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# **Do Daughters Change Their Fathers? Evidence from the first-daughter effect in Japan**

**CHIBA, Daina**  
University of Macau

**ONO, Yoshikuni**  
RIETI



Research Institute of Economy, Trade & Industry, IAA

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## Do Daughters Change Their Fathers? Evidence from the first-daughter effect in Japan<sup>1</sup>

Daina CHIBA  
University of Macau

Yoshikuni ONO  
Waseda University  
Research Institute of Economy, Trade and Industry

### Abstract

Research in advanced democracies documents the “first-daughter effect,” whereby fathers of firstborn daughters express more egalitarian views on gender roles. However, evidence from non-Western contexts remains scarce and inconclusive. This study examines whether the first-daughter effect holds in Japan, a country characterized by stable democratic institutions but enduring gender inequality. Using nationally representative survey data from 2000 to 2018 and quasi-random assignment of first child sex, we demonstrate that Japanese fathers with firstborn daughters exhibit significantly more gender-egalitarian attitudes. They also express greater support for gender equality policy reforms. These effects are confined to gender-related domains and do not extend to broader political ideology. Raising daughters can reshape core political attitudes, even within culturally conservative settings.

Keywords: first-daughter effect, reverse socialization, gender attitudes, political behavior, Japan  
JEL classification: J16, D72, D91

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# Introduction

Do daughters influence their fathers' political attitudes? Despite governmental efforts, gender disparities persist across employment, wages, education, political representation, and social norms (Goldin 2021; Iversen and Rosenbluth 2010; Xie and Shauman 2003). One promising avenue for promoting change is the family, particularly through parent–child socialization processes. While political socialization has conventionally been understood as a top-down process from parents to children (Jennings and Niemi 1968; Jennings, et al. 2009; Niemi and Jennings 1991), recent studies highlight the possibility for reverse socialization, whereby children reshape their parents' political views through their lived experiences (McDevitt and Chaffee 2002; Greenlee 2014). Notably, fathers of daughters often develop more gender-egalitarian attitudes (Warner 1991; Warner and Steel 1999; Shafer and Malhotra 2011), potentially due to heightened awareness of gender-based discrimination and greater concern for their daughters' opportunities in life. Such attitudinal shifts may strengthen support for gender-equality policies, underscoring the potential role of engaging fathers of daughters as agents of social and political change.

Scholars link having daughters to support for gender equality by leveraging the quasi-random assignment of a firstborn child's sex—a natural experiment known as the “first-daughter effect” (Shafer and Malhotra 2011; Sharrow et al. 2018). This design compares fathers whose first child is a daughter with those whose first child is a son, assuming that the sex of the firstborn child is random. However, empirical evidence remains mixed: studies in advanced democracies often support the effect, but research results in less democratic or more patriarchal societies are generally null (e.g., Clayton et al. 2023).

We examine Japan as a least-likely case for detecting the first-daughter effect. Despite stable democracy and a developed economy, Japan has high levels of gender inequality. As of December 2024, women held fewer than 16% of the seats in the House of Representatives. In

2021, female general workers earned 75.2% of the wages of their male counterparts, placing Japan 12th out of 14 Organization for Economic Co-operation and Development countries in terms of gender wage inequality.<sup>1</sup> Japan also differs from other East Asian countries, where son preference has skewed sex ratios (Kureishi and Wakabayashi 2009; Attané 2013; Choi and Hwang 2015). Since official records began in 1899, Japan's birth sex ratio has remained stable at approximately 105 boys per 100 girls, with no evidence of systematic manipulation (Ministry of Health, Labour and Welfare).<sup>2</sup> This stability reinforces the natural experiment's core assumption, increasing confidence that the firstborn child's sex in Japan is effectively random.<sup>3</sup>

## Research Design

To test the “first-daughter effect” in Japan, we analyze data from the Japanese General Social Survey (JGSS), a biennial, nationally representative survey of residents aged 20 to 89.

Conducted since 2000 by the Osaka University of Commerce, the JGSS employs a stratified two-stage sampling method and collects data through a combination of face-to-face interviews and self-administered questionnaires. We focus on male respondents with at least one child, with sample sizes ranging from approximately 250 in 2016–2017 to over 1,500 in 2010–2012.

The key independent variable is a binary indicator for the sex of the firstborn child (1 = daughter, 0 = son). We analyze two sets of dependent variables: (1) primary outcomes, which measure attitudes toward gender equality or gender-related policies; and (2) placebo outcomes, which measure political attitudes unrelated to gender. We hypothesize firstborn child's gender affects the primary outcomes but has not the placebo outcomes.

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<sup>1</sup> Gender Equality Bureau, Cabinet Office, Government of Japan. n.d. Wage Inequality Data. [https://www.gender.go.jp/research/weekly\\_data/07.html](https://www.gender.go.jp/research/weekly_data/07.html) (accessed June 7, 2025).

<sup>2</sup> Figure A1 in the online appendix shows trends in the sex ratio at birth from 1899 to 2023.

