

# **North Korea's Declining Fertility Rate Seen through a Survey of North Korean Refugees**

## **ABSTRACT**

To calculate the total fertility rate in North Korea, this paper surveyed 120 North Korean refugees to investigate their 1,610 relatives' and friends' marriage and fertility experiences. The results show that North Korea's total fertility rate was 1.88 in the 1990s, then dropped to 1.55 in the 2000s, and was at 1.39 in the 2010s. The 1.39 fertility rate in the 2010s is consistent with North Korean refugees' testimonies that most women born in the 1980s have only been giving birth to one child. When calculating the contribution of each factor to the change in the total fertility rate, the significant decline in the total fertility rate in the 1990s was mainly due to changes in the marital fertility rate. Then, the decline in the total fertility rate in the 2000s was due to changes in both the marital fertility rate and the nuptiality. However, in the 2010s, the contribution of nuptiality exceeded that of the marital fertility rate. This study has some limitations in terms of methodology, and it is necessary to expand our sample to include residents from other parts of North Korea rather than just from the North Korea-China border region so that in future studies the sample can better reflect the entire population.

## **KEYWORDS**

Fertility, Data and methods, Census Data, Decomposition Analysis

## **Introduction**

Since 2018, the Bank of Korea has been conducting a survey of North Korean refugees. The results of the survey regarding North Koreans born in the 1980s showed that the proportion of women who gave birth to one child was much higher than the proportion of women who gave birth to two children.

North Korea's low fertility, which has been decreasing rapidly since the economic crisis in the 1990s called the “Arduous March”, seems to have been intensifying in recent years. At the fifth Mothers' Conference in December 2023, North Korean authorities mentioned for the first time that the declining birth rate was a social problem

that needed to be addressed. The North Korean authorities seem to be trying to overcome the declining birth rate through various policies.

The United Nations has published estimates of North Korea's total fertility rate. And U.N. statistics have the advantage of facilitating international comparisons and providing long-term time series. However, according to the testimony of North Korean refugees, the statistics since the late 1990s do not correspond to reality.

In this paper, we first obtained information about the characteristics of individual marriages and childbirths of North Korean women through a survey of North Korean refugees and calculated the total fertility rate. Then, the contribution of nuptiality, the marital fertility rate, and the non-marital fertility rate to the change in the total fertility rate, were calculated to examine the factors of change in the total fertility rate by period.

## **Survey method**

In order to calculate the total fertility rate in North Korea, a survey was conducted among North Korean refugees to investigate the marriage and childbirth experiences of relatives and acquaintances currently living in North Korea. The respondents to this survey were 120 North Korean refugees who fled North Korea between 2000~2019, and the sample of respondents was extracted using the chain referral method.

North Korean refugees who may have experienced distortions in marriage and childbirth decision-making during the process of defection were excluded from the sample, instead 1,610 relatives/friends of North Korean refugees were sampled. In a preliminary survey, the total fertility rate calculated for North Korean refugees was found to be 0.2 to 0.5 lower than the total fertility rate calculated for their relatives/friends.

We conducted a survey through direct interviews with North Korean refugees and obtained childbirth data about 5~20 relatives/friends per person. The survey was conducted from January 1, 2022, to October 31, 2024, and the survey items included information about personal characteristics of the relatives/friends, marriage information, and fertility information.

Looking at the sample of 1,610 people by region, we have 224 from Pyongyang, 499 from other cities, and 887 from the countryside. Although this regional distribution of

our sample largely reflects that of the actual population, there is still some problems because of the provincial bias in the sample. That is, in both other cities and the countryside, the proportion of the sample in Ryanggang-do Province, which borders China, is very high compared to the proportion of actual population that lives there. It is necessary to expand our sample to include residents from other parts of North Korea rather than just from the North Korea-China border region so that in future studies the sample can better reflect the entire population.

Table 1. Sample Size by Region

	(persons)			
	Sample		Target Population <sup>1)</sup>	
Total	1,610	[100.0]	23,350,000	[100.0]
Pyongyang	224	[13.9]	3,255,000	[13.9]
Other Cities	499	[31.0]	7,218,000	[30.8]
(Cities in Ryanggang-do Province)	(103)	[6.4]	(193,000)	[0.8]
Countryside	887	[55.1]	12,877,000	[55.3]
(Countryside in Ryanggang-do Province)	(101)	[6.3]	(527,000)	[2.3]

Notes: 1) Based on 2008 population census data from the DPRK Central Bureau of Statistics (2009).

2) The figures in square bracket represent the proportion of sample or population in each region to the total (%).

