Social Policy and Childbearing Behavior in Japan since the 1960s – An Individual Level Perspective

Li Ma

li.ma@sociology.su.se
marialee2000@hotmail.com

Stockholm University Demography Unit

Abstract

Japan is the first country in Asia that underwent noticeable fertility decline. The Total Fertility Rate (TFR) of Japan was around four or five before WWII. In 2003, it reached a low at 1.29, making Japan one of the lowest-low fertility countries in the world. 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. A lot of research has been done to try to assess the effect of social policies on fertility in Japan in the past two or three decades. However, most related research is based on period TFR as a measure of fertility. The TFR is a very crude fertility measure and does not depict women's childbearing behaviors very closely. Linking up recent policy developments and the latest trends in TFR in Japan reveals nothing than a steadily declining trend. This study distinguishes itself by detecting the effects or non-effects of the pro-natalist policies in recent decades in Japan from a perspective of individual-level data. We investigate parity-specific effects of policies through proportional hazard regression. By observing the childbearing patterns of different sub-groups of women over time, especially differences before and after 1991, we can better identify whom the pro-natalist policies since the early 1990s may have influenced. The estimated results show that the pro-natalist policies since the early 1990s have almost no elevating effect on the second and third birth rates in Japan. But a possible positive impact of the policies on the first birth is discerned in that the first birth rates show a slight recuperation from 1991 onwards. We find that it is the halt of the declining trend of the first birth rates among childless women aged 15-30 that has contributed to this slight reversal.

Key words: Japan, the Total Fertility Rate, pro-natalist policies, proportional hazard regression, policy effects

Table of contents

1. Introduction

Japan is the first country in Asia that underwent noticeable fertility decline. The Total Fertility Rate (TFR) of Japan was around four or five before WWII. It plummeted to the two-child level in the late 1950s. In 1989 it reached 1.57, which was then a great shock to the whole country. Ever since the early 1990s, the Japanese government has initiated a series of pro-natalist policies, but the trend of TFR has still been steadily downward. In 2003, it reached a low at 1.29, making Japan one of the lowest-low fertility countries in the world. In the past two or three decades, a lot of research has been done to try to assess the effect of social policies on fertility in Japan. Most researchers use the TFR as the measurement of fertility. However, TFR, which is a very crude fertility measure, does not depict women's childbearing behavior very closely. This study shall distinguish itself by analyzing the effects or non-effects of the pro-natalist policies in recent decades in Japan from a perspective of individual-level data. We aim at investigating parity-specific effects of policies through proportional hazard regression of longitudinal fertility data. This allows us to better identify whom the pro-natalist policies may have influenced. Data for our analysis are from the National Family Research of Japan 2003 (NFRJ03).

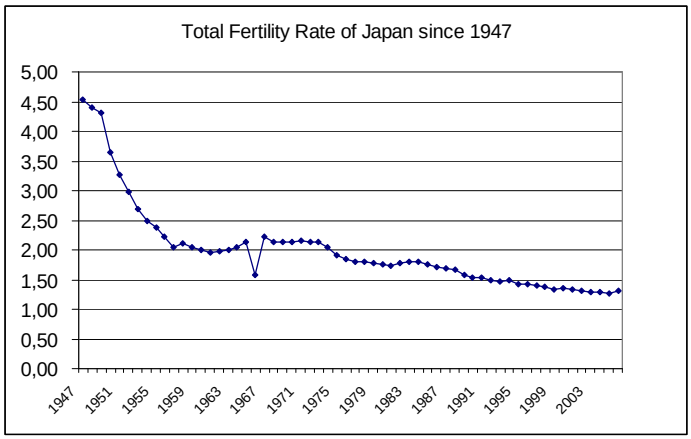
2. Fertility development of Japan and potential causes of decline

Fertility in Japan has undergone substantial changes. The TFR of Japan lingered around 4 or 5 during the 1940s. But since the late 1940s, it has shown a declining trend in general, as Figure 1 shows. Ogawa and Retherford (1993) divide Japan's fertility development after WWII into three stages – declining period (1947-1957), leveling off period (1957-1973) and another declining period (1973-present). The last period has been called the "baby bust" period by Retherford and Ogawa (2005:1). Within ten years' time from 1947 to 1957, the TFR dropped from a 4-child level to 2-child level. Afterwards, it stayed around the replacement level for around a decade and half, except for in 1966, when the TFR temporarily dropped to 1.58. 1966 was *Henoeuma*, the Year of Fire Horse that arrives every 60 years according to 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 delivering any child that year (Ueno 1998, Ogawa and Retherford 1993). Ever since 1973, the TFR of Japan has shown a steady downward trend again. In

1989, when it reached 1.57, even lower than that of 1966, Japan was shaken because 1989 was not a year of fire horse when people avoid childbearing on purpose. This was later publicly known as the "1.57 shock" (Ogawa and Retherford 1993, Retherford and Ogawa 2005). This shock aroused various concerns about population-related issues from both the government and population experts. It caused the enactment of a series of pro-natalist policies since the early 1990s, which we will discuss in the next section.

In contrast with the declining trend of fertility during this time, Japan's economy grew at high speed and Japan developed itself into one of the world's most developed countries. McNicoll (2006) indicates that extraordinary economic growth and poverty reduction often go hand in hand with the demographic transformation from high to low mortality and fertility and that the declining fertility in turn provides a country a period of low dependency ratios during which time it has an opportunity to further develop its economy. Apart from this, the fertility trends may be affected by many socioeconomic factors.

Figure 1: Total Fertility Rate of Japan since 1947



Source: Population Statistics of Japan 2008

First, the spread of contraceptive use and legalization of abortion may contribute to fertility decline. From 1950 to 1990, the overall contraceptive use rate increased from 30 to 84 percent among married women (Ogawa and Retherford 1993). In 1940, induced abortion became legalized in Japan. When parents realize it is too expensive to bring up

another child, if a third or fourth child is on its way, induced abortion is very likely to be its destination (Ueno 1998). In 1950 there were 489,000 registered induced abortions in Japan. When related to 2,338,000 births, the abortion rate was 20.9 percent. The "paradise of abortion" was a dishonorable name for Japan after the Second World War (Ueno 1998:105).

Secondly**,** values on marriage, children and family life have changed and may affect childbearing. Traditionally, marriage is universal in East Asian culture and is often a premise of childbearing (Atoh 2008). Previously, women in Japan were expected to get married by their mid-20s (Tsuya and Bumpass 2004). However, the mean age at first marriage for women has been postponed from 23.6 in 1951 to 28.2 in 2006 (Population Statistics of Japan 2008). Besides, the value of marriage has been belittled with women becoming more independent. A comparative study done by Tsuya *et al* (2004) on views of marriage among never married young adults in Japan and the US shows that young unmarried Japanese women hold a less positive view than the Americans on the benefits of marriage. They see marriage more restrictive of personal freedom, more likely to reduce economic well-being and less likely to improve overall happiness. Accordingly, a "new single" concept -- enjoyment of single life without pressure to marry enjoys great popularity among young single urban men and women, and especially among women. The proportion of unmarried men and women has increased dramatically since the mid-1970s and there is a sign of increase in permanent non-marriage (Tsuya and Bumpass 2004). Moreover, having children is no longer taken as a necessity of a satisfying life. Based on the National Survey of Work and Family Life in Japan 1994, Bumpass and Choe (2004) discover that women are less likely than men to desire children in order to have a satisfying life. Women of younger cohorts are less likely than older cohorts to feel that women need children for a satisfying life. What's more, since the mid-70s, sexual activities among unmarried young people have increased (Atoh 2008). This also weakens the necessity of marriage and is conducive to the delay of marriage as well as childbearing.

Thirdly, delayed home leaving and prolonged education may also have an effect on fertility. The proportion of females advancing to college or university has risen dramatically from 2.4 percent in 1955 to 40.6 percent in 2007 (Population Statistics of Japan 2008). As a consequence, with more females attending higher education, their marriage as well as childbearing is postponed (Atoh 2008). Some young adults are reluctant to leave home even when they are employed because they do not think they can

live an abundant life if they are on their own. Atoh (2008:18) terms these people “parasite singles” and holds a view that delayed home leaving lengthens the duration of single life, which also affects the fertility of Japan.

Fourthly, the disharmony between the employment system and social expectations of women can be conducive to the fertility decline. The rising educational levels of females as well as their expanding job opportunities in the labor market have increased the probability of women as full-time employees (Retherford and Ogawa 2005). Moreover, Japan is a place where education and income are positively associated (Retherford and Ogawa 2005, Ogawa and Retherford 1993). With the increase of women advancing to higher education, more women are involved in the fields of law, economics, science and engineering which offer better income and lifelong employment (Yashiro 1998). However, the labor market in Japan is rigid and inflexible (Lambert 2007). Overtime work is quite common and employees have to experience frequent personnel relocations and transfers. An employee’s wages is distributed across the total working life, with larger proportions paid later in the career. Training, years of service, promotion and wage scales are closely intertwined and this seniority-order wage system keeps workers within one company (Yashiro 1998). This employment system is in conflict with the social expectation of women. Traditionally, women are expected to resign from job and be full-time housewives when they start a family (Lambert 2007, Yashiro 1998). But under such a wage system, once they leave a job as regular employees, it is hard for them to find another full-time job with full benefits when they finally come back to the labor market after childbearing. What they can get are often supplementary jobs (Lambert 2007, Yashiro 1998). That is, leaving the regular employment indicates a career ending and loss of lifetime income for women in Japan (Lambert 2007). Therefore, given the trade-off between employment and childbearing, many high educated women may reject marriage or enter marriage later so that they can stay longer in the labor market to strengthen the pursuit of their career (Shirahase 2000) and to improve their economic status (Yashiro 1998), which, as a result, affects Japan’s fertility level.

