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**Lowest-Low Fertility and Governmental Actions in
Japan**

by

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Introduction

There was an emergence of “lowest-low fertility” defined as having TFR (Total Fertility Rate) of 1.3 or less in Europe in the 1990s (Kohler et al., 2002). After the turn of century, lowest-low fertility started spreading in Eastern Asia. Japan’s TFR of 1.26 in 2005 is lower than most European countries, although is higher than the Republic of Korea (1.08) and Taiwan (1.12).

The emergence of lowest-low fertility was accompanied by various reversals in the relation with socioeconomic determinants at the aggregate level. Unlike in the 1970s, low fertility countries of today are characterized by low female labor force participation, robust marriage institution, and strong family ties. Thus, it is not the change in family values toward individualization and secularization as emphasized in the second demographic transition theory (van de Kaa, 1984) that is responsible for lowest-low fertility. Rather, we should focus on the disharmony between the changing socioeconomic determinants of fertility and unchanging family values in lowest-low fertility countries.

It is thought that extremely low fertility results in rapid population aging, decline in working age population, and a sharp increase in the dependency ratio. Such demographic changes would cause many serious problems including a crisis of public pension system, labor shortages, economic recession, and loss of societal vitality. The Japanese government was shocked with the TFR of 1.57 in 1989 and launched a variety of pronatal policy measures. However, these policy interventions have not yet succeeded in preventing fertility decline.

This paper firstly examines the recent fertility decline and discusses its determinants. After considering the effect of tempo distortion, a decomposition of fertility decline to nuptiality and marital fertility will be attempted. It will be shown that demands for spouse and children are not declining rapidly and are not at the lowest-low level. Thus, recent fertility decline should be explained not from changing family values but from obstacles to fulfill the demand. Such obstacles as direct cost of children, difficulty for occupational achievement for youth and opportunity cost

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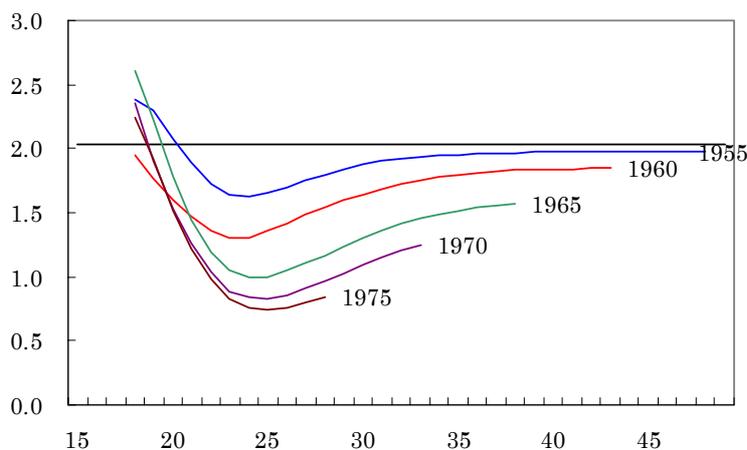
accompanied by female labor force participation are examined.

After describing the history of governmental intervention to promote fertility in Japan, the effects of policy measures such as child allowance, childcare leave, and daycare service will be examined. Analyses in Japanese literatures imply that those measures are not as effective as expected. Then, it will be shown that a large part of the differences between moderately low and lowest-low fertility are attributed to direct effects of cultural features, not to governmental efforts. A cultural deterministic view on fertility points out the cultural features in moderately low fertility countries that prevented fertility from declining to the lowest-low level. It will be shown that these cultural differences are beyond the family policy, and that a governmental intervention cannot induce continuous fertility recovery to the moderately low level.

1. Recent Fertility Decline in Japan

1-1. Cohort Fertility

Figure 1. Cohort Cumulative Fertility Relative to 1950 Cohort



The Complete Fertility Rate (CFR) of a real cohort is a more desirable measure than the TFR, because the latter suffers from tempo distortion and the parity composition effect (Ortega and Kohler, 2002). The problem is that the CFR cannot be determined until the cohort completes its reproduction. However, the CFR of cohorts in their forties is predictable because only a

small number of births will be added to the current level. Figure 1 shows the cumulative fertility relative to that of the 1950 cohort, using the scheme by Frejka and Calot (2001). Although the 1955 cohort was behind its predecessor in the early twenties, it succeeded in catch up and will fulfill a near replacement level. However, a significant decline in the CFR for cohorts born after 1960 seems to be inevitable. The cumulative fertility of the 1960 cohort is 1.84 at age 43 and will not reach 1.9 eventually. Though it is difficult to predict the CFR for cohorts born after 1965, the postponement in the early twenties seems too serious to be compensated later. Thus, the CFR of younger cohorts in Japan can be as low as 1.6, which is predicted for Italian cohorts (Frejka and Calot, 2001, p. 112; van Imhoff, 2001, p. 55).

1-2. Period Fertility

In many countries with very low fertility, there is a secular trend of postponement of childbearing. This is also the case in Japan. Figure 2 presents the mean ages at childbearing by birth order since 1984.² The mean age at all births rose from 28.1 in 1984 to 29.6 in 1997. Then, the change stagnated toward the turn of century. However, the delay was accelerated again and the mean age rose to 29.9 in 2004. This reacceleration was caused by the delay in first birth, which age jumped from 28.0 in 2001 to 28.5 in 2004.

Such a postponement in childbearing causes “tempo distortion” that the TFR is depressed to an undesirably low level. Bongaarts and Feeney (1998) proposed a measure to remove tempo distortion from the TFR. Their ATFR (Adjusted Total Fertility Rate) is a hypothetical TFR that would materialize if there were no delay in childbearing.

Another deficiency of the TFR is that it is based on “incidence rates” that do not refer to the population at risk. The denominator of incidence rate is female population by age without considering parity. On the other hand, the theoretically desirable occurrence / exposure ratio is called “intensity” of birth (Ortega and Kohler, 2002, p. 4) and given as the ratio of age-parity specific births to age-parity specific female population. While incidence rates are easily obtained, intensities are more difficult especially in Japan where the census does not include a question on children ever born. Here, parity distributions are estimated by tracing

Figure 2. Mean Age at Birth by Birth Order

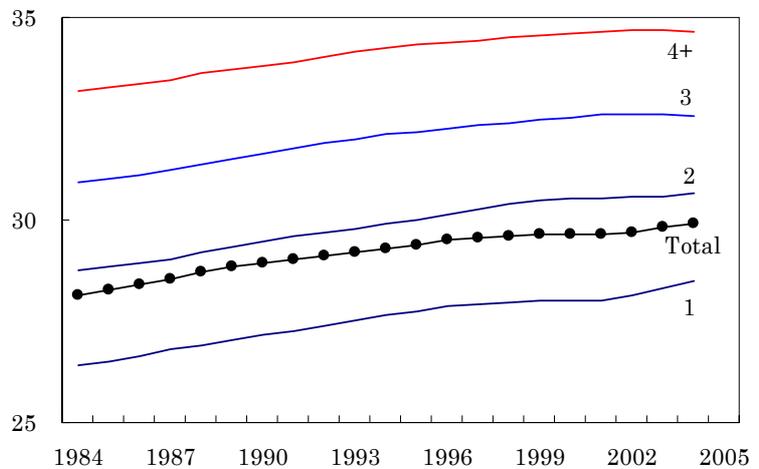
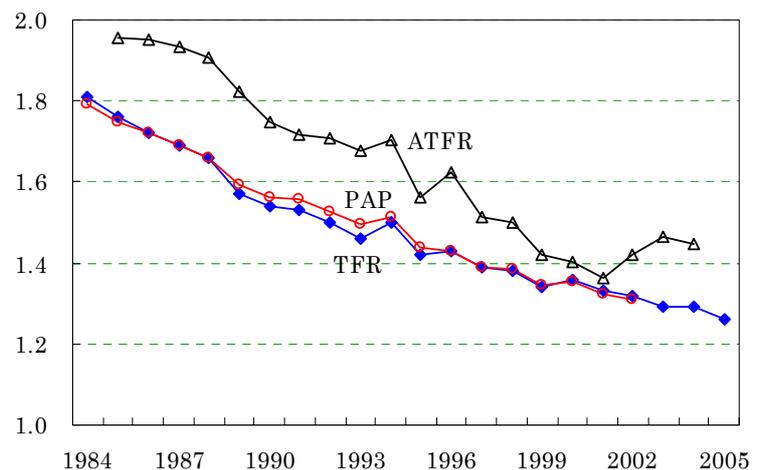


Figure 3. Fertility Decline with Different Measures



² The mean ages are based on age-specific fertility rates and are different from the official figure in vital statistics which is based on the number of births.

the fertility behavior of each cohort. Once a set of intensities in a given year is obtained, a multi state life table that depicts the parity progression of a hypothetical cohort can be created. Then, one can calculate the mean number of children using the eventual parity distribution in this life table. Here, such a measure of fertility is called PAP (Period Average Parity)³ and compared with the TFR and the ATFR.

