.53 | 0.50 | 0.55 | 0.50 | 0.50 | 0.50 |
| City size | | | | | | |
| Largest cities | 0.22 | 0.42 | 0.23 | 0.42 | 0.22 | 0.41 |
| medium city (cities with a population of around 200000) | 0.71 | 0.46 | 0.70 | 0.46 | 0.71 | 0.45 |
| towns or villages | 0.07 | 0.26 | 0.07 | 0.25 | 0.07 | 0.26 |
| N | 8,121 | | 4,634 | | 3,487 | |

Table 2 The effect of marriage with the husband of the eldest son on the wife's SWB

| Dependent variables | Happiness | | | Happiness | | | High happiness=1, otherwise=0 | | | Low happiness=1, otherwise=0 | | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------------------|---------------------|---------------------|------------------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Husband: eldest son | -0.057*** (0.019) | -0.063*** (0.019) | -0.051*** (0.020) | -0.121*** (0.043) | -0.133*** (0.043) | -0.110** (0.044) | -0.022** (0.010) | -0.025** (0.010) | -0.021** (0.010) | 0.009* (0.005) | 0.009** (0.005) | 0.008* (0.005) |
| Husband's education: Junior college or specialized school | | 0.110*** (0.030) | 0.110*** (0.030) | | 0.237*** (0.066) | 0.236*** (0.066) | | 0.062*** (0.015) | 0.062*** (0.015) | | -0.005 (0.007) | -0.005 (0.007) |
| Husband's education: University graduate or more | | 0.044 (0.027) | 0.039 (0.027) | | 0.084 (0.060) | 0.073 (0.060) | | 0.035** (0.014) | 0.034** (0.014) | | 0.000 (0.007) | 0.000 (0.007) |
| Husband is working | | 0.122*** (0.033) | 0.123*** (0.033) | | 0.262*** (0.072) | 0.265*** (0.072) | | 0.058*** (0.017) | 0.059*** (0.017) | | -0.030*** (0.008) | -0.030*** (0.008) |
| Living with husband's parents | | | -0.124*** (0.035) | | | -0.272*** (0.074) | | | -0.047** (0.019) | | | 0.009 (0.010) |
| Living with wife's parents | | | -0.013 (0.041) | | | -0.055 (0.090) | | | 0.001 (0.022) | | | -0.005 (0.010) |
| Individual attributes of the wife | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Estimation method | OLS | OLS | OLS | Ologit | Ologit | Ologit | OLS | OLS | OLS | OLS | OLS | OLS |
| R-squared | 0.127 | 0.130 | 0.131 | | | | 0.093 | 0.097 | 0.098 | 0.031 | 0.033 | 0.034 |
| N | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Table 3 Robustness check using the matching methods

| Dependent variables | Happiness | | | Happiness | | | Happiness | | |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Husband: eldest son | -0.052** | -0.058*** | -0.062*** | -0.062*** | -0.068*** | -0.063*** | -0.062*** | -0.067*** | -0.063*** |
| | (0.020) | (0.022) | (0.022) | (0.019) | (0.019) | (0.020) | (0.019) | (0.019) | (0.020) |
| Individual attributes of the wife | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Husband's education & working status | | Y | Y | | Y | Y | | Y | Y |
| Living with husband's or own parents | | | Y | | | Y | | | Y |
| Estimation method | PSM | PSM | PSM | IPWRA | IPWRA | IPWRA | EB | EB | EB |
| N | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 | 8,121 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses. In Table, the PSM, IPWRA, and EP mean the propensity score matching, inverse-probability-weighted regression adjustment, and entropy balancing, respectively.

