

An Empirical Study on the Housing Affordability of Multi-Family Dwellers

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Abstract

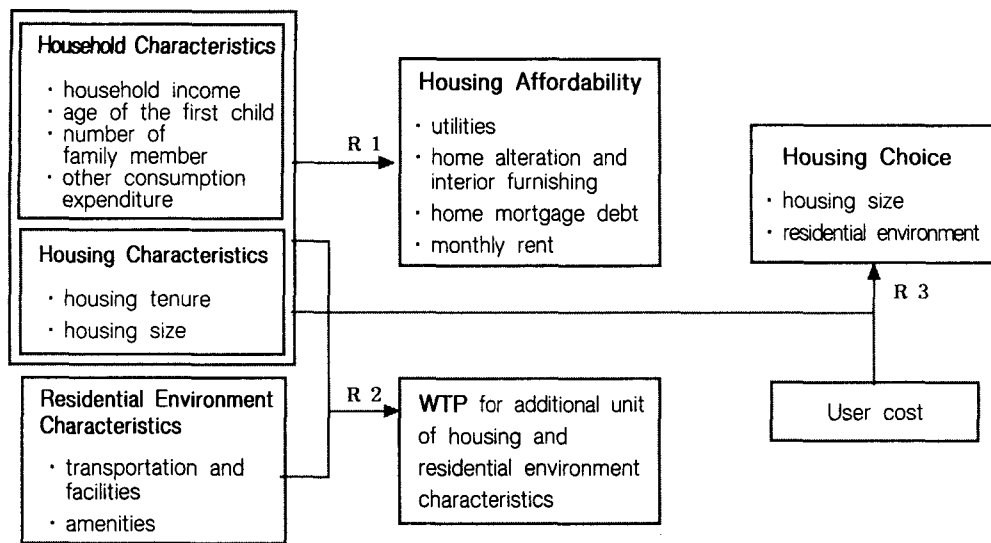
The purpose of this study is to investigate the housing affordability of multi-family dwelling in Seoul and to systemize the housing expenditure patterns and housing affordability according to household and housing characteristics. Housing expenditures are basically composed of the payments of four major items, including utilities, home alteration and interior furnishing, home mortgage debt, and monthly rent. Housing affordability index as operationally defined in this study is Housing Expenditure-to-Income Ratio (HEIR). The ratios were computed for each of the four housing expenditure items. Data for 465 multi-family dwellers were gathered from the structured questionnaire. The results showed the differences between household and housing characteristics on housing expenditure levels and HEIR. In addition, these differences had influence on future housing choice behavior. The analysis on the variables of housing choice behavior showed the result that user cost considering capital gains were less important, comparing those of early 1990's.

1. Introduction

Despite the massive housing production since the 1990's, the housing affordability of individual household has not been substantially improved. A household is said to have housing affordability problem, if and when it spends more than a certain percentage of its income to housing consumption of an adequate level; e.g., 25 to 30 percent as a rule of thumb.

In recent years, the urban housing market is more demand oriented, and thus, this study was conceived to examine and analyze how the consumer behavior has changed with the market structure. More specifically, the study objectives include: identification of housing expenditure, measurement of housing affordability, and prediction of future housing choice behavior. The conceptual framework of this study is shown in [Figure 1].

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[Figure 1] Conceptual Framework of This Study

2. Literature Review

Housing affordability can be roughly defined as a situation in which a household does not have to pay too much for shelter (Oh, 1995). A household facing a housing affordability problem does not have the ability to meet non-shelter needs after paying housing expenses.

The Department of Housing and Urban Development (HUD) defines "excess cost burden" as paying more than 30% of one's income for housing and "severe cost burden" as paying more than 50% of one's income for housing (Bogden et al., 1993).

Following Grigsby and Rosenberg (1975), affordability should be defined in terms of the adequacy for other household needs of income remaining after deducting housing costs. Thus, income remaining after the deduction of housing costs should be compared to benchmarks for after-housing poverty.

Housing expenditures and HEIR are dependent on income, education level of the household head, occupation, age, family size, housing type, housing tenure, and region, though it is disagreed between countries what should be included in them, and which income is based on (Hefferan, 1978; Comb et al., 1990; Smith, 1990; Stone, 1990, 1993; Oh, 1995; Hulchanski, 1995; Bourassa, 1996). Previous research has shown that, in general, income level has the greatest impact on the ratio of housing expenditures to income (Meeks, 1984; Morris and Winter, 1978).

