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## Household Projections for the Republic of Korea

by

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## 1. Introduction <sup>1</sup>

In a society a household may be considered as a molecular unit, in which case a person may be viewed as an atomic unit. Since a household serves as a seed unit of social group, its importance is vital. From an economic point of view, the household or the family is the primary unit of consumption used in various marketing and cost-of-living studies (UN, 1993). Despite the fact that a household projection has important demographic, economic and social implications, it receives little attention compared to a population projection in Korea (referred to as South Korea hereafter if not stated otherwise).

The Korean society has been traditionally dominated by social norms based on familism. However, families or households have undergone rapid changes in terms of size, function, structure, and life cycle as this country has been quickly industrialized and modernized since 1960s. When looking at demographic factors causing familial changes, it should be noted that the nucleation downsized the mean size of households in Korea. The average number of household members decreased drastically, from 5.6 persons in 1960 to 3.1 persons in 2000. The total fertility rate being below the replacement level, which was 6.0 in 1960 and marked 1.4 in 2000, was a major influence on this shrinkage among others. Also, the extended life span, from 62.3 years for males and 70.5 years for females in 1981 to 71.7 years for males and 79.2 years for females in 1999, has effected changes in the family life cycle. On the other hand, a heavy migration stream from rural to urban areas, which Korea experienced during the process of industrialization, has also served as an important factor in changing the age structure of the family, particularly in rural areas. People may possess much more diversified values, norms and attitudes toward family as the Korean society has gotten more complex.

The need or necessity of household projections has been on an increase. First of all, the effect of familial change on socioeconomic aspects is a concern among policy-makers. The close relationship between population and socioeconomic development is well known. As the rapid socioeconomic change, which Korea has seen since 1960s, has had a great influence on the family, the familial change must have influenced socioeconomic aspects inversely.

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<sup>1</sup>. This paper is considerably based on the second author (Hyungseog Kim)'s previous work at the Research-based Training Program (Sept./Nov. 2001) of SIAP, Chiba, Japan

The household serves as a basic unit of housing demand since it is a unit of common dwelling. Without proper understanding of households, meaningful policies on housing could not be formulated. Estimates of future numbers of households are also a matter of concern and interest to entrepreneurs since the household is the unit of consumption of durable goods. From the viewpoint of statistics, they serve as a sampling unit in various household surveys. This paper is a brief introduction on the household projections that the Korea National Statistical Office (KNSO) plans first to release soon unless there is much controversy among experts and researchers.

## 2. Concepts and Scope

As the concepts of “family” and “household” are used confusedly in many cases, it is necessary to clarify them in advance. According to *Multilingual Demographic Dictionary* (UN, 1958), the “household” is a socioeconomic unit, consisting of individuals who live together while the “family” is defined primarily by reference to relationships which pertain to or arise from reproductive processes and which are regulated by law or by custom (UN, 1973).

The UN introduced the term of “household” in its publication of *Principles and Recommendations for Population and Housing Censuses* (1998) as follows:

- The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essential for living. A household may be either (a) a one person household, that is to say, a person who makes provision for his or her own food or other essential for living without combining with any other person to form part of a multi-person household or (b) a multi-person household, that is to say, a group of two or more persons living together who make common provision for food or other essential for living. The person in the group may pool their incomes and may, to a greater or lesser extent, have a common budget; they may be related or unrelated persons or constitute a combination of persons both related or unrelated.

The Population and Housing Census in Korea shows a more or less consistent definition, though a little variation in expression through its tradition. Generally, the type or pattern of households in Korea is not complex, and so the UN definition of household can be adopted by and large without any particular difficulties. The following

is the definition of household as used in the 2000 Population and Housing Census in Korea:

- A household consists of a person who provides for his own food or other essentials for living, or a group of two or more persons who make common provision for food or other essentials for living. They are divided into ordinary and institutional households.

a) Ordinary Household

(1) Head and his/her family, sometimes with persons who are unrelated to the head (boarder, housemaid, etc.)

(2) A group of 5 persons or less who are unrelated to the head

(3) Persons who live alone (one-person household)

b) Institutional household

On the other hand, the UN (1989) defines the head of the household as that person in the household who is acknowledged as such by the other members, and assumes that most households are family households and that one person in such family households has primary authority and responsibility for household affairs and is, in the majority of cases, its chief economic support. Similarly, the 2000 Population and Housing Census in Korea defines the head of household as the person who is primarily responsible for household affairs and economic support regardless of the headship in residential registration or civil registration.