Fifthly, the costs and benefits of children may affect people's decision of having more children. Among the ever-increasing expenses in childrearing, the education cost is the largest and chief item (Yashiro 1998, Ogawa and Retherford 1993). In Japan, education attainment is closely associated with children's future careers. Parents are burdened with a pressure of offering children "good" education through admission to "good" schools. To achieve this, parents usually invest heavily on children's after-school programs, which are

expected to better prepare children for entrance exams (Tsuya and Choe 2004). Ueno (1998) asserts that education is so costly and privatized that young people hesitate to have children because they foresee the heavy burdens lying in front of them. Given the high cost of rearing children, some prefer to have a smaller family size so that they can invest more on children's education (Yashiro 1998, Tsuya and Choe 2004). Currently, a two-child family is a widely accepted norm in Japan (Ueno 1998) but people might have fewer children than they consider ideal.

Lastly, son preference in Japanese culture may also affect childbearing. When analyzing the benefit of having children, Retherford (1985) classifies the utility of children into three categories -- production or economic utility, security utility, and consumption utility. Based on the 1990 round of the Mainichi National Family Planning Survey, Ogawa and Retherford (1993) find that 73 percent of respondents think children brighten family life. Only 1 percent of them depend on their children for family income, 9 percent claim to depend on children for support in old age and another 9 percent expect their children to carry on the family line and properties. The result indicates that the consumption utility of children is ranked above the economic and security utility. However, Yasukochi (1995) indicates that in Japan, where ageing is rapidly advancing, the main support for the aged is still family support and the support and care for the aged have long been the responsibilities of wives and son's wives. Hence, sons are highly valued in Japan as in other East Asian countries (Bompass and Choe 2004). It is normatively expected that the eldest son, together with his wife and children will live in an extended household with his parents. If for some reason this is not possible, it is the next eldest son's responsibility to co-reside with the parents (Rindfuss *et al* 2004). Even though there is a new trend that some couples live with wives' parents, this practice is uncommon (4 percent in 1977 and 7 percent in 1990) and mostly occurs to families without sons (Tsuya *et al* 2004). Therefore, after balancing the costs and benefits of raising a daughter and a son, it is possible that individual couples might stop producing another child after they get a son or they might continue with childbearing when they only have a daughter, which may, as a consequence, also affect fertility.

Under the possible impact of diverse socioeconomic factors, the TFR kept on declining and reached a low at 1.29 in 2003, making Japan one of the lowest-low fertility countries in the world. To reverse the declining trend, the Japanese government has initiated a series of pro-natalist policies since the early 1990s, expecting that these policies may recuperate Japan's fertility. In the next section, we will see what measures the Japanese government

has taken to affect fertility. Family policies in Japan since the time immediately before WWII will be reviewed, with an emphasis on the more recent pro-natalist policies since the 1990s.

3. Pro-natalist policies in Japan

The Japanese government was pro-natalist before WWII, believing that a large population could "strengthen its military and economic power" (Inoue 2001:25, Presser *et al* 2006). To curb birth control, the government prohibited abortion, infanticide, and the manufacture and distribution of contraceptive drugs and devices. In addition, the government bolstered up preferential treatment for pregnant women and nursing mothers and offered child allowances and tax benefits to large families (Inoue 2001).

With the defeat in WWII, Japan lost its overseas colonies and was occupied and ruled by the Allied Forces from 1945 to 1951. Returning soldiers came back either to reunite with their wives or find wives if unmarried. This led to an ensuing baby boom and a rapid growth of population. At that time, the General Headquarters of the Allied Forces invited two American population experts, Warren Thompson and Pascal Whelpton to Japan. The two experts warned the Japanese of the consequence of too rapid population growth and recommended birth control, which confronted strong public opposition. The Occupation Forces kept a neutral position and let the Japanese people decide by themselves whether to control childbearing or not (Inoue 2001). However, the concept of birth control had been introduced and it did influence a large number of Japanese. When common fear occurred in the country that population development was "out of control" and "a threat to economic recovery", individual couples practiced birth control voluntarily (Inoue 2001:27, Presser *et al 2006*: 138). Since the 1950s total fertility of Japan shows a slow and steady downward trend. The public and the government did not react to the declining trend until 1989, when TFR reached 1.57, a new lowest level in Japanese history. This development aroused great concern from both the government and researchers about the population shrinking problem.

In the early 1990s, the then Institute of Population Problems in Japan[1] appealed that with both fertility level and mortality rates continuously declining, the proportion of

[1] The Institute of Population Problems is now called the National Institute of Population and Social Security Research.

young people would shrink and the proportion of the aged would increase, which would result in the rapid ageing of the population and total population shrinking (Ogawa and Retherford 1993). Their concern is not superfluous. In 2005, Japan's population size did shrink for the second time in modern history, with a growth rate of -0.01 per cent. The last previous time was in 1945, when the country suffered the Second World War (Population Statistics of Japan 2008). If population keeps declining, there will be fewer laborers and consumers, less supply of qualified labor for the country's economy and fewer people to take care of the old. In addition, the younger generation will be heavily burdened with lower income owing to greater social security contributions. Consequently, Japan's position as "a premier economic power" would be shaken (Boling 1998:175). Worried about these prospects, the Japanese government has initiated a series of pro-natalist policies since the 1990s with the purpose of stopping the steadily declining fertility (Retherford and Ogawa 2005).

3.1 Major government actions

As a matter of fact, the government introduced child allowances as early as 1972, intending to help low-income families with at least three children. The allowances were restricted to the third or higher-order children. At that time, the TFR was still around the replacement level and the introduction of child allowances had no purpose of raising fertility. In 1986 the allowances were increased and extended to cover the second child and in 1992 the first, too (Matsukura et al 2007). 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 (Retherford and Ogawa 2005). As of 2004, children of any birth order below age 3 can receive a child allowance of around US$100 per month (around 1/50 of the average household income). The first and the second child aged between 3 and 12 can receive around US$50 every month (around 1/100 of the average household income) while children of higher order can still receive around US$100 per month. [2] This allowance is means-tested.

[2]According to Statistics Handbook of Japan (2008), the average monthly income of a household in Japan in 2004 is ¥531,700, which is roughly US$ 5600 according to exchange rate in 2009.

Table 1: Major Japanese government actions regarding population issues

Year	Means-tested Actions		Employment- restricted Actions	Others
	Child allowances	**Angel Plans**		
Before WWII				***Pro-natalist actions:*** Prohibiting abortion, infanticide, manufacture and distribution of contraceptive drugs and devices; preferential treatment for pregnant women; offering child allowances and tax benefits to large families
1945-51				Individual voluntary birth control
1972	To the third or higher-order children			
1986	Extended to the second child			
1990				***Inter-ministry Committee:*** The main task is to create "a sound environment for bearing and rearing children"
1991			***Childcare Leave Act:*** One-year unpaid leave offered to full-time employees	
1992	Covering all children			
1994		***Angel Plan (1995-99):*** Establishing more day-care centers and family support centers; organizing more after-school programs to help working mothers with childrearing		
1995			***Childcare and Family Care Leave***	

			Act: 25% of salary for childcare and family care leave offered to full-time employees	
1999		***New Angel Plan (2000-04):*** More day-care centers, family support centers and after-school programs		
2001			***Employment Insurance Law:*** 40% of salary for childcare leave or family care leave to full-time employees	
2002				***Plus One Plan:*** Calling on fathers to take at least five days' leave when a child is born
2003			***Next Generation Law:*** Employers with more than 300 employees should submit to the local government a plan for raising fertility. The plan should cover both regular and temporary workers.	***Basic Measures:*** Setting stage for future action without concrete measures
2004		***New Angel Plan (2005-09):*** Increasing husbands' involvement in family life and calling for more family support-centers	***Revised Childcare and Family Care Leave Act:*** Temporary workers entitled childcare leave	

Source: National Institute of Population and Social Security Research (NIPSSR) (2003), Inoue (2001), Matsukura et al (2007)

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, which intended to facilitate for working women with children. One year unpaid leave was offered to either the mother or father who was full-time employed in order to look after the infant. Besides, it stipulated that firms or organizations with more than 30 employees should establish a childcare leave scheme before April 1st 1992 when the law was put into effect. This act is the first in a series of legislative changes in Japanese family policies (Lambert 2007).

In 1994, 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). As a result, the day-care center capacity for kids aged 0-2 was increased from 451,000 in 1994 to 564,000 in 1999 (Retherford and Ogawa 2005). Services under this plan were also means tested.

The 1995 Childcare and Family Care Leave Act was actually an extension of the 1991 Childcare Leave Act. This act regulates that apart from the one year leave for care of an infant, a person can have 25 percent of salary during the leave and enjoy up to three months of leave per year for taking care of another family member including parents. The act is restricted to full-time employees, as was the 1991 Childcare Leave Act.

In 1999, the New Angel Plan for 2000-2004 was announced, aiming to set up more day-care centers, after-school programs and family support centers. Services available are based on means tests that may vary from place to place (Matsukura *et al* 2007, Retherford and Ogawa 2005).

In 2001, according to the amendment to the Employment Insurance Law, employees could receive 40 percent of salary paid by the government while on childcare or family care leave. In the same year it was regulated that employers are forbidden to dismiss, transfer or demote employees who apply for childcare (Lambert 2007). Still, it is restricted to regular full-time workers (Retherford and Ogawa 2005).

In 2002, a plan on "Measures to Cope with a Fewer Number of Children Plus One", known as the "plus one" plan was announced, 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).

