Social Policy and Childbearing Behavior in Japan (1961-2003): An Individual Level Perspective

Li Ma

li.ma@sociology.su.se

Stockholm University Demography Unit

Abstract

Japan is the first country in Asia that underwent noticeable fertility decline. Ever since the early 1990s, the Japanese government has initiated a series of pro-natalist policies in the hope of reversing the declining fertility trend. So far, research that tries to assess policy effect on fertility in Japan has most often used period total fertility rate (TFR) as a measure. The TFR is an aggregate fertility measure that does not depict women's childbearing behaviors very closely. This study distinguishes itself by investigating the policy effects on fertility in Japan from a perspective of individual-level data. We investigate parity-specific policy effects through proportional hazard regression. The results reveal that the first birth trend has commenced to reverse slightly since the beginning of the 1990s in concert with the implementation of policies. We discover that it is the halt of the declining trend of the first birth rates among younger childless women aged 15-30 that has made an important contribution to this reversal. We ascertain that the impact of the policies since the early 1990s on preventing fertility decline among the younger childless women is a success and deserves confirmation. The elevating effect of these policies on promoting the childbearing intensities of older childless women, one-child mothers and two-child mothers is still invisible yet up until 2003.

Keywords: Japan, pro-natalist policies, the Total Fertility Rate, parity-specific policy effects, proportional hazard regression

Table of contents

1. Introduction

Japan is the first country in Asia that underwent noticeable fertility decline. Ever since the early 1990s, the Japanese government has initiated a series of pro-natalist policies. Till now, a lot of studies have been done on the fertility decline in Japan and the policy responses (Retherford and Ogawa 2005; Matsukura *et al* 2007; Ogawa *et al* 2008; Jones *et al* 2009). Comparatively, fewer studies focus on the impact of policies on fertility in Japan. In the few studies that try to assess policy impact the total fertility rate (TFR) has most often been used as a measure. The TFR, being an aggregate measure, may not show the parity-specific effects of the policies clearly because policies may affect different parities differently. Linking up the recent policy developments in Japan and the latest trends of the TFR before and after 1990 reveals nothing more than a steadily declining trend. Lee *et al* (2009), on the other hand try to observe the effect of childcare leave on married women's fertility by calculating the parity progression ratios – the fraction of women who have a child and who go on to have another. They find that taking childcare leave for the first child increases the percentage progressing from the first to the second birth by six percentage points. Apart from these, few other measures have been tried. This provides us with an intriguing opportunity to study the policy effect on fertility in Japan.

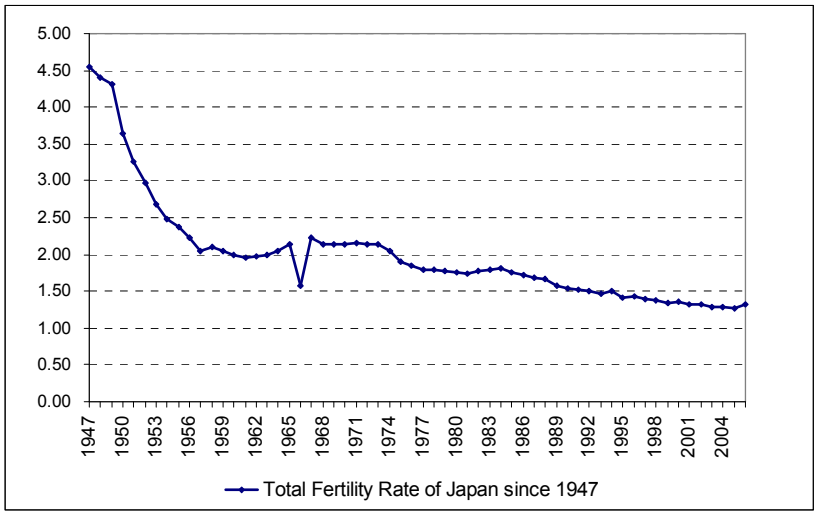
The possibility of any impact of social policies on fertility has been heatedly debated around the world. Demeny (2003) insists that effects are only marginal and Gauthier (2007) posits that impacts tend to be small and may fall on the timing of births rather than on completed fertility. Other researchers such as McDonald (2006) and Rindfuss and Brewster (1996) hold a more positive view. To Neyer and Andersson (2008), simply concluding "the more the better" or assuming that the existence of family polices that intend to increase fertility must have an elevating effect is not appropriate. They claim that finding of no effects, or only insignificant effects are also effects.

This study shall investigate the effects or non-effects of the pro-natalist policies in recent decades in Japan from a perspective of individual-level. Data for analysis are from the National Family Research of Japan 2003 (NFRJ03). First, we account for the fertility development and policies relevant to childbearing and childrearing in Japan since the early 1990s. Then we briefly describe the data and method for this study. Main findings will be discussed at length, with a follow-up of conclusions on the policy impact on fertility in Japan.

2. Fertility development and pro-natalist policies in Japan

Fertility in Japan has undergone substantial changes. During the 1940s the TFR of Japan lingered around 4 or 5. Since 1947 it has shown a declining trend in general (see Figure1). Within ten years' time from 1947 to 1957, the TFR plummeted from a 4-child level to a 2-child level. Afterwards, it stayed around the replacement level for around a decade and half, except in 1966, when the TFR temporarily dropped to 1.58[1]. Since 1973 the TFR has shown a steadily downward trend again. In 1989, when it reached 1.57, even lower than that of 1966, Japan was shaken. This was later publicly known as the "1.57 shock" (Retherford and Ogawa 2005). When the TFR reached a low at 1.29 in 2003, Japan became one of the lowest-low fertility countries in the world.

Figure 1: Total Fertility Rates of Japan since 1947



Source: Population Statistics of Japan 2008

The declining fertility aroused public awareness. A lot of committees submitted reports to the government and suggested policy actions. For example, the Institute of

[1] The Japanese calendar before 1873 was adapted from the Chinese calendar. 1966 was the year of *hino-euma* (fire horse) that arrives every 60 years according to the Chinese calendar. It is traditionally believed that girls born in such a year will gnaw their husbands to death when they get married. Consequently couples tried to avoid having a child that year (Ueno 1998).

Population Problems in Japan[2] appealed in the early 1990s that the continuous decline of both fertility level and mortality rates would result in the rapid ageing of the population and total population shrinking (Ogawa and Retherford 1993). The awareness of the public prompted the government to formulate series of policies to cope with population decline. In general, these policies can be grouped into three categories: child allowance, childcare leave and Angel Plans.