Looking at the distribution of the sample by income level, the middle-income bracket is the largest. However, the proportion in the lower-income bracket is higher than that in the higher-income bracket. The income level variable was measured by dividing the income level into nine grades, with the highest grade being #9 and the lowest grade being #1. The income level of the sampled person was measured by the respondents' subjective assessment of the relative level in the city, town, or county where the sampled person of the survey primarily resided. The mean income level of those born before 1980 is 4.6, slightly below grade #5, which is half way between the highest #9 and the lowest #1. And median income level of those born before 1980 is 5.

Table 2. Distribution of Sample by Income Level

Income level (grade)	1	2	3	4	5	6	7	8	9
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Percentage shares in total (%)	7.3	13.6	7.7	16.5	20.8	19.3	7.9	3.9	3.1
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### Estimation results

Based on the results of the survey of North Korean refugees, the total fertility rate of North Korea was 2.53 in the 1980s, but it decreased to 1.88 in the 1990s, which is below the replacement fertility rate, and then continued to decline to 1.55 in the 2000s and to 1.39 in the 2010s. The total fertility rate in the 2010s, which reached 1.39, is consistent with the testimony of North Korean defectors that it is considered a social custom for women born in the 1980s to have one child.

Table 3. Estimation Results of Total Fertility Rate in North Korea <sup>1)</sup>

	(persons)			
	1980~1989	1990~1999	2000~2009	2010~2019
Total Fertility Rate in North Korea	2.53	1.88	1.55	1.39

Note: 1) Authors' calculations based on the results of a survey of North Korean refugees

When comparing our estimate of the total fertility rate with the estimate from the United Nations, the estimate of this paper was calculated as being somewhat lower, and there was a difference of -0.31, -0.36, and -0.47 in the 1990~1999, 2000~2009, and 2010~2019 periods, respectively. In the case of the 1980~1989 period, the difference between the two estimates was not large, at -0.13. However, since the 1990s, when the “Arduous March” occurred and during which time residents were actively displaced, the difference between the two estimates has slightly widened.

Table 4. Comparison with the U.N. Estimate of North Korea's Total Fertility Rate

	(persons)			
	1980~1989	1990~1999	2000~2009	2010~2019
UN estimate <sup>1)</sup> (A)	2.66	2.19	1.91	1.86
This paper's estimate (B)	2.53	1.88	1.55	1.39
Difference (B-A)	-0.13	-0.31	-0.36	-0.47

Note: 1) Published in UN World Population Prospects (2024)

The discrepancy between the U.N. estimates and this paper's estimates, on the one hand, is presumed to be due to the fact that the sample to which we had access is not

fully representative. On the other hand, some researchers have doubts about reliability of North Korea's population statistics. Spoorenberg (2014) points out that little demographic and social information has ever filtered out of the country. And Lee (2011) points out that on topics such as North Korea's military population, it provides several figures that are not consistent with each other.

### **Analysis of changes in total fertility rate for each period**

Here, we calculate the contribution of each factor to the change in the total fertility rate in order to identify the main factors affecting the decline in the total fertility rate in North Korea. The contribution of nuptiality was measured under the assumption that the marital fertility rate remained unchanged, and the contribution of the marital fertility rate was measured under the assumption that nuptiality remained unchanged. In addition, the total fertility rate with non-marital status was measured in the same way.

The change in the total fertility rate during periods 0 and 1 can be decomposed as follows.

$$\begin{aligned}
 TFR_1 - TFR_0 &= \sum w_{i1} b_{i1} - \sum w_{i0} b_{i0} + \sum (1 - w_{i1}) c_{i1} - \sum (1 - w_{i0}) c_{i0} \\
 &= \sum (w_{i1} - w_{i0}) b_{i1} + \sum w_{i0} (b_{i1} - b_{i0}) \\
 &\quad + \sum (1 - w_{i1} - (1 - w_{i0})) c_{i1} + \sum (1 - w_{i0}) (c_{i1} - c_{i0}) \\
 &= \text{contribution of nuptiality} + \text{contribution of marital fertility rate} \\
 &\quad + \text{contribution of (1-nuptiality)} + \text{contribution of non-marital fertility rate}
 \end{aligned}$$

where

$TFR_0$  : total fertility rate in base period (0),

$TFR_1$  : total fertility rate in comparative period (1),

$w_{i0}$ : nuptiality of base period (0) of women aged  $i$  years,

$b_{i0}$ : marital fertility rate of base period (0) of women aged  $i$  years,

$c_{i0}$ : non-marital fertility rate of base period (0) of women aged  $i$  years,

$w_{i1}$ : nuptiality of comparative period (1) of women aged  $i$  years,

$b_{i1}$ : marital fertility rate of comparative period (1) of women aged  $i$  years,

$c_{i,1}$ : non-marital fertility rate of comparative period (1) of women aged  $i$  years.