In 2003, two laws were enacted to carry out the plan of the 2002 “plus one”. They are 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” (Retherford and Ogawa 2005). The “Next Generation” law regulated 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. The submitted plan must span from two to five years. If the local government approves the plan, the employer could get permission to display a special logo on the firm’s products, advertisements and other promotional literature (Retherford and Ogawa 2005). At the end of the plan, the employer needs to report progress to the local government. And under the guidance of the Labor Bureau of the local government, an evaluation will be made. If the progress is considered as unsatisfactory, the firm cannot use the logo any longer (Retherford and Ogawa 2005). Under the “next generation” law, local prefectural governments have to formulate special pro-natalist programs as well. One of the unique programs implemented by a local government is to start offering a monthly allowance of US$50 when a woman begins her fifth month of pregnancy (Retherford and Ogawa 2005). The other law enacted in 2003 known as the “Basic Measures” states that Japan needs to halt the decrease in children. The 2003 “Basic Measures” sets the stage for future action without implementing concrete measures. 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 (Retherford and Ogawa’s view 2005).

Figure 2: Logo for government-certified child-friendly employer

Source: Retherford and Ogawa (2005:34)

The 2004 New Angel Plan for 2005-2009 aims at increasing husbands' involvement in childcare and household chores and calls for more family-support centers. Also in 2004, the Childcare and Family Care Leave Act was revised so 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 and are also included in a firm's plan to raise fertility (Retherford and Ogawa 2005).

On the whole, these policies have a very clear underlying purpose – to counteract further fertility decline and to reverse fertility. Child allowances have been extended from higher order children to the first two children. This helps to reduce people's economic pressure in childrearing. The coverage of childcare and family care leave has been expanded from full-time to temporary employees and the salary on leave has been increased from being unpaid to 40 percent of previous income. In addition, under the Angel Plans, more day-care centers have been established and more after-school programs have been promoted. Husbands are encouraged to be more involved into family life; firms have been urged to make pro-natalist plans; and workplaces are pushed to be more child-friendly so that working women can become more comfortable to take child-care leave. In summary, we can see that the actions taken by the Japanese government since the early 1990s to enhance fertility are developing in a more ambitious direction, step by step.

3.2 Debates over the effects of policies on fertility in Japan

Heated debates over the effects or non-effects of the recent pro-natalist policies on fertility have been going on. Retherford and Ogawa (2005) remark that these policies are not universal, with some of them targeting more educated women while some aiming the less educated. They reveal that laws dealing with childcare leave (1991 Childcare Leave Act, 1995 Childcare and Family Leave Act and 2001 Amendment to the Employment Insurance Law) favor more-educated women more than the less educated because the childcare leave provision applies only to regular full-time employees, who mostly have higher education level. Moreover, the 2003 "next generation" law also benefits the more educated in that workers in firms or organizations with more than 300 employees are likely to be more educated than workers in smaller firms. Whereas, the means-tested child allowances and Angel Plans benefit women with lower income who are most often less educated. Meanwhile, Retherford and Ogawa (2005) mention that the downside of the 2001 amendment is that employers would be less willing to hire women as full-time employees even though the 40 percent of previous income is paid by the government and not the employers. The authors worry that these non-universal measures might widen fertility differentials by income and education.

Boling (1998) and Lambert (2007) state that the Angel plans did increase the capacity of day-care centers especially for children under three, extended the care hours and increased after-school programs. However, the fulfillment of the Angel Plans is often hindered owing to the lack of financial support from local governments. To Boiling (1998), the Japanese family policies are very conflicting. She claims that even though the policies encourage mothers to join the labor market by helping working parents to deal with work-family conflicts and reducing the costs of childrearing, this intention can be offset by other incentives that keep women playing their traditional gender roles as full-time housewives. For example, the pension system discourages women to enter the labor-force. According to Japan ECHO (2004), residence in Japan at ages 20-59 are required to join the public pension system. The self-employed and unemployed, including farmers, full-time homemakers and students are supposed to enroll in the National Pension Plan and in principle all must pay monthly contributions (around ¥13,300) until they are 60 regardless of their employment status and income level. At age 65, they receive a basic pension of up to ¥66,000 per month based on the length of their participation period. However, in 1986, homemakers with an annual income of below ¥1.3 million and whose

husbands are enrolled in the Employees' Pension Plan or other schemes for salaried workers do not need to pay contributions but still can get the basic pension based on the contributions paid by their husbands and their husbands' employers. That is, without contributing to the National Pension fund, when aged 65, full-time housewives with employed husbands can still get a monthly basic pension of ¥66,000, which roughly equals to US$ 700 according to exchange rates of 2009.

Another policy component that can play a counteracting role is the tax system, which encourages married women to work part time rather than full time (Boiling 1998). If a married woman's income surpasses a certain amount, she has to pay taxes on her own earnings and will not be able to enjoy the spousal allowance and tax deduction that comes through her husband's insurance policy. Thus, many women prefer not to work or they choose to work part time. Boiling (1998) asserts that the Japanese policies will continue to send mixed messages, attempting to palliate the strain on families by improving day care and parental leave but meanwhile deepening the cultural values about marriage, self-sacrifice and women's obligations to care for the children and the old. Likewise, Inoue (2001) also takes a pessimistic view of the recent policies. The author claims that recent policies have not yet generated positive effects in that they focus more on alleviating problems than address their causes.

Despite all this, the recent pro-natalist policies since the early 1990s have also gained some positive remarks. Lambert (2007) comments that during the post-war period, women were encouraged to work when the labor market structure made it possible, given that it did not interfere with their care giving obligations. Both employers and the government encouraged part-time employment in that the government could still delegate care burdens to women so that social welfare expenditures could be kept low. At that time, a woman's continuous or full-time employment could seldom be guaranteed. But since the early 1990s, policies try to accommodate women in all types of employment and apply to a broader range of families. This represents a significant change. Instead of restricting mothers to care-giving at home, the policies become more and more supportive of maternal employment, encouraging mothers to remain employed after having a child. Even though some might argue that the policy support is not sufficient or supportive enough to improve women's ability to balance family and work, chronologically it is great progress. Atoh (2008) shares the same view and states that recent policies have been designed to make it easier for working women to continue their jobs after marriage and childbirth.

Actually, the possibility of using public policies to influence fertility has been heatedly debated around the world. Demeny (2003) insists that policy interventions have only marginal effects on fertility. After examining theoretical propositions and empirical studies based on both macro- and micro-level data through various kinds of methods that link policies and fertility, Gauthier (2007) posits the impact of policies on fertility tends to be small and that it may fall on the timing of births rather than on women's completed fertility. In contrast, Rindfuss and Brewster (1996) indicate that if social policies play an important role in facilitating for women to combine work and childbearing, they should have an impact on a country's fertility level. Some empirical in-depth micro-level studies such as Hoem (1990, 1993), Duvander and Andersson (2006), and Anderssson *et al* (2006) also show that family policies can have an effect on women's childbearing behavior. According to Frejka *et al* (2008), it is hard to ascertain how influential individual public policies are on fertility levels and how long the effect can last. Nevertheless, they point out that a consistent system of population and family policies can effectively sustain or modify fertility levels in contemporary societies. And total fertility rates of countries that emphasize gender equity in policies are often relatively close to the replacement level.

3.3 Proposals on how to improve effects of policies on fertility in Japan

Researchers have put forward a series of proposals with regard to enhancing fertility through policies in Japan. In this respect, Retherford and Ogawa (2005) state that pro-natalist measures are costly. To put existing measures into real effect, the government must also let its economy prosper, reduce unemployment and government debt first so that couples will not feel under pressure to produce and raise children. They recommend a larger income tax deduction for children. Meanwhile, they point out that in Japan it is always the employers who prepare the employees' tax return. Most Japanese taxpayers have little or no idea of what tax deductions for children are. The authors strongly suggest that tax forms be revised so that individual taxpayers can see clearly how large the amount of tax reduction they can enjoy on account of the number of children they have.

Some researchers focus on the perspective of reducing women's responsibility of care giving and reducing the opportunity cost of childrearing. Boiling (1998) and Yashiro (1998) suggest that family policies should provide generous funds to day care and

residential facilities for the aged so that women will not be left alone with the responsibility of care giving. In Yashiro's view (1998), employment practices should be reformed so that women can return to their former positions after taking childcare leave. Boiling (1998) emphasizes that to ensure women's career tracks, it is necessary to get rid of the mandatory transfers and relocations from the seniority wage system for both men and women. Nishimura (2003) holds that in countries where the work-family policies guarantee mothers' career and help mothers to return to work without career interruptions, the fertility rate is stable. These researchers have confidence that fertility will go up when women are emancipated from the bonds of caring and when they are ensured that childbearing will not cost them their careers.

Some other researchers strongly advocate the formation of marriage as a precondition of raising fertility. Retherford and Ogawa (2005) advocate that promoting more and earlier marriage is quite relevant to Japan's situation where the desire of getting married is strong but the desire is not often acted upon (Ueno 1998). They insist that improving the prosperity of the marriage market as a policy initiative is necessary to solve the fertility problem. Whereas, Shirahase (2000) argues that the more marriage and childbearing are bound together, the more likely young women will be to distance themselves from both marriage and childbearing. The author advocates more flexible lifestyles, which might be of some help to solve the problem of fertility decline.

