

Control variables

I control for several background variables that affect fertility including mother's age at childbirth, mother's tobacco use, and mother's employment status. Mother's age at childbirth is measured in years and tobacco use is dummy coded where 1=current smoker and 0=currently a non-smoker. I create five categories for mother's education: junior high school graduate, high school graduate (reference), vocational school graduate, junior college graduate, and college graduate or above. I create a variable for mother's employment status at the time of the first survey: unemployed/students (reference), full-time employees who are currently on maternal leave (or have already been on or expecting to be on maternal leave), full-time employees who did not take and do not plan on taking a maternal leave), part-time employees, and self-employed. I also control for a variable indicating whether the child's grandmother was co-residing at the time of the first survey.

Analysis

First, I present descriptive statistics of the variables used in the study. Then, I show bivariate associations between gender of the first-born child, measures of parenting difficulty and second birth (i.e. percentage having a second child, duration to second birth among those who had a second birth). I also show the relationship between gender of the first-born child and measures of parenting difficulty. Finally, data are analyzed using discrete-time event history analysis. Specifically, I estimate the complementary log-log (cloglog) model to person-month data on transition to a second birth. The original data were converted into a monthly person-period file. Analysis time spanned from 7 months to 67 months from the birth of the first child and cases were right-censored at 67 months if birth of a second birth did not occur by then.

Results

Table 2 presents descriptive statistics of all variables used in the analysis. Of the 20,413 first-borns, 51.23% were boys and 48.77% were girls. 64.95% of them had a little brother or

sister by the 6th survey. Of those who had a younger sibling, the average number of months it took to welcome a sibling was 33.52 months from their birthday. About two-thirds of parents had at least some concern about raising their first-borns when they were 6 months and 18 months old. More than a third of parents also claimed physical exhaustion associated with parenting their 6-month olds and 18- month olds. Not very many parents reported that their first-borns get sick often but about 10% of the children have been hospitalized and 78% of them have experienced some kind of accident or injury.

Table 2: Descriptive Statistics of the Variables in the Analysis		
Variable		n = 20,413
Sex of the first-born child		
Boy		51.23
Girl		48.77
Had a second child before the 6th survey		
No		35.05
Yes		64.95
(If yes) Average number of months to second child ^a		33.52 (12.56)
<i>Subjective parenting difficulty of the first child</i>		
(1st survey) Concerned about raising your child		
Very concerned		6.54
Somewhat concerned		58.60
Not very concerned		34.86
(2nd survey) Concerned about raising your child		
Very concerned		5.79
Somewhat concerned		58.66
Not very concerned		35.55
(1st survey) Physical exhaustion from parenting		
Not selected		62.18
Selected		37.82
(2nd survey) Physical exhaustion from parenting		
Not selected		62.40
Selected		37.60
(2nd survey) Child needs close supervision/can't take eyes off the child		
Not selected		66.10
Selected		33.90
<i>Objective parenting difficulty of the first child</i>		
(1st survey) Child gets sick often		
Not selected		98.31
Selected		1.69
(2nd survey) Child gets sick often		
Not selected		95.40
Selected		4.60
(2nd survey) Hospitalization		
Not selected		89.18
Selected		10.82
(2nd survey) Accident/injury		
Not selected		21.64
Selected		78.36
Values are percentages.		
^a Values are means and (standard deviations).		

Table 2: Descriptive Statistics of the Variables in the Analysis (cont'd)		
Variable		n = 20,413
<i>Mother's background</i>		
Age at birth of the first child ^a		28.63 (4.26)
Tobacco use		
	Non-smoker	84.62
	Current smoker	15.38
Educational attainment		
	Junior high school graduate	4.81
	High school graduate	36.23
	Vocational school graduate	18.41
	Junior college graduate	25.00
	College graduate and above	15.55
Employment status at the time of the first survey		
	Unemployed/students	75.60
	Full-time employees currently on maternal leave	15.27
	Full-time employees who did not take a maternal leave	2.76
	Part-time employee	2.70
	Self-employed	3.67
Coresidence with child's grandmother		
	No	82.49
	Yes	17.51
Values are percentages.		
^a Values are means and (standard deviations).		

Tables 3 and 4 show bivariate relationships between sex of the first-born and second birth. There is no significant difference between whether a second child is born or not depending on the sex of the first-born child. Duration in months to a second birth was slightly shorter for first-born boys than for girls; however, as Kaplan-Meier survival curves for time to parity progression by sex of first-born child shows, both curves are almost identical (Figure 1).

