

## Fertility Decline and Governmental Interventions in Eastern Asian Advanced Countries

Toru Suzuki

National Institute of Population and Social Security Research, Tokyo, Japan

### Introduction

This paper is prepared as a long introduction to papers presented by Dr. Lee Sam-Sik on the Republic of Korea (simply “Korea” henceforth) and Professor Lee Meilin on the Republic of China (simply “Taiwan” henceforth). Both papers include detailed description of fertility decline and its determinants and governmental responses. This paper firstly compares fertility decline in three countries. Secondly, a methodological problem is pointed out concerning the role of nuptiality decline. Thirdly, socioeconomic and cultural determinants of low fertility will be discussed. Lastly, governmental response to extremely low fertility in three countries will be compared. This work was supported by the Scientific Grant of Ministry of Health, Labour and Welfare of Japan.

### 1. Fertility Decline in Eastern Asia after 2000

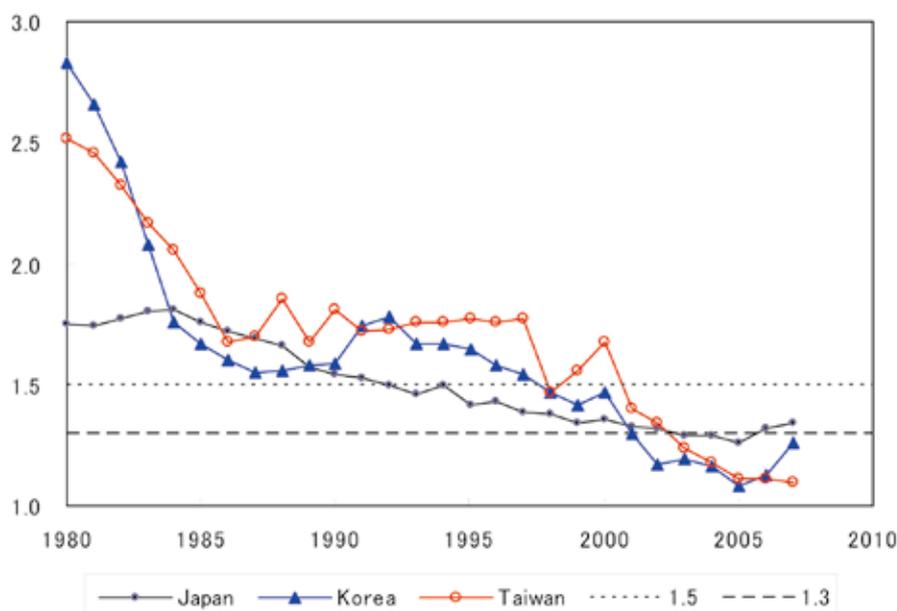
After the first fertility transition in the 1950s, the TFR of Japan fluctuated around the replacement level until the mid 1970s. The TFR started declining again in the late 1970s and, as shown in Figure 1, arrived at the line of 1.5 in 1992. The line was chosen by McDonald (2005; 2008) to refer to

“very low fertility.” Japan’s TFR declined further and crossed the line of 1.3 in 2003. Kohler et al. (2002) chose the line of 1.3 to define “lowest-low fertility,” which appeared in Europe in the 1990s. As in papers by Lee Sam-Sik and Lee Meilin, the TFR of Korea and Taiwan arrived at the replacement level in 1983 and 1984, respectively. Both countries crossed the line of 1.5 in 1998, though Taiwan temporarily escaped from very low fertility in 1999 and 2000. Three countries showed slight baby boom in 2000 and figures were 1.36 in Japan, 1.47 in Korea and 1.68 in Taiwan. While Japan sustained the slow pace of fertility decline after 2000, the acceleration in other two countries was outrageous. Korea arrived at the line of 1.3 as early as in 2001, followed by Japan and Taiwan in 2003. The figures in 2007 are 1.34 in Japan, 1.26 in Korea and 1.10 in Taiwan. Although Japan escaped from the threshold of 1.3, it is questionable if it is possible to retrieve moderately low fertility of 1.5 or more in the near future.

### 2. The Role of Nuptiality

Unlike in Europe and Northern America where extramarital births account for considerable part

Figure 1. Total Fertility Rate



of fertility, such condition does not hold in Eastern Asia. The proportion of extramarital births in 2006 was 2.1% in Japan, 1.5% in Korea and 4.2% in Taiwan. Thus, fertility decline can be decomposed to nuptiality decline and the decline in marital fertility.

