Preferences for Retirement Housing: A Case Study of Thai Senior Citizens

Atcharawan Ngarmyarn[*] and Supeecha Panichpathom[**]

This paper explores factors affecting preferences for retirement housing using the behavioral model of health service use suggested by Andersen & Newman (1973) and Andersen (1995) as a theoretical framework. A population of 635 samples was drawn from two groups of Thai senior citizens aged 60 years and older in the Bangkok metropolitan area. Half of the collected samples were living in their old homes that they lived in before retirement and half were living in retirement housing, mostly nursing homes. Four major types of factors influencing the desire to move to retirement housing are predisposing factors, inhibiting factors, enabling factors and need factors. Exploratory factor analysis was used to determine the underlying dimensions of latent variables within the four major types, and logistic regression was employed as an analysis tool to determine the influencing factors. The results show the predisposing factors are -- "uncomfortable to stay with their offspring", "confidence in retirement housing", "desire to live independently", and "self support". Age and gender are significant observed variables within the predisposing factors. The inhibiting factors are "warm memory of the old home" and "negative attitudes toward nursing home" and enabling factor is "assets". Two latent variables within the need factors are "current ailment" and "desire to stay close to the doctor and hospital". These findings help developers to prepare retirement housing for Thai senior citizens.

1. Introduction

When a person enters senior citizen age his/her demand for housing may change due to deteriorating health. Some senior citizens decide to move to suburbs, or to a foreign country, or to retirement housing, such as nursing homes. According to a study by Bose (1996, as cited in College of Population studies 2007), although nursing homes offer health services to the elderly, they may not be able to provide moral or emotional support to them. However, with declining health or physical ailments, nursing homes may be the unavoidable choice. According to the American Retirement Association (1996, as cited in Gibler, Lumpkin & Moschis 1998), 80% of senior citizens prefer to live in their old homes, they did not want to move to retirement housing. According to the study by US National Institute on aging (2007), 79% of the participants still lived in their own homes in 2002. Though the proportion of the elderly moving to a nursing home or retirement community was increasing with increasing age, more than half of the elderly age 85 and over still preferred to stay in their own homes. A similar result was found in a survey conducted on Thai senior citizens. They prefer to be taken care of at home by their children (Knodel & Chayovan 1997), which is generally the norm for Asian families, (Chan 2005). Even though the percentage of senior citizens staying in retirement housing, either government or private units, is not high, the increasing number of the elderly, especially baby boomers, is driving an increasing demand for

---
[*] Atcharawan Ngarmyarn, Ph.D., Department of Real Estate Business, Thammasat Business School, Thammasat University, Thailand. Email: a_ngarmyarn@yahoo.com
[**] Supeecha Panichpathom, Ph.D., Department of Management Information Systems, Thammasat Business School, Thammasat University, Thailand. Email: spanitdmc52@gmail.com

retirement housing, including nursing homes. The main reasons for moving from the old home the elderly had lived before retiring are spouse death, safety and security needs, health problems and deteriorating physical condition (Gibler et al. 1998).

This article presents the preferences for retirement housing compared with the old home using the theoretical model developed by Andersen & Newman (1973) and Andersen (1995) which has been used extensively in the area of health care services (Bradley et al. 2002; Chakraborty et al. 2003; Dilworth-Anderson, Williams & Gibson 2002; Habibov & Fan 2008; Lee & Kim 2003). The senior citizens' predisposing factors, enabling factors and need factors under Andersen & Newman (1973) and Andersen (1995) were used in constructing the analysis model. Since most of this research work was done in the area of health care and not on retirement housing, this paper is an attempt to apply Andersen and Newman's conceptual model to study Thai senior citizens' demand for retirement housing. The results will help guide real estate developers to understand what kind of factors influence senior citizens' desires for retirement housing. The government can prepare the necessary facilities for the low income elderly and entrepreneurs can provide suitable retirement housing for the medium and high income elderly.

1.1 Objectives

(1) To study attitudes and socioeconomic factors of senior citizens who prefer to move to retirement housing as well as those who choose to stay in their old homes within the Bangkok metropolitan area.

(2) To determine factors (both latent and manifested variables) affecting the senior citizen's decision making process in choosing whether to move into retirement housing or to stay in their old homes.

The outline sequences of this paper (other than the introduction) are as follows: the literature review is presented in the second section; the methodology and model are shown in the third section; the finding results are in the fourth section; and the summary and conclusions are in the fifth section.

