

**Special Report on**  
**the Longitudinal Survey of Newborns in the 21st Century**  
**and the Longitudinal Survey of Adults in the 21st Century:**  
**Ten-Year Follow-up, 2001–2011**

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# I About This Report

## 1. Introduction

This special report presents causal inference analysis on the behavioral change of young adults with respect to their employment, marriage, and childbirth in and after the 2000s, while taking advantage of longitudinal surveys that enable us to follow the same individuals.

The data used are “The Longitudinal Survey of Newborns in the 21st Century (2001 Cohort)” and “The Longitudinal Survey of Adults in the 21st Century (2002 Cohort).” Both surveys have accumulated 10 years worth of data since the initiation of the surveys. “Chapter 4: Work-Life Balance and Transition to Second Birth” of “III Summary of Results” is based on analyses of the “Longitudinal Survey of Newborns in the 21st Century (2001 Cohort), while findings presented in the rest of the report are from the “Longitudinal Survey of Adults in the 21st Century (2002 Cohort).”

Analyses in this report were conducted in cooperation with the National Institute of Population and Social Security Research (NIPSSR). “Chapter 1: Employment and Marriage/Childbearing Intentions of Young Adults”, “Chapter 5: Achievement of Intended Number of Children”, and “Appendix: Effects of the 2005 Revision of the Child Care and Family Care Leave Act on Female Labor Participation and Child Birth” were prepared in collaboration with Dr. Tadashi Sakai (Senior Researcher, Department of Theoretical Social Security Research, NIPSSR), Ms. Rie Moriizumi (Senior Researcher, Department of Population Dynamics Research, NIPSSR) and Dr. Haruko Noguchi (Professor, Faculty of Political Science and Economics, Waseda University), respectively\*.

In principle, figures present numerical values that are statistically significant at the .05 level or less. Details on the values presented in each figure are described at the end of each Chapter.

\*Titles and affiliations of the collaborators are as of 1<sup>st</sup> April 2013.

## II Outline of Surveys

### 1. Longitudinal Survey of Newborns in the 21st Century (2001 Cohort)

(1) Objective

This longitudinal survey, which follows the same subjects over the years, was launched in 2001. By continuously observing changes over time of children born in the first year of the 21st century, the survey aims to obtain basic data for use in the planning and implementation of policies in dealing with the declining birthrate, sound upbringing of children, and other issues.

(2) Survey subjects

The survey covers children born between January 10 and 17, 2001, and between July 10 and 17, 2001, nationwide. The Ministry of Health, Labour and Welfare sampled the subjects based on the live birth forms from the Vital Statistics. In the case of twins and triplets, both siblings were surveyed individually.

(3) Survey date

1st through 6th wave surveys were conducted on August 1 for infants born in January, and on February 1 for those born in July.

Since the 7th wave survey, the survey was conducted on January 18 for infants born in January, and on July 18 for those born in July.

(4) Survey items

The survey includes topics such as the employment status of the mother, time spent with the child, burdens and anxieties of parenting, benefits of parenting, child-rearing expenses, bedtime, lessons, etc.

(5) Survey method

Questionnaires were distributed and collected by mail.

### 2. Longitudinal Survey of Adults in the 21st Century (2002 Cohort)

(1) Objective

The objective of this survey is to continuously observe marriage, childbirth, employment, etc., of sampled men and women, and changes in people's attitudes over the years, and thereby obtain basic data for planning, implementation of health, welfare, and labor administrative policies such as measures for fertility decline. This survey has been conducted annually since its first implementation in 2002.

(2) Survey subjects

The target of this survey are men and women (and their spouses) nationwide who were within the age range of 20–34 years at the end of October 2002. Survey respondents were extracted by the Ministry of Health, Labour and Welfare based on the "Comprehensive Survey of Living Conditions".

(3) Survey date

Once every year (in principle, the first Wednesday of November)

(4) Type of questionnaire

(a) Male questionnaire, (b) Female questionnaire

Men and women who were within the age range of 20–34 years at the end of October in 2002 have filled out the questionnaires.

(c) Spouse questionnaire (for men), (d) Spouse questionnaire (for women)

[1] Persons, who were the spouses of respondents of the male questionnaire or female questionnaire at the time of the 1st wave survey and were either 19 years of age or younger, or 35 years or older, have filled out the questionnaire.

[2] Persons, who have newly become spouses of respondents of the male questionnaire and female questionnaire after the 2nd wave survey, have filled out the questionnaire.

(5) Survey items

The survey covers employment status, income, marital status, views on children, time spent on housework and child-care, whether parents coreside, and, support system for balancing work and child-care, etc.

(6) Survey method

In the 1st through 8th waves of the survey, enumerators handed out and collected questionnaires. Since the 9th wave of the survey, questionnaires were distributed and collected by mail.

### III Summary of Results

#### Chapter 1 Employment and Marriage/Childbearing Intentions of Young Adults

Destabilization of youth employment is often considered to be responsible for the declining marriage and childbearing intentions among young adults in recent years. In particular, employment immediately following school graduation is considered to affect both subsequent employment and intentions to form a family. In this Chapter, job mobility and intentions of family formation (intention to marry and intention to have children) are examined in relation to employment status of young adults. Data used for the analyses are 1st through 10th waves of the “Longitudinal Survey of Adults in the 21st Century.” Descriptive statistics of the variables used in the following analyses are presented in Table 1-1 at the end of the chapter.

##### 1. Employment status and job separation rate

- *Even after controlling for unobserved individual factors, job separation rates of unmarried men and women who work as non-regular employees are significantly higher compared to those who work as regular employees.*

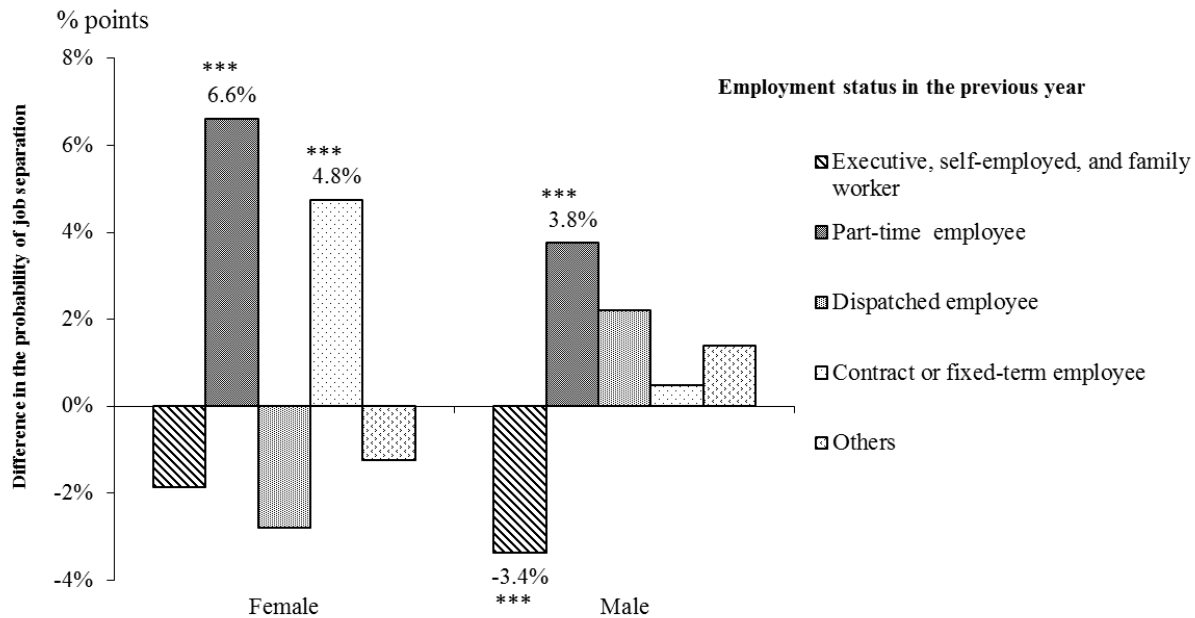
Taking advantage of the longitudinal survey, we calculated job separation rates (the proportion of persons who left their jobs within the past 1 year) and found that the job separation rate of persons who worked as non-regular employees was evidently higher than that of persons who worked as regular employees. However, age and economic situation affect employment. It is also possible that persons with less motivation to work may choose non-regular employment. Therefore, we conducted multivariate panel analysis of job separation controlling for age, period and unobserved individual heterogeneities.

It was found that, even after controlling for the factors described above, the probability of leaving their jobs within a year was significantly higher for part-time workers (Figure 1-1). Among women, the probability of leaving a job within 1 year was 7 percent points (pp) higher for part-time workers and 5 pp higher for contract employees and fixed-term employees than for regular employees. Among men, the probability of leaving a job within 1 year was 4 pp higher for part-time workers than for regular employees.

According to analysis of reasons for leaving jobs, however, the probability of non-regular employees leaving jobs for involuntary reasons (e.g., bankruptcy or layoff) was not higher compared to regular employees (see Table 1-2).

Figure 1-1 Difference in job separation rates by employment status in the previous year:  
unmarried men and women

(Percentages shown below are differences in probability of job separation between those in a given employment type and those in regular employment.)



Note: 1) Based on Table 1-2. Results are based on a fixed-effect linear-probability model, which controls for age, period and duration of employment.

2) Statistical significance level: \*\*\* 1%, \*\* 5% (regular employee as reference)

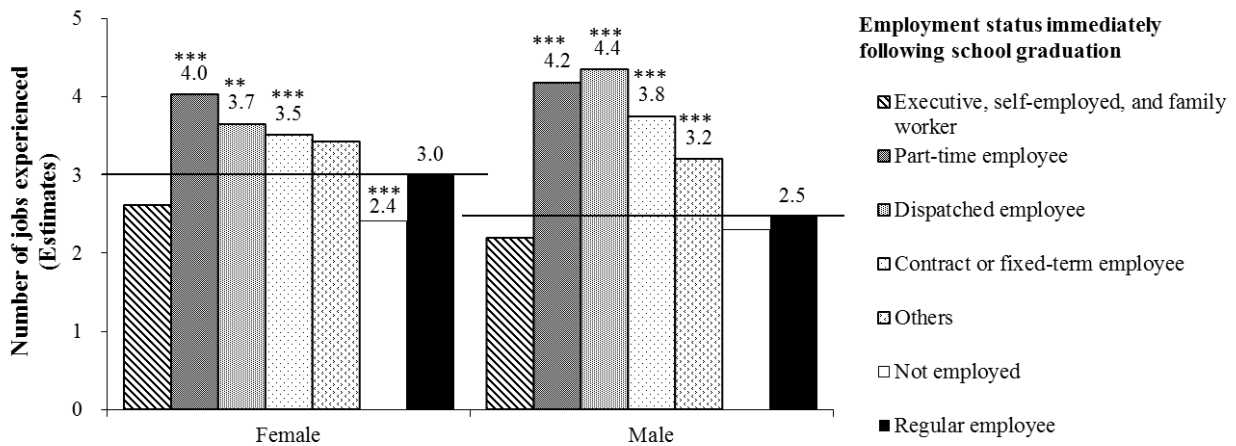
## 2. Type of first employment and frequency of job change

- When one's first employment is a regular employment, they tend to stay in the same job; however, when one's first employment is a non-regular employment, they tend to change jobs several times after that.

In order to identify the relationship between first employment (type of employment immediately following school graduation) and job change, the number of jobs experienced since graduating was counted. It was found that the number of jobs experienced in the past was only 1 for most men and women whose first employment was a regular employment, but the most frequent number (mode) of jobs experienced was 2 for both men and women whose first employment was a non-regular employment.

Multivariate analysis results controlling for marital status and time since school graduation showed that the number of jobs experienced since graduation was significantly higher when the first employment was a non-regular employment compared to when the first employment was a regular employment (Figure 1-2). For example, the average number of jobs ever had was 3 for women and 2.5 for men when their first employment was a regular employment, but the number was about 4 for both men and women when they worked as a part-time employee immediately after graduation. Those whose first employment was a regular employee tended to stay in the same job, but those who were employed as a non-regular employee as their first job were more likely to change jobs several times. It is also shown in Figure 1-2 that the number of jobs since graduation was significantly less for women who were not employed for 1 year or longer immediately after school graduation.

Figure 1-2 Type of first employment and number of subsequent jobs experienced:  
unmarried men and women



- Note: 1) Based on the model without education level presented in Table 1-3. The results are based on a Poisson regression model, in which the number of jobs experienced since graduation is regressed on duration since school graduation and marital status. The analytical sample consists of those who consecutively responded to the 1st through the 10th survey and were age 30 or older at the time of the 10th survey.
- 2) The number of jobs experienced is an estimated mean value obtained for unmarried men and women who have spent an average number of years since graduation.
- 3) Statistical significance level: \*\*\* 1%, \*\* 5% (Regular employees as reference)

### 3. Employment status and marriage intention

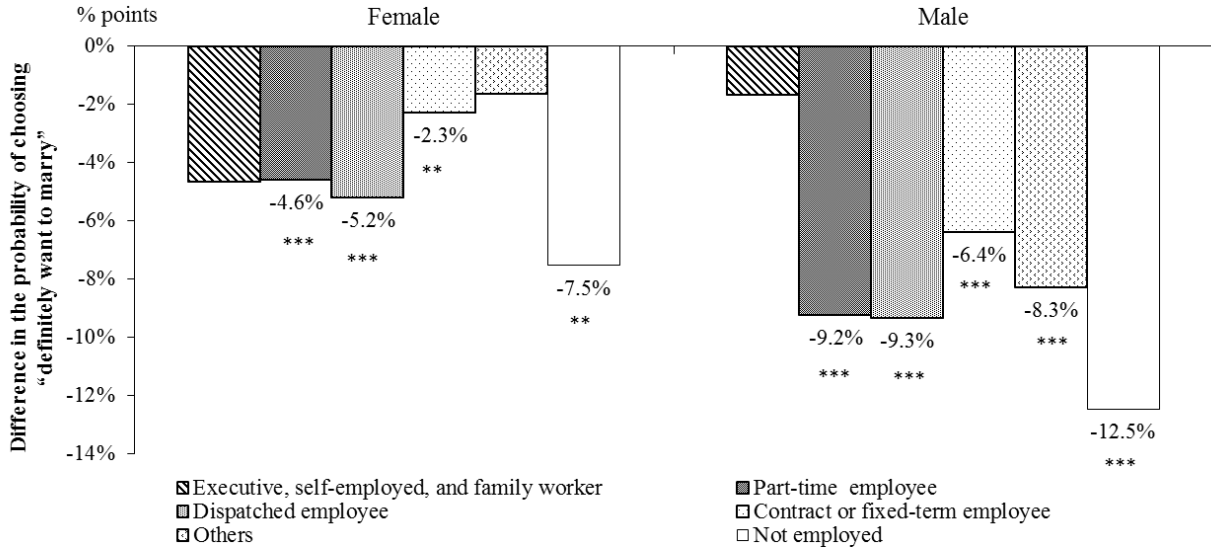
- *Controlling for various factors, men and women who work as non-regular employees are less motivated to marry than those who work as regular employees.*

Controlling for various factors such as education level and age, non-regular employees were less motivated to marry than regular employees (Figure 1-3). Among non-employed persons, motivation to marry was even lower. For example, for non-employed men, the probability that they “definitely want to marry” was more than 10 percentage points lower than for men in regular employment.



Figure 1-3 Employment status and marriage intention: unmarried men and women

(Difference in the probability of responding "definitely want to marry" between those in the following types of employment and those in regular employment)



- Note: 1) Based on Table 1-4. Results are based on an ordered logit model, which controls for education level, age, and period. Selection bias may arise from the fact that marriage intention is obtained from unmarried persons only. This selection bias is accounted for in the model.  
 2) Statistical significance level: \*\*\* 1%, \*\* 5% (regular employees as reference)

However, in the Figure above, the possibility that those with low intentions to marry tend to become non-regular employees cannot be ruled out. To account for this, to some extent, fixed-effect estimation was conducted controlling for unobserved factors that may simultaneously affect intentions to marry and selection of employment type (see Table 1-5). It was found that changes in employment type did not significantly affect the marriage intention of women; however, for men, marriage intentions became significantly lower when their employment status changed from a regular employment to a non-regular employment or unemployed. Therefore, for men, changes in employment status directly affect their marriage intentions. For women, those with low marriage intentions tend to choose to work as a non-regular employee.

