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Parental Earnings Trajectories Around Childbirth in Japan: Evidence from local tax records*

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Abstract

This study examines the impact of childbirth on parental earnings in Japan, using newly available local tax records from multiple municipalities. By applying an event study specification, we estimate the "child penalty"—the percentage reduction in women's income relative to men's after childbirth. Our results reveal that women's income declines by 60–80% immediately after childbirth and remaining 50% below pre-childbirth levels even four years postpartum, while men experience modest income growth. Moreover, the study also identifies significant heterogeneity in income trajectories, particularly among higher-earning women, some of whom recover their earnings close to their pre-birth levels, whereas others earnings remain significantly below pre-birth levels. Additionally, women with pre-birth earnings were lower than the median tend to exit the workforce or adjust their income below the threshold for dependent spouses.

Keywords: Child penalty, labor supply, gender, fertility, tax record
JEL classification: J13, J16, J31, J32

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1 Introduction

The relationship between family formation and female labor force participation has garnered increasing attention worldwide. In Japan, a rapidly aging society, the rise in female labor force participation plays a crucial role in sustaining the working population (Kawaguchi and Mori, 2019; Kawaguchi et al., 2021). Figure 1 illustrates the employment rate of women by age for 1980–2020 and show a significant reduction in the previously observed dip in employment rates for women in their late 20s to 40s, commonly referred to as the "M-shaped-curve". Additionally, overall employment rates have steadily increased, with the employment rate at age 30 increasing from approximately 45% in 1980 to approximately 80% in 2020. The growth in female labor force participation has gradually diminished gender disparities in employment. However, significant earnings gaps persist in earnings, a substantial part of which is arguably influenced by childbirth.

The decline in women's income and employment following childbirth, commonly referred to as the "motherhood gap" or "child penalty", has been analyzed extensively owing to the increased availability of panel data and administrative records. For example, Kleven et al. (2024) used microdata from 134 countries to demonstrate that the decline in women's employment in the years following childbirth is a widespread phenomenon across many countries with varying effects. Similar decline in earnings is observed in the United States (Cortés and Pan, 2023), Denmark (Kleven et al., 2019), Norway (Andresen and Nix, 2022), and Spain (Fernández-Kranz et al., 2013).

Understanding why childbirth effecutuates a persistent decline in women's employment is essential for shaping family policies and addressing gender disparities in the labor market. Therefore, accurate documentation of women's earnings trajectories around childbirth is a necessary first step. Japan has observed considerable growth in female labor force participation amid declining birth rates, engendering complication and analysis of these data. it is particularly valuable to compile and analyze this data.

However, to capture income and employment details around childbirth accurately, a panel dataset including many women who gave birthed during the sample period is required. Research on this topic in Japan remains limited owing to the scarcity of such data sources. For example, Hsu (2021) used the Japan Panel Survey of Consumers, a panel dataset of women, to show that women's income decreases by approximately 40% after childbirth, and Mugiyama (2024) found no significant difference in the penalty across different educational attainments of mothers; however they do not extend the analysis to men. Komura (2021) examined couples

using panel data and estimated a child penalty of approximately 0.6; however, sample size limitations hindered the stability of the estimates.

Given this context, this study provides a more precise estimation of income trajectories around childbirth in Japan by leveraging newly available administrative records on household registration and municipal residential tax data. These administrative data enables access to accurate household composition and income information for all residents within municipalities included in the data. Moreover, if individuals remain in the same municipality, their income can be tracked over time, allowing for precise estimation of income changes around childbirth.

We adopt an event study specification similar to Kleven et al. (2019). By examining income trajectories over time for both genders, we quantify the so-called "child penalty"—the percentage decrease in women's income post-childbirth relative to men. Our findings reveal that women's income declines substantially after childbirth, with a 60–80% drop immediately after and a persistent 50% decline four years later. In contrast, men experience a modest income increase in income during the same period.

An analysis of the income distribution reveals a complex pattern of women's earnings trajectories after childbirth. Women with higher pre-birth incomes experience greater variability in their post-childbirth income trajectories. Although some women manage to recover their earnings close to their pre-birth levels, others remain at less than half of their pre-birth levels even after four years. However, women with pre-birth earnings was lower than the median tend to exit the workforce or adjust their income below to 1.03 million yen, which is the threshold for dependent spouses[1]. As the most dependent spouses earn less than the threshold, the correlation between pre-birth and post-birth earnings is weak among women with below-median pre-birth earnings. This heterogeneity along the pre-birth earnings underscores the complexity of the income recovery process after childbirth, with factors such as tax system and labor market dynamics playing critical roles.

This study makes two key contributions to existing literature. First, it estimates income changes around childbirth in Japan, which is the first robust estimate of child penalty using local administrative data. Second, it examines the distributional aspects of income changes, focusing on how the decline in women's income unfolds (Budig and Hodges, 2010; Glauber, 2018; Almond et al., 2023). This analysis elucidates the academic understanding of the mechanisms driving these income declines.

[1]An annual wage income of 1.03 million yen is the threshold for being considered a tax-dependent. Although exceeding this threshold does not substantially increase the financial burden, as demonstrated by Kondo and Fukai (2023), for reasons that are not entirely clear, there is a marked clustering at the 1.03-million-yen level.

The remainder of this study is structured as follows: Section 2 describes the data, Section 3 presents the analysis results, and Section 4 concludes the study.

2 Data

This study utilizes municipal resident registration and tax records provided by municipalities participating in the "Project for Utilizing Municipal Tax Data to Promote Evidence-Based Policy Making (EBPM)" led by the Center for Research and Education in Program Evaluation (CREPE) at the University of Tokyo. Hereafter, we refer to this project as the CREPE project.

The resident registration records contain information on all individuals registered in the municipality as of January 1st of each year, including gender, birth date (or birth quarter), and relationship with the household head. Each individual and household is assigned a unique ID, allowing us to identify the marital status and the birth of the first child based on the relationship with the household head. The tax records include income earned in the previous year and information on deductions that are used to calculate municipal tax liabilities. We can track individuals' income over time as long as they remain in the same municipality, using their unique ID.

This study focuses on annual gross salary income[2] as the main outcome variable. The advantage of gross salary income over total income is that it is available to individuals with earnings below the tax exemption threshold. The disadvantage is that self-employed households are not distinguished from non-employed households.

Note that parental leave compensation from the public employment insurance is not included in our data because it is nontaxable. Therefore, we cannot distinguish between those on the parental leave and those who are not employed. The replacement rate of parental leave compensation is 66% for the first six months and then 50% until the parent resumes working.[3]

We use data from 16 municipalities that participating in the CREPE project in 2022, with household composition data complete for 2018–2022 (short-term sample). Additionally, data from 7 municipalities covering a seven-year period (2016–2022) are used for a more detailed analysis (long-term sample). Participation in the CREPE project is voluntary, meaning that the participating municipalities are not a random sample of all municipalities in Japan. Moreover,

[2] *Kyuyo-shunyu* in Japanese, defined as gross salary income before deductions for salary income (*kyuyo-shotoku kojo*) and social insurance payments.