2. Literature Review

Most senior citizens, both Thais and westerners, prefer to stay in their old homes as long as they are able to (Iwarsson & Wilson 2006; Yodpetch 2001). According to Iwarsson & Wilson (2006), 96% of senior citizens in Sweden prefer to stay in their old homes because they are more comfortable, the environment is more familiar, and it is the place where they can have their own social life. Yodpetch (2001) found that Thai senior citizens prefer to be taken care of in their old homes if possible.

2.1 The Living Condition of Senior Citizens

The standard of living for the elderly in each country may be different depending upon income levels. In Thailand, all members of a poor family may have to share the same small room together. Some poor Thai senior citizens may even have to use a temple or a mosque, depending on their religion, as their home. Though it is Thai government policy to give a payment of 500 baht per month to senior citizens who have no income, some may not be able to access such welfare because they do not know how to get it.

Although the housing for the Swedish elderly may be of higher quality compared to Thailand, Iwarsson & Wilson (2006) found that the housing conditions for the senior citizens in Scania, Sweden, were not appropriate for them. For example, there was no place to sit when cooking, facility cleanliness was not sufficiently hygienic, equipment was incorrectly positioned, walkways were not sturdy enough, and even doorways were too narrow. Tinker (1997) also indicated that more than half of the senior citizens in the UK still live in their old houses, which were built long ago and may not be suitable for them in their senior years. Newman (2005) discovered that 13% of the elderly aged 65-74 years old in the US have problems doing daily activities such as taking a bath, getting dressed, and taking medicines.

2.2 The Changing Economy

Due to changing economic conditions, the number of elderly in Korea and Taiwan living independently apart from their families is increasing (Kwon 2001). Though some of the elderly in Korea still depend on their childrens' income, this trend is declining and they are more inclined to support themselves (Euehun & Gibler 2004). In Thailand, the changing economic structure from agriculture to industrialization has induced young females into the work force, thus reducing time they previously spent on care for elderly family members. This has the potential to lead to family problems. This situation is similar to what has already happened in Korea and Japan. From 1970 to 1998, Korean senior citizens who do not stay with their children increased to 40%. About 20% stay alone while about 22% stay with their spouses (Kwon 2001 as cited in Euehun & Gibler 2004). Sagaza (2004) also mentioned that an economy changing from an agriculture society to an industrial society causes a declining birth rate, while at the same time medical care is advancing. This may influence the decision for the elderly to stay alone. Although the percentage of Thai senior citizens living alone may not be as high as in Korea or Japan now, the increasing trend is definitely occurring.

2.3 Demand for Retirement Housing

Because of increasing health problems as senior citizens age, the homes they lived in when they were younger may no longer be appropriate and may more easily cause accidents. A suitable house for the elderly would likely be different from their old homes and be appropriate for the type and level of their disabilities. Gibler, Lumpkin & Moschis (1997) studied awareness and attitudes toward retirement housing and long-term care alternatives of US senior citizens. They found both positive and negative traits of nursing homes which may be considered predisposing factors and inhibiting factors in choosing a nursing home as the last resort. However, what Gibler et al. (1997) overlooked were enabling factors such as the financial preparation of the elderly to assist them in making the decision of where to live after retirement. Not only their attitudes, which are latent variables and important factors in making decisions, but manifested variables representing the financial preparation of the elderly such as assets, income, savings, investments, life and health insurance that they have accumulated in their lifetime, should play an important part in determining their preferences also. Moreover, according to a study by the US National Institute on Aging (2007), the increasing age of the elderly also has a role in determining the increasing demand for nursing homes. It is interesting to discover the factors driving this increasing demand for retirement housing and what are the main decision factors for senior citizens who prefer to stay in retirement housing compared with those who still prefer to stay in their old homes, even though their health may be declining.

Though there is a variety of retirement housing available, the type most Thais think of is nursing homes, especially those under government management. There is a long waiting list to get into government nursing homes, thus not everyone who so desires gets the opportunity to live in them. Since Thailand is now becoming an aging society with the percentage of senior citizens up to 10.7% in 2007 (National Statistical Office 2007), similar to many developed countries, the preparation of both government units and real estate companies to satisfy the increasing demand of retirement housing is encouraging. Aging Thai baby boomers have higher incomes and more savings than the elderly of previous times. Changing the living place as they age to one more suitable for increasing disabilities and difficulty in performing daily activities, and less risky for accidents could be a wise decision. There is a potential for developers to invest in retirement housing for the middle and high income senior citizen groups, especially the baby boomers which will represent the majority of Thai senior citizens this decade.