Table 3: Percentage of second birth occurrence, by sex of first-borns			
	With second child	Without second child	sig.
First-born=Boy	34.9	65.1	
First-born=Girl	35.2	64.8	

Table 4: Duration (months) to second birth, by sex of first-borns ^a				
	n	mean	SD	sig.
First-born=Boy	6804	33.3	12.5	*
First-born=Girl	6455	33.8	12.6	
^a Of those with a second birth only				
* p<.05; Significant mean difference between first-born boys and girls				

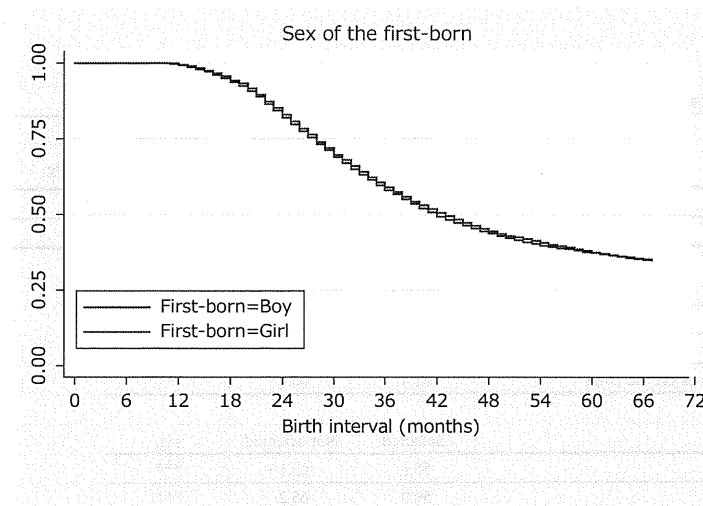


Figure 1: Kaplan-Meier survival estimates by sex of the first-born

Table 5 presents bivariate associations between subjective and objective measures of parenting difficulty and second birth. Overall, a significantly higher percentage of second births occurred among parents whose first-borns were not difficult to raise compared to those whose first-borns were difficult to raise. An exception to this is first-borns with accident/injury experience; first-borns with such experience had a slightly higher percentage of having a younger sibling than those without an accident/injury experience. This may be because the variable includes such small injuries as “accidentally cut himself/herself,” and the majority of parents (78%) report at least some kind of accident/injury occurring. Parents who are so sensitive they don’t even let a minor injury occur may be a group of people that struggle with parenting, hence hesitate subsequent children. Duration to a second birth (Table 6) was also longer among parents who perceived their first-borns difficult to raise on several subjective measures and whose first-borns were prone to sickness by 18-months of age. Figure 2 and 3

present Kaplan-Meier survival curves of time from first to second birth according to parenting difficulty categories for each measure of parenting difficulty. Overall, groups of parents experiencing parenting difficulty had a slower transition to second birth and eventually a decreased probability of giving birth to a second child compared to groups with less parenting difficulty

	Very concerned	Somewhat concerned	Not very concerned	sig.
Subjective parenting difficulty				
(1st survey) Concerned about raising your child	56.1	64.1	68.2	***
(2nd survey) Concerned about raising your child	53.3	64.3	68.5	***
Subjective parenting difficulty	Selected	Not selected		sig.
	61.0	67.4		***
(2nd survey) Physical exhaustion from parenting	61.5	67.1		***
(2nd survey) Child needs close supervision/can't take eyes off the child	61.4	66.8		***
Objective parenting difficulty	Selected	Not selected		sig.
(1st survey) Child gets sick often	55.1	65.1		***
(2nd survey) Child gets sick often	59.9	65.2		***
(2nd survey) Hospitalization	62.7	65.2		*
(2nd survey) Accident/injury	65.6	63.1		**

* p<.05; ** p<.01; *** p<.001; Significant overall chi-square for the association between parenting difficulty and second birth occurrence