Child allowance was introduced as early as 1972, intending to help low-income families with at least three children. The allowance was restricted to the third or higher-order children below 18 years old. At that time, it had no purpose of raising fertility. In 1988 the allowance was extended to cover the second child and in 1994 the first, too, but only children below 3 years old can enjoy this benefit. In 2000, the age restriction was released to 6 years old (Abe 2004). Child allowances are funded by employers and the government. As of 2004, employers pay most of the allowance for children below three and the government pays entirely for children aged three and older. The allowance is roughly around US$50 (5,000 Japanese yen) for the first two children per month. Any additional child can receive around US$100 (10,000 Japanese yen) (Retherford and Ogawa 2005). [3] *By 2009, the age restriction is released again to children at elementary school (up to around age 12). A couple can receive an allowance of around US$100 per month for a child under 3 years old, regardless of the birth order. For children aged above 3, a family can receive around US$50 per month for the first and second child. For the third or higher-order child, a family can get about US$100 a month* (Jones *et al* 2009). All these allowances are means-tested. Ogawa and Retherford (2005) and Jones *et al* (2009) believe that from the early 1990s, when the child allowance was extended to the second and then the first child, the policies started to carry a pro-natalist purpose.

In 1990, a committee on "Creating a Sound Environment for Bearing and Rearing Children" was established and this caused the enactment of the 1991 Childcare Leave Act. One-year unpaid childcare leave is offered to either the mother or father who is full-time employed in companies with more than 30 employees for a child under one year old. The 1995 Childcare and Family Care Leave Act is actually an extension of the 1991 Childcare Leave Act. This act extends coverage to full-timers in companies with fewer than 30

2 The Institute of Population Problems is now called the National Institute of Population and Social Security Research.

[3]According to Statistics Handbook of Japan (2008), the average monthly income of a household in Japan in 2004 is ¥531,700. A child allowance of 5,000 yen, which is roughly equal to $50, is around 1/100 of the average household income.

employees and regulates that apart from the one year leave for care of an infant, a person can have 25 percent of salary paid by the Employment Insurance Fund during the leave (Jones *et al* 2009). From 2001, according to the amendment to the Employment Insurance Law, employees can receive 40 percent of salary paid by the government while on childcare leave. Still, it is restricted to regular full-time workers. It is not until 2004 that temporary workers (including part-time and contract workers) who have been working in a firm for more than a year can also be entitled to childcare leave (Retherford and Ogawa 2005). Although the leave entitlement applies both father and mother, most leaves are taken by mothers only because women's role as care taker is prevailingly valued in Japan.

In 1994, the *Basic Direction for Future Child Rearing Support Measures*, known as the "Angel Plan" was announced for the period 1995-1999, intending to help working mothers with childrearing. More day-care centers were established throughout the country. After-school programs were organized and family support centers were set up to help working mothers who could not return in time from work to pick up their kids (Matsukura *et al* 2007). In 1999, *Basic Principles to Cope with the Fewer Number of children*, known as the "New Angel Plan" for 2000-2004 was announced, followed by another "New Angel Plan" for 2005-2009. The main purpose of these plans is to set up more day-care centers, after-school programs and family support centers. Services available under these plans are based on means tests (Matsukura *et al* 2007; Retherford and Ogawa 2005).

In addition, the Japanese government made some other efforts to promote fertility. For example, *Measures to Cope with a Fewer Number of Children Plus One*, known as the "plus one" plan was announced in 2002, intending to increase husbands' efforts in bringing up fertility. This plan calls on fathers to take a leave of at least five days when a child is born. Besides, flexible working time and shorter working hours are suggested to employed parents with pre-school children. And more day-care centers are established to extinguish the waiting queues for services (Retherford and Ogawa 2005).

Table 1: Major Japanese government actions regarding population issues

Child Allowance (means-tested)	
1972	*Child allowance to the third or higher order children*
1988	*Child allowance extended to the second child*
1994	*Child allowance extended to the first child*
Childcare Leave	
1991	*Childcare Leave Act*
	One-year unpaid leave to full-time employees
1995	*Childcare and Family Care Leave Act*
	25% of salary for childcare leave to full-time employees
2001	*Employment Insurance Law*
	40% of salary for childcare leave to full-time employees
2004	*Revised Childcare and Family Care Leave Act*
	Childcare leave to temporary workers
Angel Plans (means-tested)	
1994	*Angel Plan (1995-99)*
	More day-care centers and family support centers
	More after-school programs to help working mothers with childrearing
1999	*New Angel Plan (2000-04)*
	More day-care centers, family support centers and after-school programs
2004	*New Angel Plan (2005-09)*
	Increasing husband's involvement in family life and calling for more family support centers
Other actions	
2002	*"Plus One" Plan*
2003	*"Next Generation" Law*
2003	*"Basic Measures"*

To carry out the 2002 "plus one" plan, two laws were enacted in 2003 -- the *Law for Measures to Support the Development of the Next Generation*, which is known as the "Next Generation" law and the *Law for Basic Measures to Cope with a Declining Fertility Society*, known as the "Basic Measures". The "Next Generation" law regulates that employers with more than 300 employees need to make a plan for raising fertility among employees and submit the plan to the local prefectural government before the law came into effect on 1 April 2005 (Matsukura *et al* 2007). This law covers not just full-time employees but also temporary workers who have been working continuously for more than a year. Under the "next generation" law, local prefectural governments have to formulate special pro-natalist programs as well. The "Basic Measures" states that Japan needs to halt the decrease in children. It sets the stage for future action without implementing concrete measures (Retherford and Ogawa 2005). In the view of Retherford and Ogawa (2005), the purpose of the 2002 and 2003 laws is to make the workplace atmosphere child-friendly so that parents, especially women feel more comfortable when taking the childcare leave.

In general, we can see that the actions taken by the Japanese government since the early 1990s are developing in a more ambitious direction, step by step. First, the *child allowance* has been gradually increased and expanded to cover all children. This benefit is based on means test. Regulations on the eligibility of this benefit have an inclination of excluding the higher-income earner. Japan is a society where employment careers are closely associated with educational attainment (Tsuya and Choe 2004). We thus expect that lower-income earner, most of whom are lower-educated are more likely to be influenced by this policy. Second, the *childcare leave* has developed from an unpaid leave to a leave with 40 percent of previous salary paid by the government as income replacement. This *childcare leave* entitlement has long been restricted to full-time employees up until 2004. In addition, the *Next Generation Law* pushes companies with more than 300 employees to formulate action plans. In Japan both full-time employees and employees working in big companies are likely to obtain higher achievement in education (Retherford and Ogawa 2005). Hence, we speculate that the comparatively higher educated women have more chance to rejoice over the *childcare leave*, and therefore, linked to a higher risk of getting a(nother) child. Third, under the *Angel Plans*, more day-care centers have been established and more after-school programs have been promoted, which makes the environment more supportive to families with children. Even though services under the *Angel Plans* are initially means-tested, which might exclude

high-income earners from the services, some municipalities have gradually loosened the criteria. We therefore expect that both high-income earners and low-income earners can benefit from the services, whether lower-educated or high-educated. Based on the essentials of these policies, we pose the following questions, expecting to find out the nexus between the policies and fertility.