Table 1-1 Descriptive statistics of variables

**Analysis on the probability of job separation**

Females (Number of observations: 13,618)

	N	%	
Job separation	2,825	20.74	
Job separation due to bankruptcy or layoff	121	0.89	
Job separation due to expiration of the contract term	289	2.12	
Employment status in the previous year			
Regular employees	7,842	57.59	
Company executives, self-employed, family business workers	418	3.07	
Part-time employees	2,897	21.27	
Dispatched employees	954	7.01	
Contract and fixed-term employees	1,236	9.08	
Others	271	1.99	
	Average	Minimum value	Maximum value
Duration of continuous employment (Years)	5.02	0	22
Age	28.78	22	42

**Analysis on the number of jobs experienced in the past**

Females (Number of observations: 4,530)

	Average	Minimum value	Maximum value
Number of jobs experienced in the past	3.16	0	17
	N	%	
Employment status at the time of school graduation			
Regular employees	3,307	73.00	
Company executives, self-employed, family business workers	64	1.41	
Part-time employees	420	9.27	
Dispatched employees	23	0.51	
Contract and fixed-term employees	159	3.51	
Others	69	1.52	
Not employed	488	10.77	
Education level			
Junior high school	112	2.47	
High school	1,600	35.32	
Technical college/Junior college	1,997	44.08	
University/Graduate school	814	17.97	
	Average	Minimum value	Maximum value
Year of birth	1973.43	1967	1981
Duration since school graduation	17.69	8.08	28.67
	N	%	
Unmarried (at the 10th survey)	1,071	23.64	

**Analysis on the probability of being in regular employment**

Females (Number of observations: 67,830)

	N	%	
Regular employment	22,621	33.35	
First job was a regular employment	48,023	70.80	
	Average	Minimum value	Maximum value
Duration since school graduation	12.19	0.00	28.67
	N	%	
Education level			
Technical college/Junior college	26,391	38.91	
Technical college/Junior college	29,805	43.94	
University/Graduate school	11,634	17.15	
Unmarried (at the 10th survey)	27,218	40.13	
	Average	Minimum value	Maximum value
Duration since school graduation	12.19	0.00	28.67
Unemployment rate at the time of school graduation	3.21	2.20	5.10

Males (Number of observations: 14,218)

	N	%	
Job separation	2,234	15.71	
Job separation due to bankruptcy or layoff	121	0.85	
Job separation due to expiration of the contract term	101	0.71	
Employment status in the previous year			
Regular employees	9,358	65.82	
Company executives, self-employed, family business workers	1,309	9.21	
Part-time employees	2,250	15.83	
Dispatched employees	364	2.56	
Contract and fixed-term employees	668	4.70	
Others	269	1.89	
	Average	Minimum value	Maximum value
Duration of continuous employment (Years)	6.14	0	25
Age	29.60	22	43

Males (Number of observations: 3,467)

	Average	Minimum value	Maximum value
Number of jobs experienced in the past	2.42	0	13
	N	%	
Employment status at the time of school graduation			
Regular employees	2,472	71.30	
Company executives, self-employed, family business workers	163	4.70	
Part-time employees	284	8.19	
Dispatched employees	14	0.40	
Contract and fixed-term employees	56	1.62	
Others	50	1.44	
Not employed	428	12.34	
Education level			
Junior high school	185	5.34	
High school	1,418	40.90	
Technical college/Junior college	731	21.08	
University/Graduate school	1,126	32.48	
	Average	Minimum value	Maximum value
Year of birth	1973.18	1967	1981
Duration since school graduation	17.60	8.58	28.67
	N	%	
Unmarried (at the 10th survey)	1,141	32.91	

Males (Number of observations: 55,296)

	N	%	
Regular employment	38,358	69.37	
First job was a regular employment	38,223	69.12	
	Average	Minimum value	Maximum value
Duration since school graduation	11.98	0.08	28.67
	N	%	
Education level			
Technical college/Junior college	26,815	48.49	
Technical college/Junior college	11,859	21.45	
University/Graduate school	16,622	30.06	
Unmarried (at the 10th survey)	28,162	50.93	
	Average	Minimum value	Maximum value
Duration since school graduation	11.98	0.08	28.67
Unemployment rate at the time of school graduation	3.27	2.00	5.50

Table 1-1 continued

**Selection function of being unmarried**

Females (Number of observations: 45,565)			
	N	%	
Unmarried	18,553	40.72	
Employment status			
Regular employees	15,056	33.04	
Company executives, self-employed, family business workers	1,953	4.29	
Part-time employees	10,563	23.18	
Dispatched employees	1,671	3.67	
Contract and fixed-term employees	2,324	5.10	
Others	932	2.05	
Not employed	13,066	28.68	
Education level			
Junior high school	1,311	2.88	
High school	15,936	34.97	
Technical college/Junior college	18,987	41.67	
University/Graduate school	9,225	20.25	
	Average	Minimum value	Maximum value
Age	31.95	18	45
	N	%	
Separated from father by death	4,987	10.94	
Separated from mother by death	1,902	4.17	

**Analysis on marriage intention (Ordered logit model)**

Females (Number of observations: 18,553)			
	Average	Minimum value	Maximum value
Marriage intention (5 levels)	3.94	1	5
	N	%	
Employment status			
Regular employees	9,482	51.11	
Company executives, self-employed, family business workers	529	2.85	
Part-time employees	3,454	18.62	
Dispatched employees	1,120	6.04	
Contract and fixed-term employees	1,387	7.48	
Others	330	1.78	
Not employed	2,251	12.13	
Education level			
Junior high school	365	1.97	
High school	4,976	26.82	
Technical college/Junior college	8,101	43.66	
University/Graduate school	5,057	27.26	
	Average	Minimum value	Maximum value
Age	28.73	20	43
Inverse Mills ratio	0.73	0.00	2.63

**Analysis on marriage intention (Panel estimation)**

Females (Number of observations: 20,332)			
	N	%	
Marriage intention (Binary variables)	14,337	70.51	
Employment status			
Regular employees	10,278	50.55	
Company executives, self-employed, family business workers	603	2.97	
Part-time employees	3,857	18.97	
Dispatched employees	1,188	5.84	
Contract and fixed-term employees	1,516	7.46	
Others	363	1.79	
Not employed	2,527	12.43	
	Average	Minimum value	Maximum value
Age	28.65	20	43

**Analysis on childbearing intention (Panel estimation)**

Females (Number of observations: 19,645)			
	N	%	
Childbearing intention (Binary variables)	13,559	69.02	
Employment status			
Regular employees	9,981	50.81	
Company executives, self-employed, family business workers	586	2.98	
Part-time employees	3,727	18.97	
Dispatched employees	1,154	5.87	
Contract and fixed-term employees	1,453	7.40	
Others	348	1.77	
Not employed	2,396	12.20	
	Average	Minimum value	Maximum value
Age	28.60	20	43

Males (Number of observations: 41,050)			
	N	%	
Unmarried	19,473	47.44	
Employment status			
Regular employees	27,860	67.87	
Company executives, self-employed, family business workers	5,027	12.25	
Part-time employees	2,774	6.76	
Dispatched employees	529	1.29	
Contract and fixed-term employees	1,136	2.77	
Others	531	1.29	
Not employed	3,193	7.78	
Education level			
Junior high school	2,452	5.97	
High school	16,306	39.72	
Technical college/Junior college	8,013	19.52	
University/Graduate school	14,179	34.54	
	Average	Minimum value	Maximum value
Age	32.56	19	45
	N	%	
Separated from father by death	5008	12.20	
Separated from mother by death	1744	4.25	

Males (Number of observations: 19,473)			
	Average	Minimum value	Maximum value
Marriage intention (5 levels)	3.79	1	5
	N	%	
Employment status			
Regular employees	11,286	57.96	
Company executives, self-employed, family business workers	1,463	7.51	
Part-time employees	2,466	12.66	
Dispatched employees	379	1.95	
Contract and fixed-term employees	746	3.83	
Others	304	1.56	
Not employed	2,829	14.53	
Education level			
Junior high school	994	5.10	
High school	6,998	35.94	
Technical college/Junior college	4,050	20.80	
University/Graduate school	7,366	37.83	
	Average	Minimum value	Maximum value
Age	29.33	20	43
Inverse Mills ratio	0.59	0.00	2.26

Males (Number of observations: 22,637)			
	N	%	
Marriage intention (Binary variables)	14,476	63.95	
Employment status			
Regular employees	12,988	57.38	
Company executives, self-employed, family business workers	1,756	7.76	
Part-time employees	2,866	12.66	
Dispatched employees	453	2.00	
Contract and fixed-term employees	861	3.80	
Others	368	1.63	
Not employed	3,345	14.78	
	Average	Minimum value	Maximum value
Age	29.30	20	43

Males (Number of observations: 20,902)			
	N	%	
Childbearing intention (Binary variables)	13,302	63.64	
Employment status			
Regular employees	12,078	57.78	
Company executives, self-employed, family business workers	1,586	7.59	
Part-time employees	2,699	12.91	
Dispatched employees	416	1.99	
Contract and fixed-term employees	787	3.77	
Others	328	1.57	
Not employed	3,008	14.39	
	Average	Minimum value	Maximum value
Age	29.15	20	43

Table 1-2 Panel estimation of probability of job separation (Unmarried persons)

Explanatory variables:	Job separation		Job separation due to bankruptcy or layoff		Job separation due to expiration of the contract	
	Females	Males	Females	Males	Females	Males
Employment status in the previous year						
Regular employees	-	-	-	-	-0.009	-0.009 ***
Company executives, self-employed, family business workers	-0.019	-0.034 **	-0.003	0.010	-0.019	-0.008 **
Part-time and temporary employees	0.066 ***	0.038 ***	0.005 **	-0.009 **	-	-
Dispatched employees	-0.028	0.022	0.002	-0.018 **	0.031 ***	0.040 ***
Contract and fixed-term employees	0.048 ***	0.005	0.000	-0.006	0.039 ***	0.019 ***
Others	-0.012	0.014	-0.009	-0.008	0.028 **	0.024 ***
Constant	0.907 ***	0.752 ***	0.070	0.016	0.070 **	-0.030
Duration of continuous employment (dummy)	Yes	Yes	Yes	Yes	Yes	Yes
Age (dummy)	Yes	Yes	Yes	Yes	Yes	Yes
Period (dummy)	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	13,618	14,218	13,618	14,218	13,618	14,218
Estimation model	Fixed-effect model	Fixed-effect model	Random-effect model	Fixed-effect model	Fixed-effect model	Random-effect model

1) Regression coefficients are displayed. Estimation is made by means of a linear probability model.

2) “Regular employees” is used as reference for employment status. (“Part-time employees” is used as reference for the analysis of “job separation due to expiration of the contract period.” The estimation above is possible, because there are some “regular employees” who separate from jobs due to expiration of the contract period.)

3) Level of statistical significance: \*\*\* 1%, \*\* 5%, \* 10%.

Table 1-3 Poisson regression model of the number of jobs experienced in the past

Explanatory variables:	Number of jobs experienced in the past after school graduation (Poisson regression model)			
	Females	Males	Females	Males
Employment status immediately following school graduation				
Regular employees (reference)	-	-	-	-
Company executives, self-employed, family business workers	-0.133	-0.117	-0.133	-0.147 **
Part-time employees	0.299 ***	0.528 ***	0.291 ***	0.485 ***
Dispatched employees	0.201 **	0.568 ***	0.249 ***	0.572 ***
Contract and fixed-term employees	0.162 ***	0.419 ***	0.187 ***	0.432 ***
Others	0.137 *	0.263 ***	0.147 *	0.209 **
Not employed	-0.216 ***	-0.072	-0.227 ***	-0.137 ***
Education level				
Junior high school (reference)	-	-	-	-
High school	-	-	-0.060	-0.202 ***
Technical college/Junior college	-	-	-0.115 **	-0.223 ***
University/Graduate school	-	-	-0.185 ***	-0.360 ***
Duration since school graduation	1.000	1.000	1.000	1.000
Unmarried (dummy)	-0.008	0.138 ***	0.001	0.124 ***
Constant	0.092 ***	-0.259 ***	0.187 **	0.005
Year of birth (dummy)	No	No	Yes	Yes
Number of observations	4,530	3,467	4,530	3,467

1) Regression coefficients are displayed.

2) The sample consists of persons who responded to the 1st to 10th surveys continuously and who were 30 years of age or older at the time of the 10th survey.

3) Level of statistical significance: \*\*\* 1%, \*\* 5%, \* 10%.

Table 1-4 Ordered logit model of marriage intention

	Marriage intention			
	Ordered logit model		Ordered logit model	
	Females	Males	Females	Males
<b>Employment Status</b>				
Regular employees (reference)	-	-	-	-
Company executives, self-employed, family business workers	-0.092 ***	-0.013	-0.046 *	-0.016
Part-time employees	-0.084 ***	-0.102 ***	-0.046 ***	-0.092 ***
Dispatched employees	-0.041 ***	-0.099 ***	-0.052 ***	-0.093 ***
Contract and fixed-term employees	-0.025 **	-0.069 ***	-0.023 **	-0.064 ***
Others	-0.053 ***	-0.087 ***	-0.016	-0.083 ***
Not employed	-0.140 ***	-0.134 ***	-0.075 **	-0.125 ***
<b>Education level</b>				
Junior high school (reference)	-	-	-	-
High school	0.164 ***	0.090 ***	0.172 ***	0.092 ***
Technical college/Junior college	0.222 ***	0.120 ***	0.217 ***	0.125 ***
University/Graduate school	0.249 ***	0.150 ***	0.229 ***	0.154 ***
Inverse Mills ratio			-0.095 **	0.019
Period (dummy)	Yes	Yes	Yes	Yes
Age (dummy)	Yes	Yes	Yes	Yes
Constant 1	-3.163	-3.424	-3.385	-3.317
Constant 2	-1.723	-2.044	-1.944	-1.937
Constant 3	-0.138	-0.275	-0.358	-0.167
Constant 4	1.510	1.465	1.291	1.572
<b>Selection function of being unmarried</b>				
<b>Employment status</b>				
Regular employees (reference)	-	-	-	-
Company executives, self-employed, family business workers	-	-	-0.272 ***	-0.106 ***
Part-time employees	-	-	-0.257 ***	0.447 ***
Dispatched employees	-	-	0.079 ***	0.303 ***
Contract and fixed-term employees	-	-	-0.021 *	0.248 ***
Others	-	-	-0.226 ***	0.179 ***
Not employed	-	-	-0.420 ***	0.457 ***
<b>Education level</b>				
Junior high school (reference)	-	-	-	-
High school	-	-	-0.059 ***	0.081 ***
Technical college/Junior college	-	-	0.018	0.165 ***
University/Graduate school	-	-	0.120 ***	0.153 ***
<b>Separation by death</b>				
Father	-	-	-0.088 ***	-0.112 ***
Mother	-	-	-0.042 ***	-0.135 ***
Period (dummy)	-	-	Yes	Yes
Age (dummy)	-	-	Yes	Yes
Number of observations	18,553	19,473	45,565	42,237

1) Marginal effects are displayed. The probit model is used to estimate the selection function of being unmarried, and the ordered logit model is used to analyze marriage intention (the probability of choosing “definitely want to marry” applies to the marginal effects of the ordered logit model).

2) Age is a set of dummy variables in 3-year interval.

Table 1-5 Panel Estimation of marriage intention and childbearing intention

Explanatory variables:	Marriage Intention		Childbearing Intention	
	Females	Males	Females	Males
Employment Status				
Regular employees (reference)	-	-	-	-
Company executives, self-employed, family business workers	-0.002	-0.006	0.039	-0.014
Part-time employees	0.001	-0.065 ***	-0.020 *	-0.055 ***
Dispatched employees	-0.008	-0.003	-0.030 *	-0.029
Contract and fixed-term employees	-0.019	-0.054 ***	-0.004	-0.061 ***
Others	0.025	-0.051 *	-0.007	-0.059 **
Not employed	-0.010	-0.048 ***	-0.014	-0.049 ***
Constant	0.677 ***	0.627 ***	0.699 ***	0.643 ***
Age (dummy)	Yes	Yes	Yes	Yes
Period (dummy)	Yes	Yes	Yes	Yes
Number of observations	20,332	22,637	19,645	20,902
Estimation model	Fixed-effect model	Fixed-effect model	Fixed-effect model	Fixed-effect model

- 1) Regression coefficients are displayed. The estimation is made by means of a linear probability model.
- 2) Age is a set of dummy variables in 3-year interval.
- 3) Marriage intention is a binary variable that takes the value of 1 in the case of “Definitely want to marry” or “Want to marry.” Childbearing intention is a binary variable that takes the value of 1 in the case of “Definitely want a child” or “Want a child.”
- 4) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

## Chapter 2 Transition to First Marriage

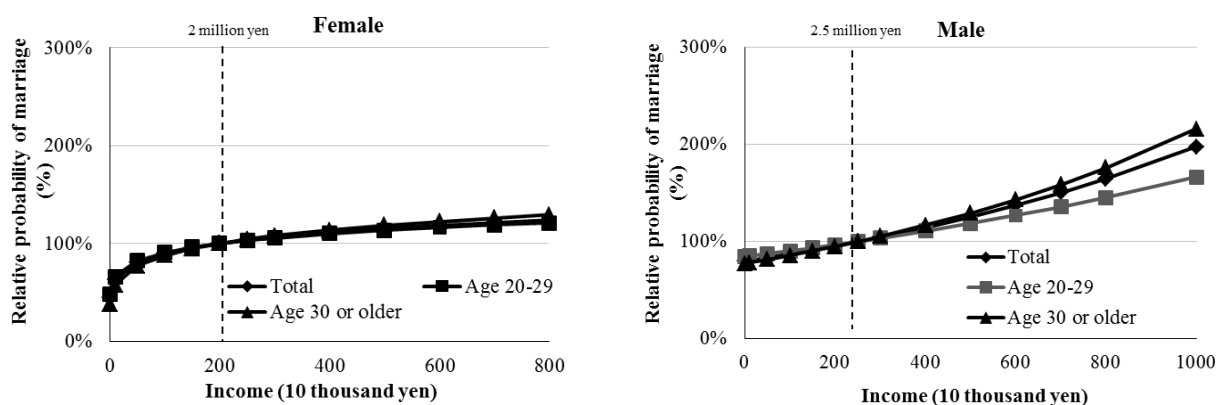
In Japan, about 98% of children are born to married couples. For this reason, trends in marriage have a substantial impact on fertility. Views on marriage have been changing since the 1990s among unmarried men and women. Young adults are increasingly expecting women's economic contribution to the family. Therefore, it is possible that economic attributes, such as educational attainment, employment status and income, have been important for marriage prospects of both men and women in the 2000s. In this Chapter, we report on the economic factors associated with marriage, based on data obtained from the 1st through 10th waves of the "Longitudinal Survey of Adults in the 21st Century." Descriptive statistics of the variables used in the following analyses are presented in Table 2-1 at the end of the chapter.

### 1. Income and marriage behavior

- Both men and women are more likely to marry if their income is high

As employment of young adults continues to be destabilized, it is important to understand the relationship between economic attributes and marriage among young adults in forecasting trends in marriage. In addition, with women expected to further participate in the labor force, examining the relationship between economic attributes of women and marriage has implications for understanding not only marriage trends but also family and marital relations. Figure 2-1 shows results on the relationship between income in the previous year and the likelihood of first marriage.

Figure 2-1 Income in the previous year and likelihood of first marriage



- Note: 1) Based on Model 2 through Model 4 of Table 2-2 and Table 2-3 for women and men respectively. Results are based on a discrete-time hazard model, controlling for age, education level, employment status, coresidence with parents, the average age at first marriage in the prefecture where the respondent resided at the time of the 1<sup>st</sup> wave of the survey, and the size of the municipality where the respondent resided at the time of the 1<sup>st</sup> wave of the survey. In estimating the hazard ratio of marriage, the interaction term between age and education level is included in the model.
- 2) To specify the function form of income, models with a linear-, quadratic- and logarithm form of income are estimated separately. Log-likelihood tests are then conducted to compare across the fit of each model. The logarithm form is chosen for all age groups of women, while the linear form is chosen for all age groups of men.
- 3) The effect of income is statistically significant at the 10% level for men aged 20-29, while the effect of income in other groups are statistically significant at the 1% level.



In Figure 2-1, assuming that the likelihood of marriage is 100% for women whose income is 2 million yen and for men whose income is 2.5 million yen, the relative difference in the likelihood of marriage (hazard ratio multiplied by 100) is calculated for different income levels. For men, the higher the income, the higher the likelihood of marriage. According to the analysis by each age group, this tendency was stronger in the age group of 30 and over than in the age group of the 20s.

