Population Aging and Housing Space Needs in the Seoul Metropolitan Region

SEONG-YOUN SIMON CHOI* & SEONG-KYU HA**

*Department of Planning and Policy, Southern California Association of Governments, U.S.A,
** Department of Urban and Regional Planning, Chung-Ang University, Korea,

Correspondence address: Profesor Seong-Kyu Ha,
Department of Urban and Regional Planning, Chung-ang University, 72-1 Nae-Ri,
Daeduck-Myun, Anseong-Si, Gyeonggi-Do, 456-756, Korea.
Tel: 82-11-324-3408
Fax: 82-31-675-1381
E-mail: ha1234@cau.ac.k

Abstract

There was a recent surge in the demand of the medium and large size housing units in Korea. Housing price of the housing units, in particular, the large size housing units, has rapidly increased since 2000. The aim of this article is to estimate the future medium and large size housing needs of low-income renter households of the Seoul Metropolitan Region (SMR) in Korea, and to discuss housing policy responses to their housing space needs. Using demographic methods, this study produces total housing construction need projections of the SMR and decomposes projected housing units into different size housing unit needs by tenure and household expense using the household-housing size matrix. Renter households between 2005 and 2015 need approximately 400,000 medium and large size housing units. As appropriate policy responses to the increasing large size rental housing needs of the low-income households, we argue that Korean government should pay more attention to rental housing policy. By doing so, we expect that polarization between the housing conditions of the better off and those of the worse off would get smaller.

Introduction

Housing is a major capital resource that affects every aspect of national life. Despite many measures to improve housing supply and quality over recent decades, housing remains a persistent and divisive social issue in Korea. The Korean government has always pursued housing policies designed to foster economic growth and as a tool for political stabilization.

In Korea, prices of housing units, in particular, the large size units (30 pyong[1] (99 m^2) or more), have rapidly increased since 2000. The increase in the price of large housing units was due to a surge in the demand for these units. Shifts in the demand for different housing sizes are affected by several factors: population composition, household formation, household composition, and housing arrangement preference. The most significant demographic characteristic of the recent Korea population is aging. With the

world's lowest birth rate and the limited number of international net immigration, Korea does not show a reasonable increase in its total population size, but simply develops into an aging society.

The changing population composition affects collective household formation. Household composition is also changing along with demographic trends. Examples of changing household composition includes, but not limited to, the decline in household sizes, the increase in elderly households, the increase in one person households, and the increase in female headed households. The changing household composition may result in diverse housing size needs.

The purpose of this study is to estimate the future needs for large size housing needs of low-income renters of the Seoul Metropolitan Region (SMR) in Korea, and to discuss housing policy responses to their housing space needs. The study uses a two step process of projecting needs for medium- and large-sized rental housing units. The first step is to develop total housing needs using the household headship rate method with assumptions of vacancy needs and replacement needs. The second step is to decompose projected overall housing needs into needs for different sizes of housing units, further breaking down to tenure and household expense types by using a household-housing size matrix. The study finally discusses proper housing policies to respond to the increasing needs for large size housing units of the low-income renter households.

Demographic Changes and Housing Space Needs

The population of Korea has doubled to approximately 48 millions in 2007 for the last forty-five years. The population growth of Korea has been mainly influenced by the declining fertility rate and mortality rate. International migration did not play a big role in the overall population change due to its traditionally low level. The rapidly declining fertility rate is the biggest contributor to the slowing population growth rate in Korea. As a result, the median age of the population has continued to increase and the age-sex composition is increasingly dominated by the middle and old aged people. This pattern is expected to continue in the coming decades (Korea National Statistical Office, 2007).

The population of Korea had inclined to move into the urban area, in particular, the Seoul Metropolitan Region (SMR), along with economic development facilitated by the Korea government since the early 1960s. From a population of 5.2 million in 1960, an addition of nearly 18 million had moved to the SMR by 2005. The most recent population projections for the SMR showed that the population of the region would continue to increase in the coming decades and would eventually account for 54.1% of the nation's population in 2030 (Korea National Statistical Office, 2007).

Korea and the SMR also experience aging in the population. The projected number of the younger age group (0-19 years old) in 2015 is consistently lower than the estimated number of the same age group in 1980. However, the projected number of the middle and old age group (20 years old or more) in 2015 is well above the estimated number of the same age group in 1980. The percentage of the old aged people (65 years old or more) has increased from 2.8% in 1980 to 7.1% in 2005, and will continue to rise to to 10.8% in 2015. (See Figure 1).
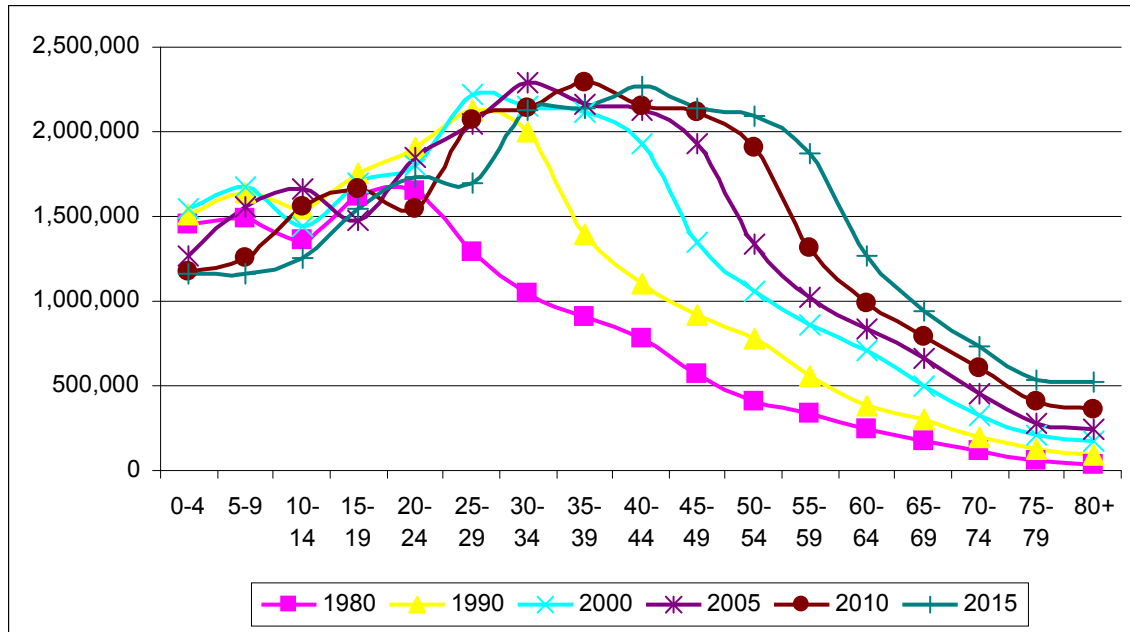
Figure 1. Age Composition of the Population in the SMR, 1980-2015

The rapidly changing demography is expected to affect the number of projected households. According to the current study, the number of households with heads aged 45 years or older or more is projected to increase from 48% in 2005 to 59% in 2015, while the number of households with heads of 15-44 years old is projected to decline from 52% in 2005 to 41% in 2015. In particular, the number of old age householders (aged 65 years or older) accounts for 46% of total household growth between 2005 and 2015.