3. Methodology and Model

3.1 Samples

Sampling was conducted in two stages. For the first stage, questionnaires were mailed to 10,620 senior citizens aged 60 years or older in the Bangkok metropolitan area, asking for their general demographic data, type and size of housing, home ownership, and financial and housing preparations after retirement. The mailing list was randomly chosen for this project by the Department of Provincial Administration, Ministry of Interior. Questionnaires totaling 966 were returned, which equated to a 9.1% response rate. Some incomplete questionnaires were disregarded, resulting in 910 samples remaining for the first stage of the analysis. About half of those respondents were willing to join the second stage, a personal interview. However, due to higher gas prices and difficulty in conducting home interviews, mail and telephone surveys were used instead. In the second stage, 635 samples were drawn from two groups of Thai senior citizens; 326 of the samples came from those staying in their old home, and 309 samples were collected from those living in retirement housing, mostly nursing homes. Personal interviews were utilized with the second group using convenience sampling. The data collection was completed in 2009.

3.2 Measurement

In-depth interviews with senior citizens staying in retirement housing were conducted to gain an understanding of the basic reasons for spending their older years in retirement housing. Important information was determined on variables regarding predisposing factors, inhibiting factors, enabling factors and need factors according to the theoretical model proposed by Andersen & Newman (1973) and Andersen (1995). The questionnaire was pretested several times with 200 samples each in order to determine reliable latent variables for measuring the aforementioned factors in the model. Both groups of senior citizens were interviewed on demographic and social data, characteristics of housing needed, attitudes, and motivation for moving to retirement housing. There are two kinds of variables measured in this study -- the latent variables and the observed variables. Exploratory factor analysis was used to determine appropriate constructs and the coefficient alpha was calculated to assure the reliability of the latent variables. Both hypothesized latent and observed variables were used as independent variables in the subsequent logistic regression analysis

where the dependent variable is a proportion of the probability to stay in the retirement housing compared with the old home. All latent variables were measured by five point likert scale ranging from strongly disagree to strongly agree.

3.3 The Model and Hypotheses

The framework for this research came from the behavioral model of health service usage developed by Andersen & Newman (1973, p.14) and Andersen (1995, p.2). Under this framework, the reasons people use health services is determined by three main factors -- predisposing, enabling and need factors. Gibler et al. (1997) has called the negative predisposing factors as the inhibiting factors. However, they disregard some observed predisposing and inhibiting factors, including observed enabling factors which should take part in determining demand for retirement housing. Some of the attitude constructs have been developed based on the literature on attitudes toward long-term care facilities and living situations by Gibler et al. (1997, p. 124). More attitude constructs from the depth interviews have been added as additional unobserved variables as important factors in estimating the probability of staying in retirement housing compared to staying in the old home.

Since almost all of the retirement housing studied are nursing homes, the hypotheses have to be developed accordingly. Moreover, the decision of where to live is made between two choices: the old home and retirement housing. Therefore if there are factors encouraging the choice to stay in retirement housing (in this study mostly nursing homes), those same factors will discourage the choice to stay in their old homes. The hypotheses are as follows.

(1) **Predisposing factors:**
Age: Increasing age has a positive relationship with demand for retirement housing.
Gender: Women senior citizens tend to rely on retirement housing more than men.
Marital status: Singles, divorced and widows prefer to stay in retirement housing more than the married ones.
Occupation: Those who work in the private sector will be more inclined to not stay in retirement housing.
Attitudes 1: A more positive attitude toward retirement housing, a higher probability to stay in retirement housing.

(2) **Inhibiting factors:**
Education: The higher the level of education, a lower probability to choose retirement housing.
Family size: More family members, a lower probability to stay in retirement housing.
Attitudes 2: A higher positive memory of the old home, a lower probability to stay in retirement housing.

(3) **Enabling factors:**
Less financial preparation (assets, income, savings, investments, life insurance, health insurance), a higher probability to choose retirement housing.