[3] A parent can take a parental leave until the child's first birthday, and in case the child cannot enter the publicly subsidized childcare centers, the leave can be extended until the second birthday of the child. In practice, most mothers restart working either at around the first birthday of the child or first or second April (beginning of the school year, when many childcare slots become available) after the child's birth.

the population sizes significantly vary across the municipalities, with the three largest municipalities constituting more than half of the total sample. As noted in Kondo and Fukai (2023), the population of the participating municipalities is slightly younger than the national average, with a higher proportion of university graduates and slightly less representation from the manufacturing sector. In addition, our data do not include any of the 23 wards in central Tokyo; however, we includes a few major cities designated by the ordinance.

To estimate the child penalty, we constructed the following sample. First, we restricted the sample to households where parent–child relationships and the birth of the first child were identified from the resident registration data (Appendix A). Following Kleven et al. (2019), the sample was further restricted to individuals for whom data were available both before and after the birth of their first child. Specifically, it included individuals who (1) had income data for two years before childbirth, (2) had income data after childbirth, and (3) could be tracked for at least five years in total. The outcomes analyzed were pre-tax wage income and a dummy variable indicating employment status based on salary income data. For women, the sample is limited to those who aged 15 to 49 years at the time of childbirth. Table C1 summarizes the sample size that remained until each step.

Table 1 presents the descriptive statistics for short- and long-term samples used to estimate the child penalty presented in Section 3.2. The short-term sample, which uses data from 16 municipalities, has a total sample size of 194,015 and includes approximately 39,000 men and women. The long-term sample, which uses data from 7 municipalities, has a sample size of 164,259, including approximately 24,000 men and women. Table 1 shows the pre-birth employment rates, salary levels and age at two years before childbirth for each sample.

For men, the pre-birth employment rate is approximately 92% in both the short- and long-term samples. This rate refers only to individuals in wage employment and does not include the self-employed. The annual salary income is 4.12 million yen in the short-term sample and 3.93 million yen in the long-term sample, indicating that municipalities in the long-term sample tend to have slightly lower income levels. The average age two years before childbirth is 32.0 years in the short-term sample and 31.4 years in the long-term sample. The long-temr sample includes slightly younger men.

For women, the pre-birth employment rate is approximately 90% in both samples similar to men. The salary levels for women are 2.65 million yen and 2.40 million yen in the short- and long-term samples, respectively, with slightly lower income levels in the long-term sample municipalities. Although the pre-birth employment rates are similar for both men and

women, women earn significantly lower annual salaries than men. The average age two years before childbirth is 30.5 years in the short-term sample and 29.8 years in the long-term sample. Similarly to men, the long-term sample includes slightly younger women. According to Vital Statistics (Ministry of Health, Labour and Welfare), the average age of mothers of the firstborn children in Japan is 30.7 years in 2018. Therefore, our sample does not deviate significantly from the national average.

For analyzing heterogeneity across pre-birth earnings, we limited the sample to those who were observed from $t-2$ to $t+4$. Table 2 compares the larger sample used in the estimation of child penalty (long-term sample in Table 1) and the complete spell sample used in Sections 3.3 and 3.4. The complete spell sample ins similar to the entire analysis sample, except that income is slightly lowerprobably because the year of birth is fixed at 2017.

Furthermore, individuals can only be tracked only if they remain in the same municipality. Those who relocated to different municipalities were excluded from the sample. Table C2 shows that approximately 28% of mothers with 2-year-old child moved in to the sample municipalities sometime after two years before birth. For both men and women, the moved-in sample is approximately 1.5 years younger. Additionally, women who moved in are more likely to have a second child by $t+2$. Women in the moved-in sample earned less in $t+2$ while men in the moved-in sample earned more than those in the analysis sample. Specifically, the income gap after childbirth between men and women is larger for the moved-in sample, suggesting that households moving at the time of childbirth reduce their maternal labor supply more than those that remain. Thus, our estimates of the child penalty may be understated.

3 Child Penalty Measured Using Local Tax Records

3.1 Event Study Specification

Following Kleven et al. (2019), we employ an event study specification to estimate the impact of childbirth on parental earnings trajectories. We run the following regression model for each gender:

$$Y_{ij}^g = \alpha^g + \sum_{k \neq -2} \beta_k^g 1[t_{ij} = k] + \phi_a^g + \eta_j^g + u_{ij}, \tag{1}$$

where subscripts i and j represent the individual and calendar year, respectively, and superscript $g \in \{m, w\}$ denotes gender, m for men and w for women. t represents the event time, with $t = 0$ corresponding to the time of childbirth. The vector β_k^g captures the impact of childbirth at each event time t. The variables ϕ_a and η_j represent the age and year fixed effects

respectively, and u_{ij} denotes the error term.

Then, we measure the percentage impact on each gender as follows:

$$P_t^g \equiv \frac{\hat{\beta}_t^g}{\mathbb{E}\left[\tilde{Y}_{ij}^g | t\right]}, \tag{2}$$

where $\tilde{Y}_{ij}^g | t$ represents the counterfactual outcome in the absence of childbirth for individual i whose gender is g in year j which corresponding to event time t. This value is calculated from equation (1) setting $1[t_{ij} = k] = 0$ for all k. Thus, the prediction assumes that the distribution of parents' age at childbirth for each calendar year is similar to the actual distribution, representing the predicted salary income/employment status of parents in a given year t years later if they do not have children.

Then, the child penalty is defined as the difference in the percentage of impact between men and women:

$$\text{Child Penalty}_t \equiv P_t^m - P_t^w. \tag{3}$$

where P_t^m and P_t^w represent the percentage impacts on men and women defined in equation (2), respectively.

3.2 Child Penalty Estimates

Figure 2 summarizes the changes in income and employment status before and after childbirth estimated using the long-term sample. First, Figure 2a illustrates the changes in salary income as the percentage change in the average salary at $t-2$. Women's salary income significantly decreases after childbirth. Specifically, income drops by approximately 60-80% immediately following childbirth and remains approximately 50% below the original level even 2–4 years later. Conversely, men experience little change, with a slight increase of about 5% in income after childbirth. The estimated "child penalty" at four years postpartum is 0.628. Similarly, Figure 2b presents the percentage change in the employment rate. No significant changes are observed for men, whereas women's employment rates decrease after childbirth. The peak decline is approximately 40% and remains 20% lower even four years postpartum.

The greater impact on income than on employment rates implies that the effect on income is not only due to women leaving the workforce but also due to reduced income for those who remain employed. This is owing to a decline in working hours or lower hourly wages. Although our data do not distinguish between the two channels because information on working hours is unavailable, both channels are likely to work. It is anecdotally said that the majority of women

who resume working after parental leave reduce their scheduled working hours, while those who permanently quit their pre-birth jobs often reenter the labor market as part-time workers and typically paid lower wages than full-time regular workers.

Moreover, employment rates and earnings observed for four years after the birth of the first child are affected by the birth of the second child. As Adams et al. (2024) points out, the birth of a second child exacerbate the "child penalty" through parental leave for the second child and temporary decline of hours worked due to the second child rather than the first. As parents who have a second child within a particular year from the birth of the first child are likely to be selected differently from the others, it is difficult to estimate the child penalty in the absence of the second child. For information, Table C3 shows the proportion of mothers with a second child by the periods following the first child's birth. By the fourth year after the first child's birth, 56% of individuals have a second child. Thus, the impact of the second child is likely to be substantial in our case. A more detailed analysis requires longer-term data and new strategies to identify the decision-making process surrounding having a second child.