Figure 3 shows these three indices of fertility. The difference between the TFR and PAP, which is the parity distribution effect without tempo adjustment, is very small in Japan. While the proportions of parity zero and one are rapidly increasing, such a change does not result in a deceptive fall in the TFR. The difference between the TFR and ATFR is the tempo distortion based on incidence rates. The distortion continuously diminished by 2001 and then expanded again due to the reacceleration in postponement.

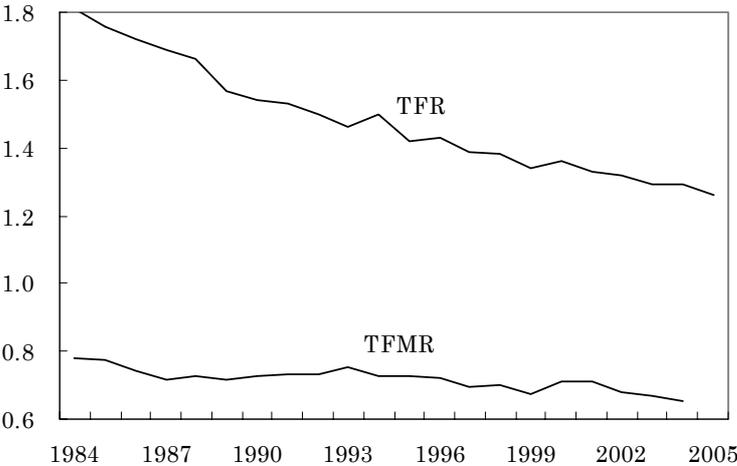
2. Determinants of Lowest-Low Fertility in Japan

2-1. Nuptiality

Extramarital births are rare in Japan, accounting for only 1.99% of all births in 2004. Thus, a fall of nuptiality directly results in a fall of fertility. Figure 4 compares the TFR and female TFMR (Total First Marriage Rate). The TMFR is an estimate of the proportion ever married at age 50 of a hypothetical cohort without death. This proportion dropped more moderately than the TFR. While the TFR fell by 28.7% between 1984 and 2004, TFMR of Japanese women fell only by 16.2%.

Figure 5 presents female mean age at first marriage and at first childbearing. As mentioned above, the delay in first birth stagnated around 2000 and then

Figure 4. Female TFMR and TFR

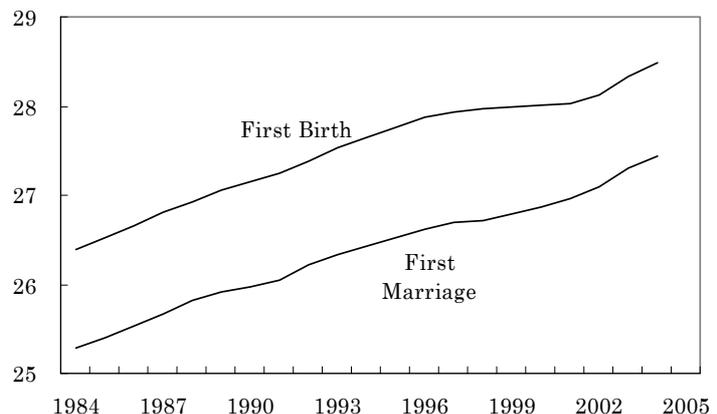


accelerated again. This change was not wholly attributable to the change in marriage timing but there was a change in fertility behavior of newly wed couples. In addition to the fall in quantum and delay in timing of first marriage, the crude divorce rate rose from 1.28 per thousand in 1990 to 2.15 per thousand in 2004.

³ Rallu and Toulemon (1993) called this measure PATFR (Parity and Age Total Fertility Rate). TFRPPR (TFR based on Parity Progression Ratio) by Feeney (1986) is also a closely related measure.

The contribution of nuptiality to fertility was conducted using AMFRs (Age-specific Marital Fertility Rates) until the mid 1990s in Japan (Atoh, 1992, p. 51; Kono, 1995, pp. 67-71; Tsuya and Mason, 1995, pp. 147-148; NIPSSR, 1997, p.10). Though such analyses always say that the recent fertility decline in Japan was caused solely by the nuptiality decline, the result is not reliable because of the deficiencies in AMFRs (Hirosima, 2001; Suzuki, 2004). More sophisticated methods have been showing very different results. Hirosima (1999) used the proportion of eventually married women and the complete average number of

Figure 5. Female Mean Age at First Marriage and First Birth



children among married women to decompose the effects of nuptiality and marital fertility. For the TFR decline between 1974 and 1997 (from 2.05 to 1.39), 24.3% was attributed to the quantum of marriage, 36.5% to the quantum of marital fertility, and the remaining 39.4% to tempo distortion. Hirosima (2000) attempted to decompose the effect of tempo distortion on marriage and childbearing. His result shows that quantum and tempo of marriage account for approximately 70% of the TFR decline between 1970 and 2000 (from 2.138 to 1.386), while those of marital fertility explains 30%. Ogawa (1998) decomposed the fertility decline between 1990 and 1995 measured with parity progression ratios and found that a little less than 40% is explained by nuptiality decline. Kaneko (2004) adjusted AMFR by shifting age-specific fertility rates $f(x)$ in accordance with the delay in marriage. He concluded that 73.7% of the TFR decline between 1980 and 2000 was caused by nuptiality decline. Iwasawa (2002) introduced the eventual average number of children by age at marriage to decompose the decline in cohort cumulative fertility. Converting the estimated cohort fertility to period fertility, she had a similar result as Hirosima (2000), i.e. that approximately 70% of the TFR decline between 1970 and 2000 was due to nuptiality decline. Suzuki (2005) applied the simplified method of Iwasawa to Japan and Korea, assuming that marital fertility does not depend on the age at marriage but solely on the marriage duration. The result showed that 37% of the TFR decline between 1990 and 2002 in Japan (from 1.54 to 1.32) was explained by nuptiality decline.

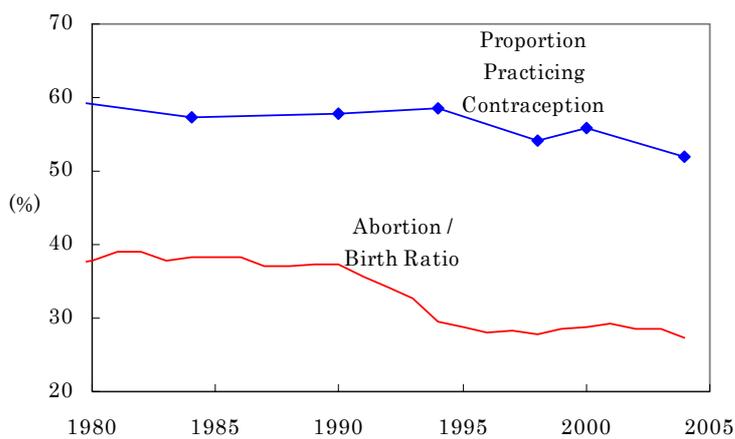
As a whole, nuptiality decline explains between 35% and 75% of the TFR decline, depending on the period in question. Thus, it is safe to say that both nuptiality and marital fertility have contributed to the recent fertility decline in Japan,

and their relative importance varies over time.

2-2. Proximate Determinants

Since marriage does not explain the fertility decline in its entirety, there should be proximate determinants (Bongaarts, 1978) that caused a significant fall in marital fertility. However, neither contraception nor induced abortion is responsible for it. As shown in Figure 6, the proportion of currently married women practicing contraception was 55.9% in 2000 and was lower than in the early 1990s. This considerably low level of contraception practice is attributed to a heavy bias in favor of male methods (Atoh, 2000, p. 108). Condom accounted for 75.3% of all contraceptive methods (multiple answers) in 2000, while the pill and IUD accounted for only 4.2%. It was as late as in 1999 that the low dose pill was legalized in Japan. Because there were worries about an expansion of STDs, access to the low dose pill is still limited and a prescription is required. As a result, the practice of contraception increased only slightly after the permission.