The sharp increase in the prices of large sized housing units in SMR is not surprising in view of the prevaling demographic trends. It is a result of the stronger desire of middle-aged family households for larger housing spaces. First of all, 8.5 million "extended baby boomers"[2], mostly born between 1956 and 1975, reached 30-49 years old in 2005. The baby boomers have been active in housing markets to secure higher quality housing units,

in particular, the large-sized housing units in the recent past. They will even play a bigger role in the housing market in the coming years as they age over time.

As a result of the aging of the baby boomers, the number of potential householders in the age group of 45-54 year old, which show the highest income level among all age groups, jumped up by adding 850,000 people in that age category between 2000 and 2005 (See Figure 2). The baby boomers further influence the number of potential householders (of 45-54 years old) in the period of 2005 and 2015. The overall increase of the middle and old age householders will result in more demands for large size housing units.
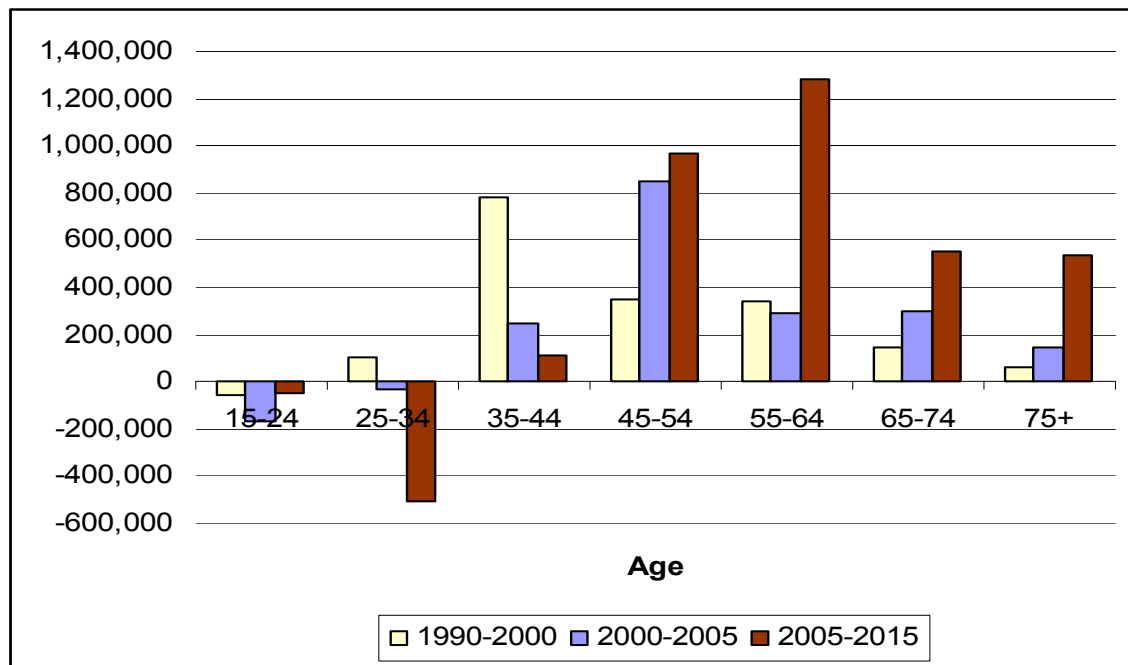
Figure 2. Change in the Number of Population of 15 Years Old or More in the SMR, 1990-2015

Economic development drive has also dramatically improved people's income. The gross domestic product per capita in current US dollars has increased by 39 times from 249 U.S. dollars in 1970 to 9,770 U.S. dollars in 2000 (Yoon, 2002). The increased

personal and household income could be used to accommodate the increased needs for the large size housing units.

As one of major housing quality indicators, housing space need is measured in diverse ways. A variety of housing space indicators shows that the average Korean households have enjoyed increasing housing space over the last few decades (See Table 1). This improvement was made possible with greater supply of the larger housing units in recent decades (Kim, H., 2002). The average housing units constructed in the 1990s tend to have one more rooms than that in the 1980s.

The rapidly increased housing space of Korean households measured on a per capita basis is, however, still smaller than that of many developed countries; for example, 33.1 m^2 in Japan, 40 m^2 in England, 43 m^2 in Germany and 60 m^2 in the USA.[3]

Table 1. Trends in Housing Space Use of Korean Households, 1970-2000

	1970	1980	1990	2000
Floor Area Per Household (m^2)	35.9	45.8	51.0	63.1
Floor Area Per Person (m^2)	6.8	10.1	13.8	20.2
Average Floor Area (m^2)	47.7	68.4	80.8	-
Average Number of Rooms per Unit	3.0	3.3	4.0	-
Average Number of Rooms per Household	2.2	2.2	2.5	3.4
Average Number of Persons per Room	2.4	2.1	1.5	0.9

Source: Korea Ministry of Construction and Transportation

The average housing size per household by the age of household heads does not remain constant between 1980 and 2000 (See Figure 3). The housing size per household varied by age and changed over time. The needs for housing size change according to the family

life cycle: children leave parents to become independent households in the late 10s and early 20s and start new families in their mid-late 20s and early 30s. Till then, the need for large housing size is yet small. But when they become parents during their 30s and 40s, such a need would surface and reaches the highest level during the 50s and early 60s. Their need for large housing units would decrease when they become old particularly when they eventually end up being single person household in their 70s and beyond.