1. Has the first, second or third birth trend reversed in concert with the pro-natalist policies since the early 1990s?
2. Are higher-educated women more likely to get a(nother) child from the early 1990s onwards than before?
3. Do the propensities of having a(nother) child among lower-educated women show an upward trend after 1990?

3. Data and methods

The Data used in this study are based on the National Family Research of Japan 2003 (NFRJ03). The survey organizer is the Japan Society of Family Sociology, NFRJ Committee. The survey was carried out between January and February 2004. The sample size is 10,000 Japanese nationals born between 1926 and 1975 living all over Japan. They were aged 28 to 77 as of the end of 2003. 6,302 people responded, which results in a response rate of 63 percent. Among the respondents, 3336 (around 53 percent) are women. Only women respondents are included in our analysis because the potential beneficiaries of the pro-natalist polices are women. We exclude childbearing events that occurred before 1961 in respect that there are few cases there. Thus, the study period is restricted to 1961-2003.

Using NFRJ03 to investigate women's birth transition has many advantages. First and foremost, the sample size and the age range of the respondents are large enough for observing Japanese women's childbearing behavior through the period of the main fertility decline and also the period of the pro-natalist policy implementation. Second, it contains detailed information of women's date of birth, women's education, children's date of birth and sex composition of children, which allows us to construct a longitudinal data set with retrospective histories of women's childbearing behavior. There are also some restrictions of using this survey. For example, the information related to marriage and employment regards only the most recent occurrence. Nevertheless, owing to the fact

that almost all births fall within wedlock (Atoh and Akachi 2003) and employment status is closely associated with education achievement in Japan, we assume in this study that marriage is endogenous to childbearing in some sense and that the effect of employment on childbearing can be represented with education. Moreover, the information on children covers both biological children and adopted and step children but the data offer no information for us to distinguish between them. However, this will not affect the accuracy of this study much because adoption is not particularly common in Japan (Ochiai 2003) and the divorce rate and the remarriage rate are rather low during our study period according to the report by *Population Statistics of Japan 2006*. Hence, we assume that respondents overwhelmingly report their own biological children rather than adopted or step children.

We shall apply event-history analysis (proportional hazard regression models) on the individual level data. By doing so, we observe childbearing trends of different parities over time and compare the trend changes before and after the implementation of a certain policy. In addition, we can also derive a disaggregated picture of whom the increasingly pro-natalist policies in the 1990s possibly influence, the higher educated women or the lower educated, by running interactions between calendar year and woman's educational level. This method can provide strong evidence for us to better assess how policies may have affected women's propensity to give births at different parities.

Recent pro-natalist family policies in Japan have been enacted frequently ever since 1990. Given that these policies are clustered together, it may be difficult for us to spot the effect of any given policy on fertility. Still we argue that if we take them together as a set of critical changes which may have affected women's childbearing behavior, we are able to assess whether the general increase of policy support and its re-orientation since the initial implementation have had any impact on childbearing pattern. Thus, 1990 is considered in this study as a "*critical juncture*" (see Neyer and Andersson 2008:708) to indicate "a point in time at which a change occurs". In particular, first, second and third birth rates from 1990 onwards shall deserve special attention inasmuch as they can reveal whether the birth trends change in response to the changes of polices.

The propensity to give birth for three groups of women will be estimated. They are childless women, one-child mothers and two-child mothers, respectively. To observe childless women's propensity of becoming a mother, the trajectory is followed since they turn 15 until the arrival of the first birth, until they turn 45 or until December, 2003, which ever comes first. To study one/two-child mothers' propensity to give a

second/third birth, we start observation at the birth of the first/second child. Women who get twins for the first birth are included in the observation for parity 1 but excluded from subsequent observations. Women with twins for the second birth are included in the observation up to parity 2 but not in the observation for parity 3. We exclude these women in respect that having twins for one birth may lower their innate inclination of having another child.

The first, second and third birth risks for the basic time factor are given in absolute risks. The other factors in the models are supposed to modify these absolute risks with multiplicative effects. The propensity to give the first, second and third birth for women of a certain category is related to a baseline reference group. Hence, the results will be presented in terms of relative risks.

The computation of childbearing risks is based on the number of birth occurrences and the corresponding exposure times of risk for various groups of women through the software EvHA developed at the Max Planck Institute for Demographic Research. Table 2 presents the basic descriptive statistics for each parity observation. A simple model with only main effects to test the risk of first birth can take the following form:

$h(t) = sced$

where $h(t)$ refers to the propensity of giving the first birth standardized for factors s (*woman's own number of siblings*), c (*calendar year*), e (*educational level*) and d (time duration since age 15 represented by *woman's age*).

In our main effect models, calendar years are aggregated into seven year-groups. When grouping years, we make sure that most of law enactment years fall at the beginning of a year group rather than in the middle or at the end. Single calendar-year categories with 43 levels (from 1961 to 2003) is also applied for a clear presentation of *annual* index of birth rates.

Number of woman's own siblings and *sex composition of previous child(ren)* are time constant. *Number of woman's siblings* is categorized into three groups: no siblings, 1-2 siblings, and 3 or more siblings. *Sex composition of previous child(ren)* is grouped into boy and girl for the second birth risks and 2 boys, 2 girls, and boy and girl for the third birth risks.

Table 2: Descriptive statistics on different parity observations

	Parity 1	Parity 2	Parity 3
Occurrences	2,483	2,078	660
Exposure time (Woman months)	436,213	20,615	188,795
Variable distributions, percent			
Siblings			
0	7.6	6.9	6.7
1-2	58.2	56.4	55
3 or more	34.2	36.7	38.3
Sex composition of pevious kid(s)			
Boy	--	51.9	--
Girl	--	48.1	--
2 boys	--	28	--
2 girls	--	--	25
Boy and girl	--	--	47
Year groups			
1961-1970	25.5	21.9	18.8
1971-1980	25.8	26.8	25
1981-1985	11.8	12.5	13.5
1986-1990	11	11.8	13
1991-1994	9.30	8.4	10.8
1995-1999	10.7	11.3	10.6
2000-2003	6	7.4	8.3
Educational level			
Junior school or below	15	16.1	17.6
High/vocational school	57.9	58.2	56.8
Junior/technical college	18.3	17.6	18.5
University or above	8.7	8.1	7.1
Woman's age			
15-20	1.4	0.2	0.0
21-25	33.5	8.8	2.9
26-30	48.6	55.4	33.8
31-35	13.3	30.1	48
36-40	2.8	5.2	14.4
41-45	0.3	0.2	0.9
Age of the last child			
0-2	--	32.6	25.3
3-4	--	50.4	45.5
5-6	--	12.5	18.9
7-8	--	3.6	7.4
9-10	--	0.9	2.9

The information we can obtain from the questionnaire on *education* is the final educational level that a respondent has achieved at the interview time. To make the best of education as an explanatory variable and to avoid anticipatory analysis, we construct a time-variant variable of education based on the rigid time schedule of 6-3-3 in the Japanese education system (6 years in primary school, 3 years in junior school and 3 years in high school). We assume that women respondents in our study follow a model educational trajectory. The educational level of women is categorized into four groups: junior school or below, high or vocational school, junior or technical college, and university or above. If a respondent reports "not finishing" or "currently enrolled" for the educational level she claims, her educational level is degraded to the previous level.

