

## THE LONG-TERM REGIONAL FERTILITY DISPARITY IN JAPAN

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**Abstract:** This paper investigates the long-term fertility development in Japan at the prefectural and the national levels. Fertility changes after the World War II are characterised by the demographic transition and urbanisation. We may regard the period before 1970 of the last stage of the „First demographic transition“ in peripheral areas and of urbanisation in metropolitan areas. In the period after 1985, on the other hand, the symptoms of the „Second demographic transition“ are observable and they are diffusing rapidly from the well-urbanised area to the rest of Japan.

**Keywords:** regional fertility, demographic transition, urbanisation, prefecture, Japan

### 1. INTRODUCTION

Declining fertility has lately drawn a considerable attention in Japan. This fact is well known not only from the population studies but also among policy makers and the general public. A topic tends to be come a nation-wide problem because of its potential impact on the future labour market and a pension system at the national level. However, there are not enough research on fertility decline from the regional or geographic perspectives objected on the causes of fertility decline at the regional level (Figure 1). Moreover, as the fertility decline is regarded as a comparatively new topic, not enough studies had been conducted so far on the long-term change on fertility.

Therefore this paper is aimed at the description of changing fertility in Japan at the regional and the national levels after the World War II, trying to explain some factors that affect changing regional structure of fertility.

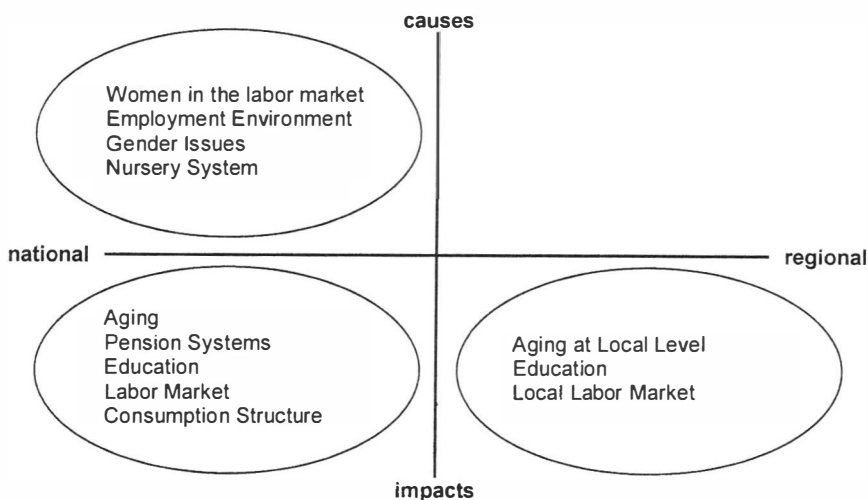


Figure 1 Research topics concerning fertility decline in Japan

## 2. FERTILITY DECLINE AT THE NATIONAL LEVEL

### 2.1 Recent fertility decline in Japan

Table 1 and Figure 2 show the long-term fertility development in Slovakia and Japan. Comparing with Slovakia, the total fertility rate in Japan was higher before 1950 and became lower since 1950 with exception of 1998, 1999 and 2000. Fertility in Japan has dropped most evidently in the first half of 1950s, being regarded as a traditional demographic transition, and fertility in Slovakia started to decline drastically since 1994. However the recent fertility decline in Japan does not seem to be as obvious as in Slovakia (Figure 2). The total fertility rate (TFR) in Japan has been declining gradually since 1989. The TFR in 1989 recorded 1.57, which was by 0.9 point lower than the year before. This fertility drop was called „1.57 shock“ by mass media and since that time declining fertility get into a focus of public attention in Japan.

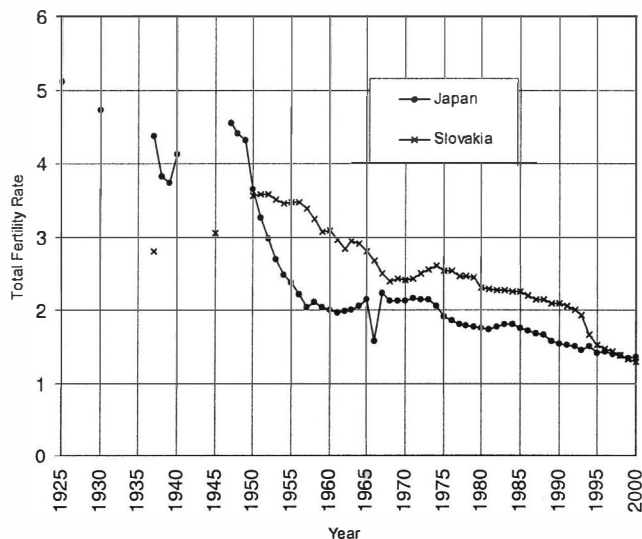
### 2.2 Consequences of fertility decline

The recent decline of fertility in Japan may influence the future Japanese economy and society through changes in the age structure of population. Table 2 and Figure 3 show the development of age structure from 1950 to 2050. The proportion of children under 15 years of age dropped evidently since 1950 and would continue to decline in the future, while the proportion of the aged population (aged 65 and over) would a rise. According to the official

**Table 1** Trend of total fertility rate in Japan and Slovakia

Year	Japan	Slovakia	Year	Japan	Slovakia	Year	Japan	Slovakia
1925	5.11		1951	3.26	3.58	1977	1.80	2.47
1926			1952	2.98	3.57	1978	1.79	2.45
1927			1953	2.69	3.5	1979	1.77	2.44
1928			1954	2.48	3.45	1980	1.75	2.31
1929			1955	2.37	3.47	1981	1.74	2.28
1930	4.72		1956	2.22	3.46	1982	1.77	2.27
1931			1957	2.04	3.39	1983	1.80	2.27
1932			1958	2.11	3.25	1984	1.81	2.25
1933			1959	2.04	3.06	1985	1.76	2.25
1934			1960	2.00	3.07	1986	1.72	2.20
1935			1961	1.96	2.96	1987	1.69	2.15
1936			1962	1.98	2.83	1988	1.66	2.15
1937	4.37	2.80	1963	2.00	2.93	1989	1.57	2.08
1938	3.82		1964	2.05	2.91	1990	1.54	2.09
1939	3.74		1965	2.14	2.80	1991	1.53	2.05
1940	4.12		1966	1.58	2.67	1992	1.50	1.99
1941			1967	2.23	2.49	1993	1.46	1.93
1942			1968	2.13	2.40	1994	1.50	1.67
1943			1969	2.13	2.43	1995	1.42	1.52
1944			1970	2.13	2.40	1996	1.43	1.47
1945		3.04	1971	2.16	2.43	1997	1.39	1.43
1946			1972	2.14	2.49	1998	1.38	1.37
1947	4.54		1973	2.14	2.56	1999	1.34	1.33
1948	4.40		1974	2.05	2.60	2000	1.36	1.29
1949	4.32		1975	1.91	2.53			
1950	3.65	3.56	1976	1.85	2.52			

Source: National Institute of Population and Social Security Research, 2002, Latest Demographic Statistics 2001/2002. Institute for Information and Statistics, 2001, Population of Slovakia, 1945 – 2000.



**Figure 2** Trend of total fertility rate in Japan and Slovakia

Source: National Institute of Population and Social Security Research, 2002, Latest Demographic Statistics 2001/2002. Institute for Information and Statistics, 2001, Population of Slovakia, 1945 – 2000

population projections of Japan, the total population in Japan will reach its peak in 2006 and then will decrease gradually, and the population at productive age will reduce drastically in coming decades (The National Institute of Population and Social Security Research 2002b).

**Table 2** Trend and prospects of population in Japan (in thousand)

Year	Total	-15	15-64	65+	% 65+
1950	83 200	29 428	49 658	4 109	4,9%
1955	89 276	29 798	54 729	4 747	5,3%
1960	93 419	28 067	60 002	5 350	5,7%
1965	98 275	25 166	66 928	6 181	6,3%
1970	103 720	24 823	71 566	7 331	7,1%
1975	111 940	27 221	75 807	8 865	7,9%
1980	117 060	27 507	78 835	10 647	9,1%
1985	121 049	26 033	82 506	12 468	10,3%
1990	123 611	22 486	85 904	14 895	12,0%
1995	125 570	20 014	87 165	18 261	14,5%
2000	126 926	18 505	86 380	22 041	17,4%
2005	127 708	17 727	84 590	25 392	19,9%
2010	127 473	17 074	81 665	28 735	22,5%
2015	126 266	16 197	77 296	32 772	26,0%
2020	124 107	15 095	74 453	34 559	27,8%
2025	121 136	14 085	72 325	34 726	28,7%
2030	117 580	13 233	69 576	34 770	29,6%
2035	113 602	12 567	65 891	35 145	30,9%
2040	109 338	12 017	60 990	36 332	33,2%
2045	104 960	11 455	57 108	36 396	34,7%
2050	100 593	10 842	53 889	35 863	35,7%

Source: National Institute of Population and Social Security Research, 2002, Latest Demographic Statistics 2001/2002

Despite the fact that proportion of aged people in Japan is still not very high comparing with the other countries, the tempo of ageing is estimated to be one of the fastest among the developed countries (The United Nations 1999). The government and the business circles are seeking for better solutions in connection with changing pension system, labour market and consumer market in condition that fertility in Japan will not recover fundamentally.

