

A REPORT OF THE CSIS
KOREA CHAIR

Demography of a Reunified Korea



January 2013

Author

Elizabeth Hervey Stephen



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DEMOGRAPHY OF A REUNIFIED KOREA

By Elizabeth Hervey Stephen

At this time it is impossible to know when, or the conditions under which, North and South Korea might be reunified. This exploratory paper, though, analyzes the current demographic characteristics of the two countries and sets out potential scenarios given conditions that might exist during and following reunification. The South Korean government clearly prefers that an economic integration precede political integration; a complete collapse of the North Korean government is the least desired outcome.¹ The demographic outlook for a unified peninsula will be closely tied with the pace and form of political and economic integration. For the purpose of this paper, it is assumed that the process will be gradual and peaceful, as desired by the South Korean government and the international community—what Wolf has termed the “gradualist scenario.”² While analysis to date has examined military, economic, and geopolitical dimensions of the reunification process and end state, it is also critical for planners and policymakers to understand the current and potential demographic dynamics of the peninsula.

In order to prepare the possible demographic simulations for the reunified country, it is important to first examine the demographic portraits of the two countries. Demographic data from South Korea are plentiful and of excellent quality. North Korea conducted a census in 2008, with the assistance of the United Nations Population Fund. This gave the rest of the world a rare demographic glimpse into the country, so it is possible to compare characteristics of the two countries.

As of April 1, 2008, North Korea totaled 24.1 million people, nearly 2.8 million more than in their previous census in 1993. This translates into an annual average growth rate of 0.85 percent.³ South Korea had twice the population of North Korea, with 48.4 million people in 2008, but is growing at the much smaller annual rate of 0.3 percent.⁴

North Korea is likely the most homogenous country in the world. Of the 23.3 million people who answered the question on nationality, only 553 reported not being Korean. All of the non-Koreans are 25 years old or older and 89 percent are female. The odd sex ratio may be a result of the median age of these 533 people being 67.29 years. It appears that nearly all of the non-Koreans were in North Korea prior to or during the Korean War.

1. Soogil Young, Chang-Jae Lee, and Hyoungsoo Zang, “Preparing for the Economic Integration of Two Koreas: Policy Challenges to South Korea” in *Economic Integration of Korean Peninsula*, ed. Marcus Noland (Washington, D.C.: Institute for International Economics, 1998), 251.

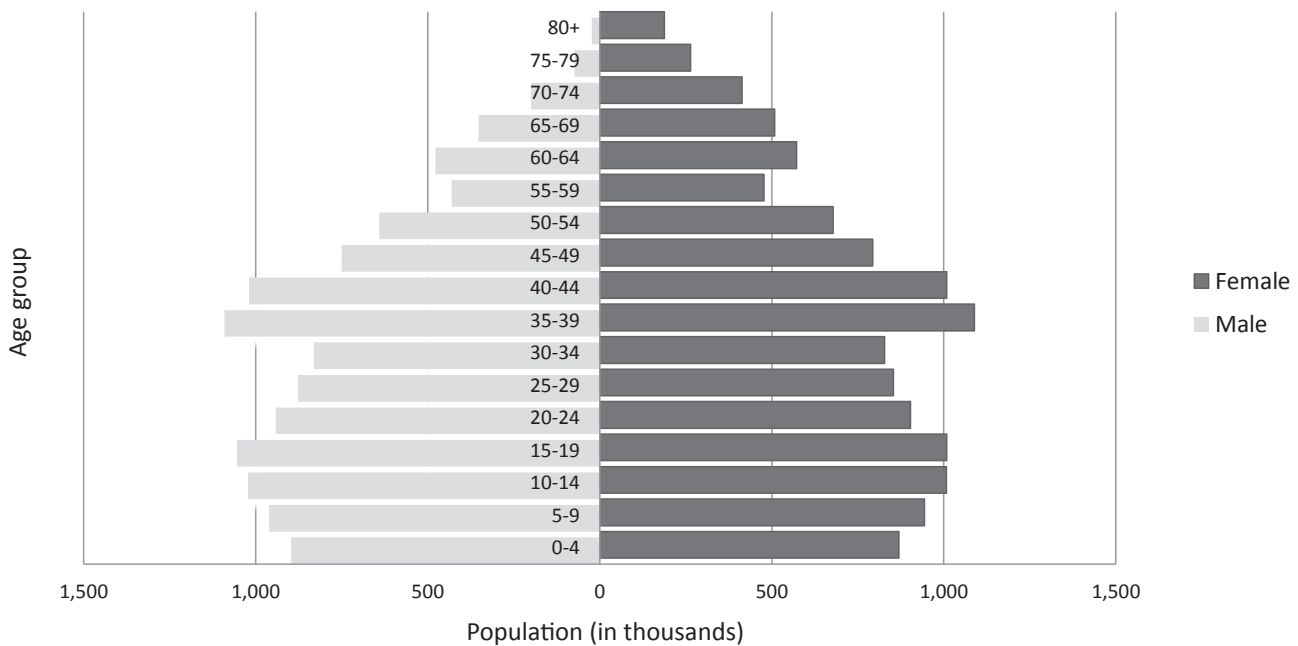
2. Holger Wolf, “Korean Unification: Lessons Learned from Germany,” in *Economic Integration of Korean Peninsula*, ed. Marcus Noland (Washington, D.C.: Institute for International Economics, 1998), 167.

3. Yong Seung Dong, “North Korea’s Declining Life Expectancy,” *SERI Quarterly*, April (2010): 110–14.

4. U.S. Census Bureau, International Data Base, 2012, <http://www.census.gov/population/international/data/idb/country.php>.

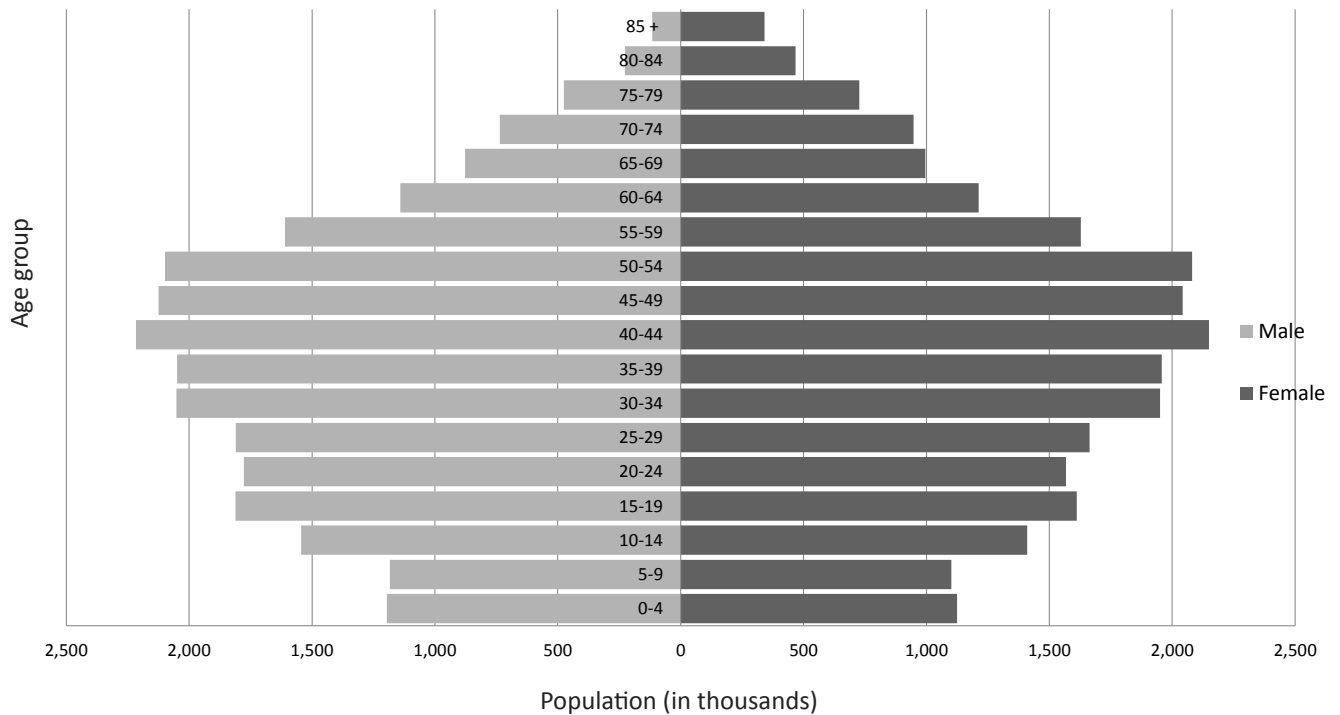
The population pyramid for 2008 shown in figure 1 mirrors various upheavals and struggles in North Korea. The Korean War had a significant effect on the population distribution, with the male cohorts aged 75 and above in 2008 being considerably smaller than that of females. In addition, the 1948–1953 birth cohort (aged 55–59 in 2008) is smaller than previous and successive cohorts, which indicates that there was a fertility decline and possibly higher infant mortality during the war. There is an echo effect from the small birth cohort of 1948–1953. The cohort aged 30–34 in 2008 (born between 1973 and 1978) is smaller than cohorts on either side, which is a result of their parents’ small birth cohort moving through the prime reproductive years. Government policies that encouraged parents to have one or two children in the 1970s and early 1980s are reflected in the relatively smaller 2008 cohorts of persons aged 20–29. The smaller cohorts aged 15 and under in 2008 reflect mortality of children related to the famine and floods of the mid-1900s, as well as a slight decrease in fertility.

