The Cost of Raising Children and Family Intentions and Desires: A Survey Experiment Approach Using Information Intervention

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Introduction and research questions

Demographers have long sought to understand the sources of the cross-national variation in fertility levels. One of the key explanations discussed in the previous literature is the cost of raising children (Anderson and Kohler 2013; Cheng 2020). Specifically, these studies posit that a high education cost for children induces a trade-off between quantity and quality (Becker and Lewis 1973). If couples anticipate the high cost of raising children, they may reduce their fertility intentions. Since intentions are a strong predictor for realized fertility, the cost of education is likely to cause lower fertility.

In this context, scholars have argued that the high cost of education plays a critical role in explaining the so-called "lowest low" fertility in East Asia (Anderson and Kohler 2013; Cheng 2020). Total Fertility Rate (TFR) in East Asian societies is considerably lower than other low fertility contexts. East Asian societies are also characterized by widely shared values emphasizing children's social mobility through educational attainment (Li and Xie 2020). The educational cost of children has been prevalent and higher than in other affluent countries due to relatively limited public spending on education as well as the prevalence of supplementary education (Hannum et al. 2019; Hwang 2023).

While the cost of education has been a widely accepted explanation for low fertility in East Asia, previous studies are unclear about causality. Empirical efforts to understand the relationship between the rising cost of education and fertility decline are largely correlational (e.g., Ogawa et al. 2009). Observationally, there is robust evidence showing that the cost of raising children is the main reason married couples have fewer children than desired (Jun 2005; Nishimura 2012; Suzuki 2009), yet this does not necessarily mean that the cost of children leads to low fertility; it could be the case that material conditions (e.g., lower household income) may deter these parents from having fewer children than desired and make these parents estimate higher education cost relative to their income.

It is important to note here that the education cost of raising children is *perceived*, which indicates that some individuals may have more accurate estimates than others. If the perceived cost of education may vary across individuals, correcting potential misinformation may change their behavior. Does the (perceived) cost of education shape family intentions? We address this question by focusing on the case of Japan, which is characterized by limited public spending on education and the cost of raising children as the primary reason for the gap between desired and realized fertility (NIPSSR 2023). Theoretically, identifying causal relationships contribute to our better understanding of a cross-national variation in low fertility contests. We answer this question by leveraging an experimental method called information experiment (Haaland et al. 2023). Specifically, we exogenously generate environments, where a group of respondents are exposed to accurate information about the education cost while other respondents are not. By asking them to provide their guess about the cost of education per child before the experimental exposure, we identify the causal impact of providing information about the education cost on their family intentions.

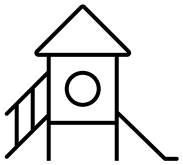
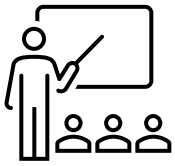
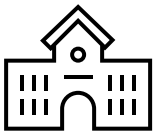
In this study, we test the following two hypotheses. If higher educational costs per child decrease the willingness to marry and have children, we would expect the intervention group, who realize that educational costs per child are *lower* than their guess, to be more willing to marry and have children compared with the control group (*Hypothesis 1*). In contrast, if the intervention group realizes that educational costs per child are *higher* than their guess, we expect that they are less willing to marry and have children compared with the control group (*Hypothesis 2*). Since the control and treatment groups are randomly assigned, we can estimate the causal impact of correcting respondent's over/underestimation on family intentions. We hypothesize the over- or under-estimation of the cost of children affects not only fertility desires but also marriage intentions in light of evidence that marriage decisions are partly driven by fertility intentions and desires (Chen et al. 2020).

Data and method

In this study, we combine a survey experiment approach with information intervention. The information intervention experiment is one of the information provision experiments, a growing experimental method in economics (see Haaland et al. 2023 for a review). By exogenously changing perceptions of real-world phenomena, this experiment method allows researchers to identify causal evidence for a particular treatment (e.g., education cost), which we cannot directly change.