Although both Lee Sam-Sik and Lee Meilin rely on AMFRs (Age-specific Marital Fertility Rates), the method is erroneous (Hirosima, 2001; Kaneko, 2004). Let  $x$  be the current age,  $a$  be the age at first marriage, and  $y = x - a$  be the marital duration. It is assumed that there is no divorce, remarriage or death during the childbearing age. Thus, the term “marriage” always means first marriage and there is no marital status other than “single” and “(currently) married”. The ordinary age-specific fertility rate  $f(x)$  can be expressed as follows.

$$f(x) = \int_0^x n(a)m(a, x-a)da, \tag{2-1}$$

The denominator of AMFRs is the proportion married and is written  $N(x)$ .

$$N(x) = \int_0^x n(a)da. \tag{2-2}$$

The AMFR at age  $x$  is defined as the ratio of fertility to the proportion married.

$$AMFR(x) = \frac{f(x)}{N(x)} = \frac{\int_0^x n(a)m(a, x-a)da}{\int_0^x n(a)da}. \tag{2-3}$$

As far as the marital fertility is a function of marriage duration, dividing with  $N(x)$  does not help. The ratio is theoretically valid only in the pre-industrial setting where no intentional birth control is made and the marital fertility is a function of age. If  $m(a, x-a)$  in (3) is replaced with  $m(x)$ ,

$$AMFR(x) = \frac{\int_0^x n(a)m(x)da}{\int_0^x n(a)da} = \frac{m(x)\int_0^x n(a)da}{\int_0^x n(a)da} = m(x). \tag{2-4}$$

In this case, the age-specific fertility rate is the product of the proportion married and marital fertility rate. However, when the marital fertility is a function of marriage duration as well as of the age at marriage, the ratio is not meaningful.

Decomposition analysis does not always fail, even though AMFRs are not theoretically valid. In the following,  $\Delta TFR$  is the total change,  $\Delta TFR_n$  is the change due to the marriage behavior, and  $\Delta TFR_m$  is that due to the childbearing behavior of

a married couple. It can be shown that age-shift in marriage causes a serious problem that other types of changes do not suffer.

$$\Delta TFR = TFR_2 - TFR_1 = \int_0^\infty \{f_2(x) - f_1(x)\}dx, \tag{2-5a}$$

$$\Delta TFR_n = \int_0^\infty \{N_2(x) - N_1(x)\} \cdot \frac{1}{2} \left\{ \frac{f_2(x)}{N_2(x)} + \frac{f_1(x)}{N_1(x)} \right\} dx, \tag{2-5b}$$

$$\Delta TFR_m = \int_0^\infty \left\{ \frac{f_2(x)}{N_2(x)} - \frac{f_1(x)}{N_1(x)} \right\} \cdot \frac{1}{2} \{N_2(x) + N_1(x)\} dx. \tag{2-5c}$$

**Case 1. Age-neutral nuptiality change:** Assume that all the age-specific marriage rates are multiplied with a constant  $c$ . Thus,  $n(a)$  turns to be  $cn(a)$ . By (2-1) and (2-2), new age-specific fertility rate and the proportion married will be  $cf(a)$  and  $cN(a)$ , respectively. Then, there is no change in age-specific marital fertility rates. The decomposition shows correctly that the nuptiality change caused the fertility change in its entirety.

$$\begin{aligned} \Delta TFR_n &= \int_0^\infty \{cN(x) - N(x)\} \cdot \frac{1}{2} \left\{ \frac{f(x)}{N(x)} + \frac{f(x)}{N(x)} \right\} dx \\ &= (c-1) \int_0^\infty f(x)dx = TFR_1 - TFR_2, \end{aligned}$$

$$\Delta TFR_m = \int_0^\infty \left\{ \frac{f(x)}{N(x)} - \frac{f(x)}{N(x)} \right\} \cdot \frac{1}{2} \{cN(x) + N(x)\} dx = 0.$$

**Case 2. Duration-neutral marital fertility change:** Assume that all the marital fertility rates are multiplied with a constant  $c$ . Thus,  $m(a, y)$  is replaced with  $cm(a, y)$ . By (2-1), new age-specific fertility rate will be  $cf(x)$ . There is no change in the proportion married. Then, age-specific marital fertility rates will be multiplied with  $c$ . The decomposition shows correctly that the marital fertility change caused the fertility change in its entirety.

$$\Delta TFR_n = \int_0^\infty \{N(x) - N(x)\} \cdot \frac{1}{2} \left\{ c \frac{f(x)}{N(x)} + \frac{f(x)}{N(x)} \right\} dx = 0,$$

$$\begin{aligned} \Delta TFR_m &= \int_0^\infty \left\{ c \frac{f(x)}{N(x)} - \frac{f(x)}{N(x)} \right\} \cdot \frac{1}{2} \{N(x) + N(x)\} dx \\ &= (c-1) \int_0^\infty f(x)dx = TFR_1 - TFR_2. \end{aligned}$$