<sup>3</sup> By contrast, in China, a strong preference for sons, exacerbated by the one-child policy, has resulted in a highly imbalanced sex ratio. This demographic distortion undermines the plausibility of applying this identification strategy in China.

The main outcome variables come from six gender-related survey items: (1) gender roles, (2) separate surnames for married couples, (3) redistributive policies, (4) crime control, (5) support for female monarchs, and (6) support for female-line monarchs. The first two items address equality in norms and legal identity, while the third and fourth capture policies with gendered implications. The final two items measure attitudes toward female succession in the Imperial family—a culturally salient issue in Japan—distinguishing between support for female versus female-line monarchs, which we explain in greater detail below. Survey content varies across years, so sample sizes differ by item. Detailed variables descriptions are as follows:

(1) Gender roles ( **n = 10,221** ): This variable measures support for egalitarian gender norms via agreement with the following statement, “A husband’s job is to earn money; a wife’s job is to look after the home and family.” Responses are rated on a 4-point Likert scale (higher scores indicate more support for more egalitarian norms). This item appears in all rounds of the JGSS and has the largest sample size (mean = 3.12, median = 2 ).

(2) Separate surnames ( **n = 5,398** ) : This variable measures attitudes about reforming Japan’s legal requirement that married couples share a single family surname, typically the husband’s. This issue has been debated in Japan for decades, with critics arguing that the current policy reflects patriarchal norms and disproportionately burdens on women through career disruption and diminished personal identity. The proposed reform would allow married individuals to retain separate surnames or select a preferred surname. Responses are measured on a 4-point scale (higher scores indicate more support for egalitarian policies; mean = 2.18, median = 2 ).

(3) Redistribution ( **n = 11,030** ) : This variable assesses support for government-led income redistribution, rated on a 5-point scale (higher scores indicate more support for

redistribution; mean = 3.78, median = 4). In Japan, 89.7% of single-parent households are headed by women (Statistics Bureau of Japan 2022), and the relative poverty rate among these households is 48.3%, the second highest among OECD countries (Cabinet Office 2022). Thus, support for redistribution may reflect concerns about women's economic vulnerability.

(4) Crime control ( **n = 2,800** ): This item measures support for greater government spending on crime prevention. Although men are statistically more likely to be victims of violent crime, women are widely perceived as more vulnerable, particularly to sexual violence and harassment, which have gained significant public and policy attention in Japan. Thus, support for crime control policies may reflect broader concern for women's safety. Responses are recorded on a 3-point scale (higher scores indicate more support for anticrime policies; mean = 2.54, median = 3 ).

(5) Female monarchs ( **n = 1,541** ) : This variable measures support for allowing women to ascend the Chrysanthemum Throne. While Japan has had female emperors, succession is currently restricted by law to patrilineal male descendants of the Imperial family. Support for female monarchs reflects approval of allowing women within the patrilineal line to become emperors. Responses are measured on a 4-point scale (higher scores indicate more support for female monarchs; mean = 3.13, median = 3 ).

(6) Female-line monarchs ( **n = 762** ) : This variable measures the more controversial position of allowing imperial succession through the female-line, which would allow children born to female Imperial family members and commoner men to be eligible to become emperor. This change would represent a radical departure from Japan's long-standing patrilineal succession tradition. Although female emperors have existed historically in Japan, matrilineal succession is unprecedented. Accordingly, the proposal remains highly contentious and continues to be

debated nationally. Responses are measured on a 4-point scale (higher scores indicate more support for female-line succession; mean = 2.92, median = 3 ).

We test the specificity of the first-daughter effect by also including five placebo variables that are not directly related to gender or women-specific concerns: (1) liberal ideological orientation, (2) support for the Liberal Democratic Party (LDP), (3) views on immigration, (4) attitudes toward homosexuality, and (5) views on national security. While some of these issues may interact with gender norms in specific political or cultural contexts, they are largely separate from core gender-related issues. These include family structure, legal identity, or symbolic representation, that are explicitly addressed in our main outcomes. These placebo items are used to perform falsification checks: if the first-daughter effect appears only for gender-related outcomes and not for nongender items, the internal validity of our identification strategy is reinforced. Full item wordings are provided in the appendix.

