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

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, ΔTFR is the total change, ΔTFR_n is the change due to the marriage behavior, and ΔTFR_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.

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

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

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

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 $c\ n(a)$. By (2-1) and (2-2), new age-specific fertility rate and the proportion married will be $c\ f(a)$ and $c\ N(a)$, 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 entity.

$$\Delta TFR_n = \int_0^\infty \{c\,N(x) - N(x)\}\cdot\frac{1}{2}\left\{\frac{f(x)}{N(x)} + \frac{f(x)}{N(x)}\right\}dx$$
$$= (c-1)\int_\alpha^\beta f(x)dx = TFR_1 - TFR_2,$$

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

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 $c\ m(a,y)$. By (2-1), new age-specific fertility rate will be $c\ f(x)$. 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 entity.

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

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

Case 3. Tempo change in marital fertility: Assume that marital fertility rates are uniformly shifted by h. Thus, $m(a,y)$ becomes $m(a,y\text{-}h)$ 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.

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

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

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 $n(a\text{-}h)$. 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, ΔTFR_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.

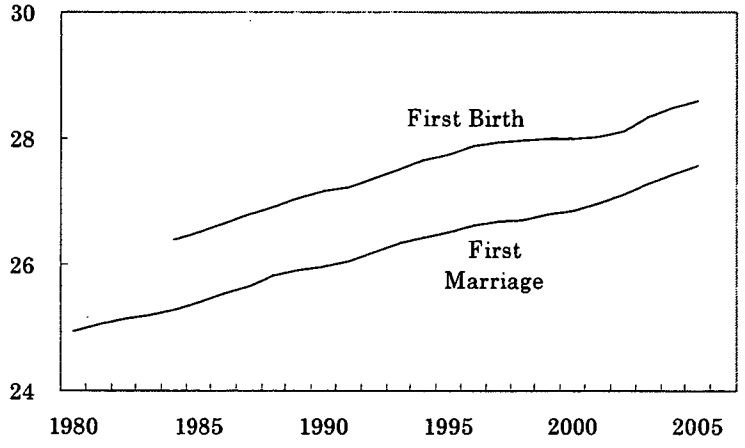
$$\Delta TFR_m = \frac{1}{2}\Delta TFR + \frac{1}{2}\left\{\int_0^{\infty} n(a-h)\, M^{+}(a)\, da - \int_{\alpha}^{\beta+h} n(a)\, M^{-}(a)\, da\right\},$$

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

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

Figure 2 shows that the mean age at first marriage of Japanese women has been rising, which implies that the decomposition using AMFRs is likely to fail. The figure also displays the mean age at first birth. Again, fertility change is not simply a copy of nuptiality change. The mean age at first birth slowed down around 2000 independently of the timing of marriage, causing a reduction in the first birth interval.

Figure 2. The Mean Age at First Marriage and First Birth of Japanese Women



More sophisticated methods than that depends on AMFRs have been showing that nuptiality decline does not explain fertility decline in its entity. Hirosima (1999; 2000) used the proportion of eventually married women and the complete average number of children among married women to decompose the effects of nuptiality and marital fertility. Kaneko (2004) adjusted AMFR by shifting age-specific fertility rates $f(x)$ in accordance with the delay in marriage. Iwasawa (2002) introduced the eventual average number of children by age at marriage to decompose the decline in cohort cumulative fertility. Suzuki (2005) applied the simplified method of Iwasawa to Japan and the Republic of Korea, assuming that marital fertility does not depends on the age at marriage but solely on the marriage duration. Ogawa (2006) calculated PPPRs (Period Parity Progression Ratios) to decompose fertility decline by parity.

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.

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%

2. Pronatal Measures of the Central Government

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 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 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 in child allowance for children under two years old, 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. The additional benefit of child allowance for young children started in April, 2007. The Ministry of Health plans to increase the cash benefit during the childcare leave from 40% to 50% of the wage.

2-1. Financial Supports

In Japan, financial supports for childbearing and childrearing are provided through the one time cash benefit at birth (baby bonus), child allowance and tax relief. Since October 2006, the baby bonus was raised from 300,000 yen to 350,000 yen. The child allowance system provides with 10,000 yen per month for the first three years and 5,000 yen until the graduation of primary school of the first and second children. For the third and subsequent children, 10,000 yen per month is paid until the child graduate primary school. Japan's child allowance is means-tested. It is estimated that approximately 15% of children were eliminated because of the high income of their parents in 2003 (Suzuki, 2006, p. 10).

