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(Bucharest, 10-12 October 2007)

Agenda item 4: Household projections

## **TRENDS IN PARTNERSHIP BEHAVIOURS IN JAPAN FROM THE COHORT PERSPECTIVE**

### **Invited Paper**

Submitted by National Institute of Population and Social Security Research, Japan<sup>1</sup>

### **Introduction**

1. Assumptions about the future age-specific fertility rates required for population projections can be obtained using the cohort fertility method. With this method, we predict the average completed family size of younger cohorts, based on the actual birth process of preceding cohorts. Since childbearing behaviour is affected by family formation and dissolution, it is essential to examine these processes for constructing and assessing the future fertility assumptions. Results we will show in this paper are based on the preliminary analyses for producing official population projections for Japan conducted by the National Institute of Population and Social Security Research (NIPSSR).

2. In this paper, we describe patterns of partnership formation and dissolution from the birth cohort perspective. Recognizing that declining exposure to marriage may place a strong structural restriction on childbearing, we then examine the extent to which these behavioural changes contribute to a fertility decline by cohort. In addition to marriage, divorce, bereavement and remarriage may also be significant factors for fertility.

3. However, in most developed countries, the link between marriage and fertility has been weakening. We also look into the trends in the new patterns of family formation: cohabitation, non-marital fertility, and marriage preceded by pregnancy. We provide cohort indices for cohorts born from 1935 to 1990, incorporating some estimation for cohorts born after 1956.

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## Data

4. We use Vital Statistics data for calculation of fertility, marriage, and divorce rates, and we also use Japanese National Fertility Surveys, conducted by NIPSSR every five years, for estimating the average family size by marital status.
5. Since roughly 10% of marriages and 30% of divorces are not registered in the year in which they occur (Ishikawa 1995), we estimated the number of marriage and divorces in the year they actually occurred using the ratios on delayed registration obtained from the observed data.
6. Due to the recent increase in non-Japanese residents and relative imperfection of the data for them, trends in indices among all residents in Japan including non-Japanese could be unstable and difficult to understand. We therefore focus on events in the lives of Japanese female residents and look into indices for those people.

## Trends in marriage

7. Postponement of family formation, which has been widely witnessed in most industrial countries since the second half of the 20th century (Billari 2005), can be also seen in Japan. The mean ages at first marriage and first childbearing have risen dramatically since the late 1970s, and total fertility rates and total first marriage rates (sum of age-specific first marriage rates for ages between 15 and 49) continue declining (Figure 1, Figure 2).
8. To obtain data on cohort age-specific first marriage rates for those who do not complete the reproduction period, we applied a generalized log-gamma distribution model presented by Kaneko (2003) to the actual values for the cohort age-specific first marriage rates. Because future trends are highly uncertain, we set three assumptions (medium, high, and low).
9. The mean age at first marriage and the proportion of those never married has risen for cohorts born after 1950. We show the cumulative first marriage rates relative to that of the 1950 birth cohort, using the scheme provided by Frejka and Calot (2001). For recent birth cohorts, a decline from the base cohort observed in the 20s will not be entirely made up in the 30s (Figure 3, Figure 4).

## Trends in Divorce and Marital Status Composition

10. Divorce rates in Japan have risen since the 1960s, and the total divorce rate (sum of age-specific divorce rates for ages between 15 and 49) is beyond 0.25 in the 2000s (Figure 5). We tried to calculate the cohort index on divorce experience: that is, the proportion of those who experience divorce at least once among women with marriage experience by age and birth cohort. For future values, we set three assumptions. Medium values were produced with the assumption that the average trends in the last three years will continue.
11. According to this medium assumption (synthetic cohort projection), 36 percent of first-married women eventually experience divorce by age 50 in the 1990 birth cohort (Figure 6). This is consistent with the results on the proportion of divorce experience by marriage duration and marriage cohort proposed by Raymo et al.(2005), which suggested that at least one third of marriages in 2002 might end in divorce within 20 years.

12. Based on these trends in divorce experience and the future trends in the proportion of women never married by the age of 50 and the occurrence of remarriage estimated from the results of the National Fertility Survey, we obtained the actual and assumed composition of marital status of women at age 50 by birth cohort from 1930 to 1990. We can see that first-marriage couples were in the majority up to the 1950s birth cohort, but due to the increase in women without marriage experience and divorced women, the proportion of first-marriage couples has been decreasing, and will be eventually around 50 percent (Figure 7).