Figure 4 shows the housing size distribution by the age of householders in the SMR in 2000. The smallest housing size (19 pyong or less) was mostly needed among the younger householders. The need for the small size housing units then declines until the younger householders reach their middle age. Consequently, the need for small-sized units increases again when househoulders reach old age. The need for the medium-sized housing units (20-29 pyong) goes up until the householders reach the age of 40-50 year old, and then it goes down after the householders become 50 years old. The need for the large size housing (30 pyong or more) is highest among age groups of 55-64 years old.
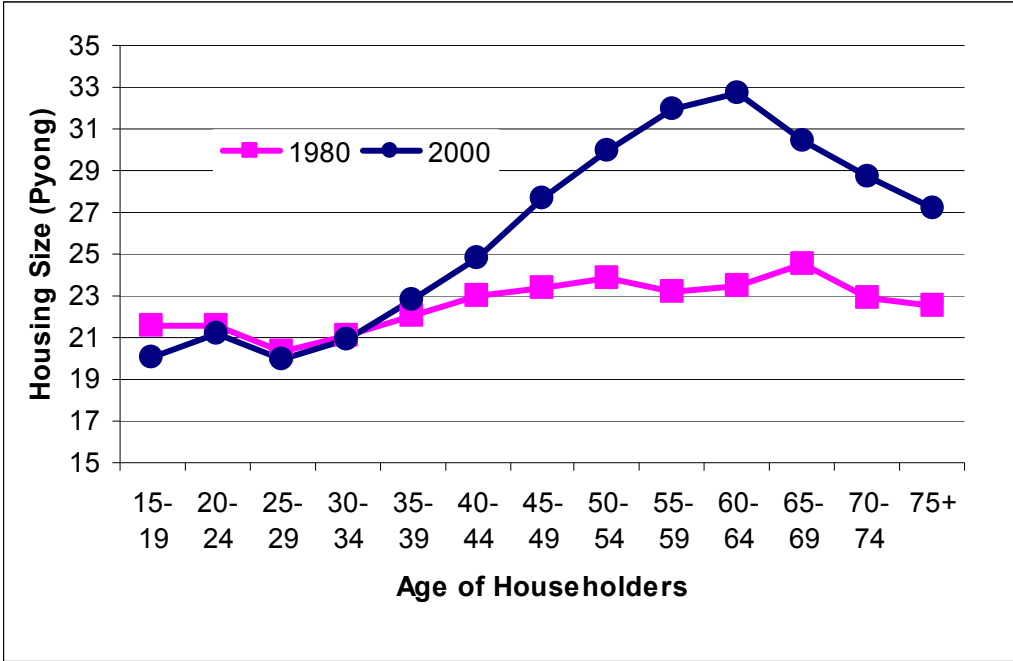
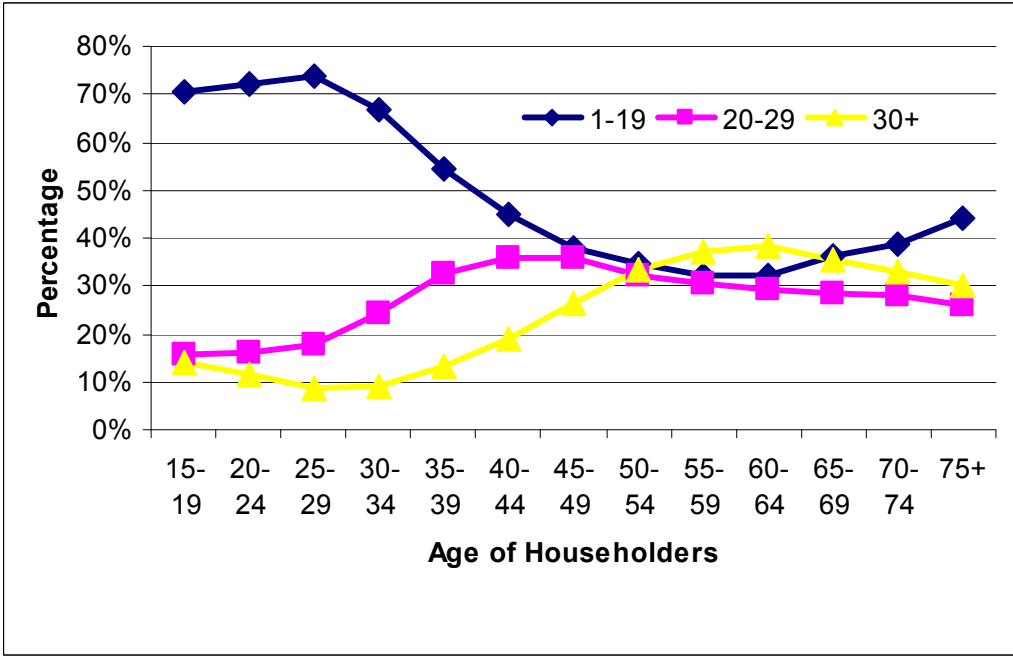Figure 3. Housing Size by Age of Householders in the SMR, 1980 and 2000

Figure 4. Housing Size Distribution by Age of Householders in the SMR, 2000

Developing Housing Space Needs Projection

The close connections between demography and housing have been long neglected, but more efforts to link the two different subjects have been observed due to the changed social climate (e.g., affordability crisis for middle class; publicity of impacts of baby-boom generation), joint housing-population data bases (e.g., better access to micro data records), and the rise of applied research in demography (Myers, 1990). The forecast for housing needs is one of such integrated efforts and it has become more important to urban planners because of its policy implications. Urban planners use such forecast to prepare for the future housing strategies and for community and regional plans.

Forecast for housing needs is often derived by demographic methods, which reflect the changing demography and housing arrangement preferences (Myers, 1990). The key components used for such forecast include population projection, household projection, projection of vacant units and demolished units. The total housing needs projected by such components are further converted into needs for different sizes of housing units by specific socio-economic sub-groups (e.g., low-income renter households).

Figure 5. Process of Developing Housing Space Needs Projection

The process of projecting housing needs is summarized in Figure 5. The first step is to project population changes. The study uses the most recent official population projections at the national and provincial level (Korea National Statistical Office, 2007), which are regularly updated by the Korea government.

The second step is to estimate the total number of households using the projected population growth and headship rates. Household projections have started in many European and American countries since 1950, as response to an increasing demand from the post-war reconstruction and national economic and housing development planning (Kono, 1987; The Economic Commission for Europe, 1968). As the most common procedure to produce household projections, the headship rate method has the advantage of being simple and operational, and requires minimal data (Plane & Rogerson, 1994). Headship rates are usually calculated by dividing household heads in each group (age, sex) by the population in that age and sex group. This method produces reasonable household projections (Kono, 1987).

The future headship rates are developed using four categories of techniques: trend extrapolation, cohort approach, regression and normative approach (Kim, 2001; Kono, 1987; United Nations, 1973 & 1993; Myers *et al.*, 2002; California Department of Housing and Community Development, 2000). The first two approaches are widely used. The extrapolation methods are characterized by the assumption that future headship rate is determined by its past trends. There are many ways of measuring the past trends and project them into the future. They include judgmental extrapolation, curve fitting, log regression, linear regression and time series analysis (Kim, 2001). The cohort approach allows the generational differences in headship rate to carry forward, while allowing for normal life-course changes as each generation ages (Myers *et al.*, 2002). The cohort approach is found useful when changes in headship rates are rapid among the young population and when the size of a certain cohort is quite different from the adjacent

cohorts immediately before and after, as embodied in the post-war baby boomers (Kim, 2001; United Nations, 1993).

The third step is to project total vacant units and demolished units using the normal vacancy rates and normal demolition rates. The reasonable amount of vacant units in the housing market facilitates the free movement of population and choice of reasonable housing alternatives and plays a big role in stabilizing the housing price across the region. There is no clear-cut standard for the normal vacancy rate. There is a wide range of vacancy rate assumptions by tenure used in many states and other agencies in the USA (Nelson, 2004). The rule of thumb is to use 2% for the normal owner vacancy rate and 5% for the normal rental vacancy rate.