Under the current taxation system, a parent with a dependent child less than age 16 is exempted 380,000 yen from income tax and 330,000 yen from local taxes. Thus, a couple can receive 350,000 + 10,000 x 12 = 470,000 for the first year after the childbirth. Assuming that tax rates for an average parent are 20% for income tax and 10% for local taxes, 380,000 * 0.2 + 330,000 * 0.1 = 109,000 yen can be saved from the taxes. As a whole, the cash benefit for the first year after having a child amounts 579,000 yen.

Because of the small income elasticity of fertility, however, such financial supports in Japan cannot have an impressive effect. As shown in Table 2, the fertility function by Yamagami (1999) implies that an increase in husband's annual income by 10,000 yen will raise the number of births by 0.00244. Then, an increase by 579,000 yen will raise the number by 0.141. The OLS model by Oyama (2004) implies that an increase in husband's monthly income by 10,000 yen will raise the number of births by 0.01. Then, an increase by 579,000 / 12 = 48,250 yen will raise the number by 0.048. The OLS model by Morita (2006) shows that the income elasticity of fertility is 0.043.

Since the average income of husband in the data she analyzed was 432,000 yen per month, an increase by annual amount of 579,000 yen implies an increase by 11.1%. Such an increase will raise fertility by 0.48%. If we rely on more recent results by Oyama (2004) and Morita (2006), the current financial supports in Japan are very unlikely to contribute raising the TFR by 0.1.

Table 2. Effect of the Current Financial Supports on the Number of Births

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
Expected Change in Fertility	0.141 person	0.048 person	0.48%

2-2. Childcare Leave

Childcare leave is available for a male or female worker with an infant until the first birthday. A worker who worked for more than a year before the leave can receive 50% of his/her wage. Under the current system, 30% is paid monthly during the leave and 20% 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 does not plan to come back to her job is also excluded. There were 118,339 cases that received cash benefit during childcare leave in 2005 (NIPSSR, 2005, p. 381). This was only 11.1% of the number of annual births.

There are several studies that evaluate the effect of childcare leave on fertility in Japan. Table 3 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;

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

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 3, the values in 2005 namely 1.29 for the TFR and 0.1114 for p 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 also shown in Table 3. 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, a dramatic improvement from 11.1% to more than 45% is required. It would be difficult to make such an advance within a decade or two.

Table 3. 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)	0.0359	0.0355	0.0352	0.0351
Fertility with leave (f_1)	0.0367	0.0400	0.0422	0.0434
Proportin of leave takers (p)	0.1114	0.1114	0.1114	0.1114
Required p to raise TFR by 0.1	--	0.7443	0.5195	0.4524

* $\exp(b/5)$

2-3. Childcare Services

The Japanese government has been paying efforts to improve the compatibility between the family and work by providing with childcare services. As the result, the enrollment of young children under age two has been growing steadily. There were 640,293 children under age two (18.8% of the population) in daycare center in April 2006. Since the proportion was 13.4% in 1998, there was an increase by 5.4 percentage points in eight years. However, the figure is far below Northern European countries that exceeds 40%. It also seems that the compatibility between the family and work in Japan is much poorer than that in these countries.

The simplest measure of compatibility between wife's work and childbearing would be the proportion of working mothers among all women. This measure is the key to understanding the micro-macro paradox that the international comparison demonstrates the positive correlation between fertility and mother's work (Engelhardt and Prskawetz, 2005, pp. 2-3; Billari and Kohler, 2002, pp. 20-21; Atoh, 2000, p. 202) while micro data analyses have been revealing the negative impact of female labor force participation on fertility (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). 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 $0 < g < w$.

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

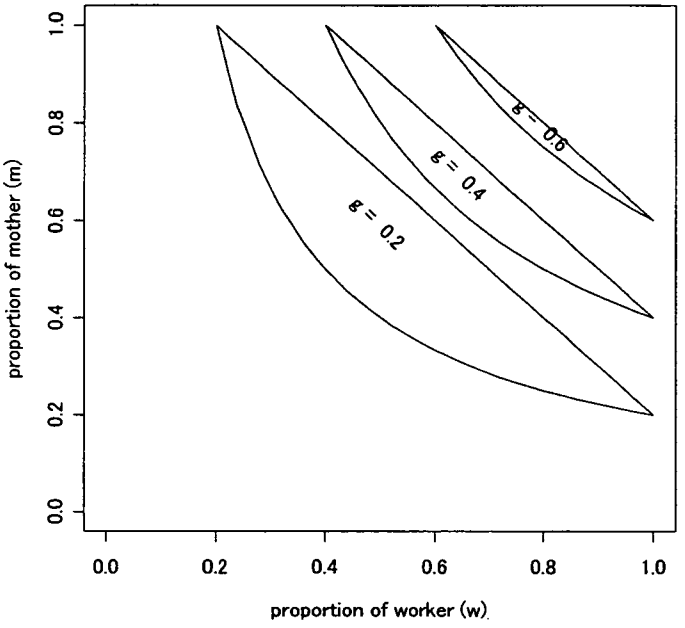
For the work status and presence of a child to be negatively correlated, g must be smaller than the expected value of the independence model.