In the 1990s, during the “Arduous March”, the total fertility rate decreased by 0.65 compared to the 1980s, and decline in the total fertility rate in the 1990s was mainly due to changes in the marital fertility rate. Then, the decline in the total fertility rate in the 2000s was due to changes in both the marital fertility rate and the nuptiality. In the 2010s, when the Kim Jong-un regime came to power, the total fertility rate decreased by 0.16 compared to the 2000s, and the contribution of nuptiality, the marital fertility rate, and the total fertility rate with non-marital status was calculated as  $-0.17$ ,  $-0.02$ , and  $+0.03$ , respectively. The contribution rate of nuptiality exceeded that of the marital fertility rate.

Table 5. Contribution of the Change<sup>1)</sup> in the Total Fertility Rate by Factor

	(persons)			
	1980s	1990s	2000s	2010s
<b>Total fertility rate</b>	<b>2.53</b>	<b>1.88</b>	<b>1.55</b>	<b>1.39</b>
<b>Change in total fertility rate</b>	<b>-</b>	<b>-0.65</b>	<b>-0.33</b>	<b>-0.16</b>
Contribution of the marital fertility rate	-	-0.71	-0.17	-0.02
Contribution of the nuptiality	-	+0.04	-0.19	-0.17
Contribution of the total fertility rate with non-marital status	-	+0.02	+0.03	+0.03

Note: 1) This is an increase and decrease compared to 10 years ago. For example, the increase or decrease in the 1990s is a measure of the increase or decrease in the total fertility rate from 1990 to 1999 compared to the total fertility rate from 1980-1989.

Trends of each component of the total fertility rate are as follows. Looking at the nuptiality (Table 7), the nuptiality of women aged 25-29, considered the marriageable age, reached 85.6% in the 1980s and 83.5% in the 1990s, but has decreased significantly to 75.3% in the 2000s and to 60.7% in the 2010s. Also, the nuptiality of women aged 45-49 was 92.6% in the 1980s, but has decreased to the mid-80% range since the 1990s. This is believed to be mainly due to the increased mortality rate among men after the “Arduous March,” the period of mass starvation and general

economic crisis during 1995-1999. On the other hand, for those aged 20-24, it temporarily rose from 27.3% in the 1980s to 31.6% in the 1990s, but then fell again. According to the testimony of North Korean refugees, not a few women chose early marriage due to economic difficulties during the Arduous March in the 1990s.

Table 6. Trends in the Nuptiality by Age

(%)

	Age Group						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1980-1989	0.6	27.3	85.6	96.5	93.9	90.0	92.6
1990-1999	1.4	31.6	83.5	94.8	93.6	89.3	84.7
2000-2009	0.9	25.2	75.3	90.6	90.3	89.7	86.4
2010-2019	3.4	23.5	60.7	82.1	88.9	87.7	86.0

Note: Authors' calculations based on the results of a survey of North Korean refugees

Next, looking at the estimated marital fertility rate (Table 7), the fertility rate for married women aged 25-29 and 30-34 decreased significantly since the 1990s. This seems to be because they were severely affected by the economic crisis. However, the marital fertility rate for women aged 20-24 temporarily increased in the 1990s and then began to decrease in the 2000s.

Table 7. Trends in the Marital Fertility Rate by Age

(persons)

	Age Group							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	15-49
1980-1989	0.00	1.46	1.47	0.78	0.12	0.00	0.00	<b>2.52</b>
1990-1999	1.11	1.55	1.12	0.35	0.05	0.03	0.00	<b>1.85</b>
2000-2009	0.50	1.47	0.97	0.32	0.09	0.01	0.01	<b>1.50</b>
2010-2019	0.86	1.26	0.99	0.30	0.09	0.03	0.01	<b>1.30</b>

Note: Authors' calculations based on the results of a survey of North Korean refugees

Meanwhile, the estimated total non-marital fertility rate (Table 8) shows that it has remained low overall, but has continued to increase slightly since the 1990s. However, when looking at it by age, the total non-marital fertility rate of women aged 15-19 and 20-24 has shown a relatively rapid increase since the 2010s.

Table 8. Trends in the Total Non-Marital Fertility Rate by Age (persons)

	Age Group							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	15-49
1980-1989	0.00	0.01	0.00	0.00	0.00	0.00	0.00	<b>0.01</b>
1990-1999	0.00	0.02	0.00	0.00	0.00	0.00	0.00	<b>0.03</b>
2000-2009	0.00	0.02	0.02	0.01	0.00	0.00	0.00	<b>0.05</b>
2010-2019	0.02	0.04	0.03	0.01	0.00	0.00	0.00	<b>0.09</b>

Note: Authors' calculations based on the results of a survey of North Korean refugees

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