Figure 6. Contraception and Induced Abortion



NIPSSR, Latest Demographic Statistics 2006.

There is no evidence of an increasing number of unwanted pregnancies. As shown in Figure 6, the ratio of abortions to births dropped in the early 1990s and sustained a low level under 30%. In 2004, there were 301,673 cases of induced abortion operations and the ratio to births was 27.2%. This means that, in Japan, approximately two in nine

pregnancies end in abortion. However, the trend does not match the assessed decline in marital fertility.

As expected, the frequency of miscarriages has been declining. There were 34,365 still births in 2004 and the ratio to live births was 3.1%. It was significantly lower than the 4.9% in 1984 and 4.4% in 1990. It is said that many mothers in Japan have stopped breastfeeding by 1.5 years after the birth. Thus, neither intrauterine mortality nor postpartum amenorrhea seems to have contributed to the recent fertility decline.

The remaining proximate determinants are frequency of intercourse and sterility. There is no time series data on coital frequency or infecundity of married couples in Japan. It might be possible to assert that sexless couples are increasing

due to the long working hours or strengthened mother-child ties. It might also be possible to hypothesize an increase in infecundity due to the rising age at marriage, environmental hormones, and sexually transmitted diseases (Semba, 2002). However, quantitative evaluations of such hypotheses will be difficult due to the lack of necessary data.

2-3. Demands for Spouse and Children

An important question on the recent nuptiality and fertility decline is whether it is a result of intentional behaviors. The second demographic transition theory (van de Kaa, 1987) emphasizes the role of value changes such as individualization and secularization. We can imagine a more radical value change toward an absolute individualism that refuses spouse or any form of partnership. However, this is not the case in Japan. Figure 7 shows the proportion of unmarried males and females responding “I won’t marry forever”. Although there is a continuous increase in the proportion of single people rejecting marriage, only 7.1% of men and 5.6% of women answered in 2005 that they won’t marry forever. Majority of men and women still hold the demand for spouse.

Figure 7. Proportion of Unmarried without Intention of Marriage

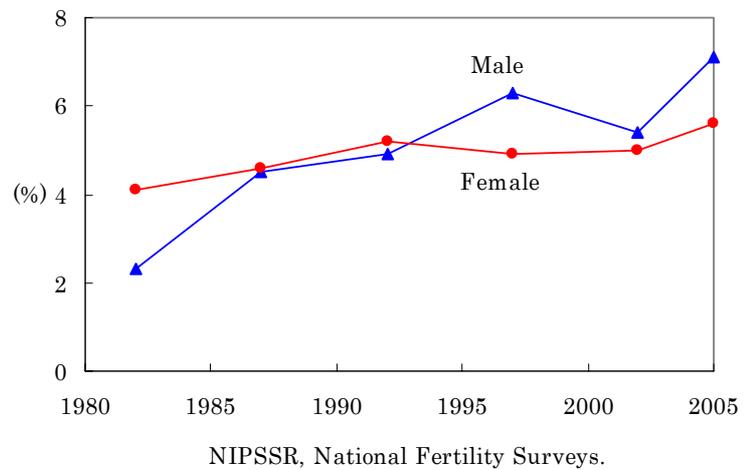


Figure 8. Demand for Children

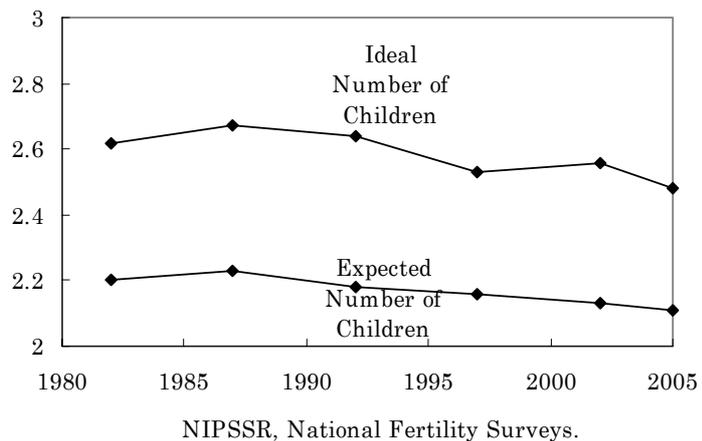


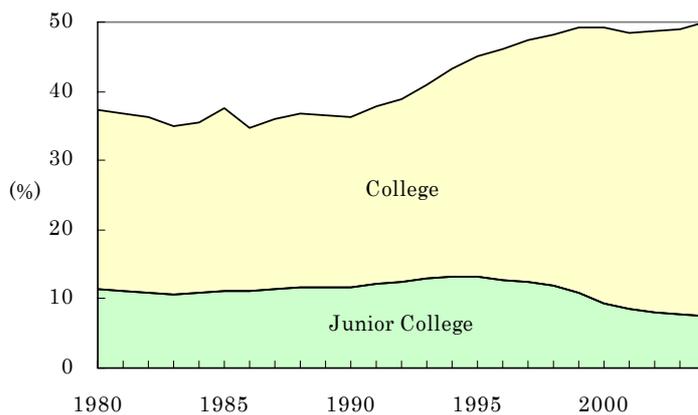
Figure 8 depicts changes in the ideal and the expected number of children of Japanese wives younger than age 50. The ideal number of children is the answer to “how many children do you think to be ideal for you and your husband?”. The expected number of children is the number that the couple already has plus the answer

to “how many children do you and your husband plan to have in the future?”. Although there was a slight decrease in demand for children, the figures are still higher than two. In the 2005 survey, the ideal number was 2.48 and the expected number was 2.11. Both were well above the replacement level.

After all, it is clear that lowest-low fertility in today’s Japan is not due to lowest-low demand for spouse and children. According to Atoh (1997), the individualistic attitude has increased only moderately in Japan. Although attitudes toward gender relationship and care for elderly parents have changed considerably, those changes have not caused a decline in demand for spouse or children. Thus, recent fertility decline should be explained not from demand itself but from obstacles to fulfilling the demand. We will examine such obstacles in the following sections.

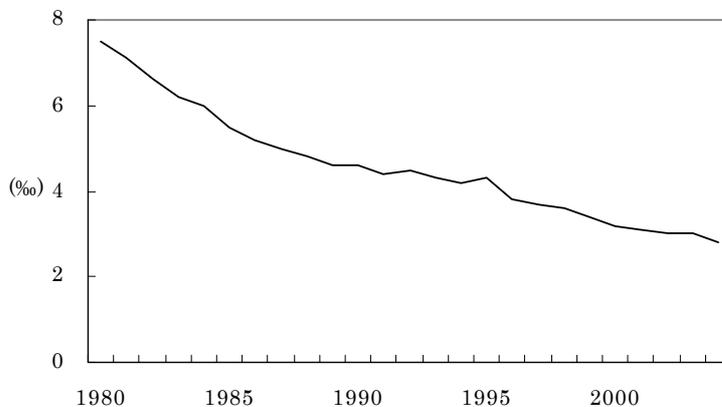
2-4. Direct Cost of Children

Figure 9. College Enrolement



Ministry of Education, School Basic Surveys.

Figure 10. Infant Mortality Rate



NIPSSR, Latest Demographic Statistics 2006.

In the world of post-industrialization, globalization and rapid technological development, there is a growing demand for human capital investment. Thus, parents are more interested in quality of children and educational cost becomes higher (Becker, 1981; Willis, 1994). The rising cost of children including public and private educational costs is thought to be the main reason of the recent low fertility in Japan. For Japanese wives whose expected number of children was lower than the ideal number, the most frequent answer was “Too much money is needed for childbearing and education” (NIPSSR, 2003, p.60).