**Case 3. Tempo change in marital fertility:** Assume that marital fertility rates are uniformly shifted by  $h$ . Thus,  $m(a, y)$  becomes  $m(a, y-h)$  and there is no birth for  $h$  years after marriage. By (2-1), new age-specific fertility rate will also be shifted by  $h$ . There is no change in the TFR, because the

whole fertility schedule is shifted while the quantum is kept constant. The decomposition shows correctly that both effects are null.

$$\Delta TFR_n = \int_0^\infty \{N(x) - N(x-h)\} \cdot \frac{1}{2} \left\{ \frac{f(x-h)}{N(x-h)} + \frac{f(x)}{N(x)} \right\} dx = 0,$$

$$\begin{aligned} \Delta TFR_m &= \int_0^\infty \left\{ \frac{f(x-h)}{N(x-h)} - \frac{f(x)}{N(x)} \right\} \cdot \frac{1}{2} \{N(x) + N(x-h)\} dx \\ &= \int_0^\infty f(x-h) dx - \int_0^\infty f(x) dx = 0. \end{aligned}$$

**Case 4. Tempo change in marriage:** Unfortunately, age-shift in marriage does not produce such a nice result even when the change is an ideal shift without a change in quantum. Assume that age-specific marriage rates are uniformly shifted by  $h$ . Thus,  $n(a)$  is replaced by  $n(a-h)$ . New age-specific fertility rate and the proportion married are,

$$f_2(x) = \int_0^x n(a-h) m(a, x-a) da,$$

$$N_2(x) = \int_0^x n(a-h) da = \int_0^{x-h} n(a) da = N(x-h).$$

Since there is no change in marital fertility,  $\Delta TFR_m$  should be zero. However, such a correct result can rarely be obtained. Thus, the use of AMFRs should be avoided whenever there is a change in the timing of marriage.

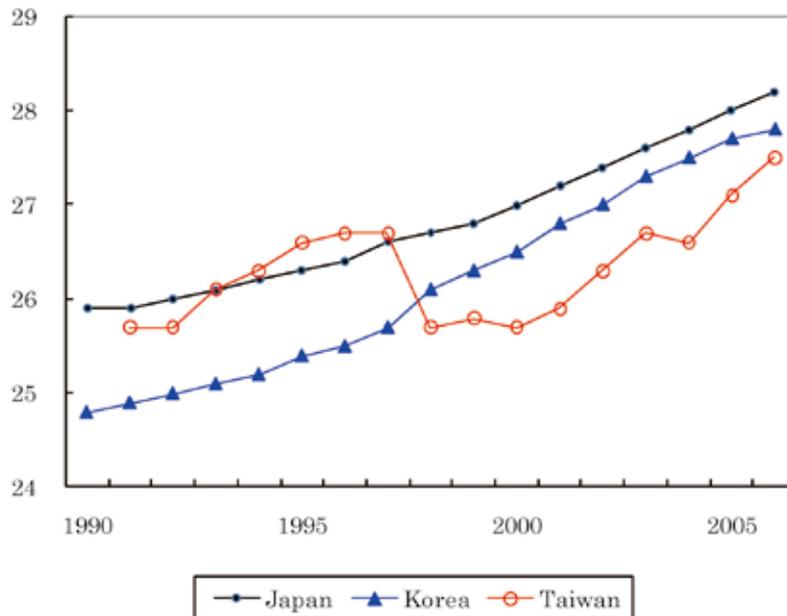
$$\Delta TFR_m = \frac{1}{2} \Delta TFR + \frac{1}{2} \left\{ \int_0^\infty n(a-h) M^+(a) da - \int_a^{\beta+h} n(a) M^-(a) da \right\},$$

$$\text{where, } M^+(a) = \int_0^\infty \frac{N(x)}{N(x-h)} m(a, x-a) dx,$$

$$M^-(a) = \int_0^\infty \frac{N(x-h)}{N(x)} m(a, x-a) dx.$$

As shown in Figure 2, there has been a secular trend of delay in marriage in three countries. In such a case, the proportion of newly-wed wives rises in older ages. Then, AMFRs in these ages can rise even when genuine marital fertility declines. This implies that the decomposition using AMFRs can underestimate the role of marital fertility. According to a study cited by Lee SamSik, 195% of fertility decline between 1990 and 1999 in Korea was explained by nuptiality decline. Lee Meilin also referred to literatures asserting that marital fertility rose and did not contribute to fertility decline in Taiwan since the late 1980s. Such assertion was made also in Japan until the mid 1990s (Atoh, 1992, p. 51; Kono, 1995, pp. 67-71; Tsuya and Mason, 1995, pp. 147-148; NIPSSR, 1997, p.10). However, more sophisticated methods than that depends on AMFRs have been showing that nuptiality decline does not explain fertility decline in its entirety. Table 1 summarizes results of these studies. 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.