	n	mean	SD	sig.
(1st survey) Concerned about raising your child: Very concerned	747	35.1	12.4	***
(1st survey) Concerned about raising your child: Somewhat concerned	7647	34.0	12.6	
(1st survey) Concerned about raising your child: Not very concerned	4846	32.6	12.4	
(2nd survey) Concerned about raising your child: Very concerned	618	35.4	13.3	***
(2nd survey) Concerned about raising your child: Somewhat concerned	7557	33.8	12.7	
(2nd survey) Concerned about raising your child: Not very concerned	4876	32.9	12.3	
(1st survey) Physical exhaustion from parenting: Selected	4708	34.5	0.2	***
(1st survey) Physical exhaustion from parenting: Not selected	8551	33.0	0.1	
(2nd survey) Physical exhaustion from parenting: Selected	4718	33.5	0.2	
(2nd survey) Physical exhaustion from parenting: Not selected	8541	33.5	0.1	
(2nd survey) Child needs close supervision/can't take eyes off the child: Selected	4251	33.2	0.2	
(2nd survey) Child needs close supervision/can't take eyes off the child: Not selected	9008	33.7	0.1	
(1st survey) Child gets sick often: Selected	190	33.5	1.0	
(1st survey) Child gets sick often: Not selected	13069	33.7	0.1	
(2nd survey) Child gets sick often: Selected	562	35.8	0.6	***
(2nd survey) Child gets sick often: Not selected	12697	33.4	0.1	
(2nd survey) Hospitalization: Selected	1385	34.1	0.4	
(2nd survey) Hospitalization: Not selected	11874	33.5	0.1	
(2nd survey) Accident/injury: Selected	10122	33.6	0.1	
(2nd survey) Accident/injury: Not selected	2690	33.4	0.2	

^aOf those with a second birth only
*** p<.001; Significant mean difference between/across categories of parenting difficulty