13. While divorce rates have been increasing, bereavement has been declining due to the decline in mortality rates of males. Bereavement has been expected to increasingly become a rarity for recent birth cohorts.

### Impact on cohort fertility

14. What impact does the change in partnership behaviour - declining marriage rates and increasing divorce rates – have on fertility? We measured the contribution of both factors using models for cohort TFR.

15. We formed a statistical model of cohort's completed fertility consist of its segments from the factors, i.e., marriage, divorce, and couple's reproductive behavior with in marriage. With the model, the cohort cumulative fertility rate at age 50 (CTFR) is expressed as;

$$\begin{aligned} CTFR &= (1 - \gamma) \cdot CEB \cdot \delta \\ &= (1 - \gamma) \cdot (CEB^*(afm) \cdot \kappa) \cdot \delta. \end{aligned}$$

16. Here,  $\gamma$  is the percentage of never-married women at age 50 (one minus cumulative first marriage rate), the CEB is the completed number of children of women in the first-marriage couples, and  $\delta$  is the coefficient of the divorce and bereavement effects. The CEB can be broken down into the expected cumulative number of births based on the age pattern of first marriage ( $afm$ ) of birth cohorts in question ( $CEB^*$ ) and  $\kappa$  that is a coefficient modifying the expected marital fertility rate.

17. The change in the  $\gamma$  and age pattern of first marriage ( $afm$ ) mean behavioural change on first marriage, the change in the  $\delta$  means behavioural change on divorce, and the change in  $\kappa$  reflects changes in the couple's reproductive behaviour after marriage.

18. We calculated the counterfactual CTFR with unchanged coefficients, and we can see the contribution of each behavioral change on the CTFR compared with the medium assumptions for the projection.

19.  $CEB^*$  requires a standard pattern for the completed number of children by age at first marriage. We obtained this from the average pattern of 1932 - 1965 birth cohorts using the 7th through the 13th Japanese National Fertility Surveys (Figure 8).

20. Figure 9 shows the three simulated CTFRs. The first line is where no change in  $\gamma$ ,  $afm$ ,  $\kappa$ , or  $\delta$ , have been seen since the 1955 birth cohort, while the second curve provides the results where only  $\gamma$  and  $afm$ , thus marriage behavior, have changed. The third one uses the medium assumption with changes in all coefficients. Changes in marital behaviour explain nearly 80 percent of the difference in family size for the cohorts born in 1950 and 1990.

21. The  $\delta$  was set in the following manner. We calculated the completed number of children of women with marriage experience by marital status such as first-marriage couples ( $ff$ ), couples with a first-married wife and a remarried husband ( $fr$ ), couples with a remarried wife ( $r.$ ), and divorced/widowed women ( $dw$ ) from data of the NFS (Figure 10). We can obtain the indices for each marital status relative to the average number of children of the first-marriage couple ( $R..$ ). In the previous section, we prepared the prediction of the composition of female marital status at age 50 ( $P..$ ) by birth cohort. The  $\delta$  is the weighted mean of  $R..$  with  $P..$ , and is defined as below.

$$\delta = 1/(1-\gamma) \{P_{ff} + P_{fr}R_{fr} + P_{r.}R_{r.} + P_{dw}R_{dw}\}.$$

22. The  $\delta$  is represented as the function of the proportion of those who experience divorce by age 50 (Figure 11).

23. Cumulative divorce rates among first-married women have been increasing across different cohorts. Based on a synthetic cohort projection, 36 percent of first-married women eventually experience divorce by age 50 in the 1990 birth cohort. Therefore, the  $\delta$  in this cohort is 0.925.

24. Using the variable  $\delta$ , we can obtain CTFR without the divorce, bereavement and remarriage effects or one with the constant  $\delta$  for the time since the 1955 birth cohort (Figure 12).

25. However, since bereavement has been declining and a proportion of divorced women get remarried, the net contribution of the change in divorce, bereavement and remarriage to the cohort fertility decline between 1950 and 1990 is about 3%.

### **New patterns of family formation: Cohabitation, nonmarital childbearing, and marriage preceded by pregnancy**

26. Do these changes in partnership formation and dissolution mean the emergence of new patterns of family formation? Here we show some aspects of change regarding new patterns of family formation recently observed in Japan.