Figure 2. Mean Age of Women at First Marriage



**Table 1. Contribution of Nuptiality in Fertility Decline**

Literature	Period	Contribution of Nuptiality
Hirosima (1999)	1974~1997	40%
Hirosima (2000)	1970~2000	70%
Iwasawa (2002)	1970~2000	70%
Kaneko (2004)	1980~2000	74%
Suzuki (2005)	1990~2002	37%
Ogawa (2006)	1972~2000	52%

**Figure 3. Proportion of Currently Married Women in 2005**

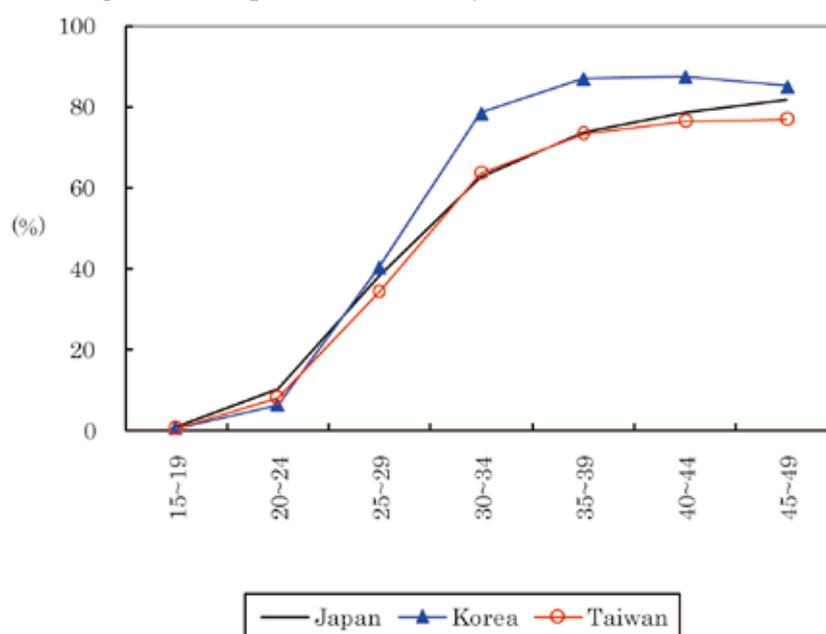


Figure 3 shows the proportion of currently married women in 2005. Although Korea showed lowest proportion up to age 25 reflecting the recent rapid nuptiality decline, the proportion was highest at age 25 and older. Thus, Korea had the most advantageous marriage pattern for fertility at that time. However, the TFR of Korea was 1.08 in 2005, the lowest among three countries. This implies that marital fertility in Korea was extremely low in 2005. Although Lee Sam-Sik asserts that approximately a half of fertility decline between 2000 and 2004 can be attributed to marital fertility, this conclusion could be underestimation due to the deficiency of AMFRs. Suzuki (2008) used parity progression measures and concluded that two thirds of fertility decline between 2000 and 2005 in Korea can be attributed to the decline in marital fertility.

### 3. Determinants

Both Lee Sam-Sik and Lee Meilin refer to higher educational attainment in younger cohorts. Figure

4 shows the trend of college enrollment in three countries. Although the rate has been increasing in all countries, the rise in the 1990s in Korea is especially impressive. This caused social concern on educational cost in Korea and the governmental intervention reflected such concern. Arita (2006) pointed out three characteristics of extraordinary educational fever in Korea; its strength is apparent in higher private educational cost than other countries that Korean parents pay; it is continuous in the sense that no cooling down can be observed; it is universal in the sense that all social strata are caught in the fever.

Lee Sam-Sik mentions the economic instability and uncertainty of Korean young workers. Figure 5 shows the trend in unemployment rates of young men and women. Only Japan shows the recent improvement since 2002 or 2003 reflecting the recovery from economic recession. Such good economy in Japan could be the main reason of the recent fertility recovery and escape from the lowest-low level. However, the effect of good