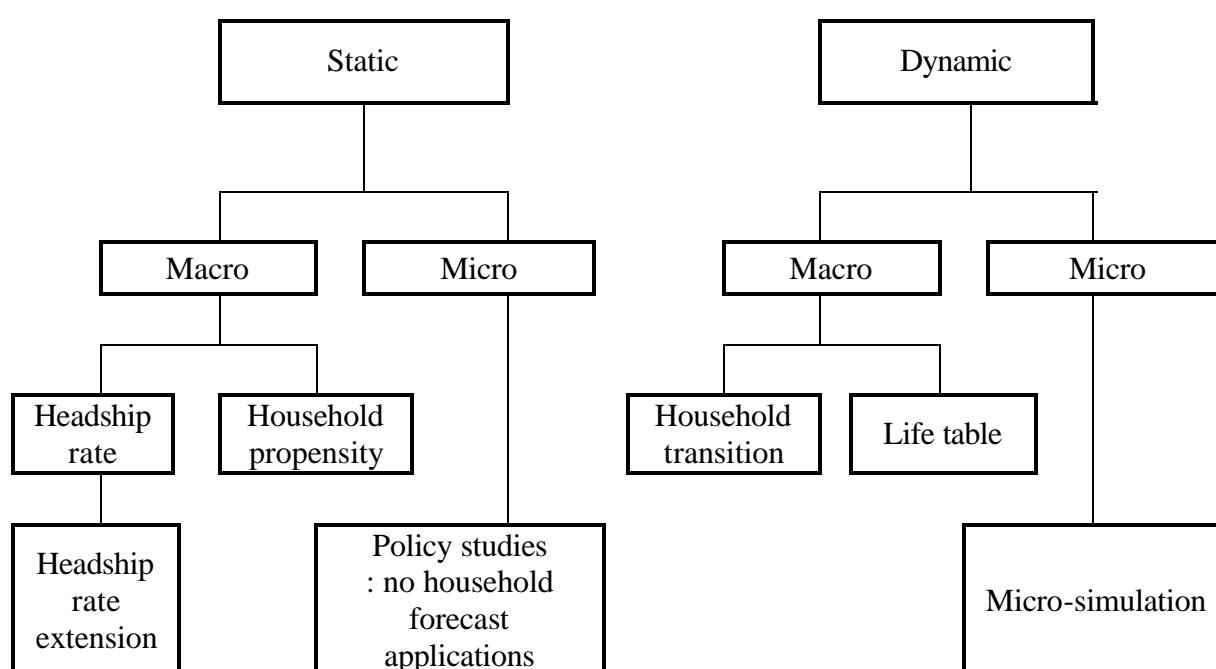
The period of time in the household projections is 20 years, i.e., 2000-2020. It covers only ordinary households which consist of a family group related by birth or marriage with less than 5 persons unrelated to the head. Accordingly, those who are in military camps, social institutions, jails, and foreigners are excluded in this projection.

### **3. Review of Household Projection Methods**

According to their review of the household and family forecasting models, Bell et al. (1995) classified various existing methods into two categories, i.e., static and dynamic. Dynamic methods essentially trace the behavior of individuals or cohorts through time whereas static methods compare the distribution of population and household attributes at discrete points in time. Thus, in family and household forecasting, static methods typically allocate population to households by reference to proportions or rates that are projected independently of the population at risk. Dynamic

models, on the other hand, examine the change or transition between household states or household positions and project these changes endogenously (Bell, Cooper and Les, 1995). Five methods are macro models, as shown in Figure 1, i.e., headship rate, headship rate extension, household propensity, household transition and life table methods. As for micro models, a micro-simulation method represents dynamic models but no direct application for household forecast has appeared in the micro/static method (Kelman, Kuijsten and Vossen, 1988).

Figure 1. Classification of household projection methods



Note: 1) Mathematical model: Statistics Canada (1994), US Dept. of Commerce (1986), Ketkar (1990, US), UK Dept. of Environment (1989); Economic approach: Kent (1992, US); Cohort progression model: Masnik et al (1990), Oe (1994, Japan), Kono (1987, Japan), Mason (1997: *Homes*)

2) Akkerman (1977, Canada: *a household composition matrix*), Pitkin and Masnick (1987, Dutch: *a household headship-membership-accomodation matrix*)

3) Ironmonger and Lloyd-Smith (1992), Bell and Cooper (1990, Australia)

4) Keilman and Keyfitz (1988), van Imhoff & Keilman (1991)

5) Brown (1951), Glass and Davidson (1951), UN (1973)

6) Hecheltjen (1974), Steger (1980)

Source: Excerpted from Bell et al. (1995)

Considering both the objectives and the data constraints of this study, the following criteria are put forwards as possibilities for household projection methods. First, given the data sources, which are the Population Census and the Population Projection, the method should be one based on the aggregate data. Second, priority will be given to those methods that are more responsive in nature to changes in demographic factors related to household formation. Note that Korea has experienced a rapid demographic transition from high mortality and high fertility in the 1960s to low mortality and low fertility in the mid 1980s and also saw a fast growing increased age at first marriage, increasing divorces and continued aging population. Accordingly, such techniques that assume these changes to be constant are not appropriate in the Korean context.

Therefore, the review of household projection methods in this study is concentrated on macro/static methods; particularly the headship rate method is intensively examined. One of key advantages of the headship rate method is the simplicity in computation and data requirement. This method is very responsive to the major factors that influence household formation; i.e., changes in the age structure of the population (Bell et al, 1995). Since Korea has experienced a rapid demographic transition, this technique is more likely to be acceptable than others. The identification of household trends revealed, though not presented in detail here, that the age at first marriage of Korean males had increased from 26.4 years old in 1981 to 29.6 years old in 2001 and that of females from 23.2 years old to 26.8 years old during the same period.