For first birth, *woman's age* is categorized into six levels, corresponding to age groups 15-20, 21-25, 26-30, 31-35, 36-40, and 41-45 years respectively. When estimating first birth rates, we additionally run two separate models for the younger childless women (aged 15-30) and the older childless women (aged 31-45) in case their patterns and trends of motherhood entry are different from each other (Andersson 1999). *Woman's age* is the basic time factor in the manner of absolute risks in the estimation of the first birth propensity. When estimating the propensities of giving second and third births, *woman's age* is involved as a control variable.

Age of the last child is the basic time factor when observing second and third birth rates. This variable is categorized into five levels: 0-2 years, 3-4 years, 5-6 years, 7-8 years, and 9-10 years, respectively, since the last birth. The effect of this variable is also shown in absolute risks of getting a second or a third child.

4. Main findings

4.1 Childbearing propensities of first, second and third births

Estimated results of Model 1, Model 1A (childless women aged 15-30) and Model 1B (childless women aged 31-45) are presented in Table 3 where calendar years are grouped into seven levels in the main effect model. The table also provides p-values from tests of non-effects of each factor as a guidance to judge the significance of first birth risks. High p-values will not make us ignore patterns we otherwise find meaningful. Even though the number of respondents in our data is not excessively large, most factors have significant effects. We will mainly focus on Models 1A and 1B because we attempt to find out the difference in motherhood entry between the younger childless women and the old.

The estimations of calendar year groups show that the propensities of becoming a mother for younger childless women are decreasing gradually with years. But the time trend for older childless women is not so clear-cut. We can also see that for all women, the more siblings they have, the more likely they are to become mothers. For women aged below 30, higher education brings them difficulties in becoming a mother. But higher-educated women aged 31-45 are more prone to become a mother, ceteris paribus.
In regard to the baseline absolute risks, we see from Model 1 that Japanese women are most likely to become a mother when aged 26-30.

Table 3: Relative risks of first birth for Japanese women, 1961-2003, by number of siblings, educational level, and calendar year groups. Absolute risks (per 1000 months) by woman's age.

	Model 1		Model 1A (Woman aged 15-30)		Model 1B (Woman aged 31-45)	
	Relative risk	P-value	Relative risk	P-value	Relative risk	P-value
Siblings		0.000		0.001		0.043
0	1		1		1	
1-2	1.04		0.96		1.53	
3 or more	1.26		1.17		1.68	
Year groups		0.000		0.000		0.397
1961-1970	1.39		1.39		1.29	
1971-1980	1.28		1.35		0.92	
1981-1985	1.18		1.16		1.32	
1986-1990	1		1		1	
1991-1994	0.96		0.93		1.11	
1995-1999	0.97		0.91		1.09	
2000-2003	1.05		0.88		1.23	
Educational level		0.497		0.004		0.001
Junior school or below	1		1		1	
High/vocational school	1.02		0.96		1.23	
Junior/technical college	0.96		0.84		1.68	
University or above	0.94		0.74		1.99	
Woman's age (baseline absolute risks per 1000 months)		0.000		0.000		0.000
15-20	0.18		0.20		--	
21-25	4.37		5.06		--	
26-30	12.11		14.40		--	
31-35	8.45		--		4.56	
36-40	3.12		--		1.78	
41-45	0.30		--		0.18	
Log-likelihood:	-14020.63		-11642.22		-2344.48	
Number of parameters:	17		14		14	

Table 4: Relative risks of second and third birth, Japanese women, 1961-2003, by number of siblings, sex of previous child(ren), calendar year groups, educational level and woman's age. Absolute risks (per 1000 months) by age of the last child.

	Model 2 (Second birth)		Mode 3 (Third birth)	
	Relative risk	P-value	Relative risk	P-value
Siblings		0.025		0.448
0	1		1	
1-2	1.25		1.19	
3 or more	1.27		1.23	
Sex of previous child(ren)		0.029		0.011
Boy	1		--	
Girl	1.10		--	
2 boys	--		1	
2 girls	--		1.20	
Boy and girl	--		0.89	
Year groups		0.022		0.342
1961-1970	0.81		1.04	
1971-1980	0.87		0.85	
1981-1985	0.98		0.95	
1986-1990	1		1	
1991-1994	0.78		1.21	
1995-1999	0.84		1.00	
2000-2003	0.76		1.05	
Educational level		0.106		0.246
Junior school or below	1		1	
High/vocational school	1.14		1.06	
Junior/technical college	1.19		1.29	
University or above	1.22		1.18	
Woman's age		0.000		0.000
15-20	0.90		0.00	
21-25	1		1	
26-30	1.48		0.77	
31-35	1.21		0.55	
36-40	0.72		0.33	
41-45	0.09		0.09	
Age of the last child (baseline absolute risks per 1000 months)		0.000		0.000
0-2	7.06		3.95	
3-4	22.65		10.30	
5-6	13.25		5.91	
7-8	6.33		3.10	
9-10	2.34		1.70	
Log-likelihood:	-10006.41		-4211.03	
Number of parameters:	22		23	

Table 4 presents the estimated second and third birth rates from the main effect event history model. The trend over calendar year groups for the second birth is not quite clear, nor is it for the third. The more siblings a woman has, the more likely she is to have a second or a third child. The estimation of sex composition of previous child(-ren) implies a very interesting finding -- the existence of son preference and mixed preference in the Japanese society. If the first child is a girl, a mother is more likely to get a second child than mother with a boy. If the first two children are girls, the propensity for a mother to get a third child is 20 percent higher than mothers with two boys. But if a mother has already got a boy and a girl, the propensity for her to have a third child is relatively lower. Education plays an important role in affecting mother's propensities of having another child. Women with an educational level of junior college or above are at higher risk of having another child. From the perspective of the effect of woman's age on childbearing, we can see that age period 26-30 is a climax for women to give a second birth. After age 30, the propensities decrease. While the climax age for women to deliver a third child is not much trustworthy on account of the random few cases. The absolute risks suggest that women are more prone to get another child 3-4 years after the last previous birth.

4.2 Birth trend changes before and after 1990

As mentioned in 4.1, the grouping of calendar years renders the first (for the older childless women), second and third birth trends not entirely clear in the main effect models. To demonstrate a more detailed pattern of birth rates across the study period, 1961-2003, we display the *annual* index of first, second and third birth rates, relative to the rate of 1990, and standardized for the effects of the number of woman's siblings, sex composition of previous child(ren) (for parity 2 and 3), educational level, woman's single-year age and age of the last child (for parity 2 and 3). To make these trends more visible and clear, we plot a smoothed moving average curve dependant on the *annual* index by choosing 21-term formula exact for straight lines (see Hoem and Linnemann 1988). This allows for a better view and comparison of trend developments at different parities before and after the "*critical juncture*" -- 1990.