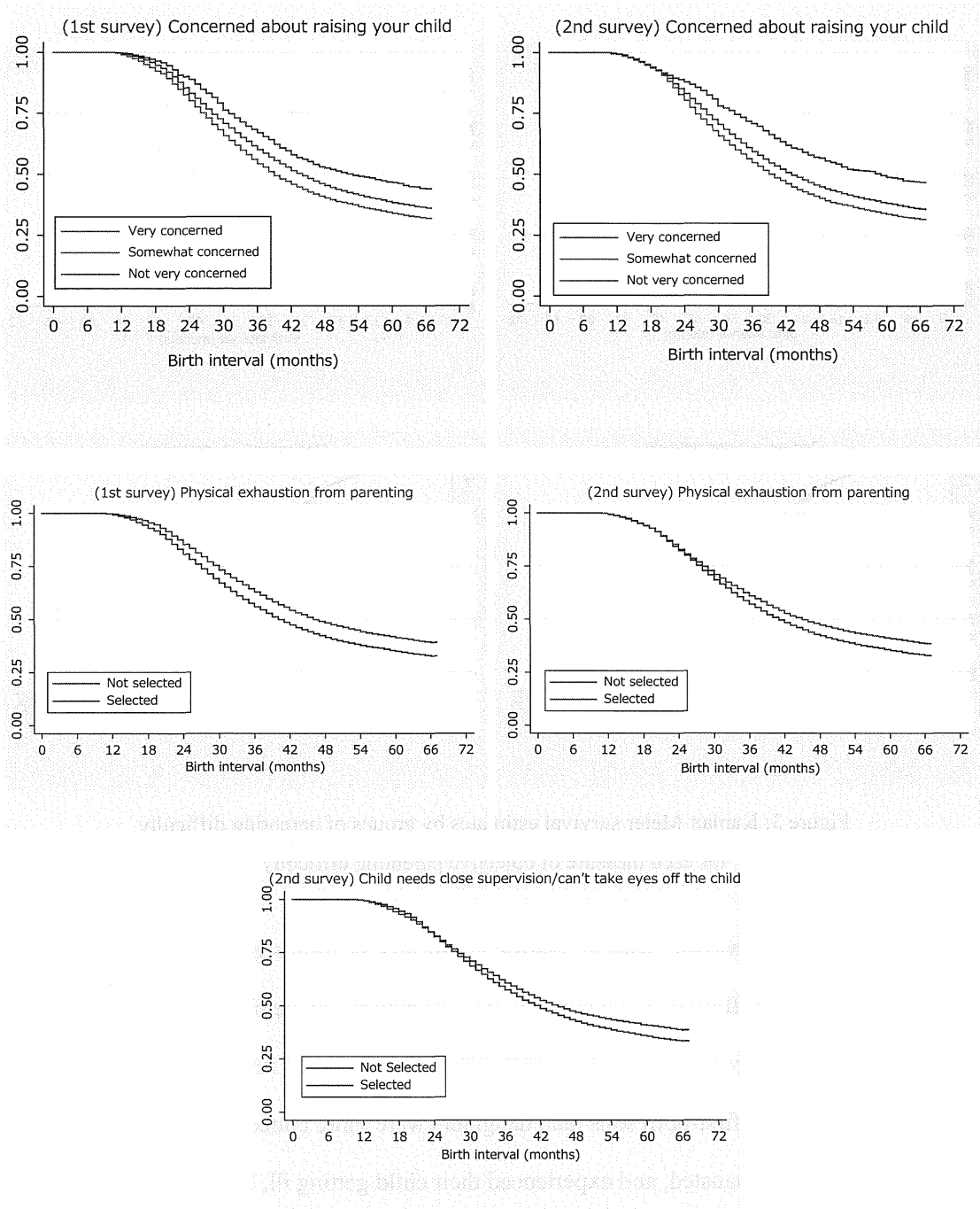


Figure 2: Kaplan-Meier survival estimates by groups of parenting difficulty for each measure of subjective parenting difficulty

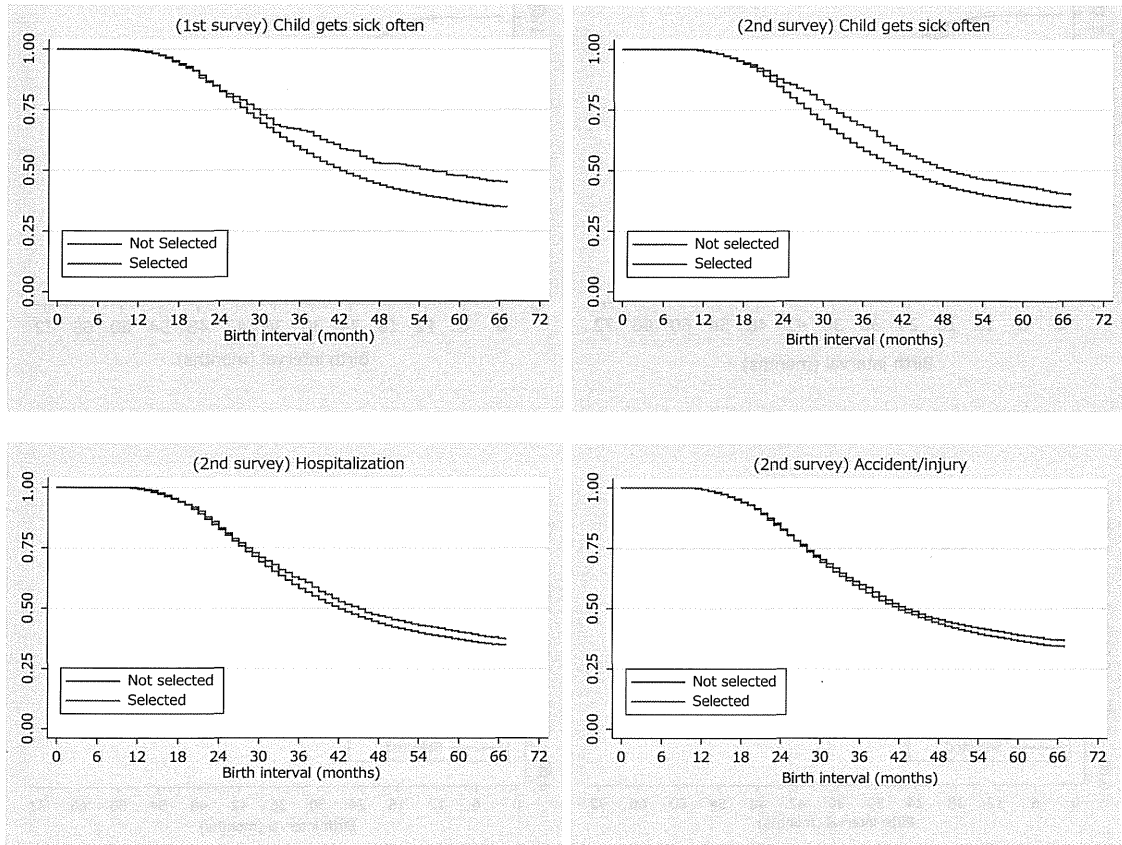


Figure 3: Kaplan-Meier survival estimates by groups of parenting difficulty for each measure of objective parenting difficulty

To get an idea whether parenting difficulty differs by child's gender, Table 7 shows measures of parenting difficulty by gender. An obvious pattern can be observed; parents of first-born boys experienced more parenting difficulty than parents of first-born girls. A higher percentage of parents of first-born sons than daughters were more concerned about their parenting, physically exhausted, and experienced their child getting ill, hospitalized, injured and/or in accidents.