Looking at the timing of entry into first marriage of Japan, as an example, it is believed that there would be room for further increases in the age of first marriages for both Korean males and females. So, the number of households in Korea should be based on the method that reflects better a changeable pattern of household formation in a society. It should be noted that many projection methods, particularly many complex methods such as headship extension methods, etc., assume a constant household composition, which is not likely to be appropriate in the Korean setting.

On the other hand, the method of headship extensions provides additional information on household attributes with modifications of the headship rate method, taking into account characteristics of household members other than the head. However, this method is evaluated as having a number of conceptual and methodological difficulties in implementation (Bell et al., 1995). Household propensity methods have features in common with headship rate methods but with extensions using the

information about household members additional to the head. This method is also unclear as to whether this extension yields as much merits as the increased difficulties in application. For these reasons, this study concentrates on the headship rate method.

## 4. Development of a Household Projection Method for Korea

### 4.1 Framework of household projection

Several existing methods of household projection were reviewed in the previous chapter and the review suggested a headship rate method as one useful tool for the household projection when considering the type of data and the rapidly changing nuptiality pattern in Korea. This study projects the number of households in Korea between 2000 and 2020 by using the following equation:

$$H^s(x,t) = \sum_m P^s(m,x,t)h^s(m,x,t) \text{ ----- (1)}$$

where:

- $H^s(x,t)$  is designated as the number of households in sex  $s$ , age  $x$  of head, and year  $t$ ,
- $P^s(m,x,t)$  is the number of persons in sex  $s$ , marital status  $m$ , age  $x$  of head, and year  $t$ ,
- $h^s(m,x,t)$  is headship rates in sex  $s$ , marital status  $m$ , age  $x$  of head, and year  $t$ .

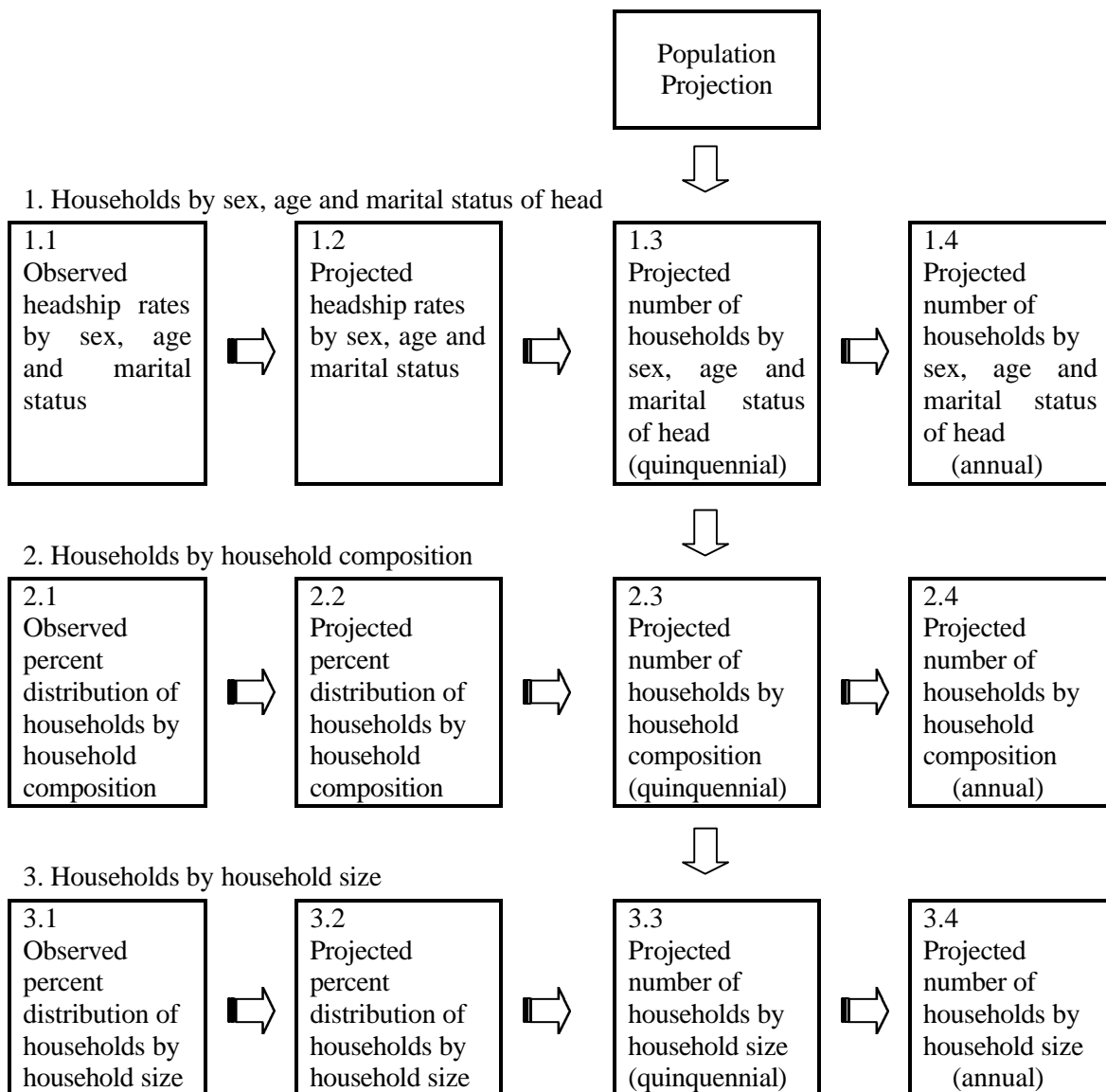
wherein, the number of households are simply projected by the product of the number of persons in sex  $s$ , age  $x$ , marital status  $m$  and the headship rates in sex  $s$ , age  $x$ , marital status  $m$ . This equation is believed to be responsive to the recent pattern of delayed marriage in Korea.