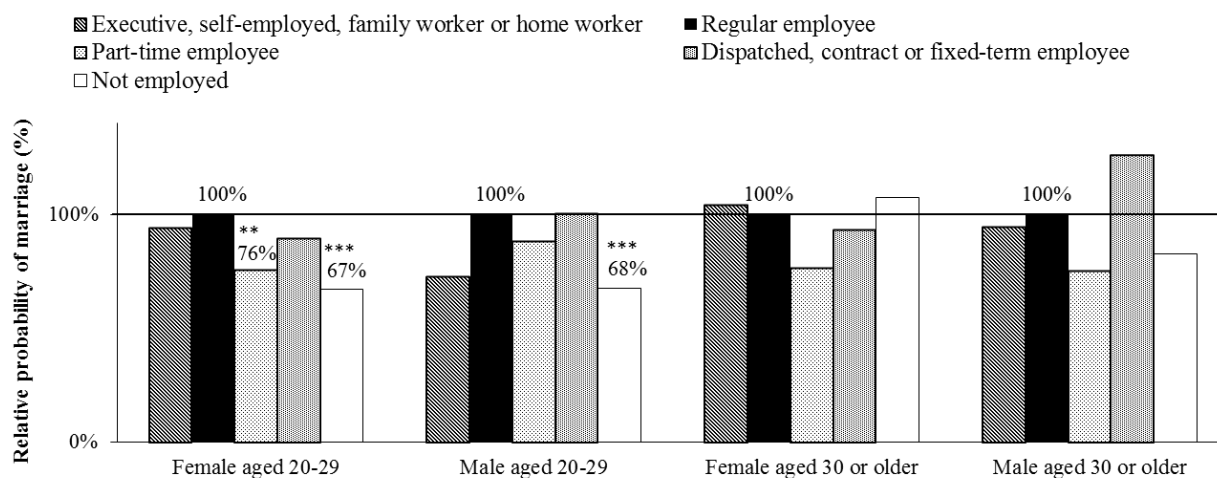
For women, the probability of marriage also increased with income, but in a different fashion compared to that of men. The relationship between income and likelihood of marriage was strongly positive for those with an income of less than 2 million yen, but the positive relationship was a moderate one for those with an income of more than 2 million yen. Also, the effect of income on marriage did not differ by age groups for women.

## 2. First employment and marriage behavior

- Men and women whose first employment status was part-time employment or non-employment tend not to marry in their 20s.

Timing of marriage may be affected not only by economic circumstances at any given time, but also by economic prospects including employment stability and salary raise. The employment status immediately following school graduation is an important variable that determines individual economic prospects. Here, we have analyzed the relationship between the first employment status and marriageability.

Figure 2-2 First employment and likelihood of first marriage



- Note: 1) Based on Model 6 and Model 7 of Table 2-4 and Table 2-5 for women and men respectively. The results are based on a discrete-time hazard model, controlling for age, education level, employment status, coresidence with parents, the average age at first marriage in the prefecture where the respondent resided at the time of the 1<sup>st</sup> wave of the survey, and the size of the municipality where the respondent resided at the time of the 1<sup>st</sup> wave of the survey. In estimating the hazard ratio of marriage, interaction terms between the age and education level are included in the model.
- 2) The relative probability is calculated by multiplying the hazard ratio by 100.
- 3) Statistical significance level: \*\*\* 1%, \*\* 5% (in comparison with regular employment)

Analysis results show that the employment status immediately following school graduation is associated with subsequent marriage in the 20s (aged 20 to 29). Figure 2-2 shows that for women, those whose first employment was part-time employment or non-employment were less likely to marry in their 20s. For men, however, even if his first employment was a part-time one, it did not affect their probability of subsequent marriage. Men are less likely to marry in their 20s only if they were not employed for more than 6 months immediately after school graduation.

These results are obtained by controlling for current employment status. Therefore, it can be said that both men and women are less likely to marry in their 20s if they did not work immediately following graduation, regardless of whether or not their employment status has changed since then. In addition, for men, even if their first employment was a non-regular one, their subsequent employment may influence their marriageability in their 20s. However, for women, if their first employment was a non-regular one, their marriage prospects remain low throughout their 20s.

For both men and women, there was no significant difference in the probability of marriage between those whose first job was a regular employment and those whose first job was a dispatched, contract, or fixed-term employment (i.e. non-regular types of employment that are similar to regular employment).

Table 2-1 Descriptive statistics of variables

Females				Males			
	N	%			N	%	
<b>Married or unmarried</b>				<b>Married or unmarried</b>			
Unmarried	22,722	94.1		Unmarried	23,737	95.7	
Married	1,427	5.9		Married	1,080	4.4	
<b>Total</b>	<b>24,149</b>	<b>100.0</b>		<b>Total</b>	<b>24,817</b>	<b>100.0</b>	
<b>Age</b>				<b>Age</b>			
Age 20-24	5,528	22.9		Age 20-24	4,652	18.8	
Age 25-29	9,649	40.0		Age 25-29	9,139	36.8	
Age 30-34	6,260	25.9		Age 30-34	7,361	29.7	
Age 35-42	2,712	11.2		Age 35-42	3,665	14.8	
<b>Total</b>	<b>24,149</b>	<b>100.0</b>		<b>Total</b>	<b>24,817</b>	<b>100.0</b>	
<b>Education level</b>				<b>Education level</b>			
Junior high school/High school	6,464	26.8		Junior high school/High school	9,621	38.8	
Junior college/Technical college/Vocational school	11,011	45.6		Junior college/Technical college/Vocational school	5,358	21.6	
University/Graduate school	6,674	27.6		University/Graduate school	9,838	39.6	
<b>Total</b>	<b>24,149</b>	<b>100.0</b>		<b>Total</b>	<b>24,817</b>	<b>100.0</b>	
<b>Employment status</b>				<b>Employment status</b>			
Company executives, self-employed, family business workers and home workers	699	2.9		Company executives, self-employed, family business workers and home workers	1,885	7.6	
Regular employees	13,076	54.2		Regular employees	15,093	60.8	
Part-time employees	3,636	15.1		Part-time employees	2,342	9.4	
Dispatched employees	1,528	6.3		Dispatched employees	467	1.9	
Contract and fixed-term employees	1,917	7.9		Contract and fixed-term employees	910	3.7	
Not employed	2,066	8.6		Not employed	2,545	10.3	
Full-time students	1,227	5.1		Full-time students	1,575	6.4	
<b>Total</b>	<b>24,149</b>	<b>100.0</b>		<b>Total</b>	<b>24,817</b>	<b>100.0</b>	
<b>Employment status after school graduation</b>				<b>Employment status after school graduation</b>			
Company executives, self-employed, family business workers and home workers	346	1.4		Company executives, self-employed, family business workers and home workers	1,004	4.1	
Regular employees	15,832	65.6		Regular employees	15,536	62.6	
Part-time employees	3,406	14.1		Part-time employees	3,478	14.0	
Dispatched, contract and fixed-term employees	1,387	5.7		Dispatched, contract and fixed-term employees	688	2.8	
Not employed	3,178	13.2		Not employed	4,111	16.6	
<b>Total</b>	<b>24,149</b>	<b>100.0</b>		<b>Total</b>	<b>24,817</b>	<b>100.0</b>	
<b>Coresidence with parents</b>				<b>Coresidence with parents</b>			
Not living together with parents	3,419	14.2		Not living together with parents	4,690	18.9	
Living together with parents	17,501	72.5		Living together with parents	16,490	66.5	
Living together with one parent	3,229	13.4		Living together with one parent	3,637	14.7	
<b>Total</b>	<b>24,149</b>	<b>100.0</b>		<b>Total</b>	<b>24,817</b>	<b>100.0</b>	
<b>Size of municipality where the respondent resided at the time of the 1st wave of the survey</b>				<b>Size of municipality where the respondent resided at the time of the 1st wave of the survey</b>			
Large cities	5,496	22.8		Large cities	5,316	21.4	
Cities with population of 150,000 or more	7,804	32.3		Cities with population of 150,000 or more	8,125	32.7	
Rural districts and cities with population less than 150,000	10,849	44.9		Rural districts and cities with population less than 150,000	11,376	45.8	
<b>Total</b>	<b>24,149</b>	<b>100.0</b>		<b>Total</b>	<b>24,817</b>	<b>100.0</b>	
Variables	N	Mean	SD	Variables	N	Mean	SD
Singulate mean age at marriage (SMAM) of the	24,149	28.9	0.63	Singulate mean age at marriage (SMAM) of the	24,817	30.9	0.62
Income (10 thousand yen)	24,149	213.1	131.78	Income (10 thousand yen)	24,817	256.1	168.11

Table 2-2 Hazard ratios of marriage of females: income, by age

Explanatory variables	Model 1	Model 2	Model 3	Model 4
	Age 20-43 exp(b)	Age 20-43 exp(b)	Age 20-29 exp(b)	Age 30-43 exp(b)
Age spline (Base point: Age 24)				
Age 20-24	1.26 **	1.24 **	1.22 **	-
Age 25-29	1.04	1.04	1.06	-
Age 30-34	0.91 **	0.91 **	-	0.98
Age 35 or older	0.87 *	0.87 *	-	0.85 **
Education level				
Junior college/Technical college/Vocational school	0.76 *	0.75 *	0.80	2.53 ***
University/Graduate school	0.80	0.80	0.79	1.77 *
Age spline×Education level				
Age 20-24×Junior college/Technical college/ Vocational school	1.14	1.10	1.13	-
Age 20-24×University/Graduate school	1.92 ***	1.77 ***	1.67 **	-
Age 25-29×Junior college/Technical college/ Vocational school	1.16 ***	1.15 ***	1.10 *	-
Age 25-29×University/Graduate school	1.15 ***	1.14 **	1.13 **	-
Age 30-34×Junior college/Technical college/ Vocational school	0.96	0.96	-	0.83 **
Age 30-34×University/Graduate school	1.00	1.00	-	0.97
Age 35 or older × Junior college/Technical college/ Vocational school	1.12	1.12	-	1.19 *
Age 35 or older×University/Graduate school	1.04	1.04	-	1.05
Employment status (Reference: Regular employees)				
Company executives, self-employed, family business workers and home workers	0.53 ***	0.58 ***	0.43 ***	0.76
Part-time employees	0.73 ***	0.83 **	0.76 **	0.97
Dispatched employees	0.89	0.94	1.00	0.90
Contract and fixed-term employees	0.93	0.98	0.96	1.03
Not employed	0.75 ***	1.05	1.10	1.00
Full-time students	0.58 **	0.72	0.52 **	1.19
Coreidence with parents				
Not living together with parents	1.17 **	1.14 *	1.33 ***	0.92
Living together with one parent	0.96	0.96	1.02	0.88
SMAM in the prefecture where the respondent resided at the time of the 1st wave of the survey	0.86 ***	0.85 ***	0.85 **	0.84 **
Size of municipality where the respondent resided at the time of the 1st wave of the survey (Reference: Cities with population of 150,000 or more)				
Large cities	0.96	0.96	0.89	1.08
Rural districts and cities with population less than 150,000	1.17 ***	1.17 ***	1.08	1.35 ***
Ln(Income (10 thousand yen))	-	1.166 ***	1.148 ***	1.203 ***
Constant	0.07 ***	0.03 ***	0.03 ***	0.02 ***
Number of person-years	24,149	24,149	15,177	8,972
Number of samples	4,853	4,853	3,959	2,299
Number of events	1,427	1,427	864	563
Chi-square values	301.02	308.71	217.36	111.55
Degrees of freedom	25	26	20	20

\* p<.1; \*\* p<.05; \*\*\* p<.01

Table 2-3 Hazard ratios of marriage of males: income, by age

Explanatory variables	Model 1	Model 2	Model 3	Model 4
	Age 20-43	Age 20-43	Age 20-29	Age 30-43
	exp(b)	exp(b)	exp(b)	exp(b)
Age spline (Base point: Age 24)				
Age 20-24	1.28 **	1.26 **	1.26 **	-
Age 25-29	1.02	1.01	1.03	-
Age 30-34	0.95	0.95	-	0.97
Age 35 or older	0.88 **	0.88 **	-	0.87 **
Education level				
Junior college/Technical college/Vocational school	0.57 **	0.57 **	0.61 *	1.34
University/Graduate school	0.59 ***	0.61 **	0.59 **	1.50
Age spline×Education level				
Age 20-24×Junior college/Technical college/ Vocational school	1.03	1.02	1.05	-
Age 20-24×University/Graduate school	1.53 *	1.50 *	1.57 *	-
Age 25-29×Junior college/Technical college/ Vocational school	1.13 *	1.13 *	1.09	-
Age 25-29×University/Graduate school	1.22 ***	1.21 ***	1.22 ***	-
Age 30-34×Junior college/Technical college/ Vocational school	1.01	1.00	-	0.94
Age 30-34×University/Graduate school	0.98	0.98	-	0.99
Age 35 or older × Junior college/Technical college/ Vocational school	0.99	0.98	-	1.00
Age 35 or older×University/Graduate school	1.07	1.07	-	1.06
Employment status (Reference: Regular employees)				
Company executives, self-employed, family business workers and home workers	1.19 *	1.25 **	1.19	1.30 **
Part-time employees	0.39 ***	0.45 ***	0.41 ***	0.53 **
Dispatched employees	0.28 ***	0.31 ***	0.35 **	0.27 **
Contract and fixed-term employees	0.69 **	0.76	0.62 *	0.95
Not employed	0.21 ***	0.26 ***	0.33 ***	0.17 ***
Full-time students	0.26 ***	0.30 ***	0.36 ***	-
Coresidence with parents				
Not living together with parents	1.68 ***	1.63 ***	1.72 ***	1.52 ***
Living together with one parent	0.78 **	0.79 **	0.82	0.76 **
SMAM in the prefecture where the respondent resided at the time of the 1st wave of the survey				
	0.82 ***	0.80 ***	0.72 ***	0.89
Size of municipality where the respondent resided at the time of the 1st wave of the survey (Reference: Cities with population of 150,000 or more)				
Large cities	1.05	1.04	1.13	0.96
Rural districts and cities with population less than 150,000	1.30 ***	1.32 ***	1.31 ***	1.36 ***
Income (10 thousand yen)				
	-	1.009 ***	1.007 *	1.010 ***
Constant				
	0.08 ***	0.06 ***	0.09 ***	0.04 ***
Number of person-years	24,817	24,817	13,791	10,928
Number of samples	4,968	4,968	3,740	2,754
Number of events	1,080	1,080	548	532
Chi-square values	440.29	470.67	291.64	177.53
Degrees of freedom	25	26	20	19

\* p<.1; \*\* p<.05; \*\*\* p<.01

Table 2-4 Hazard ratios of marriage of females: employment status immediately following school graduation, by age

Explanatory variables	Model 5	Model 6	Model 7
	Age 20-43 exp(b)	Age 20-29 exp(b)	Age 30-43 exp(b)
Age spline (Base point: Age 24)			
Age 20-24	1.26 **	1.24 **	-
Age 25-29	1.04	1.06	-
Age 30-34	0.91 **	-	0.97
Age 35 or older	0.87 *	-	0.85 **
Education level			
Junior college/Technical college/Vocational school	0.76	0.82	2.65 ***
University/Graduate school	0.79	0.79	1.87 **
Age spline×Education level			
Age 20-24×Junior college/Technical college/ Vocational school	1.15	1.17	-
Age 20-24×University/Graduate school	1.92 ***	1.80 ***	-
Age 25-29×Junior college/Technical college/ Vocational school	1.16 ***	1.10 *	-
Age 25-29×University/Graduate school	1.16 ***	1.15 **	-
Age 30-34×Junior college/Technical college/ Vocational school	0.97	-	0.83 **
Age 30-34×University/Graduate school	1.00	-	0.97
Age 35 or older × Junior college/Technical college/ Vocational school	1.12	-	1.19 *
Age 35 or older×University/Graduate school	1.04	-	1.05
Employment status after school graduation (Reference: Regular employees)			
Company executives, self-employed, family business workers and home workers	0.98	0.94	1.04
Part-time employees	0.76 ***	0.76 **	0.77 *
Dispatched, contract and fixed-term employees	0.91	0.90	0.94
Not employed	0.83 **	0.67 ***	1.07
Employment status (Reference: Regular employees)			
Company executives, self-employed, family business workers and home workers	0.55 ***	0.43 ***	0.67
Part-time employees	0.79 ***	0.77 **	0.84
Dispatched employees	0.91	0.98	0.84
Contract and fixed-term employees	0.97	0.99	0.96
Not employed	0.80 **	0.93	0.63 **
Full-time students	0.61 **	0.46 **	0.99
Coresidence with parents (Reference: Living together with parents)			
Not living together with parents	1.17 **	1.35 ***	0.96
Living together with one parent	0.96	1.02	0.88
SMAM in the prefecture where the respondent resided at the time of the 1st wave of the survey	0.86 ***	0.86 **	0.86 *
Size of municipality where the respondent resided at the time of the 1st wave of the survey (Reference: Cities with population of 150,000 or more)			
Large cities	0.96	0.89	1.08
Rural districts and cities with population less than 150,000	1.16 **	1.07	1.32 ***
Constant	0.07 ***	0.07 ***	0.06 ***
Number of person-years	24,149	15,177	8,972
Number of samples	4,853	3,959	2,299
Number of events	1,427	864	563
Chi-square values	307.63	222.34	109.15
Degrees of freedom	29	23	23

\* p<.1; \*\* p<.05; \*\*\* p<.01

Table 2-5 Hazard ratios of marriage of males: employment status immediately following school graduation, by age

Explanatory variables	Model 5	Model 6	Model 7
	Age 20-43 exp(b)	Age 20-29 exp(b)	Age 30-43 exp(b)
Age spline (Base point: Age 24)			
Age 20-24	1.28 **	1.27 **	-
Age 25-29	1.02	1.03	-
Age 30-34	0.95	-	0.98
Age 35 or older	0.88 **	-	0.87 **
Education level			
Junior college/Technical college/Vocational school	0.56 **	0.60 **	1.32
University/Graduate school	0.58 ***	0.57 ***	1.55 *
Age spline×Education level			
Age 20-24×Junior college/Technical college/ Vocational school	1.04	1.07	-
Age 20-24×University/Graduate school	1.55 *	1.61 **	-
Age 25-29×Junior college/Technical college/ Vocational school	1.13 *	1.09	-
Age 25-29×University/Graduate school	1.23 ***	1.24 ***	-
Age 30-34×Junior college/Technical college/ Vocational school	1.01	-	0.94
Age 30-34×University/Graduate school	0.98	-	0.99
Age 35 or older × Junior college/Technical college/ Vocational school	0.98	-	1.01
Age 35 or older×University/Graduate school	1.07	-	1.07
Employment status after school graduation (Reference: Regular employees)			
Company executives, self-employed, family business workers and home workers	0.82	0.73	0.95
Part-time employees	0.83	0.88	0.75
Dispatched, contract and fixed-term employees	1.12	1.01	1.26
Not employed	0.75 ***	0.68 ***	0.83
Employment status (Reference: Regular employees)			
Company executives, self-employed, family business workers and home workers	1.27 **	1.29 *	1.26 *
Part-time employees	0.42 ***	0.40 ***	0.46 ***
Dispatched employees	0.29 ***	0.35 **	0.24 **
Contract and fixed-term employees	0.71 *	0.62 *	0.84
Not employed	0.23 ***	0.33 ***	0.13 ***
Full-time students	0.28 ***	0.35 ***	-
Coresidence with parents (Reference: Living together with parents)			
Not living together with parents	1.66 ***	1.74 ***	1.56 ***
Living together with one parent	0.79 **	0.83	0.76 *
SMAM in the prefecture where the respondent resided at the time of the 1st wave of the survey	0.82 ***	0.74 ***	0.92
Size of municipality where the respondent resided at the time of the 1st wave of the survey (Reference: Cities with population of 150,000 or more)			
Large cities	1.06	1.14	0.98
Rural districts and cities with population less than 150,000	1.30 ***	1.29 **	1.32 ***
Constant	0.08 ***	0.11 ***	0.06 ***
Number of person-years	24,817	13,791	10,928
Number of samples	4,968	3,740	2,754
Number of events	1,080	548	532
Chi-square values	452.66	292.63	172.30
Degrees of freedom	29	23	22

\* p<.1; \*\* p<.05; \*\*\* p<.01

## Chapter 3      Transition from Marriage to First Birth

With the declining marriage rate, the percentage of women who give birth to their first child in their lifetime is decreasing. The timing of the first birth significantly affects the possibility and timing of subsequent childbirth. Therefore, the occurrence and timing of the first birth determines both birth rates and the life course of young adults.