During parental leave, the salary income becomes zero. Instead, 66% (50% after 6 months) of pre-birth salary is paid as parental leave compensation by the public employment insurance scheme. As this compensation is not subject to the local residential taxes, our data do not include the information on the amount each individual receives. Nonetheless, it is unlikely that the parental leave compensation covers all the decline in income in the first two years since the birth of the child for two reasons. First, the decrease in the earnings at $t = 1$, about 80% ,is greater than the replacement rate of the parental leave compensation (66%). Second, and more importantly, only those who are going to return the pre-birth job after the leave are eligible for the parental leave compensation. Given the 20% decline in employment at $t = 4$ implies at least 20% are not eligible for the compensation.

Figure B1 shows the results using the short-term, aligning with those from the long-term sample, indicating that the choice of municipality does not significantly affect the findings. Moreover, we examine the heterogeneity in the changes in income and employment around childbirth based on the woman's age at the time of childbirth (Figure B2) and their spouse's income level (Figure B3). We find that older women experience smaller declines in income and employment after childbirth, while women with higher-income spouses (indicating a positive income effect) experience larger declines. However, these differences are not substantial.

3.3 Pre-birth Income Levels and Post-birth Income Distribution

The previous analysis confirmed that women experience a significant declines in both income and employment rates after childbirth. Even four years after childbirth, salary income remains 60% lower than pre-birth levels. The question persists that whether this decline occurs uniformly across all women or whether the magnitude of the drop varies significantly across individuals. While conventional panel surveys do not capture changes in the income distribution owing to sample size limitations, the comprehensive data from municipal tax records enables such analysis.

In this subsection, we consider women who can be continuously tracked from two years before childbirth to four years after childbirth to analyze changes in the income distribution around childbirth. This enables us to track the same population over time, eliminating any compositional changes affecting the distribution.[4]

Figure 3 illustrates the income distribution of women from two years before childbirth to four years after childbirth. For individuals with an annual salary income exceeding 10 million yen, income is capped at 10 million yen. Additionally, as the proportion of women with zero income is much higher compared with other categories, those with zero income are excluded from the figure. Before childbirth, income is widely distributed, mostly between 0 and 5 million yen. However, after childbirth, the distribution shifts downward, with incomes concentrating below 2 million yen. During 2–4 years following childbirth, the income distribution gradually shifts upward; however, the density above 3 million yen remains thinner than the pre-birth distribution. Another significant feature is the concentration of incomes just above 1 million yen after childbirth. As indicated by Kondo and Fukai (2023), this is bunching to the tax thresholds to be a dependent spouse, suggesting that part of the post-childbirth income decline is owing to some women switch to part-time jobs and remaining within the threshold for dependent spouses.

The above analysis indicates three key findings regarding the decline in women's income following childbirth: (1) the overall distribution of income shifts downward, (2) only a few women return to pre-birth income levels, and (3) many women begin to adjust their income to the threshold for dependent spouse after the childbirth.

Then we explore changes in the income distribution before and after childbirth, based on pre-birth salary levels. Figure 4 compares the income in each year with the income in the two

[4]This limits the sample to 3,178 individuals; however, it is still a sufficient sample size for our analysis. Furthermore, note that, as the full sample period (2016–2022) is utilized, we cannot fully separate the effects of the years from event time.

years before the birth of first child. Here, women are divided into decile groups based on their salary income two years before childbirth (t = -2). The income distributions for each group are depicted from one year before childbirth (t = -1) to four years after childbirth (t = 4). The red boxplots represent the income distribution of each decile group two years before childbirth (t = -2), serving as reference points, while the blue boxplots represent the income distribution at each event time (t = -1 to t = 4). The box represents 25–75 percentile, the dot and horizontal bars indicate the mean and median, respectively, and the endpoints of the vertical line are 10 and 90 percentile, respectively. The dashed reference line in the figure indicates 1.03 million yen, which is the threshold for dependent spouses in the tax system.

Figure 4 reveals a significant downward shift in income distribution across all decile groupsd immediately following childbirth (t = 0). While this immediate decline in the salary income is partly attributable to parental leave,[5] even three to four years after childbirth (t = 3, t = 4), income declines are observed across all groups rather than in any specific group.

Post-birth income exhibits greater variability among women with higher pre-birth incomes. On average, women in the higher pre-birth income group retain higher post-birth income levels. However, while the top 25% (those above the box) earns almost similar to the pre-birth income in the fourth year, the median in the fourth year is substantially below the pre-birth income.

Additionally, women in the lower half of the pre-birth income distribution remain within the threshold for dependent spouses. As most women adjust their income below the threshold of 1.03 million yen, the correlation between pre-birth and post-birth income is weaker in the lower half of pre-birth income distribution, which is shown as a flatter slope of mean post-birth income up to the fifth or sixth decile group. Income after birth recovers more steeply for the higher decile groups.

Women with lower pre-birth incomes either exit the workforce or adjust their labor supply to remain within tax-exempt thresholds. This pattern is illustrated in Figure B4, which shows the transition in income distribution for both high- and low-income groups. A bunching at the tax-exempt threshold emerges after childbirth in the income distribution of women with lower 75% pre-birth income. In contrast, Figure B4 shows that women with 25% pre-birth income seldom adjust their income to the tax-exempt thresholds. Although the 25 percentile for 8th and 9th decile groups in Figure 4 is below the tax-exempt threshold, they do not bunch at the threshold.

[5]Parental leave compensations from the public employment insurance are tax-exempt and thus excluded in income recorded in our data.

In summary, women with low pre-birth income levels adjust their post-birth income levels below the threshold for a dependent spouse. In contrast, substantial heterogeneity exists in post-birth income levels within the high pre-birth income group; some women return to high income levels after childbirth, while others remain at significantly lower income levels than pre-childbirth.

3.4 Family Income Levels Around Childbirth

From the previous analysis, we confirmed that women's income declines significantly following childbirth. Nwo we investigate whether this decline affects household income. A reduction in household income has substantial implications on the welfare of families with children and the developmental outcomes of the children themselves. Therefore, we examine changes in household income, alongside the incomes of husbands and wives individually, from the pre-childbirth to the post-childbirth period.

Figure 5 illustrates the trends in household income, defined as the sum of the husband's and wife's incomes,[6] husband's income, and wife's income over the period from two years before childbirth to four years after. We have capped the household income at 15 million yen. Consistent with previous findings, wives' income experiences a sharp decline afterchildbirth and remains approximately 1 million yen below pre-birth levels even four years after childbirth. However, when considering household income, although there is a temporary dip occurs following childbirth, it returns to pre-birth levels by the fourth year after childbirth.

Underlying this stabilization of household income is the rising income of fathers. From two years before childbirth to four years later, the fathers' income increased by approximately one million yen. This post-birth increase in fathers' income is consistent with the findings from Figure 2a.

To investigate whether the observed increase in fathers' income is unique to men with children, we conducted a comparative analysis with men who did not have children during the same period. For comparison, we constructed income data for men in the same age range as those with children, tracking income growth over the same seven-year window. Then we compared the income trajectories of men with and without children whilecontrolling for age.