Figure 2: **Standardized *annual* index of first birth rates, relative to 1990, Japanese women, 1961-2003 and weighted moving average of series.**

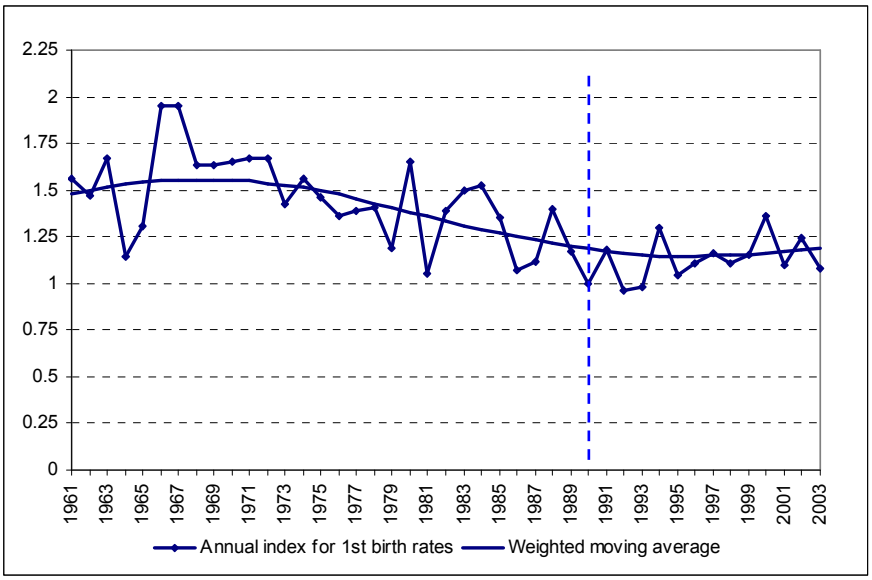


Figure 3: **Standardized *annual* index of first birth rates, relative to 1990, Japanese women, 1961-2003, by group of ages and weighted moving average of series.**

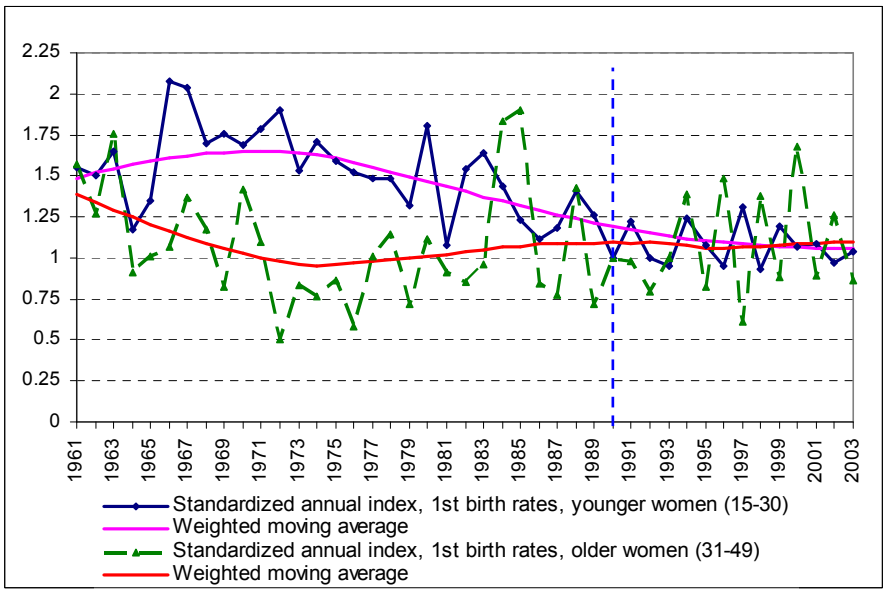
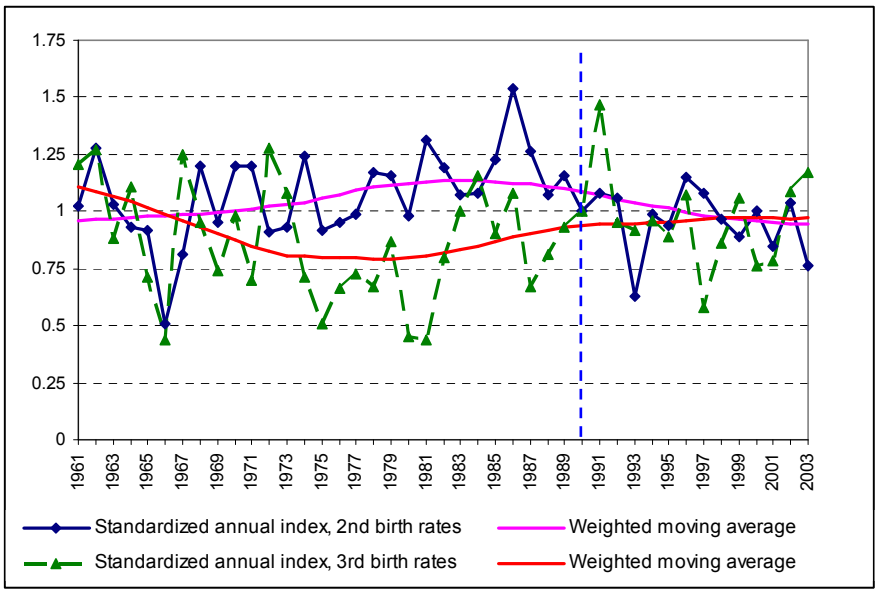


Figure 2 shows a largely declining trend in Japanese women's propensity to become a mother during the first three decades of the observation period. This declining trend halts in the early 1990s and thereafter starts to reverse slightly. In order to see who contributes to the slight reversal, we run separate models for younger women (aged 15-30) and older women (aged 31-49) respectively. An important difference in propensities to become a mother between the two groups of women is revealed in Figure 3. First birth intensities of younger childless women have decreased dramatically by around 50 percent from the mid-1960s to the late-1980s. From the early 1990s, this trend levels off. In contrast, the propensities of motherhood entry for older childless women have been increasing since the mid-1970s. This is likely due to the general postponement of childbearing on account of education and subsequent entry to the labor market. This postponement causes a slight recuperation of childbearing of at higher ages. We can also see clearly that the two trends show similar patterns after 1990. On the whole, Figures 2 and 3 not only reveal a clear pattern of postponement at becoming a mother among Japanese women during the study period, but also disclose that the leveling off of the first birth trend after 1990 among the younger childless women makes an important contribution to the overall slight reversal of first birth rates since the beginning of 1990s. Therefore, we conclude that the pro-natalist policies since the early 1990s have a positive effect on preventing further fertility decline among younger women.