Table 7: Parenting difficulty, by sex of first-borns (values are percentages)				
Subjective parenting difficulty	Very concerned	Somewhat concerned	Not very concerned	sig.
	(1st survey) Concerned about raising your child: Boy	7.1	58.9	
(1st survey) Concerned about raising your child: Girl	6.0	58.3	35.7	
(2nd survey) Concerned about raising your child: Boy	6.2	59.5	34.3	***
(2nd survey) Concerned about raising your child: Girl	5.3	57.8	36.9	
Subjective parenting difficulty	Selected	Not selected	sig.	
(1st survey) Physical exhaustion from parenting: Boy	38.8	61.2	**	
(1st survey) Physical exhaustion from parenting: Girl	36.8	63.3		
(2nd survey) Physical exhaustion from parenting: Boy	38.6	61.4	**	
(2nd survey) Physical exhaustion from parenting: Girl	36.6	63.4		
(2nd survey) Child needs close supervision/can't take eyes off the child: Boy	37.0	63.0	***	
(2nd survey) Child needs close supervision/can't take eyes off the child: Girl	30.6	69.4		
Objective parenting difficulty	Selected	Not selected	sig.	
(1st survey) Child gets sick often: Boy	2.1	97.9	***	
(1st survey) Child gets sick often: Girl	1.3	98.7		
(2nd survey) Child gets sick often: Boy	5.5	94.5	***	
(2nd survey) Child gets sick often: Girl	3.6	96.4		
(2nd survey) Hospitalization: Boy	12.6	87.4	***	
(2nd survey) Hospitalization: Girl	8.9	91.1		
(2nd survey) Accident/injury: Boy	80.5	19.5	***	
(2nd survey) Accident/injury: Girl	76.1	23.9		

** p<.01; *** p<.001 Significant overall chi-square for the association between child's sex and the parenting difficulty measure

Table 8 presents estimated hazard ratios of the clog-log models for having a second birth. Model 1 examines the effect of gender of the first-born controlling for mother's background and coresidence with a grandmother. Contrary to the gender preference hypothesis, sex of the first-born had no significant effect on parity progression; all else equal, parents of first-born boys and girls had similar experiences of transition to a second birth. Looking at the control variables, younger mothers, non-smoking mothers, and mothers with higher education had a greater hazard of giving birth to another child. Compared to unemployed mothers, full-time working mothers who were on maternal leave when their first child was 6 months old had a significantly higher hazard for parity progression. On the other hand, mothers who were part-time employees and self-employed had a lower hazard for parity progression relative to unemployed mothers.

To test the parenting difficulty hypothesis, Model 2 adds parenting difficulty of the

first-born at 6 months of age, and Model 3 adds parenting difficulty of the first-born at 18 months of age in the analysis. In Model 2, parenting difficulty, both subjective and objective, appear to have a significant effect on the hazard of an additional birth. Having parenting concerns and being physically exhausted significantly decreased the probability of parity progression. Parents of first-borns prone to illness were less likely to go on to have another child. These findings support the parenting difficulty hypothesis.

In Model 3, overall, parents whose first-borns were difficult to parent their 18-month olds were less likely to have a second child. Controlling for all other predictors, those who were very concerned about their parenting, exhausted and attended to their child closely had a significantly lower hazard of a second birth. First-borns who often get sick and have been hospitalized by 18 months old had a lower risk of welcoming a younger sibling. Although having experienced an accident and/or injury unexpectedly increased the probability of parity progression, this may be due to reasons indicated earlier. As in Model 1, contrary to my expectation, transition to a second birth did not significantly differ by sex of the first-born in Models 2 and 3.