The results of this analysis are shown in Figure 6. Two years after childbirth, the income growth among fathers accelerates, surpassing that of their childless counterparts. By the second year after childbirth, the fathers' income is approximately 300,000 yen higher than that

[6]Single-parent households are excluded from this section's analysis.

of childless men of the same age, and by the fourth year, this difference increased to approximately 500,000 yen. This suggests that men with children may increase their work hours or assume additional responsibilities in response to their wives' income declines, or that men with stronger income growth potential are more likely to marry and have children. Additionally, given the parental leave benefits available during the period immediately after childbirth (t = 0 to t = 1), the issue of household income around childbirth appears to be well smoothed.

4 Conclusion

This study examines the income trajectories of parents in Japan around childbirth byleveraging unique local tax records from participating municipalities. Our findings confirm the existence of a significant "child penalty" for women, with income declining by 60-80% immediately after childbirth and remaining 50% below pre-childbirth levels even four years later. In contrast, men's incomes showes a modest increase post-childbirth. This gender disparity highlights the long-term economic impact of childbirth on women's labor market outcomes in Japan.

Furthermore, we find substantial heterogeneity in income trajectories, particularly among women with higher pre-birth earnings. Some women recover a portion of their income whereas others continue to experience a significant decline. The results also reveal that women with lower pre-birth incomes are more likely to exit the workforce or reduce their working hours considering the tax incentives. This nuanced understanding of changes in income distribution changes provides crucial insights into the structural factors contributing to the persistence of gender inequality in the labor market.

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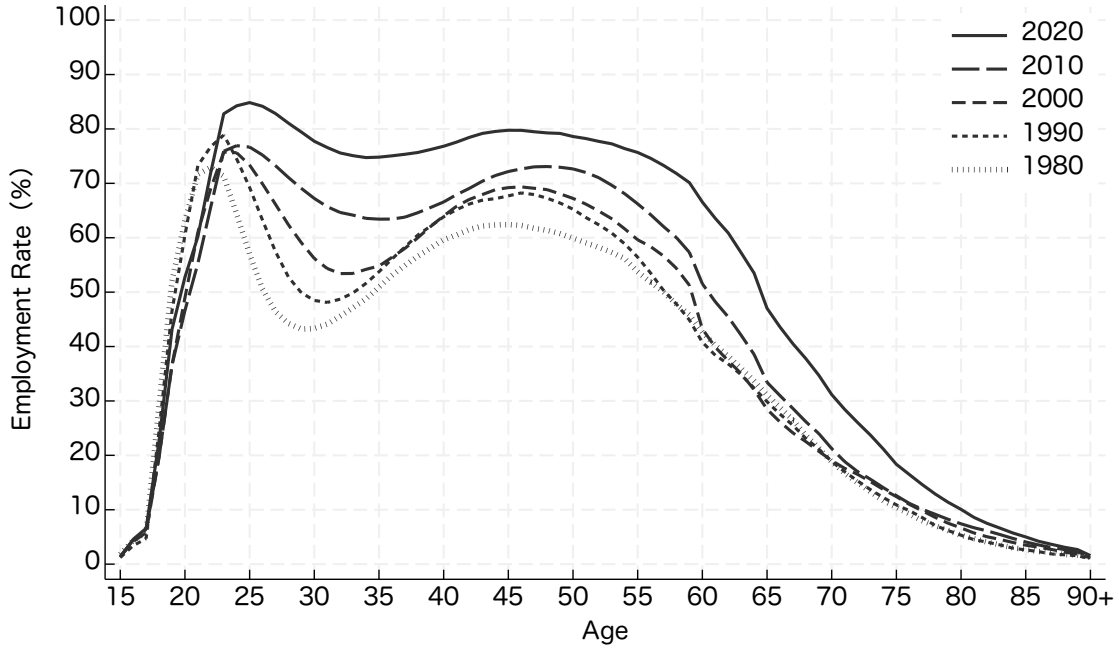
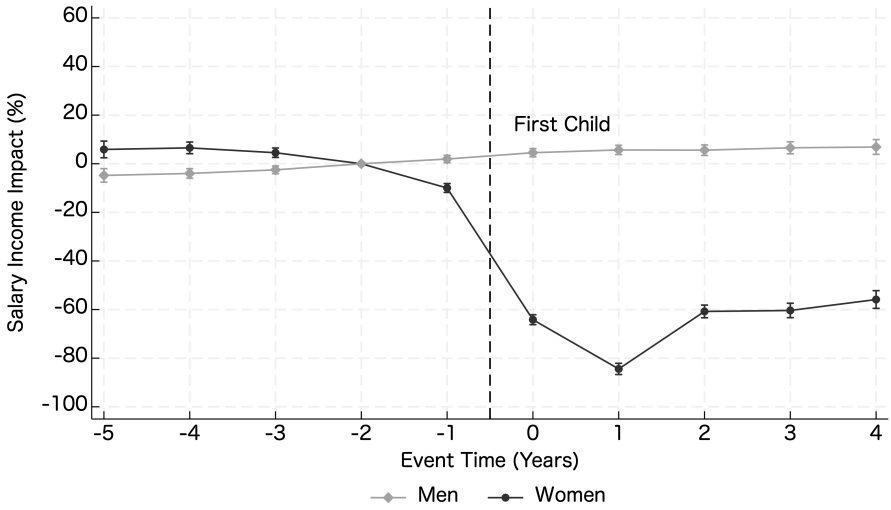
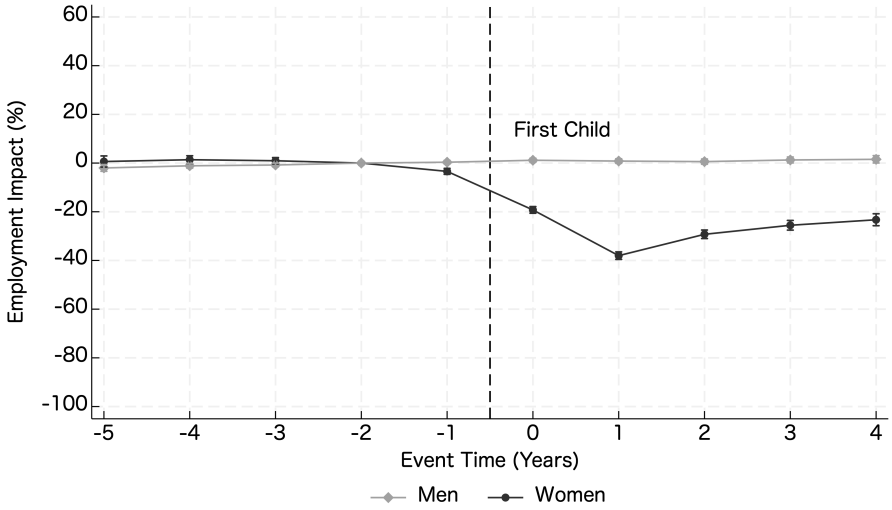


Figure 1: Women's Employment Rate from 1980 to 2020

Source: Population Census (Ministry of Internal Affairs and Communications).