$$g < w\,m.$$

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 3 shows such areas for $g = 0.2$,

0.4 and 0.6. If we consider g to be a measure of compatibility, the area moves in the upper-right direction as the compatibility is improved. Thus, the paradoxical situation can be understood as a result of an increasing compatibility. When women'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 the macro level while the negative correlation is sustained at the micro level.

Figure 3. Area with Negative Correlation for Different g



One implication of Figure 3 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 3 suggests that in a country with low compatibility such as Japan, there is a wide room of fertility decline.

In Japan, however, the governmental efforts have not been successful in improving the compatibility. Table 4 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, implying the compatibility is most crucial. The proportion of working mothers (g) decreased slightly from 31.4% in 1997 to 30.2% in 2004 while labor force participation (w) and fertility (m) showed no significant

changes. This implies that the compatibility in Japan has not been improved but possibly deteriorated. Thus, a question arises if public daycare services have any impact on the compatibility.

Table 4. Labor Force Participation and Motherhood of Married Women Aged 30-34 (%)

1997		Not Mother	Mother	
	Not Worker	9.6	47.1	56.7
	Worker	11.9	31.4	43.3
		21.6	78.4	100.0

2004		Not Mother	Mother	
	Not Worker	8.2	48.7	56.9
	Worker	12.9	30.2	43.1
		21.2	78.8	100.0

Ministry of Internal Affairs and Communications, Employment Status Survey.

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. A statistically significant result was that in a 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 seems to be too small to be verified clearly.

3. Lowest-Low Fertility in Comparative Perspective

3-1. 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. Forerunners of fertility decline by the 1980s were characterized by developed capitalist market system, high female labor force participation, and the 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 female labor force participation rate, the total

first marriage rate, and the proportion of extramarital births (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. The Republic of 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 5. Lowest-Low Fertility after 2000

Region	Country	2000	2001	2002	2003	2004	2005	2006
Eastern Asia	Japan	1.36	1.33	1.32	1.29	1.29	1.25	1.32
	Republic of Korea	1.47	1.30	1.17	1.19	1.16	1.05	1.13
	Taiwan	1.68	1.40	1.34	1.24	1.18	1.12	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 Statisitics Office
Taiwan: Taiwan Directorate-General of Budget, Accounting and Statistics
Europe: Council of Europe, Recent Demographic Development in Europe 2003&2004

3-2. Cultural Deterministic View on Fertility

There is a cultural divide between moderately low fertility and lowest-low fertility. As suggested in Table 5, 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.