In the information intervention, we randomly assign respondents to treatment and control groups. For both groups, respondents are asked to estimate the average educational cost of children. For the treatment group, respondents are further shown the average educational cost of children calculated by the authors based on various sources including consumer expenditure surveys and tuition information provided by the Ministry of Education, Culture, Sports, Science and Technology. Specifically, we ask respondents the following question, as shown in Figure 1.

The following figure presents a typical educational experience among children in Japan.

				
Public pre-school	Public elementary school	Public middle school	Public high school	Private four-year university, non-STEM
3 years	6 years	3 years	3 years	4 years

Question: As you can see, some people spend 19 years from public pre-school to a private university (non-STEM). What is your guess for the educational cost of a child who experiences such educational trajectories? Please make your guess including educational costs related to extracurricular activities (e.g., cram school or prep school). Please provide estimates related to education, excluding the cost related to meals, living expenses, or remittances. (emphasis in original)

Figure 1 Survey instrument for the cost of education per child

For the treatment group, we also show how their estimates are different than the average estimates, while we do not show this information to the control group so that they do not have a chance to correct the gap between their estimates and the average estimates.

The guess you provided was ____ JPY, but according to the average estimates, 19 years from public pre-school to private university (non-STEM) would cost about 12,600,000 JPY. This means that you [overestimated/underestimated] the actual educational cost by _____JPY.

This survey was conducted in collaboration with Japan Public Opinion Research (JAPOR), which made a call for online social surveys in January 2024. After our proposal was accepted by JAPOR, we designed and launched the survey in June 2024. The survey questionnaire was distributed to online panels registered with *Nikkei Research*, which is a survey company working with *Nihon Keizai Shimbun* (Japan Economic Newspaper), one of the largest Japanese newspaper companies.

We set sampling quotas based on three demographic variables (respondents' age, sex, and area of residence) to obtain a sample representing never-married adults aged 20-39, a target population in this study. We closed the survey when we reached our planned sample size, which is 5,000 subjects. We employed multiple survey experiments for different respondents. Respondents who were assigned to the information intervention experiment consist of 2,849 respondents. In addition to the survey experiment questions and family intentions, we also asked attitudinal questions (e.g., attitudes toward parenting or perceptions about future uncertainty) and sociodemographic characteristics including income, occupation, and educational background.

The main outcome variable is family intention, measured by marriage and fertility intentions and desires. For marriage intentions and desires, we ask three questions. For the first question, respondents were asked to provide a dichotomous yes-no response to the following question about marriage intention: "Thinking about your life as a whole, which of the following describes your thoughts on marriage?" The response options are "I intend to marry at some point" and "I have no intention of ever marrying." For the second question, respondents were asked to answer the following question about marriage desire; "What are your thoughts regarding marriage?" and provided the following response options: "I definitely want to marry," "I want to marry if possible," "I don't care if I marry or not," "I'm not thinking about marriage," and "I don't want to marry." These two questions are the two most frequent ways of asking about marriage intentions and desires in nationally representative surveys in Japan. Comparing the former and the latter, the latter question allows respondents to provide a more nuanced answer to how they think about marriage (Raymo et al. 2021). Lastly, the third question asked respondents (those who stated they do not want to marry are excluded) to provide their desired age at marriage, ranging from their current age to "50 years old or older."

For fertility desires, we ask two questions. First, respondents were asked "What is the ideal number of children for you?" with six choices: zero, one, two, three, four, and five or more. Second, for those who stated a desire for one child or more, we asked a follow-up question: "In the future, by what age do you want to have the first child?" Respondents can provide their desired age for the first childbearing ranging from their current age to "50 years old or older."

We estimate the following linear regression models (linear probability models for categorical outcomes) to assess the effect of overestimation and underestimation of education costs:

$$Y_i = \alpha + \beta_1 Z_i + \beta_2 Z_i \times O_i + \beta_3 Z_i \times U_i + \gamma X_i + e_i,$$

where Z_i refers to whether respondents are assigned to the treatment group (i.e., provision of education cost information); O_i refers to the extent to which treated respondents overestimate the education cost, taking a value of zero if respondents either underestimated the cost or were not assigned to the treatment group; U_i refers to the extent to which treated respondents underestimate the education cost; X_i refers to individual characteristics; and e_i refers to the error term.