Predictor	Model 1	Model 2	Model 3
	exp(b)	exp(b)	exp(b)
Sex of the first-born child			
Boy (ref)			
Girl	0.981	0.975	0.968
<i>Subjective parenting difficulty of the first child</i>			
(1st survey) Concerned about raising your child			
Very concerned		0.873 ***	
Somewhat concerned		0.954 **	
Not very concerned (ref)			
(2nd survey) Concerned about raising your child			
Very concerned			0.959 **
Somewhat concerned			0.998
Not very concerned (ref)			
(1st survey) Physical exhaustion from parenting		0.888 ***	
(2nd survey) Physical exhaustion from parenting			0.927 ***
(2nd survey) Child needs close supervision/can't take eyes off the child			0.916 ***
<i>Objective parenting difficulty of the first child</i>			
(1st survey) Child gets sick often		0.815 **	
(2nd survey) Child gets sick often			0.855 ***
(2nd survey) Hospitalization			0.930 *
(2nd survey) Accident/injury			1.050 *
<i>Mother's Background</i>			
Age at birth of the first child	0.932 ***	0.934 ***	0.933 ***
<i>Tobacco use</i>			
Non-smoker (ref)			
Current smoker	0.762 ***	0.761 ***	0.771 ***
<i>Educational attainment</i>			
Junior high school graduate	0.778 ***	0.779 ***	0.789 ***
High school graduate (ref)			
Vocational school graduate	1.161 ***	1.160 ***	1.157 ***
Junior college graduate	1.120 ***	1.200 ***	1.197 ***
College graduate and above	1.170 ***	1.180 ***	1.166 ***
<i>Employment status at the time of the first survey</i>			
Unemployed/students (ref)			
Full-time employees currently on maternal leave	1.066 **	1.065 **	1.074 **
Full-time employees who did not take a maternal leave	0.928	0.926	0.931
Part-time employee	0.876 *	0.868 *	0.886 *
Self-employed	0.890 *	0.883 *	0.898 *
<i>Coresidence with child's grandmother</i>			
	1.031	1.025	1.024
Month (time)	1.020 ***	1.020 ***	1.021 ***
constant	0.075 ***	0.077 ***	0.076 ***
person-months	913501	913501	881237
log-likelihood	-67422.418	-67377.588	-65076.315
LR chi ²	2825	2914.66	2845.41
degrees of freedom	13	17	20

* p<.05; ** p<.01; *** p<.001

Summary and Discussion

The purpose of this paper was to investigate whether the sex of the first-born and/or parenting difficulty of the first-born affect transition to a second birth. Given an increasing preference for daughters in Japan, I anticipated that parents with a first-born boy (i.e. possibly the “unpreferred” sex) are more likely to transition to another birth than parents of a first-born girl (i.e. possibly the “preferred” sex) in order to go on to secure a child of the preferred sex.

Contrary to my expectation, however, sex of the first-born did not affect parity progression among Japanese couples. This result is surprising in light of previous research of countries with widespread gender preference indicating gender preference influences fertility behavior. In the case of the Japanese, even with prevailing daughter preference, such gender *preference* does not appear to translate into reproductive *behavior*. Though parents whose first-born was a son and first two children were both sons were more likely than others to report that they “intend” to have another child (Moriizumi 2008), my finding suggests that such intention is in fact not put into action. This is actually an intriguing finding; gender preference is not translated into behavior in Japan.

There is one possible explanation for this finding. Among Japanese couples, the average ideal and intended number of children are both about 2 (National Institute of Population and Social Security Research 2011). A preference for a balanced sex composition of children (e.g. one of each sex) is also a common type of preference. Therefore, it is possible that the effect of gender preference on fertility is not quite evident up to parity two; the effect may become apparent at higher parities. Recommendation for future research is to extend analyses to incorporate the potential effect of gender preference at higher parities.

In line with literature on the effect of child’s socioemotional and behavioral traits on second birth, I also explored an alternative possibility that parents of first-born boys may rather delay or not have another child given boys are considered more difficult to raise. Since sex of the first-born did not have a significant effect on subsequent fertility, this possibility is also not supported. Apparently, regardless of the sex, ease of parenting of the first-born promotes a

second child. Parents who are happy with their parenting and are not burdened by the responsibilities parenting entail are enthusiastic about having a larger family. Also, parents fortunate to have a healthy child may feel positive enough to consider having more children.

My findings have some policy implications. With Japan's longstanding issue of low fertility, the government has been implementing policies that include development of support systems for parents to address concerns and burden associated with rearing infants and small children. For example, all households with newborns are visited by a certified staff within 4 months from birth to consult any needs they may have. Also, community child support centers have been established in many communities with the aim of easing parenting concerns and burden. These centers allow parents with young children to come together to communicate with each other and to discuss concerns with specialized staff. Continued efforts in addressing parenting burden are needed for the well-being of children and parents. Efforts to develop a parenting-friendly environment may also eventually contribute to promoting fertility. Past research has found mothers of difficult children at 18 months of age report higher child-rearing stress than mothers of easy children (Honjo et al. 1998). Therefore, not only parents under child-rearing stress but also parents raising difficult children must be identified early so they can especially benefit from the public services available.