Figure 4 exhibits the standardized *annual* index of second and third birth rates relative to that of 1990. We can see that the second and third birth rates follow similar trends in the 1960s, except for a common downturn in 1966, which is a consequence of the year of *hino-euma*. From the 1970s onwards, the trend of the second birth rate remains rather stable until the end of the study period. In comparison, the trend of the third birth rates experiences a general downturn in the 1970s, and from the early 1980s, this reverses to an increase and levels off in the 1990s. No rising trend can be seen after 1990 for either the second or the third birth rate. The flat trends cannot confirm our previous expectation. We thus conclude that the elevating influence of the series of pro-natalist policies on women's propensities of getting a second or third child is invisible yet until 2003.

Figure 4: **Standardized *annual* index of second and third birth rates relative to 1990, with separate models for each birth order, Japanese women, 1961-2003. Weighted moving average of series.**



4.3 Who is more likely to get a(nother) child after 1990 than before?

Grounded in the fact that some policies benefit only full-timers before 2004, most of whom are higher-educated and some means-tested policies attempt to give priority to the lower educated, we had speculated that both the higher- and the lower-educated women should respond actively to the policies after 1990. We run interactions between calendar year and educational level to seek for evidence.

When we split the childless women into younger and older childless women groups and then sub-split them into four small groups with different educational attainments, much of the variation over time seems to be random. Yet, we can still see some differences in the effect of education over time between the two groups on the propensity of becoming a mother. In the younger group, it is noteworthy that from the 1960s to the late 1980s, the first birth trends of all educational groups show a general decline (see Figure 5). For instance, the first birth intensity of the university educated women has dropped by around 50 percent from the 1970s to the late 1980s. However, in the 1990s all of the trends seem to have leveled off. Even though there is no particular trend that

goes upward after 1990, we still acknowledge the important role of policies in deterring fertility decline among the younger childless women with different educational levels.

In the older women group, no clear differences in the childbearing trends and levels emerge among women with different educational levels in the 1960s and 1970s (see Figure 6). Since the 1980s, the trends and levels differ more clearly. The higher educated a woman is, the more likely she is to become a mother. Furthermore, the first birth rate of women with a level of junior or technical college increased during the 1980s. And the birth trends of women with the lower educational levels hardly change systematically over time. No special education group experiences a trend reversal after 1990 out of the policy implementations. Hence, we conclude that neither the higher educated nor the lower educated respond actively to the policies in the older childless women group.

The interaction of calendar year and educational level does not show clear differences in second births during the first two decades of the study period between women with different educational levels (see Figure 7). In the 1980s, it was women with an educational level of junior or technical college that were most prone to have a second child. From the 1990s onwards, they were surpassed by women with an educational level of university or above. In general, from the mid-1980s, higher-educated women have been more likely to have a second child than the lower-educated. However, we do not discern any elevated trends in the second birth after 1990 for either the higher- or lower-educated women. The estimated results cannot provide evidence for us to say that the second birth intensity of the higher- or the lower-educated women is higher under the pro-natalist policies than before.

For the third birth rates (see Figure 8), much of the variation over calendar time is random because of the smaller number of cases in the dataset, but we can still spot that women with an educational level of junior or technical college have been under a relatively higher risk of third births than most other groups of women during most of the study period and their propensities of having a third child started to show an upward trend as early as the 1980s. Likewise, no visible upward trends closely associated to policies are discovered among any education groups of women in the 1990s and afterwards. Thus, we conclude that the uplifting impact of policies on the third birth propensity is not visible either among the higher- or lower- educated women.

Figure 5: **First birth rates by calendar year groups and educational level for Japanese women aged 15-30, 1961-2003, standardized for number of siblings and woman age.**

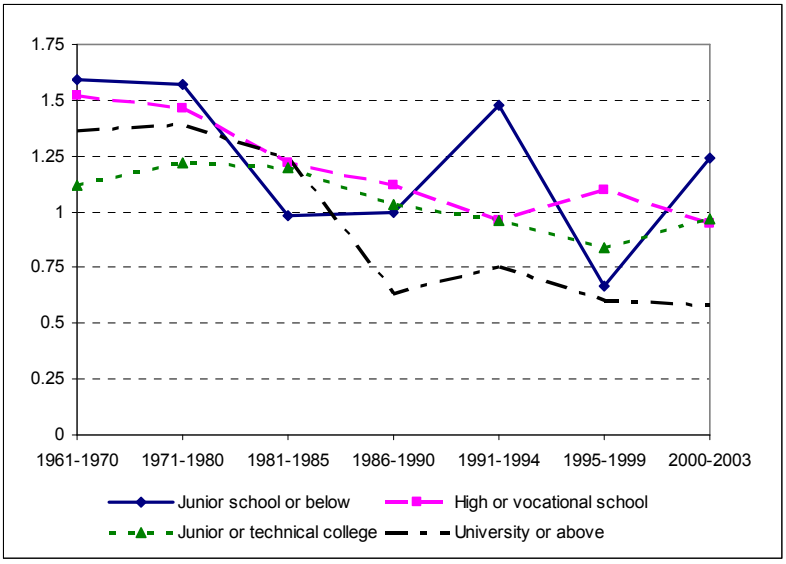


Figure 6: **First birth rates by calendar year groups and educational level, Japanese women aged 31-49, 1961-2003, standardized for number of siblings and woman's age.**

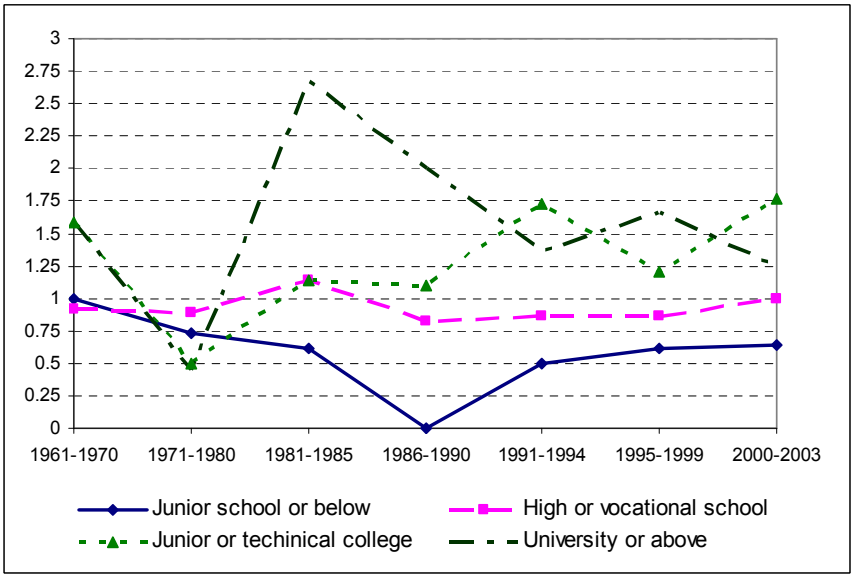


Figure 7: **Second birth rates by calendar year groups and educational level, Japanese women, 1961-2003, standardized for number of siblings, sex of previous child, woman's age and age of the last child.**