3.4 Methods of assessing effects of policies on fertility

In Japan, most research with regard to assessing the effects of pro-natalist policies uses the TFR as a fertility measure. According to Bongarrts (2008), the TFR is the most widely used and available indicator of fertility quantum observed in a time period (usually a year). It appears to be easy to interpret because it is expressed in births per woman. Thus, policy makers prefer this simple indicator. However, the TFR is a hypothetical measure for a synthetic cohort, which shows the average number of children a woman will have in her lifetime according to the prevailing age-specific fertility rates in a given calendar year. This synthetic cohort interpretation often provides a distorted view of the underlying behavior of cohorts when the timing of births changes. In short, it does not depict women's real childbearing behavior very closely and the information it indicates is limited.

Linking up the recent policy developments in Japan and the latest trends of the TFR before and after 1991 reveals nothing more than a steadily declining trend. Apart from this, nothing in particular can be discerned. According to Neyer and Andersson (2008), if researchers rely solely on aggregate measures of behavior, like the total fertility or the female-labor force participation rate, or on aggregate measures of family policies, like the amount of social spending, neither effects nor non-effects of family policies can be measured. They argue that a proper assessment of the consequences of policies on childbearing can be achieved only if researchers "study the impact of policies on individual behavior, taking into account the features of family policies and their various connections with dimensions of time, space and uptake" (ibid: 700). Meanwhile, they stress that a clearer assessment rely on research designs and methods that enable researchers to grasp the impact of policies on individual behaviors. They highlight that analyzing longitudinal data that contain individual life-course histories and applying event-history analysis of the propensities of different categories of people to have a(nother) child is "the state-of-the-art" in such research in that it allows researchers to study childbearing over a woman's and any partner's life course while considering their education histories, employment histories and so on; this enables researchers to link the individual life-course histories to contextual macro indicators such as development of policies. They point to the importance of critical junctures, which is a point in calendar time when an important change, such as an introduction of a policy, a significant change in benefits, a radical change in the political or institutional setting, or a change in socioeconomic factors occurs. These deserve special attention in the efforts of detecting policy's influence on women's individual behavior. If socioeconomic circumstances are stable, event-history analysis based on longitudinal individual-level childbearing data for time-periods before and after a critical juncture can allow us to see whatever effect this change has on subsequent childbearing behavior: on the progression to different parities and on the childbearing behavior of specific groups of women. If family policies remain the same while the socioeconomic or political and institutional circumstances change, researchers can examine what effects the policies have on childbearing behavior in different contexts (*ibid*).

In the case of Japan, pro-natalist family policies have been enacted frequently ever since 1991. Policies related to childcare leave in 1991, 1995 and 2001, the two Angel plans in 1994 and 1999, the "plus one" plan and the "next generation law" in 2002 and 2003 can together be regarded as a set of critical junctures which may have affected

women's childbearing behavior. Given that these policies are clustered together, it will be difficult for us to spot the effect of any given policy on fertility. Still we argue that the effects or non-effects of the general increase of policy support and its re-orientation since the initial implementation can be analyzed. Thus, 1991 should be considered a critical juncture in this study. In particular, birth rates from 1991 onwards shall deserve special attention in that they might show changes of childbearing behavior of certain sub-groups of women in response to the changes of polices or other macro events. Different from previous research on Japan, most of which applies macro indicators as measures to test the impact of policies on fertility, we analyze individual-level data which contain women's detailed life-course history of childbearing and try to test the parity-specific effect of the pro-natalist policies on women's childbearing behaviors through event history analysis (proportional hazard regression). Our intention is to derive a disaggregated picture of whom the policies possibly influence. The following section will describe our data in detail, the variables we apply and the method we use for our study.

4. Data and methods

The Data for 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 28-77 as of the end of 2003. 6,302 people responded and the response rate is 63 percent. Among the respondents, 3336 are women. The survey used two types of questionnaires: questionnaire for young respondents (for those born between 1956 and 1975) and questionnaire for middle-aged or senior respondents (for those born between 1926 and 1955). Most questions are common across both questionnaires with the former including special questions about marriage, childbirth, and childcare and the latter special questions about relations between older parents and their children. This study shall use information concerning woman's age, date of birth, education, month and year of each childbirth and sex composition of children from both questionnaires to examine calendar-year effects on fertility and related to this, how policies may have affected women's propensity to give births at different parities in Japan. Even though the calendar-year trends of childbearing can be determined by a variety of micro or macro factors apart

from policy effects, we still expect to discern evidence of some link between pro-natalist policies and childbearing through this study. The study period is restricted to 1961-2003. Only women respondents will be included into the analysis because the recent pro-natalist policies in Japan since the early 1990s mainly aim at women.

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 big enough for observing Japanese women's childbearing behavior all through the study period. Second, it contains detailed information of women's date of birth, women's education, children's date of birth and children's sex, which allows us to construct a longitudinal dataset with retrospective histories of women's childbearing behavior. This makes observing parity-specific fertility development in response to policy changes possible. There are also some restrictions of using this survey. For example, the information related to marriage regards only the most recent marriage. Nevertheless, owing to the fact that almost all births fall within wedlock in Japan and almost all married women have a child, marriage is endogenous to childbearing in some sense and thus, does not necessarily need to be included into the estimation. Another restriction is that the information on children covers not only that of biological children but also adopted and step children and the data offer no information for us to distinguish between them. Whereas, this will not affect the accuracy of this study much in that adoption is not particularly common in Japan (Ochiai 2003), and Japanese culture places great emphasis on blood relations (Lo and Bettinger 2001:238). Thus, we assume that respondents overwhelmingly report their own biological children rather than adopted or step children.

Our study is done by estimating multiplicative intensity-regression (or proportional-hazard) models. 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 50 or until December, 2003, which ever comes first. During observation, time duration since age 15 represented by *woman's age* is the basic time factor. To study one/two-child mothers' propensity to give a second/third birth, we start observation at the birth of the first/second child. It stops when the second or third birth occurs, when these women turn 50, when their previous youngest child turns 10, or December 2003, whichever comes first. Women who produce 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. *Age of the last child* is the basic time factor for these two processes of observation. The first, second and third birth risks for the basic time factor (*woman's age* for the first birth and *age of the last child* for the second and third births) are given in absolute risks, which is the number of the first, second and third births per 1000 woman months as being childless, one-child mother and two-child mother, respectively. The other factors in the models are supposed to modify these absolute risks with multiplicative effects. 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. 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. Table 2 presents the basic descriptive statistics on the number of occurrences and total exposure time for each parity observation.

Table 2: Descriptive statistics on occurrences and exposure time

Parity 1	Woman months as childless	436,213
	Number of first births	2,483
Parity 2	Woman months as one-child mother	120,615
	Number of second births	2,078
Parity 3	Woman months as two-child mother	188,795
	Number of third births	660

A simple model with only main effects to test the risk of first birth can take the 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*). The main effect model to test the propensity of the second or third birth can take the following form:

h(t) =sgcead

where h(t) stands for the intensity of the second or third birth when factors s *(woman's own number of siblings)*, g *(sex composition of previous child(ren))*, c *(calendar year)*, e

(educational level), a *(woman's age)* and d (duration since last birth, represented by *age of the last child)* are included in standardizations.

Calendar period is an essential time-variant covariate and the main variable of interest in this study. In our main effect models, calendar years are aggregated into seven year-groups (1961-70, 1971-80, 1981-85, 1986-90, 1991-94, 1995-99, and 2000-03). In the grouping of years, special attention is given to when a new policy was enacted to 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 applied for our presentation of *annual* index of birth rates. Interaction effects between calendar year and other socio-demographic factors are of main interest in this study because they can show whether childbearing changes differ by sub-groups of women. Special attention is given to the childbearing trends after 1991 in that they help discern which subgroups of women were more likely to produce children at different parities in concert with the increasingly pro-natalist policies and critical changes of policies during the 1990s.

Number of woman's own siblings and *sex composition of previous child(ren)* are two time constant control variables. *Number of woman's siblings* is categorized into three groups: no siblings, 1-2 siblings, 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.

Educational level is involved as an important factor that can help explain women's childbearing behavior. The information we can obtain from the questionnaire is the final educational level that a respondent has achieved at the interview time. If we use it to explain women's childbearing behavior, especially for the first birth, it can amount to an anticipatory analysis and make the study less accurate. In Japan, the education system is quite rigid, with a time schedule of 6-3-3: 6 years in primary school, 3 years in junior school and 3 years in high school. A new academic year starts in April and ends the following March. When a student finishes high school and is about to start junior college (which usually lasts 2 years) or university (which usually lasts four years), it should be the April following the student's 18^{th} birthday (Fukuda 2007). Owing to the relatively fixed education system in Japan, we assume that women respondents in our study follow a model educational trajectory. Based on this, we construct a time-variant variable of education so that we can not only make a better use of education as an explanatory factor but also avoid anticipatory analysis. The educational level of women is categorized into

four groups in accordance with the time schedule: 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 she has achieved. We also experimented with including a level "in education" to indicate the time before a woman achieves her final level of education. When finding that such an inclusion does not make much difference to the overall estimated results of our model, we decided to rely on the results from the models without such an inclusion.

Woman's age is a significant time-variant factor in our estimations. For first birth, duration since age 15 is categorized into seven levels, corresponding to age groups 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45-49 years respectively. When estimating first birth rates, we additionally run two separate models (Model 1A and Model 1B) for the younger childless women (aged 15-30) and the older childless women (aged 31-49) because their patterns and trends of motherhood entry are different from each other (Andersson 1999). When estimating the propensities of giving second and third births, *woman's age* is also involved as a control variable.

Age of the last child is our 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, which indicates a duration time of 0-24 months, 25-48 months, 49-72 months, 73-96 months and 97-120 months, respectively, since the last birth. The effect of this variable is also shown in absolute risks of producing a second or a third child.