Two major patterns are observed in the transition from marriage to first birth in Japan. One pattern is a relatively short duration of marriage until the first birth due to premarital pregnancy. The other pattern is postponement of first birth after marriage. In this Chapter, we report on the relationship between wife's employment and likelihood of first birth, based on data accumulated for 10 years from the 1st through 10th waves of the "Longitudinal Survey of Adults in the 21st Century." Descriptive statistics of the variables used in the following analyses are presented in Table 3-1 at the end of the chapter.

### 1.    Employment status of married women and likelihood of first birth

- *If a married woman is a non-regular employee (i.e. part-time, dispatched, contract and fixed-term employee), she is less likely to give first birth than if she were a regular employee or non-employed.*

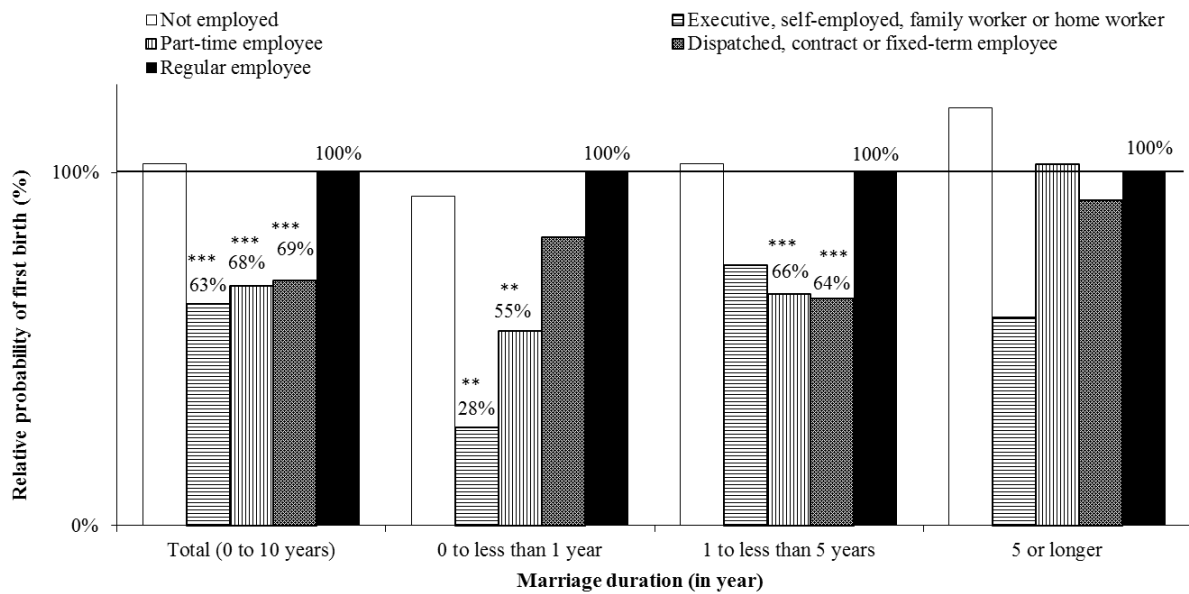
One of the reasons for delaying first birth may be that an increasing number of married women have been employed in the past ten years. The association between a married woman's employment status and the likelihood of first birth is examined here.

Figure 3-1 shows the relative probability of first birth according to a married woman's employment status. If the duration of the marriage was 0 to 1 year or 1 to 5 years, the probability of first birth was significantly low in cases where the woman was employed as part-time, dispatched, contract or fixed-term or where the woman was self-employed or a family worker, compared to cases where she was employed as a regular employee. However, if the duration of marriage was 5 years and longer, there was no significant difference in the probability of first birth between the different employment statuses of married women.

In addition, it is shown that the probability of first birth among married women employed as regular employees and non-employed women were similar for the entire duration of marriage.



Figure 3-1 Employment status of married women and likelihood of first birth by duration of marriage



Note: 1) Based on Model 1 through Model 1-3 of Table 3-2. The results are based on a discrete-time hazard model, controlling for marriage duration, wife's education level, wife's age at marriage, coresidence with parents and husband's employment status. For the hazard ratio of the first birth, interaction terms between the marriage duration and wife's education level are included in Model 1.  
 2) The relative probability is calculated by multiplying the hazard ratio by 100.  
 3) Statistical significance level: \*\*\* 1%, \*\* 5% (in comparison with regular employment)

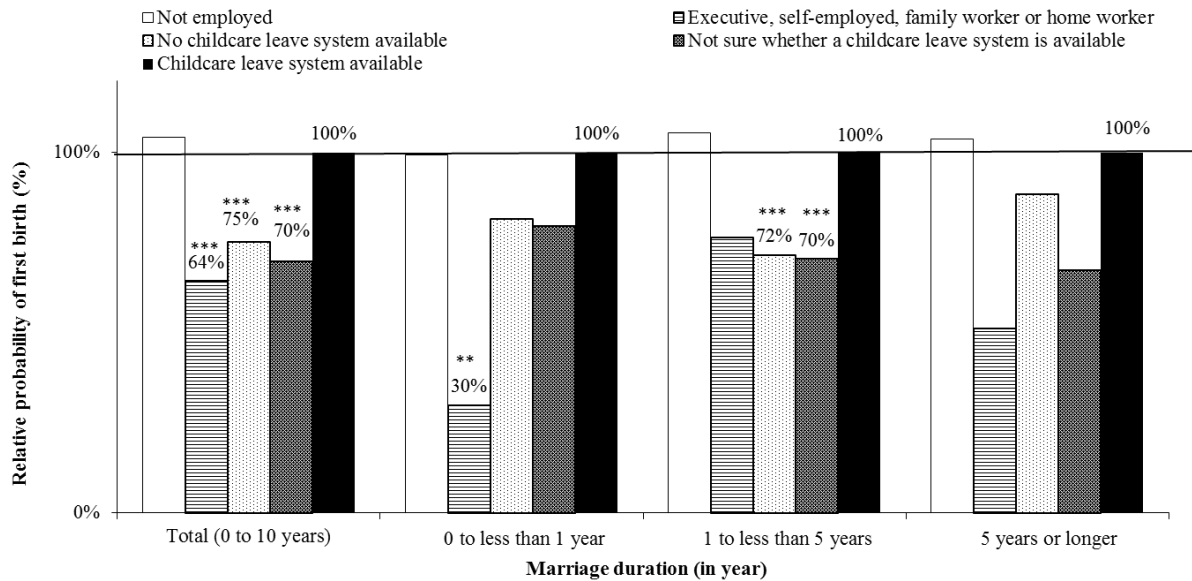
## 2. Availability of childcare leave at wife's workplace and likelihood of first birth

- Among married women with employment, women who do not have access to childcare leave or who are not sure whether childcare leave is available have a lower likelihood of first birth, compared to women who have access to a childcare leave system.

Birth of the first child is one of the major reasons women leave their job. The availability of a childcare leave system represents ease of continuing work after childbirth. This section examines how availability of childcare leave affect married women's probability of first birth.

Figure 3-2 shows the relative probability of first birth according to availability of a childcare leave system at the workplace of a married woman. If the marriage duration was 1-5 years, the probability of first birth is low in cases where the woman is working and does not have access to a childcare leave system or does not know whether she has access to it, compared to cases where the woman is sure that she has access to a childcare leave system.

Figure 3-2 Availability of childcare leave system at workplace and likelihood of first birth by marriage duration



Note: 1) Based on Model 2 through Model 2-3 of Table 3-3. The estimation method and control variables included in the analyses are the same as in Figure 3-1. For the hazard ratio of the first birth, the interaction terms between the marriage duration and wife's education level are included in Model 2.  
 2) The relative probability is calculated by multiplying the hazard ratio by 100.  
 3) Statistical significance level: \*\*\* 1%, \*\* 5% (in comparison with the case where childcare leave system is available)

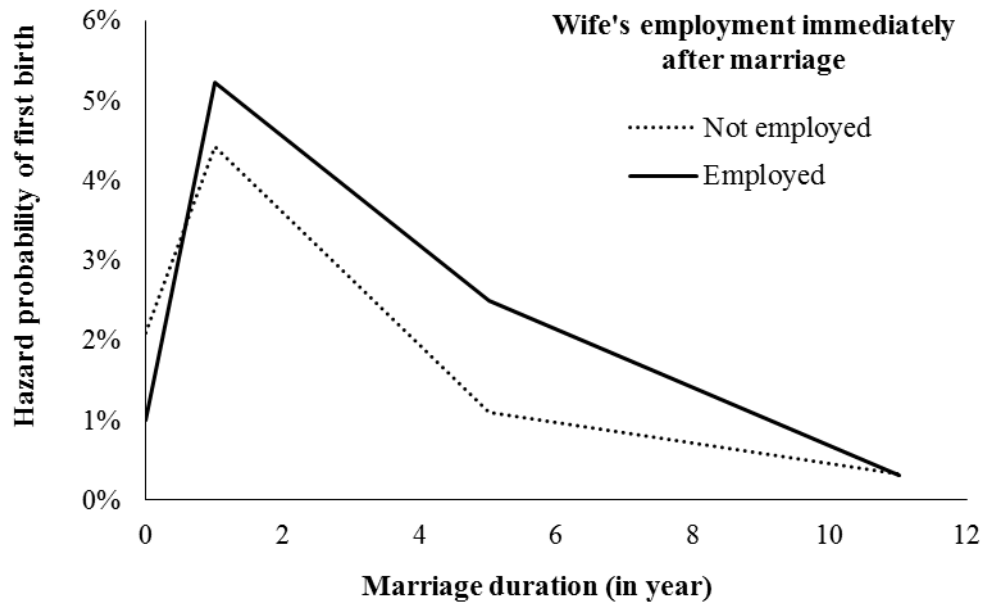
### 3. Women's post-marital employment and likelihood of first birth

- A married woman who was employed after marriage is more likely to give birth to a first child, compared to a married woman who was not employed following marriage.

More and more women are continuing to work after marriage. Timing of the birth of the first child may vary depending on whether or not a woman continues to work after marriage. In Figure 3-3, the probability of first birth over the marriage duration is shown according to whether or not the woman was employed at the time of the survey following her marriage (an average of 4-5 months after marriage). The probability of first birth in the group of women who were employed after marriage was low in the beginning of their marriage, compared to the group of women who were not employed. However, after 1 year of marriage, the probability of first birth in the group of women who were employed became higher than their counterpart, and remained so afterwards.

Women's current employment status is controlled for in these analyses. In relation to women's current employment status, the probability of first birth is high among married women with regular employment or those who are unemployed while the probability tends to be lower among married women with non-regular employment or self-employed/family workers (see Table 3-4).

Figure 3-3 Wife's employment after marriage and likelihood of first birth



- Note: 1) Based on Model 3 of Table 3-4. Results are based on a discrete-time hazard model, controlling for wife's employment at the time of the survey following marriage, marriage duration, wife's education level, wife's age at marriage, coresidence with parents and husband's employment status. In terms of whether or not the wife is employed following marriage, interaction terms between marriage duration and wife's education level are included in the model.
- 2) To calculate the predicted hazard probability, all control variables are set to the reference category.

Table 3-1 Descriptive statistics of covariates

	Model 1 and Model 2		Model 3	
	N	%	N	%
<b>Wife's education level</b>				
Junior high school/High school	17,686	29.7	16,798	29.2
Junior college/Technical college/Vocational school	23,512	39.5	22,895	39.8
University/Graduate school	18,405	30.9	17,897	31.1
Total	59,603	100.0	57,590	100.0
<b>Wife's age at marriage</b>				
Age 20-24	8,455	14.2	8,381	14.6
Age 25-29	32,354	54.3	31,914	55.4
Age 30-34	15,428	25.9	14,406	25.0
Age 35 or older	3,366	5.7	2,889	5.0
Total	59,603	100.0	57,590	100.0
<b>Coresidence with parents</b>				
Not living together with parents	48,883	82.0	47,406	82.3
Living together with parents	10,720	18.0	10,184	17.7
Total	59,603	100.0	57,590	100.0
<b>Wife's employment status</b>				
Not employed	17,060	28.6	16,457	28.6
Company executives, self-employed, family business workers and home workers	3,048	5.1	2,781	4.8
Regular employees	19,420	32.6	18,853	32.7
Part-time employees	12,899	21.6	12,477	21.7
Dispatched, contract and fixed-term employees	7,176	12.0	7,022	12.2
Total	59,603	100.0	57,590	100.0
<b>Husband's employment status</b>				
Company executives, self-employed, family business workers and home workers	7,049	11.8	6,705	11.6
Regular employees	48,778	81.8	47,375	82.3
Non-regular employees and not employed	3,776	6.3	3,510	6.1
Total	59,603	100.0	57,590	100.0
<b>Availability of a childcare leave system at the wife's workplace</b>				
Not employed	17,060	28.6	16,457	28.6
Company executives, self-employed, family business workers and home workers	3,048	5.1	2,781	4.8
Childcare leave system available	18,767	31.5	18,364	31.9
Childcare leave system not available	11,954	20.1	11,512	20.0
Not sure whether a childcare leave system is available or not	8,774	14.7	8,476	14.7
Total	59,603	100.0	57,590	100.0
<b>Wife's employment immediately after marriage</b>				
Not employed	-	-	25,574	44.4
Employed	-	-	32,016	55.6
Total	-	-	57,590	100.0

Table 3-2 Hazard ratios of the first birth: wife's employment status, by marriage duration

Explanatory variables	Model 1	Model 1-1	Model 1-2	Model 1-3
	0-10 years exp(b)	0-1year exp(b)	1-5 years exp(b)	5-10 years exp(b)
Marriage duration spline (Base point: 12th month)				
0-1 year	2.68 ***	3.89 ***	-	-
1-5 years	0.68 ***	-	0.79 ***	-
5-10 years	0.76 ***	-	-	0.78 ***
Wife's education level (Reference: Junior high school/High school)				
Junior college/Technical college/Vocational school	0.93	0.85	1.17 *	1.77 ***
University/Graduate school	0.87	0.89	1.12	2.16 ***
Spline for marriage duration×Wife's education level				
0-1 year×Junior college/Technical college/Vocational school	0.85	-	-	-
0-1 year×University/Graduate school	2.20	-	-	-
1-5 years×Junior college/Technical college/Vocational school	1.14 **	-	-	-
1-5 years×University/Graduate school	1.23 ***	-	-	-
5 years and longer×Junior college/Technical college/Vocational school	1.02	-	-	-
5 years and longer×University/Graduate school	1.01	-	-	-
Wife's age at marriage (Reference: Age 25-29)				
Age 20-24	1.14	1.49 *	1.07	1.21
Age 30-34	0.74 ***	0.90	0.72 ***	0.70
Age 35 and older	0.56 ***	0.98	0.51 ***	0.24
Coresidence with parents (Reference: Not living together with parents)				
Living together with parents	1.71 ***	4.61 ***	1.38 ***	1.37
Wife's employment status (Reference: Regular employees)				
Not employed	1.02	0.93	1.02	1.18
Company executives, self-employed, family business workers and home workers	0.63 ***	0.28 **	0.74 *	0.59
Part-time employees	0.68 ***	0.55 **	0.66 ***	1.02
Dispatched, contract and fixed-term employees	0.69 ***	0.82	0.64 ***	0.92
Husband's employment status (Reference: Regular employees)				
Company executives, self-employed, family business workers and home workers	1.07	1.67 **	0.95	1.14
Non-regular employees and not employed	0.91	2.10 ***	0.76 *	0.55
Constant	0.05 ***	0.03 ***	0.04 ***	0.01 ***
Number of person-months	59,603	6,430	34,265	18,908
Number of samples	2,273	1,143	1,887	631
Number of events	1,271	185	941	145
Chi-square values	442.29	187.37	148.31	45.37
Degrees of freedom	21	13	13	13

\* p<.1; \*\* p<.05; \*\*\* p<.01

Table 3-3 Hazard ratios of the first birth: availability of childcare leave system at the wife's workplace, by marriage duration

Explanatory variables	Model 2	Model 2-1	Model 2-2	Model 2-3
	0-10 years exp(b)	0-1year exp(b)	1year-5 years exp(b)	5-10 years exp(b)
Marriage duration spline (Base point: 12th month)				
0-1 year	2.61 **	3.81 ***	-	-
1-5 years	0.68 ***	-	0.78 ***	-
5-10 years	0.76 ***	-	-	0.78 ***
Wife's education level (Reference: Junior high school/High school)				
Junior college/Technical college/Vocational school	0.92	0.86	1.16 *	1.71 **
University/Graduate school	0.84	0.89	1.09	2.11 ***
Spline for marriage duration×Wife's education level				
0-1 year×Junior college/Technical college/Vocational school	0.85	-	-	-
0-1 year×University/Graduate school	2.20	-	-	-
1-5 years×Junior college/Technical college/Vocational school	1.14 **	-	-	-
1-5 years×University/Graduate school	1.24 ***	-	-	-
5 years and longer×Junior college/Technical college/Vocational school	1.02	-	-	-
5 years and longer×University/Graduate school	1.01	-	-	-
Wife's age at marriage (Reference: Age 25-29)				
Age 20-24	1.14	1.50 *	1.08	1.24
Age 30-34	0.75 ***	0.90	0.72 ***	0.70
Age 35 and older	0.55 ***	0.98	0.51 ***	0.24
Coresidence with parents (Reference: Not living together with parents)				
Living together with parents	1.69 ***	4.55 ***	1.36 ***	1.38
Availability of childcare leave system at the wife's workplace (Reference: Childcare leave system available)				
Not employed	1.04	0.99	1.05	1.04
Company executives, self-employed, family business workers and home workers	0.64 ***	0.30 **	0.76	0.51
Childcare leave system not available	0.75 ***	0.82	0.72 ***	0.88
Not sure whether a childcare leave system is available or not	0.70 ***	0.79	0.70 ***	0.67
Husband's employment status (Reference: Regular employees)				
Company executives, self-employed, family business workers and home workers	1.07	1.63 **	0.94	1.15
Non-regular employees and not employed	0.92	2.09 ***	0.77 *	0.56
Constant	0.05 ***	0.03 z	0.04 ***	0.01 ***
Number of person-months	59,603	6,430	34,265	18,908
Number of samples	2,273	1,143	1,887	631
Number of events	1,271	185	941	145
Chi-square values	443.85	185.53	142.44	48.49
Degrees of freedom	21	13	13	13