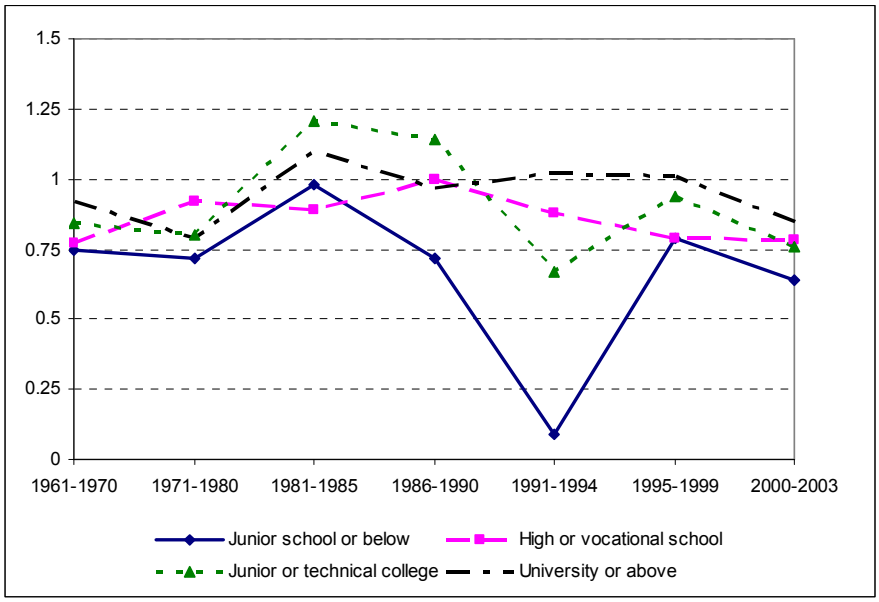
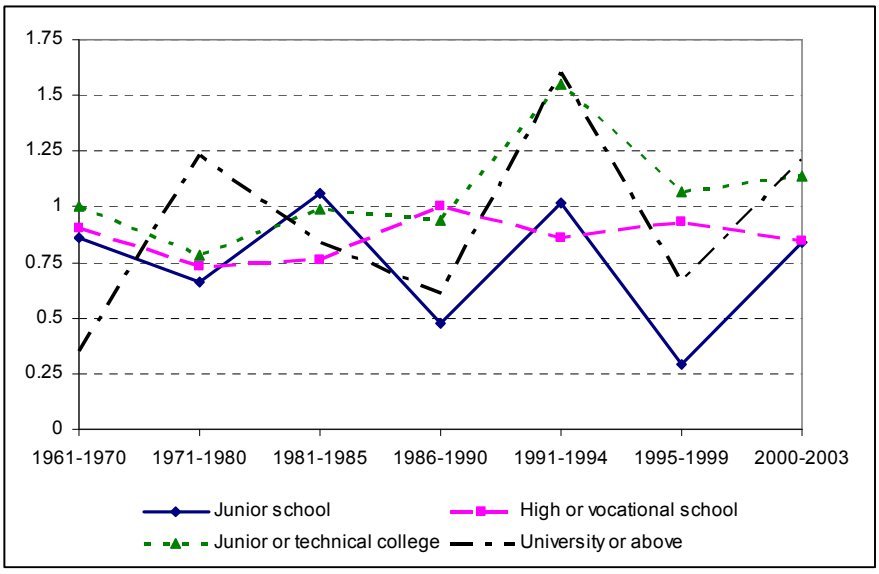


Figure 8: **Third birth rates by calendar year groups and educational level, Japanese women, 1961-2003, standardized for number of siblings, sex of previous children, woman's age and age of the last child.**



5. Impact of policies on fertility in Japan

Based on the family policies in Japan from the 1990s, we had expected that the first, second and third birth trends can all reverse after 1990. We had also longed to see that the first, second and third birth trends of both higher-and lower-educated women should deviate upwards during the same period. We have applied proportional hazard regression to individual level data -- NFJR (2003). Even though the variables that can be adopted for event-history analysis of fertility in our data are limited, we could still discover some important trend changes over time in response to the implementation of policies.

The standardized *annual* index reveals that the declining first birth trend levels off in the early 1990s and thereafter, commences to carry a slight reversal. A comparison of the first birth trends between the younger and the older childless women reveals that the halt of the declining trend among the younger childless women has made an important contribution to the slight recuperation. The reversing trend of the older childless women, which starts from the 1970s, is out of postponement of motherhood entry till later ages rather than policies. For the second and the third birth, no reversal trend is seen after 1990. We conclude that the policies since the beginning of the 1990s have exerted an unignorable influence on preventing fertility decline among the younger childless women, which consequently entails a slight overall first birth trend reversal. However, the uplifting impact of policies on encouraging older childless women, one-child mothers and two-child mothers to have a(nother) child is invisible until 2003.

To discern whether the higher- or lower-educated women might have been influenced by the recent pro-natalist policies, we have run interactions between calendar years and educational levels. The results also show that in the younger childless women group, a leveling off of the first birth trend occurs among almost all educational groups since the start of the 1990s. Despite that we are not able to discover a prosperous childbearing among either the higher educated women or the lower educated, we still verify that the impact of policies on hampering fertility decline in this group is a success. In the older childless women group, there is no trend reversal among any education groups in the 1990s that can be attributed to the policy impact. The same situation also applies to the second and the third birth risks among different education groups.

To sum up, the estimated results from event history analysis on Japanese longitudinal individual level fertility data ascertain us that the impact of the pro-natalist policies in Japan since the 1990s on preventing further fertility decline among childless young

women is a success and deserves confirmation. But the elevating effect of these policies on promoting the childbearing intensities of older childless women, one-child mothers and two-child mothers, whether they are higher educated or lower educated, is still invisible yet up until 2003. Moreover, we still cannot assure that the parity-specific trend changes in Japan in the early 1990s are necessarily due to the policies from the 1990s to 2003. Alternatively, the parity-specific trend changes in Japan in the early 1990s could be dependent on some other socio-economic changes in society that accompany the development of policies. For example, in a society where almost all births fall within wedlock, the rise of non-married men and women may hold back the process of fertility recuperation. Further, any impact of child allowances on fertility might be offset by increasing investments in children's education. Expansions in day-care services may be offset by prevailing values that women should take the care responsibility themselves. Moreover, the availability of grandparents can affect couple's decision of having a(nother) child. And the real uptake of parental leave by working mothers may also affect the propensity of childbearing. In addition, the 1990s witnessed the economic depression in East Asian areas. The consequent labor market deregulation in Japan and the ensuing economic pressure that families might encounter can affect fertility development as well. The impact of these aforementioned socio-economic factors on fertility cannot be spotted in our study because of constraints with our data.