Figure 1. Population pyramid of North Korea: 2008 (in thousands)



A population pyramid for South Korea in 2012 (figure 2) highlights the decrease in fertility decline that has resulted in smaller cohorts in every age below age 40, with the effect of low fertility most evident in the 0–4 and 5–9 age groups. Fertility declines will be discussed in more detail below. The effect of the Korean War is also evident in the oldest age groups, with more females than males, although this is a typical pattern of higher mortality among males. Overall the age distribution of South Korea is much less irregular than that of North Korea.

Figure 2. Population Pyramid of South Korea: 2012 (in thousands)



In an analysis of the North Korean 1993 census data, Spoorenberg and Schwekendiek state: “Given the long-term demographic disturbance caused by the Korean War most of the classic measures devised by demographers to assess data quality...are not appropriate.”⁵ This observation echoes through the 2008 census data. All of the standard measures of data quality calculated by the authors were inconclusive. Their data analysis indicates that the 1993 census excluded 691,000 persons—likely nearly all males who were in the military.⁶ The 2008 census, however, appears to have included nearly all of those in the military, so the census undercount in 2008 is much lower than in 1993.

The broad age distribution is shown for North and South Korea in 1993 and 2008 in table 1. While North Korea has become a slightly older country in the 15 years (moving from 5.4 percent in 1993 to 9.0 percent in 2008 of the population being elderly), South Korea has become a much older country as a result of sustained low fertility levels with elderly comprising 5.4 percent in 1993 and 10.3 percent in 2008. If we look at a more refined measure of the age distribution—the median age—we see that the median age of North Korea in 2008 was 30.1 for males and 33.7 years for females as compared to 35.3 years for males and 37.4 years for females in South Korea.⁷

5. Thomas Spoorenberg and Daniel Schwekendiek, “Demographic Changes in North Korea: 1993–2008,” *Population and Development Review* 38, no.1 (2012): 139.

6. *Ibid.*, 133–158.

7. Jae-Un Limb, “Study puts spotlight on effects of North’s famine,” *Korea JoongAng Daily*, November 23, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928743>; Jungui Lee and Min-A Jung, “South Korea: Statistical Profile,” *Country Statistical Profile* 4 (2008): 1–12, http://www.bc.edu/content/dam/files/research_sites/agingandwork/pdf/publications/CP04_Workforce_Korea.pdf (web publication by the Sloan Center on Aging and Work at Boston College).

Table 1. Percent Age Distribution by Broad Age Group, North and South Korea, 1993 and 2008

	North Korea 1993	North Korea 2008	South Korea 1993	South Korea 2008
Population aged 0–14	26.9	23.9	24.5	17.4
Population aged 15–64	67.6	67.1	70.1	72.3
Population aged 65+	5.4	9.0	5.4	10.3

Fertility

Historical data on fertility in North Korea are very limited because no published data were available prior to the 1993 census. Eberstadt reconstructed data from the North Korean Central Statistics Bureau to estimate and project the Total Fertility Rates (TFR) from 1960 to 2010.⁸ The historical trends in the TFRs for both countries are shown in figure 3. The North Korean trend is based on Eberstadt’s data through 1992, which utilizes U.S. Census Bureau estimates and projections based on the 1993 census up through 2007, and the TFR for 2008 is based on the 2008 census. Both countries had high-fertility years in the early 1970s, as is evident in figure 3, which corresponds to the relatively large age cohort of 35–39 seen in both population pyramids (figures 1 and 2). In both countries the age cohort of 40–44 is the largest, but reliable TFR data were not available for figure 3 for the 1960s. The rapid fertility declines in North Korea in the 1970s were followed by more gradual declines in the 1980s and 1990s, reaching replacement-level fertility in 1996 and remaining fairly steady through to 2008.

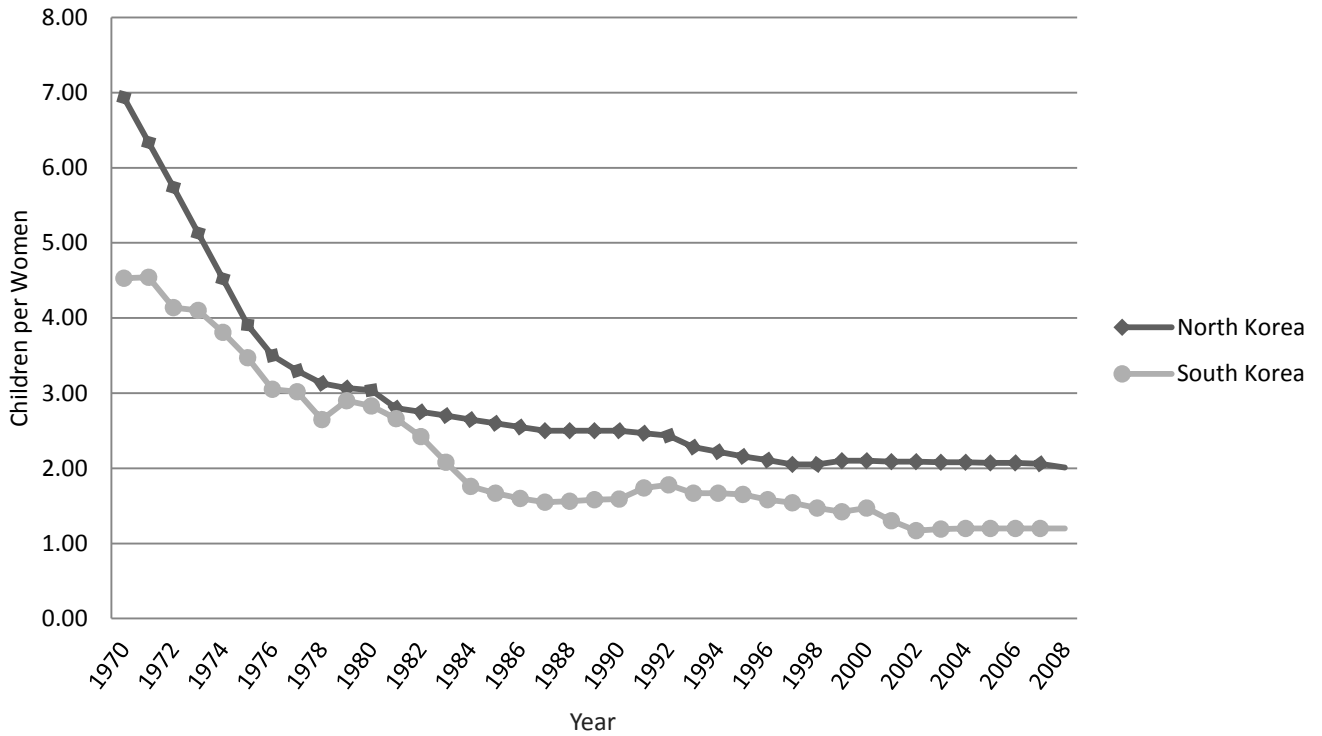
The TFR in South Korea was 4.53 in 1970, more than two children less than North Korea, but by 1976 the two countries had similar fertility levels. Since 1983 South Korea has experienced below-replacement fertility, which was a 54 percent decline in fertility between 1970 and 1983 (figure 3). In the next 20 years, the TFR dropped from 2.08 children per woman in 1983 to 1.19 in 2003, and has remained steady at 1.2 ever since 2003. This sustained low fertility level is one of the most dramatic in the world and is unprecedented historically.

The age-specific fertility rates of North Korea by urban/rural status and for South Korea are shown in figure 4. Fertility in North Korea is highly concentrated in the 25–29 age group, which is evidence of family formation that follows participation in the armed forces and effective use of abortion and family planning (Schwekendiek 2011).⁹ The only two age groups with any other

8. Nicholas Eberstadt, “Population and Labor Force in North Korea: Trends and Implications,” *Journal of the Population Association of Korea* 14, no. 2 (1991): 18–44.