Figure 4. College Enrollment Rate

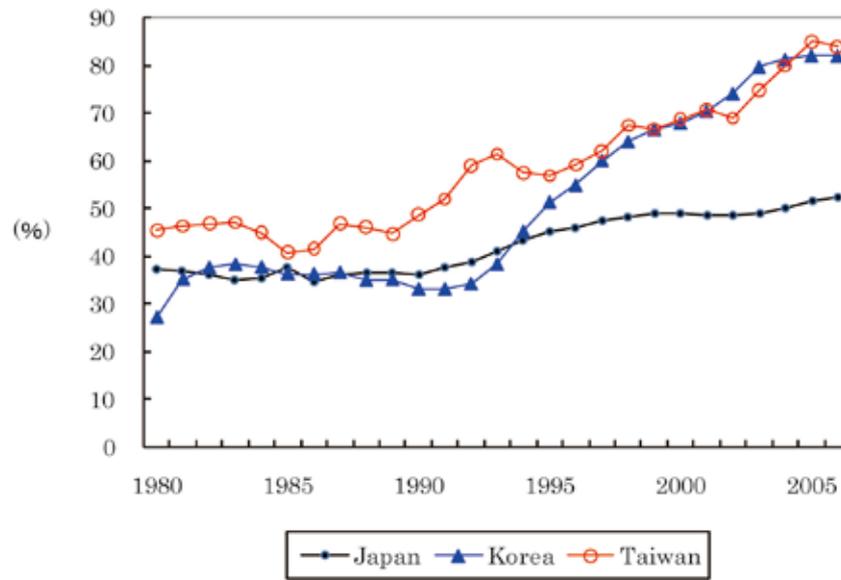


Figure 5a. Male Unemployment Rate at Age 20-29

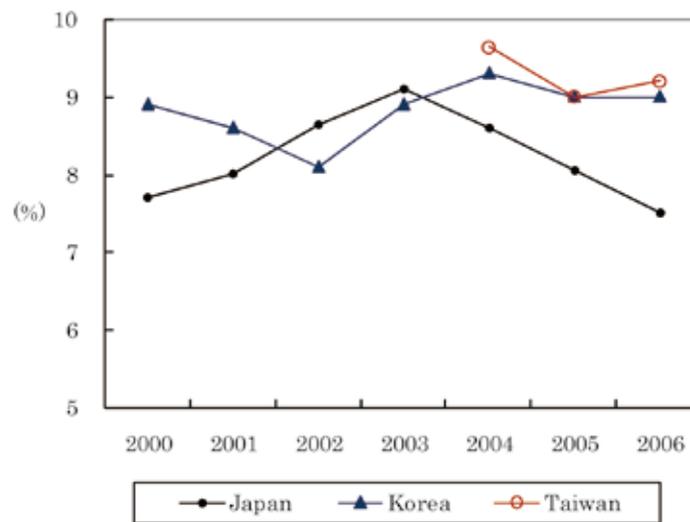
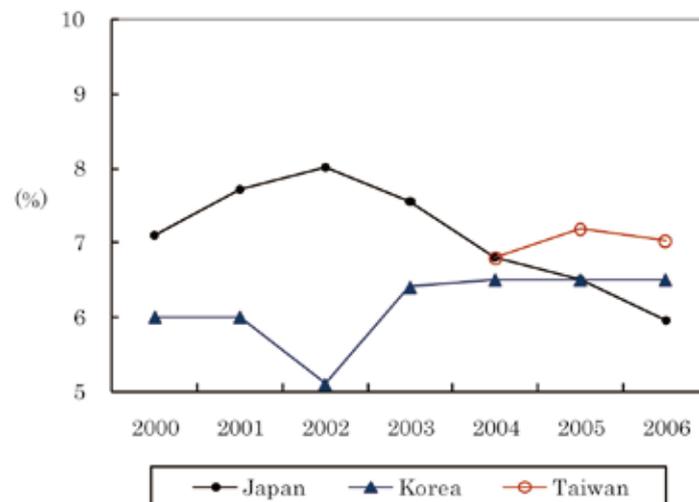
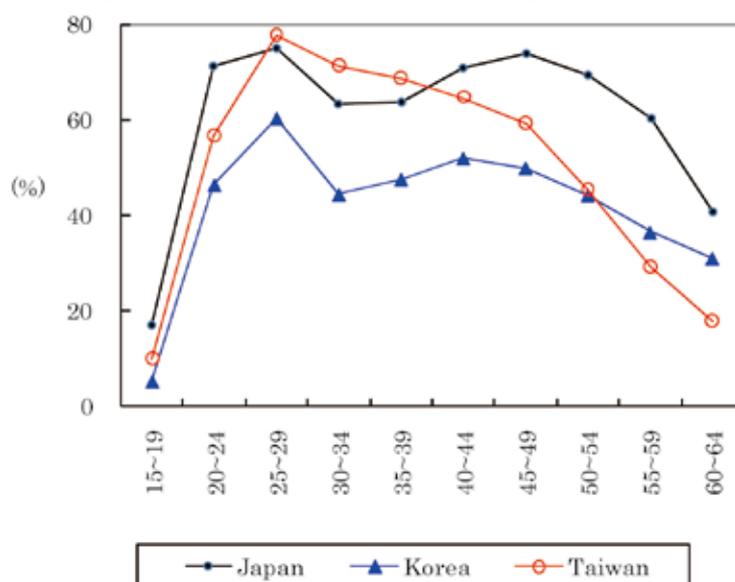


Figure 5b. Female Unemployment Rate age Age 20-29



**Figure 6. Female Labor Force Participation in 2005**



economy will disappear soon due to the global recession started in the United States.