The statistics for vacancy rates in Korea does not distinguish vacant units for sale or rent from vacant units for seasonal or vacation purposes. With the increasing household income, the increasing demand for the seasonal or second home should be incorporated in the vacant unit projection. As a result of different concepts of vacancy rates and increasing household income, the normal vacancy rates in the MSR might be a little higher than the standard vacancy rates.

We estimate the replacement needs using normal demolition rate. A certain percentage of housing units are removed from the inventory due to fire, natural disasters, and obsolescence due principally to aging (Nelson, 2004). Some housing units are converted into other non-residential uses. The trend extrapolation might be a useful method to project replacement needs.

The fourth and last step is to convert total housing needs into different housing size needs using the household-housing size matrix (HHSM). The HHSM is intended to link

householder's demographic characteristics (e.g., age, gender, income, and tenure) to

housing characteristics (e.g., size). The HHSM allows us to see the effects of the

changing household demography (including age and sex composition of population and

household formation behavior) on the future housing size needs. The HHSM is developed

using the 2000 Korea Census of Population and Housing 2% tape data and 2001 Korea

Household Expenditure Survey (HES) [4].

Housing size distribution for projected households is determined using the projected

households and the HHSM ($(Hsnum_{a,g,e,r,s} / Hsnum_{a,g,e,r})$), which is a matrix linking age,

gender, household expense, renter status, and housing size. (See (1) and (2)).

$$Hsnum_{a,g,e,r,s}^{t+n} = Hsnum_{a,g,e,r}^{t+n} * (Hsnum_{a,g,e,r,s}^{t+n} / Hsnum_{a,g,e,r}^{t+n}) \tag{1}$$

Where $Hsnum_{a,g,e,r,s}^{t+n}$ is housing construction needs by age, gender, total household

expense, renter status, and housing size for the target year. $Hsnum_{a,g,e,r}^{t+n}$ is housing needs

by age, gender, total household expense, and renter status for the target year.

The equation (5) is converted into the equation (6) for computation purpose.

$$Hsnum_{a,g,e,r,s}^{t+n} = Hsnum_{a,g}^{t+n} * (Hsnum_{a,g,e}^{t+n} / Hsnum_{a,g}^{t+n}) * (Hsnum_{a,g,e,r}^{t+n} / Hsnum_{a,g,e}^{t+n})$$
$$* (Hsnum_{a,g,e,r,s}^{t+n} / Hsnum_{a,g,e,r}^{t+n}) \tag{2}$$

Where $Hsnum^{t+n}_{a,g,e,r,s}$ is the housing needs by age, gender, total household expense, renter status, and housing size for the target year, $Hsnum^{t+n}_{a,g}$ are housing needs by age and gender for the target year, $Hsnum^{t+n}_{a,g,e}$ are housing needs by age, gender, and total household expense for the target year, and $Hsnum^{t+n}_{a,g,e,r}$ are housing needs by age, gender, total household expense, and renter status for the target year.

Since income variables are not available in the 2000 Korea Census of Population and Housing, a proxy income variable is developed for each household in the Census by using a national household expenditure survey containing income related variables. Data matching technique is used to assign values for income variables that are not originally included in the Census (Van Fer Puttan *et al.*, 2002). A regression method is widely used to develop predicted values because of its easy applicability and statistical properties (Ribar, 2004). Lee *et al.* (2006) used the log-linear regression method to predict the household income estimate for the 2000 Korea Census of Population and Housing. The regression coefficients were derived using 2003 special household survey collected by Korean Research Institute for Human Health. Following the method used by Lee *et al.*, this study used the 2001 Korea HES to derive the regression coefficients. The log-linear regression method was used to develop the predicted values of household income and household expenses. Household income in 2001 Korea HES is generally underreported relative to total expense and tends to underestimate the income of one person householders, the self employed household members, or agricultural worker householders, etc. The total household expenses are considered to accurately depict the relative income level of these households, in particular, low-income households. This study uses total

household expenses as an income proxy variable to reflect the relative income level of households.

Housing Needs Projection of the Seoul Metropolitan Region

Household Projection, 2005-2015

There have been a limited number of studies on household projections in Korea. The Bank of Korea developed the first household projection using the projected total population and the extrapolated average household size in 1970 (Kim, 1994). Over the last twenty-year period, demographers in Korea have used the headship rate method to produce household projections (Park and Moon, 1981; Kim, 1988; Kim, 1995; Byun, Chang, and Kim, 1997; Chang, Byun, and Kim, 1998; Kim, 2001; Park, Kim, and Ko, 2002). The current study uses headship rates by age and gender to develop household projections by age and gender (See (2)).

This study uses the provincial population projections by five-year age group (2001-2030) released by the Korea National Statistical Office in May 2007. Three household projection scenarios are developed based on headship rate assumptions, while one household projection scenario is developed based on the historical household growth trend. They are detailed below.

1) Linear trend extrapolation of total household growth between 1995 and 2005: This approach can be applied in the absence of detailed population and headship rate information. The households are determined using the simple linear trend extrapolation

method, which assumes households will increase by the same number of households in the future year as the average annual increase observed during the base period.

2) Modified exponential growth of headship rates between 1990 and 2000: This approach intends to extend the rate of change in the headship rates between 1990 and 2000. The rate of change is assumed to decelerate during the projection period. Exponential growth formula varies depending on how the headship rates change between 1990 and 2000 (Park *et al.*, 2002). Household projections are calculated in two different ways depending on the direction of headship rates change between 1990 and 2000. If the headship rates change between 1990 and 2000 in a positive way, the following is applied.

$$Hrate_{a,g}^{t+n} = 1 - [1 - Hrate_{a,g}^{t-m}] * [(1 - Hrate_{a,g}^{t}) / (1 - Hrate_{a,g}^{t-m})]^{[(t+n)-(t-m)]/m} \qquad (3)$$

Where $Hrate_{a,g}^{t}$ is headship rates by age and gender for the year *t (2000)*. $Hrate_{a,g}^{t+n}$ is headship rates by age and gender for the target year *t+n (2015)*. $Hrate_{a,g}^{t-m}$ is headship rates by age and gender for the year *t-m (1990)*. The notation *m* in this equation denotes the base period between two census years: 1990 and 2000. The notation *n* in this equation indicates the period between the launch year, 2000, and the target year.

If the headship rates change between 1990 and 2000 in a negative way, the following formula is applied.

$$Hrate_{a,g}^{t+n} = Hrate_{a,g}^{t-m}] * [Hrate_{a,g}^{t} / Hrate_{a,g}^{t-m}]^{[(t+n)-(t-m)]/m} \qquad (4)$$

3) Cohort trend of headship rates between 1990 and 2000: The cohort trend method allows us to reflect the generational differences in headship rates, while allowing for life-course changes as each generation ages (Myers *et a.l*, 2002). The cohort trend of headship rates by age and sex are developed applying the cohort change ratios by age and sex between 1990 and 2000.