### 2.3 Factors for fertility decline

The factors of the recent fertility decline will be examined in this section. Table 3 and Figure 4 demonstrate the development of the total fertility rate and the age-specific fertility rate in Slovakia and Japan<sup>1</sup>. Compared with Slovakia, the age-specific fertility rate in Japan is characterised by the late childbearing. The age-specific fertility rate of 25 – 29 people was already higher than of 20 – 24 in 1925 in Japan, while the fertility rate of 25 – 29 exceeded the rate of 20 – 24 firstly in 2000. We can say that the TFR decline between 1950 and 1980 was caused mainly by fertility decline in the group of over 30 years old (Figure 4)

<sup>1</sup> TFR in Table 3 and Figure 4 is calculated by five-year age groups and thereby the calculated total fertility rates do not coincide with those in Table 1 and Figure 2.

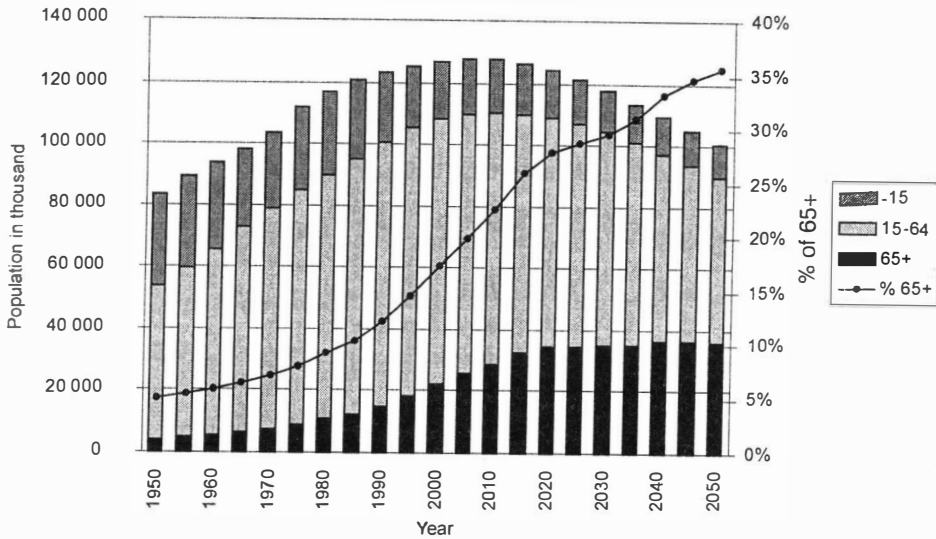


Figure 3 Trend and prospects of population in Japan

Source: National Institute of Population and Social Security Research, 2002, Latest Demographic Statistics 2001/2002.

Table 3 Age-specific fertility rate and TFR in Slovakia and Japan

**Slovakia (1937 – 2000)**

	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 – 44	45 – 49	TFR
1937	28.7	150.6	154.7	112.7	76.3	32.6	3.7	2.80
1945	28.0	157.0	164.6	128.9	87.8	37.6	4.9	3.04
1950	51.1	209.9	195.3	136.7	86.9	34.3	3.3	3.59
1960	50.5	226.6	166.9	98.4	52.4	18.5	1.5	3.07
1970	39.2	194.7	136.8	70.5	29.9	8.3	0.6	2.40
1980	48.2	204.8	131.1	56.0	18.9	4.3	0.2	2.32
1990	45.5	187.1	116.6	46.3	15.2	2.9	0.1	2.07
1995	32.3	124.4	90.6	40.0	13.8	2.8	0.1	1.52
2000	23.8	84.1	88.5	44.0	15.9	2.9	0.1	1.30

Source: Institute for Information and Statistics, 2001, *Population of Slovakia 1945 – 2000*

**Japan (1925-2000)**

	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 – 44	45 – 49	TFR
1925	43.2	227.8	259.3	228.3	174.0	74.8	12.4	5.10
1930	31.5	200.2	248.6	217.0	163.1	71.6	10.3	4.71
1940	12.6	145.7	239.1	207.7	145.8	61.9	9.4	4.11
1947	14.9	167.5	270.1	234.6	157.2	56.9	6.3	4.54
1950	13.3	161.5	237.7	175.7	104.9	36.1	2.3	3.66
1960	4.3	107.2	181.9	80.1	24.0	5.2	0.4	2.02
1970	4.5	96.6	209.3	86.0	19.8	2.7	0.2	2.10
1980	3.6	77.1	181.5	73.1	12.9	1.7	0.1	1.75
1990	3.6	44.8	139.8	93.2	20.8	2.4	0.1	1.52
1995	3.9	40.4	116.1	95.4	26.2	2.8	0.1	1.42
2000	5.4	39.2	97.6	91.4	31.4	3.8	0.1	1.34

Source: National Institute of Population and Social Security Research, 2002, Latest Demographic Statistics 2001/2002

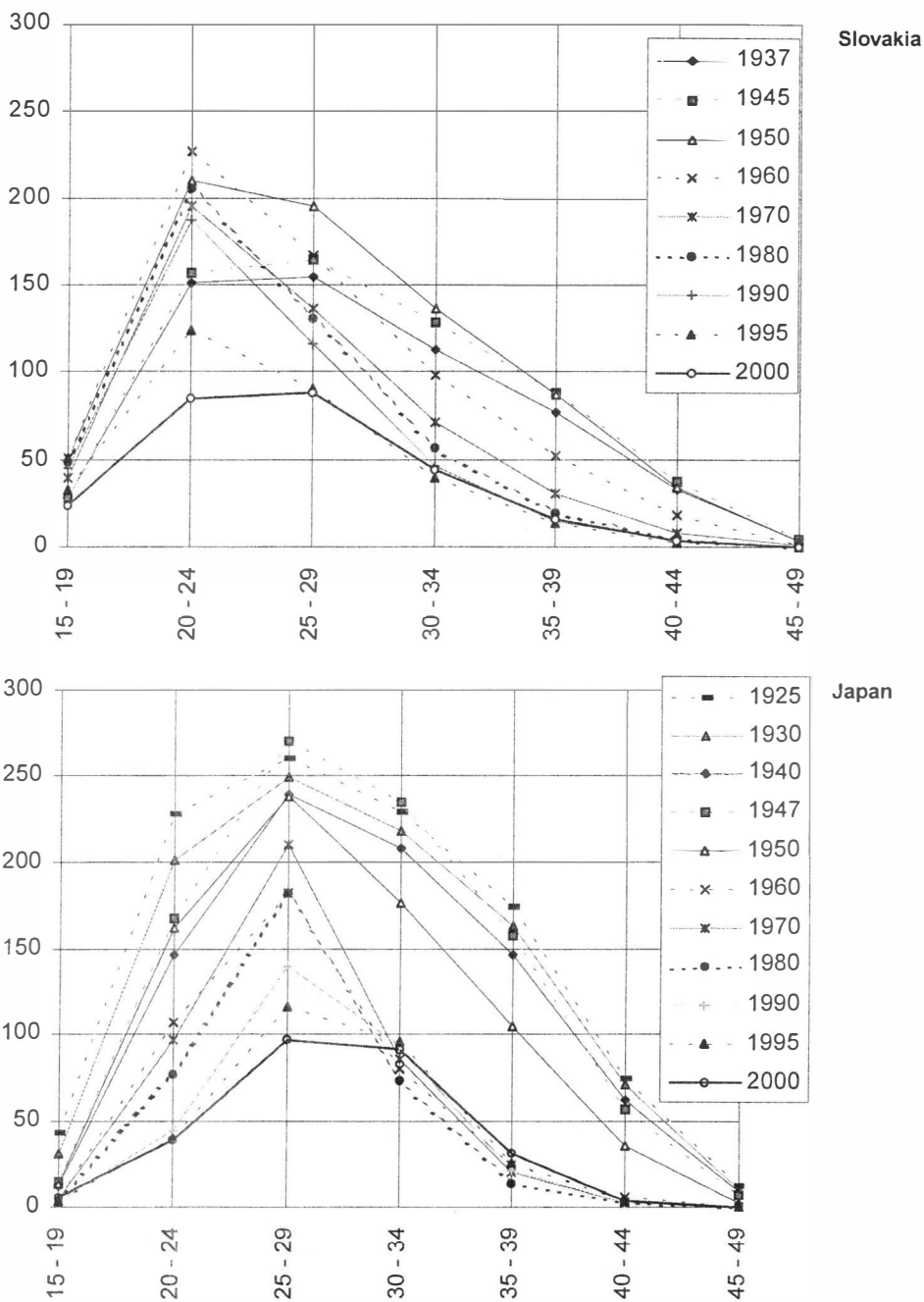


Figure 4 Age-specific fertility rate and TFR in Slovakia and Japan

Source: National Institute of Population and Social Security Research, 2002, Population of Slovakia, 1945 - 2000

and that the TFR decline after 1980, and especially after 1990, was caused by the decline among females aged 25 – 29.

Before investigating further, we may note that the proportion of non-marital births is rising in Japan, but the relative and absolute numbers are still almost negligible: 0.80% in 1980, 1.07% in 1990, 1.24% in 1995 and 1.63% in 2000. Now, we can examine the recent fertility decline in Japan from the two perspectives: one is the proportion of married females and the other is the marital fertility rate.

Table 4 demonstrates mean age at the first marriage in Japan. As it was described above, the age-specific fertility rate in Japan moved to the older age, and mean age at the first marriage was also relatively high, even before the World War II. The development in the last 40 years illustrates Figure 5, from which we can see that the mean age was almost constant or downward until 1972 and after then it increased by two years for males and by nearly three years for females. The total fertility rate started to decline in 1974 (Table 1), which seems to coincide with timing of the age increase at the first marriage. Mean age at the first marriage in Japan is now 28.8 for males and 27.7 for females, what means that the average age at entering to cohabitation seems to be the highest in the world. However, it may be noticed that cohabitation of unmarried couple is also very rare in Japan.