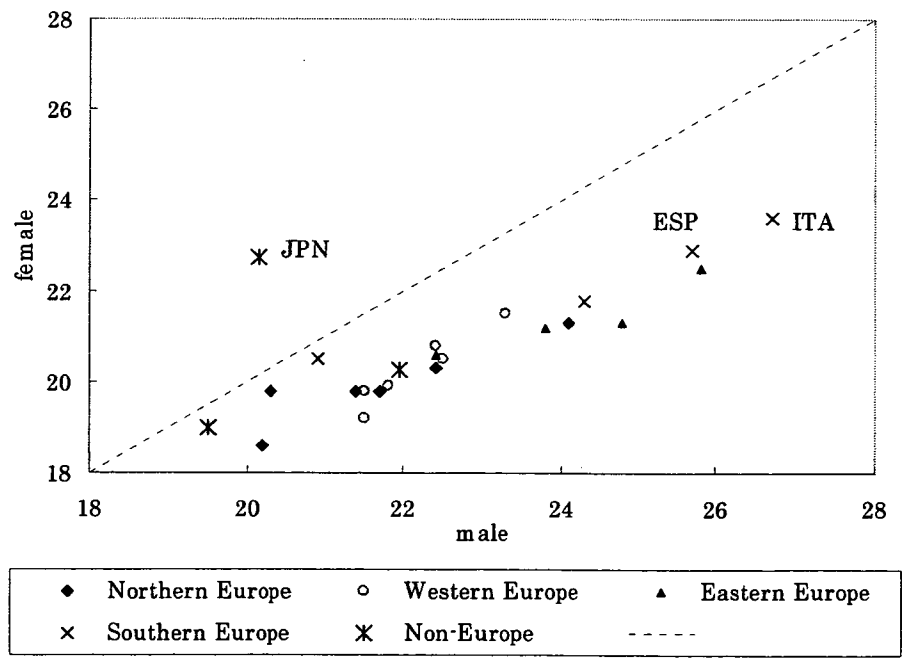
Reher (1998) asserted that the contrast between weak family ties in Western and Northern Europe and strong family ties in Southern Europe has deep historical roots. In contrast to the Oriental family system that affected Southern Europe, the "Occidental" structure was based on the conjugal pair and women's 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 by 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. According to Retherford and Ogawa (2006, p. 36), Japan's low enrollment rate of young children in day-care centers is not because of the short supply of day-care service but because of mothers' attitude that "I want to raise my children on my own."

The domestic gender equity is the key issue in very low or lowest-low fertility. McDonald (2002, p. 437) asserted that fertility falls to very low levels when gender equity rises in individual-oriented institutions while remaining low in family-oriented institutions. Japanese husbands spend considerably shorter time in housework than the US husbands (Tsuya and Bumpass, 2004) or Scandinavian husbands (Tsuya, 2003, p. 63). There is a problem of long working hours in its background and governmental efforts to shorten working hours have not been successful except for manufacturing industry (Retherford and Ogawa, 2006, p. 37). It is uncertain, however, whether

Japanese husbands will be as cooperative as Western husbands even when the working condition is improved. The problem that Italian husbands are not accustomed to housework and childcare because of the traditional gender role in their family of orientation (Caldwell, 2006, p. 360) may apply to husbands in Eastern Asia. Since the gender equity in Northern and Western Europe has such a deep root, it would be difficult for other cultural containers to catch up with.

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 4, 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.

Figure 4. Median Age at Home-Leaving of Cohorts Born around 1960

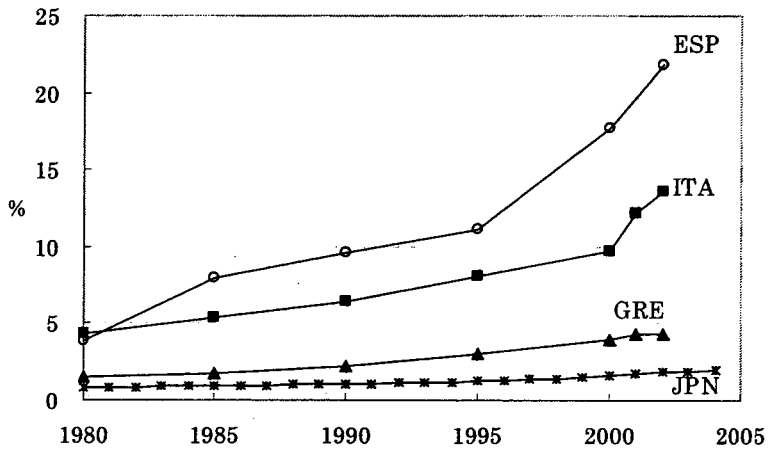


Source: Billari, et al. (2001), Goldscheider&Goldscheider (1994), Ravanera et al. (1995), Suzuki (2003)

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 robust marriage institution. As shown in Figure 5, 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.

Figure 5. Proportion of Extramarital Birth



Source: Council of Europe, NIPSSR

The explanation by the family pattern implies 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 society has such a unique family pattern as in Northern-Western Europe, fertility will go down to the extremely low level. This may happen in a decade or two in Southeastern Asia, Latin America, or coastal region of China.

4. Orientating Policy Intervention

Most of the developed countries except for the United States are suffering from below replacement fertility. It seems that an agreement is emerging that a well-developed country cannot reproduce itself (Caldwell, 2006, p. 373). Even so, very low or lowest-low fertility is by no means acceptable. The governmental task for countries experiencing such fertility is to reduce the difference with Northern-Western

Europe and English speaking countries and to secure moderately low fertility, if not the replacement level.