4) The 2005 constant headship rates: The 2005 headship rates are assumed to remain constant during the projection horizon. Four different assumptions produce a range of household projections of the SMR between 2005 and 2015 (See table 2). Using the average of results of four different methods, households are projected to grow from 7.5 million in 2005 to 8.3 million in 2010, and to 9.1 million in 2015. This study uses the household projections based on the modified exponential growth method for demographic and housing analysis.

Table 2. Household Projections of the SMR, 2005-2015   Unit: Millions

Headship Rates Method	2005	2010	2015	2005-2010	2010-15	2005-2015
	7.47					
1) Linear Trend Extrapolation		8.31	9.15	0.84	0.84	1.68
2) Modified Exponential Growth		8.32	9.01	0.85	0.69	1.54
3) Cohort Method		8.35	9.05	0.88	0.71	1.58
4) 2005 Constant Headship Rates		8.37	9.09	0.90	0.72	1.62
Average		8.34	9.08	0.87	0.74	1.61

Vacancy Projections, 2005-2015

The vacancy rate of Korea has increased from1.7% in 1970 to 5.4% in 2005 (Yoon, 2002). The vacancy rate of the SMR is estimated to be around 3.4% in 2005, which is 2% below the national average rate. This study assumes that the vacancy rate of the SMR remains 1% below the estimated national vacancy rate. This study projects the national vacancy rate to be 5.9% in 2010 and 6.2% in 2015. As a result, the vacancy rate of the SMR will be 4.9% in 2010 and 5.2% in 2015. Total vacant housing units are projected to grow by 230,000 from approximately 200,000 in 2005 to 430,000 in 2015.

Demolition Projections, 2005-2015

Estimates of demolition during the base period are made using the past Korea Census of Population and Housing and the administrative records of new construction units. The proportion of demolished units to total housing units is not stable between 1980 and 2005 and ranges between 0.4% and 2.0%[5]. There are a limited number of studies on demolition. A recent case study observes an annual loss rate of 0.6% (Nelson, 2004). The current study uses annual loss rate of 0.8% (80% of the national average of two loss rates from two periods: 1995-2000 and 2000-2005) to project demolition. Total lost units are projected to be approximately 630,000 units between 2005 and 2015.

Housing Need Projections

The sum of household projections, vacancy projections, and demolition projections discussed above becomes housing need projections. The projections of households,

vacancy, and demolition are based on the "core assumptions" of headship rates, vacancy rates, and demolition rates. The core assumptions above are major determinants of the forecast accuracy (Ascher, 1978). The key assumptions are usually developed using the trend extrapolation of historical trends of those rates. However, those historical rates are oftentimes instable (Myers et al, 2002). To complement the weakness of the trend extrapolation based demographic rates, the scenario approach with different assumptions or the average of diverse projection results is oftentimes recommended and found to produce more accurate projections (Smith, 2001).

To reflect the uncertainty of core assumptions, this study presents a range of housing need projections with three series: low, mid, and high. The mid series is the most likely scenario and is derived based on the assumptions fully discussed above. The high series is developed based on relatively strong housing demands, vacancy needs, and replacement needs, while the low series is developed based on relatively weak housing demands, vacancy needs, and replacement needs.

Household projections are selected among four scenarios and the average of them. Low and high vacancy scenarios are developed using +/-1 % of the mid series vacancy rate (4.9%). The resulting low vacancy rate is 3.9%, and the high vacancy rate is 5.9%. Low and high loss rates are also developed using +/- 0.2 % of the mid series annual loss rate (0.8%).

As a result, for 2005-2015, household projections range from 1.5 millions to 1.7 millions, vacancy projections range from 150,000 to 310,000, and the demolition projections range from 470,000 to 790,000. The mid series housing need projections for 2005-2015 are nearly 2.5 millions, whci are composed of 1.6 million household projections, 230,000 vacancy projections, and 630,000 demolition projections. (See Table 3)

Table 3. Housing Unit Construction Need Projections of the SMR, 2005-2015

Unit: Thousands

	Households	Vacant Units	Lost Units	Total
Low Series	1,542	145	474	2,161
Mid Series	1,606	225	632	2,463
High Series	1,676	308	789	2,773

The mid series housing needs projections are consistent with two national and provincial level housing needs projections prepared by the Korea Ministry of Construction and Transportation (MOCT) and Gyeonggi Research Institute (GRI) (GRI, 2004).

Low-income Renter Households Space Needs

As of 2005, the total number of renter households in the SMR is estimated to be 3.8 millions, accounting for 52% of total households in the SMR. Total rental housing needs of the SMR during the period of 2005 and 2015 are estimated to be 881,000 units. Household space needs are determined by HHSM. The key decision is how we develop assumptions of age-sex-income-tenure specific housing size distribution probability. The log-linear regression method was used to develop the predicted values of household expense (proxy variable of household income). Household expense regression model

shows R^2 of 0.61. Table 4 shows the log-linear regression results of total household

expense using the 2001 Korea HES.

Table 4. Estimated Coefficients from the Log-Linear Regression of Total Household Expense by Selected Demographic Variables, Seoul Metropolitan Region, 2000.

Variable	Coefficient	t-value
Constant	6.42058	132.7*
Household size	0.17424	34.86*
Age	0.00542	3.28*
Age*Age	-0.00003	-1.34
Gender	0.00089	0.06
Education	0.09543	21.88*
Marriage (ref.=married)		
Single	-0.18911	-10.34*
Spouse Died	-0.15499	-6.79*
Divorced	-0.11242	-5.28*
The Number of Workers Per Household	0.00152	6.67*
Employment Status (ref.=salary worker)		
Self-employed	0.00283	0.21
Business owner	0.19842	11.98*
Family worker	-0.10125	-0.99
Student or others	0.10968	4.57*
The number of children (<=17)	-0.00288	-10.18*
The number of elderly (>=60)	-0.00416	-16.66*
Housing Type (ref.=single)		
Apartment	0.07482	6.44*
Row house	-0.04069	-3.29*
Others	0.10390	3.64*
Tenure(ref.=owner)		
Annual lease (chonsei)	-0.18087	-16.53*
Monthly rent (wolse)	-0.10422	-6.98*
Others	-0.20938	-7.58*
Occupation (ref.=laborer)		
Managerial, Professional	0.31339	13.32*
Technical,Sales,Administrative	0.15784	7.84*
Services	0.08465	3.8*
Farming, Fishing	0.12173	1.07
Craft, Repair	0.05369	2.81*
Industry (ref.=agricultural, fishery, mining)		
Manufacturing	0.00091	0.03
Electrical, Gas	-0.02584	-0.94
Wholesale, Retail	-0.00948	-0.34
Transportation	0.03788	1.31
Finance, Insurance, and Real Estate	-0.00743	-0.28
Public Service & Education	-0.03045	-1.15
Auto (yes/no)	0.25082	24.61*
N	7,989	
F	373.32	
R^2	0.6076	

To see the effects of the changing age composition on the needs for housing units of various sizes, the study use two HHSMs with different age specific housing size probability assumptions (2000 constant age specific housing size distribution & extrapolated age specific housing size distribution.) to produces two scenarios (B and C). According to both scenario B and scenario C, the needs for medium and large rental housing are between 363,000-400,000 units during the planning period of 2005-2015. These estimates account for 41%-45% of total rental housing needs during the same period. The lowest (20th percentile) income rental household needs for medium and large housing units are estimated to be 118,000-128,000, which account for 28%-30% of total lowest income rental housing construction needs.