Figure 9 depicts the

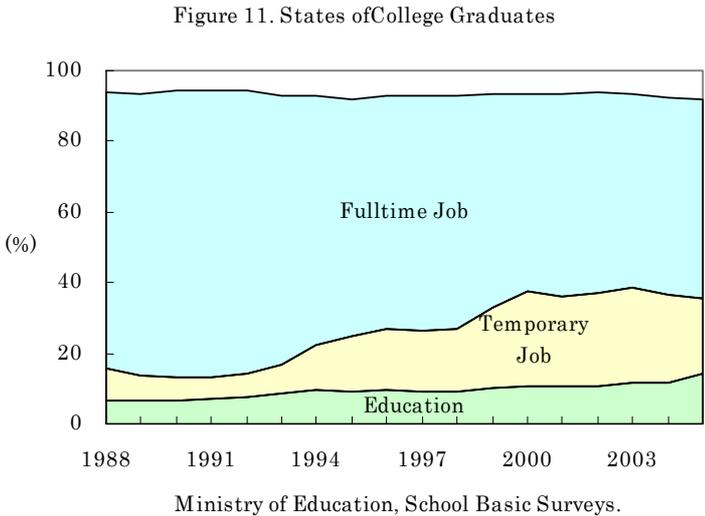
change in the college enrollment rate in Japan since 1980. Enrollment rose rapidly in the 1990s and was stagnated after 2000. However, the shift from junior college to college is proceeding. In Japan, the governmental support for tertiary education is smaller than in other developed countries and there are many private universities (Atoh and Akachi, 2003, p. 33; Moriizumi, 2005, p. 117). The availability of scholarships is also limited. For those reasons, Japanese parents are suffering from the financial cost of children more seriously than parents in other developed countries.

Human capital investments other than formal education are also increasing. Figure 10 shows the decline in the IMR (Infant Mortality Rate) in Japan since 1980. Though the pace of decline slowed down recently compared to the 1980s, the IMR in Japan is still decreasing. The current level of 3 per thousand is among the lowest in the world. Such an achievement cannot be made freely but both government and parents are paying for it. There seems to be a trend of Japanese parents becoming more protective and spending more money on the health and education of their children.

2-5. Economic Recession and Labor Market Condition

Young people that grew up in the period of rapid economic growth tend to have high aspirations for their future lives. When the economy slows down, however, the labor market conditions for the young workers become tight. Those who conceive the difficulty to achieve the expected standard of living will hesitate to step into marriage and childbearing (Easterlin, 1978; Yamada, 1999).

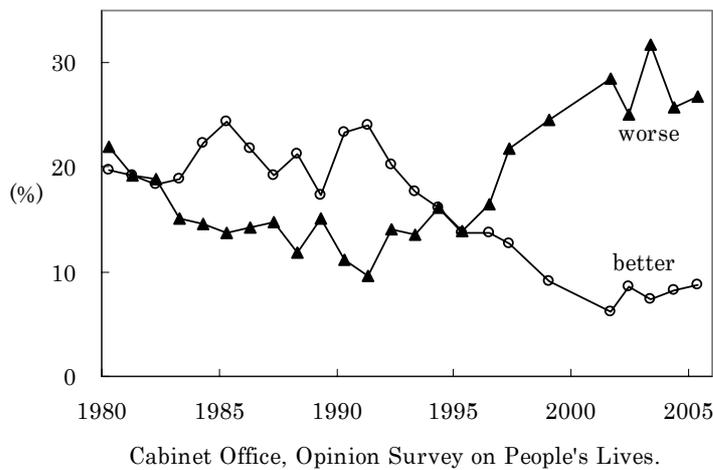
In the case of Japan, the economy was bad throughout the 1990s. The unemployment rate rose sharply from 2% in 1990 to 5% in 2003. The tight labor market conditions seriously discouraged the career achievement of the youth. Figure 11 shows the labor force status of college graduates immediately after graduation. While those



who obtained a stable job decreased from 77.8% in 1988 to 55.0% in 2003, those who obtained no job or a temporary job increased from 9.4% to 27.1% during the same period. There was an improvement very recently and the proportions in 2005 were 56.2% and 21.3%, respectively.

According to Nagase (2002, pp. 27-28), part time work significantly reduces the hazard of first marriage for both men and women. While the hazard rapidly rises between age 24 and 27 for women working on a fulltime basis, such acceleration cannot be observed for women with part time jobs. Takayama and his coauthors (2000, pp. 9-10) showed that the low income of young men relative to their fathers discouraged marriage. In the past, the income of men in age 30s overcame that of their fathers and motivated women to marry them. Recently, however, the relative income of young men to old men has declined considerably and young men are less attractive as marriage partners than before.

Figure 12. Expectation on Future's Life



The poor economic performance in recent Japan has depressed not only nuptiality but also marital fertility. The positive effect of the husband's income on marital fertility has been identified repeatedly (Yamagami, 1999; Fujino, 2002; Oyama, 2004). In this connection, the wage index in The Monthly Labor Statistics Survey dropped

by 6.7% points between 1997 and 2003. The economic recession is thought to have affected not only through income level itself but also through the expected income in the future. Figure 12 shows a result of an opinion survey conducted by the Cabinet Office asking expectation on one's future life. In the late 1980s and the early 1990s, there were more respondents who answered "(my life) will get better" than those who answered "will get worse". During the 1990s, however, the answer "worse" continuously increased and exceeded "better" around 1995. In June, 2005, the pessimistic attitude surpassed the opportunistic one by 18 percentage points. It is thought that such uncertainty about the future is one of the major sources of lowest-low fertility in recent Japan.

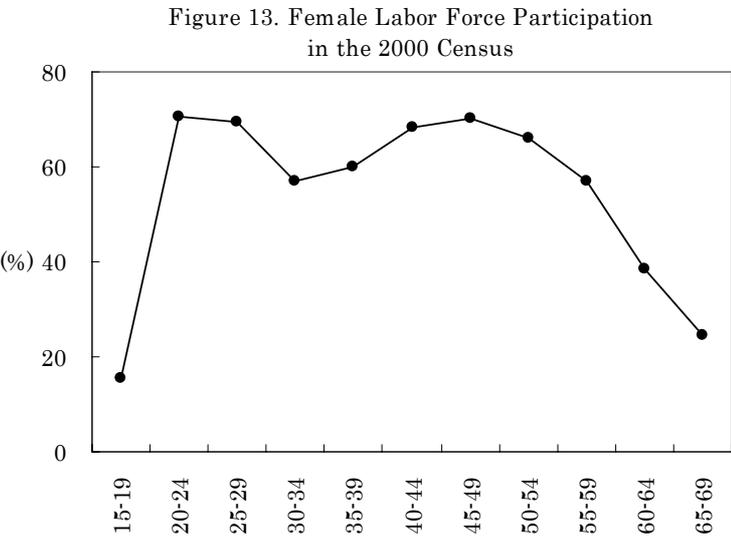
2-6. Female Labor Force Participation and Gender Roles

According to Becker (1991, pp. 350-354), the main cause of family changes since the latter half of the 20th century was the rising economic power of women. The expanding occupational opportunities for women increased the time spent on market activities and raised the opportunity cost of children. The declining return from gender-based division of labor reduced the merit of marriage and promoted the rise in

the divorce rate. These changes resulted in the increase in female-headed households, cohabitation, and extramarital births.

The theory predicts the negative impact of female labor force participation on fertility. Actually, numerous empirical studies verified the negative effect of wife's work on fertility at the micro level (Asami et al., 2000; Oi, 2004; Oyama, 2004; Sasai, 1998; Shichijo and Nishimoto, 2003; Tsuya, 1999; Fukuda, 2004; Fujino 2002; Yashiro, 2000; Yamagami, 1999; Yamaguchi, 2005). At the macro level, however, the correlation between female labor and fertility among developed countries turned from negative to positive in the 1980s (Engelhardt and Prskawetz, 2005, pp. 2-3; Billari and Kohler, 2002, pp. 20-21; Atoh, 2000, p. 202).

In Japan, the incompatibility between female labor and fertility is expressed in an M-shaped curve of age-specific participation rates (Figure 13). Although an M-shaped curve can be seen also in Korea and New Zealand, the drop between age 25-29 and age 30-34 is steepest in Japan (Furugori, 2003, p. 48). Thus, many Japanese women have the ability and opportunity to work but they have to give up their career on childbearing. Such incompatibility is attributed to the remaining gender role attitude, low participation of the husband in housework, characteristics of the labor market, and underdevelopment of family friendly policy (Atoh and Akachi, 2003, p. 35; Meguro and Nishioka, 2000).