5. First, second and third birth trends in Japan, 1961-2003

5.1 First birth rates

5.1.1 Relative risks of first birth from main effects models

Table 3 displays the estimated results of Model 1, Model 1A (childless women aged 15-30) and Model 1B (childless women aged 31-49) where calendar years are grouped into seven levels. The table also provides p-values from tests of non-effects of each factor. Even though the number of respondents in our data is not excessively large, most factors have significant effects. (P-values are listed in the table as a guidance to judge the significance of first birth risks; high p-values will not necessarily make us ignore patterns we otherwise find meaningful.) To discern age-specific differences in the timing of first

birth, we will mainly focus on Models 1A and 1B. The estimated calendar-year effect on first birth of younger women is largely negative while that of women aged above 31 is less clear-cut. The association between woman's own siblings and her first birth rate is positive in both the younger and the older childless group. Besides, the relationship between current educational level and younger women's propensity to become a mother is negative while for older women positive. That is, higher-educated women in the younger group are less prone to enter motherhood than lower-educated women while their counterparts in the older group are more prone to become a mother than the lower-educated, ceteris paribus. As regards the baseline absolute risks of the three models in Table 3, we see 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 (Ages 15-30)	Model 1B (Ages 31-49)
	Relative risk P-value	Relative risk P-value	Relative risk P-value
Siblings	0.000	0.001	0.043
No sibling	1	1	1
1 to 2 siblings	1.04	0.96	1.53
3 siblings or more	1.26	1.17	1.69
Year groups	0.000	0.000	0.397
1961 - 1970	1.39	1.39	1.28
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 or 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	12.12	14.40	--
31-35	8.46	--	4.57
36-40	3.12	--	1.79
41-45	0.43	--	0.25
46-49	0.10	--	0.06
Log-likelihood:	-14019.29	-11642.22	-2343.13
Number of parameters:	18	14	15

5.1.2 Period trends in first birth

When calendar years are grouped into seven levels, the trend of first birth rates by calendar years is not entirely clear. To demonstrate a more detailed pattern of first birth rates across the study period, 1961-2003, we also display Figures 3 and 4, which exhibit the standardized *annual* index of first birth rates, relative to the rate of 1990 and standardized for the effects of the number of woman's siblings, educational level and woman's single-year age. Figure 3 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. Figure 4 reveals an important difference in propensities to become a mother between the two age groups of women. 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. We speculate that the pro-natalist policies since the early 1990s may have had the effect of preventing the continuity of the declining trend. This level-off in birth propensities among the younger childless women has contributed to the slight reverse of overall first birth rates from 1991 onwards (Figure 3). 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, which causes a slight recuperation of childbearing at higher ages. On the whole, Figure 4 reveals a clear pattern of postponement of the age at becoming a mother among Japanese women during the study period.

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

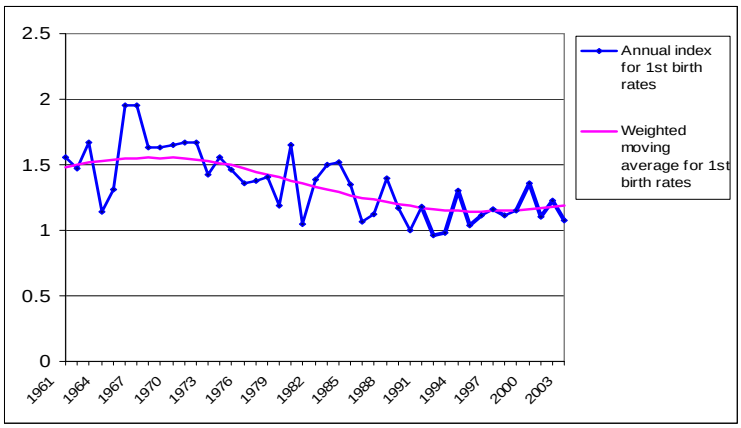
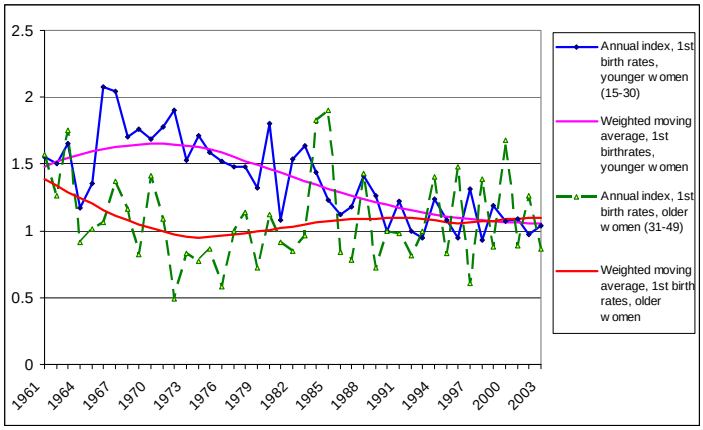


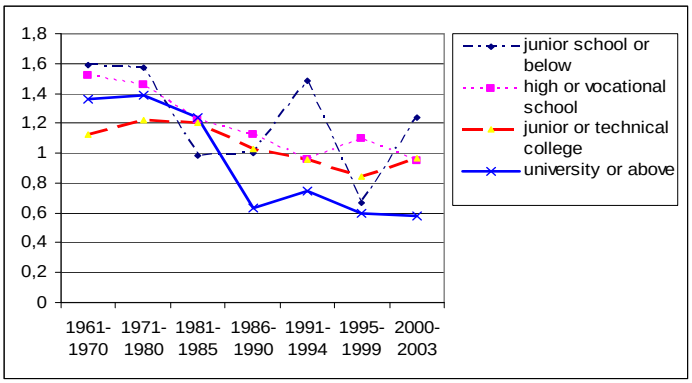
Figure 4: **Standardized *annual* index of first birth rates, relative to 1990, Japanese women, 1961-2003, by group of ages. Weighted moving average of series.**



5.1.3 Period first birth trends by educational level

Given that the effects of the control variables on first births may vary over time, we have run interactions between calendar year and all other variables in order to observe differential trend changes over time of different sub-groups of women. We hope that this will allow us to discern whom are possibly influenced by the pro-natalist policies of the 1990s. The interaction of calendar year and educational level shows some differences over time between younger and older childless women in the role of education on the propensity of becoming a mother. In the younger group, it has most often been women with higher educational level (junior or technical college, university or above) that have been less prone to become a mother during the study period (see Figure 5). During the first two decades, it was women with junior or technical college who were least likely to become a mother. From the mid-1980s onwards, they were replaced by women with an educational level of university or above as the group with the lowest fertility. It is also noteworthy that over the whole period, the first birth trends of all education groups show general decline. However, in the 1990s they seem to have leveled off.

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.**



Among the older childless, there were no clear differences in the childbearing trends and levels of 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. Much of the variation over calendar time seems to be random, but we note that the birth trends of women with the lower educational levels hardly change systematically over time. In correspondence with Figure 5 and Figure 6, Table 4 presents the estimated first birth rates by calendar year groups and educational level relative to the rates of high or vocational school educated women for each year group separately.

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.**

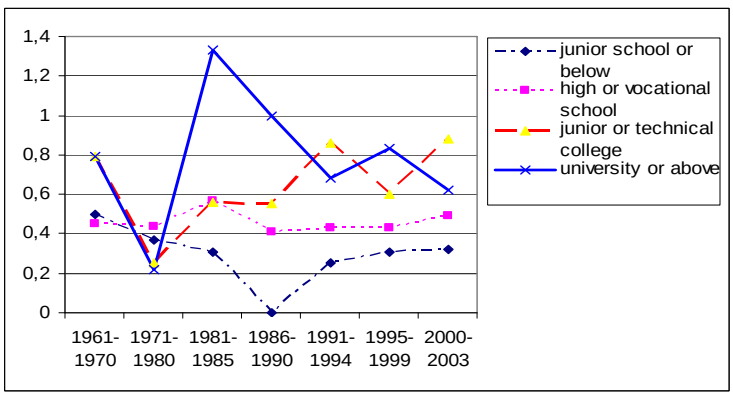


Table 4: First birth rates by calendar year groups and educational level relative to the rate of high or vocational school educated women for each year group, separately, Japanese women, 1961-2003. Standardized for number of siblings and woman's age.