The needs for medium and large rental housing construction units are on the rise during the planning period. The proportion of low-income households living in large and medium rental housing units to total low-income households is expected to increase from 25% in 2005 to 25.7%-26.4% in 2015. It is projected that 41%-45% of the renter household growth during the planning period live in medium and large housing units.

The overall effects of changing age composition on the needs for medium and large housing units between 2005 and 2015 are clear from figure 6. Middle and old age groups (aged 35 years or older) tend to have stronger needs for larger housing space needs, while younger age groups (34 years old or younger) do not have such needs. This implies that the future housing supply strategy for the renter households should be linked to the aging pattern of renter householders.
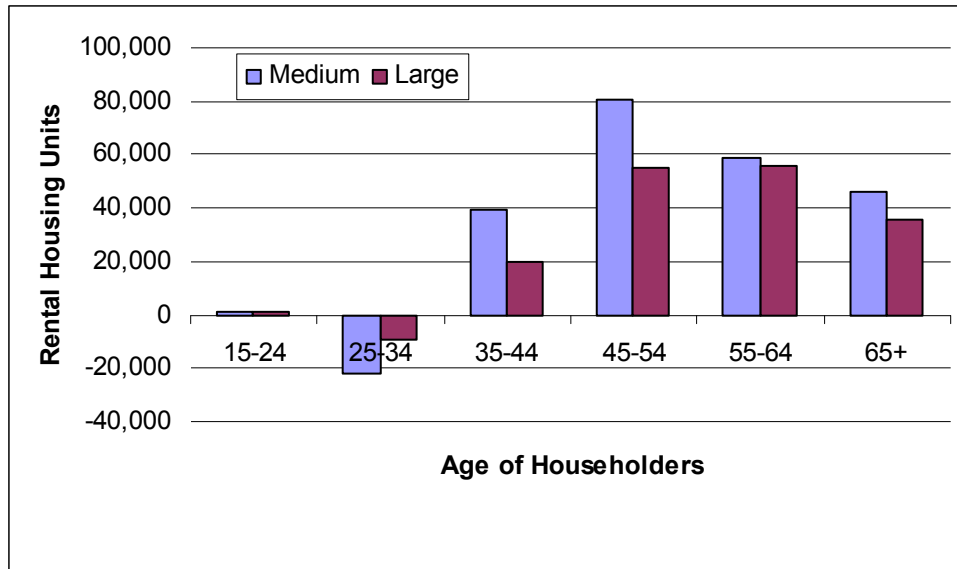
Figure 6. Needs for the Medium and Large Rental Housing Units by Age of Householders, 2005-2015.

To further understand the impacts of the changing age composition on housing space needs controlled for household income, we standardized the housing space needs of scenario B using the 2005 age-sex composition (Pollard *et al.*, 1990). This means that we use both the derived 2015 household projections from scenario B and the constant 2005 age-sex composition to derive housing size needs of a new scenario "A". By doing this, we are able to see the effects of the changing age composition on the housing space needs. The housing space needs of scenario A are compared with scenario B and scenario C.

First, scenario A shows strong rental needs relative to scenario B and C. Assuming that the 2005 age-sex composition is constant, more than 300,000 rental units are needed to meet the housing needs (See Table 5). Second, the rental housing needs of scenario A are spread to relatively low and medium income groups, but the rental housing needs of scenario B and C are concentrated in the lowest fifth income renter households. Third, the lowest fifth income group in scenario B and C looks for a bigger housing space than that

of scenario A. The percentage of the large size housing needs to total renter households

increases from 13% (scenario A) to 18% (scenario B) and 23% (scenario C).

Table 5. Rental Housing Construction Need Projections by Household Expenses and Size
Unit: Thousands

Household Expense*	Medium Size (20-29 Pyong)			Large Size (30 Pyong or more)			Total	
	A**	B**	C**	A**	B**	C**	A**	B & C**
0-20th	53	69	65	36	49	63	356	428
20th-40th	60	35	34	39	28	35	333	161
40th-60th	59	36	36	32	27	35	256	119
60th-80th	52	34	33	25	25	33	172	96
80th-100th	39	30	28	26	29	38	98	76
Total	262	204	197	158	159	203	1,214	881

Note: * Household expense is classified into quintiles using 2000 Korean won: the
lowest fifth (1,370,000 won or less), the second fifth (1,371,000-1,787,000 won), the
middle fifth (1,788,000-2,191,000 won), the fourth fifth (2,192,000-2,739,000 won), and
the highest fifth (2,740,000 won or more). ** Scenario A is based on the 2000 constant
age-sex-housing size distribution. Scenario B is based on the 2000 constant housing size
distribution. Scenario C is based on the extrapolated housing size distribution.

Policy Implications

The importance of rental housing in Korea has long been eclipsed by the value of

Koreans' emphasis on homeownership, even though over 44 % of all householders are

renters. In the 1980s, however, rental housing was more significant, as the number and

proportion of renters rose. These increases will occur again not because more people

prefer renting, but because they will find they cannot afford to own their homes. However,

the Korean governments have not provided sufficient public housing. As shown in Table

6, public rental housing (1,150,054) currently accounts for only 8.9% of the total housing

stock (12,989,000). They are mostly short-term rental houses (57% of public rental

housing stock). Rental housing of five-year leases are sold off to the tenants after the

mandatory rental period. If we only classify permanent public rental housing, the fifty-year rental housing, and the thirty-year national rental as public housing, the existing public housing stock is estimated at about 330,130 units, accounting for only 2.5 % of the total housing stock.