The framework of the household projection consists of three panels as shown in Figure 2. In this scheme, the first panel, from 1-1 to 1-3 (refer to Figure 2), yields the projected number of households by using the projected headship rates and the projected number of population. Then, the number of households by household composition is gained by multiplying the projected percent distribution of households by the number of households projected in the previous step (refer to the second panel). Likewise, the number of households by household size is projected by using the same method as used

for projecting the number of households by household composition(see also boxes from 3.1 to 3.3 in the third panel). Next, given the values at five-year intervals, annual numbers of households between two census years are interpolated.

Since the projections of household by household composition and household size are nothing but the proportional allotment of total projected number of households by sex, age and marital status of heads, this study elaborates on the method of household projection by head of household’s sex, age and marital status. First of all, it is to be

Figure 2. Framework of household projection



decided what methods would be employed to project the size of population by sex, age and marital status and the headship rates by sex, age and marital status. Here, it should be noted that population projections in Korea do not provide information on the size of population by marital status.

## 4.2 Projecting percent distribution of people by marital status and headship rate

For the projection of percent distribution of population by sex, age and marital status, and of headship rates, an extrapolation method is known to be widely used, by which the future percent distribution is estimated by extending the rate of change in the percent distribution of the past (UN, 1973). In this study, two types of formula, which are exponential and log-linear, are studied in the projection of both population by sex, age and marital status and headship rates. In addition, the net transition rate used in the household projections for Japan by Oe (1994) is investigated as another tool for projecting future headship rates. The following is the formulae examined for projecting headship rates in this study:

### 1) Modified exponential formula

$$h^s(m, x, t+k) = 1 - [1 - h^s(m, x, t-n)] \times \left[ \frac{1 - h^s(m, x, t)}{1 - h^s(m, x, t-n)} \right]^{\frac{(t+k)-(t-n)}{n}} \quad \text{--- (2)}$$

or

$$h^s(m, x, t+k) = h^s(m, x, t-n) \times \left[ \frac{h^s(m, x, t)}{h^s(m, x, t-n)} \right]^{\frac{(t+k)-(t-n)}{n}} \quad \text{----- (3)}$$

where:

$h^s(m, x, t)$  indicates headship rate specific for sex  $s$ , marital status  $m$ , age  $x$  and year  $t$ ,

$h^s(m, x, t+k)$  denotes headship rate specific for sex  $s$ , marital status  $m$ , age  $x$  and year  $t+k$ , and

$h^s(m, x, t-n)$  is headship rate specific for sex  $s$ , marital status  $m$ , age  $x$  and year  $t-n$ .

The notion  $n$  in this equation marks the base period between two census years. For those age groups in which the formula yields decreases in headship rates, the formula (3) is used.

2) Log-linear formula

$$h^s(m, x, t) = a \times \ln(n) + b \text{ -----(4)}$$

where  $h^s(m, x, t)$  indicates headship rate specific for sex  $s$ , marital status  $m$ , age  $x$  and year  $t$ ,  $\ln(n)$  is the natural log of interval  $n$  while  $a$  and  $b$  are slopes and intercepts respectively.

3) Net transition rate

$$C^s(m, x, t) = \frac{H^s(m, x+5, t+5)}{H^s(m, x, t)} - \frac{P^s(m, x+5, t+5)}{P^s(m, x, t)} \text{ ----- (5)}$$

where  $C^s(m, x, t)$  is the net transition rate in sex  $s$ , age  $x$ , marital status  $m$  and year  $t$  while  $H^s(m, x, t)$  and  $P^s(m, x, t)$  indicate the number of households and persons in sex  $s$ , age  $x$ , marital status  $m$  and year  $t$  respectively. The net transition rate is nothing but the difference between household changes and population changes.