(a) Impact on Salary Income



(b) Impact on Employment

Figure 2: Changes in Salary Income and Employment Rates Around Childbirth

Note: The graphs show event time coefficients estimated from equation in the Section 3.1 using the data from seven municipalities data (long-sample). The estimated coefficients are presented with 95% confidence intervals based on robust standard errors clustered at each municipality.

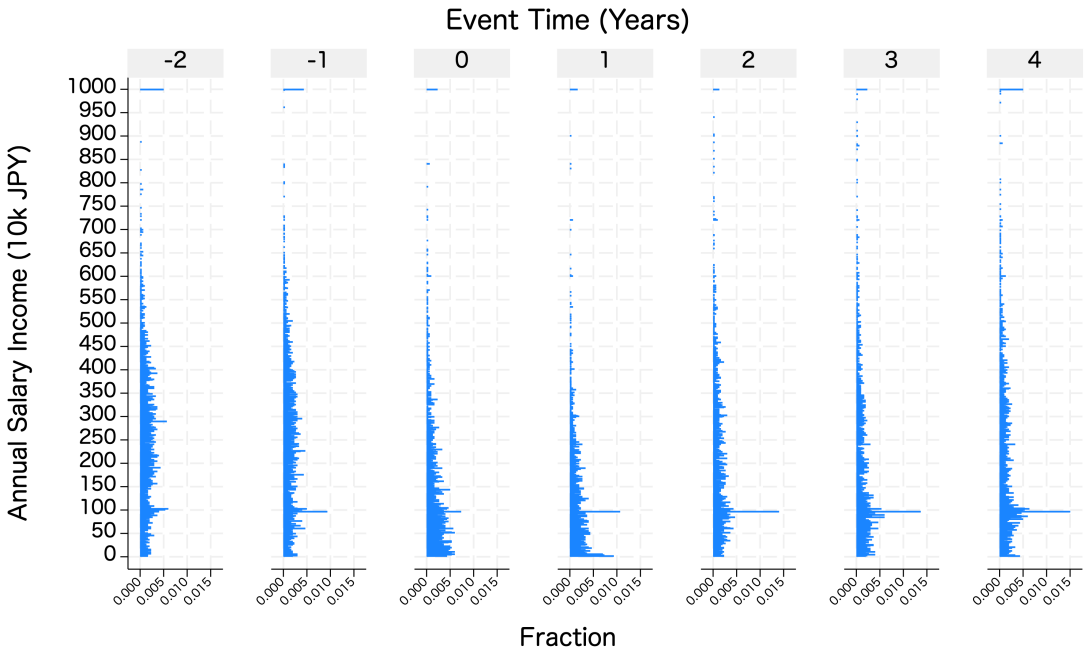


Figure 3: Earnings Distribution of Women

Note: This figure shows the income distribution of women from two years before childbirth to four years after childbirth using the data from seven municipalities data (long-term sample). For individuals with annual salary income exceeding 10 million yen, income is capped at 10 million yen. Additionally, as the proportion of women with zero income is much higher compared with other categories, those with zero income are excluded from the figure.

Figure 4: Earnings Distribution by the Income Group

Note: This figure shows salary income distributions for each income group from one year before childbirth (t = -1) to four years after childbirth (t = 4) using the data from seven municipalities data (long-term sample). Women are divided into decile groups based on their salary income two years before childbirth (t = -2). The red boxplots represent the income distribution of each decile group two years before childbirth (t = -2), serving as reference points, while the blue boxplots represent the income distribution at each event time (t = -1 to t = 4). The box represents 25-75 percentile, the dot and horizontal bar indicate mean and median, and the end points of the vertical line are 10 and 90 percentile, respectively. The dashed reference line in the figure indicates 1.03 million yen, the threshold for income adjustment related to tax incentives.

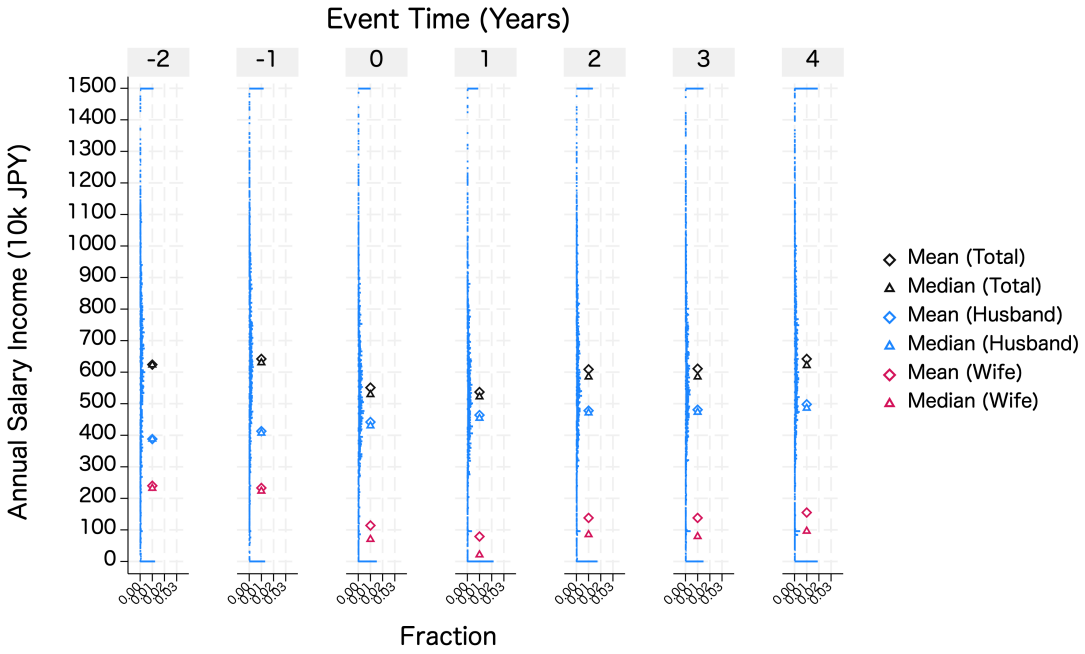


Figure 5: Earnings Distribution of Household, Men and Women

Note: This figure shows the income distribution of household, men and women from two years before childbirth to four years after childbirth using the data from seven municipalities data (long-term sample). For household/individuals with annual salary income exceeding 15 million yen, income is capped at 15 million yen.