Since 2004, social policies, socio-economic changes and childbearing dynamics in Japan have experienced new developments. The New Angel Plan (2005-2009) calls for husbands' involvement in family life. And the 2004 revised Childcare and Family Care Leave Act regulates that temporary workers are also entitled to childcare leave and are to be included in a firm's plan to raise fertility if they have worked there for more than a year. This means that the number of women that can benefit from the policies is greatly enlarged. To get a better insight into the nexus between social policies and childbearing behavior of women in the context of Japan, it is highly relevant to keep following the childbearing trends in Japan by analyzing updated data which include further socio-economic and demographic detail. It would be desirable with more in-depth information on women's life-course histories, such as histories of home leaving, education, co-residence with parents and partners, civil status, employment, income, financial investment in children's education, partners' income, partners' education and so on. In this manner, we could derive a better understanding of how policies operate in Japanese society, by observing how parity-specific fertility interacts with crucial socio-economic

factors. This would contribute to new knowledge on childbearing dynamics in general and on the effects of social policies in particular.

Finally, it would be valuable to carry out comparative research on the effects of social policies on fertility in further East Asian countries, which share common socio-economic and cultural characteristics and meanwhile also suffer from fertility decline. By comparing motivations and developments of policies, specific government actions and analysis of fertility development, we can better assess the effect of policies of a certain country on its fertility. The comparative approach shall make it easier for us to detect what parts of childbearing developments are unique to a certain country and what parts are common across South East Asia.

6. Acknowledgements

Greatest gratitude to Gunnar Andersson, who helps orient the study topic and gives instructions through the process of data construction, data analysis and paper writing. Greatest gratitude also to Elizabeth Thomson, Gerda Neyer, Jan Hoem and Pau Baizan for their valuable comments. The research has been supported by Stockholm University Linnaeus Center on Social Policy and Family Dynamics in Europe (SPaDE).

The data for this secondary analysis, "National Family Research of Japan (NFRJ2003), the National Family Research Committee of Japan Society of Family" were provided by the Social Science Japan Data Archive, Center for Social Research and Data Archives, Institute of Social Science, the University of Tokyo.

References

Abe, Aya. 2004. "Child poverty and Inequality: Public transfers to families with children", in *Child Related Policies in Japan*. National Institute of Population and Social Security Research, Tokyo, Japan. URL: hittp://www.ipss.go.jp

Andersson, Gunnar. 1999. "Childbearing trends in Sweden 1961-1997", *European Journal of Population.* 15(1):1-24.

Atoh, Makoto and Mayuko Akachi. 2003. "Low fertility and family policy in Japan: in international comparative perspectives", *Journal of Population and Social Security*. Supplement to Volume 1: 1-30

Boling, Patricia. 1998. "Family policy in Japan", *Journal of Social Policy*. 27/2:173-190.

Demeny, Paul. 2003. "Population policy dilemmas in Europe at the dawn of the Twenty-first Century", *Population and Development Review*. 29/1:1-28.

Gauthier, Anne. H. 2007. "The impact of family policies on fertility in industrialized countries: a review of the literature", *Population Research and Policy Review*. 26: 323-346.

Hoem, Jan. M. and Per Linnemann. 1988. "The tails in moving average graduation", *Scandinavian Actuarial Journal*. 193-229.

Hoem, Jan. M. 1993. "Public policy as the fuel of fertility: Effects of a policy reform on the pace of childbearing in Sweden in the 1980s". *Acta Sociologica* 36: 19-31.

Inoue, Shunichi. 2001. "Population policies and programs in Japan", in Mason Andrew (ed.), *Population Policies and Programs in East Asia*. East-West Center Occasional Papers. Population and Health Series. No. 123. Honolulu, Hawaii, pp. 23-38.

Jones Gavin, Straughan Paulin Tay, and Chan Angelique. 2009. "*Ultra-Low Fertility in Pacific Asia: Trends, Causes and Policies Dilemmas*". Routledge Research on Public and social Policy in Asia. Routledge.

Lee Sang-Hyop, Ogawa Naohiro and Matsukura Rikiya. 2009. "Is childcare leave effective in raising fertility in Japan?", *Asian Population Studies*. 5/3:349-369.

McDonald, Peter. 2006. "Low fertility and the state: the efficacy of policy", *Population and Development Review*. 32/3:485-510.

Matsukura, Rikiya., Robert D Retherford and Naohiro Ogawa. 2007. "Declining fertility in Japan: Its mechanisms and policy responses", *Asia-Pacific Population Journal*. 22(2): 33-50

Neyer, Gerda and Gunnar Andersson 2008. "Consequences of family policies on childbearing behavior: Effects or artifacts?", *Population and Development Review.* 34(4): 699-724.

Ochiai, Emiko. 2003. “Post war transitions in the Japanese family”, in Le Grand, Carl. and Toshiko T. le Grand (eds.) *Women in Japan and Sweden-Work and Family in Two Welfare Regime.* Almqvist & Wiksell International Stockholm. Pp 137-166.

Ogawa, Naohiro, and Robert D Retherford 1993. “The resumption of fertility decline in Japan: 1973-92”, *Population and Development Review*. 19(4):703-741.

Ogawa, Naohiro, Robert. D. Retherford and R. Matsukura. 2008. “Japan’s declining fertility and policy responses. In G. Jones, P. Tay-Straughan, and A. Chan (eds.), *Ultra-low Fertility in Pacific Asia: Trends, Causes and Policy Deliemmas*. London: Routledge.

Oishi, Akiko Oishi. 2004. “Childcare system in Japan”, in *Child Related Policies in Japan.* National Institute of Population and Social Security Research, Tokyo, Japan. URL: hittp://www.ipss.go.jp

Population Statistics of Japan 2006. National Institute of Population and Social Security Research. Tokyo, Japan

Retherford, Robert D, and Naohiro Ogawa. 2005. “Japan’s baby bust: Causes, implications, and Policy Responses”, *Population and Health Series.* No. 118. East-West Center Working Papers. Revised version in Fred. R. Harris (Ed.) 2006. *The Baby Bust: Who Will Do the Work? Who Will Pay the Taxes?* Boulder, Colorado: Rowman and Littlefield.

Rindfuss, Ronald. R. and Brewster, Karin. L. 1996. ‘Childbearing and fertility’, *Population and Development Review. A supplement to* 22:258-289.

Statistics Handbook of Japan. 2008. Statistics Bureau, Japan

Tsuya, Noriko O. and Minja K. Choe. 2004. “Investment in children's education, desired fertility and women's employment”, in Tsuya Noriko O. and Bumpass Larry L. (eds) 2004. *Marriage, Work and Family Life in Comparative Perspective: Japan, South Korea, and the United States.* University Hawai'i Press. Pp. 76-94.

Ueno, Chizuko. 1998. “The declining birthrate: Whose problem”, *Review of Population and Social Policy.* 7:103-128