\* p<.1; \*\* p<.05; \*\*\* p<.01

Table 3-4 Hazard ratios of the first birth: wife's employment shortly after marriage

Explanatory variables	Model 3 exp(b)
Whether employed or not at the survey immediately following marriage (Reference: Not employed)	
Employed	1.18
Marriage duration spline (Base point: 12th month)	
0-1 year	2.12 **
1-5 years	0.71 ***
5-10 years	0.81 ***
Whether employed or not immediately following marriage × Marriage duration spline	
Employed × 0-1 year	2.48 *
Employed × 1-5 years	1.18 ***
Employed × 5 years and longer	0.87
Wife's education level (Reference: Junior high school/High school)	
Junior college/Technical college/Vocational school	1.43 ***
University/Graduate school	1.38 ***
Whether employed or not immediately following marriage × Wife's education level	
Employed × Junior college/Technical college/Vocational school	0.65 ***
Employed × University/Graduate school	0.67 **
Wife's age at marriage (Reference: Age 25-29)	
Age 20-24	0.88
Age 30-34	0.67 ***
Age 35 or older	0.52 ***
Coresidence with parents (Reference: Not living together with parents)	
Living together with parents	1.77 ***
Wife's employment status (Reference: Regular employees)	
Not employed	0.95
Company executives, self-employed, family business workers and home workers	0.62 ***
Part-time employees	0.66 ***
Dispatched, contract and fixed-term employees	0.67 ***
Husband's employment status (Reference: Regular employees)	
Company executives, self-employed, family business workers and home workers	1.08
Non-regular employees and not employed	0.91
Constant	0.04 ***
Number of person-months	57,590
Number of samples	2,217
Number of events	1,253
Chi-square values	433.35
Degrees of freedom	21

\* p<.1; \*\* p<.05; \*\*\* p<.01

## Chapter 4 Work-Life Balance and Transition to Second Birth

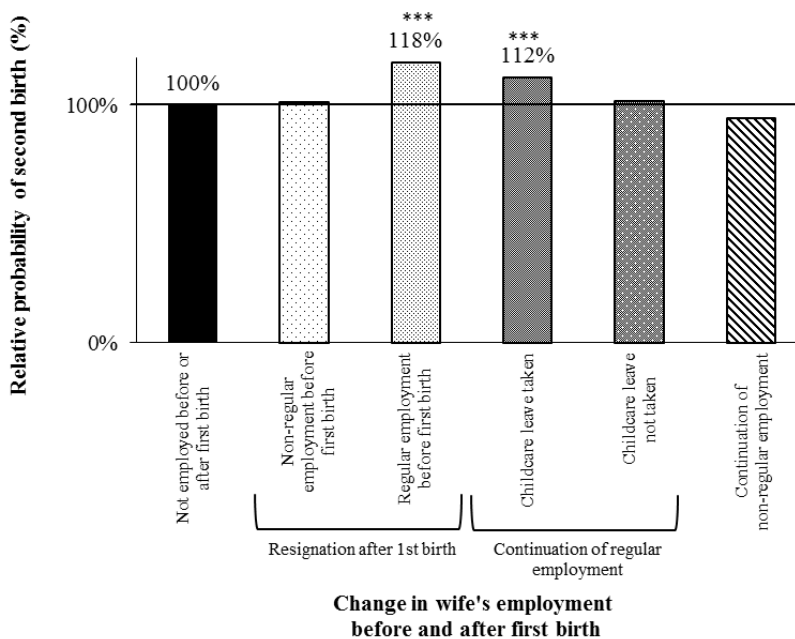
With decrease in marital fertility, the percentage of women who give birth to a second child has been decreasing. The second birth is an important event that affects the completed level of cohort fertility. It is considered that the decision to give birth to a second child is influenced by the couple's situation after the arrival of the first child and their subsequent child-rearing experience. In this Chapter, we report on the factors that affect second birth, based on the observation for 10 years from 1st through 10th waves of the "Longitudinal Survey of Newborns in the 21st Century." Descriptive statistics of the variables used in the following analyses are presented in Table 4-1 at the end of the chapter.

### 1. Wife's employment status and the likelihood of second birth

- *The probability of second birth is high among women who left regular employment at the time of the first birth and among women who continued to work as regular employees by taking a childcare leave at the time of their first birth.*

Today, the number of women who continue to work after giving birth to their first child is increasing. The relationship between women's employment and birth of a second child is becoming an important issue, especially in forecasting trends in low fertility. Figure 4-1 shows the analysis results on the relationship between changes in wife's employment status around the time of the first birth and the birth of the second child.

Figure 4-1 Wife's employment change around time of first birth and likelihood of second birth



- Note: 1) Based on Model 1 of Table 4-2. The results are based on a discrete-time hazard model, controlling for the birth interval, frequency of housework and child rearing by the husband, wife's anxiety and sense of burden over child rearing, husband's employment status, wife's education level, coresidence with parents (grandparents of children), attributes of the first child, wife's age at first birth, area of residence, size of city, and variables concerning local child-rearing environment.
- 2) Relative probability is calculated by multiplying the hazard ratio by 100.
- 3) Statistical significance level: \*\*\* 1%, \*\* 5% (in comparison with cases where the wife was not employed around the time of the first birth)



In Figure 4-1, assuming that the relative probability of a second birth for women who were not employed around the time of the first birth is 100%, the likelihood of a second birth is 118% for currently non-employed women who were regular employees before the first birth, and 112% for women who took a childcare leave to continue regular employment after their first birth. On the other hand, the relative probabilities of a second birth for women who left non-regular employment, women who continued regular employment without taking a childcare leave, and women who continued non-regular employment were similar to that of women who were not employed around the time of the birth of their first child. Thus, wife's employment status around the time of the first birth affects the probability of a second birth. In particular, whether or not the woman can take a childcare leave affects employed women's decision to give birth to a second child.

## 2. Husband's participation in housework and childrearing and the likelihood of second birth

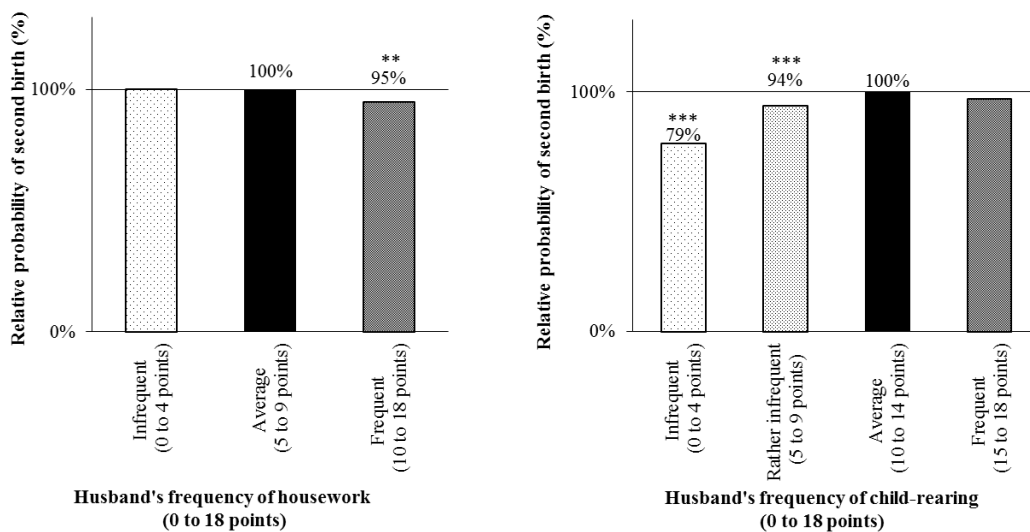
- *If the husband participated in childrearing after the birth of the first child, a second child is more likely to be born.*

More men, especially younger men are participating in childrearing today. Men's participation in housework and childrearing is important and it has implications not only for men to balance work and family life, but also for overall fertility. Here, the association between husband's frequency of participation in housework and childrearing at the time of the first wave of the survey (when the first child is 6 months old for all respondents) and the likelihood of a second birth is examined.

According to Figure 4-2, the higher the frequency with which housework is done by the husband, the lower the likelihood of a second birth. However, this association is relatively small. On the other hand, there is a clear tendency that the higher the frequency of participation in childrearing by the husband, the higher the likelihood of a second birth becomes.

According to a more detailed analysis (not shown), it becomes evident that the relationship between the frequency of husband's participation in housework and childrearing and the likelihood of a second birth depends on the share of husband's income in total household income. When the husband's income accounts for less than 40% of the household income, the higher the frequency of the husband's participation in housework and childrearing, the higher the probability of a second birth becomes. Therefore, the relationship between husband's participation in housework and childrearing and the birth of a second child depends not only on the frequency of participation but also on the economic contribution of husband and wife.

Figure 4-2 Husband's participation in housework and child rearing and likelihood of second birth



- Note: 1) Based on Model 1 of Table 4-2. The estimation method and control variables included in the analyses are the same as in Figure 4-1.  
 2) The relative probability is calculated by multiplying the hazard ratio by 100.  
 3) Statistical significance level: \*\*\* 1%, \*\* 5% (compared to the items in black in each Figure)

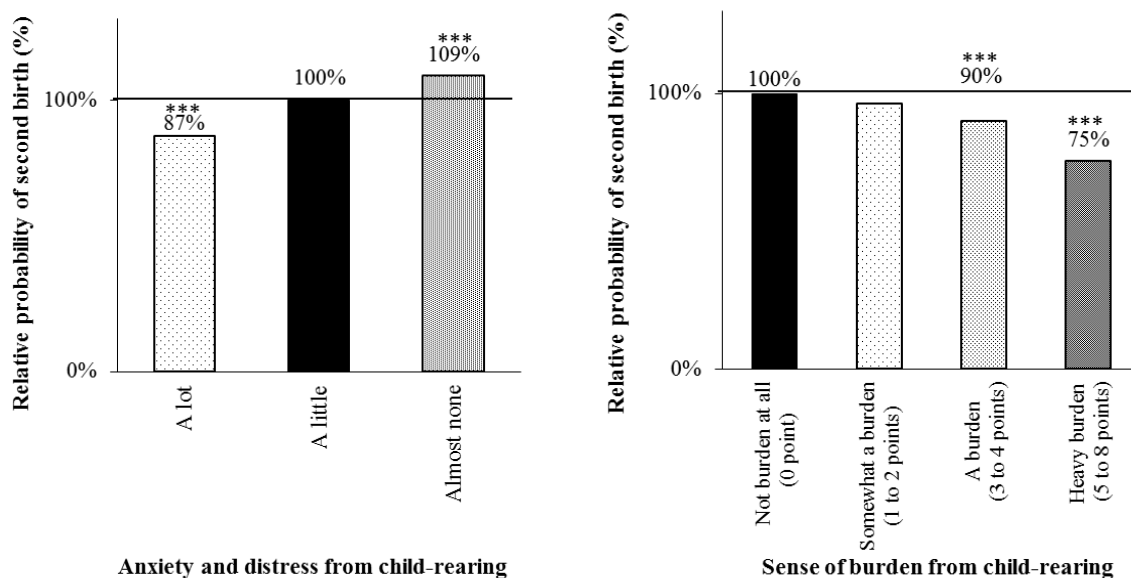
### 3. Wife’s burden from child -rearing and likelihood of second birth

- If the wife felt a large amount of anxiety or burden from childrearing after the birth of the first child, the second birth is less likely to occur.

It is considered that the decision to give birth to a second child is influenced by the couple’s childrearing experience. Here, we examine how wife’s anxiety and sense of burden of childrearing 6 months after the birth of the first child are associated with the likelihood of a second birth.

According to Figure 4-3, the level of anxiety and distress related to childrearing is clearly associated with the probability of a second birth. When women who felt “a lot” of anxiety and distress related to childrearing are the reference, the probability of a second birth is lower among women who felt “a lot” of anxiety and distress, and is higher among women who felt “almost none.” Similarly, there is a tendency that the more the women feels burdened from childrearing, the less likely that they will give birth to a second child. Women who reported childrearing a “heavy burden” had a low probability of a second birth.

Figure 4-3 Wife’s anxiety and sense of burden from child rearing and likelihood of a second birth

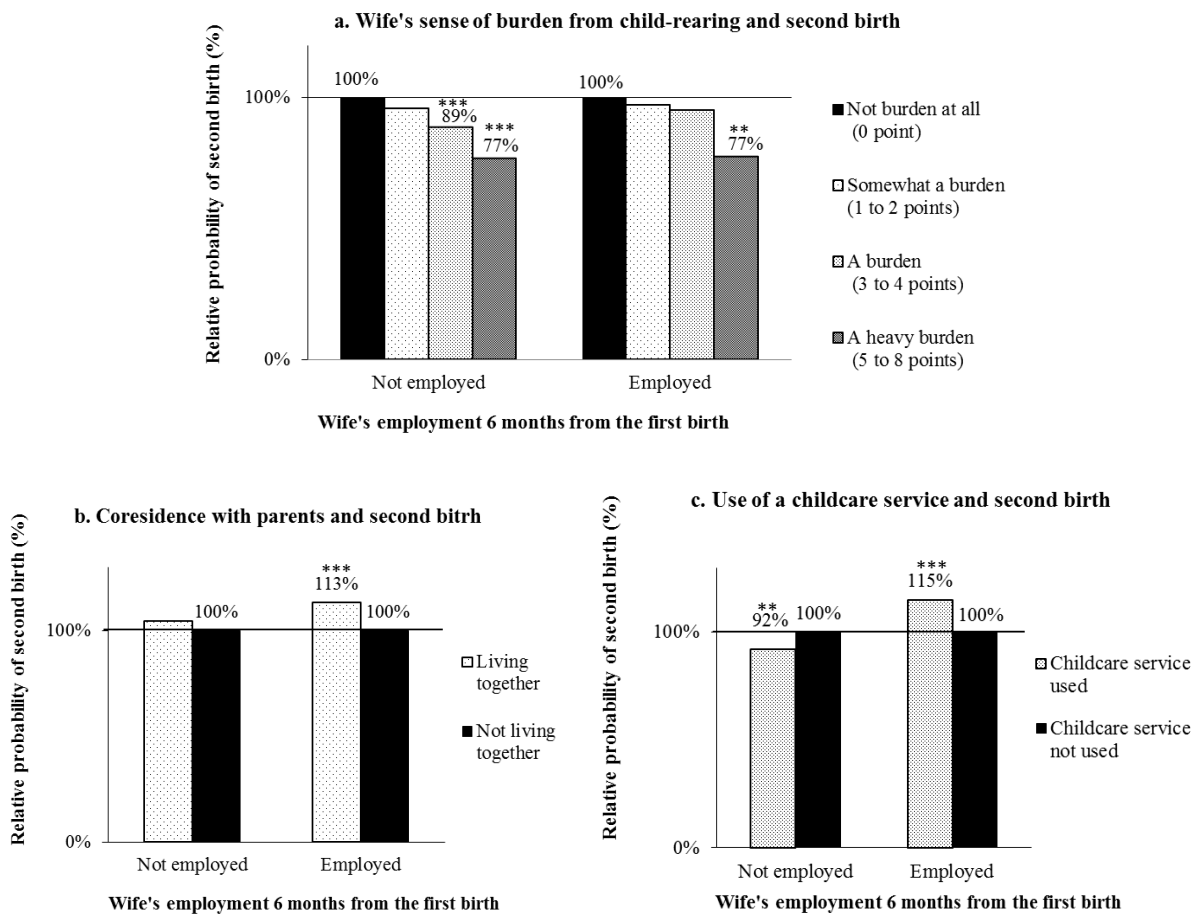


- Note: 1) Based on Model 1 of Table 4-2. The model is the same as in Figure 4-1.  
 2) The relative probability is calculated by multiplying the hazard ratio by 100.  
 3) Statistical significance level: \*\*\* 1%, \*\* 5% (compared to the items in black in each Figure)

According to a more detailed analysis, the relationship between wife’s anxiety and sense of burden from childrearing and the likelihood of a second birth depends on the wife’s employment status after the birth of the first child. Women were less likely to give birth to a second child if her anxiety and sense of burden were high. This tendency was especially evident among women who were not employed than among women who were employed when the first child was 6 months old (Figure 4-4, a).

Further, among employed wives, the probability of a second birth tends to be high when she lives with her parents or when they use childcare service (Figure 4-4, b and c). An employed wife has her parents or childcare service take care of her children during the daytime. However, a non-employed wife spends a lot of time at home taking care of her children. Therefore, her anxiety and sense of burden from childrearing can easily and directly affect her decision to give birth to a second child. For working mothers, expanding childcare services is required. For mothers taking care of children at home, it is necessary to take measures to prevent them from being isolated and alleviate their anxiety and sense of burden.

Figure 4-4 Relationship between various factors and likelihood of a second birth: by wife's employment status when the first child is 6 months old



Note: 1) Based on Models 4 and Model 5 of Table 4-3. Results based on a discrete-time hazard model, controlling for the birth interval, frequency of husband's housework and child rearing, wife's anxiety and sense of burden from child rearing, wife's employment status, use of a childcare service when the first child was younger than 3 years old, husband's employment status, wife's education level, coreidence with parents (grandparents for children), attributes of the first child, wife's age at first birth, area of residence, size of city, and variables concerning local child-rearing environment.

2) The relative probability is calculated by multiplying the hazard ratio by 100.