(4) Need factors:
Better current health status, a lower probability to stay in retirement housing.
Better future health status, a lower probability to stay in retirement housing.
More expected health care costs, a higher probability to stay in retirement housing.

4. Findings

4.1 Demographic Data

A total of 635 respondents were obtained from both groups with 309 samples living in retirement housing and 326 samples living in their old homes. Table 1 compares respondent demographic data living in both types of residence. The respondents who stayed in retirement housing mostly are women (73.1%) while the majority of the respondents who lived in their old homes who have answered the questionnaires are men (86.2%). The average age of those who stayed in retirement housing is higher than those who stayed in their old homes. It is worth noticing that the percentage of single senior citizens living in retirement housing is much more than those staying in their old homes (31.4% vs. 2.5%). Moreover, the percentage of divorced and widowed senior citizens living in retirement housing was higher than those staying in their old homes (42.7% vs. 14.6%). The education level of those who stayed in their old homes is much higher than those living in retirement housing, as are income, savings, investments, life insurance, health insurance, and total assets.

Table 1. Demographic Data of the Respondents

	Retirement housing	Old home
Gender		
Male	26.9%	86.2%
Female	73.1%	13.8%
Age		
Mean (Years)	74.29	68.54
Standard error of mean	0.43	0.28
Marital Status		
Single	31.4%	2.5%
Married	25.9%	82.9%
Divorce/Widows	42.7%	14.6%
Education		
Not complete elementary	25.9%	5.6%
Elementary	42.4%	13.0%
High school	18.4%	31.6%
Vacational school	5.8%	14.6%
Bachlor degree and higher	7.4%	35.3%
Monthly income		
Less than or equal 2,500 baht	84.8%	14.3%
2,501-5,000 baht	4.5%	10.5%
5,001-20,000 baht	8.7%	33.7%
Over 20,000 baht	1.9%	41.5%
Saving		
Mean (Thousand baht)	158.5	952.6
Standard error of mean	14.0	294.6
Investment		
Mean (Thousand baht)	20.3	236.3
Standard error of mean	7.3	81.8
Life insurance		
Mean (Thousand baht)	23.2	87.1
Standard error of mean	10.6	18.5
Health insurance		
Mean (Thousand baht)	5.2	9
Standard error of mean	3.4	7.3
Assets		
Mean (Thousand baht)	230.0	4,631.6
Standard error of mean	57.5	1,060.4
N	309	326

The demographic data above suggest that gender, age, marital status, education level, income, savings and assets of both groups are quite different. This indicates that those demographic variables should play an important role in determining the decision of senior citizens to choose retirement housing or to stay in their old homes.

4.2 Exploratory Factor Analysis

An exploratory factor analysis (EFA) was performed with 54 original items from the questionnaire, with any missing data replaced by means. Eleven variables were dropped during the analysis process, leaving 43 items used in determining the underlying constructs. A total of eleven factors were extracted using principal component analysis and varimax rotation. Each factor has been named as shown in table 2. The eleven constructs are latent variables measuring elderly attitudes on living in retirement housing and the old home according to the four categories under the Andersen and Newman (1973) and Andersen (1995) theoretical framework as mentioned before. The KMO, which is the measure of sampling adequacy, is 0.851 and the Bartlett's test of sphericity is significant, which confirms that EFA is suitable to use. The eleven factors accounted for 62.29% of the total variance from the original 43 items. Factor loadings are shown in table 2 for each construct with the reliability measurements ranging from 0.90 for the eighth construct "desire to stay close to the doctor and hospital" to 0.58 for the last construct "desire for self support".

Andersen & Newman (1973, p.4) stated that personal habits is an important determinant in forming the health care pattern that each person has and is composed of three parts -- the predisposing factor, the enabling factor and the illness level or the need factors in health care (Andersen, 1995, p.2). Moreover, Gibler et al. (1977) has called the negative predisposing factor as the inhibiting factor. Therefore those eleven factors found under the EFA can be classified as follows.