3. Research Methodology

This research applies an empirical study with a questionnaire survey. The survey is made into housekeepers who dwell at multi-family housing and take charge in consuming of households. Since there is a bias on the areas and housing types in

consuming housing expenditure, the survey is limited to the multi-family housing in Seoul to facilitate the comparison between the items of housing expenditure.

The subjects of the survey are extracted with stratified sampling, one of probability sampling. Sampling is firstly proceeded with investigation of the distribution of multi-family dwelling according to 25 districts in Seoul, and, then, 5 districts including Kangnam-Gu, Seocho-Gu, Songpa-Gu, Yangcheon-Gu and Dobong-Gu are selected considering household income, housing size, age of housing, etc. Finally 14 apartment, 2 row houses and 2 multi-family houses are determined as the survey subjects. Data were collected by interviews using a questionnaire through a preliminary study and a main study. The validity of this study was admitted as the results of three professionals' investigation. Its reliability shows the high level of 0.73 Cronbach's α by the result of the preliminary study. The main study was conducted with individual interviews with the questionnaire complemented after the first preliminary study from 22 March to 10 April in 1999. As a result of the interview with 560 housekeepers, the effective sample size used in final analysis was 465 samples.

Various multi-variate statistical techniques were employed to analyze the survey data, including ANOVA, t-test, multiple linear regression, weighted least-square (WLS), two-step least-square regression (2SLS), and logistic regression.

4. Results and Discussion

This study investigates the general characteristics of the surveyed households, and then the analytical results according to its objectives. The general characteristics shows that the average age is 43 years old, and that the rate under 55 years old is over 90%. Childless households take 14.6% of them, and the rate of the households with school age children from 8 to 19 is highest. The percentage of double income households is 33.1%, and income level is also raised to 3,170 thousand Won comparing 2,380 thousand Won, which is the average monthly income of a wage earner's household in Seoul in 1997. It is shown for housing characteristics that 76% of them dwell in apartment housing, that the average housing size is 29 Pyeong, and that 65.4% occupies their own houses.

The major findings are summarized as follows:

(1) The HEIR was estimated to be 48 percent on average; more specifically, 8 percent for utilities, 5 percent for alteration, 10 percent for home mortgage debt payment and 34 percent for monthly rent, respectively.

There existed a statistically significant difference in HEIR among households with different backgrounds and characteristics; household income, the age of the first child, other consumption expenditure, housing tenure, and housing size are relatively important variables which influence the difference in HEIR. The households with high income, the first child of over twenty years old, over 5 family members, their own

houses or large houses expended high costs of maintenance, monthly rent. The costs of improvement shows the meaningful difference only according to housing size. It was shown that the larger housing was, the more expenditure occurred.

The households with low income or their own houses tended to be more vulnerable on housing affordability, while those with the first child of over twenty years old and 2 family members, vulnerable in monthly rent. Tenant households had difficulty in monthly rent.

(2) The second objective of this study is to determine the households' payment intention of housing expenditure in changing housing characteristics. Since the housing expenditure payment intention means the marginal rate of substitution for other commodities which will be renounced so that consumer may add a housing characteristic, it shows which housing characteristic takes the marginal rate of substitution. Therefore this objective can draw the trade-off relation between housing size as a quantitative value and residential environment as a qualitative value. The additive payment of monthly rent and total housing cost is provided in <Table 1> and <Table 2>.

Estimation of the willingness-to-pay (WTP) function for monthly rent revealed that the WTP for additional unit for residential environment was more important than that for space(Table 1). In other words, households were willing to spend more for their residential environment than that for space. The households with higher income level shows this tendency more strongly than those with lower income level.