27. In the context of the second demographic transition, novel patterns of family formation, such as cohabitation and extramarital childbearing, were once considered to be related to the fertility decline to below replacement level. However, very low level of these behaviours is now common characteristics among the lowest-low fertility countries. The visibility of cohabitation remains low in Japan but is clearly becoming an increasingly common part of the union formation process (Figure 13). There is, however, substantial variation around the median duration of 15 months for the most recent cohabitation, with one-fifth of the cohabitations lasting under six months and roughly one-third lasting two years or more. Experience of cohabitation is associated with a rapid transition to parenthood through premarital pregnancy (especially among those at the lower end of the educational distribution), but cohabitation experience delays the first birth beyond age 25 for women with higher education.

28. Fertility of unmarried women is still very low in Japan, but has increased slightly since the 1990s. The projected lifetime unmarried fertility rate of the 1990 cohort seems to be nearly .03 children; two percent of their cohort TFR. Compared with the pattern of age-specific nonmarital fertility rates in 1990, the pattern of those in 2005 shows a dramatic increase for

women aged under 25 (Figure 14). Another notable behavioural change is an increase in marriages preceded by pregnancy (MPP). Based on the extrapolative projections, the proportion of the MPP to first-married women will rise to over 20% in the 1990 cohort, while it was less than 5% among cohorts born prior to 1950. The increase in childbearing of unmarried women is concentrated among teenagers, and the MPP is concentrated among women in their early 20s. These behaviours seem to be related to the trends in use of contraceptives and unintended pregnancy.

## Conclusion

29. Fertility assumptions for new population projections for Japan based on the 2005 census are extremely low – in 2030, the medium variant TFR for Japanese women is assumed to be 1.20. These prospects were led by drastic changes in the patterns of family formation and dissolution. Among the 1990 birth cohort, the mean age at first marriage is 28.2, the proportion of never-married women at age 50 extends to 23.5%, and 36% of first-married women eventually experience divorce.

30. Counterfactual CTFRs with variant patterns of family formation and dissolution have allowed us to understand that over 70% of the CTFR decline is attributed to a decline in marriage rates, and if divorce behaviour has not changed since the 1955 birth cohort, CTFR will rise by 3% in the 1990 birth cohort.

31. Developed countries with relatively high fertility rates show relatively high levels of unmarried couples cohabiting and bearing children among the youth. The visibility of cohabitation and childbearing of unmarried couples is still low in Japan, but among the 1980s and later birth cohorts, these new patterns of family formation have been increasing. Since these changes could lead to a rise in fertility rates for women in their 20s in the near future, we need to pay attention to these trends.

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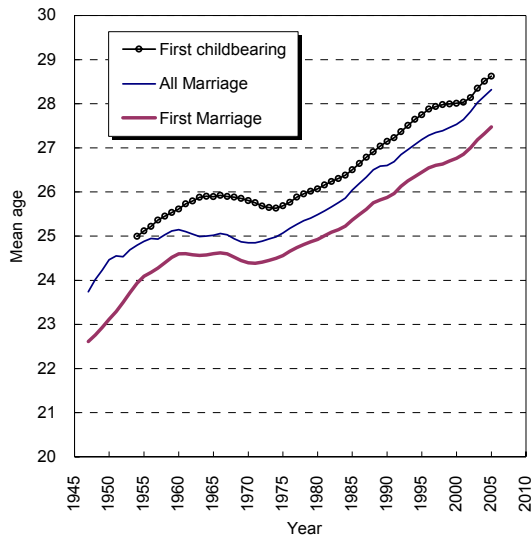
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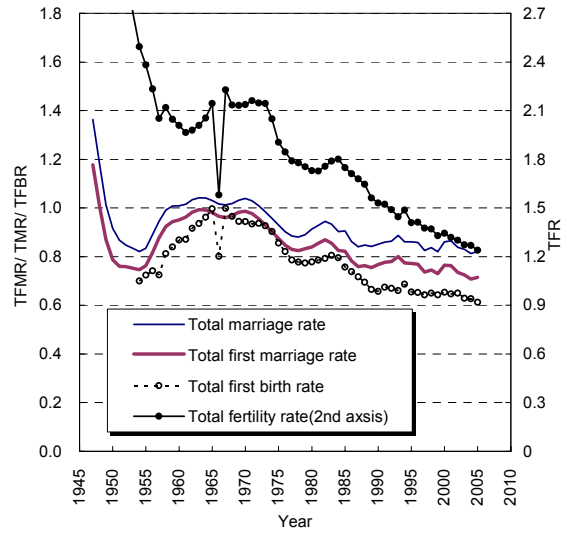
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Figure 1: Mean age at first marriage, all marriage, and first childbearing among Japanese women



Data: Vital Statistics in Japan (own calculations based on age-specific marriage rates and fertility rates of Japanese women).