Predisposing factors for the elderly to stay in retirement housing are:

1. Uncomfortable to stay with their offspring. (Factor # 1)
2. Confidence in retirement housing. (Factor # 5)
3. Desire to live independently. (Factor # 7)
4. Have to work in exchange for living in the old home. (Factor # 9)
5. Worried to find a care giver in a old home. (Factor # 10)
6. Desire for self support. (Factor # 11)

Inhibiting factors which can be interpreted as factors encouraging the elderly to stay in their old home are:

1. Warm memory of the old home. (Factor # 2)
2. Negative attitudes toward nursing home. (Factor # 3)

Need factors for health care are:

1. Current ailments. (Factor # 4)
2. Help needed during old age. (Factor # 6)
3. Desire to stay close to the doctor and hospital. (Factor # 8)

Table 2: Factor loadings, variance and reliability measures

	Factor Loadings	Cumulative % Variance	Cronbach Alpha
1.Uncomfortable to stay with their offspring.		10.66	0.860
There are problems from the generation gap when living with children.	.776		
It is not convenient to do what I like when living with children.	.761		
Living with children made me feel uncomfortable.	.753		
I think my children prefer to live alone.	.627		
I don't want to live with my children because I don't want to listen to their quarrels.	.618		
My in-laws are always sarcastic if I am still living with them.	.534		
I don't want to be tired from working when getting old if I am living with my children.	.500		
I still have to stay with my children because I have nowhere to go.	.453		
2.Warm memory of the old home.		18.63	0.854
I feel warm when living with my children.	.724		
I believe my children are my best care givers.	.702		
I believe that my children still need me.	.697		
I want my children to visit me often if I have to stay in a retirement housing.	.651		
I feel that my former home gives me a warm memory.	.651		
I want to stay on in my former home because I am acquainted with it.	.587		
3.Negative attitudes toward nursing home.		25.38	0.763
I always am depressed when thinking of the nursing home.	.777		
I think the nursing home must have strict rules and no freedom.	.701		
I never want to stay in a nursing home.	.686		
I don't want to move to a retirement housing because I won't get satisfactory services.	.607		
I feel sad when I have to move out from my former home.	.526		
Staying with unfamiliar people is quite difficult for me.	.522		
4.Current ailment.		31.33	0.757
I have to go to see the doctor more often.	.798		
I have personal illness (disease) now.	.769		
I have more illness than before.	.720		
I realized that I have more medical expenses now.	.671		
5.Confidence in retirement housing.		36.24	0.803
I have made up my mind to stay in retirement housing.	.724		
I want to stay in the retirement housing where I can be taken care of when I get old.	.708		
I believe that retirement housing is safer than my former home.	.522		
6.Help needed during the old age.		40.97	0.649
Now I need to have a care giver to help me with my daily activities.	.795		
I cannot perform my daily activities well by myself.	.675		
Now I need some instruments to help me with my daily living.	.641		
Because of my deteriorated health, I need someone to help me with some personal activities.	.508		
7.Desire to live independently.		45.66	0.663
I don't like to stay with my brothers or sisters.	.693		
I don't like to stay with my family.	.641		
I rarely stay with my family even before my retirement.	.609		
I don't want anyone to get involved with my life.	.568		
8.Desire to stay close to the doctor and hospital.		50.22	0.900
I want to stay close to the hospital.	.898		
I want to stay near the doctor.	.893		
9.Have to work in exchange for living in the former home.		54.66	0.848
I have to take care of my grandchild in exchange for staying with them.	.856		
I have to do the housework in exchange for staying with my children.	.845		
10.Worried to find a care giver in a former home.		58.53	0.665
It must be difficult to find a suitable one to take care of me at my former home.	.814		
Hiring a care giver to look after me in a former home must be very expensive.	.810		
11.Desire for self support.		62.29	0.583
I don't want to live like a parasite.	.808		
I don't want to be a burden to anyone.	.660		

Other than the above latent variables, there are many observed variables categorized as predisposing factors under this study framework, which can explain the decision to stay in the retirement housing or the old home, such as gender, age, marital status,

level of education, occupation, family size and income. The enabling factors are mostly observed variables on financial preparation for retirement -- total assets, total savings, investments, life insurance, health insurance and room allowance for medical treatment in hospitals. The latent and observed variables are used as independent variables in the binary logistic regression analysis. The probability to stay in retirement housing compared with the probability to stay in an old home is used as a dependent variable. Factor scores obtained from EFA are used for the latent variables in the model. For the observed variables, the actual numbers for metric scales and the dummy variables for the category scales are used as independent variables in model estimation. Although using factor scores can eliminate the correlation problem between the latent variables, adding the observed variables as independent variables can introduce multicollinearity among independent variables, either between the factor scores and the observed variables or between the observed variables themselves. There are more observed variables in estimating logistic regression with missing items; however, it may not be appropriate to use the variable means to replace the missing items of observed variables, therefore, the missing items for the observed variables are left as system missing.