3) Statistical significance level: \*\*\* 1%, \*\* 5% (compared to the items in black in each Figure)

Table 4-1 Descriptive Statistics

	N	%		N	%
Score on husband's participation in child rearing			Coresidence with parents		
0-4	3,857	3.0	Not living together	105,592	81.7
5-9	33,417	25.8	Living together	23,727	18.4
10-14	81,642	63.1	Total	129,319	100.0
15-18	10,403	8.0	Sex of the first child		
Total	129,319	100.0	Male	65,555	50.7
Score on husband's participation in housework			Female	63,764	49.3
0-4	36,880	28.5	Total	129,319	100.0
5-9	58,362	45.1	First child: Premature, underweight		
10-18	34,077	26.4	No	125,414	97.0
Total	129,319	100.0	Yes	3,905	3.0
Anxiety or distress from child rearing			Total	129,319	100.0
Feel a lot	9,527	7.4	First child: Premarital pregnancy		
Feel a bit	77,493	59.9	No	102,359	79.2
Feel almost none	42,299	32.7	Yes	26,960	20.9
Total	129,319	100.0	Total	129,319	100.0
Score on sense of burden from child rearing			Month of birth of the first child		
0	24,706	19.1	January	65,967	51.0
1-2	66,610	51.5	July	63,352	49.0
3-4	33,001	25.5	Total	129,319	100.0
5-8	5,002	3.9	Wife's age at first birth		
Total	129,319	100.0	16-19	1,283	1.0
Wife's employment change at the time of first birth			20-24	16,980	13.1
Not employed before and after childbirth	32,715	25.3	25-29	56,954	44.0
Non-regular employment – Not employed	28,947	22.4	30-34	39,647	30.7
Regular employment – Not employed	35,570	27.5	35-39	12,353	9.6
Regular employment continued by taking a childcare leave	20,233	15.7	40-44	2,102	1.6
Regular employment continued without taking a childcare leave	3,530	2.7	Total	129,319	100.0
Non-regular employment continued without taking a childcare leave	8,324	6.4	Area of residence		
Total	129,319	100.0	Hokkaido	5,226	4.0
Wife's employment status			Tohoku	9,037	7.0
Not employed	83,867	64.9	Kanto	46,040	35.6
Self-employed and family businesses	6,438	5.0	Hokuriku	5,685	4.4
Regular employees	22,806	17.6	Chubu	19,105	14.8
Non-regular employees	15,493	12.0	Kinki	21,372	16.5
Unknown	715	0.6	Chugoku	7,100	5.5
Total	129,319	100.0	Shikoku	3,232	2.5
Whether childcare services are used for the first child aged less than 3 years			Kyusyu and Okinawa	12,522	9.7
Not used	104,583	80.9	Total	129,319	100.0
Used	24,736	19.1	Size of the municipality where the respondent resides		
Total	129,319	100.0	Large cities	32,653	25.3
Husband's employment status			Other cities	77,366	59.8
Employed by small and medium-sized companies	63,987	49.5	Rural districts	19,300	14.9
Employed by large companies or government agencies	48,529	37.5	Total	129,319	100.0
Self-employed and family businesses	12,509	9.7	Percentage of the husband's income in the household income (%)		
Not employed, students, part-time employees, etc.	4,294	3.3	0-40	3,843	3.2
Total	129,319	100.0	40-50	5,899	4.9
Wife's education level			50-60	21,226	17.5
Junior high school/Vocational school equivalent to junior high school	5,276	4.1	60-70	17,601	14.5
High school	45,913	35.5	70-80	13,200	10.9
Vocational school equivalent to high school/Junior college/Technical college	56,205	43.5	80-90	15,093	12.5
University/Graduate school	21,925	17.0	90-100	44,401	36.6
Total	129,319	100.0	Total	121,263	100.0
	N	Mean			
Number of obstetric facilities (per 1,000 female population aged 20-39)	129,319	0.054			
Number of pediatric facilities (per 1,000 married female population aged 20-39)	129,319	2.612			
Number of children aged 0-3 on a waiting list for a public childcare vacancy (per 1,000 population aged 0-3)	129,319	4.837			
Household income at the time of the 1st wave survey	121,263	606.7			

Table 4-2 Hazard ratios of a second birth: by birth interval

Explanatory variables	Model 1	Model 2	Model 3
	0-10 years	0-4 years	4-10 years
	exp(b)	exp(b)	exp(b)
<b>Birth interval spline (Base point: 0 year)</b>			
0-3 year	2.05 ***	2.08 ***	-
3-4 year	0.59 ***	0.45 ***	-
4-6 year	0.81 ***	-	0.53 ***
6-10 year	0.74 ***	-	0.82 ***
<b>Husband's participation in housework and child-rearing</b>			
Score on husband's participation in child-rearing (Reference: 0-4 points)			
5-9 points	1.20 ***	1.16 **	1.33 **
10-14 points	1.27 ***	1.23 ***	1.41 **
15-18 points	1.23 ***	1.21 **	1.31 *
Score on husband's participation in housework (Reference: 0-4 points)			
5-9 points	1.00	0.99	1.03
10-18 points	0.95 **	0.93 **	1.01
<b>Wife's anxiety and sense of burden from child-rearing</b>			
Anxiety or distress from child-rearing (Reference: A little)			
A lot	0.87 ***	0.85 ***	0.91
Almost none	1.09 ***	1.12 ***	0.96
Score on feelings of burden from child-rearing (Reference: 0 point)			
1-2 points	0.96 *	0.96 *	0.98
3-4 points	0.90 ***	0.91 ***	0.88 **
5-8 points	0.75 ***	0.72 ***	0.86
<b>Wife's employment change at the time of first birth</b> (Reference: Not employed before and after childbirth)			
Non-regular employment – Not employed	1.01	1.01	1.05
Regular employment – Not employed	1.18 ***	1.14 ***	1.35 ***
Regular employment continued by taking a childcare leave	1.12 ***	1.03	1.48 ***
Regular employment continued without taking a childcare leave	1.02	0.97	1.23 *
Non-regular employment continued without taking a childcare leave	0.94	0.91 *	1.07
<b>Household attributes</b>			
Husband's employment status (Reference: Employed by small and medium-sized companies)			
Employed by large companies or government agencies	1.04 **	1.04 *	1.04
Self-employed and family businesses	1.04	1.06	1.00
Not employed, students, part-time employees, etc.	0.87 ***	0.82 ***	1.05
Wife's education level (Reference: High school)			
Junior high school/Vocational school equivalent to junior high school	0.89 **	0.90 *	0.86
Vocational school equivalent to high school/Junior college/Technical college	1.12 ***	1.08 ***	1.34 ***
University/Graduate school	1.11 ***	1.09 ***	1.25 ***
Coresidence with parents (Reference: Not living together)			
Living together	1.05 **	1.05 *	1.04
<b>Attributes of the first child and childbirth conditions</b>			
Sex of the first child (Reference: Male)			
Female	0.98	0.97	1.01
Premature, underweight baby (Reference: No)			
Yes	0.72 ***	0.69 ***	0.83 *
Premarital pregnancy (Reference: No)			
Yes	1.05 *	1.09 ***	0.88 **
Month of birth (Reference: Born in January)			
Born in July	1.04 **	1.03 *	1.04

Table 4-2 continued

Explanatory variables	Model 1	Model 2	Model 3
	0-10 years	0-4 years	4-10 years
	exp(b)	exp(b)	exp(b)
<b>Demographic factors</b>			
Wife's age at first birth (Reference: Age 25-29)			
Age 16-19	1.51 ***	1.38 ***	2.49 ***
Age 20-24	1.11 ***	1.11 ***	1.08
Age 30-34	0.72 ***	0.76 ***	0.59 ***
Age 35-39	0.33 ***	0.42 ***	0.15 ***
Age 40-44	0.06 ***	0.10 ***	-
Area of residence (Reference: Kanto)			
Hokkaido	0.96	0.98	0.90
Tohoku	1.03	1.04	1.02
Hokuriku	1.10 **	1.11 **	1.08
Chubu	1.13 ***	1.15 ***	1.06
Kinki	1.11 ***	1.13 ***	1.01
Chugoku	1.12 ***	1.14 ***	1.04
Shikoku	1.19 ***	1.17 **	1.29 **
Kjusyu and Okinawa	1.24 ***	1.28 ***	1.06
Size of the municipality where the respondent resides (Reference: Other cities)			
Large cities	0.91 ***	0.89 ***	0.98
Rural districts	1.12 ***	1.16 ***	0.91
<b>Local child-rearing environment (Municipal statistics)</b>			
Ln(Number of obstetric facilities per 1,000 female population aged 20-39)	1.00	1.00	1.00
Ln(Number of pediatric facilities per 1,000 married female population aged 20-39)	1.00	0.99	1.02
Ln(Number of children aged 0-3 on the waiting list for a public childcare vacancy per 1,000 population aged 0-3)	1.00	1.00	0.99
Constant	0.019 ***	0.020 ***	0.147 ***
Number of person-periods	129,319	95,057	33,226
Number of samples	17,954	17,954	6,387
Number of events	12,602	10,135	2,467
Chi-square values	5245.653	4249.97	1415.63
Degrees of freedom	48	46	45

\*: p&lt;.10, \*\*: p&lt;.05, \*\*\*: p&lt;.01

Table 4-3 Hazard ratios of a second birth: wife's employment  
6 months after the birth of the first child

Explanatory variables	Model 4	Model 5
	Wife not employed	Wife employed
	exp(b)	exp(b)
6 months after the birth of the first child		
Birth interval spline		
0-3 year	2.09 ***	1.95 ***
3-4 year	0.62 ***	0.63 ***
4-6 year	0.80 ***	0.90 **
6-10 year	0.74 ***	0.74 ***
Husband's participation in housework and child-rearing		
Score on husband's participation in child-rearing (Reference: 10-14 points)		
0-4 points	0.77 ***	0.82
5-9 points	0.96 *	0.87 ***
15-18 points	0.96	0.97
Score on husband's participation in housework (Reference: 5-9 points)		
0-4 points	1.02	0.95
10-18 points	0.97	0.91 **
Wife's anxiety and sense of burden from child-rearing		
Anxiety or distress from child-rearing (Reference: A little)		
A lot	0.84 ***	0.90
Almost none	1.09 ***	1.07 *
Score on feelings of burden from child-rearing (Reference: 0 point)		
1-2 points	0.96	0.97
3-4 points	0.89 ***	0.95
5-8 points	0.77 ***	0.77 **
Wife's employment and use of childcare services		
Wife's employment status (Reference: Regular employees)		
Not employed	1.40 ***	1.50 ***
Self-employed and family businesses	1.20 *	0.98
Non-regular employees	0.92	0.83 ***
Whether childcare services are used for the first child aged less than 3 years (Reference: Not used)		
Used	0.92 **	1.15 ***
Household attributes		
Husband's employment status (Reference: Employed by small and medium-sized companies)		
Employed by large companies or government agencies	1.01	1.04
Self-employed and family businesses	1.02	0.98
Not employed, students, part-time employees, etc.	0.86 **	0.86
Wife's education level (Reference: High school)		
Junior high school/Vocational school equivalent to junior high school	0.85 ***	0.94
Vocational school equivalent to high school/Junior college/Technical college	1.12 ***	1.17 ***
University/Graduate school	1.11 ***	1.16 ***
Coresidence with (Reference: Not living together)		
Living together	1.05	1.13 ***

Table 4-3 Continued

Explanatory variables	Model 4	Model 5
	6 months after the birth of the first child Wife unemployed exp(b)	6 months after the birth of the first child Wife employed exp(b)
<b>Attributes of the first child and childbirth conditions</b>		
Sex of the first child (Reference: Male)		
Female	1.00	0.91 ***
Premature, underweight baby (Reference: No)		
Yes	0.68 ***	0.84
Premarital pregnancy (Reference: No)		
Yes	1.09 ***	1.10 **
Month of birth (Reference: Born in January)		
July	1.03	1.05
<b>Demographic factors</b>		
Wife's age at first birth(Reference: Age 25-29)		
Age 16-19	1.47 ***	1.21
Age 20-24	1.14 ***	1.06
Age 30-34	0.71 ***	0.73 ***
Age 35-39	0.31 ***	0.34 ***
Age 40-44	0.05 ***	0.09 ***
Area of residence (Reference: Kanto)		
Hokkaido	0.99	0.88
Tohoku	1.14 ***	0.91
Hokuriku	1.09 *	1.17 **
Chubu	1.13 ***	1.07
Kinki	1.11 ***	1.04
Chugoku	1.15 ***	1.08
Shikoku	1.22 ***	1.12
Kyusyu and Okinawa	1.28 ***	1.21 ***
Size of the municipality where the respondent resides (Reference: Other cities)		
Large cities	0.94 *	0.80 ***
Rural districts	1.12 ***	1.18 ***
<b>Local child-rearing environment (Municipal statistics)</b>		
Ln(Number of obstetric facilities per 1,000 female population aged 20-39)	1.00	1.01
Ln(Number of pediatric facilities per 1,000 married female population aged 20-39)	1.01	0.96 **
per 1,000 population aged 0-3)	1.00	1.00
Constant	0.018 ***	0.028 ***
Number of person-periods	96,643	31,961
Number of samples	13,570	4,379
Number of events	9,457	3,093
Chi-square values	4142.54	1307.12
Degrees of freedom	47	47

\*: p&lt;.10, \*\*: p&lt;.05, \*\*\*: p&lt;.01



## Chapter 5 Achievement of Intended Number of Children

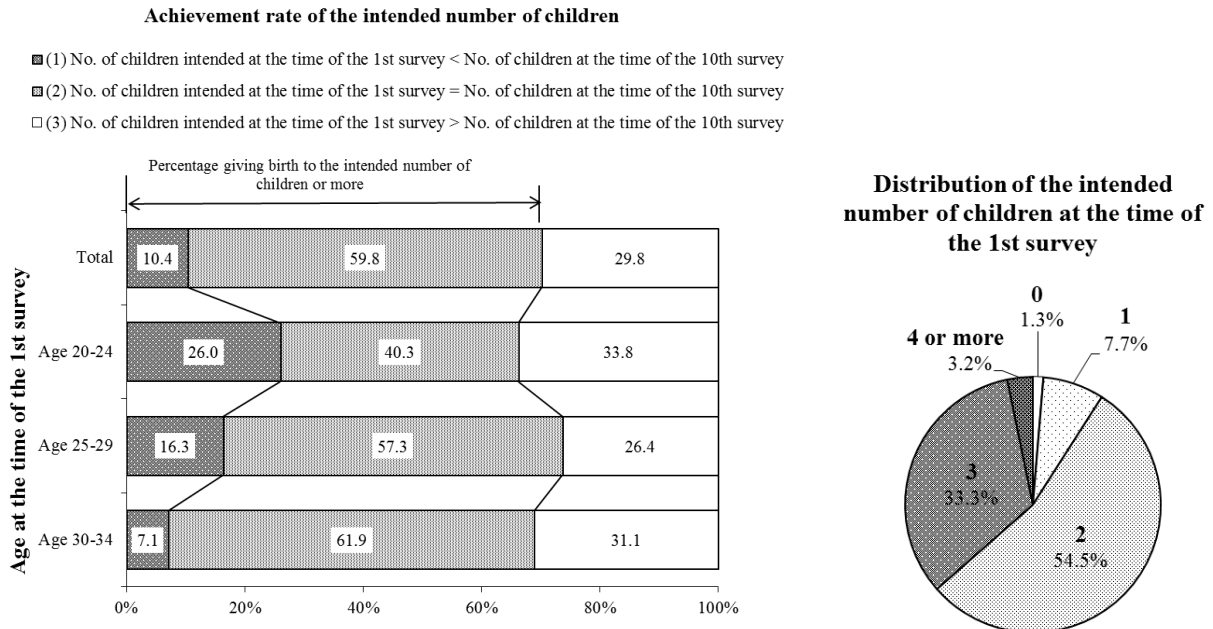
In order to find out whether or not individuals have achieved the number of children intended at the beginning of their reproductive career, it is necessary to track the same individuals and keep surveying about births. This Chapter presents results from analyses of married couples from the “Longitudinal Survey of Adults in the 21st Century.” In particular, the following are presented: (1) the extent to which wives’ intended number of children is achieved, and (2) factors that affect the probability of achieving one’s intended number of children. Descriptive statistics of the variables used in the following analyses are presented in Table 5-1 at the end of the chapter.

### 1. Achieving the intended number of children

- About 70% of married women achieve the number of children they intended at the beginning of marriage.

To what extent will the number of children intended by the wife at the beginning of the marriage be achieved? Based on the difference between the intended number of children at the time of the 1st survey (2002) and the actual number of children existing at the time of the 10th survey (2011) by the same individuals (married women), Figure 5-1 shows the distribution of (1) group of women whose number of children is greater than the number intended, (2) group of women whose number of children is the same as the number intended, and (3) group of women whose number of children is less than the number intended. This figure shows that, in all age groups, about 70% of women gave birth to the intended number of children or more children than intended.

Figure 5-1 Achievement of the intended number of children at the time of the 10th survey: married women



Note: Respondents were women who were married during the entire period from the 1st to 10th waves of the survey.

## **2. Factors affecting achievement of the intended number of children**

- *If the intended number of children is 2, important factors in achieving the number include timing of the first birth and availability of daytime childcare support. If the intended number of children is 3, whether the wife has easy access to childcare leave at her workplace and coresidence with the parents are important factors in achieving the intended number.*

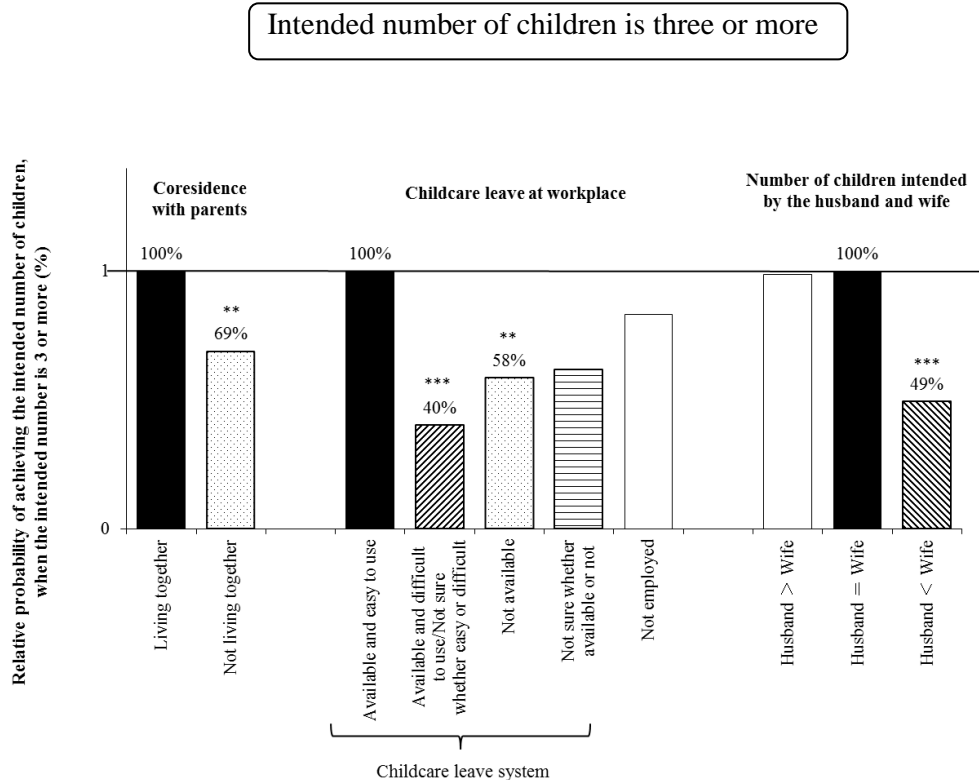
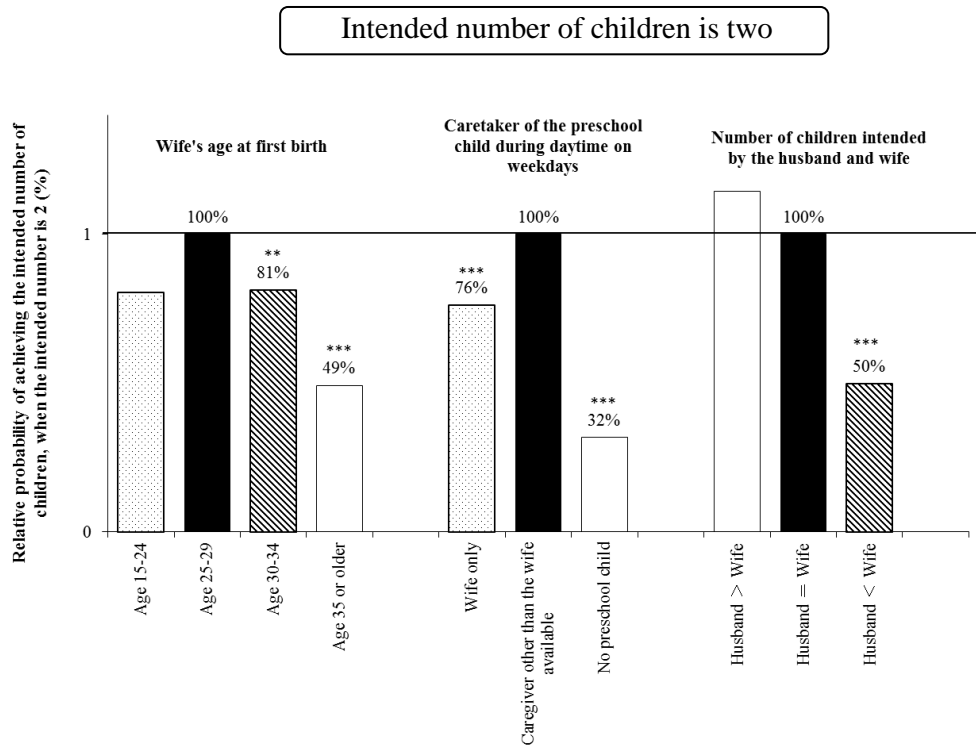
We examined factors affecting the achievement of one's intended number of children using multivariate event history analysis. Figure 5-2 presents factors affecting achievement of one's intended number of children for those whose intended number of children is 2 as well as 3 or more.