Figure 2: Total fertility rates, total (first) marriage rates, and total first birth rates among Japanese women



Data: Vital Statistics in Japan (own calculations based on age-specific marriage rates and fertility rates of Japanese women).

Figure 3: Cumulative age-specific first marriage rates: Actual values and assumptions, birth cohort 1935-1990

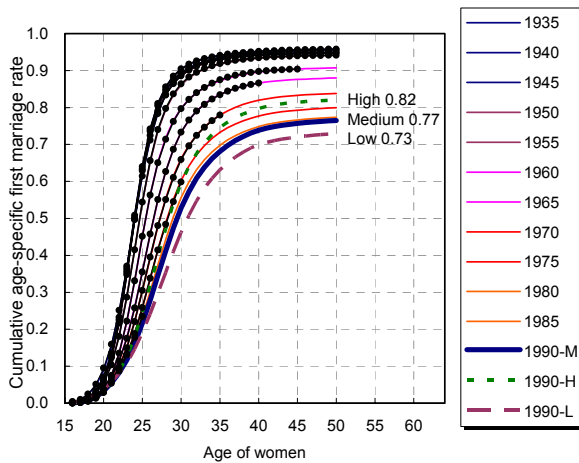
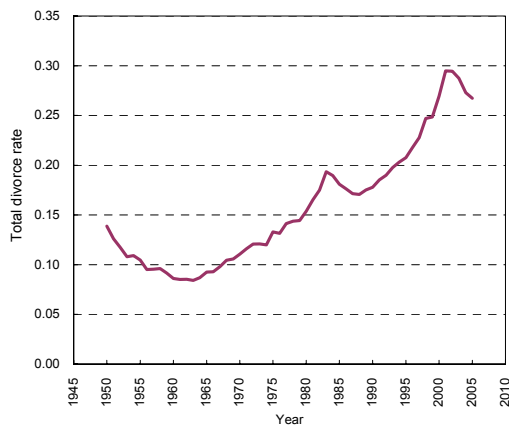


Figure 5: Total divorce rates among Japanese Women



Data: Vital Statistics in Japan (own calculations based on age-specific divorce rates of Japanese women).

Figure 4: Differences in cumulative cohort first marriage rates between base and subsequent cohorts

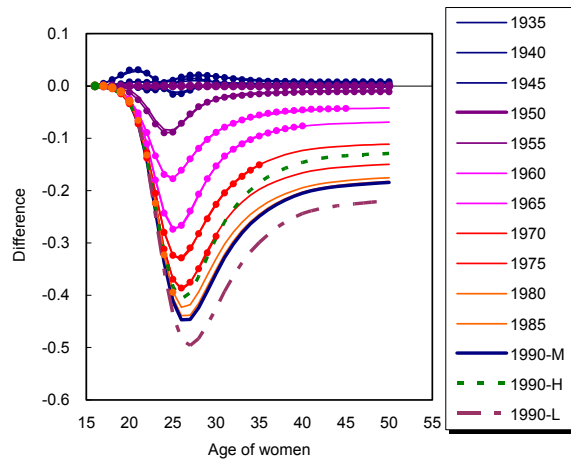


Figure 6: Cumulative divorce rates among women who have been married at least once: Actual values and assumptions, birth cohort 1935-1990

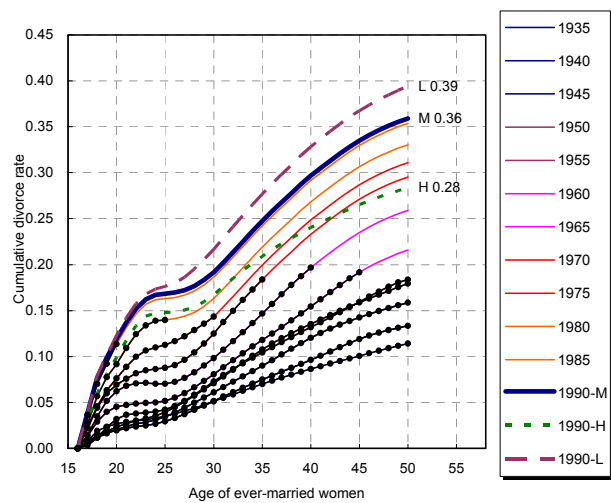


Figure 7: Marital status of women at age 50: Actual values and medium assumptions, birth cohort 1930-1990