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Gender Equality and Transition to the Second Birth in Japan

（邦題：男女共同参画の実現と第2子出生）

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目的 社会経済の発展水準が同程度である場合、家庭内外におけるジェンダーの平等性が高い国の方が出生力も高いという研究結果がある。また、共働き世帯が一般的な欧米では、家庭内における男女の役割分業のあり方がより平等である場合に、出生力が高い傾向にある。わが国においても、2000年代以降、共働き世帯が専業主婦世帯を上回るなど、男女の役割分業のあり方が変わりつつあり、その出生力への影響が注目される。

本稿では、21世紀出生児縦断調査を用いて、夫妻の家事と育児への参加頻度が第2子出生に与える影響について検証を行った。分析では妻の就業形態によって、夫妻の家事と育児参加が出生に与える影響がどのように異なるのかを明らかにし、労働市場ならびに家庭生活におけるジェンダーの平等性が出生力とどのように関わるのかについて、精度の高いエビデンスを提供する。

方法 21世紀出生児縦断調査の第1回から第6回までのデータを用いて、2001～2006年に観察された第2子出生を分析の対象とする。第1回から第3回調査において収集している家事6項目ならびに育児3項目についての実行頻度を用いて、3年間における変動を考慮しつつ、夫妻の家事ならびに育児への参加頻度に関する得点を作成した。これらの得点が第2子出生確率に与える影響ならびに妻の就業状態との間にみられる交互作用効果を、多変量ハザードモデルによって推定した。

結果 わが国においては、第2子出生のハザード率は、夫の安定的な雇用と妻の高い家事参加に基づく伝統的な性別役割分業に基づく夫婦において最も高い傾向がみられた。しかし、妻の就業状態にかかわらず、夫の育児への関与が強いほど第2子出生が生じやすい。また、夫の家事参加は妻が自営や家族従業者である場合には、第2子出生を促進する。妻がフルタイム雇用者である場合は、家事への参加が多いほど第2子出生が生じにくい。フルタイム雇用の妻の第2子出生は親との同居や九州・沖縄で高い傾向がある。

結論 働く女性の第2子出生を促進するには、女性の就業と子育ての両立支援を一層進めていく必要がある。夫の育児への参加は規範化されており、これを促す施策が出生力の上昇にも寄与する。親との同居等によりフルタイム雇用の女性の家事負担を軽減することは第2子出生の上昇に寄与する。自営業夫婦の労働環境や九州・沖縄における居住環境は、男性の家事参加が出生にプラスに働く条件やフルタイム雇用の女性が第2子をもつ条件との関連が示唆される。

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Gender Equality and Transition to the Second Birth in Japan

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1. Introduction

How gender equality relates to fertility becomes a central concern for population scholars as well as policy makers in developed countries. As women's education levels and market labor positions become much resemble to those of men in many industrial countries, achieving high degree of gender equality both in the labor market and the family life becomes an important policy goal to mitigate work-family conflicts and to increase both individuals' well-being and fertility. McDonald (2000) is one of the fastest demographers who suggested taking gender equality into account of the theory of fertility decline. He proposed that decline to very low fertility levels is associated with the gap between high levels of gender equality in individual-oriented institutions such as education and market employment and low levels of gender equality in the family (McDonald 2000). Therefore, women who value their involvement in such individual-oriented institutions would limit family-oriented demands by deterring marriage and childbearing (McDonald 2000).

McDonald's proposition is gaining empirical supports from recent studies of large cross-national comparisons as well as fertility analysis of individual-level data from Europe and the United States. Myrskylä, Kohler and Billari (2009) examined cross-national data of 24 developed countries during a 30-year period up until the early 2000s and discovered a reversal in total fertility rate in the countries where socioeconomic development measured by Human Development Index (HDI) produced by United Nations Development Programme (UNDP) is the most advanced. Moreover, in the subsequent study, they further revealed that the fertility reversals in advanced HDI countries are, in fact, driven by fertility at older reproductive ages and by the countries with high gender equality in the society

(Myrskylä, Kohler and Billari 2013).

By seeing a much faster pace of women's advancements in economic roles than men's participation in domestic roles as a cause of low fertility, social demographers also explore how men's gender attitude relates to their fertility desire and fertility outcomes in eight European countries such as Austria, Estonia, East- and West Germany, Italy, Lithuania, the Netherlands and Poland (Puur et al. 2008). Although the results advocate some controversy in the measurement of gender attitude (Westoff and Higgins 2009, Goldscheider, Oláh and Puur 2010), the study reports a positive relationship between men's gender egalitarian attitude and both higher fertility desire and outcomes in above countries except for West Germany and Estonia. Using more comprehensive measurement of men's gender attitudes, Miettinen, Basten and Rotkirch (2011) found that both traditional and the most egalitarian attitudes relate to men's higher fertility expectation in Finland. Do these studies suggest a possibility of fertility upturn within a country once gender equalities at work and at home are more balanced? Or are these findings just attributing to country-specific contexts?