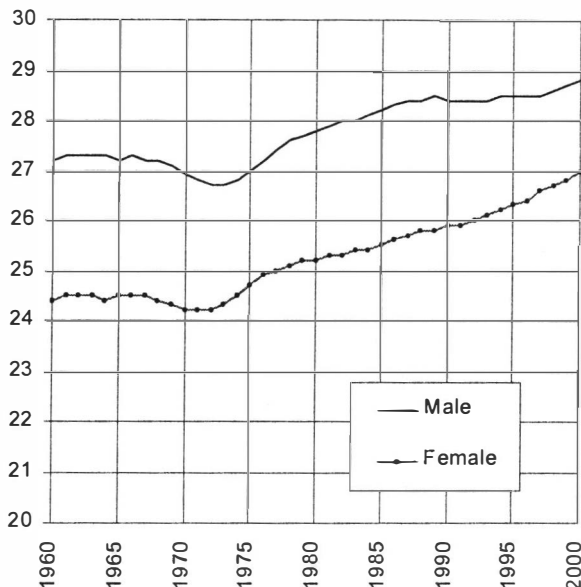
Table 4 Mean age at first marriage in Japan

	Male	Female		Male	Female
1910	27.0	23.0	1976	27.2	24.9
1915	27.4	23.2	1977	27.4	25.0
1920	27.4	23.2	1978	27.6	25.1
1925	27.1	23.1	1979	27.7	25.2
1930	27.3	23.2	1980	27.8	25.2
1935	27.8	23.8	1981	27.9	25.3
1940	29.0	24.6	1982	28.0	25.3
1947	26.1	22.9	1983	28.0	25.4
1950	25.9	23.0	1984	28.1	25.4
1955	26.6	23.8	1985	28.2	25.5
1960	27.2	24.4	1986	28.3	25.6
1961	27.3	24.5	1987	28.4	25.7
1962	27.3	24.5	1988	28.4	25.8
1963	27.3	24.5	1989	28.5	25.8
1964	27.3	24.4	1990	28.4	25.9
1965	27.2	24.5	1991	28.4	25.9
1966	27.3	24.5	1992	28.4	26.0
1967	27.2	24.5	1993	28.4	26.1
1968	27.2	24.4	1994	28.5	26.2
1969	27.1	24.3	1995	28.5	26.3
1970	26.9	24.2	1996	28.5	26.4
1971	26.8	24.2	1997	28.5	26.6
1972	26.7	24.2	1998	28.6	26.7
1973	26.7	24.3	1999	28.7	26.8
1974	26.8	24.5	2000	28.8	27.0
1975	27.0	24.7			

Source: National Institute of Population and Social Security Research, 2002 Latest Demographic Statistics 2001/2002

Table 5 and Figure 6 show, on the other hand, the proportion of married females by age, which also illustrates that the proportion of married persons has declined since 1970.

The decline was obvious at the age of 20 – 24 between 1970 and 1980, at the age of 25 – 29 between 1980 and 1990, and between 1990 and 2000, the proportion of 30 – 34 declined most of all. In 2000, only 11% of the females aged 20 – 24, 44% of 25 – 29, 69% of 30 – 34 and 79% of 35 – 39 were married in Japan.



**Figure 5** Mean age at first marriage in Japan

Source: National Institute of Population and Social Security Research, 2002, Latest Demographic Statistics 2001/2002

**Table 5** Proportion of married females by age group

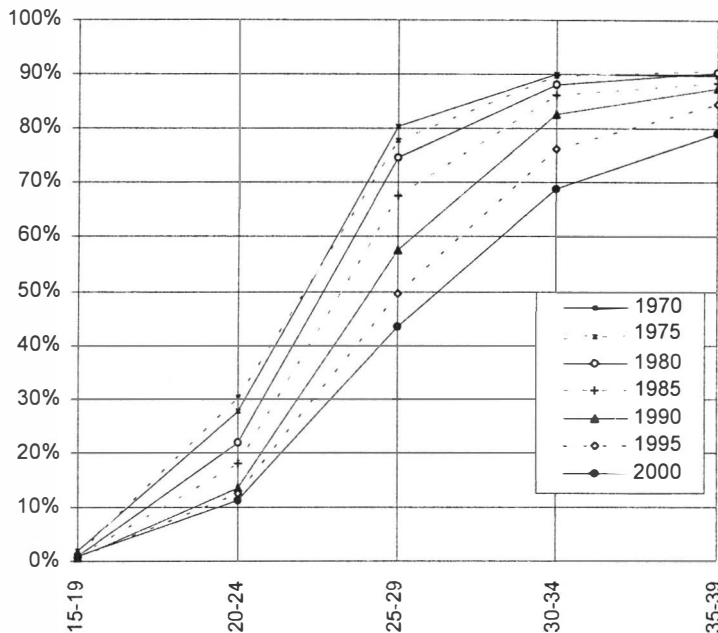
	15-19	20-24	25-29	30-34	35-39
1970	0.02	0.28	0.80	0.90	0.90
1975	0.01	0.30	0.78	0.90	0.91
1980	0.01	0.22	0.75	0.88	0.90
1985	0.01	0.18	0.68	0.86	0.88
1990	0.01	0.14	0.58	0.83	0.87
1995	0.01	0.13	0.50	0.76	0.85
2000	0.01	0.11	0.44	0.69	0.79

Source: National Institute of Population and Social Security Research, 2002 Latest Demographic Statistics 2001/2002

## 2.4 Decomposition analysis of changing fertility at the national level

The investigation of the rising marriage age after 1970s, implies that it seems to be an important factor of fertility decline in Japan. Marital fertility is also a component of fertility change. Here, we try to analyse the contribution of two components on changing fertility in





**Figure 6** Proportion of married females by age group

Source: National Institute of Population and Social Security Research, 2002, Latest Demographic Statistics 2001/2002

the last 45 years applying decomposition method. The calculation methodology of decomposition analysis is shown in the footnote to Table 6, and the results are illustrated in Table 6 and Figure 7. This analysis shows that the largest drop of fertility, which occurred between 1955 and 1960 was mainly caused by decline of marital fertility among females aged 30's, being apparently connected with the wide acceptance of the family planning. In the first half of the 1960s the TFR in Japan rose **slightly, being** influenced by the high economic growth, which caused the increase of marital fertility and the proportion of married, and that for the women in their late 1920s. In the first half of the 1970s, there was a boom of marriages and mean age at the first marriage became lower, however, the marital fertility declined to some extent. Fertility decline after 1975 is explained mostly by decline of the proportion of married females. In the late 1970s the changing marital behaviour of women aged 20 – 24 influenced strongly the fertility decline, and in the 1980s females aged 20 – 29 are responsible for the decline. Moreover, the changing proportion of married women aged 25 – 29 and even 30 – 34 played an important role in the 1990s. At the same time, the marital fertility of women aged over 30, which indicates late childbearing, has stimulated rising fertility since 1985.

The idea that the fertility decline in 1950s was caused by the decline of marital fertility stimulated by the prevalence of the family planning is widely accepted in Japan and is regarded as the last phase of so-called the „first demographic transition“. The declining proportion of married females caused the fertility decline after 1980s because the completed fertility is almost constant. Decomposition analysis carried out here also supports this idea.

Table 6 Decomposition of fertility rate into marital fertility rate and proportion of married

	1955-60	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-95	1995-00
<b>TFR</b>									
Begin of the period	2.34	1.99	2.12	2.07	1.93	1.74	1.73	1.51	1.39
End of the period	1.99	2.12	2.07	1.93	1.74	1.73	1.51	1.39	1.34
<b>Change</b>	<b>-0.36</b>	<b>0.13</b>	<b>-0.05</b>	<b>-0.14</b>	<b>-0.19</b>	<b>-0.01</b>	<b>-0.22</b>	<b>-0.11</b>	<b>-0.05</b>
<b>Components of marital fertility rate</b>									
<b>Total</b>	<b>-0.34</b>	<b>0.08</b>	<b>-0.02</b>	<b>-0.15</b>	<b>0.01</b>	<b>0.16</b>	<b>0.00</b>	<b>0.04</b>	<b>0.09</b>
-19	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
20-24	0.00	0.03	-0.02	0.01	0.00	-0.01	-0.01	-0.01	0.02
25-29	0.00	0.07	0.02	-0.06	0.00	0.07	-0.06	-0.03	-0.01
30-34	-0.17	0.02	-0.01	-0.08	0.02	0.07	0.05	0.04	0.04
35-39	-0.13	-0.02	0.00	-0.02	-0.01	0.03	0.02	0.03	0.04
40-44	-0.04	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
45+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Components of proportion of married</b>									
<b>Total</b>	<b>-0.02</b>	<b>0.06</b>	<b>-0.04</b>	<b>0.01</b>	<b>-0.2</b>	<b>-0.17</b>	<b>-0.22</b>	<b>-0.15</b>	<b>-0.14</b>
-19	-0.01	0.00	0.01	-0.01	-0.01	0.00	0.00	0.00	0.01
20-24	-0.02	0.00	-0.06	0.05	-0.15	-0.07	-0.07	-0.01	-0.02
25-29	0.00	0.04	0.01	-0.03	-0.04	-0.09	-0.13	-0.09	-0.07
30-34	0.00	0.01	0.01	0.00	-0.01	-0.01	-0.02	-0.04	-0.05
35-39	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01
40-44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

\* TFR in this table is calculated by 5-year age group, which might cause inconsistencies with other tables.