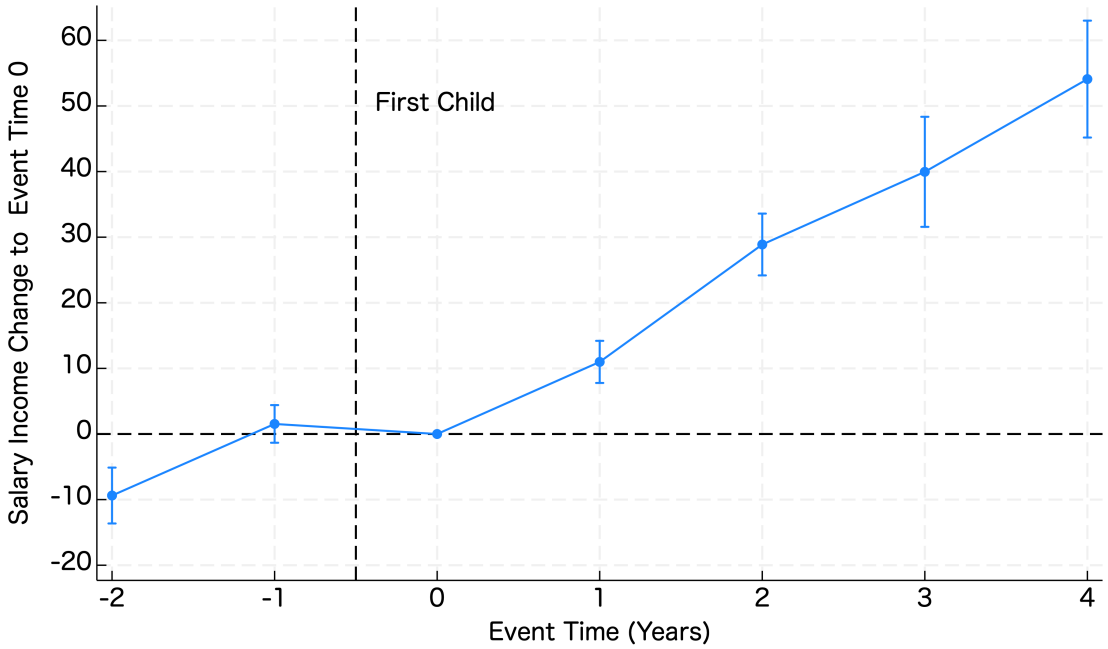


Figure 6: Earnings Growth for Men with Children

Note: This figure shows the average difference in salary income for men with and without children. The estimated coefficients are presented with 95% confidence intervals based on robust standard errors clustered at each municipality.

Table 1: Summary Statistics

	Short-sample		Long-sample	
	Men	Women	Men	Women
Employment Rate (%) at $t = -2$	92.7	90.9	92.5	89.2
	[25.9]	[28.7]	[26.3]	[31.0]
Salary Income (10k JPY) at $t = -2$	412.4	264.7	392.7	240.0
	[253.5]	[190.6]	[224.9]	[175.5]
Age at $t = -2$	32.1	30.5	31.6	29.8
	[5.9	[5.2]	[6.0]	[5.5]
N. of Individuals	19,336	19,467	11,949	12,158
N. of Individual $\times$ Years	96,680	97,335	81,502	82,757
N. of Cities	16	16	7	7

Note: This table shows the average employment rate and wage income for men and women two years before childbirth. t represents event time, with $t = 0$ corresponding to the time of childbirth.The values in brackets indicate the standard deviation. The short-sample includes data from 16 municipalities covering the period from 2018 to 2022, while the long-sample includes data from 7 municipalities covering the period from 2016 to 2022.

Table 2: Summary Statistics of Long-sample by Observed Spells

	Whole analysis sample	Complete spell sample
	(1)	(2)
Women		
Income at t-2	240.0 [175.5]	230.8 [168.4]
Age at birth	31.8 [5.5]	31.8 [5.6]
Sample size	12,158	3,027
Income at t+2	139.5 [166.4]	140.1 [161.9]
% having second child at t+2	29.1 [45.4]	28.4 [45.1]
% living with spouse at t+2	90.2 [29.7]	89.7 [30.4]
Age at birth	31.7 [5.5]	31.8 [5.6]
Sample size	9,504	3,027
Men		
Income at t-2	392.7 [224.9]	373.7 [200.6]
Age at birth	33.6 [6.0]	33.7 [6.0]
Sample size	11,949	2,918
Income at t+2	473.4 [277.6]	461.6 [216.2]
% having second child at t+2	32.2 [46.7]	31.8 [46.6]
% living with spouse at t+2	98.0 [13.9]	97.5 [15.5]
Age at birth	33.6 [6.0]	33.7 [6.0]
Sample size	9,195	2,918

Note: This table summarizes the descriptive statistics for the two years before and after childbirth in our main analysis sample, the long sample. The sample includes data from 7 municipalities covering the period from 2016 to 2022. The analysis sample includes individuals who meet the sample restrictions, while complete spell refers to those observed in the data for all seven years.

Appendix

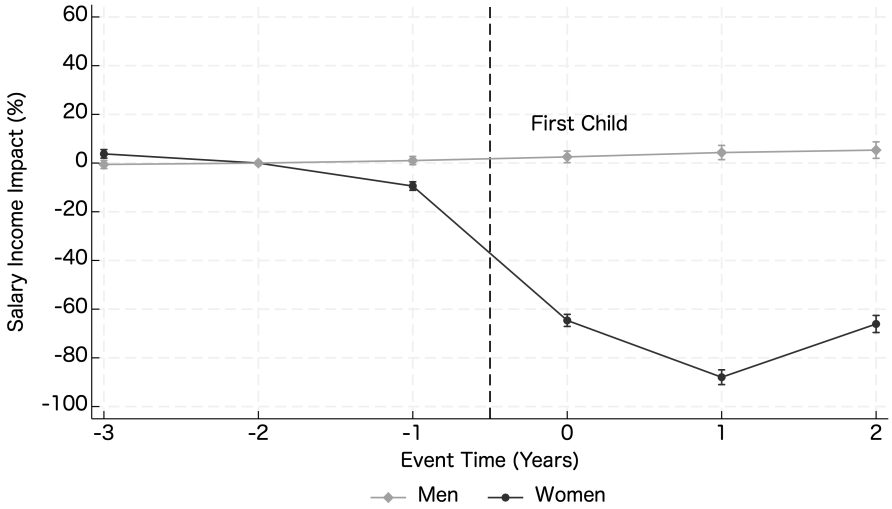
A Identification of parent-child relationships

First, we limited our sample to households whose members younger than 15 years as of January 1st of each year were either children or grandchildren of the household heads. We excluded households with children and grandchildren younger than 15 years. Furthermore, households with multiple adult children and grandchildren younger than 15 years were excluded. The remaining sample constitutes 99.4% of all households with members younger than 15 years.

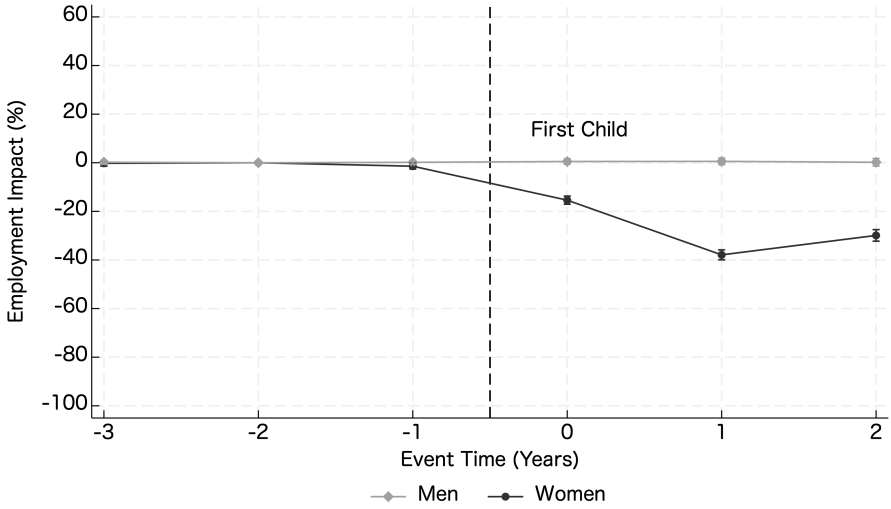
For these households, we set the birth year of the oldest child as the year of first childbirth. We assume that, for households with children of household heads, the head and their spouse are the fathers and mothers of the children. Similarly, for households with grandchildren as the household head, the (adult) child of the head and their spouse are assumed to be the parents of the grandchildren.