Table 4 The effect of marriage with the husband of the eldest son on the wife's satisfaction

Panel (A)

| Dependent variables | Relationship with spouse | | | Place you live in | | | Non-work activities | | |
|---|--------------------------|---------------------|---------------------|-------------------|--------------------|----------------------|---------------------|---------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Husband: eldest son | -0.062** (0.027) | -0.066** (0.027) | -0.063** (0.028) | -0.030 (0.023) | -0.034 (0.023) | -0.017 (0.024) | -0.045** (0.022) | -0.047** (0.022) | -0.028 (0.023) |
| Husband's education: Junior college or specialized school | | 0.069 (0.050) | 0.068 (0.050) | | 0.016 (0.037) | 0.018 (0.037) | | 0.060* (0.035) | 0.059* (0.035) |
| Husband's education: University graduate or more | | -0.006 (0.035) | -0.008 (0.035) | | 0.068** (0.033) | 0.064* (0.033) | | 0.035 (0.032) | 0.029 (0.032) |
| Husband is working | | 0.164*** (0.043) | 0.164*** (0.043) | | 0.016 (0.037) | 0.019 (0.037) | | 0.017 (0.036) | 0.020 (0.036) |
| Living with husband's parents | | | -0.039 (0.048) | | | -0.171*** (0.045) | | | -0.202*** (0.041) |
| Living with wife's parents | | | -0.026 (0.056) | | | 0.043 (0.050) | | | 0.002 (0.050) |
| Individual attributes of the wife | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Estimation method | OLS | OLS | OLS | OLS | OLS | OLS | OLS | OLS | OLS |
| R-squared | 0.091 | 0.093 | 0.093 | 0.076 | 0.076 | 0.078 | 0.105 | 0.106 | 0.108 |
| N | 5,943 | 5,943 | 5,943 | 8,050 | 8,050 | 8,050 | 8,038 | 8,038 | 8,038 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Panel (B)

| Dependent variables | Family life | | | The current financial situation of household | | | Friendships | | |
|---|---------------------|---------------------|----------------------|--|---------------------|---------------------|-------------------|--------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Husband: eldest son | -0.048** (0.022) | -0.053** (0.022) | -0.030 (0.022) | 0.004 (0.024) | -0.014 (0.024) | -0.008 (0.025) | -0.031 (0.021) | -0.036* (0.021) | -0.026 (0.021) |
| Husband's education: Junior college or specialized school | | 0.110*** (0.034) | 0.106*** (0.034) | | 0.184*** (0.038) | 0.183*** (0.038) | | 0.026 (0.033) | 0.028 (0.033) |
| Husband's education: University graduate or more | | 0.031 (0.031) | 0.018 (0.031) | | 0.231*** (0.035) | 0.228*** (0.035) | | 0.073** (0.029) | 0.072** (0.029) |
| Husband is working | | 0.120*** (0.035) | 0.122*** (0.035) | | 0.211*** (0.037) | 0.211*** (0.037) | | 0.078** (0.033) | 0.079** (0.033) |
| Living with husband's parents | | | -0.289*** (0.040) | | | -0.083* (0.044) | | | -0.086** (0.039) |
| Living with wife's parents | | | -0.120** (0.047) | | | -0.026 (0.054) | | | 0.050 (0.046) |
| Individual attributes of the wife | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Estimation method | OLS | OLS | OLS | OLS | OLS | OLS | OLS | OLS | OLS |
| R-squared | 0.110 | 0.112 | 0.118 | 0.121 | 0.130 | 0.131 | 0.086 | 0.088 | 0.088 |
| N | 8,057 | 8,057 | 8,057 | 8,066 | 8,066 | 8,066 | 8,062 | 8,062 | 8,062 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Table 5 Heterogeneous effect of the marriage with the husband of the eldest son by wife's birth cohort