As far as gender equity in the domestic area is concerned, Japan is much lower than other developed countries. Japanese husbands spend considerably shorter time on housework than US husbands (Tsuya and Bumpass, 2004) or Scandinavian husbands (Tsuya, 2003, p. 63). The Survey on Time Use and Leisure Activities by the Statistics Bureau shows that there was little change in husband's participation in housework between 1981 and 1996 (Atoh, 2000, p. 205). According to the proposition by McDonald (2000, p. 437) that "When gender equity rises to high levels in individual-oriented institutions while remaining low in family-oriented institutions, fertility will fall to very low levels", Japan has a good reason to have very low fertility.

3. Policy Interventions to Cope with Low Fertility

3-1. Governmental Actions in Japan

The Japanese government was surprised by the historically low TFR of 1.57 in 1989 and started an inter-ministry meeting to invent measures to cope with the declining fertility in 1990. The amount of child allowance was raised in 1991, while the period of payment was shortened to keep the budget. The Childcare Leave Law (formally “Law Concerning the Welfare of Workers Who Take Care of Children or Other Family Members Including Child Care and Family Care Leave”) was established in May 1991 and enforced in April 1992. In December 1994, the government publicized the Angel Plan for the period between 1994 and 1999. The program emphasized the compatibility between work and childcare and public support of childrearing. As a part of this program, amendments to the Childcare Leave Law were made to support income and exempt from payment of social security premium in 1994. In 1997, a major reformation was made to the Child Welfare Law to provide with satisfactory daycare services for working mothers.

In December 1999, the Japanese government announced the New Angel Plan for the period between 1999 and 2004. This document asserted the need to improve the gender equity and working condition. In May 2000, amendments to the Childcare Leave Law and the Child Allowance Law determined that 40% of wage should be paid during the leave. Child allowance was expanded from less than three years old defined in the 1991 revision to preschoolers. The Next Generation Law, enacted in July 2003, required local governments and large companies to submit their own programs to foster new generations. At the same time, the Law for Measures to Cope with Decreasing Children Society ordered the Cabinet Office to prepare new measures to prevent the rapid fertility decline. An expansion of child allowance to the third grade of primary school was enforced in April 2004.

In December 2004, the Japanese government declared the Support Plan for Parents and Children (New-New Angel Plan) for the period between 2004 and 2009. The document emphasized the role of local government and companies in providing with childcare supports and improving gender equity. In addition, the document pointed out the importance of economic independence of the youth. From the fiscal year of 2006, the child allowance was expanded until the sixth grade of the primary school. In addition, the Support Plan for Mothers’ Reentry to Labor Market started. The plan includes such measures as starting a course for reentering mothers at vocational schools, helping a mother who attempts to start business, and running “Mothers’ Hello Works” for job seeking mothers.

In June, 2006, the government announced the New Policy to Cope with Low Fertility, including additional cash benefit for the first three years after birth, improving payment procedure of one time cash benefit at birth, supporting the cost of medical check during pregnancy, establishing “Family Day” and “Family Week,” etc.

However, the proposed additional cash benefit for young children was failed to be included into the national budget for the fiscal year 2007. The government aims at starting the program in 2008, after achieving a tax reformation.

3-2. Child Allowance

The child allowance of Japan started in 1971. Since 1992, 5,000 yen per month for the first and second children and 10,000 yen for the third and subsequent children have been paid. Until May 2000, only children less than three years were eligible. Between June 2000 and March 2004, the target was widened to include all preschoolers. In April 2004, the age limit was raised to the third year of primary school. In April 2006, the limit was raised further to include all primary school students aged 12 years and less. Japan’s child allowance is means tested. In February 2003, 6,880,786 children were receiving child allowance (NIPSSR, 2005, p. 170). This was about 85% of the preschooler population. Thus, about 15% of children were eliminated because of high income of their parents.

The effect of child allowance is evaluated by regarding it to be additional income of husband. Since the income of wife has both income effect and opportunity effect, the child allowance should not be seen a part of it. Table 1 shows results of three papers. The effect of husband’s income was statistically significant at 10% level in Yamagami and Morita, and at 1% level in Oyama. Yamagami’s fertility function shows that a rise in husband income by 10 thousand yen per year would raise the number of children by 0.00244. Oyama’s analysis shows that an increase of 10 thousand yen per month would elevate the number of children by 0.01. Morita’s OLS result implies that the elasticity of fertility to husband income is 0.043.

Table 1. Effectiveness of Child Allowance

Literature	Yamagami (1999)	Oyama (2004)	Morita (2006)
Definition of husband's income	10 thousand yen/ year	10 thousand yen/ month	(standardized)
Partial regression coefficient	0.00244	0.01	0.043
Child allowance required to raise the number of children by 0.1 (thousand yen / month)	34	100	946

However, these income effects are so small that very high allowance is required to produce a visible effect. The table also shows the amount of child allowance that is necessary to raise the number of children by 0.1. If Morita’s elasticity were correct, no economic support policy could make a significant effect on

fertility. Even if we rely on Yamagami's coefficient, the child allowance of 34,000 yen per month must be paid to raise the TFR by 0.1. In Sweden, 950 krona (15,000 yen) is paid per month per child under 16 years old (METI, 2005). Thus, the required amount is more than twice as much as Sweden that is famous for very generous family allowance.

3-3. Childcare Leave

The childcare leave was approved in the Diet of Japan in May 1991 and enforced in April 1992. Although the law allowed a female worker or her husband to leave until the first birth day of their child, there was no cash benefit at that time. The amendments in June 1994 legalized a cash benefit of 25% of wage and exemption from social security premiums during the leave. These revisions were enforced in April 1995. The amendment in November 2001 raised the cash benefit to 40% and was enforced in April 2002. Under the current system, 30% is paid monthly during the leave and 10% is paid after returning to work. Although the leave is basically allowed until the first birthday of a child, public servants can leave until the third birthday. Other workers can prolong the leave for six months if a daycare center is not available. However, no cash benefit is paid in either case for the prolonged period.

According to the Basic Survey of Employment Management of Women in 2003, 73.1% of female workers who gave birth in fiscal year 2002 took childcare leave. However, many women retire from work before childbearing and are not included in the denominator (Atoh, 2005, p. 46). A female worker who was not continuously employed for a year or who does not plan to come back to her job is also excluded. There were 103,478 cases that received cash benefit during childcare leave in 2003 (NIPSSR, 2005, p. 381). This was only 9.2% of the number of annual births.

Table 2. Effect of Childcare Leave

Literature	Suruga and Nishimoto (2002)	Shigeno and Matsuura (2003)	Yamaguchi (2005)	Suruga and Chang (2003)
b	0.0231	0.1244	0.1886	0.22298
$\exp(b)$	1.0234	1.1325*	1.2076*	1.2498
Fertility without leave (f_0)	0.0368	0.0364	0.0362	0.0361
Fertility with leave (f_1)	0.0376	0.0411	0.0434	0.0447
Proportion of leave takers (p)	0.092	0.092	0.092	0.092
Required p to raise TFR by 0.1	--	0.424	0.709	0.490

* $\exp(b/5)$

There are several studies that evaluate the effect of childcare leave on fertility in Japan. Table 2 shows partial regression coefficients in four studies. Since each coefficient b is supposed to show a log-odds ratio of fertility between a female who can

take childcare leave and one who cannot, $\exp(b)$ gives a odds ratio. Because Shigeno and Matsuura (2003) and Yamaguchi (2005) analyzed fertility of a five-year period, $\exp(b/5)$ is shown in the table. While Suruga and Nishimoto (2002) used Basic Survey of Employment Management of Women by the former Ministry of Labour, other three studies used Japanese Panel Survey on Consumers by the Institute for Research on Household Economic. Thus, the difference in magnitude seems to come from the difference in data source.