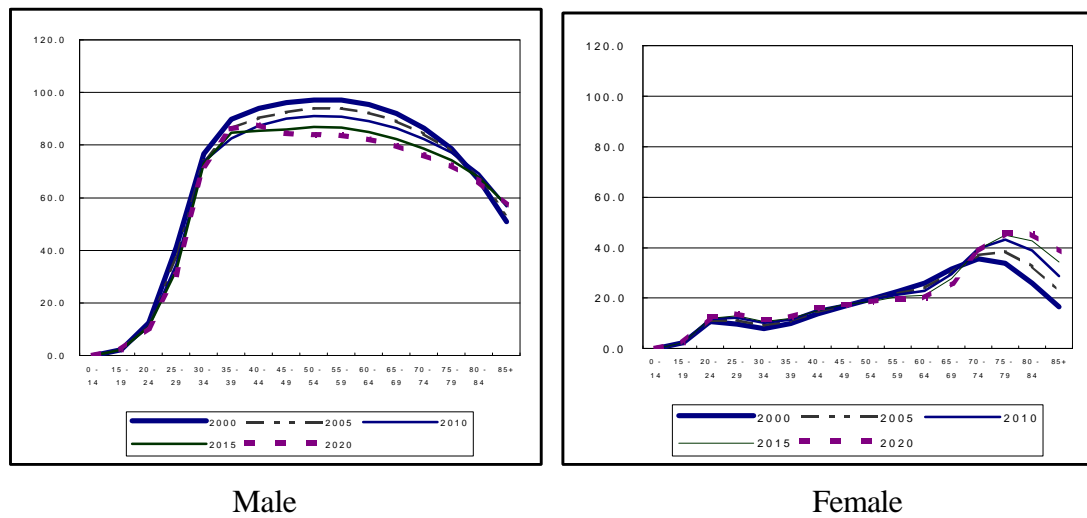
To determine the most appropriate method in the Korean context, a comparison of a series of expected values for the year 2000 with the actual values observed in the 2000 Census was made. The estimated values for 2000 were calculated by using these formulae but based differently on either a one interval, or two intervals, or the average of them. The expected values for 2000 yielded by the log-linear formula showed the smallest difference in comparison with the actual values observed in the 2000 Census in projecting the future marital status of the population. Likewise, the log-linear formula proved the most appropriate function in projecting the future headship rates for those aged under 35, while the net transition rate turned out the best for those aged 35 years and over.

Looking at the projection of headship rates during 2000-2020(see Figure 3), the following becomes apparent:

- 1) Firstly, the headship rate of Korean males shows a one-peak pattern with plateau; it would increase very sharply up to the age of 35-39, reach its peak at the age of 50-54 and decrease slowly afterward.
- 2) Secondly, the headship rate of Korean females marks a two-peak pattern;

around one out of every ten Korean females would enter into headship in their 20s and withdraw from it at the age group 30-34 due to family formation activities but enter faster after this age group.

Figure 3. Projected headship rates: 2000-2020



## 5. Major Results of the Household Projection

### 5.1 Total number of households

The total number of households is estimated to be 15,827,994 in 2005, 16,962,225 in 2010, 17,730,845 in 2015, and 18,379,761 in 2020. Average annual growth rates are predicted to be 1.62% in 2000-2005, 1.39% in 2005-2010, 0.89% in 2010-2015, and 0.72 in 2015-2020, all of which are higher than the population growth rate during the periods of time under projection. The reason is simply because households in Korea will continue to be smaller in size. Low fertility will facilitate small households. On the other hand, a large drop in the volume of household growth between 2010-2015 can be attributed to the age structure of population.

Table 1. Number of projected households: 2000-2020

	2000	2005	2010	2015	2020
1) Household	14,609,493	15,827,994	16,962,225	17,730,845	18,379,761
(Increase)	1,462,501	1,219,418	1,134,230	768,621	648,915
(Annual increase,%)	2.13	1.62	1.39	0.89	0.72
2) Total population	45,427,305	46,977,556	48,181,294	48,848,644	49,194,139
(Increase)	1,561,250	1,550,251	1,203,738	667,351	345,494
(Annual increase,%)	0.70	0.67	0.51	0.28	0.14
3) Population aged 25+	28,975,268	31,528,830	33,977,692	35,504,122	37,150,608
(Increase)	2,736,784	2,592,834	2,448,862	1,526,430	1,646,486
(Annual increase,%)	2.00	1.73	1.51	0.88	0.91

## 5.2 Number of households by household head's sex, age and marital status

The number of households projected by sex of head indicates that more Korean females would increasingly become household heads. The percent share of female heads was 18.5% in 2000 but is estimated to be 19.7% in 2005, 21.0% in 2010, 21.9% in 2015, and 22.9% in 2020. The age difference between male and female life expectancy at birth (for example, 71.7 years for males, 79.2 for females in 1999) is expected to increase the number of households headed by widowed females.

By age of heads, Figure 4 reveals a clearer trend by showing an enlarging pattern in graphs among females and the elderly between 2000 and 2020. The age distribution of household heads is largely affected by both the age structure and the propensity of headship. More improved education and participation in social activities would diversify attitudes toward marriage and thus people would delay their entry into a first marriage and even forgo marriage. This might explain why the number of households headed by youngsters is decreasing in this projection. On the contrary, the number of households headed by the elderly is expected to hike remarkably due to prolonged longevity.