When the intended number of children is 2, factors that prevent achievement are: (1) giving birth to the first child at a late age and, (2) no caregiver other than the mother available during the day. When the intended number of children is 3 or more, it is difficult to be achieved when: (1) a childcare leave system is unavailable or cannot be used easily at the wife's workplace, and (2) the married couple does not live with their parents.

Additionally, when the wife's intended number of children is 2 or 3 or more, their intended number of children is less likely to be achieved if her husband's intended number of children is less than that of the wife.

In order to achieve the intended number of children, it is important to consider an earlier timing of birth, and to provide support in balancing work and family life including a childcare leave. It is also important to raise awareness among men with respect to having children, as husbands' preferences appear to have an influence to some extent.

Figure 5-2 Factors affecting achievement of intended number of children: married women



- Note:
- 1) Based on Model 3-2 and Model 3-3 of Table 5-2. The results are based on a discrete-time logit model controlling for the existing number of children when the question about their intended number of children was asked, wife's age at previous childbirth, marriage duration, wife's education level, wife's employment status, workplace environment for taking childcare leave, coresidence with parents and difference in the intended number of children between the husband and wife.
  - 2) The relative probability is calculated by multiplying the hazard odds ratio by 100.
  - 3) Analysis is based on a sample of respondents whose existing number of children is one child short of achieving their initial intended number of children.
  - 4) Statistical significance level: \*\*\* 1%, \*\* 5% (compared to the items indicated by the black bars in each Figure)

Table 5-1 Descriptive Statistics

	N	%
Whether the intended number of children is achieved or not		
Not achieved	8,864	91.4
Achieved	839	8.7
Total	9,703	100.0
Intended number of children		
1 child	813	8.4
2 children	4,544	46.8
3 or more children	4,346	44.8
Total	9,703	100.0
Number of existing children when the question on intended number of children was asked		
0 child	2,793	28.8
1 child	3,683	38.0
2 children	3,016	31.1
3 children	211	2.2
Total	9,703	100.0
Wife's age at previous birth		
Age 15-24	1,284	13.2
Age 25-29	4,668	48.1
Age 30-34	3,247	33.5
Age 35+	504	5.2
Total	9,703	100.0
Marriage duration		
0-4 years	2,723	28.1
5-9 years	3,906	40.3
10-14 years	2,405	24.8
15 years or longer	669	6.9
Total	9,703	100.0
Wife's education level		
Junior high school/High school	4,197	43.3
Junior college/Technical college/Vocational school	4,015	41.4
University/Graduate school	1,491	15.4
Total	9,703	100.0

	N	%
Wife's employment status		
Not employed	4,743	48.9
Company executives, self-employed, family business workers, and home workers	541	5.6
Regular employees	1,750	18.0
Non-regular employees	2,669	27.5
Total	9,703	100.0
Workplace atmosphere for taking childcare leave		
Childcare leave available and easy to use	1,191	12.3
Childcare leave available but difficult to use / Not sure whether it is easy or difficult	990	10.2
Childcare leave not available	1,657	17.1
Not sure whether a childcare leave system is available	1,183	12.2
Not employed	4,682	48.3
Total	9,703	100.0
Coresidence with parents		
Not living together	6,870	70.8
Living together	2,833	29.2
Total	9,703	100.0
Difference in the intended number of children between the husband and wife		
Husband > Wife	1,116	11.5
Husband = Wife	5,935	61.2
Husband < Wife	2,652	27.3
Total	9,703	100.0
Combination of sexes in existing children		
No children	813	8.4
Only males	3,489	36.0
Only females	3,149	32.5
Males and females	2,252	23.2
Total	9,703	100.0
Caretaker for the youngest preschool children during daytime on weekdays		
A caretaker other than the wife is available	3,312	34.1
Wife only	3,094	31.9
No preschool children	3,297	34.0
Total	9,703	100.0

Table 5-2 Hazard odds ratios of achieving the intended number of children: wife's employment status, by the intended number

Explanatory variables	Model 3-1	Model 3-2	Model 3-3
	Intended number of children		
	1 child exp(b)	2 children exp(b)	3 or more exp(b)
Number of existing children when the question on intended number of children was asked (Reference: 0)			
1	-	0.97	1.04
2	-	-	0.68
3+	-	-	0.98
Wife's age at previous birth (Reference: 25-29)			
15-24	1.11	0.81	1.29
30-34	0.61	0.81 **	1.00
35+	0.48	0.49 ***	0.47
Marriage duration (Reference: 5-9 years)			
0-4	2.02 **	1.13	0.71
10-14	-	0.54 ***	0.51 ***
15+	-	0.12 **	0.10 ***
Wife's education level (Reference: Junior high school/High school)			
Junior college/Technical college/Vocational school	1.58	1.17	1.33 *
University/Graduate school	1.87	1.08	1.00
Workplace atmosphere for taking childcare leave (Reference: Childcare leave available and easy to use)			
Childcare leave available but difficult to use / Not sure whether it is easy or difficult	0.83	0.82	0.40 ***
Childcare leave not available	0.67	0.74 *	0.58 **
Not sure whether a childcare leave system is available	0.25 **	0.87	0.62
Not employed	0.44 **	1.07	0.83
Coresidence with parents (Reference: Living together)			
Not living together	0.85	1.02	0.69 **
Difference in the intended number of children between the husband and wife (Reference: Husband = Wife)			
Husband > Wife	1.08	1.14	0.99
Husband < Wife	0.32	0.50 ***	0.49 ***
Combination of sexes in existing children (Reference: Only males)			
Only females	-	1.09	1.09
Males and females	-	-	0.98
Caretaker for the youngest preschool children during daytime on weekdays (Reference: A caretaker other than the wife is available)			
Wife only	-	0.76 ***	0.80
No preschool children	-	0.32 ***	0.66
Constant	0.09 ***	0.21 ***	0.21 ***
Number of person-years	669	4,544	4,346
Number of samples	170	1,230	846
Number of events	53	583	203
Chi-square values	27.56	136.29	103.01
Degrees of freedom	13	19	22

\* p<.1; \*\* p<.05; \*\*\* p<.01

## IV Appendix

### About the Appendix

Longitudinal surveys track the same individuals. Therefore, they are suitable for understanding how individual behaviors have changed after introduction of policies. In this Appendix, we examine policy effects using the “Longitudinal Survey of Adults in the 21st Century”.

The analysis presented here is an attempt to estimate policy effects as objectively as possible. However, the results are not necessarily conclusive, as they are based on various statistical assumptions. Depending on how one considers the assumptions, several interpretations can emerge from the same analysis results. In the text, therefore, we have described the assumptions for the analysis in as much depth as possible to show how we obtained the results.

Today, policy effects are demanded to be assessed in a scientific way, and the analysis shown here is considered as a new attempt to meet such a demand. Although our attempt here may not be conclusive, it is included in this report as an appendix, considering that official statistics may begin to play a new role in presenting scientific bases for public administration.

# Effects of the 2005 Revision of the Child Care and Family Care Leave Act on Female Labor Participation and Child Birth

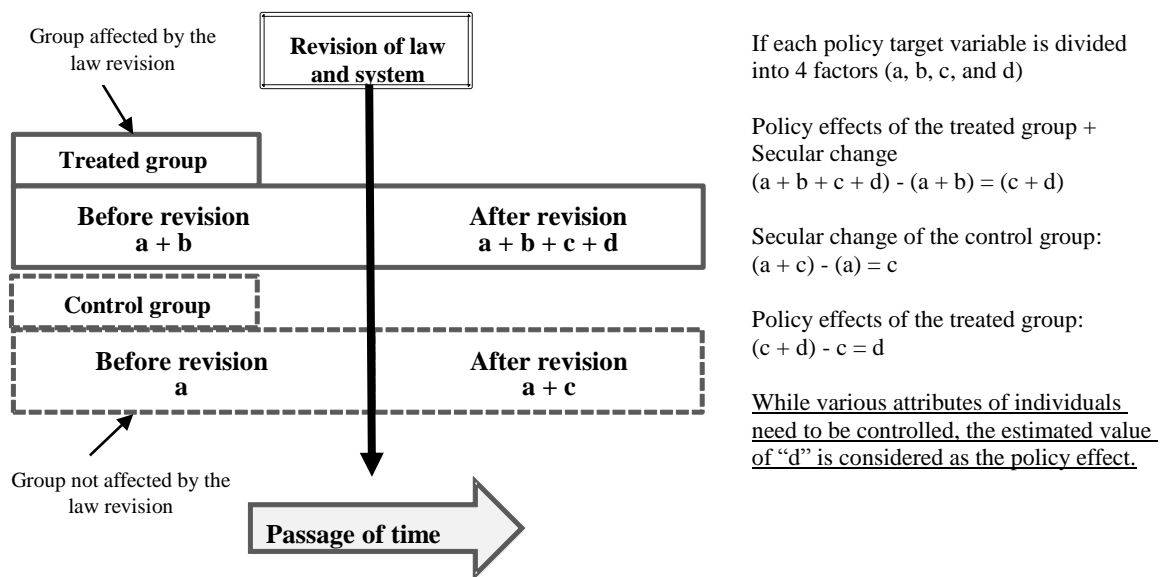
[Summary of results]

Since the 1990s, when concern over declining birth rates started to grow, a legal framework for policies that aim to effectively utilize women’s abilities by balancing work and family life has been developed. Under the revised Child Care and Family Care Leave Act, which came into effect in April 2005 (hereinafter referred to as the “2005 Revised Act”), the applicability of childcare and family care leave has been extended so that non-regular employees (such as part-time employees, temporary employees, dispatched employees, contract employees, and fixed-term employees) who satisfy certain requirements can take a childcare and family care leave in the same way as regular employees.\*

In order to analyze the effects of the 2005 Revised Act, we have quantified (1) whether the above non-regular employees could use the support measures for balancing work and family life, (2) whether they could continue their work after the births of their first child and second child, and (3) how the births of a first child and second child were affected before and after the enforcement of the 2005 Revised Act.

## 1. Method to assess the effects of the 2005 Revised Act

Figure A-2 Framework for assessment of policy effect



- Treatment group: “Women who are non-regular employees and who have been employed by the same employer for 1 year or longer”
- Control groups: “Short-term, non-regular female employees who do not fit the category above” and “women who are regular employees”

\* The “certain non-regular employees” who are newly entitled to take childcare and family care leave under the 2005 Revised Act are employees satisfying all of the following requirements:

- (1) Employees who have been employed on a continuous basis by the same employer for 1 year or longer; and
- (2) are expected to be continuously employed beyond the date on which the child reaches 1 year of age (the date immediately before the date of birth) (excluding cases where it is clear that the employment contract will expire one year from the date on which the child reaches 1 year of age, and that the employment contract will not be renewed).

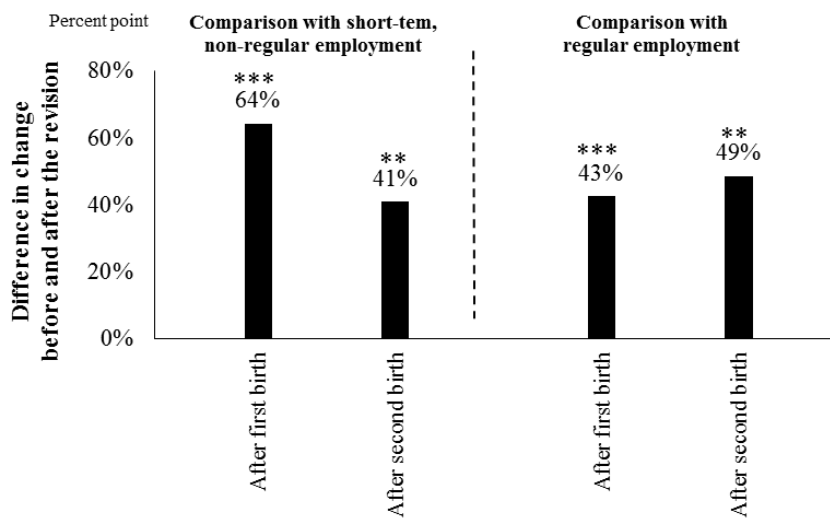
## 2. Policy effects on continuation of employment after childbirth

- Following the 2005 Revised Act, the probability that a woman in the treatment group will continue to be employed after the birth of her first child has increased, and the degree of increase is higher compared to that of the women in the control groups.

Among women in the treatment group, the percentage increase of women who continued to work after the birth of their first child was 64 percentage points (pp) more than that of the women who were short-term non-regular employees, and 43 pp more than that of women who were employed as regular employees. Therefore, the revision of the Act has contributed to an increase in the probability of continuous employment after the first birth among targeted women. In this regard, the revision has had a prominent effect.

The same tendency can be seen in the continuation of employment after a second birth. Among women in the treatment group, the percentage increase of women who continued to work after the birth of a second child was 41 pp more than that of the women who were short-term non-regular employees, and 49 pp more than that of the women who were employed as regular employees. In particular, when compared to regular employees, the increase in the probability of continuation of employment after a second birth was even higher than the increase in the probability of employment after the first birth.

Figure A-2 Difference in changes in the probability of women’s continuation of employment after childbirth before and after the 2005 Revised Act: Comparisons between treatment and control groups



- Note: 1) Based on Table A-8 and Table A-9. Results are obtained through analysis of Difference-in-Difference (DID) by means of a probit regression model for the samples matched by propensity scores of being in the treatment group or a control group. Age, education level, marital status, number of children, employment status, number of employees at the place of employment, and job type are controlled in the DID model.  
 2) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

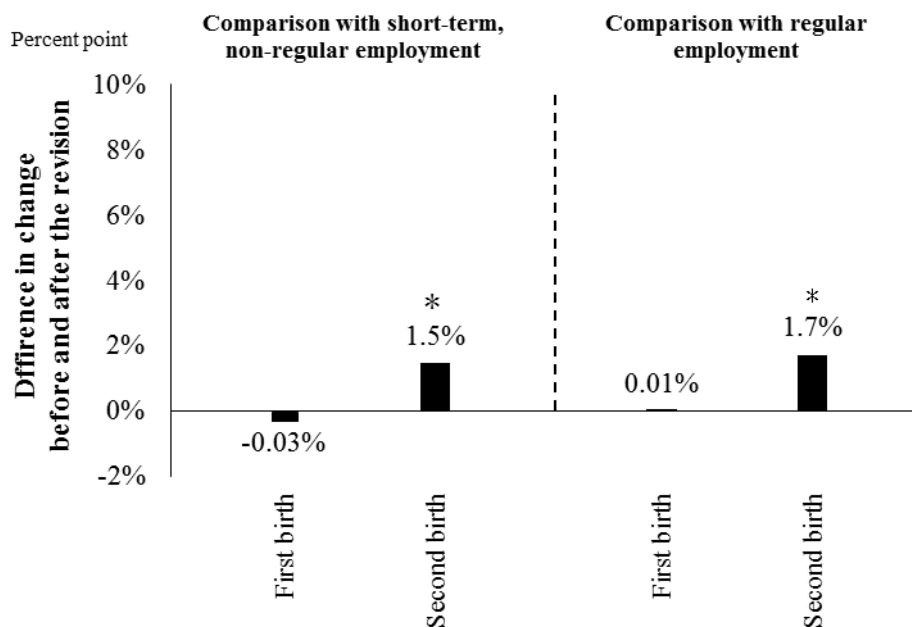


### 3. Policy effects on childbirth

- Among women in the treatment group, there may have been a slight rise in the probability of a second birth following the 2005 Revised Act.

By comparing the probabilities of childbirth before and after the 2005 Revised Act, it is estimated that, for women in the treatment group, the percentage increase in the probability of giving birth to a second child was 1.5 pp higher than that of women who were short-term non-regular employees and 1.7 pp higher than that of women who were regular employees. Although these differences may be small, it is possible that the 2005 Revised Act has contributed to an increase in the birth rate among the female non-regular employees whose years of continuous employment are relatively long.