If we express the average fertility rate of a female who cannot take childcare leave with f_0 and that of one who can take with f_1 , the odds ratio is:

$$\exp(b) = \frac{f_1}{1-f_1} \bigg/ \frac{f_0}{1-f_0}.$$

If the proportion of women who can take childcare leave is expressed as p , then the TFR can be written as follows.

$$TFR = 35 \{(1-p)f_0 + p f_1\}.$$

The multiplier 35 comes from the length of reproductive period. The expressions above give the following quadratic equation of f_0 .

$$(1-p)(1-e^{-b})f_0^2 + \{p + (1-p)e^{-b} - \frac{TFR}{35}(1-e^{-b})\}f_0 - \frac{TFR}{35}e^{-b} = 0.$$

Though the expression is a little messy, it is possible to determine the value of f_0 if one gives an adequate value for each parameter. In Table 2, TFR=1.29 and $p=0.092$ were applied. Once the values of f_0 and f_1 are determined, we can simulate the effect of rise in p , the proportion of women who take childcare leave. The hypothetical proportion that is required to raise the TFR by 0.1 is shown in Table 2. If the reality is close to the analysis by Suruga and Nishimoto, it is impossible to elevate the TFR by 0.1 with the use of childcare leave. Even if we rely on other three studies, an extremely impressive improvement from 9% to more than 40% is required. It would be difficult to make such an advance within a decade.

3-4. Childcare Service

The compatibility between female work and childrearing has been the primary political goal of the Japanese government. The Angel Plan announced in 1994 had “support for simultaneous child rearing and work” at the top of its list. In accordance to this guideline, a major revision was made to the Child Welfare Law in 1997 and public daycare service shifted from the municipality assignment system

(administrative measures) to a system to allow parents to select their preferred daycare center. The New Angel Plan in 1999 sustained the emphasis on compatibility. The New-New Angel Plan in 2004 also contained a chapter on “Compatibility between Work and Family and Reconsideration of Work Customs.” However, childcare service was discussed in other chapter entitled “Renewed Support and Solidarity for Childcare.” The chapter contained various issues such as reinforcing local childcare centers, supporting a variety of childcare services, assisting volunteer activities on childcare, expanding public daycare services, running after-school clubs at primary schools, etc.

The cabinet of Japan adopted “Zero Waiting List for Daycare Program” as a political goal in July 2001. The governmental effort was partially successful at least in very recent years. According to the Children and Families Bureau, the number of children on the waiting list decreased from 26,383 in 2003 to 23,338 in 2005. However, daycare service is still less available in Japan for very early childhood. Of the 23,338 children on the waiting list, 15,831 (67.8%) were under two years old. This accounts for 0.47% of the population under age two.

There were 632,011 children under age two (18.6% of the population) in daycare center in April 2005. Since the proportion was 13.4% in 1998, there was an increase by 5.2 percentage points by 2005. However, such an improvement in childcare service does not seem to have contributed to fertility in Japan.

The simplest measure of compatibility between wife’s work and childbearing would be the proportion of working mothers among all wives. This measure is the key to understanding the micro-macro paradox of the relationship between fertility and female labor force participation. Let g be the proportion of working mothers, m be that of all mothers, and w be that of all workers. Then, a two by two contingency table can be written as follows;

	Not Mother	Mother	
Not Worker	$1 - w - m + g$	$m - g$	$1 - w$
Worker	$w - g$	g	w
	$1 - m$	m	1

For all four cells to be positive, the following condition is necessary in addition to $0 < g < m$ and $0 < g < w$.

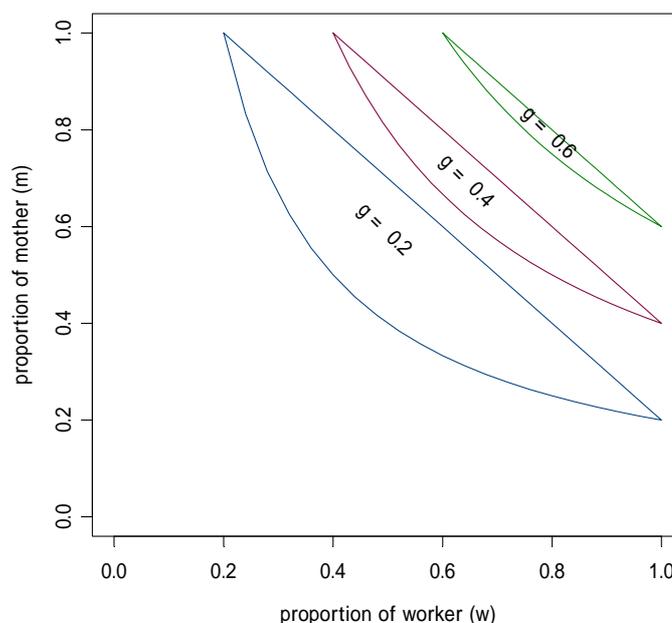
$$1 - w - m + g > 0.$$

For the work status of a wife and presence of a child to be negatively correlated, g must be smaller than the expected value of the independence model.

$$g < w m.$$

If we coordinate the proportion of workers (w) on the horizontal axis and that of mothers (m) on the vertical axis, the area enclosed by a straight line and a hyperbola simultaneously satisfies two conditions above. Figure 14 shows such areas for $g = 0.2$, 0.4 and 0.6 . When the compatibility is raised, the area moves in the upper-right direction. Then, the paradoxical situation can be understood as a result of an increasing compatibility. When wife's work and childrearing was less compatible, all the countries were located at lower-left region of the graph. However, some countries succeeded in improving the compatibility and moved to upper-right direction. In this way, the positive correlation appeared at macro level while the negative correlation is sustained at the micro level.

Figure 14. Area with Negative Correlation for Different g



One implication of Figure 14 is that the higher the compatibility, the narrower the area in which the micro-macro paradox holds. Then, it is expected that a country with high compatibility may easily escape from the area and the micro level correlation may turn to be positive. This expectation is materialized in Sweden where recent micro level analyses showed the positive impact of women's works on fertility (Hoorens, et al., 2005, pp. 226-227). However, Figure 14 suggests

Table 3. Labor Force Participation and Motherhood of Married Women Aged 30-34 (%)

Year		Not Mother	Mother
1997	Not Worker	9.6	47.1
	Worker	11.9	31.4
2004	Not Worker	8.2	48.7
	Worker	12.9	30.2

MIC, Employment Status Surveys.

that in a country with low compatibility such as Japan, there is a wide room of fertility decline.

Table 3 shows contingency tables of work status and the presence of a child of married women aged 30-34. This age group is the bottom of the M-shaped labor force participation pattern (see Figure 13), implying the compatibility is most crucial. In Japan, the governmental policy failed to increase the proportion of working mothers and the increase in labor participation resulted in fertility decline.

Some analyses of micro data in Japan identified the effect of childcare services on the work status of wives. For example, Oishi (2003) found that the cost of daycare service has negative impact on a wife's labor force participation. However, recent multivariate analyses did not identify a significant effect of childcare service on fertility. Shigeno and Ohkusa (1999) included such indices as waiting list for daycare service, availability of infant care and night-time care into their model but none of them had significant effect on recent birth. Shigeno and Matsuura (2003) included respondent's substantive evaluation for local childcare service into their fertility function but its *t* value was 1.19. One statistically significant result was obtained but it was bivariate analysis and was not a net effect (Shigeno, 2006, p. 109). Thus, even if there is a net effect of governmental effort for childcare service, its magnitude is too small to be verified clearly.

4. Low Fertility and Policy Intervention in Comparative Perspective

4-1. Spread of Lowest-Low Fertility in Europe and Asia

Lowest-low fertility appeared in Europe during the 1990s causing a drastic change in the demographic map of the region. The second demographic transition theory (van de Kaa, 1987) described the novelty of Western and Northern European countries in terms of below replacement fertility and emergence of postmodern behaviors such as cohabitation and extramarital births. However, while these forerunners stayed at moderately low fertility, latecomers showed unexpected declines to lowest-low fertility. This change caused not only a reverse in the geographic pattern of European fertility but also that in the correlation with fertility of the total first marriage rate, the proportion of extramarital births, and the female labor force participation rate (Kohler et al., 2002, pp. 643-644).

Table 5 lists up the countries having lowest-low fertility since 2000. While Kohler and his coauthors (2002) listed 14 countries in 1999, there are 20 countries on this new list. Small countries and areas such as Singapore, Hong Kong, Luxemburg, Andorra, and San Marino were excluded. Korea arrived at the threshold of 1.3 in 2001, followed by Japan and Taiwan in 2003. Bosnia-Herzegovina, Hungary, Poland, Romania, and Lithuania joined the group after 2000. On the other hand, Estonia, Armenia and Russia escaped from lowest-low fertility. Belarus was excluded from the

table because of the lack of recent data.