Japan has been adopting and extending policy measures to cope with low fertility. However, those efforts have not been successful in preventing fertility decline. As the quantitative analyses in Section 3 revealed, the effects of policy interventions are so weak that it is very difficult to raise the TFR by 0.1. The experience of Eastern European socialist countries in the 1960s and 1970s tells that the massive transfers, amounting around 10% of the national budget, could induce a significant fertility recovery (Caldwell, 2006, p. 340). However, such a magnificent allocation of budget is definitely impossible in today's capitalist country under the new market economy. Especially, Japan has recently chosen a very neoliberalistic course aiming at a small government under the leadership of Prime Minister Junichiro Koizumi (2001~06). Thus, it is very unlikely that Japan can allocate budget for pronatal policy as large as France today, not the mention to Eastern Europe in the 1960s.

Even though an immediate effect cannot be expected, governments of extremely low fertility countries such as Japan should sustain pronatal policy to delay fertility decline and to narrow the difference with moderately low fertility countries. For a governmental effort to be successful in a very long run, it should match the direction of long term changes that have been taking place in the developed world. Although the difference in gender equity between different cultures has long historical root, efforts should be paid to improve the equity, especially within family. Gender education in school may change attitudes of young men and women gradually if it is not too radical. There should be a clear opposition against so called three-year-old myth that mother's work is harmful to the development of a very young child. Efforts must be sustained to improve the compatibility and family-friendliness at working place. Such institutions as maternity and childcare leave, flexibility in working condition, and childcare services are included in this area. A clear and simple message is required that society will support childrearing. Reduction in financial supports such as child allowance and baby bonus could have a serious negative impact on such a message.

Assuming that the long term trend of value changes is toward secularization and individualization, it is questionable that an approach emphasizing traditional family value can be successful in a long run. Until the 1980s, forerunners of fertility decline were found in Scandinavia, Benelux low countries, and German speaking central Europe and were characterized with postmodern behaviors such as cohabitation, extramarital births, divorce, one-person and female-headed households. The second demographic transition theory (van de Kaa, 1987) assumed that value changes of secularization and individualization are the main cause of fertility decline. However, the emergence of lowest-low fertility in the 1990s had a serious damage to this theory. Today, a demographic map of developed world shows a paradoxical pattern that countries with robust system of marriage and the family tend to have lower fertility

than countries with advanced secularization and individualization. It is interpreted that the traditional non-Western family pattern is less adoptive to social forces that depress fertility than Northern-Western European family pattern with weak family ties. Then, emphasizing or restoring the traditional family value is unlikely to induce fertility recovery to the moderately low level.

There is a widespread feeling that it is not the government's role to define the desirable type of family or individual lifestyles (Caldwell, 2006, p. 333). In Japan, a governmental campaign stating "A man who does not participate in childcare cannot be called a father" in 1999 caused more opposition than support under the condition of long working hours and family-unfriendly work environment. Japanese government is very careful recently not to be seen forceful and interfering individuals' autonomy. Although "Plans to Support Children and Childrearing (New-New Angel Plan)" announced in 2004 has 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.

The validity of policy measure aiming at increasing marriage is more difficult to evaluate. The intention is not as ridiculous as attempting to restore the conservative family values. However, the natural response to social forces in postmodern society seems to be decline in marriage and shift to extramarital births. As shown in Figure 5, the direction of change is apparent even though the tempo is extremely slow in Japan. Thus, an effort to raise nuptiality may not help convergence to Northern-European family pattern and to moderately low fertility. Though a government should not attempt to increase extramarital births by encouraging welfare mothers, a government also should not devote too much to an effort which effect is questionable in a very long run. In fact, the central government of Japan has not attempted to encourage marriage. Such an attempt as helping match between single men and women is conducted only by local municipalities and private companies. According to newspapers, Hyogo prefecture started matchmaking service in 2006. An NPO group supporting arranged marriage was launched in Kyoto prefecture in 2007. The Mizuho Financial Group has been operating a dating service for their employees (Retheford and Ogawa, 2006, p. 43).

Conclusion

If the explanation by the family pattern is correct, it will take long time for countries with extremely low fertility to resume moderately low fertility. Although gender equity and compatibility between work and the family are widely accepted political goals, 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 and union formation of young people.

A government definitely should not induce extramarital births by encouraging welfare mothers. Thus, no positive intervention can be made to some aspects of the difference. Still, the direction of effective intervention seems to be apparent. An attempt to reverse the global family change and to restore the old family pattern would fail in a long run.

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