## Results

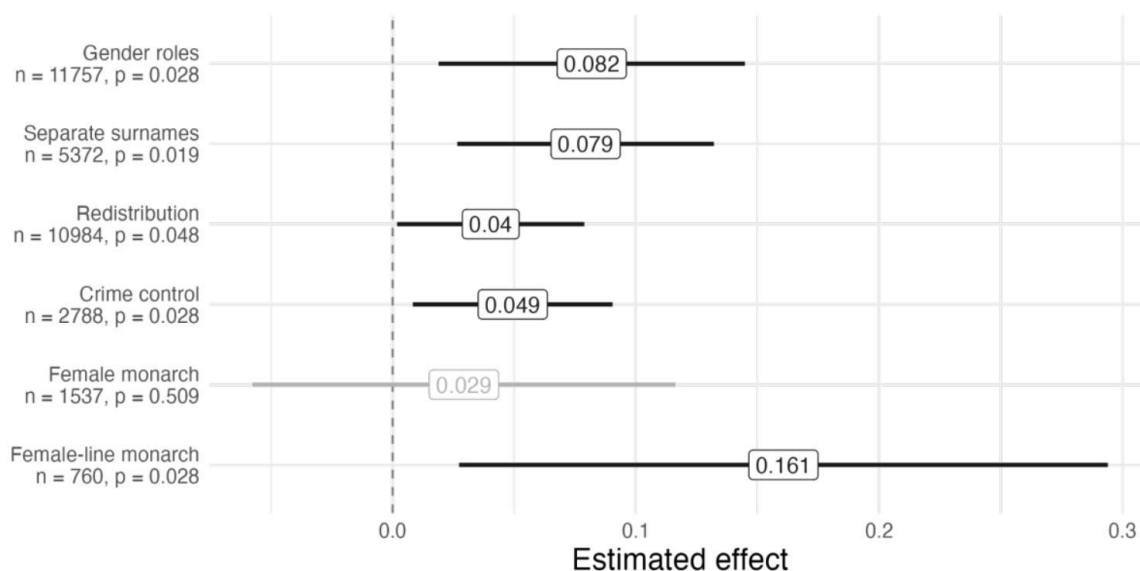
We test whether having a firstborn daughter influences fathers' gender-related attitudes by estimating regression models for each outcome variable, with a binary variable for firstborn daughter as the key predictor. All models control for respondent age (and age squared), university education, and municipality size, and include year fixed effects to account for differences across survey rounds.<sup>4</sup> Importantly, Appendix B shows no significant differences between respondents with firstborn daughters and sons on these covariates (see Figures A2–A4 in Appendix B).

Figure 1 shows the estimated first-daughter effects for the six main outcomes, with 95% confidence intervals and p-values adjusted for multiple testing using the Benjamini–Hochberg procedure. Darker lines denote statistically significant effects (  $p < .05$ , adjusted). Positive

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<sup>4</sup> The full regression coefficients are presented in Table A1 in Appendix D.

coefficients indicate greater gender-egalitarian attitudes or stronger support for pro-women policies among fathers of firstborn daughters relative to those with firstborn sons. We find significant first-daughter effects in five of the six domains: (1) fathers with firstborn daughters are more likely to reject traditional gender roles, (2) support legal reforms for separate surnames for married individuals, (3) endorse income redistribution policies, (4) favor increased government spending on crime control, and (5) support succession rights for female-line monarchs. Only support for female monarchs fails to reach statistical significance after adjustment.



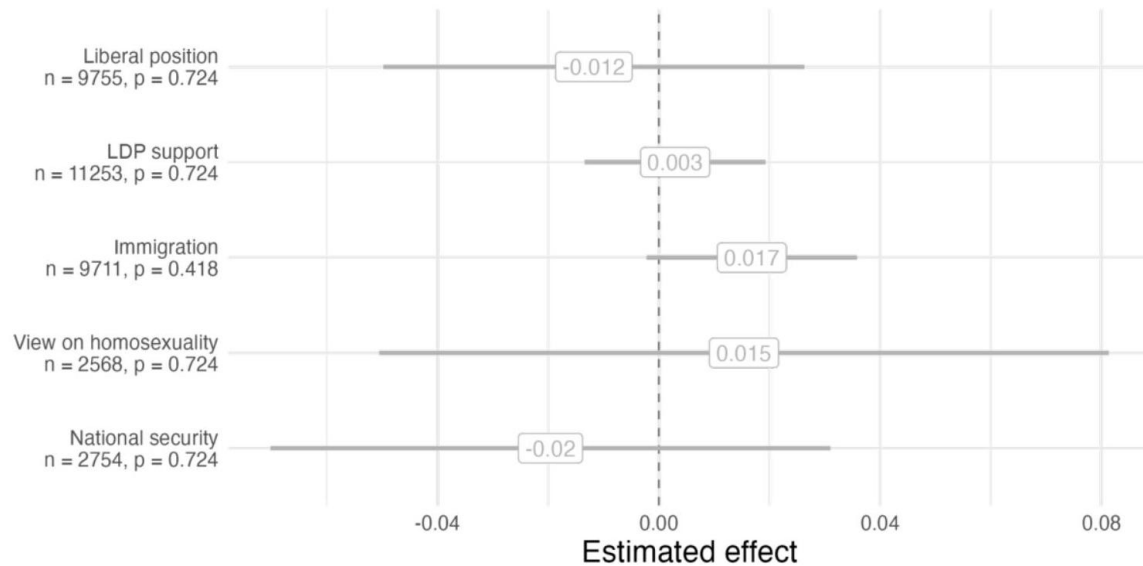
**Figure 1. Estimated First-Daughter Effects**

Note: Point estimates and 95% confidence intervals for six gender-related outcomes. Gray estimates are not statistically significant (adjusted for multiple testing using the Benjamini–Hochberg method).