Table 4. Lowest-Low Fertility after 2000

Region	Country	2000	2001	2002	2003	2004	2005
Eastern Asia	Japan	1.36	1.33	1.32	1.29	1.29	1.25
	Republic of Korea	1.47	1.30	1.17	1.19	1.16	1.05
	Taiwan	1.68	1.40	1.34	1.24	1.18	1.12
Southern Europe	Bosnia and Herzegovina	1.28	1.44	1.23			
	Greece	1.27	1.25	1.27			
	Italy	1.24	1.23	1.26	1.29		
	Slovenia	1.26	1.21	1.21	1.20		
	Spain	1.24	1.26	1.27	1.30		
Eastern Europe	Bulgaria	1.30	1.24	1.21	1.23		
	Czech Republic	1.14	1.14	1.17	1.18		
	Hungary	1.32	1.31	1.30	1.28		
	Poland	1.34	1.29	1.24	1.22		
	Romania	1.31	1.27	1.26	1.27		
	Slovak Republic	1.30	1.20	1.19	1.20		
Former USSR	Armenia	1.11	1.02	1.21	1.35		
	Latvia	1.24	1.21	1.24	1.29		
	Lithuania	1.39	1.30	1.24	1.26		
	Moldova	1.30	1.25	1.21	1.22		
	Russian Federation	1.21	1.25	1.32	1.32		
	Ukraine	1.09		1.13	1.17		

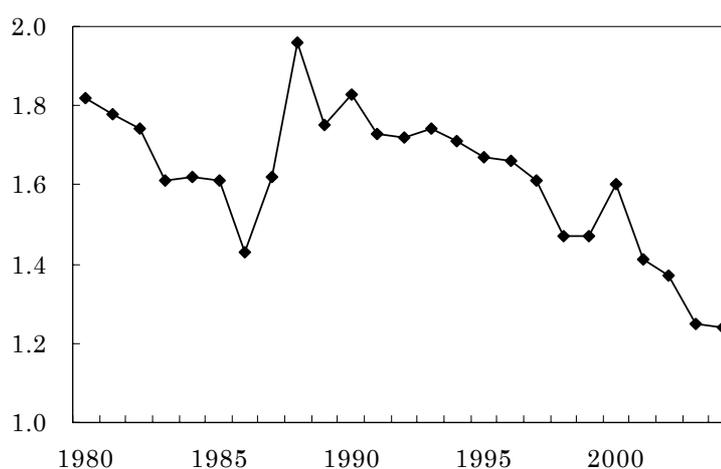
(Source) Japan: Statistics and Information Dpt, MHLW
 Korea: Korea National Statistics Office
 Taiwan: Taiwan Directorate-General of Budget, Accounting and Statistics
 Europe: Council of Europe, Recent Demographic Development in Europe 2003&2004

4-2. Effectiveness of Pronatal Policy

There is considerable evidence that the pronatal policy has some effects. Cases frequently referred to include France after the Second World War, German state of Saar under French rule, Eastern European socialist countries until the 1970s, and Sweden around 1990 (Chesnais, 1998, pp. 98-99; Atoh, 2000, pp. 198-199; Caldwell et al.,

2002, p. 18). Besides these historical cases, abundant quantitative analyses of micro data have proved the effectiveness of various policy measures (Kojima, 1989; 2003). Thus, it is widely accepted that the effect of pronatal policy is not zero. However, the

Figure 15. TFR Singapore

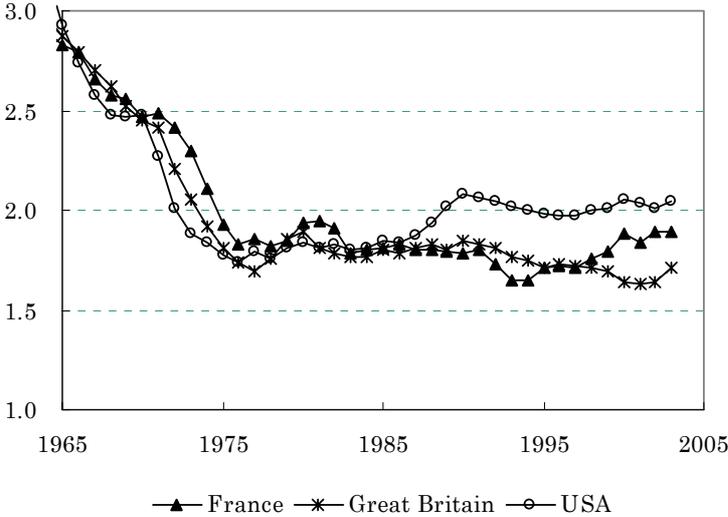


critical question here should be “Can Japan achieve moderately low fertility with policy interventions?”. It seems to be very difficult to narrow the difference between Japan and moderately low fertility countries in Western and Northern Europe and English speaking developed countries, considering the small elasticity of fertility to policy measures.

Even if policy intervention is successful, its effect is not necessarily lasting. Figure 15 displays the trajectory of the TFR in Singapore. In March 1987, Singapore started a new population policy. Under the slogan of "Have three or more, if you can afford it", such pronatal measures were enforced as tax relief for the third and subsequent children, subsidization of daycare cost, and housing privilege for a large family (Sasai, 2005, pp. 466-467). As a result, the TFR jumped from 1.43 in 1986 to 1.96 in 1988. However, the TFR started declining again from 1989, though it took 15 years to drop to the level of 1986.

4-3. Cultural Deterministic View on Fertility

Figure 16. TFR in France, Britain and the US



France is famous for its long history of pronatal policy intervention. The Family Code that imposed family allowances was enacted as early as in 1939 and was integrated to social security system in 1945 (Kojima, 1996, p. 157; Caldwell et al., 2002, p. 8). In the background, there was an anxiety on French fertility that was lower than England throughout the 19th century (Chesnais, 1998, p. 92). On

the contrary to France, the United Kingdom is famous as a country without pronatal policy (Hiraoka, 1996, p. 131; Atoh, 2000, p. 200; Kamano, 2003, p. 54). Parental leave is 26 weeks and no cash benefit is given (Fukuda, 2003, p. 12), which is less generous than Japan. Governmental effort for childcare service is low and non-profit organizations play a major role. Child allowance is lower for the second and higher order children (Neyer, 2002, pp. 62-67). In spite of this opposing policy orientation, TFRs in France and the United Kingdom showed a very similar trajectory. As depicted in Figure 15, it is only since 1998 that France has consistently overcome the United Kingdom in fertility.

Weak explanatory power of policy intervention becomes clearer if we include

another English speaking country. The United States is even more indifferent to family policy than the United Kingdom. There is no child allowance system. Parental leave is untouched to be 12 weeks without cash benefit (Kamano, 2003, p. 55). Despite the lack of governmental effort, TFR of the United States has been considerably higher than France since the mid 1980s. Thus, there must be some socio-cultural characteristics in Anglo-Saxon countries that keep fertility higher than France. The distinctive feature of age pattern of fertility in English-speaking countries (Chandola et al., 2002) seems to support such an inference.

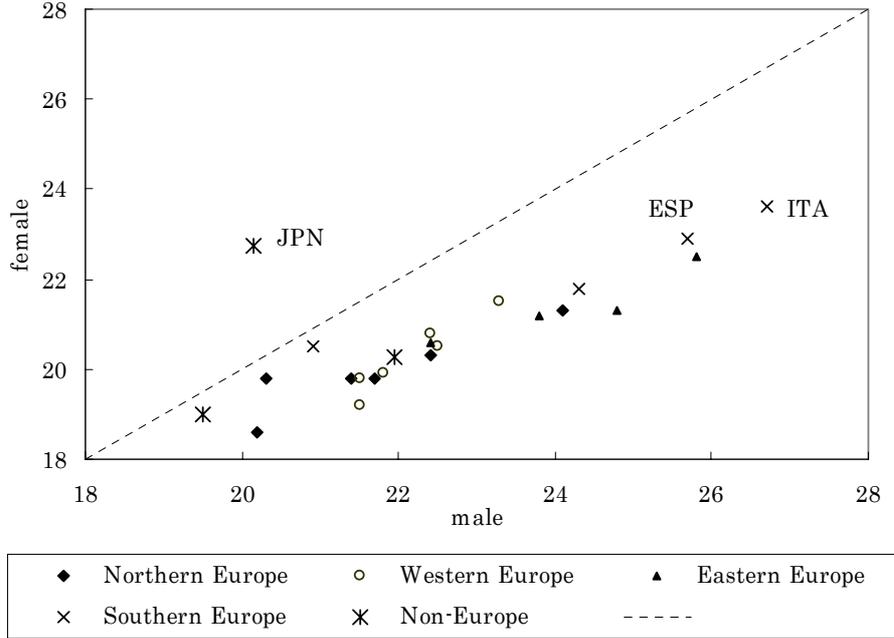
There is a cultural divide between moderately low fertility and lowest-low or very low fertility. As suggested in Table 4, all Western and Northern European countries and English-speaking countries have successfully avoided lowest-low fertility. McDonald (2005) chose the line of 1.5 to divide moderately low fertility and very low fertility. In his cultural divide, all Nordic countries, all English-speaking countries, and all French and Dutch speaking Western European countries have TFR of 1.5 or higher. The countries with very low fertility are all advanced Eastern Asian countries, all Southern European countries and all German-speaking Western European countries. While emphasizing the role of policy intervention, McDonald suggested that this divide has deep historical roots and is difficult to change. Atoh (2005, pp. 51-52) pointed out the influence of traditional values as one of factors beyond family policy.