| Dependent variables | Happiness | Relationship with spouse | Place you live in | Non-work activities | Family life | The current financial situation of household | Friendships |
|---|---------------------|--------------------------|----------------------|----------------------|----------------------|--|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Wife's birth cohort: 1950-1969×Husband: eldest son | -0.024 (0.045) | -0.007 (0.065) | -0.036 (0.053) | -0.081 (0.051) | -0.064 (0.049) | -0.002 (0.055) | -0.034 (0.047) |
| Wife's birth cohort: 1970's onwards×Husband: eldest son | -0.060 (0.051) | -0.006 (0.070) | -0.104* (0.063) | -0.057 (0.061) | -0.103* (0.058) | -0.147** (0.065) | -0.069 (0.057) |
| Husband: eldest son | -0.023 (0.034) | -0.054 (0.048) | 0.025 (0.039) | 0.021 (0.038) | 0.022 (0.036) | 0.026 (0.040) | 0.005 (0.036) |
| Wife's birth cohort: 1950-1969 | -0.080** (0.037) | -0.202*** (0.053) | -0.191*** (0.044) | -0.190*** (0.042) | -0.149*** (0.041) | -0.415*** (0.045) | -0.161*** (0.039) |
| Wife's birth cohort: 1970's onwards | 0.099** (0.046) | -0.126** (0.064) | -0.167*** (0.057) | -0.182*** (0.055) | -0.046 (0.053) | -0.426*** (0.059) | -0.084* (0.051) |
| Individual attributes of the wife | Y | Y | Y | Y | Y | Y | Y |
| Husband's education & working status | Y | Y | Y | Y | Y | Y | Y |
| Living with husband's or own parents | Y | Y | Y | Y | Y | Y | Y |
| Estimation method | OLS | OLS | OLS | OLS | OLS | OLS | OLS |
| R-squared | 0.128 | 0.087 | 0.075 | 0.106 | 0.116 | 0.120 | 0.089 |
| N | 8,121 | 5,943 | 8,050 | 8,038 | 8,057 | 8,066 | 8,062 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Table 6 Heterogeneous effect of the marriage with the husband of the eldest son by the husband's sibling composition

| Dependent variables | Happiness | Relationship with spouse | Place you live in | Non-work activities | Family life | The current financial situation of household | Friendships |
|---|----------------------|--------------------------|-------------------|---------------------|---------------------|--|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Husband: eldest son with no siblings | -0.159*** (0.043) | -0.154** (0.061) | -0.025 (0.053) | -0.062 (0.049) | -0.122** (0.048) | -0.078 (0.053) | -0.116** (0.046) |
| Husband: eldest son with younger sibling | -0.058** (0.023) | -0.065** (0.033) | -0.012 (0.027) | -0.025 (0.026) | -0.037 (0.026) | -0.026 (0.029) | -0.014 (0.025) |
| Husband: eldest son with a younger sibling and older sister | -0.014 (0.026) | -0.035 (0.036) | -0.020 (0.031) | -0.024 (0.030) | 0.003 (0.028) | 0.037 (0.032) | -0.020 (0.028) |
| Individual attributes of the wife | Y | Y | Y | Y | Y | Y | Y |
| Husband's education & working status | Y | Y | Y | Y | Y | Y | Y |
| Living with husband's or own parents | Y | Y | Y | Y | Y | Y | Y |
| Estimation method | OLS | OLS | OLS | OLS | OLS | OLS | OLS |
| R-squared | 0.132 | 0.094 | 0.078 | 0.109 | 0.119 | 0.131 | 0.089 |
| N | 8,121 | 5,943 | 8,050 | 8,038 | 8,057 | 8,066 | 8,062 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Table 7 The difference in the view about the responsibility for taking care of old parents by the birth order of the husband

| Dependent variables | Which child do you think is most responsible for taking care of old parents? | | | |
|-----------------------------------|--|--|----------------------|-----------------------------------|
| | Eldest son=1 | Any son, any daughter, or any son or daughter=1 | All children=1 | Children are not responsible=1 |
| | (1) | (2) | (3) | (4) |
| Husband: eldest son | 0.107*** (0.025) | 0.021 (0.024) | -0.102*** (0.032) | -0.023 (0.019) |
| Individual attributes of the wife | Y | Y | Y | Y |
| Estimation method | Probit | Probit | Probit | Probit |
| Log likelihood | -534.240 | -523.655 | -805.143 | -391.062 |
| N | 1,207 | 1,207 | 1,207 | 1,207 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Table 8 The difference in the frequency of providing support to the husband's parents by birth order of the husband