Figure 2 presents the results for the five placebo outcomes.<sup>5</sup> As expected, we find no significant differences between fathers of firstborn daughters and fathers of firstborn sons in liberal ideological outlook, support for the LDP, or views on immigration, homosexuality, and

<sup>5</sup> The regression coefficients are presented in Table A2 in Appendix D.

national security. The absence of effects on placebo items supports the validity of our main findings that the first-daughter effect is specific to gender-related attitudes and not driven by broader ideological orientations or personality traits.



**Figure 2. Placebo Test Results**

Note: Estimated effects on five placebo outcomes; all are statistically indistinguishable from zero (adjusted for multiple testing using the Benjamini–Hochberg method), suggesting first-daughter effects are specific to gender issues.

## Conclusion

Although political attitudes are commonly thought to be transmitted from parents to children through socialization within the family, recent research has suggested that the act of parenting, especially the experience of raising daughters, can also shape parents' own political views.

Scholars have used the near-random assignment of a first child's biological sex to estimate the causal effect of having a daughter. These studies find that fathers of daughters are more likely to adopt gender-egalitarian political views, which was observed not only among the general public but also among legislators and judges. However, most of this evidence comes from the United States and other Western democracies, with limited comparable findings from non-Western contexts, such as China or South Africa.

This study extends previous research by applying the same identification strategy to Japan, a country characterized by strong democratic institutions, a stable birth sex ratio, and persistent gender inequality. Using nationally representative survey data, we find that Japanese fathers of firstborn daughters are significantly less likely to endorse traditional gender roles and more likely to support gender-related reforms, including legal recognition of separate surnames for married individuals and increased public spending on crime prevention. Importantly, these effects are domain specific, appearing only in attitudes related to gender and not extending to broader political views, such as immigration, national security, partisanship, or ideology. Thus, having a firstborn daughter does not make fathers ideologically more liberal overall. This pattern supports the interpretation that the observed changes are driven by gendered parenting experiences rather than by broader shifts in ideological orientation.

We find that the “first-daughter effect” extends beyond Western contexts and can shape political attitudes even in more culturally conservative societies. Nonetheless, several limitations should be acknowledged. First, the estimated effects may be conservative, since many fathers of sons also have daughters (although prior research suggests that the proportion of daughters does not necessarily increase fathers’ support for gender equality; see Sharrow et al. 2018), and the sex of previous children may influence fertility decisions. Moreover, our study captures changes in attitudes rather than behaviors and we cannot assess whether these shifts translate into concrete political actions, such as voting or policy advocacy. Future research could investigate whether attitudinal changes resulting from having daughters result in sustained behavioral changes among fathers.

Despite these caveats, our findings indicate that raising daughters can serve as a catalyst for stronger support for gender equality. In contexts where institutional reforms have not yielded insufficient progress, engaging fathers of daughters may provide a complementary pathway for fostering more gender-progressive change. This family-based mechanism offers a

novel avenue for policy-makers and advocates seeking to advance women's empowerment across the public and private spheres.

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# Online Appendix for “Do Daughters Change Their Fathers? Evidence from the First-Daughter Effect in Japan”

This appendix presents the supplementary materials described in the main text. These include:

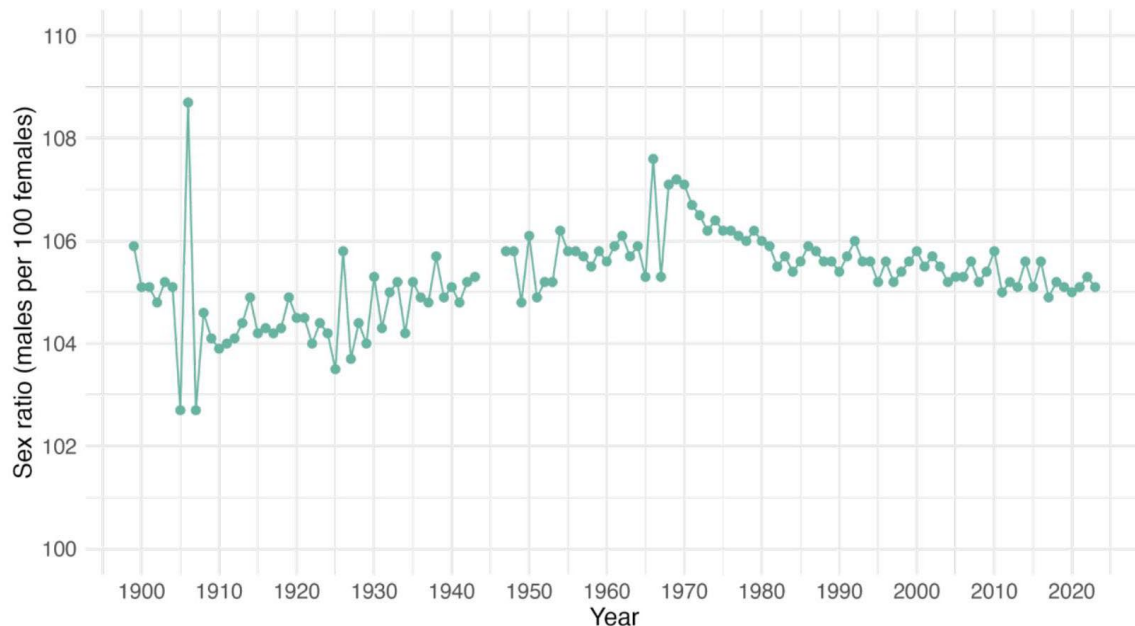
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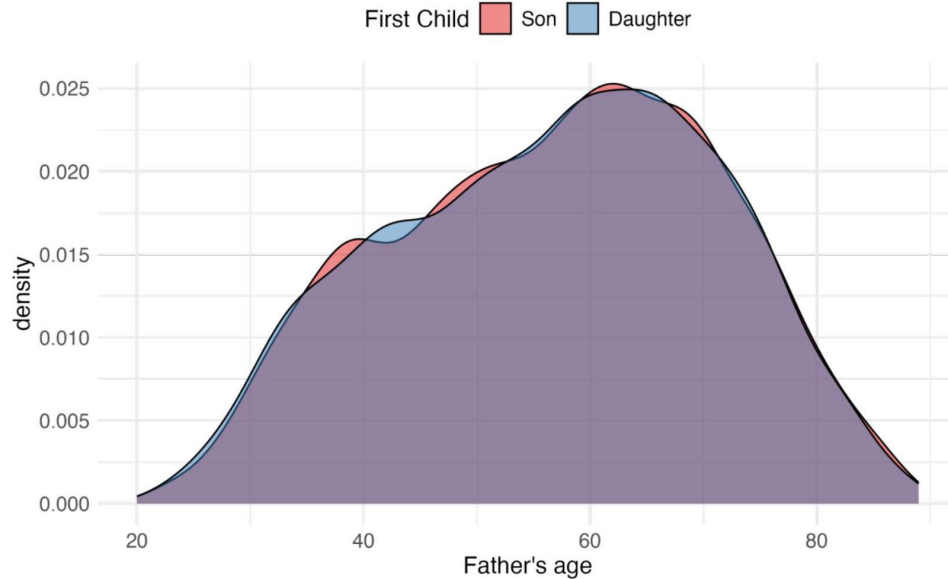
## Appendix A: Trends in Sex Ratio at Birth



**Figure A1: Trends in Sex Ratio at Birth, 1899–2023**

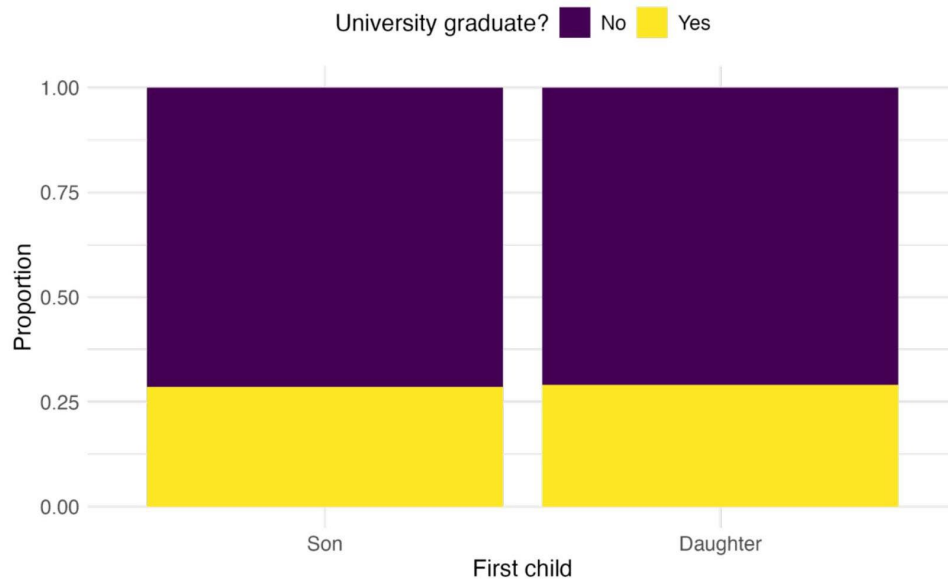
Note: This figure presents trends in the sex ratio at birth in Japan since 1899, the year when the Japanese government first began collecting these data. The sex ratio is measured as the number of male births per 100 female births. Data for the years 1944–1946 are unavailable, likely due to the disruption of reliable official statistics during World War II. Data are from the Ministry of Health, Labour and Welfare, “Vital Statistics: Trends in live births, live birth rates (per 1,000 population), total fertility rates, and sex ratio of live births: Japan (Table 4-1),” retrieved from eStat, Portal Site of Official Statistics of Japan ([https://www.e-stat.go.jp/en/statsearch/files?stat\\_infid=000040207114](https://www.e-stat.go.jp/en/statsearch/files?stat_infid=000040207114); accessed May 28, 2025).