As is the case in 2000, the age group of 40-44 is expected to emerge as a major age group among household heads in 2005 and 2015. In 2010 and 2020, however, the majority would be 45-49 due to age structure. Generally, throughout the periods of time under projection, female heads outnumber male heads before the age of 25 but male heads increase very sharply in the age group 25-29 while female heads grow marginally. But the gap between male and female heads in number is bridged in their old age.

Table 2. Households by head of household's sex and marital status: 2000-2020

	2000	2005	2010	2015	2020
<b>MALE</b>	11,901,304(81.5) <sup>1</sup>	12,713,312(80.3)	13,408,123(79.0)	13,840,427(78.1)	14,179,092(77.1)
Married	10,513,977(88.3)	11,058,157(87.0)	11,566,440(86.3)	11,877,687(85.8)	12,119,514(85.5)
Widowed	227,985( 1.9)	254,635( 2.0)	291,871( 2.2)	323,460( 2.3)	358,811( 2.5)
Divorced	250,871( 2.1)	362,135( 2.8)	455,109( 3.4)	520,231( 3.8)	567,805( 4.0)
Single	907,900( 7.6)	1,038,386( 8.2)	1,094,703( 8.2)	1,119,050( 8.1)	1,132,962( 8.0)
<b>FEMALE</b>	2,708,189(18.5) <sup>2</sup>	3,114,682(19.7)	3,554,102(21.0)	3,890,418(21.9)	4,200,669(22.9)
Married	448,805(16.6)	498,106(16.0)	552,349(15.5)	580,241(14.9)	598,112(14.2)
Widowed	1,366,342(50.5)	1,514,668(48.6)	1,770,804(49.8)	1,988,086(51.1)	2,214,916(52.7)
Divorced	313,345(11.6)	442,877(14.2)	550,371(15.5)	623,822(16.0)	673,683(16.0)
Single	579,352(21.4)	659,031(21.2)	680,578(19.1)	698,269(17.9)	713,958(17.0)

Note: 1. Including unknown (571), 2. Including unknown (345)

3. Figures in parentheses beside total for each sex are the percent distribution of total households; whereas those beside each marital status are the percent distribution of each sex.

By the marital status of household head, households headed by the married were the majority among males marking 10,513,977 households (88.3% of total male heads) followed by the single (7.6%), the divorced (2.1%), and the widowed (1.9%) in 2000 and this pattern would, by and large, be maintained in 2020. As for female household heads, households headed by the widowed numbered 1,366,342 households (50.5% of total female heads) followed by the single (21.4%), the married (16.6%), and the divorced (11.6%) in 2000. However, households headed by the divorced (673,683 households) are expected to outnumber the married (598,112 households) in 2020.