Change of an age specific fertility rate (from  $f_0$  to  $f_1$ ) is decomposed into marital fertility rate (fm) and proportion married (m) by the following way.

$$f = fm \cdot m, \quad f_1 - f_0 = fm + m, \quad fm = (fm_1 - fm_0)(m_1 + m_0)/2, \quad m = (m_1 + m_0)(m_1 - m_0)/2$$

Source: Calculations of the author using Population Census of Japan and Vital Statistics of Japan for each year

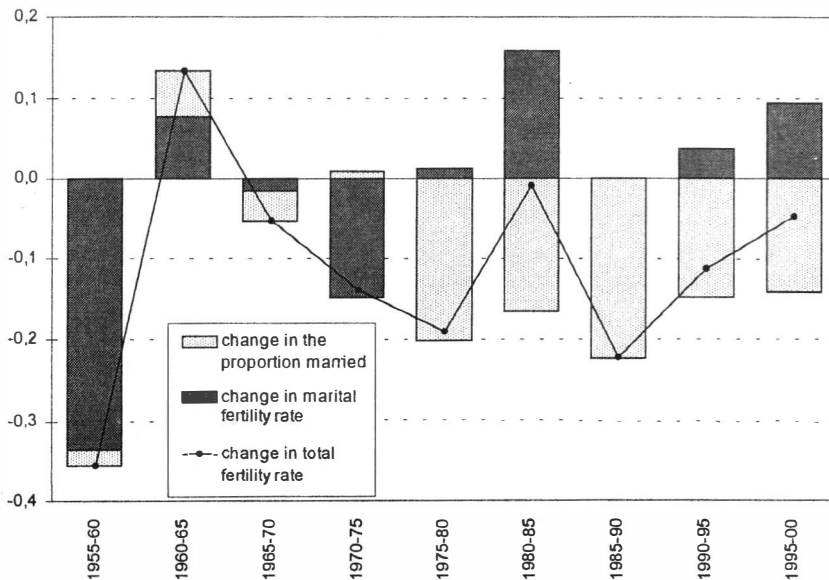


Figure 7 Decomposition of the fertility rate changes into the changes in marital fertility rate and the changes in proportion of married

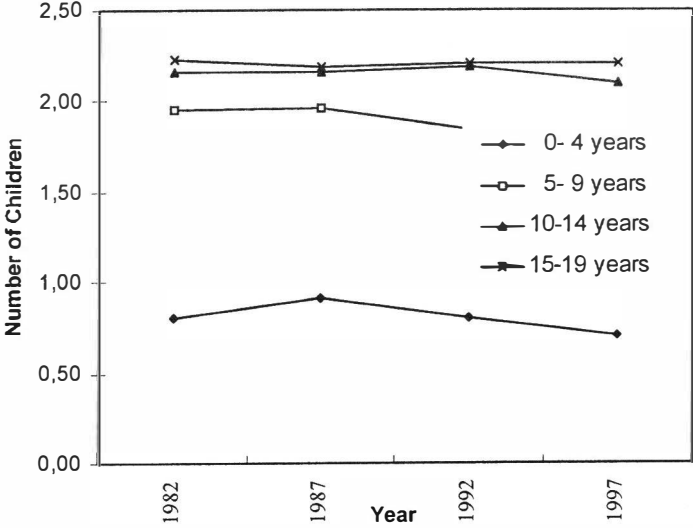
However, some latest scholar discussions express the opinion that marital fertility, which has a declining tendency in the recent years could also affect the fertility decline in total. The complete fertility is calculated by the birth cohorts of females and we have to wait some years for measuring the complete fertility of females born in 1960s and 1970s, which influenced the fertility decline in the late 1980s and 1990. Even without calculation of the complete fertility, we can find some symptoms of the recent decline of marital fertility. Table 7 and Figure 8 show the results of the National Fertility Survey conducted by the National Institute of Population and Social Security research at the five year basis. According to the recent survey, the complete fertility, which corresponds with the number of children in married couples with 15 – 19 years of marriage duration, is still constant. However, the number of children in younger couples has been decreasing since 1982, what implies the declining marital fertility and future decline of the complete fertility.

**Table 7** Number of children by marriage duration

Duration (years)	Year			
	1982	1987	1992	1997
0 – 4	0.80	0.91	0.80	0.71
5 – 9	1.95	1.96	1.84	1.75
10 – 14	2.16	2.16	2.19	2.10
15 – 19	2.23	2.19	2.21	2.21

\* The number of children of the married couples with 15 – 19 years duration corresponds to complete fertility.

Source: National Institute of Population and Social Security Research, 1998, The eleventh Japanese National Fertility Survey in 1997



**Figure 8** Number of children by marriage duration (years)

From the investigation at the national level, we have got the following results. The recent fertility decline in Japan, which started in the 1970s, has been accelerating since the

late 1980s. This will cause the fundamental changes in the age structure affecting so the Japanese economy and society. The main factor of the recent fertility decline is the downturn of marriages among females, and the decrease of marital fertility also seems to affect the fertility decline in the recent years.

### 2.5 Long-term fertility changes at the national level

Considering the above-mentioned trends in changing of fertility at the national level, the period after the World War II may be divided into three sub-periods (Figure 9). The first period – up to mid 1950s is labelled as the last stage of the „First demographic transition“<sup>2</sup>. The government was strongly **interested** in the overpopulation of Japan and quite a lot of Japanese people, being encouraged by the government, emigrated abroad, mainly to the Latin America. That was one of the reasons for quick and wide acceptance of the family planning in this first period.

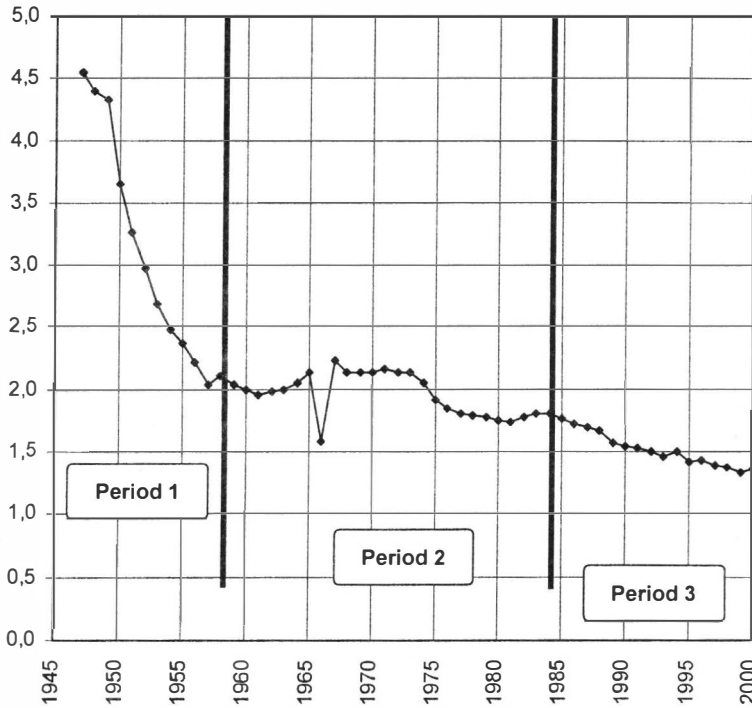


Figure 9 Three periods in fertility change in Japan

The second period is between mid 1950s and mid 1980s. The economic growth solved the overpopulation problem and the large urban-bounded internal migration had been observed, which caused another problem – depopulation of the rural areas. In the first half

<sup>2</sup> The first and the second demographic transitions are discussed in details by Van de Kaa (1999).

of this period the total fertility even rose a little being affected by the economic boom. Later this period transferred to the initial phase of the next change and the fertility rate began to decline slowly and incrementally. The Japanese society started to realise that the deepening secularisation of the society is under way. The nation-wide drastic urbanisation after the 1950s destroyed the type of traditional households represented by the multi-generation extended families. A lot of nuclear families appeared, which brought the Japanese society to secularisation, as well as the economic growth and maturity.

Around mid 1980s the changing fertility entered the third period, which is characterised by the „Second demographic transition“. The mobility among the Japanese population slowed down and the society looked more stable than before. Secularisation and emancipation became **evident comparing** with the previous time. The recent fertility decline has been attributed not only to the late marriage but also to the decline of marital fertility. Many surveys of the public opinion revealed that females tended to stay single while quite a lot of males wanted to be married.