4.3 Logistic Regression Analysis

Using logistic regression analysis, all 635 observations were randomly divided into two groups; the first 500 random observations were used to estimate the model results and the other 135 random observations were used to validate the model results. First, the forward stepwise regression was used in the estimation, then the estimated model was confirmed by backward stepwise regression to make sure that the significant coefficients were the same set. Finally the enter method was used to estimate the model. The logistic regression analysis using the enter method is shown in table 3. In actuality, three models were estimated with the enter method but the selected model in table 3 was determined to be the most favored one. From eleven latent variables, only the constructs 1-5, 7-8, and 11 were statistically significant. Factors 6, 9 and 10 are not significant constructs in determining the log odds ratio of the probability to stay in retirement housing compared with the probability to stay in the old home. Moreover there are observed variables under the predisposing factors that are statistically significant in this model -- age and gender. There is only one variable under enabling factors, "total assets", which is statistically significant. Though there are many observed variables included under enabling factors in the model estimation step, only one of them is significant. So there are eight latent and three observed variables altogether which are statistically significant independent variables in estimating the log odds.

From table 3, the coefficients estimated from the logistic regression analysis are not the same as that found in ordinary least square (OLS) estimations because the beta coefficients cannot be interpreted directly. The coefficient B in the second column represents the changing log odds when each independent variable is changing. However, the exponential of beta coefficients, Exp(B), in the logistic regression analysis is what should be looked at and can be interpreted as the changing of odds ratio. The odds ratio was calculated from the exponential to the power B as shown in the last column as value of Exp(B). The odds ratio is the ratio of probability that the elderly will stay in retirement housing compared with the probability that they will stay in the old home when the independent variable is changed by one unit.

Table 3: Logistic Regression Analysis

Independent variables in Logistic Regression	B	S.E.	Wald	df	Sig.	Exp(B)
Predisposing factors:						
Confidence in retirement housing.	2.539	0.420	36.473	1	0	12.667
Desire to live independently.	1.454	0.311	21.821	1	0	4.280
Desire for self support.	0.925	0.298	9.601	1	0.002	2.521
Uncomfortable to stay with offspring.	0.631	0.287	4.836	1	0.028	1.880
Ages in years	0.180	0.044	16.987	1	0	1.198
Gender (male=1, female=0)	-4.045	0.716	31.931	1	0	0.018
Inhibiting factors:						
Negative attitudes toward nursing home.	-2.236	0.440	25.793	1	0	0.107
Warm memory of the old home.	-1.339	0.320	17.488	1	0	0.262
Enabling factors:						
Total assets in million.	-0.272	0.138	3.898	1	0.048	0.762
Need factors:						
Desire to stay close to the doctor and hospital.	1.433	0.301	22.598	1	0	4.190
Current ailment.	-1.108	0.310	12.769	1	0	0.330
Constant	-9.247	2.910	10.101	1	0.001	0

From the chosen model, under *predisposing factors*, the "confidence in retirement housing" yields the highest positive impact on the odds ratio (12.67), following by "desire to live independently" (4.28), "desire for self support" (2.52), and "uncomfortable to stay with their offspring" (1.88). These latent variables are *predisposing factors* encouraging the senior citizens to stay in retirement housing. In this study only age and gender are the observed variables categorized under the predisposing factors which are statistically significant. The older the senior citizens are, the higher the odds ratio of the probability that they will stay in retirement housing compared with the probability that they will stay in their old home. And elderly females have a higher tendency than males to live in retirement housing relative to staying in the old home. In contrast, the *inhibiting factors* prohibiting the elderly to move to retirement housing relative to staying in the old home are "negative attitudes toward nursing home" (0.11), and "warm memory of the old home" (0.26) with the Exp(B) less than 1 which means the probability that they prefer to stay in their old home relative to the probability to move in retirement housing is more than 1. The only *enabling factor* which is significant is "total assets in millions" (0.76); the more assets they have, the less tendency to move to retirement housing relative to staying in the old home. The *need factors* in this case are "desire to stay close to the doctor and hospital" (4.19), and "current ailments" (0.33). The significant Exp(B) of "desire to stay close to the doctor and hospital" which is higher than 1 means the probability that they will stay in the retirement housing relative to staying in their old home is higher with higher attitudes, while the Exp(B) that is less than 1 of the "current ailment" reflects the opposite result. The higher realization in the "current ailment" the higher they would prefer to stay in their old home relative to moving in the retirement housing.