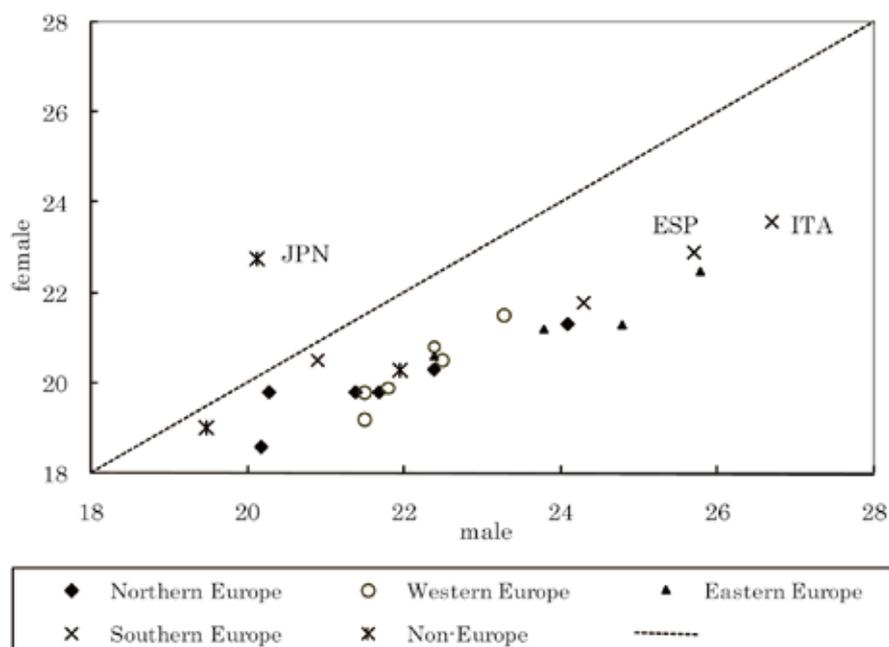
Lee Meilin emphasizes the role of improvement in women’s status. The high status of women in formal sector and remaining traditional gender role within family matches the proposition by McDonald (2002) that fertility falls to very low levels when gender equity rises in individual-oriented institutions while remaining low in family-oriented institutions. Such conflict between occupational and familial sectors becomes apparent as more married women participate in labor market. Figure 6 shows the age profile of female labor force participation in 2005. While Japan and Korea show the famous M-shaped pattern, Taiwan shows a monotonously declining pattern after the peak in late 20s. Such declining pattern can be also found in Southern European low fertility countries. On the other hand, very little decline can be observed between ages 25 and 50 in moderately low fertility countries.

When lowest-low fertility was a phenomenon occurring only in Europe, it was natural to look for features common in lowest-low fertility countries. However, once lowest-low fertility spread out from Europe, the appropriateness of this attempt became 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 as requiring explanation.

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 had a higher position 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, reduced parental authority, and promoted individualism (Reher, 1998, pp. 213–214). Clearly, gender equity and compatibility between wife’s work and childcare in today’s countries with moderately low fertility have a long historical background. This is why these countries developed non-parental childcare activities involving baby sitters, tutors, childcare workers and other professionals. In contrast, countries with strong family ties are still clinging to maternal care.

**Figure 7. Median Age at Home-Leaving of Cohorts Born around 1960**



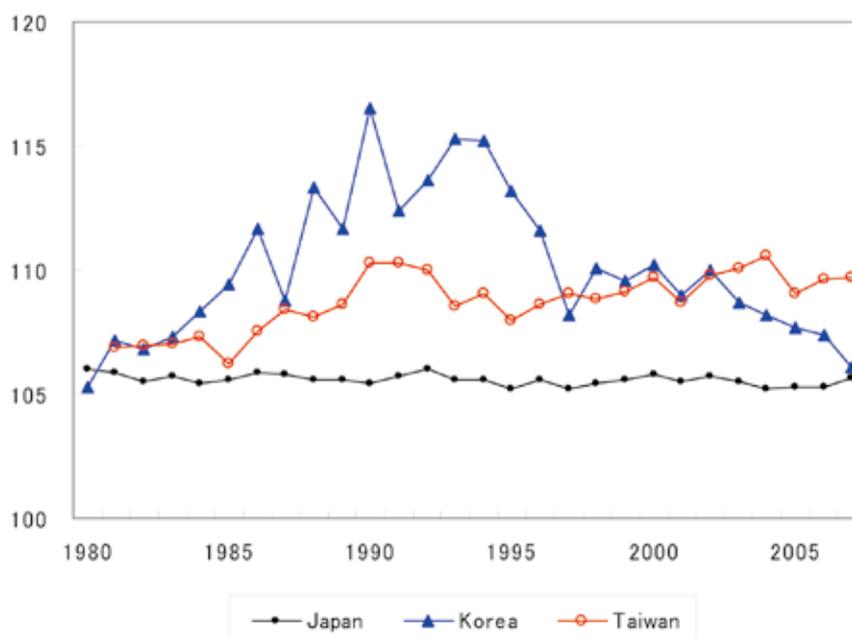
Another prominent feature of Northern/Western Europe and their descendents is early home-leaving. In these countries in the pre-industrial era, young men and women left the parental home before marriage to work as servants (Reher, 1998; Wall, 1999). The tradition of the majority of men and women leaving home before marriage still remains today (Billari et al., 2001, pp. 18–19). Premarital home-leaving is thought to promote union formation through both consensual union and formal marriage, while Southern European adolescents are suffering from postponement syndrome, which discourages autonomy and weakens their ability to make decisions in their own lives (Dalla Zuanna, 2001; Livi-Bacci, 2001). As shown in Figure 7, 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. It does not seem that comparable life table measures are calculated by Korean or Taiwanese demographers.