### 3. FERTILITY DECLINE AT THE REGIONAL LEVEL

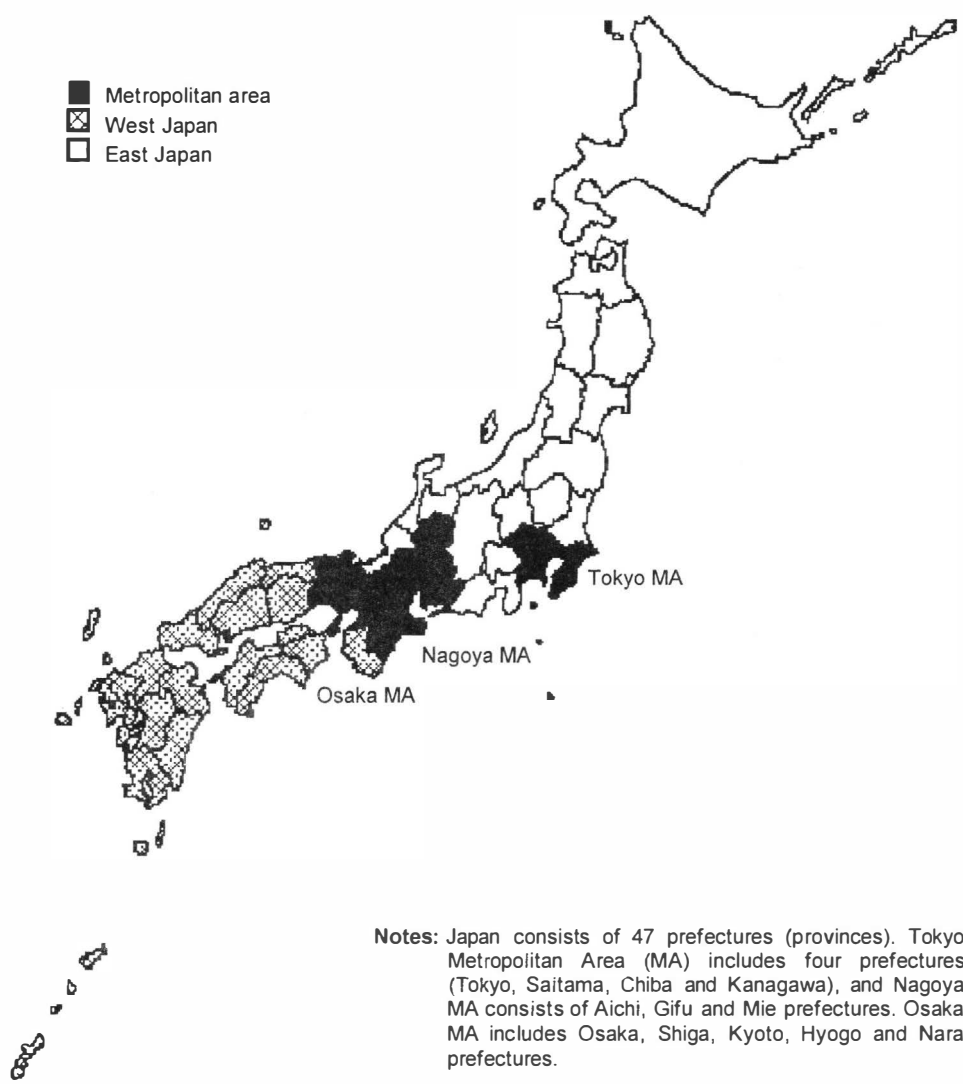
#### 3.1 Introduction

Before entering the investigation of fertility at the regional level, we have to make sure the regional composition of Japan. Japan consists of 47 prefectures (*ken*) or 3218 municipalities. Among 3218 municipalities, 675 are cities (*shi*), 1981 towns (*machi/cho*) and 562 villages (*mura/son*) as per April 2002 statistics. The population of Japan concentrates rather strongly in urbanised areas. The three major metropolitan areas are often regarded as the most urbanised, where about the half of the total population lives (Figure 10). It is also useful to take the western and the eastern Japan for investigation of the regional disparity, particularly in the older age. Figure 10 shows the **metropolitan area, East Japan and West Japan**. We do not have the exact and commonly accepted boundary between the East and the West Japan, however, many Japanese people are conscious of the difference between the East and the West. The boundary, therefore, could be regarded as a tool for description of the regional fertility disparity.

For analysis of fertility at the regional level, it is possible to get statistical data on the municipality level. But as the fertility rate in municipalities with the small population size is not stable enough and as the purpose of this study is investigation of changing fertility on the long-term basis, so in our survey we have taken 47 prefectures (*ken*) as the analytical units for examination. The prefecture system has not changed significantly for almost one hundred years.

#### 3.2 The total fertility rate by prefectures

Figure 11 illustrates the total fertility rate by prefectures in 1955, 1970, 1985 and 2000. In 1955 the higher fertility was recorded in the East Japan and on the *Kyushu Island* located in the most southwestern part of Japan, where the demographic transition occurred



**Figure 10** Three regions of Japan (East, West and Metropolitan area)

relatively later. West Japan, except *Kyushu*, where the demographic transition was completed, reported lower TFR. So-called the „First demographic transition“ was over in all parts of Japan around 1970. The highest TFR at that time was registered in some prefectures located in the surroundings of the major metropolitan areas, where newly married couples settled down at their affordable residences and bore their children. Sub-urbanisation in Japan was most obvious in 1960s and early 1970s. Until 1985, sub-urbanisation calmed down and the regional profile of fertility showed the disparity between well-urbanised area and less urbanised area. The spatial profile of the fertility rate does not seem to be altered by the recent fertility decline occurred in 1990s.

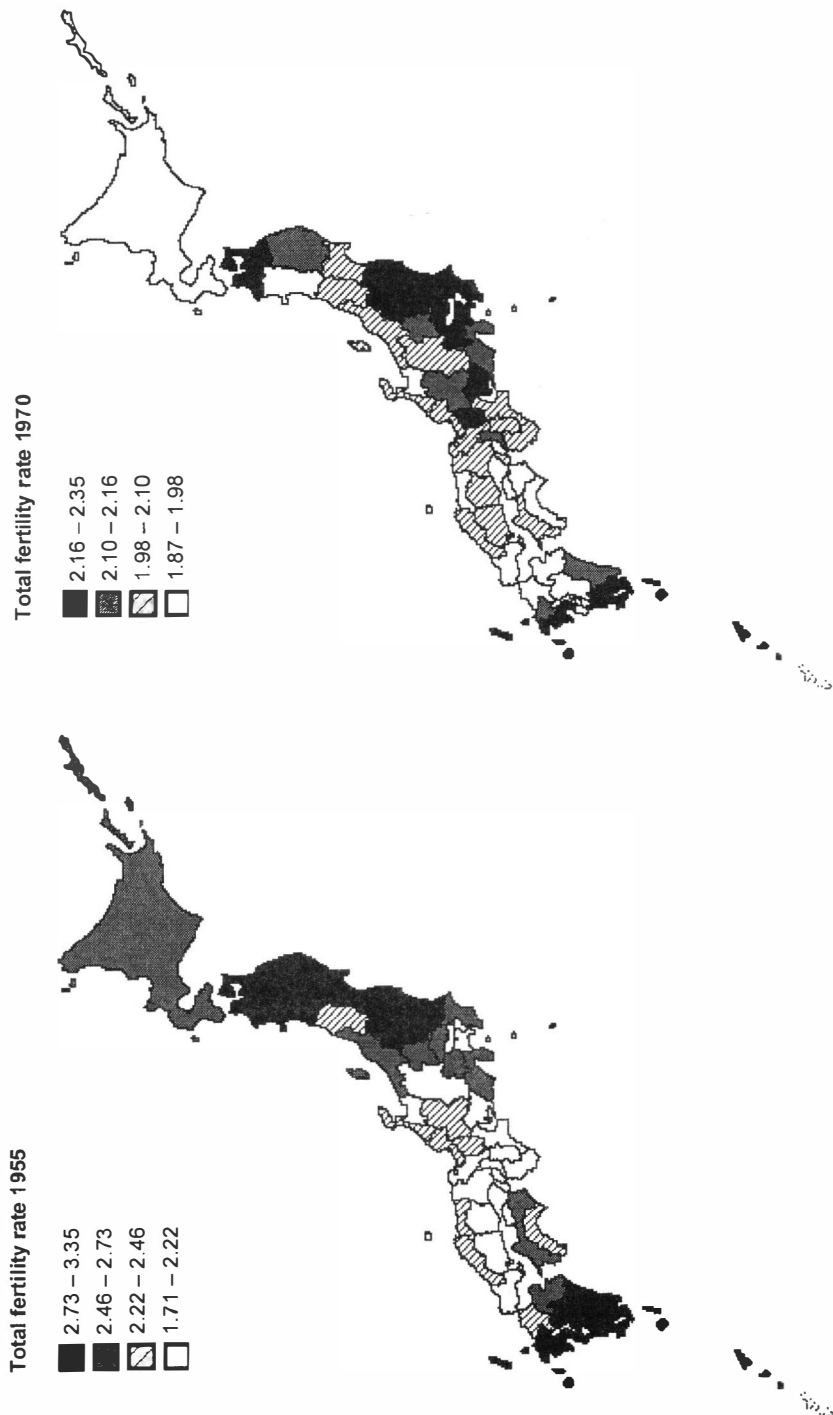
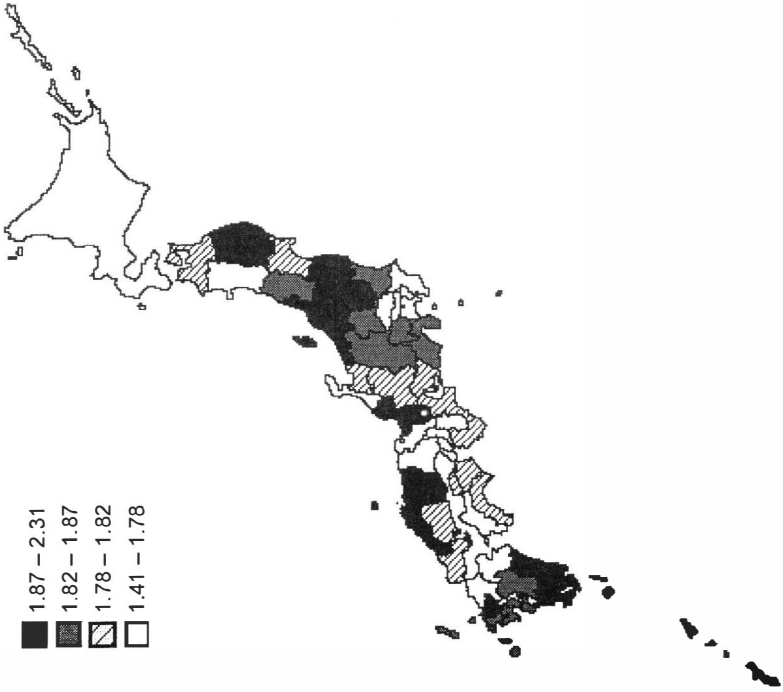


Figure 11a Total fertility rate by prefecture in 1955 and 1970  
 Source: Population Census of Japan, Vital Statistics of Japan, each year