Figure 4. Sex and age distribution of household heads: 2000 and 2020

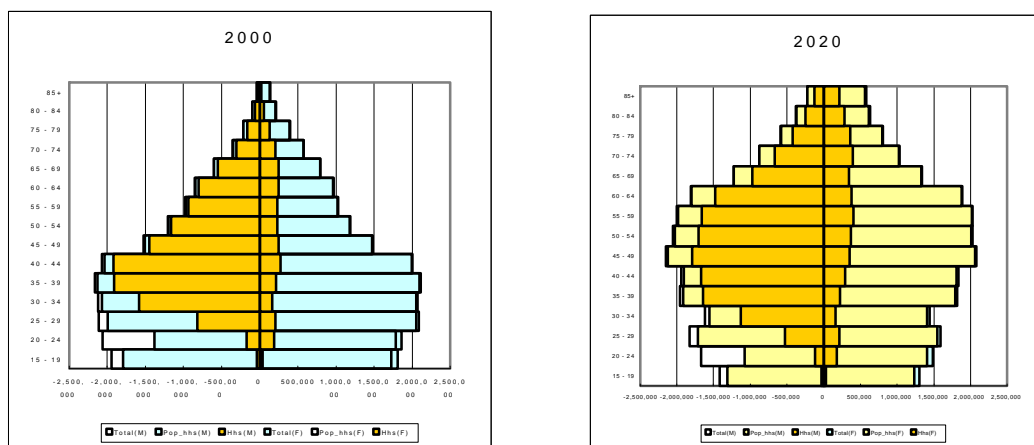


Table 3. Households by head of household's sex and age: 2000-2020

	2000	2005	2010	2015	2020
Male	11,901,303 <sup>1</sup>	12,713,312	13,408,123	13,840,427	14,179,092
0 -14	720	660	506	393	313
15-19	40,221	33,986	38,482	34,892	29,735
20-24	170,711	147,423	117,530	130,368	116,182
25-29	821,587	689,265	639,752	492,428	528,047
30-34	1,585,645	1,600,475	1,409,733	1,387,442	1,125,332
35-39	1,908,005	1,828,518	1,786,508	1,626,611	1,646,804
40-44	1,917,344	1,912,903	1,836,405	1,838,207	1,670,414
45-49	1,445,561	1,824,091	1,872,750	1,774,332	1,788,859
50-54	1,159,195	1,336,155	1,755,108	1,770,431	1,704,478
55-59	939,655	1,062,214	1,250,399	1,625,222	1,662,134
60-64	805,598	836,643	957,027	1,119,981	1,477,091
65-69	551,757	679,966	713,985	814,323	974,007
70-74	303,707	425,384	540,206	565,845	664,281
75-79	167,482	209,249	308,111	389,820	419,798
80-84	63,278	93,786	126,124	190,012	246,474
85 +	20,267	32,595	55,499	80,121	125,142
Mean age	45.8	47.1	48.5	49.9	51.3
Female	2,708,184 <sup>2</sup>	3,114,682	3,554,102	3,890,418	4,200,669
0 -14	763	701	547	428	342
15-19	39,874	32,649	36,287	33,960	29,492
20-24	189,329	196,041	160,962	183,887	175,710
25-29	201,771	202,004	217,404	181,638	210,969
30-34	163,359	190,587	183,813	193,369	159,762
35-39	209,925	222,450	238,440	218,950	225,556
40-44	275,398	300,930	310,123	313,190	289,718
45-49	247,715	333,045	355,560	354,325	356,141
50-54	232,203	275,086	372,950	380,048	371,376
55-59	232,417	252,351	300,176	396,160	401,731
60-64	251,128	239,799	257,366	292,107	377,906
65-69	249,673	278,809	281,948	299,751	347,097
70-74	205,436	266,859	337,710	349,379	393,423
75-79	132,516	186,363	271,770	339,240	363,920
80-84	54,541	95,562	148,490	217,362	280,777
85 +	21,797	41,444	80,557	136,623	216,749
Mean age	50.5	51.9	54.0	55.7	57.4

Note: 1. Including unknown (571), 2. Including unknown (345)

### 5.3 Number of households by household composition

The most pronounced pattern in household composition revealed from the household projections is a fast growing number of one-person households in Korea. One-person households were 2,269,964 (15.5% out of total) in 2000 and are expected to grow to 2,695,218 (17.0%) in 2005, 3,158,192 (18.6%) in 2010, 3,576,090 (20.2%) in 2015, and 4,016,903 (21.9%) in 2020. It should be noted when regarding one-person households in Korea that the volume and tempo of growth are very striking among the elderly, though not presented here in detail.

The households of parents with unmarried child(ren), which is the major type of Korean family, are estimated to decrease continuously in share but to increase in number up to 2015. The households of married couple without child(ren) will grow both in absolute number and relative share while the households composed of three generations and more and the non-relative households will decrease either absolutely or relatively.

Table 4. Households by household composition: 2000-2020

	2000	2005	2010	2015	2020
All households	14,609,493 <sup>1</sup> (100.0)	15,827,994 (100.0)	16,962,225 (100.0)	17,730,845 (100.0)	18,379,761 (100.0)
Married couple w/o child(ren)	1,802,054 (12.3)	2,197,596 (13.9)	2,629,902 (15.5)	3,040,288 (17.1)	3,502,709 (19.1)
Married couple w/ child(ren)	7,034,864 (48.2)	7,436,421 (47.0)	7,669,234 (45.2)	7,691,741 (43.4)	7,541,799 (41.0)
Father w/ child(ren)	224,572 (1.5)	242,383 (1.5)	266,541 (1.6)	279,790 (1.6)	285,157 (1.6)
Mother w/ child(ren)	922,649 (6.3)	1,006,166 (6.4)	1,081,269 (6.4)	1,115,117 (6.3)	1,128,479 (6.1)
Three generation or more	1,223,214 (8.4)	1,153,826 (7.3)	1,075,570 (6.3)	966,560 (5.5)	854,018 (4.6)
One-person	2,269,964 (15.5)	2,695,218 (17.0)	3,158,192 (18.6)	3,576,090 (20.2)	4,016,903 (21.9)
Non-relative	162,530 (1.1)	160,078 (1.0)	150,616 (0.9)	143,711 (0.8)	136,810 (0.7)
Other	968,729 (6.6)	936,306 (5.9)	930,900 (5.5)	917,549 (5.2)	913,886 (5.0)

Note: 1. Including unknown (916)

2. Figures in parentheses are the percent distribution of each category of total households

With relation to the composition of household, this projection indicates that nuclear families, which consist of “a couple”, “parents with unmarried child(ren)”, and “a single parent with unmarried child(ren)”, will increase in number but their share of total households will remain constant. This suggests that Korea has almost completed the process of family nucleation.

#### 5.4 Number of households by household size

Between 2000-2020, households with more than 4 persons will decrease while those with less than 3 persons will increase. Households with 4 persons will have the largest proportion, marking around 31% of total households throughout the periods of time under projection. According to this pattern, it is believed Korea will continue to undergo a downsizing in terms of household size. The average size of household would be lessened from 3.12 in 2000 to 2.73 in 2020.