9. Daniel Schwekendiek, *A Socioeconomic History of North Korea* (Jefferson: McFarland, 2011), 49.

Figure 3. Total Fertility Rates of North Korea and South Korea: 1970–2008

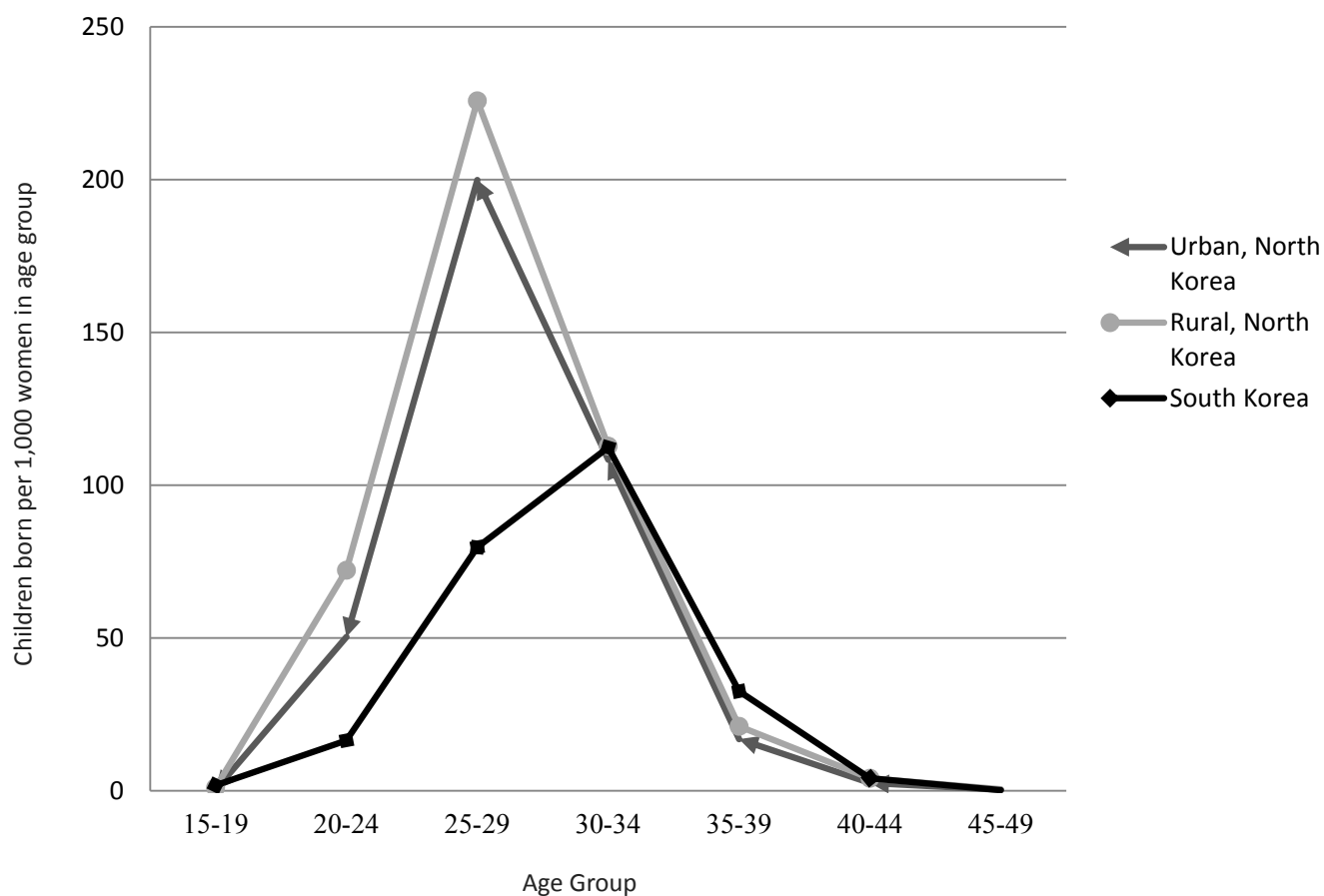


notable levels of fertility are 20–24 and 30–34. Teenage childbearing is virtually nonexistent, since fertility occurs within marriage, and marriage is not allowed until after government military service is completed. Also, there is little fertility in the older reproductive ages, which reflects a high level of women’s labor-force participation and lower rates of fecundity after age 35. Fertility in rural areas is slightly higher than in urban areas, but the pattern is remarkably similar for both.

The age-specific fertility rates for South Korea are also shown in figure 4. Fertility reaches its apex in the 30–34 age group, but at a much lower level than observed with the North Korean apex in the 25–29 age group. In addition, fertility in South Korea is much more evenly distributed across prime reproductive age groups than was evident in North Korea, but still there is virtually no childbearing in the teen years and little fertility among the women in the oldest reproductive ages.

Both countries could be facing the effects of infertility, but for differing reasons. Women who postpone fertility in South Korea may face age-related infertility; famine-related health effects may limit fertility of North Korean women.

Figure 4. Age-specific Fertility Rates for North Korea by Urban-rural Status and for South Korea: 2008



Household Composition and Marital Status

Nearly everyone in North Korea marries, and the divorce rate is extremely low. Only 0.2 percent of men and 0.7 percent of women are divorced or separated. Widowhood is much more common for women than men, with 15.6 percent of women aged 15 and over being widowed and only 1.2 percent of men. This likely reflects the much longer life expectancy of women in the country, as was evident in the population pyramid (figure 1) and the older age at first marriage for men than women. Also, men may be more likely to remarry if their spouse dies.

By ages 30–34 only 4 percent of North Korean women and by ages 35–39 only 2 percent of the men had never been married.¹⁰ Mean age at first marriage in North Korea as of 2008 was 29.0 years for men and 25.5 years for women, as compared to the South Korean mean ages of first marriage of 31.4 years for men and 28.3 years for women as of 2008.¹¹ Although completion of

10. Carl Haub, “North Korea Census Reveals Poor Demographic and Health Conditions,” *Population Reference Bureau*, December 2010, <http://www.prb.org/Articles/2010/northkorea-population.aspx>.

11. “Census figures reveal North Korea is also an aging society,” *The Hankyoreh*, March 17, 2010, http://www.hani.co.kr/arti/english_edition/e_northkorea/410578.html.

military service is one factor in delaying marriage in South Korea as well as in North Korea, other socioeconomic and ideational factors have been the primary reason for an increasing first age at marriage in South Korea.¹²

There are nearly 5.9 million households in North Korea, with an average of 3.9 persons per household.¹³ About a quarter of the population lives in nuclear households; nearly three-quarters live in extended families; and less than 1 percent live in “other” households, which would include single persons or households with a non-relative. Three-quarters of the other households consist of just one person. Differences in the percentage of extended households by urban and rural status are negligible; 74 and 76 percent of the urban and rural populations, respectively, live in extended-family households. The lack of differentiation between rural and urban is difficult to interpret, since the definition of urban/rural is unknown. Eberstadt likewise noted that there is not a single standard definition for urban/rural, and that urban blocks (*dong*) are sometimes, but not always, defined as areas in which 3,000 industrial workers are employed.¹⁴ If we can surmise anything about the lack of rural/urban difference in extended families, it does indicate the predominance of the extended-family structure throughout the country and that North Korea is not yet following the pattern of most industrialized countries, with urban areas more commonly consisting of nuclear and single-person households.

Schewendiek notes that family life in North Korea has been surpassed by collective life, that is, more time is spent with coworkers and the social unit than with own families.¹⁵ This has the value for the country of substituting the national leader (Kim Il-Sung, Kim Jong-il, and now Kim Jong-un) as the “benevolent father,” by controlling leisure activities in social units, and by promoting political and social cohesion while tamping down potential political criticism. The rigid *songbun* classification system in North Korea results in virtually no upward mobility, and as a result marriage partners are generally from the same class.¹⁶

Data on households and families are not categorized the same way in South Korea; however, to give some comparison, 67 percent of South Korean households are nuclear, 11 percent are extended families, 20 percent are single-person households, and 1 percent live in non-related households.¹⁷ This reflects the more common family pattern associated with development and indicates the vast differences in family and household structure in the two Koreas.

12. Elizabeth Hervey Stephen, “Bracing for Low Fertility and a Large Elderly Population in South Korea,” *On Korea: Korea Economic Institute Academic Paper Series* 6 (2012): 1–10, http://67.227.178.49/sites/default/files/publications/aps_doc_elizabeth_stephens.pdf.

13. United Nations Fund for Population Activities, “2008 Census of Population of DPRK Key Findings,” 2010, http://www.unfpa.org/webdav/site/global/shared/documents/news/2010/dprk08_censuskeyfinds.pdf.

14. Nicholas Eberstadt, *Korea Approaches Reunification* (New York: M. E. Sharpe, Inc., 1995), 85.

15. Schewendiek 2011: 47.

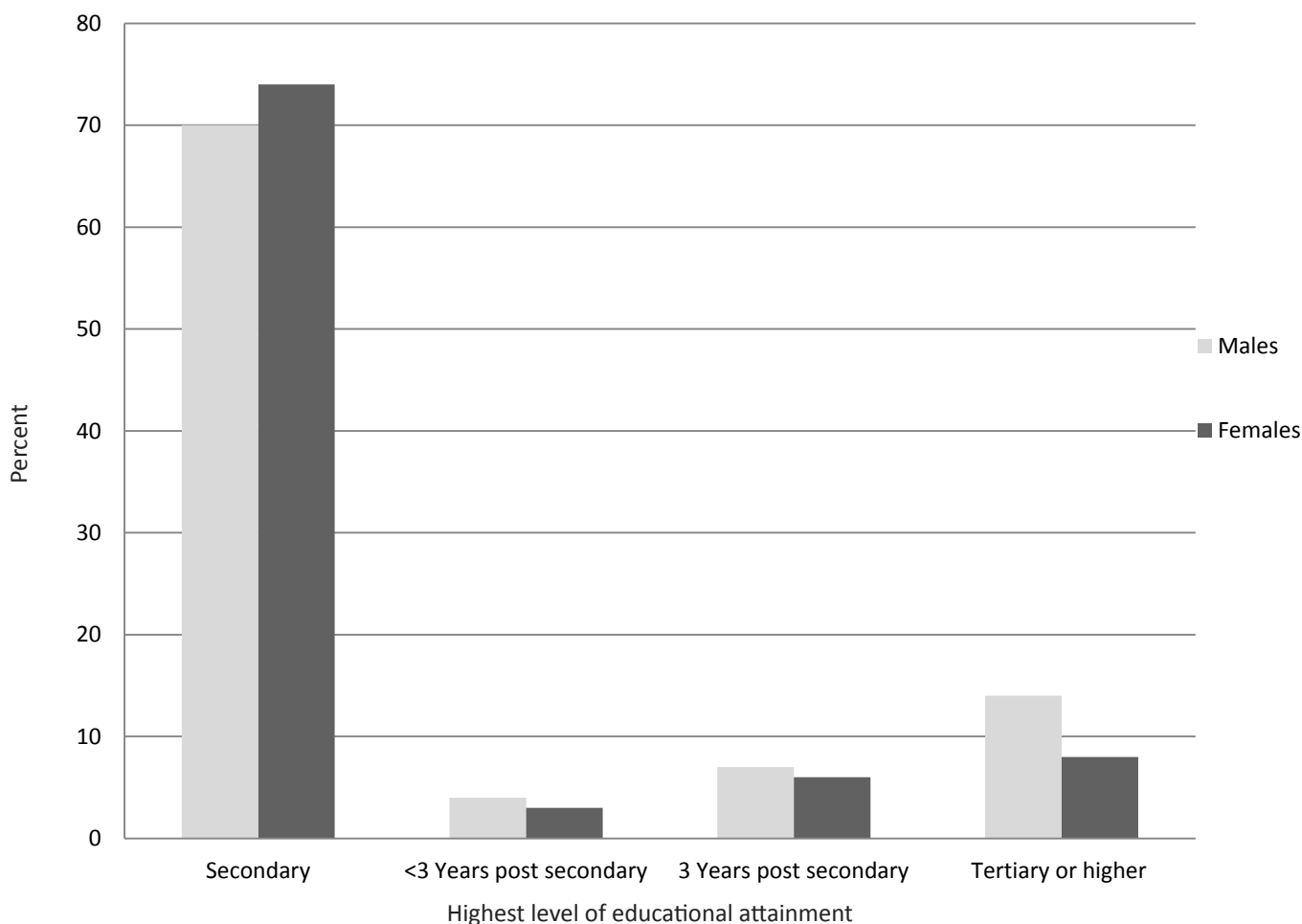
16. *Songbun* is North Korea’s sociopolitical classification system that regulates nearly every aspect of daily life. The word is translated as “ingredients” or “material,” but basically the system “identifies, assesses, categorizes, and politically stratifies each North Korean resident as a political asset or liability to the socialist revolution and the regime in general and to the ruling Kim family specifically” (Collins 2012: 6). In most basic terms, the system consists of the core (*haeksim*) class, the wavering (*dongyo*) class, and the hostile (*choktae*) class. A rich description of the classes and the devastating effect of the system on the country is given in Collins (2012).