We restrict the sample to parents for whom data are available before and after the birth of their first child. This implies that the oldest child is born after the first year of data collection (2016 for the long-term sample and 2018 for the short-term sample). Thus, although we cannot completely preclude the possibility that siblings older than 15 years are ignored, such cases are limited.

B Figures



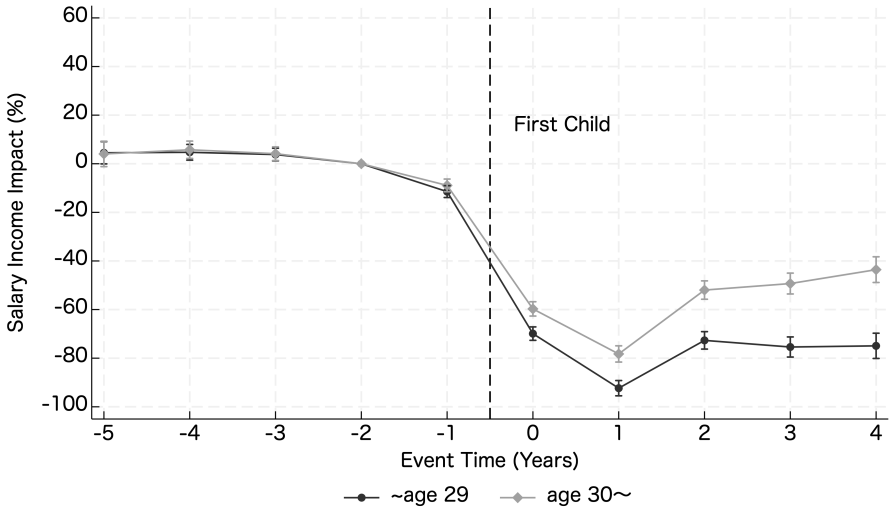
(a) Impact on Salary Income



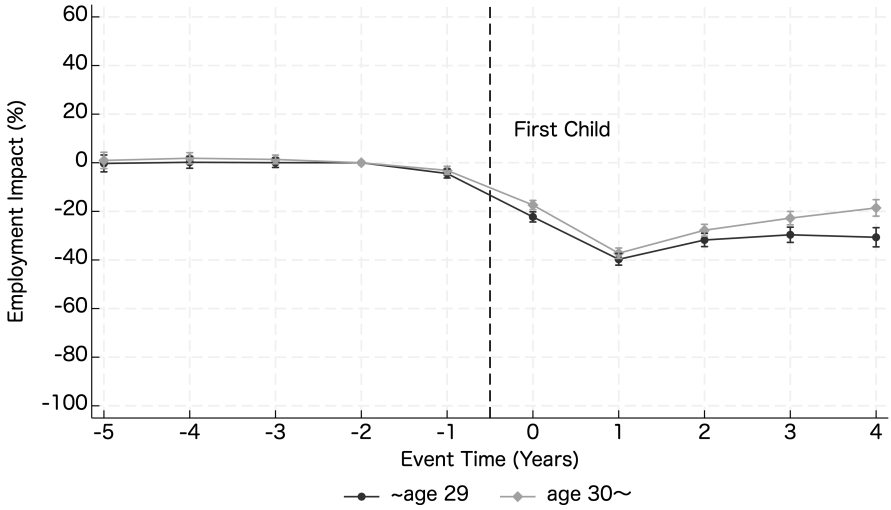
(b) Impact on Employment

Figure B1: Changes in Salary Income and Employment Rates Around Childbirth Using Short-term Sample

Note: The graphs show event time coefficients estimated from equation in the Section 3.1 using the data from 16 municipalities data (short-term sample). The estimated coefficients are presented with 95% confidence intervals based on robust standard errors clustered at each municipality.



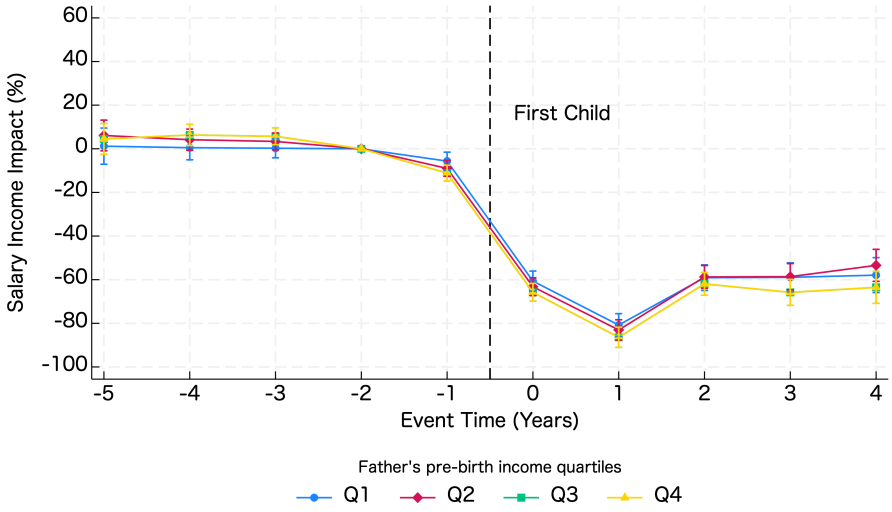
(a) Impact on Salary Income



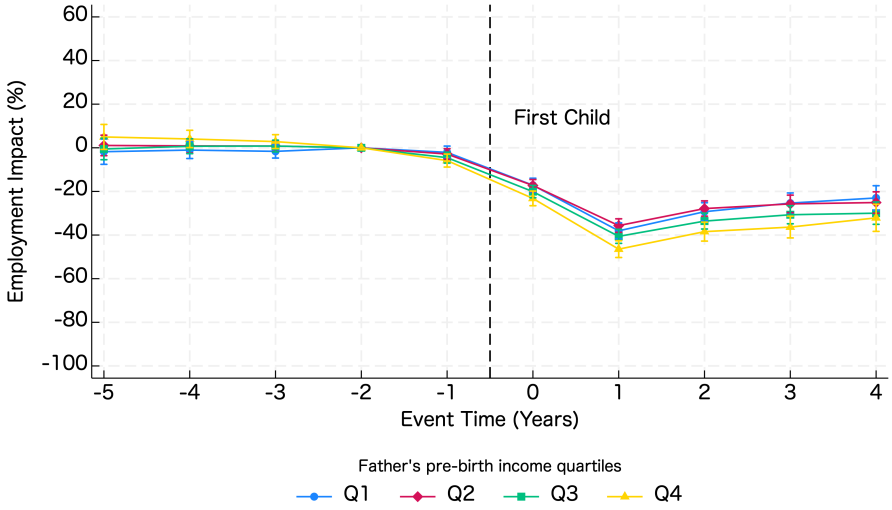
(b) Impact on Employment

Figure B2: Changes in Salary Income and Employment Rates Around Childbirth by the Age of Women

Note: The graphs show event time coefficients estimated from equation in the Section 3.1 by the age of women at childbirth using the data from seven municipalities data (long-term sample). The estimated coefficients are presented with 95% confidence intervals based on robust standard errors clustered at each municipality.