Table 5. Households by household size: 2000-2020

	2000	2005	2010	2015	2020
All households	14,609,493 (100.0)	15,827,994 (100.0)	16,962,225 (100.0)	17,730,845 (100.0)	18,379,761 (100.0)
1 person	2,269,964 (15.5)	2,695,218 (17.0)	3,158,192 (18.6)	3,576,090 (20.2)	4,016,903 (21.9)
2 persons	2,787,510 (19.1)	3,201,160 (20.2)	3,573,656 (21.1)	3,833,861 (21.6)	4,029,961 (21.9)
3 persons	3,049,725 (20.9)	3,372,195 (21.3)	3,639,934 (21.5)	3,805,187 (21.5)	3,917,331 (21.3)
4 persons	4,539,943 (31.1)	5,043,095 (31.9)	5,409,865 (31.9)	5,627,631 (31.7)	5,769,865 (31.4)
5 persons	1,472,995 (10.1)	1,193,444 (7.5)	966,028 (5.7)	743,183 (4.2)	538,816 (2.9)
6 persons	352,189 (2.4)	245,497 (1.6)	176,822 (1.0)	132,406 (0.7)	104,872 (0.6)
7 persons or more	137,167 (0.9)	77,386 (0.5)	37,729 (0.2)	12,488 (0.1)	2,012 (0.0)
Mean	3.12	2.99	2.89	2.81	2.73
Median	3.74	3.60	3.48	3.38	3.29

Note: Figures in parentheses are the percent distribution of each category of total households

## 6. Conclusions and Discussion

Given these results, this study presents broad conclusions together with policy insights as well as possible research directions for the future as follows:

Firstly, this study developed an appropriate method of household projection in the Korean setting. To begin with, a review of existing methods of household projections provides a possible approach to household projections. Considering the data source, the static approach at an aggregate level turned out to be more suitable. In this study, the headship rate method was selected because it is known to be more responsive in nature to the changes in the demographic factors related to household formation (Bell et al., 1995). Korea has experienced a rapid demographic transition from high mortality and high fertility in the 1960s to low mortality and low fertility in the mid 1980s and also saw a fast growing age at first marriage, increasing divorces and continued aging population. One of the key advantages of the headship rate method is the simplicity in computation and data requirement.

On the other hand, the framework of household projection built in this study consists of three panels; i.e., 1) households by sex, age, and marital status of head, 2) households by household composition, and 3) households by household size. In this scheme, the projected numbers of households by head of household's sex, age and marital status are yielded by multiplying the headship rates by sex, age, marital status by the projected population. Given the total projected number of households, the number of households by household composition and that by household size are projected successively.

For the projection of future percent distribution of people by marital status, two types of formulae, i.e., modified exponential and log-linear equations, were examined whereas three types of formulae, i.e., net transition rates plus the above two, were studied for the projection of future headship rates. To better apply these formulae, several alternatives based on different census intervals were examined by comparing them with the actual values observed in the 2000 Population and Housing Census in Korea. In fact, there were no significant differences among the alternatives but the log-linear formula was chosen due to its providing the narrowest gap with the actual values in projecting future percent distribution of people by sex, age and marital status. As for future headship rates, the net transition rate was adopted for those aged 35 and over

while the log-linear formula was employed for those aged under 35.

Secondly, this study projected future number of households by sex, age and marital status of head, and by household composition and household size for 2000-2020. Major findings are as follows:

- 1) The total number of households in Korea will continue to grow in near future even though the population growth rate reaches almost nil. The reason is believed to be the increasing trend of small-sized households and nuclear families.
- 2) Females will increasingly become the head of households. Divorced and widowed female heads will increase in both number and share while married and single female heads will increase in number but decrease in share.
- 3) An age pattern of household heads suggests that more youngsters will delay the formation of family whereas more elderly people will remain as household head.
- 4) The most pronounced pattern in the household projections by household composition is the increasing number of one-person households. One out of every five households will be one-person households in 2015. Particularly, the heads of household aged 65 and over are expected to grow faster than other age brackets. Related policies should be accordingly formulated. Also, it is high time that one-person households should be included as a housing demand. Note that one-person households have so far been excluded when housing policies have been made in Korea.
- 5) The households of couple without child(ren) will grow both in absolute number and relative share. The increase will be pronounced among the so-called “empty-nest” households due mainly to the low fertility.
- 6) Nuclear families will increase in number but their share of total households will remain constant. This suggests that Korea has almost completed the process of family nucleation.
- 7) Households with less than 3 persons will increase while those with more than 4 persons will decrease. According to this pattern, it is believed that Korea will continue to undergo a downsizing in terms of the size of household. The average size of households in Korea will shrink from 3.12 persons in 2000 to 2,73 persons in 2020.

Finally, for a better projection in the future, more careful treatment is suggested for, in particular, one-person households since they are mostly either young adults or the elderly whose activities of households formation and dissolution are very hard to

forecast. Also, a regional household projection would be very useful not only for regional development planning but also for the estimation of parameters in various household surveys.

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