Preliminary results

First, we confirmed that the demographic characteristics are balanced between them except for the area of residence,. The different distribution of the area of residence may affect the results, so we control for this variable when testing the effect of treatment, as well as other characteristics.

How much do individuals estimate education costs to be? We found that 25.5% of respondents 25% or less underestimate the education cost, while 34.0% of respondents 25% or more overestimate it. This indicates that a non-negligible proportion of respondents have misperceived the cost of education relative to the actual cost, particularly in the direction of overestimation.

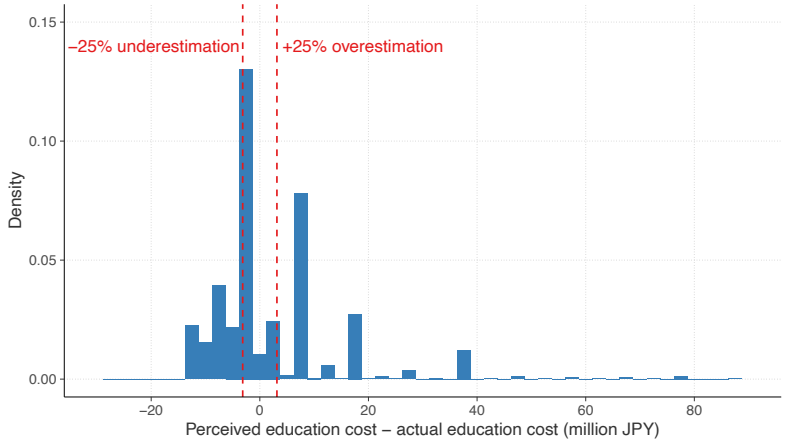


Figure 2 Distribution of the gap between perceived and actual education cost for treated respondents. *Note:* Actual average education cost is 12.6 million JPY.

Table 1 shows the results of regression models predicting fertility intentions from the provision of education cost information. Regarding marriage intentions, marriage desires, and the desired timing of marriage and number of children, we do not see any significant treatment effects regardless of the definition of the measure. However, we can see that the treatment has a significant effect on the earlier desired timing of the first birth for those who overestimated the cost of education. Specifically, comparing those who were informed of the actual cost of education and those who were not, the former group of respondents shows a much earlier timing of the first childbearing than the latter group does, as the interaction coefficient between treatment and overestimation is negative and statistically significant at the 5% level. Substantively, this means that if respondents overestimate the cost of education by twice the actual cost, they wish to have a first child 0.35 years (=-0.028×12.6) earlier. This result is consistent with Hypothesis 1. Meanwhile, the interaction coefficient between the treatment and underestimation is not significantly related to the desired timing of first birth, which is not consistent with Hypothesis 2.

In presentation, we discuss theoretical as well as policy implications to advance our understanding of the cross-national variation in fertility levels across low fertility contexts. We also examine whether the effect of the revised perceptions of education costs varies by individuals' characteristics such as gender, individual income, educational background, or attitudes for parenting.

Table 1 OLS Regression models predicting marriage and fertility intentions and desires

	Marriage intention (1/0, categorical)	Marriage desire (5–1, continuous)	Desired timing of marriage (continuous)	Desired number of children (5–1, continuous)	Desired timing of the first birth (continuous)
Treatment	-0.001	0.008	-0.372	0.009	0.283
	(0.024)	(0.061)	(0.226)	(0.052)	(0.205)
Treatment x overestimation	0.003	0.003	0.006	0.001	-0.028*
	(0.001)	(0.004)	(0.012)	(0.003)	(0.013)
Treatment x underestimation	0.002	0.003	0.058	-0.002	-0.028
	(0.004)	(0.010)	(0.044)	(0.009)	(0.035)
N	2,849	2,849	2,633	2,849	1,659

Notes. * $p < .05$ (two-tailed tests). Heteroskedasticity-robust standard errors in parentheses. Controls for sex, age, age squared, educational attainment, and region of residence. Desired timing of marriage and first birth was defined as the difference between the desired age of marriage or first birth and the respondent's current age.