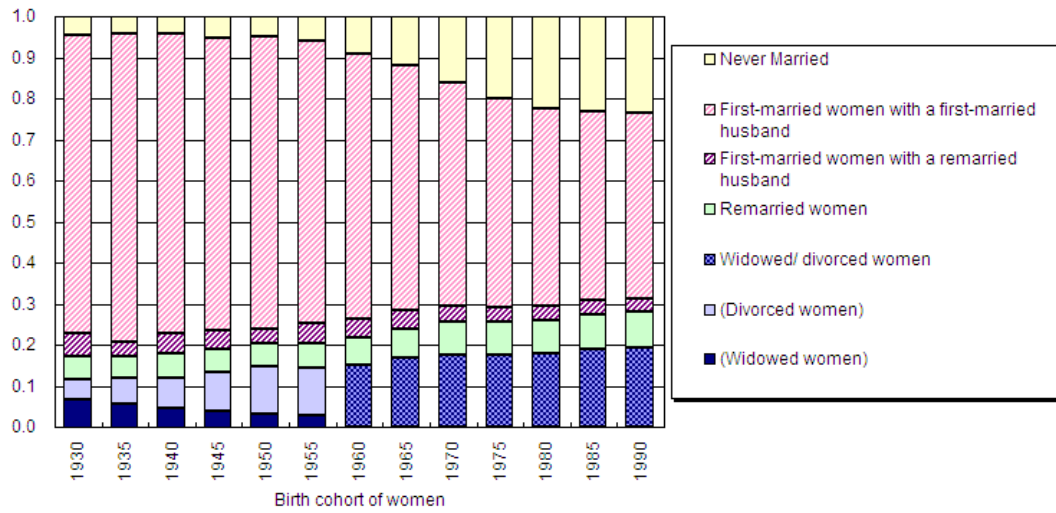
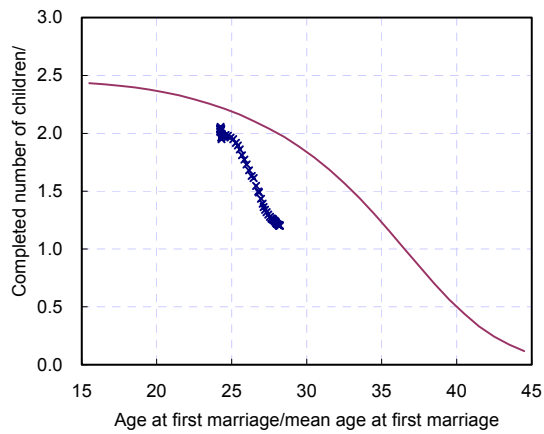


Figure 8: Completed number of children of first married couples by wife's age at first marriage and CTFRs by mean age at first marriage



Data: Women aged 40-49 in the 7th -13th Japanese National Fertility Survey (NIPSSR).

Figure 9: Simulated results with respect to marital behavior and medium assumption for cohort total fertility rates, birth cohort 1935-1990