Last but not least, a clear cultural divide in cohabitation and extramarital births was observed. These forms of postmodern behavior were once

related to a decline in fertility to below the replacement level. Today, however, the low frequency of such behavior is a good predictor of lowest-low fertility. Japan is characterized by a very robust marriage institution. As mentioned above, the proportion of extramarital births in three Eastern countries are still very low, ranging between 1% and 5%. On the other hand, Southern European countries are now experiencing the rapid increase in extramarital births. The recent escape from lowest-low fertility in these countries could be attributed to such “delayed second demographic transition” (Billari 2008).

The explanation based on the family pattern suggests that very low or lowest-low fertility will keep spreading around the world. When a society arrives at a certain level of economic development, social forces such as increasing human investments, occupational insecurity and female labor force participation will severely depress fertility. Because no other societies have family patterns as unique as Northern/Western Europe’s, their fertility rates will go down to the extremely low level. This may happen soon in Southeastern Asia, Latin America, or the coastal region of China.

Figure 8. Sex Ratio at Birth



#### 4. Governmental Interventions

The Japanese government was surprised by the historically low TFR of 1.57 in 1989 and started an inter-ministry committee to create measures to cope with the declining fertility in 1990. An expansion of child allowance, establishment of childcare leave, announcement of governmental program called Angel Plan took place between 1991 and 1994. However, the transition to pronatal policy in Korea and Taiwan was slower than in Japan. The high population density and the long lasting fear for population explosion in both countries may explain the slowness in consensus building that is necessary in such transition. The TFR of Korea was 1.54 in 1997, which was the level that forced the Japanese government to start pronatal interventions. However, it was only after the TFR hit 1.17 in 2002 that the Korean government started worrying about low fertility. After a series of round table meeting participated by various interest groups, the government finally announced the program called “Saeromaji Plan” in 2006 to cope with low fertility and population aging. As Lee Meilin writes, the concern of feminists and environmentalists caused the delay in transition to pronatal policy. Although the Taiwanese government originally planned to publish the White Book of Population Policy in 2005 to announce new pronatal measures, the book was not published until 2008. Assertions by feminists widely included in the book as a result of long discussion and coordination.

Reflecting the extraordinarily high private educational cost in Korea, the Saeromaji Plan

includes such measures as expansion of after-school programs and development of cyber learning programs in addition to supporting child care and educational cost for low income group. On the other hand, educational cost is not a big issue in Japan and Taiwan. Financial supports other than educational area include tax reform, exemption of pension premium and housing support for childrearing families in Korea. Taiwanese government is planning tax reform and housing loan, as Lee Meilin explains.

The child allowance is still “on consideration” stage in Korea and Taiwan. It is a difficult decision making for both governments to launch a universal child allowance program that requires huge amount of budget. It is estimated in Korea that a universal allowance of 100,000 won per month would require budget of 5.5 trillion won between 2007 and 2010. This is approximately 30% of pronatal budget decided in the Saeromaji Plan. While the White Book of Taiwan recommends child allowance, some Korean social scientists blames a possible side effect to depress the female labor force participation.

Three countries aim at providing with high quality childcare services under the governmental control. In Japan, the major revision of Child Welfare Law in 1997 allowed parents to select their preferred daycare center. The cabinet adopted “Zero Waiting List for Daycare Program” as a political goal in 2001. In 2008, the program of at-home-care by qualified care takers started. The Saeromaji Plan of Korea recommended to increase the number of public daycare centers and

to launch an evaluation program of all daycare centers. Taiwan's White Paper is more interested in the improvement in working conditions of care takers than the amount and types of services to be provided.