	1961-1970	1971-1980	1981-1985	1986-1990	1991-1994	1995-1999	2000-2003
	First birth						
junior school or below	1.03	0.98	0.72	0.65	1.20	0.62	1.03
high or vocational school	1	1	1	1	1	1	1
junior or technical college	0.78	0.82	0.98	0.96	1.10	0.87	1.31
university or above	0.97	0.92	1.19	0.77	0.95	0.83	0.84
	First birth, women aged 15-30						
junior school or below	1.05	1.07	0.80	0.89	1.54	0.61	1.31
high or vocational school	1	1	1	1	1	1	1
junior or technical college	0.74	0.83	0.98	0.92	0.99	0.76	1.03
university or above	0.89	0.95	1.02	0.56	0.78	0.55	0.61
	First birth, women aged 31-49						
junior school or below	1.09	0.83	0.55	0.00	0.60	0.72	0.65
high or vocational school	1	1	1	1	1	1	1
junior or technical college	1.74	0.56	1.00	1.33	2.01	1.40	1.78
university or above	1.74	0.49	2.34	2.43	1.59	1.94	1.25

5.2 Second and third birth rates

5.2.1 Relative risks of second birth from main effects models

Table 5 presents the estimated second and third birth rates from the main effects event history model where calendar years are grouped into seven levels and the effects of the mothers' siblings, sex composition of previous child(ren), education, woman's age and age of the last child are controlled. We can see that the number of woman's own siblings has a positive effect on both second and third birth rates. Besides, the intensity of one-child mothers to produce a second child is higher if the first child is a girl. Likewise, if the first two children are girls, the risk of producing a third child is higher. But if a mother has already got a boy and a girl, her propensity of producing a third child is

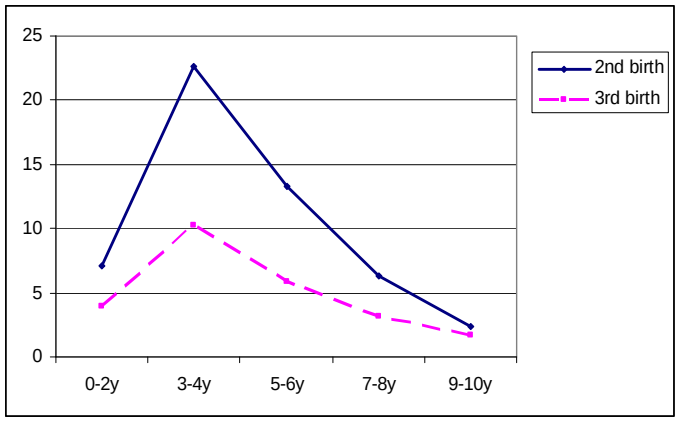
comparatively lower. When calendar years are grouped into seven levels, the calendar-year effect on the second and third birth is not quite clear. The effects of education on both the second and third births appear to be positive. From the perspective of the effect of woman's age on childbearing, we can see that ages 26-30 is a climax period for women to give a second birth. After age 30, the propensities decrease. The impact of woman's age on the third birth rate is negative for ages above 25. The estimated absolute risks of second and third births by age of the last child shows that women are more prone to produce another child 3-4 years after the last previous birth (see also Figure 7). Figure 7 also displays that the level of second birth rates is generally higher than that of third birth rates. The propensity to produce another child is obviously higher for one-child mothers than for two-child mothers.

The estimated effect of education on second and third birth rates (see Table 5) appears to show that a higher level of education stimulates second and third births. To some extent, the higher estimated second and third birth rates for the higher educated may be due to selection effects in education as well as parity progression in a model where we control for the effect of woman's age. As is aforementioned, Japanese women often finish education and work for some time before they start family life. Higher educated women are more likely to postpone becoming a mother to later ages. A late entry into motherhood will, as a consequence, affect the timing of the second and third birth as well. Women who become a mother at later ages will have shorter time exposed to further childbearing. Furthermore, when women remain childless to older ages, they might form other interests that compete that of becoming a mother (Morgan and Rindfuss 1999) and thus, some women might remain childless indefinitely. Hence, a larger final number of children for higher-educated women should not be taken for granted just because of their higher age-standardized second and third birth rates. Figures 11-13 in the Appendix reveal the interaction effect of education and age on the first, second and third childbearing. They demonstrate how educational level affects the timing of births. It can be seen that the higher a woman's educational level is, the later she is likely to enter motherhood and thereafter, produce the second and third birth.

Table 5: 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)		Model 3 (Third birth)	
	Relative risk	P-value	Relative risk	P-value
Siblings		0.025		0.448
No sibling	1		1	
1 to 2 siblings	1.24		1.19	
3 siblings 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	--		0.90	
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 or 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	0.11		0.10	
46-49	0.00		0.00	
Age of the last child (baseline absolute risks per 1000 months)		0.000		0.000
0-2	7.07		3.95	
3-4	22.67		10.30	
5-6	13.27		5.91	
7-8	6.34		3.10	
9-10	2.35		1.71	
Log-likelihood:	-10005.58		-4210.53	
Number of parameters:	23		24	

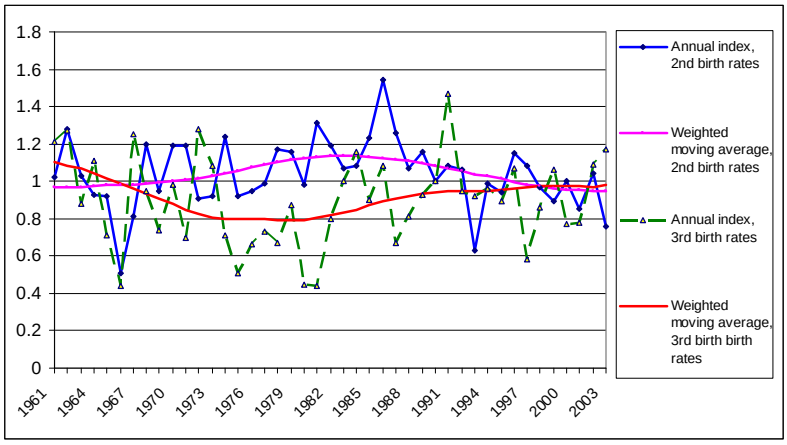
Figure 7: **Absolute risks of second and third birth per 1000 woman months by age of the last child (separate models for each birth order), Japanese women, 1961-2003, standardized for siblings, sex of previous child(ren), calendar year, education, and woman's age.**



5.2.2 Period trends in second and third births

The calendar year effects on second and third births are not very striking in our main effect model in Table 5. In order to get a more detailed picture of calendar-year trends, we construct standardized *annual* indexes of second and third birth rates, relative to the birth rate of 1990, from two separate models (see Figure 8). For each birth order, birth rates are standardized for the effect of number of woman's siblings, sex of previous child(ren), educational level, woman's age and age of the last child. We can see that the second and third birth rates follow similar flat trends in the 1960s, except for a common downturn in 1966, which is a consequence of the year of fire horse. From the 1970s onwards, the trend of the second birth rate remains rather stable until the end of the study period. No rising trend can be seen after 1991. The influence of pro-natalist policies since the early 1990s on the second birth rates is invisible. 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.

Figure 8: 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.



5.2.3 Period second and third birth trends by educational level

We run interactions between calendar year and all other variables to detect the effect of control variables on second and third births over time. This allows us to spot which sub-groups of women are likely to produce a second or third child in response to the increasingly pro-natalist policies of the 1990s. 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 (Figure 9). In the 1980s, it was women with an educational level of junior or technical college that were most prone to produce a second child. From the 1990s onwards, women with an educational level of university or above are most prone to produce a second child. In general, from the mid-1980s onwards, higher-educated women (women with an educational level of college or above) have been more likely to have a second child than the lower-educated. For the third birth rates, much of the variation over calendar time is random, 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 (Figure 10). In correspondence with Figure 9 and Figure 10, Table 6 presents interaction effects of calendar year period and education on the second and third birth rates. The rates are given relative to that of high or vocational school educated women for each year group, separately.

Figure 9: **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.**

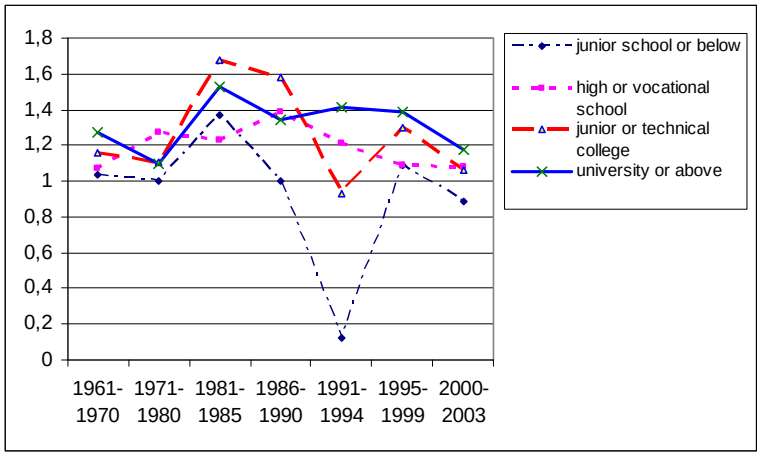


Figure 10: **Third birth rates by calendar year groups and educational level, Japanese women, 1961-2003, standardized for number of siblings, sex of previous children, woman's age and age of the last child.**

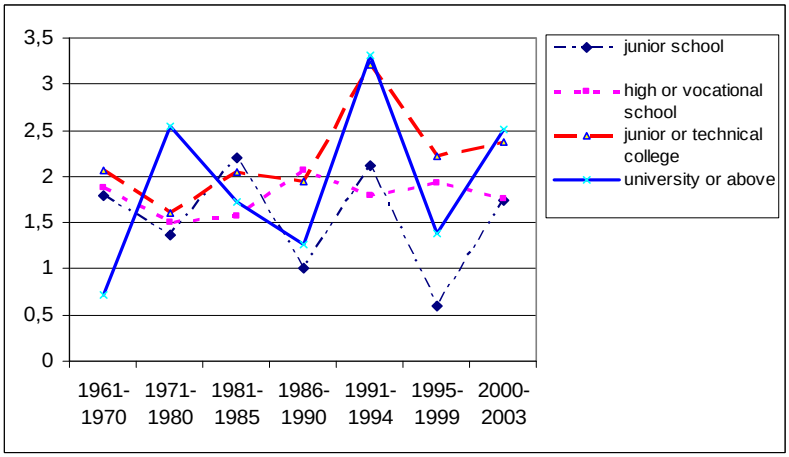


Table 6: Second and third birth rates by calendar year groups and educational level relative to the rate of high or vocational school educated women for each year group, Japanese women, 1961-2003. Standardized for number of siblings, sex of previous child(ren), woman's age and age of the last child.