17. Korean Statistical Information Service (KOSIS), Statistical Database for 2011, <http://www.kosis.kr/eng>.

Literacy and Education

According to the 2008 census, only 326 persons aged 10 or older in North Korea are illiterate: 232 are female and 165 are over the age of 80. Thus it appears that the government’s push for literacy and education has been realized. Schooling for children up through 11th grade is free and compulsory, as a result the school attendance rate is nearly 100 percent for both boys and girls.¹⁸ The difference between males and females aged 15 and over is evident in completion rates for tertiary or higher education, as seen in figure 5. Fourteen percent of males and 8 percent of females had completed a tertiary degree.

Figure 5. Educational Attainment Status for North Koreans, age 15 and over: 2008



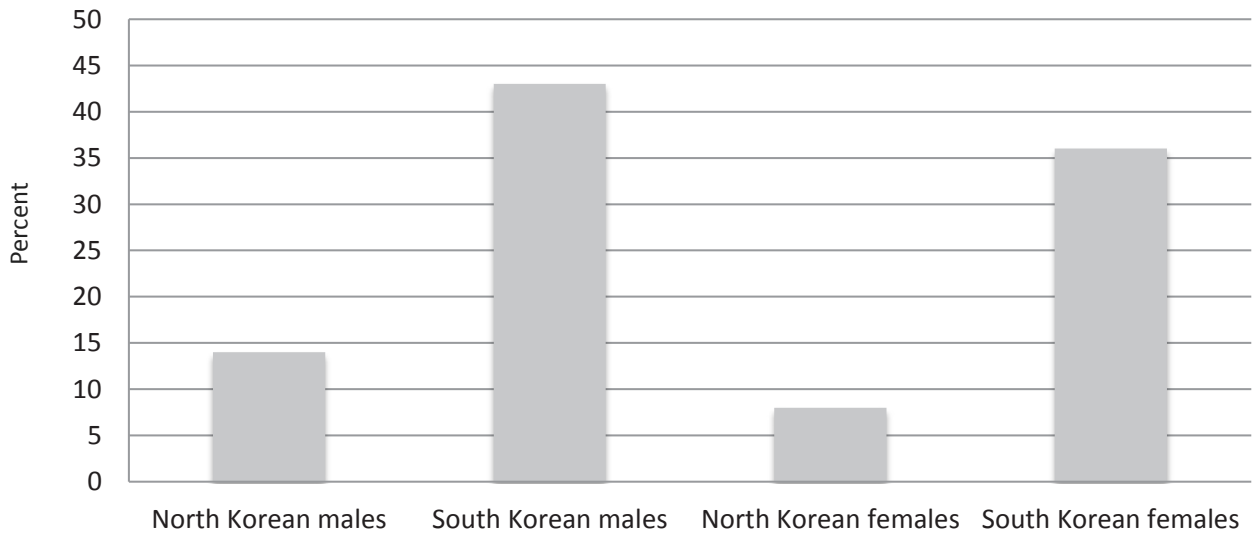
In comparison, 43 percent of South Korean males and 36 percent of females aged 25–64 (as of 2007) had completed a tertiary degree (figure 6).¹⁹ Differences in tertiary completion rates for North Korean males and females are most pronounced by urban/rural status. Among the population aged 15 and over, in urban areas 15 percent of men have a tertiary degree, compared with 10

18. “2008 Census of Population of DPRK [Democratic Peoples Republic of Korea] Key Findings.”

19. “Organization of Economic Cooperation and Development, database for 2011, <http://www.oecd.org>.

percent of urban women, 10 percent of rural men, and 4 percent of rural women. This pattern likely reflects that most colleges and universities are in urban areas, as well as positions requiring a higher education.

Figure 6. Tertiary Education by Sex, North and South Korea: 2007-2008



The labor force participation rate in North Korea is high, particularly for males (80 percent), as seen in figure 7a. Nearly a quarter of women are retired (23 percent) and 10 percent report housework as their usual activity (figure 7b).

Figure 7a. Usual Activity for North Korean Males, 2008

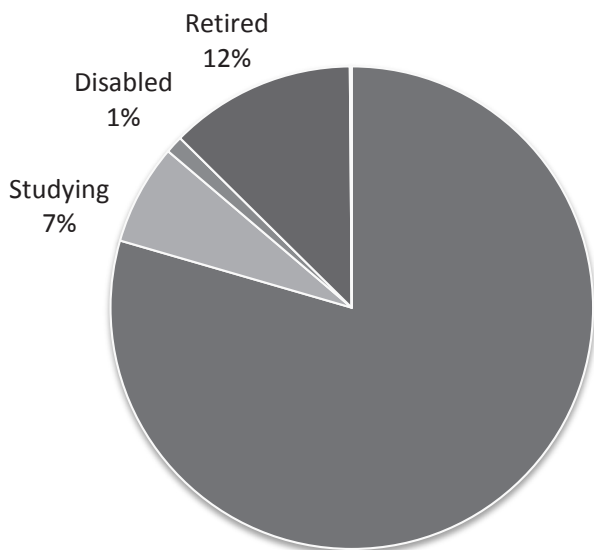
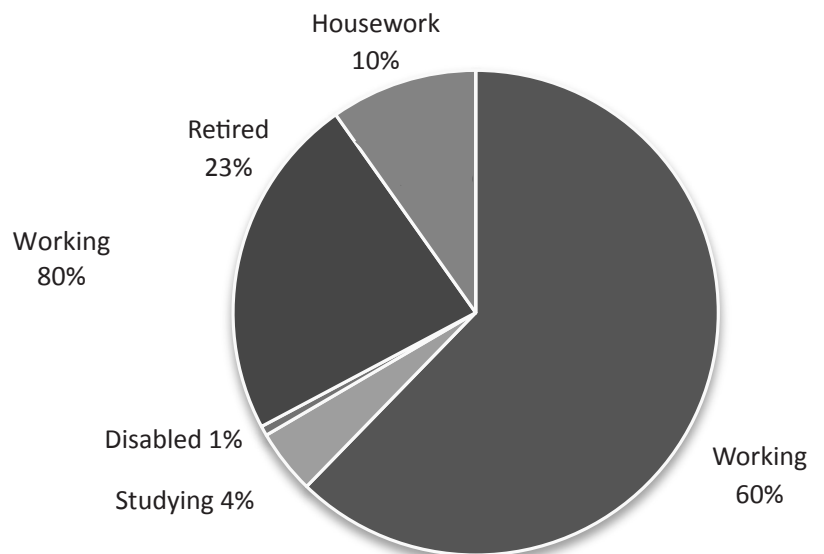


Figure 7b. Usual Activity for North Korean Females, 2008



The North Korean census reveals many interesting facets of life in the country that are far removed from developed countries. For instance, data are included on the type of household economic activity that persons aged 15 and over are engaged in: fruit/vegetable gardening; fishing/raising livestock and/or poultry; gathering firewood; fetching water; other household economic activity. As seen in table 2, even a high percentage of persons—men and women—living in urban areas perform these activities, but again there should be caution, since it is unclear what comprises the definition of urban. It is likely that raising livestock and growing fruit and vegetables were key activities during famines, and given current depleted food supplies may remain a common household economic activity. The census data closely parallel the narrative of life in North Korea, as reported by refugees who reached South Korea.²⁰

Table 2. Percentage of North Korean Population Aged 16 Years and Older Engaged in Household Economic Activities, by Type of Economic Activity, Gender, and Urban/rural Status, 2008

	Fruit/Vegetable Gardening	Fishing/Raising Livestock and/or	Gathering Firewood	Fetching Water	Other Household Economic
Urban					
Male	42.6	33.0	38.8	13.7	12.7
Female	47.8	40.5	25.0	22.1	17.9
Rural					
Male	60.1	48.1	53.1	17.9	15.4
Female	84.9	73.0	43.0	38.3	17.9

Housing

North Korean housing is entirely owned by the state and is allocated according to a family's *songbun* status. In theory everyone has a home, so there is no homeless population, although during the worst part of the famine there were homeless families. Newly married couples may have to co-reside in a parental home for as long as five years until they are assigned housing, as a result of a housing shortage. Only the top party leaders receive the highest level of housing in Pyongyang. Collins estimates that 15 percent of the population lives in the next lower level of housing, which would primarily be high-rise apartments of approximately 121–182 square meters.²¹ About 60 percent of the housing stock is in the lowest level of housing, which includes small apartments, farmers' houses, and older homes for general laborers, agricultural workers, and farm residents.²²

20. Barbara Demick, *Nothing to Envy: Ordinary Lives in North Korea* (New York: Spiegel and Grau, 2009), 133–59.

21. Robert Collins, *Marked for Life: Songbun North Korea's Social Classification System* (Washington, D.C.: Committee for Human Rights in North Korea, 2012), 76.