Total fertility rate 1985

- 1.87 - 2.31
- 1.82 - 1.87
- 1.78 - 1.82
- 1.41 - 1.78



Total fertility rate 1970

- 1.54 - 1.82
- 1.45 - 1.54
- 1.41 - 1.45
- 1.03 - 1.41

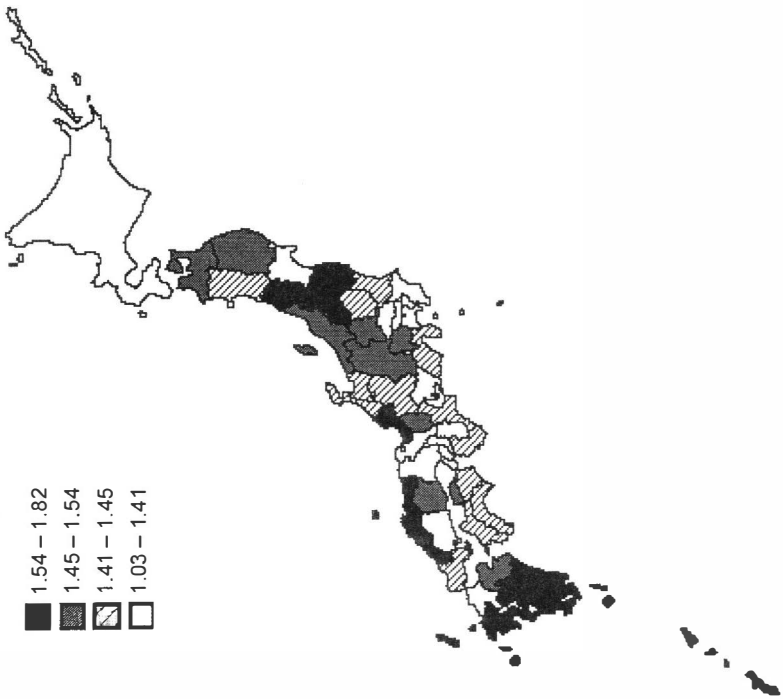


Figure 11b Total fertility rate by prefecture in 1985 and 2000  
Source: Population Census of Japan, Vital Statistics of Japan, each year



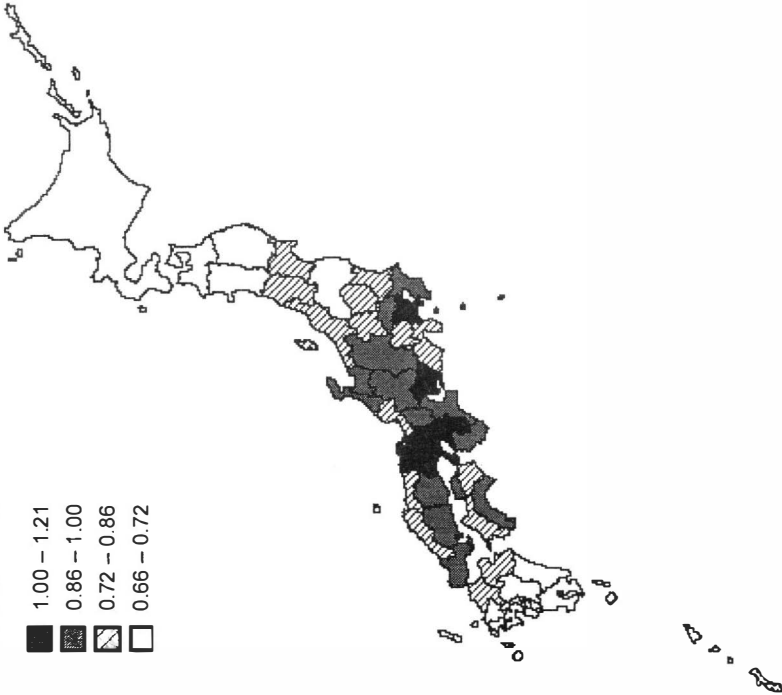
### 3.3 Changes in the regional disparity of the total fertility rate

Although many scholars of different disciplines have investigated the recent fertility decline in Japan, the studies from the regional perspective seem to be still insufficient. As described above, we try to discuss the long-term changing fertility at the regional level in this paper. Figure 12 shows the spatial profiles of the fertility changes during the periods of 1955 – 1970, 1970 – 1985 and 1985 – 2000. During 1955 – 1970, the total fertility rate in prefectures located in the metropolitan areas, for example, in *Tokyo*, *Osaka* and *Aichi*, has increased, while the fertility rates in the peripheral prefectures, particularly in the East Japan and on the *Kyushu Island*, declined dramatically. Figure 13 illustrates a relationship between the fertility change during 1955 – 70 and the total fertility rates in 1955. The correlation coefficient is  $-0.92$ , what indicates that the prefectures with the lower fertility raised their fertility, while the prefectures with the higher fertility rates reduced their fertility during that period. The reason for the fertility growth seems to be related with urbanisation. Highly reproductive young people in the reproductive age tended to move to urbanised areas and their immigration affected rising fertility in the metropolitan areas. On the other hand, the demographic transition finally reached the rural peripheral prefectures and their fertility declined at that period. Changes in this period thereby stimulated the reduction of the regional disparity in fertility.

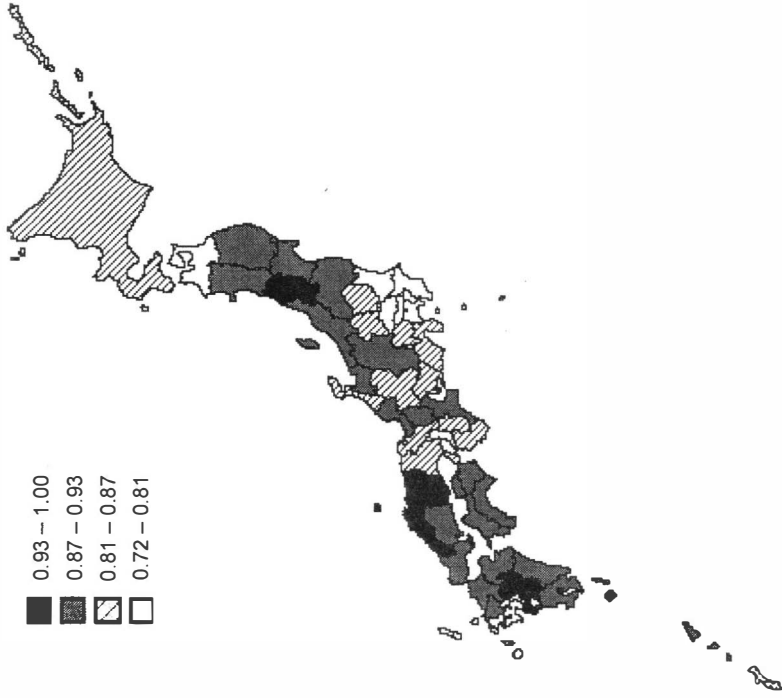
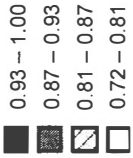
The fertility change during 1970 – 1985 is regarded as a transition between 1955 – 1970 and 1985 – 2000. Prefectures in the Tokyo metropolitan area and in Osaka reduced their fertility largely, while fertility in Aomori, the northernmost prefecture in the mainland, was still evidently declining. From the analysis at the national level, we divided the period after the World War II into three periods, namely the period before 1955, the period between mid-50s and mid-80s and the period after mid eighties. It is difficult to investigate the regional fertility differences before 1955 due to the lack of published vital statistics. This period is regarded as the period of the „First demographic transition“. The second period around 1955 – 1985 was characterised by the economic growth and urbanisation can be sub-classified into the first and the second period from the perspective of the regional fertility development. The first one (before 1970) seems to be the period of the drastic change, owing to incredible economic growth and urbanisation. The metropolitan areas experienced a remarkable extent of the net migration and sub-urbanisation, while the peripheral areas, especially East Japan and *Kyushu Island*, were still in the process of the „First demographic transition“ and the contrast reflected the shrinking **regional** fertility disparity shown by Figure 13. Japanese society passed through stability and stagnation in 1970 – 1985 and the development of the regional fertility differences in those days demonstrated the relative stability.