Table 4: Test of Model Fit

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	5.463	8	0.707

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	105.721	0.667	0.895

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	434.182	11	0
	Block	434.182	11	0
	Model	434.182	11	0

Table 4 shows the test of the model fit. In order to determine model fit, the value of the Hosmer and Lemeshow test should not be significant, or the value of significant chi-square should be higher than 0.05. Though the chosen model may not yield the highest insignificant value of the Hosmer and Lemeshow test, it is still insignificant with the value of 0.707 which is higher than 0.05. On another hand, the Cox and Snell R square, and the Nagelkerke R square can be used similar to the R square in the OLS. Between the two R squares, the Nagelkerke R square is easier to interpret due to the highest value close to 1, similar to the normal R square in the OLS, while the highest value of the Nagelkerke R square is lower than 1. In the selected case, the Nagelkerke R square is 0.895, which can be interpreted that all explanatory variables included in the model explain the change in odds ratio of about 89.5%, which is substantial. The significant chi-square in the Omnibus Tests of Model Coefficients indicates that there is at least one independent variable which explains the relationship between the independent variables and the log odds. Similar to the F test in linear regression, this test confirms that the change in all explanatory variables included in the system explains the change in odds ratio very well.

The logistic regression model has a predictive ability for the validating cases which were not used in the model estimation correctly 91.4% overall, which is rather high (table 5). Using the validating cases of 135 observations to determine the predictive ability of the logistic regression model, the model predicts those who would like to live in retirement housing correctly 95.3% and predicts those who would like to stay in their old homes 86.5% correct. In general the predictive ability for the selected cases used in determining logistic regression coefficients is higher than those for validating cases used. The predictive ability for the cases used in determining the logistic regression coefficients is 95.4% correct overall. The estimated model can predict those who stayed in their old homes correctly 95.9% and those who stayed in retirement housing 95.1% correct.

Table 5. Prediction Ability of the Logistic Regression Model

Classification Table

	Predicted					
	Selected Cases a			Unselected Cases b		
	Stay in retirement housing?			Stay in retirement housing?		
Observed	old home	Retirement housing	% Correct	old home	Retirement housing	% Correct
Stay in an old home	163	7	95.9	45	7	86.5
Stay in a retirement housing	11	214	95.1	3	61	95.3
Overall Percentage			95.4			91.4

a. Selected cases 500 from the first 635 cases (SAMPLE) EQ 1

b. Unselected cases 500 from the first 635 cases (SAMPLE) NE 1

5. Summary and Conclusions

This research explores the preferences of Thai senior citizens with half of the study sample staying in their old homes and half living in retirement housing. The results indicate that predisposing factors other than age and gender, attitudes toward staying in retirement housing play important roles in determining the preferences for retirement housing. This is especially apparent for the "confidence in retirement housing" attitude which induces more than twelve times the change in the probability to stay in retirement housing relative to the old home (12.7 times). The "desire to live independently" (4.3 times) and "desire for self support" (2.5 times) play the next important roles indicating that the elderly have a preference to stay alone and apart from their old family as these attitudes are stronger. For the need factors, the more they desire to stay close to doctors or hospitals, the higher the probability that they will stay in retirement housing (4.2 times), while the current level of ailments encourages them more to choose to stay in their old home.

For housing developers who are interested in investing in this business, knowing the attitudes of senior citizens should help them predict the elderly tendency to stay in retirement housing. Female senior citizens are more inclined to stay in retirement housing than males, but this has a very small impact compared with increasing age which is consistent with the findings of the US National Institute on Aging (2007). At first five different types of retirement housing were planned for data collection; however, data from nursing homes were mostly utilized in this study because most other types of retirement housing are from the private sector and interviews were hardly allowed. Enabling factors in this study are enabling senior citizens to stay in their old homes other than retirement housing (0.8 times). If inhabitants of more types of retirement housing other than government nursing homes could be interviewed, the Exp(B) in the logistic regression analysis should be greater than one for the financial preparation of the senior citizens to be truly enabling factors other than the reverse. Therefore in future research, it may be beneficial to explore different kinds of retirement housing and corresponding preferences of senior citizens. The market for

different levels of retirement housing can be better segmented to fit varying preferences.