| Dependent variables | Providing support for household chores to husband's parents frequently=1,otherwise=0 | | Providing financial support to the husband's parents frequently=1,otherwise=0 | |
|---|--|---------------------|---|---------------------|
| | (1) | (2) | (3) | (4) |
| Husband: eldest son | 0.127*** (0.037) | 0.079*** (0.029) | 0.004 (0.022) | -0.010 (0.019) |
| Husband's education: Junior college or specialized school | | 0.045 (0.028) | | -0.007 (0.045) |
| Husband's education: University graduate or more | | 0.011 (0.025) | | 0.027 (0.021) |
| Husband is working | | 0.002 (0.044) | | 0.062 (0.044) |
| Living with husband's parents | | 0.242*** (0.018) | | 0.100*** (0.021) |
| Living with wife's parents | | 0.016 (0.045) | | -0.026 (0.036) |
| Individual attributes of the wife | Y | Y | Y | Y |
| Estimation method | Probit | Probit | Probit | Probit |
| Log likelihood | -174.113 | -106.771 | -93.923 | -79.520 |
| N | 523 | 523 | 523 | 523 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.

Table 9 The difference in the preference for employment and parenthood between the wives marrying the husband of the eldest son and other wives

| Dependent variables(Agree, or somewhat agree=1, otherwise=0) | | Marginal effect | S. D. | Estimation | | |
|--|---|-----------------|---------|------------|----------------|-------|
| | | | | method | Log likelihood | N |
| (1) | If a husband has sufficient income, it is better for his wife not to have a job | 0.012 | (0.011) | Probit | -4472.381 | 7,131 |
| (2) | Without a doubt, a woman's happiness lies in a marriage | 0.002 | (0.011) | Probit | -4472.962 | 7,094 |
| (3) | Men should cook and look after themselves | 0.003 | (0.006) | Probit | -1569.339 | 7,161 |
| (4) | A husband's job is to earn money; a wife's job is to look after the home and family | 0.008 | (0.011) | Probit | -4492.635 | 7,133 |
| (5) | A preschool child is likely to suffer if his/her mother works | 0.003 | (0.012) | Probit | -4641.229 | 7,103 |
| (6) | It is not necessary to have children in a marriage | -0.011 | (0.011) | Probit | -4438.933 | 7,094 |
| (7) | It is more important for a wife to help her husband's career than to have one herself | -0.003 | (0.011) | Probit | -4359.021 | 7,073 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses. Individual attributes of the wife are used as the independent variables.

Appendix The eldest son's effect taking into account the wife's preference for employment and parenthood