## Appendix B: Balance of Covariates by Firstborn Child's Sex



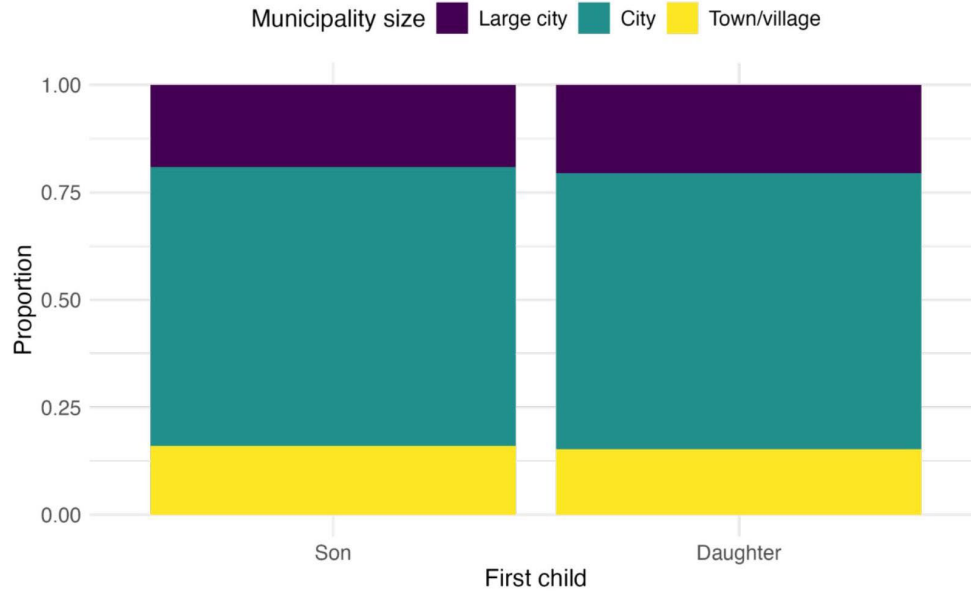
**Figure A2: Distribution of Age for Fathers by Sex of Their First Child**

Note: This figure illustrates that the age distribution of fathers is nearly identical, regardless of whether their firstborn child is a son or a daughter. The x-axis represents the age of respondents (Japanese fathers) at the time of the survey.



**Figure A3: Proportion of University Graduates among Fathers by Sex of Their First Child**

Note: This figure illustrates that fathers whose firstborn child is a son or a daughter do not differ significantly in their level of education. Among fathers whose firstborn child is a son, 28.6% are university graduates, compared to 29.1% of those whose first child is a daughter.



**Figure A4: Distribution of Municipality Size for Fathers by Sex of Their First Child**

Note: This figure illustrates that fathers whose firstborn child is a son or a daughter do not differ significantly in the size category of their municipality of residence. Among fathers of sons, 19.1% live in large cities, 64.9% in cities, and 16.0% in towns or villages. The corresponding percentages for fathers of daughters are 20.5%, 64.2%, and 15.3%, respectively.

## Appendix C: Item Wordings for Main and Placebo Outcome Variables

### Main Outcome Variables

#### Main Outcome (1): Gender roles ( n = 10,221 )

This variable measures attitudes toward traditional gender roles on the basis of agreement with the following statement: “A husband’s job is to earn money; a wife’s job is to look after the home and family.” Responses are recorded on a 4-point Likert scale: 1 (agree), 2 (somewhat agree), 3 (somewhat disagree), to 4 (disagree), with higher scores indicating more gender-egalitarian views.<sup>6</sup> Because this question was included in every survey round, it provides the largest sample size (n = 10,221). The mean response is 3.12 and the median of 2.

#### Main Outcome (2): Separate surnames for married individuals ( n = 5,398 )

This variable measures attitudes toward reforming Japan’s current legal requirement that married couples adopt a single family name—typically the husband’s. This policy has been criticized for both the symbolic and practical burdens it places on women. Proposed reforms

<sup>6</sup> In the 2017 and 2018 surveys, the original 4-point Likert scale was expanded to a 7-point scale, adding options such as neither agree nor disagree and strongly agree/disagree. To ensure consistency across survey years, responses were recoded into a 4-point format: 1-2 as 1; 3-4 as 2; 5-6 as 3; and 7 as 4.

would allow couples to either retain their respective surnames or choose which one to use. Responses are measured on a 4-point scale: 1 (“The wife should take her husband’s surname without question”), 2 (“The wife should change her surname under current conditions”), 3 (“It is up to the couple to decide whose name they will keep”), to 4

(“There is no need for either person to change their names”). Higher values indicate more gender-egalitarian attitudes. The mean is 2.18, and the median is 2.