When lowest-low fertility was a phenomenon within Europe, it was natural to look for features common in lowest-low fertility countries. However, once lowest-low fertility has spread out from Europe, the appropriateness of this attempt is questionable. Because lowest-low fertility has appeared in very different cultural settings in Southern Europe, Eastern Europe and Eastern Asia, the phenomenon seems to be a natural response to socioeconomic changes in the postmaterial era. In this respect, those countries that have avoided lowest-low fertility should be seen as exceptional and requiring explanation. This section expands the discussion in Suzuki (2003a) and examines cultural determinants of moderately low fertility in Western and Northern Europe and advanced English-speaking countries.

Reher (1998) asserted that the contrast between weak family ties in Western and Northern Europe and strong family ties in Southern Europe has deep historical roots. In contrast to the Oriental family system that affected Southern Europe, the "Occidental" structure was based on the conjugal pair and women's position was high in the northern part of the continent. The Reformation changed the meaning of marriage from a sacrament to a civil contract, enhanced women's position further, lowered parental authority, and promoted individualism (Reher, 1998, pp. 213-214). Thus, gender equity and compatibility between wife's work and childcare in today's moderately low fertility countries have long historical background. This is why these countries developed non-parental childcare activities by baby sitters, tutors, childcare

workers and other professionals. In contrast, countries with strong family ties are still clinging to maternal cares. According to the Third National Family Survey in 2003 (NIPSSR), 82.9% of Japanese wives agreed that “A mother should not work but take care of her child for three years after the birth”. Such an emphasis on mother’s supreme role could be the factor that intercepts the effect of childcare service on fertility.

Figure 17. Median Age at Home-Leaving of Cohorts Born around 1960

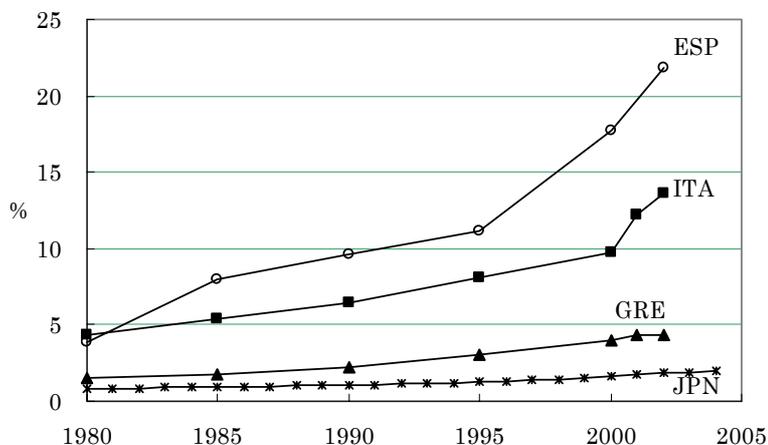


Source: Billari, et al. (2001), Goldscheider&Goldscheider (1994), Ravanera et al. (1995), Suzuki (2003b)

Another prominent feature of Western-Northern Europe and its descendents is early home-leaving. In these countries in the pre-industrial era, young men and women left the parental home before marriage to work as servants (Reher, 1998; Wall, 1999). The tradition of the majority of men and women leaving home before marriage still remains today (Billari et al., 2001, pp. 18-19). Premarital home-leaving is supposed to promote union formation through both consensual union and formal marriage, while Southern European adolescents are suffering from postponement syndrome, which discourages autonomy and decision making ability in their own lives (Dalla Zuanna, 2001; Livi-Bacci, 2001). As shown in Figure 16, Japan occupies a singular position in that men leave as early as Northern Europeans while women leave as late as Southern Europeans. However, since late leaving of either sex discourages union formation, Japan may suffer from the same problem as Southern Europeans.

Last but not least, a clear cultural divide in cohabitation and extramarital birth has been observed. These postmodern behaviors were once related to the fertility decline to below replacement level. Today, however, the low frequency of such behaviors is a good predictor of lowest-low fertility. Japan is characterized by very

Figure 18. Proportion of Extramarital Birth



Source: Council of Europe, NIPSSR

robust marriage institution. As shown in Figure 18, the proportion of extramarital births in Japan has been extremely low even compared with lowest-low fertility countries in Southern Europe. The proportion in 2004 was 1.99%, which hardly changed from 0.80% in 1980. As long as the Japanese people cling to reproduction via marriage, it would be difficult to avoid postponement syndrome, cease overprotecting children, flatten continuously rising cost of children, and socialize childrearing.

Conclusion

Japan has been adopting and extending policy measures to cope with low fertility. However, those efforts have not been successful in preventing fertility decline. Quantitative analyses have shown that the effects of policy interventions are weak. Thus, a large part of the difference from moderately low fertility should be attributed to direct effects of cultural features, not to governmental efforts. This might apply to Korea and Taiwan. It is just a fantasy that TFR would come back to moderately low level if Eastern Asian countries adopted policy interventions used in Western and Northern Europe. Although gender equity is a widely accepted political goal, it would be difficult to catch up Western-Northern Europe that has long historical background. It is questionable if a consensus can be made that a government should promote early home-leaving of young people. A government definitely should not induce extramarital births by increasing the number of welfare mothers. Then, continuous fertility recovery would be impossible without a significant change in work and family behaviors. Although there is a sign of assimilation to Western-Northern weak family pattern in Southern Europe, such a change would be more difficult to take place in Eastern Asia. Changes toward the compatibility and family-friendliness will

continue but it will take long time to for Asian countries to catch up European countries. Then, it would be possible that lowest-low fertility in Eastern Asia lasts longer and falls further than that of European forerunners.

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Lowest-Low Fertility and Governmental Actions in Japan

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[Abstract]

Japan's TFR in 2005 was 1.26, which was "lowest-low" fertility defined to have TFR of 1.3 or less. It seems to be impossible for cohorts born after 1960 to achieve the complete fertility of its predecessors. The delay in childbearing was accelerated again after 2000. It was shown that both nuptiality and marital fertility contributed to the recent fertility decline. Since demands for spouse and children are not at the lowest-low level, recent fertility decline should be explained from obstacles to fulfill the demand. Firstly, the increase in direct cost of children is attributable to growing human investments on education and health of children. Secondly, the economic recession hindered young people's economic independence and propensity to marry. Married couples were also psychologically depressed with uncertainty toward the future and avoided to have children. Finally, under the low compatibility between women's work and childrearing, the growth in female labor force participation had a negative impact on fertility.

The Japanese government has been adopting pronatal measures since the early 1990s but has not succeeded in preventing fertility decline. Measures applied by the government include expansion of child allowance, introduction of childcare leave, improvement in childcare services, subsidization of medical treatment for infecundity, etc. However, pronatal measures are not as effective as expected. Quantitative analyses show that it is very difficult to elevate TFR by 0.1 with policy interventions. A cultural deterministic view on fertility asserts that a large part of the difference between moderately low and lowest-low fertility are attributable to direct effects of cultural features. It is thought that such cultural patterns as weak family ties, traditionally high position of women, early independence of children, and high prevalence of cohabitation and extramarital births have prevented fertility in Western and Northern Europe from falling to the lowest-low level. Since some cultural differences are beyond the governmental policy and changes are slow, Eastern Asian countries will stay long at the considerably low fertility level than European countries.