<Table 1> The additive payment of monthly rent (unit: million won)

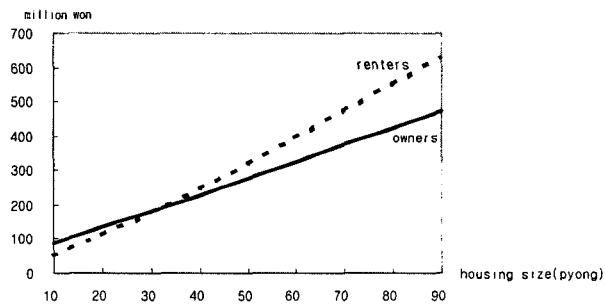
		mean	additional of unit for housing size	additional of unit for transportation and facilities	additional of unit for amenities
	Owner	169.27	179.59 (▲10.23)	208.23 (▲38.96)	256.50 (▲87.23)
	Tenant	95.74	101.48 (▲5.74)	102.54 (▲ 6.8)	107.32 (▲11.58)
Owner	upper	228.41	240.20 (▲11.79)	278.80 (▲50.39)	350.44 (▲122.0)
	middle	155.07	165.01 (▲ 9.94)	192.52 (▲37.45)	232.77 (▲77.70)
	lower	125.36	134.46 (▲ 9.10)	150.62 (▲25.26)	189.95 (▲64.59)
Tenant	upper	116.05	121.88 (▲ 5.83)	125.38 (▲ 9.33)	130.18 (▲14.13)
	middle	93.99	99.75 (▲ 5.76)	101.10 (▲ 7.11)	105.29 (▲11.13)
	lower	87.64	93.50 (▲ 5.86)	93.10 (▲ 5.86)	93.38 (▲5.74)

The willingness to pay of total housing cost is expressed differently from that of monthly rent payment. Namely for households owning housing the user convenience of transit and service facility attracts more willingness-to-pay than natural

<Table 2> The additive payment of total housing cost (unit: million won)

	mean	additional of unit for housing size	additional of unit for transportation and facilities	additional of unit for amenities
Owner	286.05	295.74 (▲ 9.69)	442.73 (▲156.68)	128.14 (▽157.91)
Tenant	146.80	153.49 (▲ 6.69)	133.05 (▽13.75)	198.54 (▲51.74)
Owner	upper	347.03 (▲ 9.97)	563.77 (▲216.74)	151.78 (▽195.25)
	middle	280.87 (▲10.0)	443.24 (▲162.37)	128.12 (▽152.75)
	lower	213.24 (▲ 8.59)	314.06 (▲100.82)	95.53 (▽117.71)
Tenant	upper	162.89 (▲ 6.22)	176.87 (▲13.98)	220.68 (▲57.79)
	middle	145.53 (▲ 6.77)	157.29 (▲11.76)	196.47 (▲50.94)
	lower	143.91 (▲ 7.3)	153.48 (▲ 9.57)	195.33 (▲51.42)

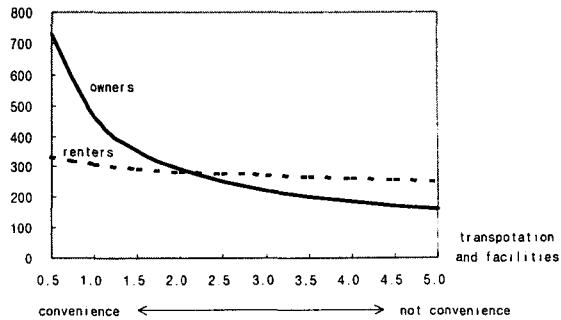
environment (Table 2), but those in rental housing shows the reverse. This result can be explained in the light of the fact that more and more distant it is from downtown, cheaper and cheaper housing become. It also means that rental housing households prefer more comfortable environment to more convenient services and facilities. [Figure 2] , [Figure 3] and [Figure 4] show owners' and tenants' opinions to bear housing expenditure according to the size of housing and residential environment characteristics.



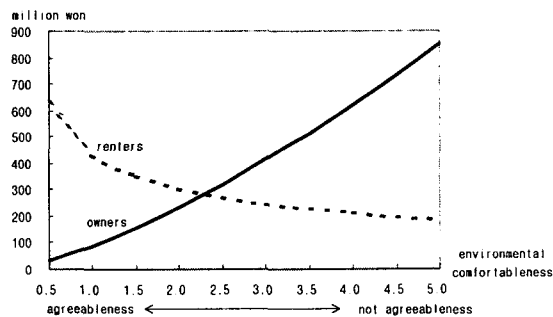
[Figure 2] Willingness to Pay (WTP) for additional unit of housing size

(3) The third objective is to search the behavior of future housing choice with categorical data and logistic regression as analytical approaches.