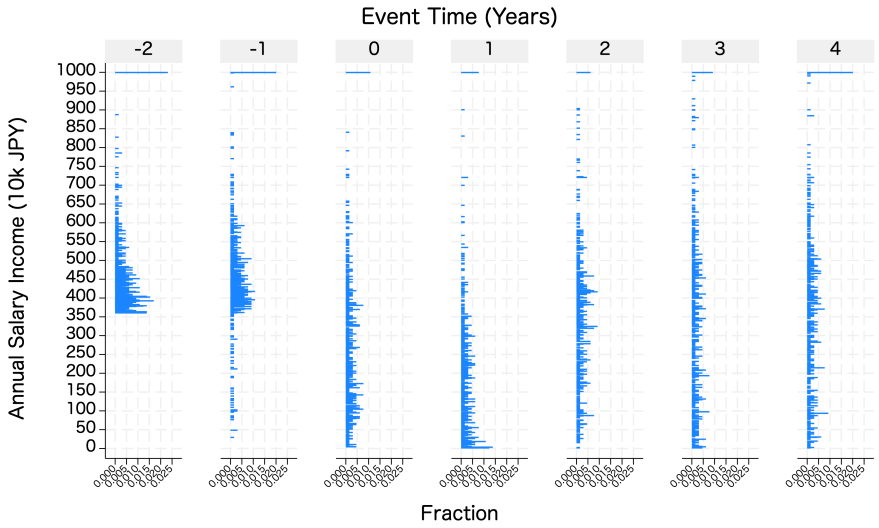
(a) Impact on Salary Income



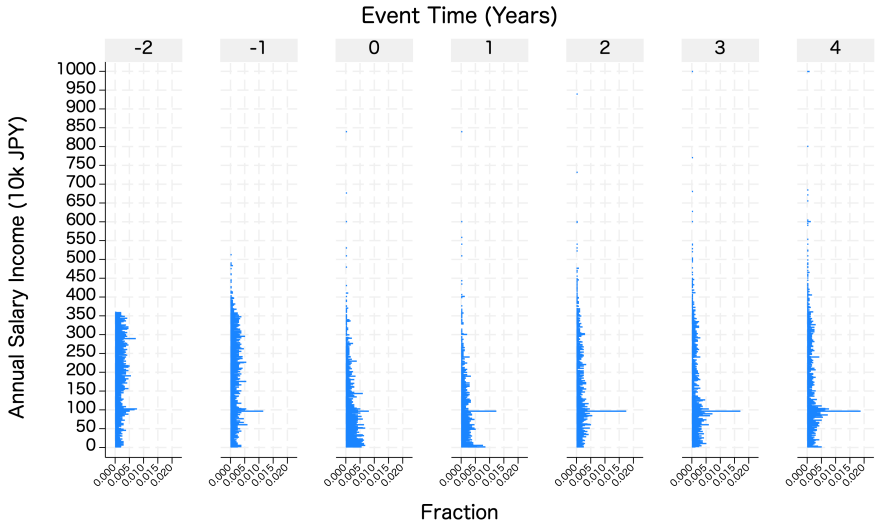
(b) Impact on Employment

Figure B3: Changes in Salary Income and Employment Rates Around Childbirth by Spousal Income Level

Note: The graphs show event time coefficients estimated from equation in the Section 3.1 by the age of women at childbirth using the data from seven municipalities data (long-term sample). Spousal income level is defined by the income quartile of men within the municipality at t = -2. The estimated coefficients are presented with 95% confidence intervals based on robust standard errors clustered at each municipality.



(a) High Pre-Birth Income Group



(b) Low Pre-Birth Income Group

Figure B4: Earnings Distribution of Women by Pre-Birth Income Group

Note: This figure shows the income distribution of women from two years before childbirth to four years after childbirth using the data from seven municipalities data (long-term sample). We defined individuals with a pre-birth income of 3.6 million yen (approximately the 75th percentile) two years before childbirth as the high-income group, while those with lower incomes were classified as the low-income group. For individuals with annual salary income exceeding 10 million yen, income is capped at 10 million yen. Additionally, as the proportion of women with zero income is much higher compared with other categories, those with zero income are excluded from the figure.

C Tables

Table C1: Sample Construction

	Short-sample		Long-sample	
	Men	Women	Men	Women
1. First birth at 2017–21 (short) / 2015–21 (long)	100,103	109,289	41,369	46,503
1′. Among (1), first birth aged from 15 - 49 for women	-	109,167	-	46,439
2. Among (1), Observed $t \leq -2$	68,749	75,195	30,419	34,253
3. Among (2), Observed $t \geq 1$	22,295	22,731	13,342	13,766
4. Among (3), Observed in total ≥ 5 years	19,689	19,468	12,455	12,663
(5. Among (3), Observed at $t = -2$)	19,336	19,467	11,949	12,158

Note: This table summarizes the process of sample construction from the raw tax data. t represents event time, with $t = 0$ corresponding to the time of childbirth. The short-sample includes data from 16 municipalities covering the period from 2018 to 2022, while the long-sample includes data from 7 municipalities covering the period from 2016 to 2022.

Table C2: Differences in parental characteristics by inter-city migration

	Analysis sample	Moved in
	(1)	(2)
Women		
Income at t+2	139.52 [166.39]	107.36 [159.75]
% having second child at t+2	0.29 [0.45]	0.34 [0.47]
% living with spouse at t+2	0.90 [0.30]	0.92 [0.27]
Age at birth	31.74 [5.48]	30.16 [5.51]
Sample size	9,504	3,787
Men		
Income at t+2	473.37 [277.65]	504,00 [278.41]
% having second child at t+2	0.33 [0.61]	0.34 [0.47]
% living with spouse at t+2	0.98 [0.14]	0.99 [0.12]
Age at birth	33.61 [6.01]	32.25 [5.81]
Sample size	9,195	2,686

Note: "Moved in" include individuals who were observed in the year when the child turned two ($t + 2$), but not observed two year before the birth. The sample size of the analysis sample at $t + 2$ is smaller than that at $t - 2$ because the analysis sample include those who had child in 2020 thus observed only up to $t + 1$. We refer to the long sample derived from the seven municipalities as the Analysis Sample.

Table C3: Proportion of having the second child

	Short-sample (1)	Long-sample (2)
t = 1	6.0%	7.2%
t = 2	27.0%	29.1%
t = 3		47.0%
t = 4		55.8%

Note: This table shows the proportion of women who have had another child after the birth of their first child. t represents event time, with $t = 0$ corresponding to the time of childbirth. The short-sample includes data from 16 municipalities covering the period from 2018 to 2022, while the long-sample includes data from 7 municipalities covering the period from 2016 to 2022.