References

Andersen, R & Newman, JF 1973, 'Societal and individual determinants of medical care utilization in the United States', *The Milbank Memorial Fund Quarterly,* Vol. 51**,** no. 1, pp. 95-124.

Andersen, RM 1995, 'Revisiting the behavioral model and access to medical care: does it matter?', *Journal of Health and Social Behavior,* Vol. 36**,** no. 1, pp. 1-10.

Bradley, EH, McGraw, SA, Curry, L, Bu, A, Kasl, SV, & Andersen, R 2002, 'Expanding the Andersen model: the role of psych in long-term care use', *Health Services Research,* Vol. 37**,** no. 5, pp. 1221-1242.

Chakraborty, N, Islam, MA, Chowdhury, RI, Bari, W. & Akhter, HH 2003. Determinants of the use of maternal health services in rural Bangladesh. *Health Promotion International,* Vol. 18**,** no. 4, pp. 327-337.

Chan, A 2005, 'Aging in southeast and east Asia: issues and policy directions', *Journal of Cross-Cultural Gerontology,* Vol. 20**,** pp. 269-284.

College of Population Studies 2007, *'Services and long-term care in the nursing home',* Chulalongkorn University, viewed May 2009, <http://w.3chula.ac.th/college/cps/thai/nop/7aging/welf.2html>.

Dilworth-Anderson, P, Williams, IC & Gibson, BE 2002. Issues of race, ethnicity, and culture in caregiving research: a 20-year review (1980–2000). *The Gerontologist,* Vol.42**,** no. 2, pp. 237-272.

Euehun, L, & Gibler, KM 2004, 'Preferences for Korean seniors housing', *Journal of Property Investment & Finance*, Vol. 22, no. 1, pp. 112-135.

Gibler, KM, Lumpkin, JR & Moschis, GP 1997, 'Mature consumer awareness and attitudes toward retirement housing and long-term care alternatives', *The Journal of Consumer Affairs,* Vol. 31**,** no. 1, pp. 113-138.

Gibler, KM, Lumpkin, JR, & Moschis, GP 1998, 'Retirement housing and long-term health care: attitudes of the elderly', in Anikeeff, MA, & Mueller, GR (ed.), *Seniors Housing*, Vol. 4, Kluwer Academic Publishers, Boston, pp. 109-130.

Habibov, NN & Fan, L 2008. Modelling prenatal health care utilization in Tajikistan using a two-stage approach: implications for policy and research. *Health Policy and Planning,* Vol. 23**,** no. 6, pp. 443-451.

Iwarsson, S & Wilson, G 2006, 'Environmental barriers, functional limitations, and housing satisfaction among older people in Sweden: a longitudinal perspective on housing accessibility', *Technology & Disability*, Vol. 18, no. 2, pp. 57-66.

Knodel, J & Chayovan, N 1997, *'Persistence and change in the living arrangements and support of Thai elderly'*, Population Studies Center, University of Michigan, U.S.A.

Kwon, H 2001, 'Income transfers to the elderly in Korea and Taiwan', *Journal of Social Policy*, Vol. 30, no. 1, pp. 81-93.

Lee, J & Kim, H 2003. An examination of the impact of health on wealth depletion in elderly individuals. *Journal of Gerontology: Social Sciences,* Vol. 58**,** no. 2, pp. s120-s126.

National Institute on Aging 2007, '*Growing older in America: the health & retirement study'*, U.S. Department of Health and Human Services, U.S.A.

National Statistical Office 2007, '*Report on the 2007 survey of the older persons in Thailand'*, Bureau of Socio-Economic and Opinion 1, National Statistical Office, Bangkok, Thailand.

Newman, DML 2005, 'A community nursing center for the health promotion of senior citizens based on the Neuman systems model', *Nursing Education Perspectives,* Vol. 26, no. 4, pp. 221-223.

Sagaza, H 2004, 'Population Aging in the Asia-Oceania Region', *Geriatrics and Gerontology International,* Vol. 4, pp. s34-s37.

Tinker, A 1997, 'Housing for Elderly People', *Reviews in Clinical Gerontology*, Vol. 7, pp. 171-176.

Yodpetch, S 2001, *'Elderly Welfare',* Thammasat University, Bangkok, Thailand.