Figure A-3 Difference in changes in the probability of childbirth before and after the 2005 Revised Act: Comparisons between treatment and control groups



Note: 1) Based on Table A-10 and Table A-11. Results are obtained through analysis of DID by means of a probit regression model for the samples matched by propensity scores of being in the treatment group or a control group. Age, education level, marital status, number of children, employment status, number of employees at the place of employment, and job type are controlled in the DID model.  
 2) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

Table A-1 Breakdown of analytical samples

Total female sample	13,861	
Women who did not give birth to the first child by the 1st survey	9,148	
Group 1: Women who at least once answered that they were non-regular employees at the time of survey	4,781	
(Regrouped) Non-regular employees who at least once were employed consecutively for 1 year or longer	3,619	→ Treatment group
(Regrouped) Non-regular employees who were never employed consecutively for 1 year or longer	1,116	→ Control group 1
(Regrouped) Lengths of employment cannot be measured throughout the survey period	46	
Group 2: Women who never answered that they were non-regular employees at the time of each survey	3,547	
(Regrouped) Women who were always regular employees whenever they answered about their employment status	3,119	→ Control group 2
(Regrouped) Women who were always regular employees or self-employed whenever they answered about their employment status	233	
(Regrouped) Women who were always self-employed whenever when they answered about their employment status	195	
Employment status is unknown throughout the survey period	820	

Table A-2 Comparison of mean values (Treatment group vs. Control group 1)

Names of variables	Treatment group (Non-regular employees who at least once were employed consecutively for 1 year or longer) (N=3,619)			Control group 1 (Non-regular employees who were never employed consecutively for 1 year or longer) (N=1,116)		
	Number of observations	Mean	Std. Dev.	Number of observations	Mean	Std. Dev.
<b>1. Personal attributes</b>						
Age	3,619	28.490	4.437	1,116	27.089	4.429 ***
Education level						**
Junior high school/High school	3,134	0.359		918	0.336	
Technical school/Junior college/Technical college	3,134	0.439		918	0.424	
University or higher	3,134	0.194		918	0.237	
Others	3,134	0.007		918	0.003	
Married	3,619	0.242		1,116	0.251	
Number of children	3,619	0.120	0.313	1,116	0.161	0.374 ***
<b>Employment conditions at each time of survey</b>						
<b>Employment status</b>						
Regular employment	3,619	0.188		1,116	0.334	***
Non-regular employment	3,619	0.792		1,116	0.642	***
Employment insurance coverage	3,479	0.610		1,007	0.579	**
301 or more employees	3,619	0.274		1,116	0.203	***
<b>Job type</b>						
White color	3,619	0.536		1,116	0.462	
Services	3,619	0.180		1,116	0.150	
Blue color	3,619	0.103		1,116	0.095	
Number of months of consecutive employment	3,619	37.451	29.242	1,116	18.504	21.869 ***
Weekly working hours	3,596	34.147	10.609	1,107	33.990	12.533
Labor income of the respondent	3,467	1,573,814	1,054,305	967	1,396,100	1,025,586 ***
<b>2. Household attributes</b>						
Number of household members	3,619	2.361	1.271	1,116	2.382	1.787
Coresidence with the father of the respondent	3,569	0.558		1,087	0.538	
Coresidence with the mother of the respondent	3,575	0.622		1,089	0.593	**
The respondent is married and coresidence with father-in-law	1,416	0.092		434	0.070	
The respondent is married and coresidence with mother-in-law	1,417	0.119		433	0.087	**
Household income	3,467	2,488,028	1,703,928	961	2,507,477	1,801,228
Equivalent household income	3,467	1,519,456	1,139,168	961	1,526,802	1,162,283
<b>Policy target variables</b>						
<b>3. Use of system in the workplaces at each time of survey</b>						
<b>Childcare leave</b>						
Available	3,213	0.291		819	0.343	***
Among them, paid leave available	1,684	0.223		408	0.245	
<b>Sick/injured child care leave</b>						
Available	3,183	0.133		803	0.158	**
Among them, paid leave available	923	0.274		232	0.297	
<b>Reduced working hour for childcare, etc.</b>						
Available	3,205	0.159		817	0.186	**
<b>4. Employment conditions after childbirth</b>						
<b>After first birth</b>						
Employed	581	0.469		215	0.321	***
<b>After second birth</b>						
Employed	218	0.539		97	0.306	***
<b>5. Childbirth during the survey period</b>						
First child	3,619	0.022		1,116	0.029	***
Second child	3,619	0.008		1,116	0.012	***

Note: 1) "Non-regular employees" include part-time employees, dispatched employees, contract employees, fixed-term employees, and others.

2) "Regular employees" include regular employees and workers.

3) As for the professions, specialized and technical jobs, managerial jobs, clerical jobs, and sales jobs are classified into "white collar," service jobs are classified into "services," jobs related to security, agriculture, forestry and fisheries, transportation and communications, production processes, and labor services are classified into "blue collar," and all other jobs are used as the reference group.

4) Equivalent household income is calculated by dividing the household income by the square root (the 0.5th power) of the number of household members.

5) Statistical significance level for the difference in mean values between the treatment group and the control group: \*<.1; \*\*p<.05; \*\*\*p<.01

Table A-3 Comparison of mean values (Treatment group vs. Control group 2)

Names of variables	Treatment group (Non-regular employees who at least once were employed consecutively for 1 year or longer) (N=3,619)			Control group 2 (Regular employees whenever they answered about their employment status) (N=3,119)		
	Number of samples	Mean	Std. Dev.	Number of samples	Mean	Std. Dev.
<b>1. Personal attributes</b>						
Age	3,619	28.490	4.437	3,119	28.806	4.240 ***
Education level						***
Junior high school/High school	3,134	0.359		2,962	0.268	
Technical school/Junior college/Technical college	3,134	0.439		2,962	0.498	
University or higher	3,134	0.194		2,962	0.231	
Others	3,134	0.007		2,962	0.003	
Married	3,619	0.242		3,119	0.194	***
Number of children	3,619	0.120	0.313	3,119	0.112	0.306
<b>Employment conditions at each time of survey</b>						
<b>Employment status</b>						
Regular employment	3,619	0.188		3,119	1.000	***
Non-regular employment	3,619	0.792		3,119	0.000	***
Employment insurance coverage	3,479	0.610		2,946	0.897	***
301 or more employees	3,619	0.274		3,119	0.345	***
<b>Job type</b>						
White color	3,619	0.536		3,119	0.722	
Services	3,619	0.180		3,119	0.087	
Blue color	3,619	0.103		3,119	0.067	
Number of months of consecutive employment	3,619	37.451	29.242	3,101	79.343	51.647 ***
Weekly working hours	3,596	34.147	10.609	3,081	42.377	9.376 ***
Labor income of the respondent	3,467	1,573,814	1,054,305	2,935	2,822,873	1,677,452 ***
<b>2. Household attributes</b>						
Number of household members	3,619	2.361	1.271	3,119	2.236	1.524 ***
Coresidence with the father of the respondent	3,569	0.558		3,041	0.547	
Coresidence with the mother of the respondent	3,575	0.622		3,043	0.610	
The respondent is married and coresidence with the father-in-law	1,416	0.092		1,027	0.087	
The respondent is married and coresidence with the mother-in-law	1,417	0.119		1,025	0.116	
Household income	3,467	2,488,028	1,703,928	2,929	3,627,075	2,804,557 ***
Equivalent household income	3,467	1,519,456	1,139,168	2,929	2,273,871	1,859,586 ***
<b>Policy target variables</b>						
<b>3. Use of system in the workplaces at each time of survey</b>						
<b>Childcare leave</b>						
Available	3,213	0.291		2,482	0.660	***
Among them, paid leave available	1,684	0.223		1,859	0.334	***
<b>Sick/injured child care leave</b>						
Available	3,183	0.133		2,473	0.278	***
Among them, paid leave available	923	0.274		1,115	0.407	***
<b>Reduced working hour for childcare, etc.</b>						
Available	3,205	0.159		2,473	0.325	***
<b>4. Employment conditions after childbirth</b>						
<b>After first birth</b>						
Employed	581	0.469		450	0.550	***
<b>After second birth</b>						
Employed	218	0.539		193	0.513	
<b>5. Childbirth during the survey period</b>						
First child	3,619	0.022		3,119	0.022	
Second child	3,619	0.008		3,119	0.009	

- Note: 1) "Non-regular employees" include part-time employees, dispatched employees, contract employees, fixed-term employees, and others.  
2) "Regular employees" include regular employees and workers.  
3) As for the professions, specialized and technical jobs, managerial jobs, clerical jobs, and sales jobs are classified into "white collar," service jobs are classified into "services," jobs related to security, agriculture, forestry and fisheries, transportation and communications, production processes, and labor services are classified into "blue collar," and all other jobs are used as the reference group.  
4) Equivalent household income is calculated by dividing the household income by the square root (the 0.5th power) of the number of household members.  
5) Statistical significance level for the difference in mean values between the treatment group and the control group: \* $p < .1$ ; \*\* $p < .05$ ; \*\*\* $p < .01$

Table A-4 Estimation of propensity scores (Treatment group vs. Control group 1)

Dependent variables: Non-regular employees who at least once were employed consecutively for 1 year or longer	Coefficients	Std. Err.	
Age	0.045	0.007	***
Junior high school/High school	0.228	0.068	***
Technical school/Junior college/Technical college	0.144	0.063	**
Married	0.042	0.112	
Number of children	-0.232	0.090	**
Employment insurance coverage	-0.160	0.066	**
301 or more employees	0.442	0.082	***
Services	0.364	0.098	***
Blue color	0.157	0.115	
Labor income of the respondent (Logarithmic value)	0.148	0.021	***
Number of household members	0.039	0.025	
Coresidence with the father of the respondent	0.027	0.086	
Household income (Logarithmic value)	0.015	0.052	
Constant	-3.046	0.688	***
Number of observations		3674	
Log likelihood		-1755.614	
LR chi2(12)		207.480	
Pseudo R2		0.056	

Note: 1) Results are obtained by a probit model.  
 2) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

Table A-5 Results of the propensity score matching: T-tests of treatment and control groups for matched/unmatched samples (Treatment group vs. Control group 1)

Names of variables	Samples	Mean values		
		Treatment group	Control group 1	p>t
Age	Unmatched	29.150	28.254	0.000
	Matched	29.077	29.150	0.518
Junior high school/High school	Unmatched	0.350	0.310	0.041
	Matched	0.346	0.341	0.715
Technical school/Junior college/Technical college	Unmatched	0.445	0.443	0.913
	Matched	0.446	0.457	0.410
Married	Unmatched	0.269	0.307	0.016
	Matched	0.269	0.283	0.168
Number of children	Unmatched	0.138	0.207	0.000
	Matched	0.139	0.153	0.123
Employment insurance coverage	Unmatched	0.641	0.636	0.804
	Matched	0.642	0.656	0.184
301 or more employees	Unmatched	0.276	0.196	0.000
	Matched	0.269	0.287	0.033
Services	Unmatched	0.165	0.125	0.000
	Matched	0.160	0.140	0.004
Blue color	Unmatched	0.103	0.087	0.073
	Matched	0.104	0.107	0.585
Labor income of the respondent (Logarithmic value)	Unmatched	14.118	13.478	0.000
	Matched	14.112	14.123	0.638
Number of household members	Unmatched	2.393	2.399	0.907
	Matched	2.390	2.343	0.137
Coresidence with the father of the respondent	Unmatched	0.549	0.519	0.075
	Matched	0.549	0.533	0.149
Household income (Logarithmic value)	Unmatched	14.585	14.543	0.127
	Matched	14.581	14.607	0.161
Unmatched	Pseudo R2	LR chi2	p>chi2	
	0.056	207.480	0.000	
Matched	Pseudo R2	LR chi2	p>chi2	
	0.002	17.820	0.165	

Note: 1) Matched samples are extracted from both groups by means of nearest-neighbor matching on a one-by-one basis.

Table A-6 Estimation of propensity scores (Treatment group vs. Control group 2)

Dependent variables: Non-regular employees who at least once were employed consecutively for 1 year or longer	Coefficients	Std. Err.	
Age	0.033	0.005	***
University or higher	0.132	0.044	***
Married	1.471	0.074	***
Number of children	-0.406	0.068	***
Blue color	0.341	0.082	***
Equivalent household income (Logarithmic value)	-1.077	0.035	***
Constant	14.078	0.475	***
Number of observations	5814		
Log likelihood	-3421.847		
LR chi2(12)	1208.490		
Pseudo R2	0.150		

Note: 1) Results are obtained by a probit model.  
 2) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

Table A-7 Results of the propensity score matching: T-tests of treatment and control groups for matched/unmatched samples (Treatment group vs. Control group 2)

Names of variables	Samples	Mean values		p>t
		Treatment group	Control group 2	
Age	Unmatched	29.122	29.026	0.385
	Matched	29.124	29.056	0.531
University or higher	Unmatched	0.198	0.234	0.001
	Matched	0.198	0.191	0.517
Married	Unmatched	0.270	0.206	0.000
	Matched	0.270	0.297	0.005
Number of children	Unmatched	0.137	0.123	0.089
	Matched	0.138	0.146	0.333
Blue color	Unmatched	0.103	0.064	0.000
	Matched	0.103	0.104	0.764
Equivalent household income (Logarithmic value)	Unmatched	14.031	14.464	0.000
	Matched	14.035	14.067	0.080
Unmatched	Pseudo R2	LR chi2	p>chi2	
	0.15	1208.490	0.000	
Matched	0.001	12.340	0.055	

Note: 1) Matched samples are extracted from both groups by means of nearest-neighbor matching on a one-by-one basis.



Table A-8 Difference-in-difference estimation of continuous employment after first and second births (Treatment group vs. Control group 1)

<u>Employed after first birth</u>			
Explanatory variables	Marginal effects	Std. Err.	
Non-regular employees who at least once were employed consecutively for 1 year or longer	-0.107	0.012	***
Dummy: after 2005	-0.122	0.013	***
<b>delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)</b>	<b>0.642</b>	<b>0.097</b>	<b>***</b>
Age	0.005	0.002	**
Junior high school/High school	-0.026	0.038	
Technical school/Junior college/Technical college	-0.039	0.029	
Married	-0.036	0.043	
Number of children	0.060	0.019	***
Employment status at each time of survey (Regular employment)	0.058	0.022	**
301 or more employees	0.023	0.023	
Services	0.043	0.024	*
Blue color	-0.034	0.041	
Number of observations	874		
Number of samples (persons)	295		
Wald chi2(12)	4107.450		

<u>Employed after second birth</u>			
Explanatory variables	Marginal effects	Std. Err.	
Non-regular employees who at least once were employed consecutively for 1 year or longer	-0.290	0.161	*
Dummy: after 2005	-0.115	0.030	***
<b>delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)</b>	<b>0.408</b>	<b>0.184</b>	<b>**</b>
Age	0.009	0.007	
Junior high school/High school	0.111	0.079	
Technical school/Junior college/Technical college	0.053	0.074	
Married	-0.012	0.315	
Number of children	0.113	0.066	*
301 or more employees	0.193	0.060	***
Services	0.317	0.051	***
Blue color	0.261	0.077	***
Number of observations	670		
Number of samples (persons)	206		
Wald chi2(11)	239.360		

- Note: 1) Results are obtained by a probit model with GEE population-average estimation.  
 2) The variable, “employment status at the time of each survey (regular employment)” is removed from the second model due to lack of variation in the variable among non-regular employees employed for 1 year or longer after the birth of a second child.  
 3) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

Table A-9 Difference-in-difference estimation of continuous employment after first and second births (Treatment group vs. Control group 2)

<u>Employed after first birth</u>		
Explanatory variables	Marginal effects	Std. Err.
Non-regular employees who at least once were employed consecutively for 1 year or longer	-0.167	0.021 ***
Dummy: after 2005	-0.078	0.011 ***
delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)	0.425	0.091 ***
Age	0.003	0.002 *
Junior high school/High school	-0.033	0.029
Technical school/Junior college/Technical college	-0.030	0.020
Married	-0.010	0.035
Number of children	0.041	0.014 ***
Employment status at each time of survey (Regular employment)	0.033	0.019 *
301 or more employees	0.015	0.015
Services	0.031	0.015 **
Blue color	-0.021	0.029
Number of observations	1,084	
Number of samples (persons)	352	
Wald chi2(12)	2451.830	

<u>Employed after second birth</u>		
Explanatory variables	Marginal effects	Std. Err.
Non-regular employees who at least once were employed consecutively for 1 year or longer	-0.393	0.133 ***
Dummy: after 2005	-0.186	0.038 ***
delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)	0.485	0.193 **
Age	0.006	0.007
Junior high school/High school	0.036	0.075
Technical school/Junior college/Technical college	0.056	0.069
Married	-0.002	0.350
Number of children	0.114	0.070
301 or more employees	0.270	0.056 ***
Services	0.331	0.047 ***
Blue color	0.276	0.068 ***
Number of observations	747	
Number of samples (persons)	237	
Wald chi2(12)	690.090	

- Note: 1) Results are obtained by a probit model with GEE population-average estimation.  
 2) The variable, “employment status at the time of each survey (regular employment)” is removed from the second model due to lack of variation in the variable among non-regular employees employed for 1 year or longer after the birth of a second child.  
 3) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

Table A-10 Difference-in-difference estimation of first and second births  
(Treatment group vs. Control group 1)

<b>First birth</b>		
Explanatory variables	Marginal effects	Std. Err.
Non-regular employees who at least once were employed consecutively for 1 year or longer	0.0001	0.001
Dummy: after 2005	-0.001	0.002
delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)	-0.0003	0.002
Age	-0.0002	0.0001 ***
Junior high school/High school	-0.001	0.0004 **
Technical school/Junior college/Technical college	-0.001	0.0004 *
Married	0.041	0.004 ***
Employment status at each time of survey (Regular employment)	0.003	0.001 ***
301 or more employees	0.0002	0.0004
Services	-0.0004	0.0005
Blue color	-0.001	0.001 *
Number of observations	15,195	
Number of samples (persons)	2,945	
Wald chi2(11)	197.380	

<b>Second birth</b>		
Explanatory variables	Marginal effects	Std. Err.
Non-regular employees who at least once were employed consecutively for 1 year or longer	-0.225	0.134 *
Dummy: after 2005	0.001	0.001
delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)	0.015	0.009 *
Age	0.0001	0.00004
Junior high school/High school	0.001	0.001
Technical school/Junior college/Technical college	0.0001	0.0003
Married	0.002	0.001 **
Employment status at each time of survey (Regular employment)	0.001	0.0004
301 or more employees	-0.0003	0.0003
Services	-0.0003	0.0003
Blue color	-0.001	0.0004 *
Number of observations	3,360	
Number of samples (persons)	646	
Wald chi2(11)	120.740	

Note: 1) Result are obtained by a probit model with GEE population-average estimation.  
2) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.

Table A-11 Difference-in-difference estimation of first and second births  
(Treatment group vs. Control group 2)

<b>First birth</b>		
Explanatory variables	Marginal effects	Std. Err.
Non-regular employees who at least once were employed consecutively for 1 year or longer	-0.001	0.001
Dummy: after 2005	0.001	0.001
<b>delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)</b>	<b>0.0001</b>	<b>0.001</b>
Age	-0.0001	0.0001 ***
Junior high school/High school	-0.001	0.0004 ***
Technical school/Junior college/Technical college	-0.001	0.0003 *
Married	0.049	0.004 ***
Employment status at each time of survey (Regular employment)	0.002	0.001 ***
301 or more employees	0.00003	0.0003
Services	-0.0003	0.0004
Blue color	-0.0004	0.0004
Number of observations	18,383	
Number of samples (persons)	3,607	
Wald chi2(11)	276.850	

<b>Second birth</b>		
Explanatory variables	Marginal effects	Std. Err.
Non-regular employees who at least once were employed consecutively for 1 year or longer	-0.063	0.042
Dummy: after 2005	0.003	0.002 *
<b>delta (Non-regular employees who at least once were employed consecutively for 1 year or longer × Dummy: after 2005)</b>	<b>0.017</b>	<b>0.010 *</b>
Age	0.0001	0.0001
Junior high school/High school	0.0004	0.001
Technical school/Junior college/Technical college	0.0003	0.0004
Married	0.004	0.001 ***
Employment status at each time of survey (Regular employment)	0.001	0.001
301 or more employees	0.000	0.0004
Services	-0.001	0.001
Blue color	-0.001	0.001
Number of observations	4,116	
Number of samples (persons)	764	
Wald chi2(11)	176.180	

Note: 1) Result are obtained by a probit model with GEE population-average estimation.  
2) Statistical significance level: \*\*\* 1%, \*\* 5%, \* 10%.