Japan is characterized as one of the highest socioeconomic development with least gender equality among high income nations. For example, in 2011, Japan's HDI is ranked top 12 out of 187 countries (UNDP 2011), while Japan is ranked 98 out of 135 countries in the Global Gender Gap (GGG) measure (Housmann, Tyson and Zahidi 2011). In Japan, however, much less is known about the relationship between fertility and gender equality in the family due mainly to data limitation. Most of previous studies in Japan use cross-sectional surveys to link men's participation in domestic work and fertility intention (Fujino 2006, Nishioka and Hoshi 2009, Koba, Yasuoka and Urakawa 2009, Mizuochi 2010). There are few existing research examines the link between men's participation in domestic work and probability of childbirth using longitudinal surveys (Abe and Oi 2004, Toda and Higuchi 2011). However, the former group of studies lacks a direct linkage to actual fertility behaviors, whereas results of the latter longitudinal studies are largely hindered by the use of inappropriate data to analyze the relationship.

Using “Longitudinal Survey of Newborns in the 21st Century”, this study overcomes shortcomings of existing research and provides firm evidence of the relationships between the degrees of wife’s and husband’s participations in domestic work and childbearing, according to wives’ employment statuses. In this study, we focus on the correlates of second births to reveal underlying mechanisms of marital fertility and spousal role sharing in market labor and domestic work. Second births represent crucial transitions in couples’ reproductive behaviors for replacement, albeit the transitions are becoming increasingly selective in younger cohorts (IPSS 2012a). Furthermore, a research on the determinants of second birth also allows us to access the impact of current family settings on fertility. Previous study found that childrearing experience after having a first child affect a couple’s decision to have additional child (Yamaguchi 2005). A couple’s gender relations measured by a wife’s employment and a husband’s participation in housework and childcare play important roles in determining the couple’s well-being after the childbearing (Yamaguchi 2009) and expected to affect their intentions to have an additional child. This study aims to investigate the direct linkage between couples’ gender relations after the arrival of the first child and additional fertility by studying the correlates of the second births.

Examination of the current relationships between second births and spouses’ participations in market labor and domestic work sheds a light on the couples’ strategies of childbearing in the beginning of the 21st century Japan. The study assumes that the couples which fit better to the current socioeconomic environment should have higher fertility if their fertility desire is equivalent. Therefore, the results of this study informs policy makers how the current policy efforts which aim to increase women’s social enhancement as well as to achieve more equal role sharing between spouses affect fertility of married couples who already have one child. The findings of this study will, then, be useful to consider future levels of fertility in relation to establishing more balanced gender equality in Japan.

2. Background

2.1. Demographic causes of fertility decline in Japan

Fertility started to decline to below replacement levels since the early 1970s in Japan, mainly due to the expansion of never-married population. The increase in never-married population is initially enforced by delayed marriage. By 2010, however, 10% of women and 20% of men stay as never-married at age 50 (IPSS 2014), and these figures are estimated to rapidly increase up to 17-18% for women in 2030 (IPSS 2012a). Given very low levels of extra-marital birth (2.23% in 2012), most of these life-time singles are assumed to end up with childlessness.

Scholars claim that one of the main reasons for the spread of delayed marriage is educational upgrading of young adults. At first place, educational upgrading, in particular, enrollments to universities, delays young adults' entry into a marriage market (Kaneko 2004, Raymo 2003). Moreover, the search process of highly educated women tends to be longer than their lower educated counterpart due partially to scarce availability of potential men who are similarly highly educated and economically qualified men, given high prevalence of female hypergamy (Raymo and Iwasawa 2005). Some of the highly educated women are arguably highly motivated for their career too and desire continuous employment during the childbearing period. Although not many, some of these women are assumed to retreat from the norm of a gender traditional marriage and choose to be life time celibacy² (Tsuya and Mason 1995). On top of that, other scholar also argues that deteriorations of men's economic standings which manifested as high youth unemployment rates, the increasing share of non-standard jobs and flattered wage increase (Brinton 2011, Genda 2005) drives marriage delay among young men, thus affected marriage timing of women accordingly (Kato 2011). As a result, a substantial proportion of men and women who could not find a marriage partner in their most marriageable ages are expected to stay as a single and childlessness for a life time unless current behavioral patterns continue.

² Women who do not intend to get married for a life time is less than 10% among women aged 18-49 in 2010 (IPSS 2012c).