22. *Ibid.*, 75.

The 2008 census data for North Korea match up with Collins' estimates fairly closely, but paint perhaps an even bleaker picture about the division between the elites and everyone else. About two-fifths (44 percent) of houses are row houses, 34 percent are single detached houses, 21 percent are apartments, and 1 percent others. Nearly three-fourths (73 percent) of the households have a floor area of 50–75 square meters; only 2 percent have a floor area of 100 square meters or larger.

Although a sizable portion of the population fetched water, 90 percent of homes in urban areas and 78 percent in rural areas have water piped in. How often water is delivered through the pipes to homes is unclear. The 2009 Multiple Indicator Cluster Survey report states: "Today the piped water system does not always function well and is reliant on electricity which is not always available. The piped system, however, remains in the household. Therefore when people are asked to identify their main source of drinking water they are likely to state 'piped water' even if that is not their only source of drinking water and even if they can only obtain water from this source for a short period in a day."²³ Private flush toilets are in two-thirds of urban homes and 46 percent of homes in rural areas.

Heating comes from two primary sources: 47 percent have a coal boiler or briquette hole in the home, and 45 percent have a wood hole. These values reinforce the sizable percentage of the population involved in gathering firewood, even in urban areas. Wood is used as cooking fuel in 77 percent of rural households and by 28 percent of urban households. Coal is used for cooking by 19 percent of rural homes and 63 percent of urban homes. Taken together, wood and coal are used in 93 percent of North Korean homes.

Health

The only health data reported in the 2008 North Korean census are for four disability categories. A small percentage of persons reported any disability: sight (2.4), hearing (1.7), mobility (2.5), and mental facility (1.5).²⁴ It is not evident why the percentages of people with a disability are so small, although it is likely that respondents did not want to identify themselves on a government document as having a disability. The census report states that people in all households and institutional living quarters were counted; however, it is possible that not all group quarters that might house people with disabilities were included in the census. Article 72 of the North Korean constitution entitles everyone to free medical care, including those no longer able to work because of old age, illness, or a physical disability, but it is more likely that persons with disabilities face discrimination.²⁵ No one with a disability is allowed into Pyongyang; elderly and disabled persons who are retired from work on medical disability are entitled to 400 grams of grain per capita (daily), in comparison to 700 grams for most military officers, most heavy-industrial and clerical workers, technicians and professors, party officials, and college students.²⁶

Although the North Korean census included limited information on health, additional information can be gleaned from life-expectancy rates. Life-expectancy rates for the two countries vary by source, so for consistency, data are used here from the U.S. Census Bureau. In North Korea life

23. Central Bureau of Statistics (CBS), *DPR Korea Multiple Indicator Cluster Survey 2009, Final Report* (Pyongyang, DPRKorea: CBS, 2010), 54–55.

24. "2008 Census of Population of DPRK Key Findings."

25. Schwekendiek 2011: 63

26. *Ibid.*, 64. Schwekendiek 2011: 64.

expectancy at birth declined from 68 years in 1993 to 63 years in 2002, and has rebounded to 69 years in 2012. South Korea's life expectancy at birth increased from 73 years in 1993 to 77 years in 2002 and 79 years by 2012. Thus the gap was widest in 2002 at 14 years, but remains at 10 years in 2012.²⁷ The Korea Institute for Social and Health Affairs published a report that the gap in life expectancy was 11 years, so it appears that current data are fairly consistent and reflect a large gap between the two countries.²⁸

The gap between health indicators in the two countries started to diverge in the 1990s. Schwekendiek has noted that the socialist regime was effective in providing a health-care system after the Korean War, with free health care for all and a national vaccination system initiated in the 1960s.²⁹ Doctors and hospital beds per 10,000 persons in North Korea have far exceeded South Korea, which has ensured an effective monitoring of each citizen's health condition at the district level and the ability to launch mass campaigns. On the other hand, the reliance on local herbs and acupuncture and an inability to import medical equipment has left the country with severe shortages, including x-ray machines and drugs being sold in the black market, sometimes even by doctors.³⁰

Another source about North Korean health is the Multiple Indicator Cluster Survey; the North Korean Central Bureau of Statistics, in partnership with the United Nations Children's Fund (UNICEF), conducted the most recent survey in 2009. The survey had an extraordinarily high response rate: "Of 7 500 households selected for the sample, 7 500 were occupied. Of these, 7 496 were successfully interviewed. Response rates were so high because selected households were contacted before the teams arrived and it was recommended to them that they stay at home to await the survey team."³¹ Among children aged 5 and under, 19 percent were reported as underweight, 32 percent stunted, 5 percent wasted, and no one was overweight.³² These values are high, but a nutritional survey conducted by the World Food Programme in August 1997 (in conjunction with the North Korean government) reported rates of 16.5 percent of children 5 and under as wasted and 38.2 percent as stunted in North Korea.³³ The two surveys were not identical in sampling and design, so the values should not be compared directly, but indications are that wasting has declined and stunting has decreased slightly since the 1990s.

27. "International Data Base."

28. Hyo-suk Lee, "North Koreans live 11 years less than South Koreans," *Korea Times*, March 25, 2012, http://www.koreatimes.co.kr/www/news/nation/2012/03/117_107667.html.

29. Schwekendiek 2011: 61–62

30. "North Korea: Testimonies of Famine," Médecins Sans Frontières, <http://www.doctorswithoutborders.org/publications/article.cfm?id=1468>.

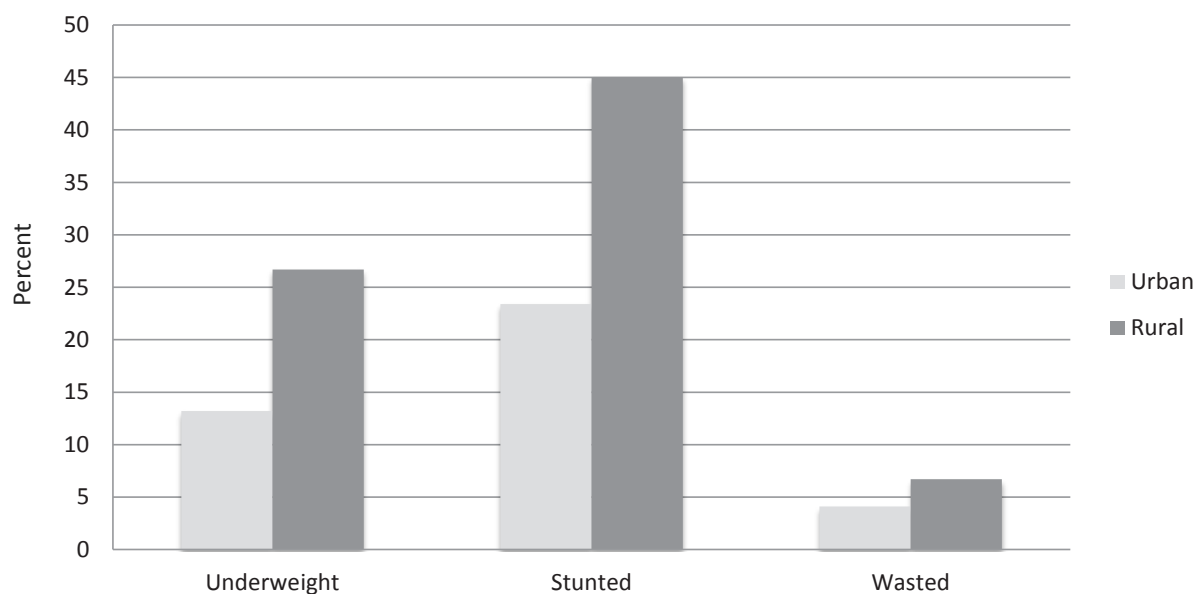
31. Central Bureau of Statistics (CBS), *DPR Korea 2008 Population Census National Report* (Pyongyang, Korea: CBS, 2009), 12.

32. Definitions of wasting, stunting, and underweight are defined in the MICS report (2012: 30) as, "Height-for-age is a measure of linear growth. Children whose height-for-age is more than two standard deviations below the median of the reference population are considered short for their age and are classified as *moderately or severely stunted*. Those whose height-for-age is more than three standard deviations below the median are classified as *severely stunted*. Stunting is a reflection of chronic malnutrition as a result of failure to receive adequate nutrition over a long period and of recurrent or chronic illness. Finally, children whose *weight-for-height* is more than two standard deviations below the median of the reference population are classified as *moderately or severely wasted*, while those who fall more than three standard deviations below the median are classified as *severely wasted*. Wasting is usually the result of a recent nutritional deficiency. The indicator may exhibit significant seasonal shifts associated with changes in the availability of food or disease prevalence."