### **Main Outcome (3): Redistribution policies ( n = 11,030 )**

This variable, along with the next, measures support for government policies that are broadly beneficial to women. This is based on agreement with the following statement: “It is the responsibility of the government to reduce the differences in income between families with high incomes and those with low incomes.” Responses are recorded on a 5-point scale, with 1 indicating the least support and 5 indicating the most. Given that low-income households in Japan are disproportionately headed by single mothers, stronger support for income redistribution can be interpreted as favoring women’s welfare.<sup>7</sup> This item appears in every survey round, resulting in one of the largest sample sizes. The mean response is 3.78, and the median is 4.

### **Main Outcome (4): Crime control ( n = 2,800 )**

This variable measures respondents’ views on government spending on crime prevention. Although men are statistically more likely to be victims of violent crimes, women are widely perceived as being more vulnerable, particularly to sexual violence.<sup>8</sup> Respondents are asked to evaluate current spending levels, with answers recorded on a 3-point scale: 1 indicates “too much,” 2 indicates “about right,” and 3 indicates “too little.” Higher scores reflect greater support for increased spending on crime prevention. The mean is 2.54, and the median is 3.

### **Main Outcome (5): Female monarchs ( n = 1,541 )**

This variable measures public support for allowing women to ascend the Chrysanthemum Throne. Under current Japanese law, only male descendants of male Imperial family members are eligible for succession. The survey asked whether a woman should be allowed to become Empress. Responses are recorded on a 4-point scale, with 1 indicating the least support and 4 the most for female succession. The mean is 3.13, and the median is 3.

### **Main Outcome (6): Female-line monarchs ( n = 762 )**

This variable measures agreement with the idea that “a child born to a woman from the Imperial Family and a commoner man should be eligible to become Emperor,” (thereby allowing succession through the female-line). As with the previous variable, responses were recorded on a 4-point scale, where 1 indicates the least support and 4 indicates the most support for female-line succession. The mean is 2.92, and the median is 3.

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<sup>7</sup> According to the 2021 Comprehensive Survey of Living Conditions by the Ministry of Health, Labour and Welfare, the relative poverty rate among households with children is 10.6%, rising to 44.5% in single-parent households. Notably, 88.1% of single-parent households are headed by single mothers (Ministry of Health, Labour and Welfare, 2022).

<sup>8</sup> According to the 2015 Crime Victim Survey by the National Police Agency, 63.9% of victims of violent crimes such as murder and assault were male (National Police Agency, 2015). The Ministry of Justice’s 2024 White Paper on Crime similarly reports that men accounted for 65.4% of all criminal victims recorded by the police (Ministry of Justice, 2024).

## **Placebo Outcome Variables**

### **Placebo Outcome (1): Liberal position ( n = 9,755 )**

This variable measures respondents' self-assessed placement on a left–right political scale, ranging from 1 (conservative) to 5 (progressive). The mean response is 2.89, and the median is 3.

### **Placebo Outcome (2): LDP support ( n = 11,253 )**

This binary variable is assigned a value of 1 if the respondent supports the LDP, Japan's dominant conservative party; otherwise, it is assigned a value of 0. Overall, 28.8% of respondents are coded as supporters.

### **Placebo Outcome (3): Immigration ( n = 9,711 )**

This binary variable equals 1 if the respondent answered “yes” to supporting an increase in the number of foreigners in their community, and 0 otherwise. Overall, 36.4% of respondents are coded as supporters.

### **Placebo Outcome (4): Views on homosexuality ( n = 2,568 )**

This variable measures respondents' attitudes toward homosexuality. Responses are coded as follows: 1 (“always wrong”), 2 (“almost always wrong”), 3 (“wrong only sometimes”), and 4 (“not wrong at all”). The mean response is 1.94, and the median is 2.

### **Placebo Outcome (5): National security ( n = 2,754 )**

This variable measures respondents' attitudes toward national security. Respondents evaluated the amount the government spends on national security, with responses coded as follows: 1 (“too much”), 2 (“about right”), and 3 (“too little”). The mean response is 2.16, and the median is 2.