Table 6. Public Rental Housing Stock by Rental Period, 2004

	Types by Rental Period						Total
	Permanent rental	50-year rental	National (Kukmin) rental (30-year)	5-year rental[1]	Workers rental (5/10/50 year)	Maeip rental(3-year)	
No. of units	190,077	92.850	47,203	655.908	38,506	125,450	1,150,054
% of total rental stock	16.5	8.1	4.1	57.0	3.4	10.9	100.0
Housing size (m^2)	45 or less	60 or less	-50 or less -50-60 -60 or more	Mostly 60	Mostly 60	Mostly 60	

Notes: 1) Included the 5 years rental housing construction by public sector and the rental housing constructed by private companies with loans from the NHF
Source: KNHC (2005)

The new civil government took office in February 2003 and announced a ten-year One Million National Rental Housing Construction Plan starting from 2003. This plan is regarded the most important housing policy for low-income families. While past government polices have led to some improvements in housing, they did not solve the housing problems of the lower income families. As a result, even though the quality of housing has improved, large numbers of urban and rural poor still live in substandard housing. Furthermore, the unequal distribution of income and wealth leaves many people

with jobs and incomes that are inadequate to meet the rising cost of housing and rent, while some remain well off.

There was a recent surge in the demand for the medium and large rental housing units in Korea, particularly in SMR. As was stated above, the needs for medium and large rental housing units are approximately 400,000 units in SMR during the planning period of 2005-2015. With respect to the changing demographics and housing space demand projected above, several important policy issues and their implications for policies are discussed below.

1) The most serious problem of the Korean housing policy was its insufficient attention to rental housing provision. Since the provision of public rental housing imposes heavier burdens on the government, the provision of public housing for sale has been the principal policy[6]. Despite the large volume of housing built for owner-occupation, the percentage of homeowners has not increased[7]. Since the 1980s, Korean governments have tried to increase home-ownership by regulating the sale price[8]. 2) One of the crucial housing problems in Korea is the increasing polarization between the housing conditions of the better off and those of the worse off (Ha, 2002). Certainly the most common concern expressed in the popular press is that of increasing housing prices and rents. The dilemma that public sector suppliers are facing is that rented houses have to be financed out of either profits made by selling other houses or increased rents. Therefore, they have contrasting difficulties in reducing the price of the houses for sale and rent payments for low-income households. The steady increase in construction costs has made it increasingly difficult to accommodate low-income households in the public sector; so public rented housing has been mainly confined to a limited range of income groups.

3) The government housing policy for sale and rent is targeted at people who do not own homes. The government provides public apartment for sale with a floor area of up to 85 square meters. And in terms of floor area, the public rental housing is restricted to 60 square meters or below. It is very hard to secure medium and large rental housing units[9] for the low-income large households. The estimates for medium and large rental housing units (400,000 units) account for 45% of total rental housing needs of the planning period. In order to meet the demand for the medium and large rental housing units, it is highly desirable that the government home sale programs are switched to rental housing programs to achieve higher efficiency and equity.

4) In Korea, there is still rent allowance schemes, even though *chonsei*[10] rent could now be financed by the National Housing Fund. A typical household in Korea in the lowest income group spends about 25% of its total income and 30 % of its cash income on housing (Park, 2007). The low-income families suffer from inadequate housing and pay too much of their income in rent. The Korean government has not tackled directly the problem of housing need, nor has it really considered who needs or deserves housing assistance. Instead, past government policy has placed emphasis on the supply of new housing for sale. The government has introduced housing for sale alongside polices to encourage home ownership with a concept of 'filtering' and 'trickling down' in mind. However, the reliance upon 'trickling down' as a means of meeting the housing needs is open to basic theoretical and empirical challenge in Korea (Ha, 2005).

5) Until the 1990s, the main themes for housing debates in Korea were related to the welfare aspects of housing, and the question was how the government should meet social housing needs. The role of the state in housing was the main focus. However, in recent

years, the main themes have begun to change: market relations in the housing sector and market forces are now regarded as of greater importance than the role of the state. This neoliberal view states that the public sector should fulfill a residual role, assisting only those households unable to afford or find any other sort of accommodation. With respect to the provision of medium and large rental housing, housing policy should focus on the deregulation of development permits, density and land use controls, and redevelopment procedures in terms of maximizing output while at the same time minimizing overall levels of excess prices and rents.

Conclusions

Although rapidly changing demographics, particularly population composition, generated massive new housing demands, it became apparent that the private builders and, to some extent, the housing market as a whole, are unable to provide the required accommodation not just for low-income households, but also for many of the new middle-income households. The Korean government has always pursued housing policies designed to foster economic growth and as a tool for political stabilization. Under this structure of housing system and market, social forecasts based on demographic trends have never been the main basis for planning housing policy, and the housing shortage and housing problems of low-income households will never be solved.

As we observed the skyrocketing housing price in Korea in recent few years, the housing demand, in particular that for large housing units, has dramatically increased. This was not new, but inevitable, given the rapidly changing demographics. The

changing age composition, the aging of baby boomers, household formation, household composition, and housing arrangement preference contribute to the surge in the demand for the large housing units.

The 8.5 million extended baby boomers (born between 1956 and 1975) of the Seoul Metropolitan Region are between 30 years old and 49 years old as of 2005. They already indicated that the sharp increase of housing price of the large size housing units in the SMR were not new, but had been expected from demographic trends. They will play a bigger role in the housing market in the coming years as they become older over time. Demographic trend is not a choice, but destiny.

Using demographic methods, this study produces the total future housing needs of the SMR and further decomposes the projected needs into those for different housing sizes and by tenure and household expenses using the household-housing size matrix. As expected, the demands for the large housing units by low-income renter households expanded continuously. Approximately 400,000 medium and large housing units are needed by renter households between 2005 and 2015. This amount accounts for 16 percent of total housing needs of the SMR during the planning period of 2005 and 2015.

What would be appropriate responses to the increasing needs for large rental housing units by the low-income households? We argued that the Korean government should pay more attention to rental housing policy. By doing so, we expect that polarization between the housing conditions of the better off and those of the worse off would reduce. The reality is that it is very hard for the low-income group and the large size households to acquire the medium and large rental housing units. In order to meet this demand, the government housing sale programs should be switched to rental housing to enhance

efficiency and equity. Moreover, rent allowance, deregulation of development permits, density and land use controls, and redevelopment procedures can be considered as housing policy tools for accommodating the housing needs of low-income renter households.

References

Ascher, W. (1978) *Forecasting: An Appraisal for Policy-Makers and Planners.* (Baltimore: Johns Hopkins University Press).

Byun, Y., Y. Chang, Y. Kim (1997) *Household Projections Techniques*, Korea National Statistical Office.

California Department of Housing and Community Development (2000) *Raising the Roof- California Housing Development Projections and Constraints 1997-2020.* Available at http://www.hcd.ca.gov/hpd/hrc/rtr/index.html Accessed on June 2007.

Chang, Y., Y. Byun, Y. Kim (1998) Development of Household Projection Model and Its Application for Korea, *The Journal of the Population Association of Korea*. Vol. 21, No. 1. pp. 129-161.

GyeonggiResearch Institute (2004) *Sudogwon Planning and Management Basic Plan*.