33. Judit Katona-Apte and Ali Mokdad, "Malnutrition of children in the Democratic People's Republic of North Korea," *Journal of Nutrition* 128 (1998): 1315–19.

The urban and rural differentials are notable for wasting and stunting, as seen in figure 8, with twice the percentage of children affected in rural areas as in urban areas. The other remarkable aspect about these data is that the proportion of children who are stunted increases with age; 47 percent of the children 48–59 months of age were stunted—children born long after the famine of the 1990s. It should also be noted that these children would have been born between 2004 and 2009, long after the famine of the 1990s had ended, but is indicative of continued food shortages and rationing. The long-term health effects of stunting are of concern because chronic under-nutrition can cause permanent growth retardation, chronic metabolic disease, impaired cognitive function, impaired immune function, and a reduced physical capacity for labor.³⁴ Most countries would want to prevent the chronic growth retardation evident in North Korea in order to achieve optimal economic conditions and to improve productivity.

Figure 8. Rural-urban Differentials in Children's Nutritional Status of North Korea: 2009



The North Korean population is so short that the country recently reduced the minimum height requirement for military service from 145 cm to 142 cm (4 feet 8 inches), and there are reports that many 16–17-year-olds in North Korea do not even meet that minimum. In comparison, the average South Korean males aged 16–17 are 172 cm in height, which is equivalent to 5 feet 8 inches.³⁵ Kim Eun-ho, a reporter for Free North Korea Radio, reports a source in Chongjin, North Hamgyong Province, as stating that, “The average height of graduating class of high school has

34. Daniel J. Hoffman and Soo-Kyung Lee, “The Prevalence of Wasting, but Not Stunting, Has Improved in the Democratic People’s Republic of Korea,” *Journal of Nutrition* 135 (2005): 452–56.

35. AFP, “North Korea cuts minimum height for military conscripts as past famine consequences hit,” *The Australian*, April 2, 2012, <http://www.theaustralian.com.au/news/world/north-korea-cuts-minimum-height-for-military-conscripts-as-past-famine-consequences-hit/story-e6frg6so-1226316548817>.

lowered to 134 cm (52.8 inch[es]).³⁶ Food rations have been reduced in recent years, with much of the food received from foreign governments and humanitarian organizations going to the military and elite.³⁷ The *Chuseok* harvest festival in fall 2011 was accompanied by the news that daily potato rations would be cut from three to two per person.³⁸

Famine

There is no question that North Korea suffered a severe famine lasting at least between 1995 and 1997. Noland, Robinson, and Wang argue that agricultural production peaked around 1989, and then the country suffered from the collapse of the Soviet Union, with as high as a 90 percent reduction of fuel and food imports.³⁹ The reduction in trade and the decline in agriculture were followed by floods in July and August 1995 that resulted in the loss of 330,000 hectares of agricultural land and 1.9 million tons of grain, only to be followed by additional (though less severe) floods in July 1996, then a drought and tidal waves in 1997.⁴⁰ The drought resulted in a loss of 1.6–1.9 million tons of corn and rice.⁴¹ North Korea's agricultural problems are exacerbated by minimal arable land—only 15 to 20 percent of the country—and by inadequate agricultural practices and an antiquated transportation system.⁴²

Less clear is how many people died as a result of the famine and how morbidity was adversely affected. Goodkind and West used demographic analysis to estimate that famine-related deaths were likely between 600,000 and 1,000,000 in the period from 1995 to 2000; the authors later revised this number downward to 500,000–600,000.⁴³ These estimates dispelled estimates of 3.5 million deaths, which were based on a convenience sample of refugees at the China-North Korea border.⁴⁴ Spoorenberg and Schwekendiek reconstructed the North Korean population using five scenarios to estimate the demographic impact of the famine and the subsequent deterioration in the living conditions and found that the total number of excess deaths from the famine was between 240,000 and 420,000.⁴⁵

It is reasonable to expect that the famine was more severe for children, women, and the elderly. The core class (*haeksim*) of the *Songbun* social stratification system likely suffered less

36. Eun-ho Kim, "N. Korean Military 'Further Lower Height Limit for Fresh Conscripts' (to 53.9 inch[es])," *Free North Korea Radio*, May 17, 2010, <http://www.freerepublic.com/focus/news/2473505/posts>.

37. Collins, *Marked for Life*, 69–70.

38. "Deprive and rule: Why does North Korea's dictatorship remain so entrenched despite causing such hunger and misery?" *The Economist*, September 17, 2011, <http://www.economist.com/node/21529063>.

39. Marcus Noland, Sherman Robinson, and Tao Wang, *Famine in North Korea: Causes and Cure*, Working Paper Series 99-2 (Washington, D.C.: Institute for International Economics, 1999), 3; Andrews S. Natsios, *The Great North Korean Famine: Famine, Politics, and Foreign Policy* (Washington, D.C.: United States Institute of Peace Press, 2001), 11.

40. Noland, Robinson, and Wang, *Famine in North Korea*, 5.

41. Katona-Apte and Mokdad, "Malnutrition of children," 1315–19.

42. Natsios, *The Great North Korean Famine*, 11–16.

43. Daniel Goodkind and Loraine West, "The North Korean Famine and Its Demographic Impact," *Population and Development Review* 27 no. 20 (2001): 219–38; Daniel Goodkind, Loraine West, and Peter Johnson, "A reassessment of mortality in North Korea, 1993–2008" (paper presented at the annual meeting of the Population Association of America, Washington, D.C., March 31–April 2, 2011).

44. BBC, "Asia-Pacific: 3.5m North Koreans starved to death," 2009, <http://news.bbc.co.uk/2/hi/asia-pacific/433641.stm>.

45. Spoorenberg and Schwekendiek, "Demographic Changes in North Korea," 133–58.

from the famine, as did the military. Also there were regional variations of the famine, with South Hamgyong the most affected.⁴⁶

Also apparent from the census data is that there was an ongoing deterioration of living conditions in North Korea resulting from the decline and eventual cessation of Russian imports, separate from the natural disasters affecting the food supply.⁴⁷ The decline in living conditions between 1993 and 2008 caused between 588,000 and 834,000 deaths.⁴⁸ Long-term effects of the food crisis continue, with some of the population receiving international food aid.

A Reunified Korea

Eberstadt has stated that “the partition of Korea into two countries is a completely unnatural arrangement. Koreans share a single language, culture and history...the division of the Korean people could only be maintained by force of arms.”⁴⁹ Although familial ties and history could reunite the Korean continent that has been divided for more than six decades, the two countries have been following two distinct paths in terms of social, political, economic, and demographic structure. This makes the projection of putting the two countries back together a challenging exercise in light of what could be a daunting reality. There are so many unknowns that will surely determine the circumstances of the reunification, including the potential for violence, conflict, and humanitarian suffering. In conjunction with the unknown timing of the reunification, the devastation of potential conflict and loss of life is impossible to comprehend. Eberstadt argued in 1995 that reunification will be “attended by turbulence” and that it will be “a time of wide spread apprehension in the North.”⁵⁰ Those predictions are as likely in 2012 as in 1995. In addition, reunification will surely be both an international crisis and opportunity for China, Japan, Russia, and the United States as well as potential other stakeholders involved in the process.

With each regime change in North Korea, there appears to be an uptick in considering what a reunified Korea would look like. In 1995 Eberstadt thought that the reunification was closer than anyone had thought possible ten years prior. And now 17 years later, with a new leader in North Korea, we examine what might be.

This section of the paper will first focus on the primary demographic variables of fertility, mortality, and migration to consider various scenarios. Other texts have examined the economic and political aspects of reunification, so this paper will focus on the demographic structure of a reunified Korea. These are not expectations but rather what the population would look like if certain conditions were met.

Although it may not seem logical to look at East and West Germany for lessons learned about reunification, Germany offers some critical information. There are many caveats to even mentioning the reunification of Germany in the same paragraph as that of Korea. West Germany was four times the size of East Germany, whereas South Korea is twice the size of North Korea. Although

46. “The Food Crisis of North Korea,” 1999, Goodfriends, <http://www.goodfriends.or.kr/eng/report/1694e.htm>.

47. Stephan Haggard and Marcus Noland, *Famine in North Korea: Markets, Aid, and Reform* (New York: Columbia Press, 2007), 27.

48. Spoorenberg and Schwegendiek, “Demographic Changes in North Korea,” 133–58.

49. Eberstadt, *Korea Approaches Reunification*, xxiii.

50. *Ibid.*, 160.

West Germany was far more economically advanced than East Germany, the differences were small compared to North and South Korea. North Korea does have more natural resources than did East Germany, with North Korea having as much as 30 times the known mineral deposits as does South Korea.⁵¹ Also, the political elite in East Germany were not as adverse to the reunification as surely would be the North Korean ruling elite.⁵² To reiterate the point, no one expects the South Korean reunification to mirror that of Germany, but rather we look to see what happened in the German reunification to consider what might happen in the Korean reunification.