	1961-1970	1971-1980	1981-1985	1986-1990	1991-1994	1995-1999	2000-2003
	Second birth						
junior school or below	0.97	0.78	1.11	0.72	0.10	1.00	0.83
high or vocational school	1	1	1	1	1	1	1
junior or technical college	1.08	0.87	1.36	1.14	0.77	1.19	0.98
university or above	1.19	0.86	1.24	0.97	1.17	1.28	1.10
	Third birth						
junior school or below	0.95	0.90	1.40	0.48	1.18	0.31	0.99
high or vocational school	1	1	1	1	1	1	1
junior or technical college	1.10	1.07	1.31	0.94	1.80	1.15	1.34
university or above	0.39	1.69	1.10	0.61	1.86	0.72	1.42

5.2.4 Gender preferences and fertility

Another interesting finding of this study is the varying effects of sex composition of previous child(ren) on women's further childbearing. Table 7 presents the interaction effects of calendar period and sex composition of previous child(ren) for the fertility of one- and two-child mothers. A slightly higher risk (e.g. 1.09 as of Table 7)[3] of having a second child after the birth of a girl suggests a relevant behavior of son preference among one-child mothers. On the whole, son preference among one-child parents was relatively strong in the 1960s and 1970s. During the same period, mothers with two girls were also more likely to produce a third child, compared to mothers with two sons. Since the 1980s, the evidence of son preference becomes weaker or even non-existent. We notice that a preference for a mixture of a boy and a girl seems to have gained in popularity, as indicated in the third-birth behavior of two-child parents with different sex compositions of their offspring. The gradually weaker effect of son preference on fertility is probably

[3] A relative risk of 1.09 means that the second-birth intensity for mothers of a girl is 9 percent higher than that for mothers of the reference category (in this case, mothers of a boy).

due to the decay of Japanese *ie* family system. Under the traditional *ie* system, the "continuity of the family line was highly prized and a stem-family structure tended to form, whereby only one of the children, when adult and married, continued to reside with the parents" (Ochiai 2003:138). It is usually the heir son who coresides with the elders. Since 1975 Japanese family system has gradually shifted from the traditional *ie* to nuclear family type and couples are increasingly unwilling to live with parents (Matsukura *et al* 2007). To sum up, our results show that from the 1980s onwards son preference seems to be less pronounced than before while mixed-preferences of children seems to have gained in importance.

Table 7: Relative risks of second and third birth by sex composition of the previous child(ren), separately, for each calendar-period in 1961-2003, Japanese women, standardized for siblings, educational level, woman's age and age of the last child.

	1961-70	1971-80	1981-90	1991-03
2nd birth for one-child mothers				
-- girl vs boy	1.09	1.28	1.04	1.00
3rd birth for two-child mothers				
-- two girls vs one boy and one girl	1.61	1.51	0.86	1.58
-- two boys vs one boy and one girl	1.10	1.07	0.83	1.50
-- two girls vs two boys	1.46	1.41	1.04	1.05

5.2.5 Other interactions with calendar time

Apart from the interactions aforementioned, interaction effects of calendar period and age of the last child have also been estimated. We find that when the previous child is aged 3-4, the risk of producing the second or third child is higher (see Figures 14-15 in the Appendix). We had hoped to discover an increased tempo in the second and third birth behavior after 1991 when Japan started to introduce its series of pro-natalist policies. But the results show no sign of birth space shortening. After all, Japan's recent pro-natalist policies do not contain any intentions to encourage women to shorten their birth intervals. Several other interactions between calendar period and other factors have also been tested in order to spot trend differences in response to policy changes or other macro influences.

However, the results of these interactions do not show significant trends or patterns and thus, are not reported.

6. Summary and conclusions

Social policies of Japan related to fertility are since the early 1990s, mainly composed of three components: child allowances, day-care support, and childcare leave. The means-tested *child allowance* has been gradually increased and expanded to cover all children even though the amount of allowance varies in accordance with birth order. The means-tested services provided by the Angel Plans, with the purpose to facilitate childrearing for working mothers, comprised the establishment of more *day-care* centers and after-school programs. Within ten years' time, from 1991 to 2001, the *childcare leave* developed from an unpaid leave to a leave with 40 percent of previous salary as income replacement. It has long been restricted to full-time employees only. In general, the recent family policies in Japan from the 1990s have been trying, step by step, to benefit an increasing number of people. These policies have had a clear pro-natalist purpose.

A lot of research has been carried out to measure the effect of these policies on fertility. As aforementioned, TFR, which is often misleadingly perceived as an easy-to-interpret indicator of fertility, has long been used as a measure to assess the impact of policies. Recent developments in TFR of Japan reveal nothing but a declining trend. This also holds for the period after the early 1990s, when the various pro-natalist policy measures were implemented. To get a more nuanced picture of the childbearing dynamics of Japanese women in response to the pro-natalist policies since the early 1990s, we have analyzed individual-level fertility data by applying proportional hazard regression to these data. We hope to discern some positive policy effects on women's propensities to give their first, second and third births and to spot which sub-groups of women that may have been most influenced by the recent policies. The analysis demonstrates the first, second and third birth trends from 1961 to 2003. Even though the variables that can be adopted for event-history analysis of fertility in our data are limited, we could still discover important differences as regards changes in women's childbearing behavior during this period.

Our presentation reveals that the standardized *annual* index of first birth rates declined by around 50% from the mid-1960s to the late 1980s. However, from 1991 onwards, this decline levels off and first birth rates seem to carry a slight reversal. This reversing trend is in correspondence chronologically with the implementation of the pro-natalist policies of Japan. Two separate models for younger and older childless women reveal that it is the halt of the declining first birth trend among women aged 15-30 that have contributed to the slight recuperation after 1991. The propensities of becoming a mother for women aged 31-49 have been increasing ever since the mid-1970s. This increase is largely due to general postponement of childbearing. The standardized *annual* indexes and the weighted moving averages for second and third birth rates show that the second birth trend is rather stable through the study period. The third birth trend experiences a general downturn in the 1970s and then seems to be increasing since the early 1980s.

To discern whose childbearing behaviors might have been influenced by the recent pro-natalist policies, we ran interactions between calendar period and other variables. In this case, most groups became too small to reveal clear changes over calendar time. Based on the fact that the laws on childcare leave from 1991 to 2003 apply only to regular full-time employers, who mostly have higher educational levels, we had expected that the first, second and third birth trends of higher-educated women should deviate upwards after 1991. The interaction of calendar year and educational level suggests that among the younger childless women, first birth trends declined for all educational groups in the 1980s and subsequently leveled off. Among the older women, the difference in fertility was larger in the 1980s and the 1990s than in the 1960s and 1970s between university-educated women and women with other educational levels. And the birth trend of lower-educated women did not change much. For the second birth, since the 1980s, higher-educated women have been more likely to produce a second child. And the propensities for lower-educated women are rather stable except for some random variation. For the third birth, much of the variation over time is random on account of small occurrences and thus, no clear trend reversals can be observed after 1991. To sum up, even though the propensities of first (older women), second and third births appear higher for higher-educated women than for women with other educational levels, these differentials opened up well before 1991. Thus, the interactions of calendar period and educational levels do not reveal any striking differences in first, second and third birth trend changes over time in response to the policies implemented since the 1990s. Apart from this, interactions of

calendar period and other variables do not disclose much differential in trends before and after 1991 for other sub-groups of women, either.

Despite the lack of massive evidence of trend reversals in fertility after the implementation of the recent pro-natalist policies, we are not disappointed by our findings. After all, a sign of a slight reversal of first birth trends is seen. We conclude that the pro-natalist policies since the early 1990s had no visible effects on the second and third birth rates in Japan, but that a possible positive impact of the policies on the first birth is discerned. And we find that it is the halt of the declining trend of first birth rates among younger childless women that has contributed to this slight reverse. Neyer and Andersson (2008) indicate that when assessing the effect of policies, simply concluding "the more the better" or assuming that the existence of family policies that intend to increase fertility must have an elevating effect is not appropriate. They claim that findings of no effects, or only insignificant effects are also effects. Consequently, it is worth considering why the policies intending to raise fertility in Japan do not have much clear positive effects on women's childbearing behaviors.

Tracing the policies related to childcare leave from 1991 to 2003, we can see, for example, that these policies only apply to regular full-time employees. According to Statistics Japan (2007), the average labor force participation rate of Japanese females at reproductive ages (15-50) during this period lingers around 57 to 60 percent. This includes employees (either regular or irregular), self-employed workers and family workers. As reported by the Japanese Working Life Profile (2003-2004) issued by the Japan Institute for Labor Force and Training, only 49% of female employees are regular full-timers. In other words, the fraction of women who could benefit from the childcare leave was far less than 30 percent. When policies are not broad-based but address only a fraction of reproductive women, it should not be surprising if no overall large-scale effects can be discerned.

Further, we still cannot assure that the parity-specific trend changes in Japan in the early 1990s are necessarily due to the policies during the 1990s to 2003. Perhaps these trend changes could be dependent on other socio-economic changes in society that accompany the development of policies. Changes in contraceptive use, prolonged education, the constantly increasing investment in children's education, changing economic status of women, value changes related to marriage, children and family life, emergence of the "new single" concept, decay of the *ie* family system, and changing popularity of the nuclear family type may also affect childbearing dynamics in Japan. For

example, any impact of child allowances on fertility might be offset by increasing investments in children's education and expansions in day-care services may be offset by prevailing values that women should take the care responsibility themselves. The effects of such 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 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 data on region of birth, region of residence, religiosity, and histories of home leaving, education, co-residence with parents and partners, civil status changes, employment, income, financial investment in children's 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.