Concerning the reproductive health, the White Paper of Taiwan focuses on the normalization of the sex ratio at birth. Taiwan sustained an abnormal sex ratio at birth of 109.7 in 2007. The topic cannot be found in Japan or Korea. The sex ratio at birth in Japan has been in the normal range between 105 and 107. As shown in Figure 8, the ratio used to be higher in Korea than in Taiwan. However, the figure dropped to the normal level of 106.1 in 2007. Thus, it seems that selective abortion is not a serious problem anymore in Korea.

The maximum length of maternity leave is 98 days in Japan, 90 days in Korea, and 56 days in Taiwan. While whole wage is paid in Korea and Taiwan, 60% is paid in Japan. In Korea, one third of the wage during the leave is paid by the public insurance system if the mother belongs to a large company. Since 2006, whole wage is paid by the public insurance if the mother works for a medium or small company. The baby bonus is defined to be 350,000 yen in Japan and one month wage in Taiwan. In Korea, many municipalities provide with baby bonus but there is no definition by the central government. The paternity quota is three days in Korea and Taiwan, but not defined in Japan.

In Japan, childcare leave is allowed for a mother or father until the first birthday of a child. The leaver can receive 50% of her or his wage. In Korea, a mother or father can take childcare leave of one year until the third birthday of a child and receives 500,000 won per month. In Taiwan, childcare leave is for two years and until the third birthday of a child. Currently no income benefit is given during the leave.

All three countries are aware of the low compatibility between the family and work as a central factor of extremely low fertility. In Japan, the Next Generation Law in 2003 included a certification program for family-friendly companies. The Support Plan for Parents and Children in 2004 included 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. The "work-life balance" was the key issue in the governmental intervention declared in 2008. The Saeromaji Plan in Korea proposed an exclusive program to support mothers' reentry to the labor market. The White Book of Taiwan also has a section about constructing family friendly work environment.

The topic of fostering family values shows sharp contrast between countries. Although Japan's Support Plan for Parents and Children has a chapter entitled "Understanding Value of Life and Role of the Family," the chapter is very brief and avoids stimulating those who stay single or childless. There is a widespread feeling that it is not the government's role to define the desirable lifestyles in Japan as well as in Western developed countries. On the contrary, the Saeromaji Plan of Korea clearly states that the formal education should emphasize the value of marriage and the family and should teach the happiness of bearing and rearing a child. It seems that Korean feminists were satisfied in inserting a statement that school text books should be free from the traditional gender roles and did not fight against the conservative familistic values. The chapter on family value in Taiwanese White Paper is dominated by feministic values. It is stated that the traditional gender role should be denied to solve low fertility problem and that the formal education should be gender free so that both boys and girls can learn domestic works.

While pronatal policy has been discussed independently in Japan, both the Saeromaji Plan and the White Book are exclusive policy package including pronatal measures as its part. Korean Saeromaji Plan includes welfare policy for the elderly and labor-employment policy together with pronatal policy. This shows that the Koreans are worrying about the negative impact of low fertility on economy and employment as well as that on the well being of the elderly. The labor-employment policy includes empowerment of women, elderly and foreign workers, raising labor productivity, and fostering new industry to adopt aging society.

The White Book of Taiwan contains welfare policy for the elderly and immigration policy in addition to pronatal policy. Thus, the Taiwanese government seems to think that extremely low fertility causes labor shortage that cannot be compensated without immigrant workers. Taiwan launched a guest worker program in 1992, followed by Korea in 2004. Although Japan has been reluctant to accept foreign workers, a major policy change seems to be inevitable. In 2008, Japan accepted nurses and care workers from Indonesia and plans to accept also from Philippines. A group of the governmental party proposed to accept 10 million foreign workers in coming 50 years. In the near future, three countries may need to compete in recruiting immigrant workers from China, India and South-Eastern Asia.

As market oriented neoliberalistic nations,

three countries have difficulty in spending a large amount of budget on family policies. In Japan, the national budget for children and the family in 2007 was 4.3 trillion yen, accounting only 0.8% of GDP. The annual budget for pronatal policy in the Saeromaji Plan is approximately 3.8 trillion won, accounting 0.5% of Korean GDP. Although no budget notation is made in Taiwan's White Book, it is guessed that the amount is even smaller than in Korea.

If it becomes clear that extremely low fertility cannot be overcome in a short run, the focus would shift to the immigration policy. Although fertility decline and population aging started much earlier in Japan than in Korea or Taiwan, globalization and immigration are taking place much faster in these countries than in Japan. While Taiwan accepts Chinese mainlanders and Korea accepts Korean Chinese, Japanese Brazilians are not motivated to migrate to Japan because of the good economy in their home countries. Thus, Japan may want to benchmark the cases of Korea and Taiwan to learn what happens if an Eastern Asian country accepts a considerable number of immigrants.

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Toru Suzuki (National Institute of Population and Social Security Research)