The period of 1985 – 2000, which corresponds with the period of the recent fertility decline, so called „Second demographic transition“, has totally diversified characteristics of the fertility changes comparing with 1955 – 1970. The prefectures in the major metropolitan areas reduced their fertility drastically, while the reduction of fertility in the peripheral prefectures remained relatively low, and as the result the regional disparity of fertility increased in this period. Figure 14 illustrates the relationship between the fertility change during 1985 – 2000 and the total fertility rate in 2000. The correlation coefficient is 0.72 and 0.81, if we exclude Okinawa. Recent fertility decline and the trend towards secularisation and emancipation have highly urbanised features. The proportion of married

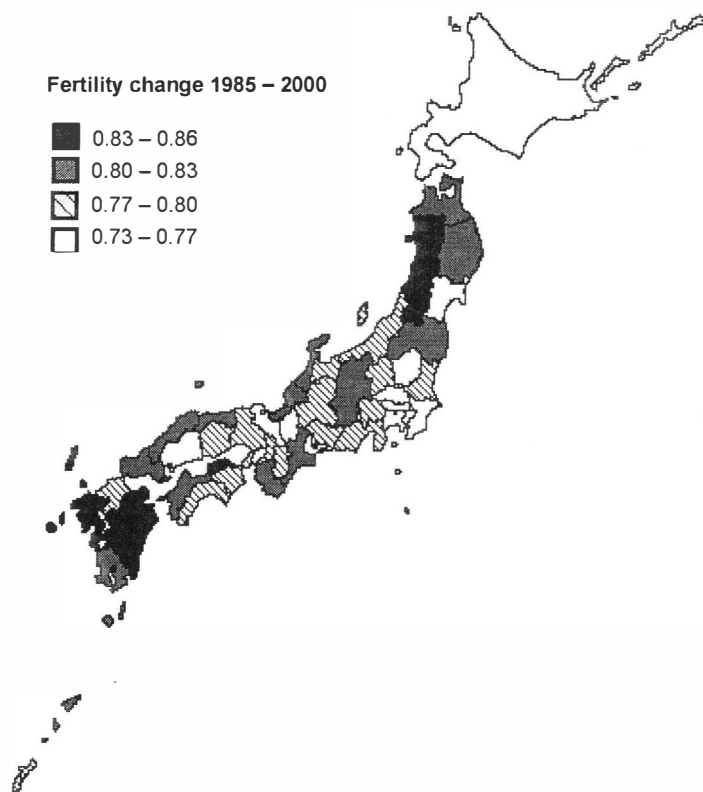
Fertility change 1955 – 1970



Fertility change 1970 – 1985



**Figure 12a** Fertility change in 1955-1970 and 1970 – 1985  
Source: Population Census of Japan, Vital Statistics of Japan, each year

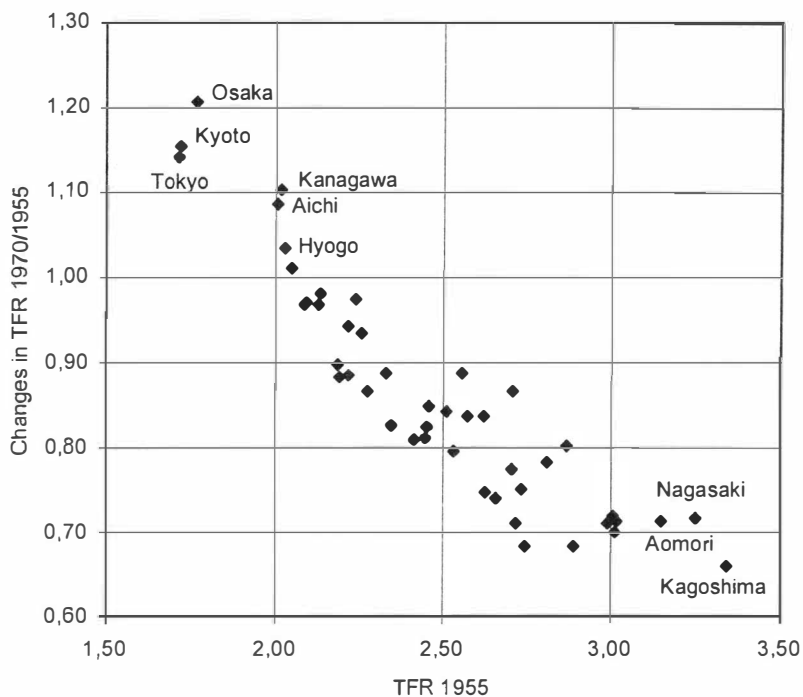


**Figure 12b** Fertility change in 1985 – 2000  
 Source: Population Census of Japan, Vital Statistics of Japan, each year

females was lowest in Tokyo, and other indicators concerned with the fertility decline, such as the proportion of females in the workforce and high housing costs, had changed more evidently in the metropolitan prefectures. **Even if the extent of the recent regional fertility disparity proved to be lower than in the period between 1955 – 70**, the „Second demographic transition“ does not seem to develop simultaneously in the whole country. The metropolitan prefectures, particularly *Tokyo*, are ahead in the process, being followed by the peripheral prefectures.

### 3.4 Decomposition of the regional fertility changes

As it was discussed at the national level, we tried to investigate the decomposition of fertility decline by prefectures. To simplify the analysis, we adopted the age-specific marital fertility rate of women aged 25 – 34 and the proportion of married women aged 25 – 34, as the compositions of the total fertility rate. Figure 15 illustrates the age-specific marital fertility rate and the proportion of married women aged 25 – 34 in 1955 and 1970. The main change in this period is, as mentioned before, the reduction of marital fertility and of



**Figure 13** Fertility change in 1955 – 1970 and TFR in 1955,  $r = -0.92$

Source: Population Census of Japan, Vital Statistics of Japan, each year

proportion of married, which had not changed significantly or exhibited even slightly upward tendency. The prefectures located in East Japan and *Kyushu Island* show obvious decline in marital fertility comparing to the other prefectures. There are only a few exceptional prefectures such as *Tokyo*, *Osaka*, *Kyoto* and *Kanagawa*, where the marital fertility in 1970 is higher than in 1955. These prefectures can be attributed to the most urbanised prefectures. Only they seem to be in the stage of urbanisation and all other prefectures still remain in the process of demographic transition.

Figure 16 shows changes in the marital fertility and the proportion of married between 1985 and 2000. **The main observable trend here is the decline in the proportion of married. The marital fertility each prefecture, though did not decline, or even increased in some prefectures.** This is the reverse to the period of 1955 – 1970. The regional characteristics observed in 1985 show a higher proportion of married and a relatively lower marital fertility in the East Japan and lower proportion of married and a higher marital fertility in the West. Because all prefectures experienced almost the same changes in the period of 1985 – 2000, the regional profile of fertility in 2000 resembled to that of 1985. Only the parallel downward development in the proportion of married in each prefecture is observable. The prefectures with the relatively low proportion of married, such as *Tokyo*, suffer stronger impacts on the total fertility rates and, thereby, changes there are relatively larger (Figure 14).

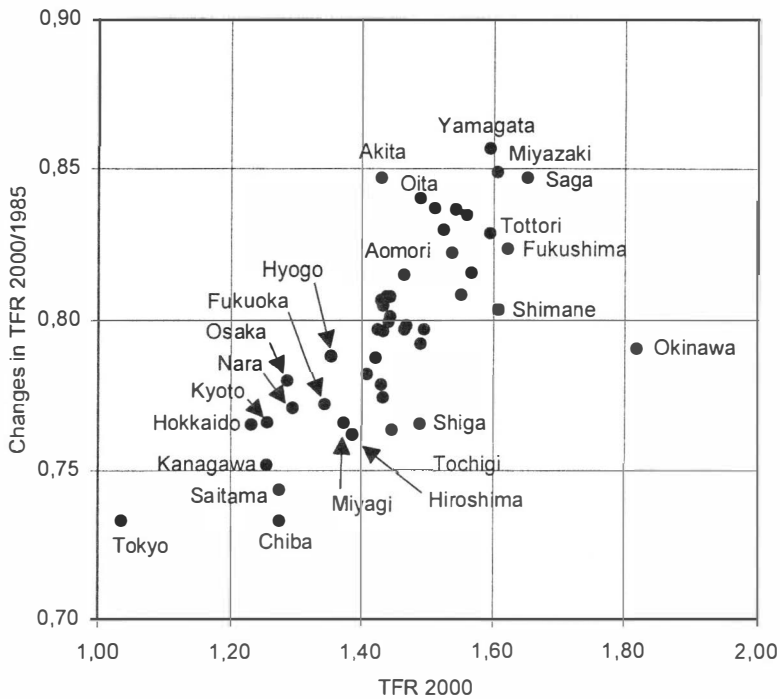


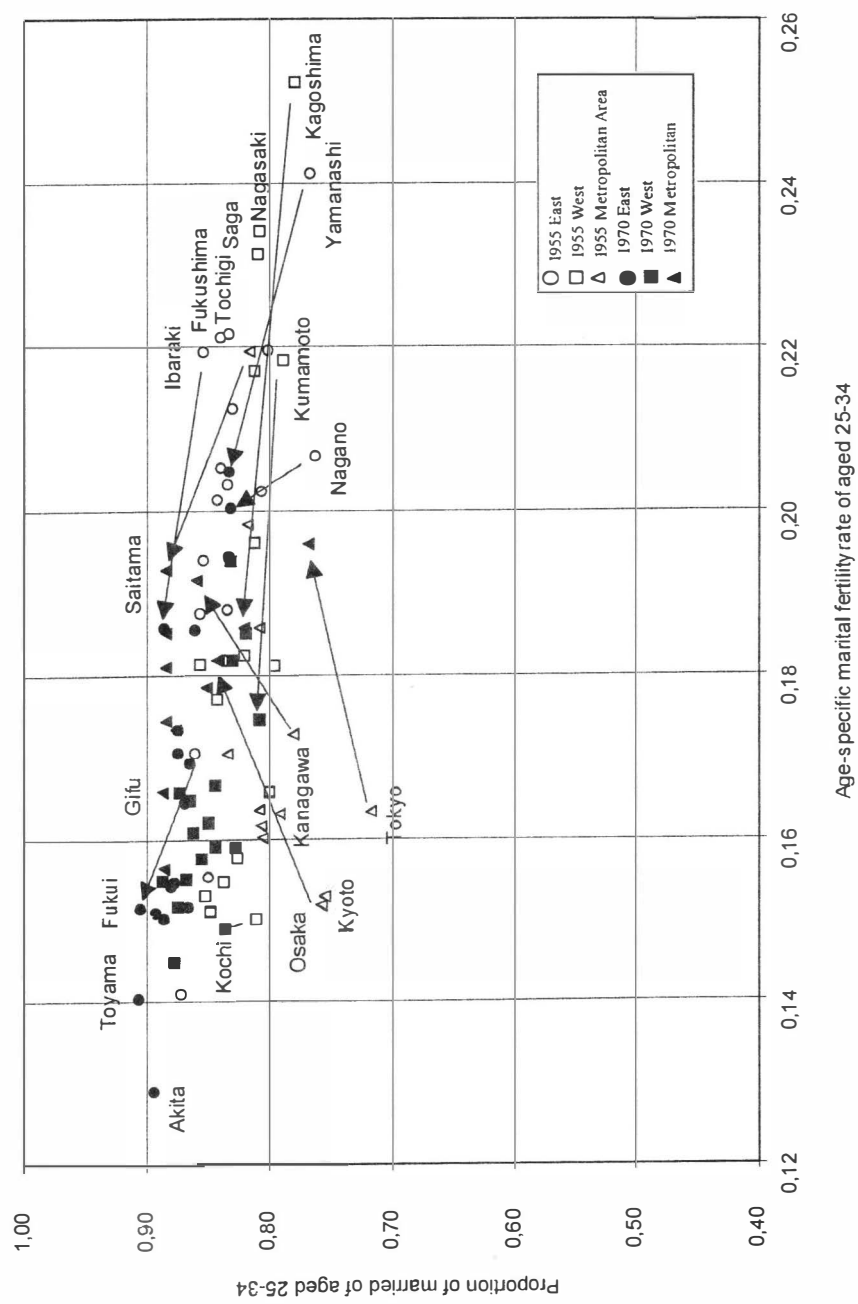
Figure 14 Fertility change in 1985 – 2000 and TFR in 2000,  $r = 0,72$ ;  $r = 0,81$  (without Okinawa)