Ha, Seong-Kyu (2002) The poor, rental accommodations, and housing policy in Korrea, Cities, 19(3), pp. 195-203.

Ha, Seong-Kyu (2005) The role of state-developed housing and housing poverty in Korea, *International Development Planning Review*, 27(2), pp.227-244.

Kim, H. (2002) Analysis of Housing Stock and Vacant Housing Units, in J. Yoon (ed), *Housing of Korea*, Korea National Statistical Office.

Kim, Hyung-Seog (2001) *Household Projections in the Republic of Korea.* Research-Based Training Programme. Available at www.unsiap.or.jp/research_paper/RbTP-t2-01.pdf. Accessed on June 2007.

Kim, J. (2002) Housing and Residential Environmental Quality of Korean People, in J. Yoon (ed), *Housing of Korea*, Korea National Statistical Office.

Kim, N. (1988) *Projections of Population and Household by Region in Korea.* (unpublished)

Kim, Y. (1995) The Change of Household Structure and Projections of Households by City and Province, *The Journal of the Population Association of Korea*. Vol. 18, No. 1. pp. 119-165.

Kono, S. (1987) The Headship Rate Method for Projecting Households, J. Bongaarts, T.K. Burch and K. W. Wachter (eds.), *Family Demography: Methods and Their Application*, pp. 287-308.

Korea Ministry of Construction and Transportation (2003) *Housing Comprehensive Plan 2003-2012*.

Korea National Housing Corporation (2005) *Year Book of Housing Statistics*, (Seoul: KNHC).

Korea National Statistical Office (2007) *Results of Population Projections by Metropolitan City and Province*. Available at http://kosis.nso.go.kr/cgi-bin/SWS_1020.cgi?KorEng=1&A_UNFOLD=1&TableID=MT_ATITLE&TitleID=BB&FPub=3&UserID=. Accessed on June 2007

Lee, H., M. Kim, D. Rho, S. Kang, B. Son, J. Yu, and W. Lim (2006) *The Structure of Poverty in Korea*, Korea Institute for Health & Social Affairs (KIHASA)

Lee, K. (2006) Next Five Years, Be Prepared for the Big Change of the Asset Market, *Shin Dong-A. Avaiable at* http://www.donga.com/docs/magazine/shin/2006/04/28/200604280500046/200604280500046_1.html. Accessed on June 2007.

Myers, D., J. Pitkin, and J. Park (2002) Estimation of Housing Needs amid Population Growth and Change, *Housing Policy Debate*, 13(3), 567-596.

Myers, D. (1990) Introduction: The Emerging Concept of Housing Demography, pp. 3-31 in Dowell Myers (ed.), *Housing Demography – Linking Demographic Structure and Housing Markets*, (Madison: The University of Wisconsin Press).

Nelson, Arthur C. (2004) *Planner's Estimating Guide Projecting Land-Use and Facility Needs*. Chicago, Illinois: Planners Press, American Planning Association. pp. 25-29.

Park, B. and H. Moon, (1981) *Projections of Households and the Number of Marriage*. Korea Institute for Population and Health.

Park, Shin-Young (2007) The State and housing policy in Korea, in R. Groves, A. Murie, and C. Watson (eds.), *Housing and the New Welfare State,* (Aldershot: Ashgate).

Park, Young-joo, Hyung-seok Kim and Heang-joon Ko (2002) Household Projections for the Republic of Korea, A Paper Presented to *20th Population Census Conference*, 19-21 June 2002, Ulaanbaatar, Mongolia. Avaiable at www.ancsdaap.org/cencon2002/papers/Korea/Korea.PDF. Accessed on June 2007

Plane, D.A. and P.A. Rogerson (1994) *The Geographical Analysis of Population with Application to Planning and Business*. (New York: John Wiley & Sons).

Pollard, A. H., F.Yusuf, and G.N. Pollard (1990) *Demographic Techniques Third Edition*, (New York: Pergamon Press).

Ribar, D.C. (2004) Uses of Matching, *Lecture Materials for Economics 721*-11: Empirical Microeconomics. Available at http://www.uncg.edu/bae/people/ribar/teaching/ECO721/. Accessed on June 2007.

Smith, S.K., J. Tayman, and S.A. Swanson (2001) *State and Local Population Projections: Methodology and Analysis*. (New York: Kluwer Academic/Plenum Publishers).

United Nations (1973) Methods of Projecting Households and Families, *Manuals on Methods of Estimating Population*, New York.

United Nations (1993) Population and Development Planning, *Proceedings of the United Nations International Symposium on Population and Development Planning*, New York.

United Nations, The Economic Commission for Europe (1968) *The Housing Situation and Perspectives for Long-Term Housing Requirements in European Countries*, (Geneva: United Nations).

van der Putten, P., J.N. Kok, and A. Gupta (2002) Data fusion through statistical matching, *Paper 185*, Center for eBusiness@MIT, MIT Sloan School of Management. Available at ebusiness.mit.edu/research/papers/185_Gupta_Data_Fusion.pdf. Accessed on June 2007.

Yoon, J. (2002) Economy, Society, and Living Arrangement Change, in J. Yoon (ed), *Housing of Korea*, Korea National Statistical Office.

Notes

[1] One pyong is equivalent to about 3.3 square meters.

[2] There are three generations of baby boomers in Korea, defined by the number of births of the specific year. The first generation of baby boomers is found between 1955 and 1963, the second generation of baby boomers is found 1968 and 1974, and the third and last generation of baby boomers is found between 1979 and 1982 (Lee, K, 2006). This study broadly defines the baby boomers as the age cohort born between 1956 and 1975, who belongs to the age group of 30 and 49 years old in 2005.

[3] http://www.land.go.kr/sudoplan/

[4] Korea Household Expenditure Survey was made in 1991, 1996, and 2001. The purpose of the survey is to estimate the quality of living conditions, income, and expense for the previous year of each survey year. The 2001 survey was collected from randomly selected households of 27,000 in the nation.

[5] Authors estimate housing loss rate using Korea Census of Population and Housing by Korea NSO and Housing Construction Performance Report by Korea MOCT. Also see Kim, H (2002).

[6] Between 1962 and 2000, the Korea National Housing Corporation produced 761,240 units for sale, accounting for 62 % of its total housing constructed (KNHC, 2002).

[7] The proportion of owner-occupancy in the country as a whole had declined form 58% in 1980 to 54% in 2000.

[8] Since 1982 the sale prices of new apartment housing have been set by the government and housebuilers have had to sell under the ceiling price.

[9] The medium size housing: 19-25 pyong (62.7-82.5 m^2), the large size housing: 26 pyong (85.8m^2) or more.

[10] Chonsei is a rent agreement where the tenant pays a lump sum deposit to the landlord in lieu of rent for two years. The entire deposit (excluding any interest earned) is returned when the households moves out at the end of the tenancy.