Prior to reunification East Germany experienced fertility levels at or near replacement levels (2.1 children per woman), but following reunification fertility levels dropped from 200,000 births in 1989 to 80,000 births in 1994.⁵³ This dramatic decline was a multifaceted response to the societal and individual effects of uncertainty, loss of free or inexpensive childcare, and migration. Total fertility rates dropped from 1.57 children per woman in 1989 to 0.98 in 1991.⁵⁴

One could imagine that reunification of the Koreas in the best of circumstances would be unsettling, particularly for North Koreans. Eberstadt points out that drastic reductions in live births historically occur "...during times of catastrophe, desperate privation and widespread loss of life."⁵⁵ As noted earlier in this paper, North Korea experienced fertility reduction during the famine of the mid-1990s, so a fertility decline would not be unprecedented and a "birth shock" such as was experienced in Eastern Germany would certainly be plausible, although for a different constellation of reasons than was experienced in Germany.

The first reason is that it is difficult to imagine a peaceful reunification on the Korean Peninsula. War would not only result in a loss of life, but would likely disproportionately affect young men in their 20s, which would lower fertility immediately.

Second, the social, economic, and political upheaval would be tremendous, particularly for North Korea but also for South Korea.⁵⁶ The scope and scale of economic integration will be much larger in Korea than Germany experienced, in particular because North Korea's infrastructure is so primitive and the differences between the two economic systems are so divergent. Also, South Korea is already dealing with its own social and economic challenges of a burgeoning elderly population and extremely low fertility, particularly since the country has only relatively recently developed government-based social security systems.⁵⁷ The tremendous economic costs of integration will stretch the South Korean budget. Also, the political systems of the two countries could not be at more extreme odds; will one supplant the other completely or will some variation of each coexist? Two generations in both countries have seen the other as the enemy; will public policy be strong enough to erase the polemic differences?

51. Edward Yoon, "Status and Future of the North Korean Minerals Sector" (paper prepared for the "DPRK Energy and Minerals Experts Working Group Project," Nautilus Institute for Security and Sustainability at the University of San Francisco Center for the Pacific Rim, San Francisco, January 11, 2011), 3.

52. Foster Klug, "Korea Reunification would Spell Trouble for Seoul," *Huffington Post*, January 4, 2012, http://www.huffingtonpost.com/2012/01/04/korea-reunification_n_1182669.html.

53. Christoph Conrad, Michael Lechner, and Welf Werner, *The Fall of the East German Birth Rate after Unification: Crisis or Means of Adaptation?* (Cambridge, Mass.: Minda de Gunzburg Center for European Studies, Harvard University, 1995), 1–32.

54. Nicholas Eberstadt, "Demographic Shocks after Communism: Eastern Germany, 1989–1993," *Population and Development Review* 20, no.1 (1994): 137–52.

55. *Ibid.*

56. Klug, "Korea Reunification."

57. Stephen, "Bracing for Low Fertility," 1–10

The optimistic scenario is that the two countries are reunified without a major war in which there would be significant loss of life. If that were the case, then South Koreans would outnumber North Koreans two to one, and South Korea would benefit tremendously by a younger North Korean population with higher fertility levels. This would be an instant, short-term help for maintaining a large elderly population with a robust working-age population, assuming that the younger North Korean population provides a stable labor force, which may be a large assumption.

The second demographic variable to consider for reunification is mortality. South Korea is currently ranked 41st in the world in terms of life expectancy at birth (79.3 years, surpassing the United States) and North Korea at 69.2 years as 151st.⁵⁸ This gap will be an extreme challenge to bridge in a reunified Korea, particularly in light of the difference in the way medicine is practiced in the two countries.

The mortality experience of the German reunification was different than will likely occur in Korea. In 1988 life expectancy for females was 70.3 years in East Germany and 71.2 in West Germany; in 1996/97 the respective values were 71.6 and 71.9. The near convergence is not such a surprise given that there was less than a year difference near the time of reunification. For males, there was roughly a one and a half-year gap in 1988 (66.6 in East Germany; 68.0 in West Germany), which remained in 1996/97 (67.9 in East Germany; 69.1 in West Germany).⁵⁹

Much of the improvement in life expectancy at birth in East Germany in the 1990s was a result of funds invested into the medical system; for instance, the number of dialysis facilities in East Germany increased two- to threefold.⁶⁰ The potentially enormous estimated costs of Korean integration will need to include an investment in medical technology and supplies to bring the North Korean medical facilities anywhere near the level currently existing in South Korea. The training of medical personnel in North Korea will also be a challenge that will likely incur significant costs for educating the medical professionals.

Although South Korea was slow to develop a strong health-care system, the National Health Insurance Policy now covers 96.3 percent of the population. A remaining problem is that services, as well as physicians and hospitals, are clustered in South Korean urban areas (90 percent), so rural areas are currently underserved. South Korea is already facing the challenge of a rapidly increasing elderly population that will strain the resources of the South Korean health-care system.⁶¹ The challenge of integrating and funding two different health-care systems is likely to affect mortality levels, at least in certain parts of the reunified country and for some subpopulations.

The other aspect of daily life that affects mortality is nutrition. The reunification of the two countries will require a massive shift in food distribution, which will require updating and upgrading the transportation system in North Korea. In addition, modernization of farms and farm equipment will be required, as well as consistent supplies of fertilizer and fuel. It will not be enough to increase the overall food supply; everyone must have access to food, which has not been

58. "World Factbook: North Korea," 2011, Central Intelligence Agency, <https://www.cia.gov/library/publications/the-world-factbook/geos/kn.html>.

59. Ellen Nolte, R. D. Scholz, Vladimir M. Shkolnikov, and Martin McKee, "The Contribution of Medical Care to Changing Life Expectancy in Germany and Poland," *Social Science and Medicine* 55 (2002): 1905–21.

60. Ibid.

61. Young Joo Song, "The South Korean Health Care System," *Japan Medical Association Journal* 52, no. 3 (2009): 206–09.

the case in North Korea. And it is not merely a question of increasing food production. Opening markets and stabilizing currency will be a massive undertaking, as well as potentially shutting down the black markets that have tended to be a source for food and income in North Korea.

Migration is the third of the primary demographic variables to consider. North Korea is in essence a closed migration country, with virtually no one entering (other than rogue abductions) and no one leaving legally. Approximately 23,000 North Korean refugees are living in South Korea, and as of 2007 the U.S. State Department estimated that 30,000 to 50,000 North Korean refugees were living in China, although some NGOs estimate the number to be as high as 300,000.⁶²

To date China has not given the United Nations High Commissioner for Refugees access to the refugees in China because it views these individuals as economic migrants rather than political refugees who cross the border illegally, primarily in search of food. Thus the exact number and status of the North Korean refugees in China remains unknown, although the status of North Koreans living in China is reportedly only slightly better than in North Korea. Without legal papers, the North Koreans survive with menial, low-paying jobs, and 80 percent to 90 percent are reportedly trafficking victims.⁶³ The status of Koreans in China after reunification is not likely to improve greatly; China will be a major player with regard to migration as either a destination or a transit country, even if it is unlikely to embrace a large number of North Koreans. Proximity, kin, and current trade patterns may make China a more attractive destination than South Korea for some North Koreans. An estimated 1 million Chinese of Korean descent live in the Yenbian Korean Autonomous Prefecture in China.⁶⁴ It remains to be seen how many North Koreans seek to live in China, as well as other countries such as Vietnam, Thailand, and Japan, rather than stay in their current homes or move to South Korea.

Movement into, out of, and within a reunified Korea will no doubt be different that what occurred in Germany. From 1961 until November 9, 1989, immigration from East to West Germany ceased officially, although immigration had been high until 1961. A limited number of asylum seekers from other friendly Communist regimes did migrate to East Germany, although it is unclear to what extent they were integrated into the country and most were repatriated back to the country of origin.⁶⁵ Following unification, 2 million East Germans migrated to West Germany between 1990 and 1996, which was approximately 12.5 percent of the East German population as of 1990.⁶⁶

Migration is one of the greatest unknowns for a unified Korea. Eberstadt noted that higher wages would surely be a draw for North Koreans, but that it could result in a marginal or employed population, particularly in the peripheries of the South's largest cities.⁶⁷ Assimilation would

62. Martin Fackler, "Young North Korean Defectors Struggle in the South," *New York Times*, July 13, 2012, <http://www.nytimes.com/2012/07/13/world/asia/young-north-korean-defectors-struggle-in-the-south.html?pagewanted=all>; Rhoda Margesson, Emma Chamlett-Avery, and Andorra Bruno, *North Korean Refugees in China and Human Rights Issues: International Response and United States Policy Options*, CRS Report RL34189 (Washington, D.C.: Congressional Research Service, September 26, 2007), i.

63. *Ibid.*, 5.

64. *Ibid.*

65. Jacqueline Fritz, "German Population Patterns: An Analysis of Demographic Trends before and after Unification," 2011, Unpublished research paper, Georgetown University, pp. 26–27.

66. Frank Heiland, "Trends in East-West German Migration from 1989 to 2002," *Demographic Research* 11, no.7 (2004): 173–94, <http://demographic-research.org/Volumes/Vol11/7/11-7.pdf>.

67. Eberstadt, *Korea Approaches Reunification*, 126.

likely prove difficult, as it has been for the handful of refugees currently in South Korea.⁶⁸ While the primary migration would be from North to South, South Koreans may wish to reclaim property in the North. Land issues will be difficult to resolve, since ownership of private property is basically nonexistent in the North and old land records may be difficult to find and authenticate.

Given all these caveats, what might the population of a unified Korea look like in 2050?