Source: Population Census of Japan, Vital Statistics of Japan, each year

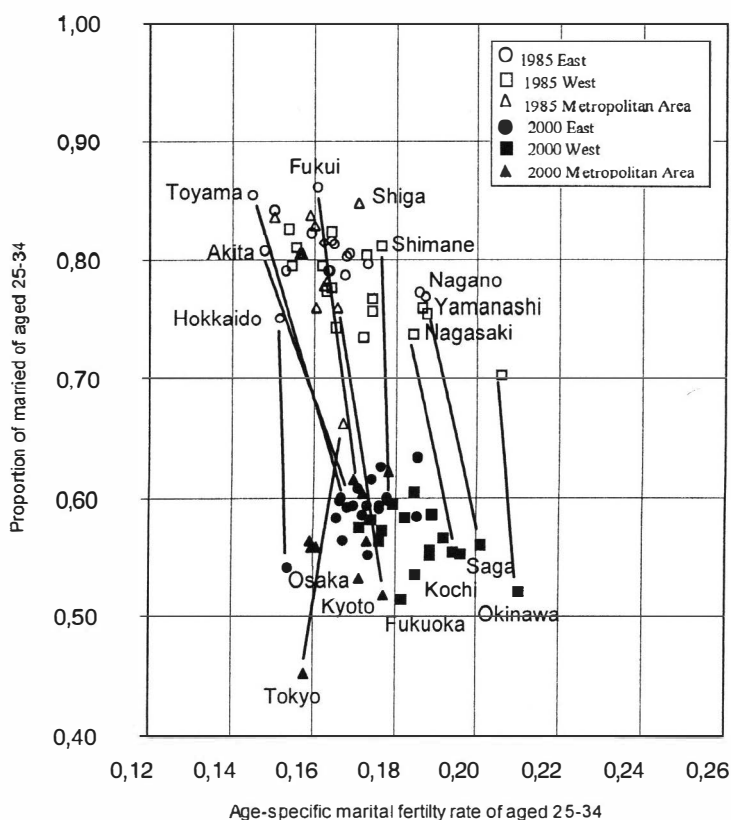
#### 4. CONCLUDING REMARKS

In this paper we have analysed the changing fertility in Japan at the prefectural and the national levels. From the view of the national level of analysis, the fertility changes after the World War II can be classified into three periods, the period before 1955, around 1955 – 1985 and the period after 1985. These three periods are characterised by the „First demographic transition“, the economic growth and urbanisation and the „Second demographic transition“ respectively.

From the analysis at the regional level, we found that the regional disparity in 1955 demonstrated the spatial process of the „First demographic transition“, and that the population urbanisation reduced the regional disparity of fertility in the period during 1955 – 1970. After the stabilisation of urbanisation, the spatial profile of fertility, characterised by the higher fertility in the rural areas and the lower fertility in the urbanised areas, shaped gradually in 1970s and 1980s, being accelerated then by the urban-characterised recent fertility decline since the late 1980s. The spatial profile of fertility formed in 1970s and in the first half of 1980s has clearly shown that the higher marital fertility and the lower proportion of married were recorded in the West Japan, while the lower marital fertility and the higher proportion married were observed in the East Japan. These regional



**Figure 15** Age-specific marital fertility and proportion of married in 1955 – 1970  
 Source: Population Census of Japan, Vital Statistics of Japan, each year



**Figure 16** Age-specific marital fertility and proportion of married in 1985 – 2000  
 Source: Population Census of Japan, Vital Statistics of Japan, each year

characteristics were maintained to the certain extent even at the time of the drastic fertility decline, because the tempo of diffusion of the „Second demographic transition“ was faster and the regional disparity looked much lower than in the „First demographic transition“. Almost all prefectures have experienced the similar declining process in the proportion of married women aged 25 – 34.

Without the investigation on the regional level it could be difficult to conclude that the traditional fertility transition was still ongoing until 1960s in the peripheral areas, and that the spatial diffusion of the „Second demographic transition“ seemed to be much faster than the „First demographic transition“.

Shimizu (2001), after the examination of contribution of the distribution change to the fertility decline by means of the decomposition method, concluded that the effects of the population distribution change on the total fertility rate was relatively **weak**. But he also argued that the various effects of the distribution change on the total fertility rate depended on the relevant period, and the results of this analysis seemed to coincide with Shimizu's analysis.

Studies of the fertility changes from the regional point of view seem to be still far behind the other approaches of the fertility changes explanation. The changing age-specific fertility by prefectures is one of the most important subjects to be investigated in the future.

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## Resume

### Regionálne disparity fertility v regiónoch Japonska

Tento príspevok je venovaný analýze vývoja fertility na regionálnej a národnej úrovni v Japonsku po 2. svetovej vojne. Aj keď existuje veľké množstvo štúdií na danú problematiku, je nevyhnutné venovať jej pozornosť aj na regionálnej a celoštátnej úrovni.

Vývoj fertility v 50. a 60. môžeme chápať ako záverečnú etapu I. demografického prechodu, charakterizovanú poklesom manželskej plodnosti v periférnych oblastiach, zatiaľ čo proces urbanizácie zvyšoval manželskú fertilitu v metropolitných oblastiach. Týmto spôsobom došlo k zníženiu regionálnych disparít v 50. a 60. rokoch.

V 70. a prvej polovici 80. rokov sa japonská populácia stala viac stabilnou a jej priestorový profil sa ďalej modeloval. Nižšiu mieru úhrnnej plodnosti mali metropolitné oblasti, zatiaľ čo jej sa úroveň v rurálnych oblastiach javila relatívne vysoká. Rozdiely boli i v samotných rurálnych oblastiach, kde západná časť Japonska zaznamenala vyššiu manželskú plodnosť a nižšiu úroveň sobášnosti a východná časť Japonska nižšiu manželenskú pôrodnosť a vyššiu úroveň sobášnosti.

Obdobie druhej polovice 80. rokov je považované za obdobie drastického poklesu úhrnnej plodnosti. Takmer všetky prefektúry zaznamenali tendenciu poklesu sobášnosti, hlavne metropolitné oblasti. V porovnaní s 50. a 60. rokmi sú regionálne rozdiely zmeny úrovne fertility menšie a priestorový profil jej drastického poklesu fertility v období z pred niekoľkých desiatok rokov sa dokonca nezmenil. Zdá sa, že druhý demografický prechod prebieha rýchlejšie a rovnomernejšie v priestorovom kontexte ako prvý demografický prechod.

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## 日本における出生率の地域差の長期的趨勢

中川聡史

日本の出生率低下については近年多くの研究がなされているが、出生率の長期的趨勢の研究、地域レベルでの研究は必ずしも十分でない。本研究は、戦後日本の出生率について、全国レベルでの変動および都道府県レベルでの変動、都道府県間の出生率の変動とその地域差について検討をおこなった。

その結果、確認できたことは以下の通りである。全国レベルでは1950年代には完了したかに思えた「第1の人口転換」であるが、都道府県レベルでみると、東日本の諸県および九州では1960年代まで有配偶出生率の顕著な低下が続いていた。また、同時期に東京都、大阪府、神奈川県などでは都市化によって有配偶出生率が逆に上昇し、この期間に出生率の地域差は縮小した。1970年代から1980年代前半までの期間は出生率変動の相対的な安定期であり、その間に、大都市圏で低く、非大都市圏で高い合計特殊出生率の地域分布が形成された。また、詳しくみると、有配偶出生率が相対的に高く、有配偶率が低い西日本、有配偶率が高く、有配偶出生率が相対的に低い東日本という違いも観察できる。

一方、1980年代後半以降、周知の通りの急速な合計特殊出生率の低下が生じる。都道府県レベルでみると、ほぼすべての県で有配偶率が同じような低下を示しており、それが合計特殊出生率の低下を招いたと考えられる。詳しくみると、東京都など大都市圏の府県で有配偶率低下の影響が相対的に大きいようであるが、その地域差は「第1の人口転換」のときほど大きくはなく、いわゆる「第2の人口転換」の生じ方はより速く、また地域差がより小さいものである。「第2の人口転換」は全国でほぼ同じように観察できることから、1970年代から1980年代に形成された出生率の地域分布の特徴は今日もかなりの程度維持されていると考えることができる。