7. Acknowledgements

Greatest gratitude to Gunnar Andersson, who helped me orient the study topic and instructed me through the process of data construction, data analysis and thesis writing. Greatest gratitude also to Elizabeth Thomson who instructed me to organize a research plan for this study. Special thanks to Gerda Neyer and Jan Hoem for their valuable comments. Many thanks also to Maria Brandén, Sofi Ohlsson and Sara Ström for their help with data construction. I would also like to thank Livia Oláh, who encouraged me into the field of Demography.

The data for this secondary analysis, National Family Research of Japan (NFRJ2003) by the NFRJ Committee, Japan Society of Family Sociology, was provided by the Social Science Japan Data Archive, Information Center for Social Science Research on Japan, Institute of Social Science, The University of Tokyo.

References

Andersson, Gunnar, Jan M Hoem and Ann-Zofie Duvander. 2006. "Social differentials in speed-premium effects in childbearing in Sweden", *Demographic Research* 14(4):51-70.

Atoh, Makoto. 2008. "Family changes in the context of lowest-low fertility: the case of Japan", *International Journal of Japanese Sociology*. 17:14-29

Björklund, Anders. 2006. "Does family policy affect fertility? Lessons from Sweden", *Journal of Population Economics.* 19:3-24.

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

Bongaarts, John. 2008. "What can fertility indicators tell us about pronatalist policy options?" *Vienna Yearbook of Population Research*. 39-45

Bumpass, Larry L and Minjia Kim Choe 2004. "Attitudes relating to marriage and family life", in Tsuya, Noriko O and Larry L. Bumpass 2004. *Marriage, Work and Family Life in Comparative Perspective: Japan, South Korea, and the United States.* University Hawai'i Press. Pp. 19-38.

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

Duvander, Ann-Zofie and Gunnar Andersson. 2006. "Gender equality and fertility in Sweden: A study on the impact of the father's uptake of parental leave on continued childbearing", *Marriage and Family Review*. 39:121-142.

Frejka, Tomas, Tomáš Sobotka, Jan M Hoem, and Laurent Toulemon, 2008. "Childbearing Trends and Policies in Europe", *Demographic Research*. Special collection 7, 19(2):5-14

Fukuda, Setsuya. 2009. "Leaving the parental home in post-war Japan: Demographic changes, stem-family norms and the transition to adulthood", *Demographic Research*. 20(30):731-816

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. 1990. "Social policy and recent fertility change in Sweden", *Population and Development Review.* 16:735-748.

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.

Japan ECHO 2004. “Reforming Japan’s Public Pensions”, 31(5)

Lambert, Priscilia A. 2007. “The political economy of postwar family policy in Japan: Economic imperatives and electoral incentives”, *Journal of Japanese Studies*. 33:1. Society for Japanese Studies.

Lo, Ming-Cheng M and Christopher P Bettinger. 2001. “The historical emergence of a ‘familial society’ in Japan”, *Theory and Society*. 30(2): 237-279.

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

McNicoll, Geoffrey. 2006. “Policy lessons of the East Asian Demographic Transition”, *Policy Research Division Working Papers*. The Population Council, Inc.

Morgan, S. Philip and Ronald R Rindfuss. 1999. “Reexamining the link of early childbearing to marriage to subsequent fertility”, *Demography*. 36(1):59-75

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

Nishimura, Tomo 2003. “Which policies facilitate the reconciliation between work and family more? – An international comparative study among seven developed countries”, *The Japanese Journal of Social Security Policy*. 2(2): 34-44.

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.

Population Statistics of Japan 2008. National Institute of Population and Social Security Research. Tokyo, Japan

Presser. Harriet B, Megan L. Klein Hattori, Sangeeta Parashar, Sara Raley, and Zhizhong Sa, 2006. “Demographic change and response: Social context and the practice of birth control in six countries”, *Journal of Population Research*. 23(2):135-163

Retherford, Robert D. 1985. “A theory of marital fertility transition”, *Population Studies*. 39:249-268.

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 Karin L. Brewster. 1996. “Childbearing and fertility”, *Population and Development Review*. 22:258-289. Supplement: Fertility in the United States: New Patterns, New Theories.

Rindfuss, Ronald R, Minja K. Choe, Larry L Bumpass, and Yong-Chan Byun. 2004. “Intergenerational Relations”, in Tsuya, Noriko O and Larry L Bumpass. (eds.) 2004. *Marriage, Work and Family Life in Comparative Perspective: Japan, South Korea, and the United States.* University Hawai'i Press. Pp. 54-75

Shirahase, Sawako. 2000. “Women's increased higher education and the declining fertility rate in Japan”, *Review of Population and Social Policy*. 9:47-63.

Statistics Handbook of Japan. 2008. Statistics Bureau, Japan

Tsuya, Noriko O. and Larry L Bumpass. 2004. *Marriage, Work and Family Life in Comparative Perspective: Japan, South Korea, and the United States.* University Hawai'i Press.

Tsuya, Noriko O, Karen Oppenheim Mason, and Larry L Bumpass. 2004. “Views of marriage among never-married young adults”, 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. 39-53.

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

Yashiro, Naohiro. 1998. “The economic factors for the declining birthrate”, *Review of Population and Social Policy*. 7:129-144.

Yasukochi, Keiko. 1995. “Support problems in the aging urban society”, *Review of population and social policy*. 4:43

Appendix

Figure 11: **First birth rates by educational level and woman's age, relative to the rates of junior school educated women aged 21-25, Japanese women, 1961-2003, standardized for siblings, and calendar year.**

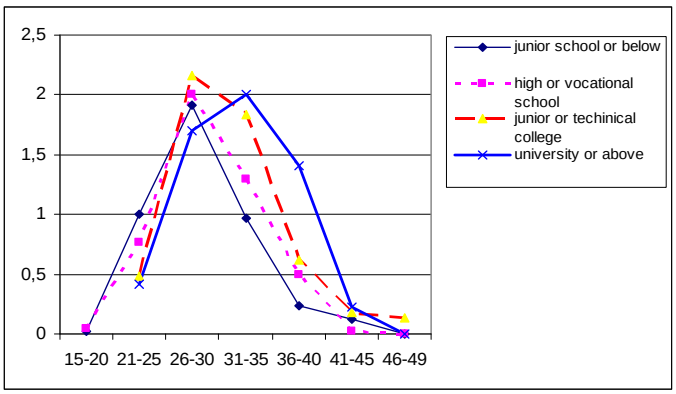


Figure 12: **Second birth rates by educational level and woman's age relative to the rates of junior school educated women aged 21-25, Japanese women, 1961-2003, standardized for siblings, sex of previous child, calendar year and age of the last kid.**

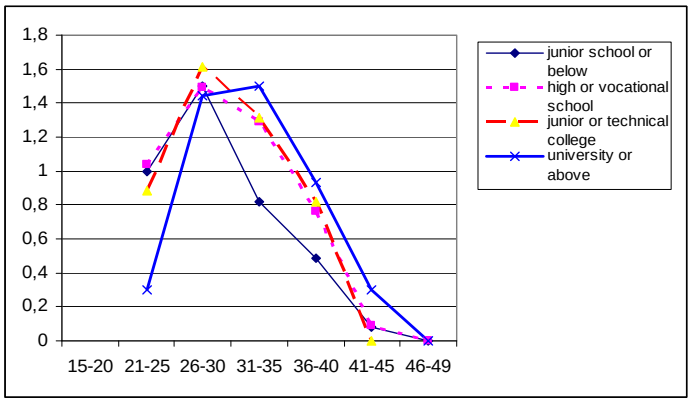


Figure 13: **Third birth rates by educational and woman's age relative to the rates of junior school educated women aged 21-25, Japanese women, 1961-2003, standardized for siblings, sex of previous children, calendar year and age of the last kid.**

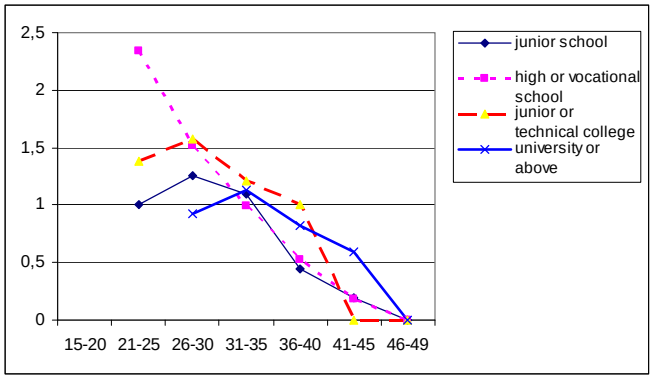


Figure 14: **Absolute risks of second birth by year and age of first child, Japanese women, 1961-2003, standardized for siblings, sex of the first kid, educational level and woman's age.**

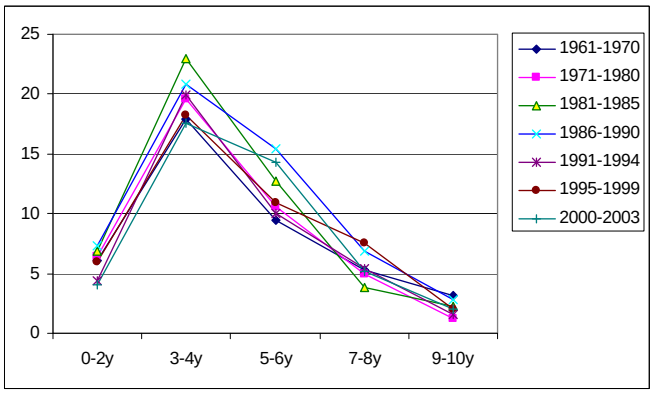


Figure 15: **Absolute risks of third birth by year and age of the second child, Japanese women, 1961-2003, standardized for siblings, sex of previous children, educational level and woman's age.**