In order to determine population projections of a unified Korea from 2015 through 2050, data are utilized from the Korean Statistical Information Service (KOSIS), for the current South Korea, and projections for North Korea are computed by the author. The first assumption is that there would be a fertility shock in (former) North Korea that would lower fertility to 1.58 children per woman for the 2015–2019 projection period. The total fertility rates used for three variants for the current North Korean population (from 2015–2019 to 2045–2049) are a linear increase from 1.58 to 1.9 (high); remain at 1.58 (medium); and decrease linearly from 1.58 to 1.0 (low). The projected values of life expectancy at birth for the North Korean projections are 77.0 years in 2045–2049 for males and 82.5 years for females. For the purpose of this simulation, there is no out migration.

The total population for a unified Korea using the high variant is 84.0 million, the medium is 74.2 million, and the low is 65.2 million (table 3). Note that these are the most optimistic of population projections, assuming that there would be no loss of life in either country in the reunification process, which is unlikely. Unless fertility increases dramatically in the current South Korea to replacement level, reunification cannot be relied upon to solve its impending population decline. The low projection results in a total population in 2050 of a unified Korea that is nearly 12 percent lower than the combined populations of the two countries in 2008.

Table 3. Total Population and Age Structure of a Reunified Korea in 2050, Using Three Projection Series

Projection Series	Total Population (in millions)	Percent Aged		
		0–14	15–64	65+
Low	65.2	8.7	57.5	33.8
Medium	74.2	11.3	55.8	32.9
High	84.0	13.3	54.6	32.1

Not only the total population is of concern, but the distribution of the age structure (see population pyramids in figures 9a and 9b). Based on the low variant, the population aged 0–14 would range between 8.7 percent of the total population to 13.3 percent for the high variant. The working-age population (15–64) would range from 57.5 percent (low variant) to 54.6 percent (high variant). The elderly population increases dramatically for all three models: 33.8 percent (low), 32.9 (medium), and 32.1 (high). If we compare these figures to those in table 1 for 1993 and 2008, the reunified Korean population in 2050 will be dramatically restructured, with a large elderly population to maintain with a much smaller youth population. As noted with the overall population numbers, reunification will not solve South Korea’s impending age restructuring.

68. Fackler, “Young North Korean Defectors Struggle in the South.”

Figure 9a. Reunified Korean Population in 2050 (low)

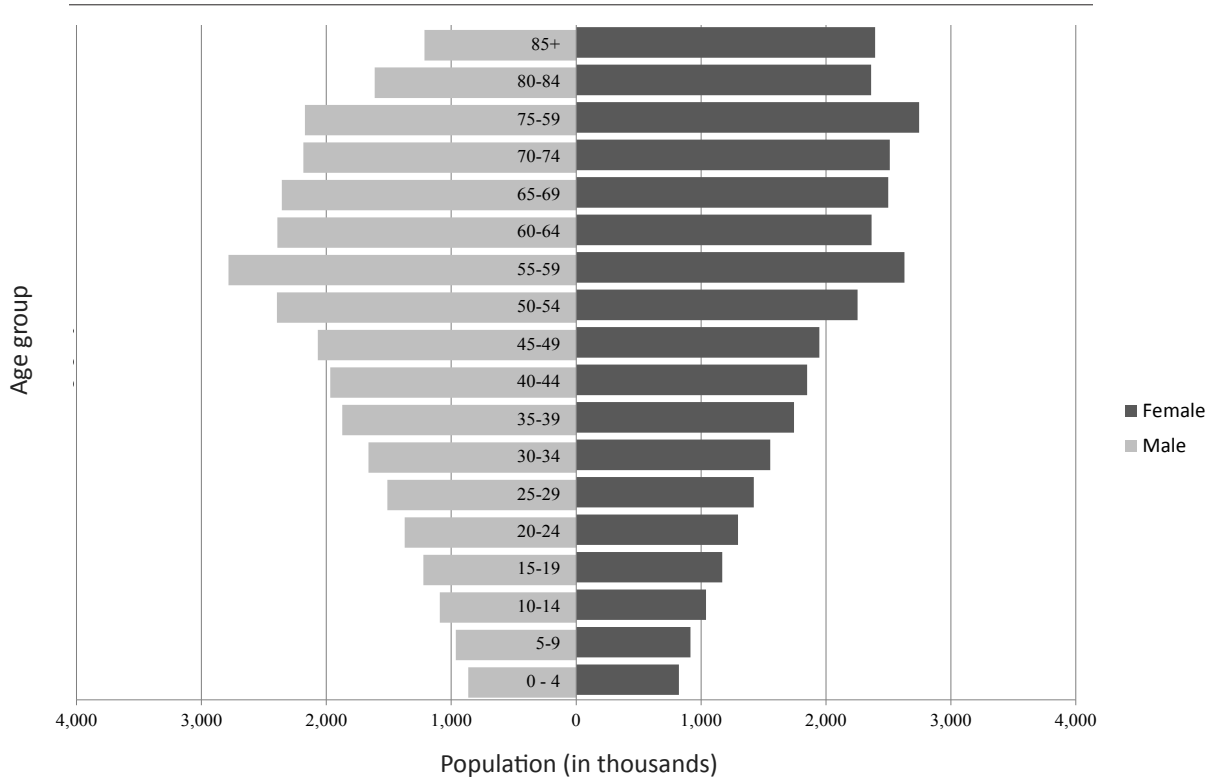
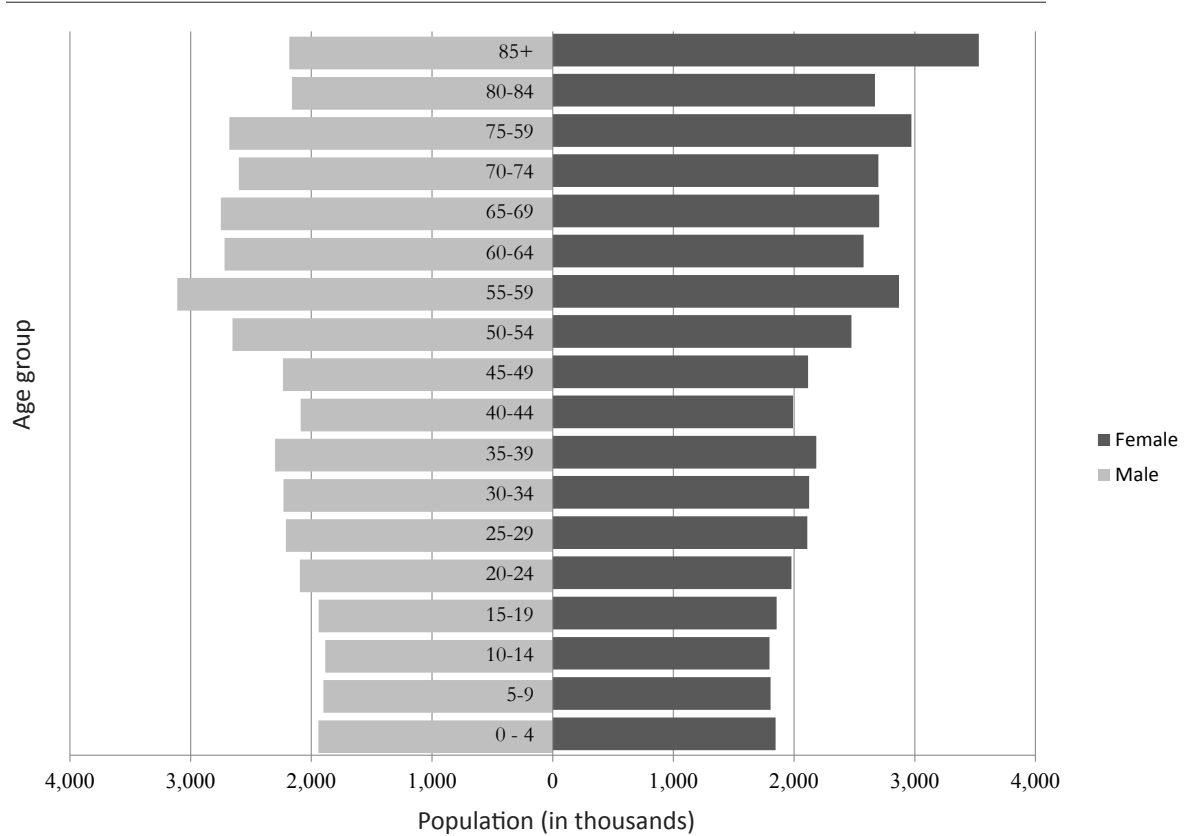


Figure 9b. Reunified Korean Population in 2050 (high)



Conclusion

The 2008 North Korean census allows demographers to analyze data for the Hermit Nation and compare it with data from South Korea to posit some possible scenarios of what a reunified Korea might look like in terms of its demographic structure.

North Korea is younger than South Korea, with higher fertility levels, and thus a higher annual rate of population growth. The population has nearly universal high school education, but only a small percentage has a tertiary degree. Housing and utilities are substandard in comparison with South Korea.

The reunification of Korea will be complex, turbulent, and will likely unfold over a long period of time. Observers hoping for a “soft landing” in which the reunification is guided by international assistance and market reforms will no doubt see political and economic systems taking center stage, but the most important concern must be the people.

This analysis has shown that a reunification will not change the age restructuring already underway in South Korea, and to a slighter extent in North Korea. Under all three projections, approximately a third of the population will be elderly, with a vast decline in the number of children aged 0–14. Mortality will depend in large part on the ability to bring medical facilities and professionals in the North up to the standards of the South, and to confirm an equitable food-distribution system. Migration will be a wild card. One could imagine massive population shifts within the country, and if so, a potential for high unemployment rates around city centers where migrants would congregate.

Reunification will not happen in a vacuum and under circumstances that are unknown at this time. By examining various scenarios, including population projections such as the ones presented here, the South Korean government can plan for an eventual unified population.



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