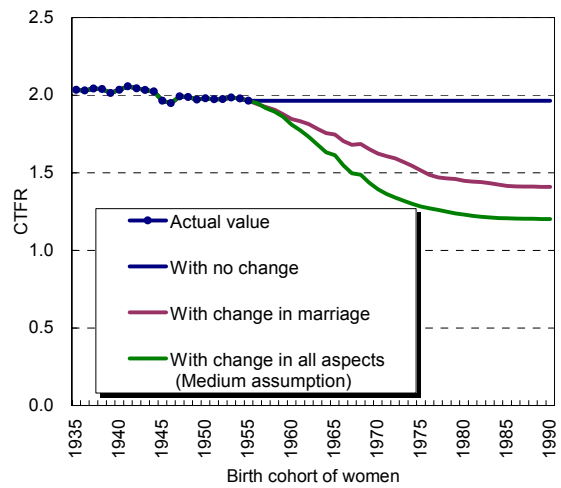
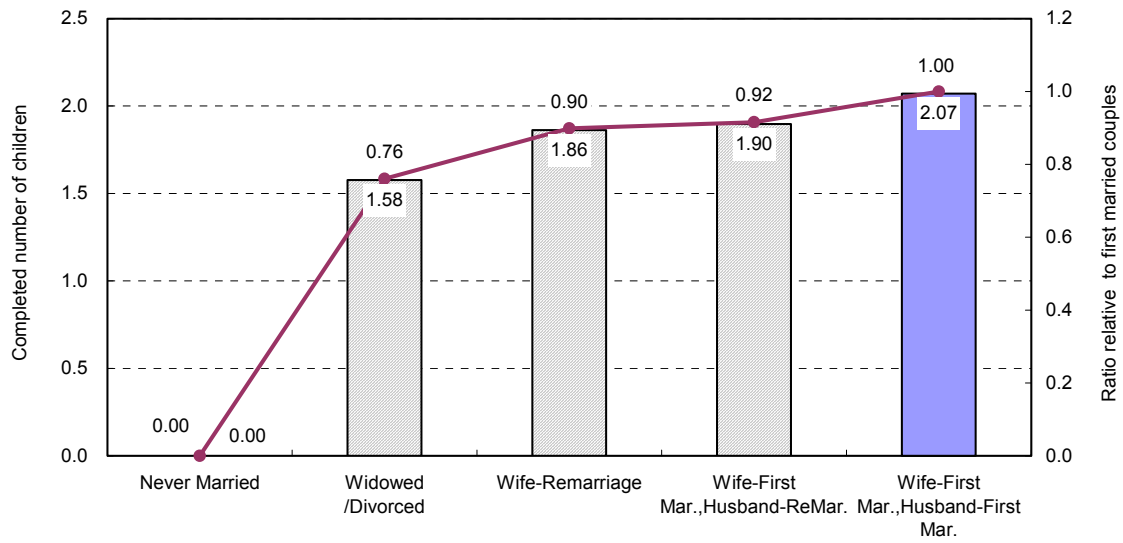


Figure 10: Completed number of children by marital status and relative ratio to first marriage couples



Data: Women aged 40-49 in the 13th Japanese National Fertility Survey (2005).

Figure 11: Association between the proportion of women with divorce experience at age 50 and the  $\delta$

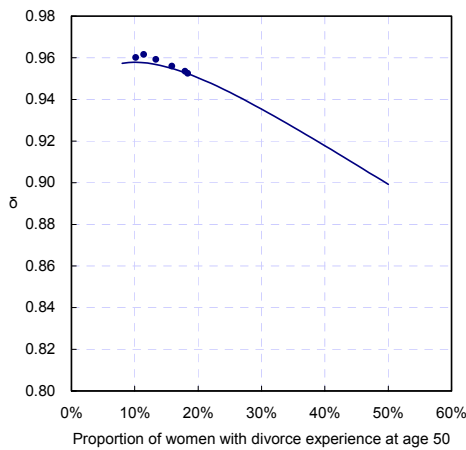


Figure 12: Simulated results with respect to divorce behavior and medium assumption for cohort total fertility rates by birth cohort of women