For housing size choice model specification housing size is composed of two alternatives, which are less than average size (under 38 Pyeong) and more than average size (over 39 Pyeong) based on the future average housing size (38.5 Pyeong).



[Figure 3] Willingness to Pay (WTP) for additional unit of transportation and facilities



[Figure 4] Willingness to Pay (WTP) for additional unit of Amenities (Environmental Comfortableness)

Housing size choice model including user cost is estimated as <Table 3> and <Table 4>. The indicative variable of both owned housing and rental housing is indicated as housing size, and monthly rent and user cost are also shown not-intentional. This conflicts with the result of '82 KRIHS(1998) and '82 & '92 Kang (1997). As a result, it can be judged that in selecting housing speculative elements may be excluded after IMF system.

The more important variable which determined housing choice turned out to be the size of the currently occupied home: clearly, housing expenditure and user cost were less important in this respect.

<Table 3> Estimation of housing size choice model for owner (N=304)
(under 38pyeong=0, over 39pyeong=1)

	β	Wald statistic	p-value	Fitness
contant	-9.2835	11.8822	0.0006 ***	-2Log Likelihood = 325.21 Goodness of Fit = 297.77 $\chi^2 = 63.05$ prediction=71.53%
income	0.2733	0.5933	0.4411	
housing size	1.9096	6.7669	0.0093 **	
monthly rent	0.0108	6.4744	0.0109	
age of first child	0.0003	0.0002	0.9878	
user cost	5.85E-06	0.1011	0.7505	

<표 4> Estimation of housing size choice model for tenant (N=154)
(under 38pyeong=0, over 39pyeong=1)

	β	Wald statistic	p-value	Fitness
constant	-16.3714	16.1610	0.0001 ***	-2Log Likelihood = 132.83 Goodness of Fit = 141.78 $\chi^2 = 36.77$ prediction= 77.54%
income	1.0499	4.0859	0.0432 *	
housing size	2.8433	6.4304	0.0112 *	
monthly rent	0.0018	0.0601	0.8063	
age of first child	0.0166	0.3337	0.5635	
user cost	3.87E-05	0.2058	0.6501	

As results, the meanings of this study are:

First, it could discover the consuming pattern according to household characteristics through investigating the percentage of housing expenditure to household income synthetically. In particular, the previous studies applied the concept of an average based on aggregated data, while this study considered different incomes according to different households, consuming and expending pattern, and the differences of housing prices, on the basis of the questionnaire for individual household. Therefore, it could provide the rate of housing expenditure, reflecting the characteristics of a household.

Second, there has not been a study considering monthly housing expenditure, converting housing price to monthly rent in domestic. This study calculated housing price by monthly fee, which is very meaningful academical and political information. It can make them comparable to that of other cultural zone. The result of simulation on the willingness to pay for additional unit of housing and residential environment characteristics may give important information on the time when the indexation of housing expenditure is required, as the willingness to bear monthly fee and the worth of environment become more important.

Third, the relation with housing expenditure to others was addressed in this study, which made it known the vulnerable group to pay housing expenditures, and, thus, the consuming pattern will be useful information in determining who the objective households are.

5. Conclusion and Implication

The purpose of the study is to measure housing affordability for multi-family dwellers in Seoul area. Housing affordability indices used this study were Housing Expenditure-to-Income Ratio(HEIR). HEIR is more realistic than PIR, RIR, LTV in the aspect of housing shares within Consumption Expenditure category. The data were obtained from the 465 multi-family dwellers of Seoul area in 1999.

Household characteristics were classified into four groups such as household income, age of the first child, number of family members, and other consumption expenditure. Housing characteristics were classified into housing tenure and housing

size. The results showed the differences among household and housing characteristics in the housing affordability. In addition, this differences had influence on future housing choice behavior. The analysis on the variables of housing choice behavior showed the result that user cost considering capital gains were less important, comparing those of 1990s.

HEIR used as an assumed measure of affordability is utilized in National Housing Fund operation, loan conditions, prediction of ability of a household to pay the rent or banking loan, administration of public housing by defining eligibility criteria and subsidy levels, and definition of housing need for public policy purpose.

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