| Dependent variables | Happiness | | | Happiness | | | High happiness=1, otherwise=0 | | | Low happiness=1, otherwise=0 | | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------------------|----------------------|----------------------|------------------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Husband: eldest son | -0.053** (0.021) | -0.061*** (0.021) | -0.050** (0.021) | -0.114** (0.046) | -0.132*** (0.047) | -0.108** (0.048) | -0.019* (0.011) | -0.024** (0.011) | -0.019* (0.011) | 0.009* (0.005) | 0.009* (0.005) | 0.009* (0.005) |
| If a husband has sufficient income, it is better for his wife not to have a job | -0.061** (0.026) | -0.053** (0.026) | -0.053** (0.026) | -0.157*** (0.058) | -0.140** (0.059) | -0.140** (0.059) | -0.029** (0.013) | -0.025* (0.013) | -0.025* (0.013) | 0.004 (0.007) | 0.003 (0.007) | 0.003 (0.007) |
| Without a doubt, a woman's happiness lies in a marriage | 0.167*** (0.024) | 0.167*** (0.024) | 0.168*** (0.024) | 0.373*** (0.054) | 0.375*** (0.054) | 0.377*** (0.054) | 0.070*** (0.012) | 0.071*** (0.012) | 0.071*** (0.012) | -0.024*** (0.006) | -0.024*** (0.006) | -0.024*** (0.006) |
| Men should cook and look after themselves | -0.138*** (0.044) | -0.136*** (0.044) | -0.134*** (0.044) | -0.354*** (0.107) | -0.347*** (0.107) | -0.343*** (0.107) | -0.046** (0.021) | -0.045** (0.021) | -0.044** (0.021) | 0.009 (0.009) | 0.008 (0.009) | 0.008 (0.009) |
| A husband's job is to earn money; a wife's job is to look after the home and family | 0.057** (0.027) | 0.054** (0.027) | 0.055** (0.027) | 0.130** (0.061) | 0.125** (0.061) | 0.127** (0.061) | 0.028** (0.014) | 0.026* (0.014) | 0.026* (0.014) | -0.005 (0.007) | -0.004 (0.007) | -0.004 (0.007) |
| A preschool child is likely to suffer if his/her mother works | -0.069*** (0.023) | -0.070*** (0.023) | -0.072*** (0.023) | -0.147*** (0.051) | -0.149*** (0.051) | -0.156*** (0.051) | -0.015 (0.012) | -0.016 (0.012) | -0.016 (0.012) | 0.011* (0.006) | 0.011* (0.006) | 0.011* (0.006) |
| It is not necessary to have children in a marriage | -0.091*** (0.022) | -0.094*** (0.022) | -0.097*** (0.022) | -0.194*** (0.050) | -0.202*** (0.050) | -0.209*** (0.050) | -0.045*** (0.012) | -0.047*** (0.012) | -0.047*** (0.012) | 0.013** (0.006) | 0.013** (0.006) | 0.013** (0.006) |
| It is more important for a wife to help her husband's career than to have one herself | 0.143*** (0.025) | 0.144*** (0.025) | 0.144*** (0.025) | 0.333*** (0.057) | 0.334*** (0.058) | 0.335*** (0.058) | 0.066*** (0.013) | 0.067*** (0.013) | 0.067*** (0.013) | -0.005 (0.006) | -0.005 (0.006) | -0.005 (0.006) |
| Husband's education: Junior college or specialized school | | 0.126*** (0.031) | 0.125*** (0.031) | | 0.278*** (0.069) | 0.274*** (0.069) | | 0.071*** (0.016) | 0.071*** (0.016) | | -0.003 (0.007) | -0.004 (0.007) |
| Husband's education: University graduate or more | | 0.082*** (0.030) | 0.077** (0.030) | | 0.161** (0.068) | 0.146** (0.068) | | 0.060*** (0.015) | 0.059*** (0.015) | | -0.003 (0.007) | -0.003 (0.007) |
| Husband is working | | 0.113*** (0.035) | 0.114*** (0.035) | | 0.233*** (0.079) | 0.235*** (0.079) | | 0.054*** (0.018) | 0.055*** (0.018) | | -0.028*** (0.009) | -0.029*** (0.009) |
| Living with husband's parents | | | -0.130*** (0.038) | | | -0.282*** (0.083) | | | -0.050** (0.021) | | | 0.008 (0.011) |
| Living with wife's parents | | | -0.034 (0.044) | | | -0.111 (0.096) | | | 0.003 (0.024) | | | -0.006 (0.011) |
| Individual attributes of the wife | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Estimation method | OLS | OLS | OLS | Ologit | Ologit | Ologit | OLS | OLS | OLS | OLS | OLS | OLS |
| R-squared | 0.150 | 0.154 | 0.155 | | | | 0.112 | 0.116 | 0.117 | 0.039 | 0.041 | 0.041 |
| N | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 | 6,902 |

Notes: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity-robust standard errors are reported in parentheses.