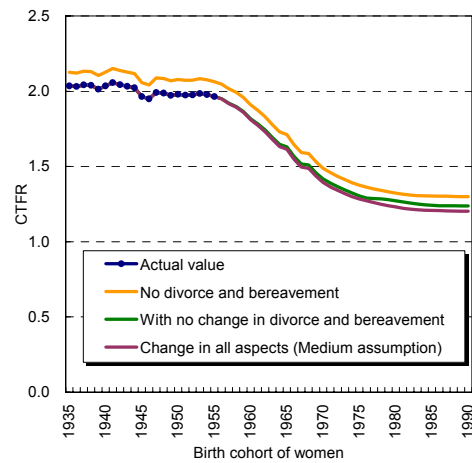
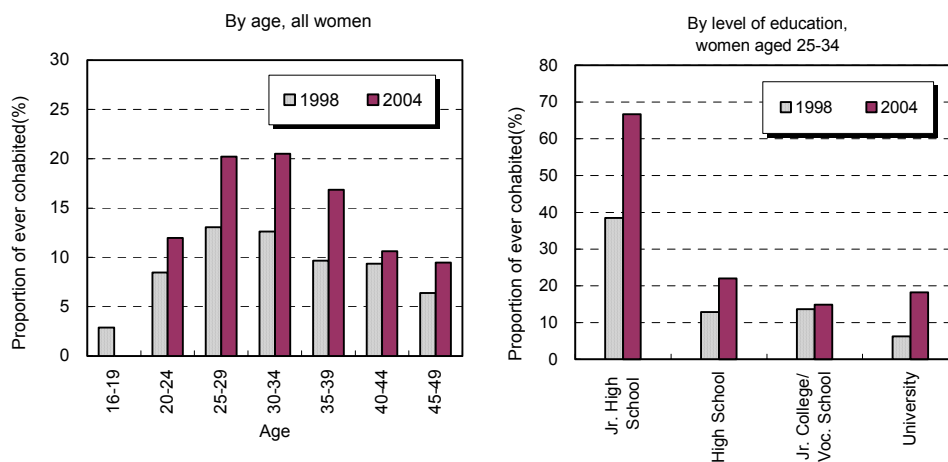
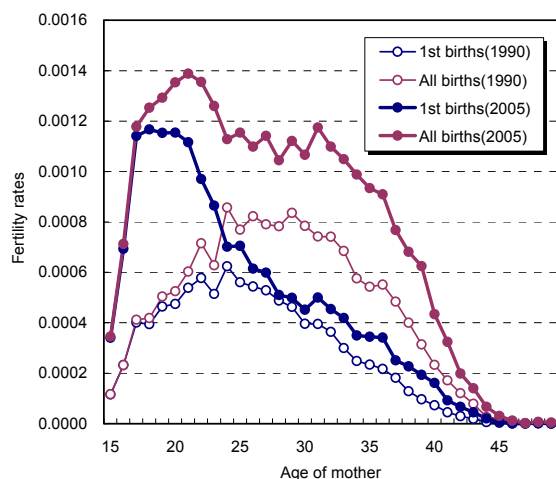


Figure 13: Proportion of those who have cohabited



Source: Own calculations from the 24th National Survey on Family Planning (1998) and the 1st SPFG(2004) conducted by the Population Problems Research Council, the Mainichi Newspapers(Iwasawa 2005).

Figure 14: Age-specific nonmarital fertility rates: 1990 and 2005



**Table 1: Cohort indices based on medium variant assumptions for future fertility trends**

Cohort Index (Japanese Women)		Women's birth cohort										
		1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005
Proportion never-married		5.8%	9.3%	12.0%	16.2%	20.0%	22.6%	23.3%	23.5%	23.6%	23.6%	23.6%
Mean age at first marriage		24.9	25.7	26.5	27.0	27.5	27.9	28.1	28.2	28.2	28.3	28.3
CTFR		1.96	1.81	1.61	1.39	1.28	1.23	1.21	1.20	1.20	1.20	1.20
Completed number of children of first married couple		2.16	2.06	1.93	1.84	1.78	1.74	1.71	1.70	1.69	1.69	1.69
Distribution	Childless	12.7%	17.5%	22.7%	30.0%	34.3%	36.4%	37.4%	37.4%	37.4%	37.5%	37.5%
	One	11.8%	13.8%	16.9%	19.0%	18.9%	18.3%	18.1%	18.2%	18.2%	18.2%	18.2%
	Two	47.1%	43.5%	40.8%	36.0%	33.9%	33.4%	33.1%	33.1%	33.1%	33.1%	33.2%
	Three	23.4%	20.5%	15.8%	11.8%	10.2%	9.5%	9.4%	9.4%	9.4%	9.4%	9.4%
	Four or more	5.0%	4.7%	3.9%	3.3%	2.7%	2.3%	2.1%	1.9%	1.8%	1.8%	1.8%
Mean age at childbearing	All	28.2	28.7	29.3	29.7	30.0	30.2	30.3	30.3	30.3	30.3	30.3
	1st	26.3	27.0	27.8	28.4	28.7	29.0	29.1	29.1	29.1	29.1	29.1
	2nd	28.8	29.4	30.1	30.5	30.9	31.0	31.1	31.1	31.2	31.2	31.2
	3rd	31.3	31.6	32.0	32.3	32.6	32.7	32.9	33.0	33.1	33.1	33.1
	4th or more	33.7	34.0	34.3	34.4	34.5	34.6	34.7	34.7	34.7	34.8	34.8

Source: NIPSSR, *Population Projection for Japan: 2006-2055* (2007).

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