## Appendix D: Regression Coefficients

**Table A1: Regression Coefficients for Main Outcome Variables**

|                                            | (1)            | (2)                  | (3)                | (4)              | (5)                   | (6)                            |
|--------------------------------------------|----------------|----------------------|--------------------|------------------|-----------------------|--------------------------------|
|                                            | Gender<br>role | Separate<br>surnames | Redistributio<br>n | Crime<br>control | Female<br>monarc<br>h | Female-<br>line<br>monarc<br>h |
| Firstborn =<br>daughter                    | 0.082**        | 0.079***             | 0.040**            | 0.049**          | 0.029                 | 0.161**                        |
|                                            | (0.032)        | (0.027)              | (0.020)            | (0.021)          | (0.044)               | (0.068)                        |
| Age                                        | 0.004          | 0.024***             | 0.019***           | 0.012**          | -0.011                | 0.010                          |
|                                            | (0.008)        | (0.007)              | (0.005)            | (0.005)          | (0.011)               | (0.018)                        |
| Age<br>squared                             | -0.0001<br>*   | -0.0003**<br>*       | -0.0001**          | -0.0001          | 0.0001                | -0.000<br>1                    |
|                                            | (0.0001)       | (0.0001)             | (0.00004)          | (0.00005<br>)    | (0.0001<br>)          | (0.0002<br>)                   |
| University<br>graduate                     | 0.169***       | 0.279***             | -0.248***          | -0.039           | 0.018                 | -0.007                         |
|                                            | (0.037)        | (0.031)              | (0.022)            | (0.024)          | (0.051)               | (0.079)                        |
| Municipalit<br>y size: city                | 0.022          | -0.004               | 0.082***           | -0.042           | 0.091                 | 0.230**                        |
|                                            | (0.042)        | (0.036)              | (0.025)            | (0.028)          | (0.058)               | (0.092)                        |
| Municipalit<br>y size:<br>town/villag<br>e | 0.068          | -0.054               | 0.120***           | -0.072**         | 0.088                 | 0.267**                        |
|                                            | (0.056)        | (0.045)              | (0.034)            | (0.035)          | (0.082)               | (0.128)                        |
| Constant                                   | 2.406**<br>*   | 1.873***             | 2.934***           | 2.149***         | 3.439**<br>*          | 2.522**<br>*                   |
|                                            | (0.225)        | (0.185)              | (0.137)            | (0.146)          | (0.310)               | (0.480)                        |
| Number of<br>observatio<br>ns              | 11757          | 5372                 | 10984              | 2788             | 1537                  | 760                            |
| Adjusted<br>R-squared                      | 0.322          | 0.069                | 0.044              | 0.024            | 0.002                 | 0.013                          |
| RMSE                                       | 1.74           | 0.98                 | 1.03               | 0.55             | 0.86                  | 0.93                           |

Note: Standard errors are in parentheses. \* p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01

Table A1 presents the estimated regression coefficients for the main outcome variables. As explained in the main text, the key independent variable is a binary indicator coded as 1 if the respondent's firstborn child is a daughter and 0 if it is a son. All models control for the respondent's age and age squared, a binary indicator for university graduation, and a categorical variable for municipality size with three categories: large city, city, and town/village. "Large city" serves as the reference category. Coefficients for "city" and "town/village" are reported relative to "large city." With the exception of Model (6), all models include year fixed effects to account for time-varying unobserved heterogeneity across different survey rounds. Because Model (6) uses data from a single survey round, it does not include year fixed effects.

**Table A2: Regression Coefficients for Placebo Outcome Variables**

|                                 | Liberal position | LDP support | Immigration | View on homosexuality | National security |
|---------------------------------|------------------|-------------|-------------|-----------------------|-------------------|
| Firstborn = daughter            | -0.012           | 0.003       | 0.017*      | 0.015                 | -0.020            |
|                                 | (0.019)          | (0.008)     | (0.010)     | (0.034)               | (0.026)           |
| Age                             | 0.005            | 0.000       | -0.005**    | -0.056***             | 0.000             |
|                                 | (0.005)          | (0.002)     | (0.002)     | (0.008)               | (0.007)           |
| Age squared                     | -0.0001***       | 0.00005***  | 0.00002     | 0.0003***             | 0.00002           |
|                                 | (0.00004)        | (0.00002)   | (0.00002)   | (0.00008)             | (0.00006)         |
| University graduate             | 0.014            | -0.018*     | 0.068***    | 0.039                 | -0.108***         |
|                                 | (0.022)          | (0.010)     | (0.011)     | (0.040)               | (0.030)           |
| Municipality size: city         | -0.038           | 0.034***    | -0.010      | 0.024                 | -0.014            |
|                                 | (0.026)          | (0.011)     | (0.013)     | (0.046)               | (0.035)           |
| Municipality size: town/village | -0.097***        | 0.065***    | 0.005       | -0.020                | -0.089**          |
|                                 | (0.033)          | (0.014)     | (0.017)     | (0.055)               | (0.043)           |
| Constant                        | 3.005***         | 0.068       | 0.592***    | 4.015***              | 2.136***          |
|                                 | (0.135)          | (0.059)     | (0.068)     | (0.229)               | (0.181)           |
| Num.Obs.                        | 9755             | 11253       | 9711        | 2568                  | 2754              |
| R2 Adj.                         | 0.025            | 0.051       | 0.018       | 0.121                 | 0.008             |
| RMSE                            | 0.96             | 0.44        | 0.48        | 0.85                  | 0.67              |

Note: Standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A2 presents the estimated regression coefficients for the placebo outcome variables. The models include the same set of independent variables as those in Table A1. All models incorporate year fixed effects to account for time-varying unobserved heterogeneity across multiple survey rounds.