Discrete Choice Experiment to Derive Willingness to Pay for Voluntary Health Insurance after Retirement in Thailand

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Abstract: This paper reports the results of a study that used the discrete choice experiment (DCE) method to estimate the willingness to pay for health insurance after retirement for workers under Social Health Insurance (SHI) in Thailand. In the DCE questionnaire, respondents were asked to choose their preferred scenario between status quo (using free healthcare services for the elderly, which has free but limited coverage of outpatient healthcare expenses and inpatient healthcare can be used in public hospitals covering only a non-private room and accommodations) and an alternative scenario (with hypothetical health insurance after retirement, including inpatient, outpatient, long-term care expenses and work compensation) that vary along several attributes, one of which is the price of the alternative. The sample of 300 workers under the Social Health Insurance (SHI) scheme, whose age were greater than 40 years, were interviewed by using a structured questionnaire. The study found that the workers under the SHI scheme that were more willing to pay for voluntary health insurance after retirement were willing to pay for inpatient (IPD) and outpatient (OPD) health service expenses more than other healthcare benefits.

Keywords: Willingness to Pay (WTP); Discrete Choice Experiment (DCE); Voluntary Health Insurance; Retirement; Thailand.

I. Introduction

Thailand has now reached a new demographic turning point with the advent of an ageing society [10]. The older population or population aged 60 and above increased from 1.5 million in 1960 to approximately 7.4 million in 2008, and it is expected to be 17.7 million in 2030 [14]. Since the number of elderly people is growing, the number of chronically ill patients, including those with diabetes, hypertension and cardiovascular disease, will increase accordingly. It was found that 74.3 percent of the Thai elderly had at least one chronic illness and that most of them suffered from many chronic illnesses [15]. As the numbers of the older population that need healthcare and long-term care services increase, the public health insurance should be adjusted and reformed in order to meet the demands of people after retirement.

In Thailand, there are three public health insurance schemes: the Social Health Insurance (SHI), the Civil Servant Medical Benefit Scheme (CSMBS), and the Universal Coverage Scheme (UC). The UC is mandatory for all Thai citizens that are not insured by another public insurance scheme. The CSMBS covers civil servants and their immediate family members, including spouses, parents, and up to three children under the age of 20 years. It also covers retirees and their dependents. The SHI provides mandatory coverage for workers in the formal sector, and since 2001 it has been mandatory for firms with more than one worker and for the self-employed. Presently, the government has provided free healthcare for older persons since the introduction of universal health coverage in 2001. Under this program, all government hospitals and health centers provide free medical services to persons aged 60 and upwards. However, only the elderly that are poor and are under the universal coverage scheme can use the free care. People under the Civil Servant Medical Benefit Scheme (CSMBS) still receive healthcare services after retirement; meanwhile, Social Health Insurance (SHI) does not cover workers after retirement. Therefore, there is a healthcare risk for workers under this health insurance scheme.

As the number of the elderly increases, the number of retired workers under the SHI scheme will increase significantly. Because the workers under the SHI scheme are not covered for healthcare or long-term care services after retirement, they have a high risk of falling into the poverty trap. However, the government budget is tight in supporting universal healthcare and long-term care services for all of the elderly. As a result, the government should support older people—especially workers that have the ability to pay should pay for the quality of healthcare services through the voluntary mechanism. The question however is how much they are
willing to pay for it. Thus, the study proposes voluntary health insurance for workers under the SHI scheme after retirement.

II. Methodology

Since the study is focused on designing voluntary healthcare insurance after retirement, the needs, preferences, and expectations of the workers under the SHI scheme should be understood. Consequently, willingness to pay is needed to evaluate whether healthcare insurance plans are worthwhile. The stated preference (SP) method, that is Discrete Choice Experiments (DCEs), was then employed in order to elicit consumer preferences and to estimate the value of services based on the individual’s willingness to pay (WTP). The technique is an attribute-based measure of benefits that is based on the assumptions that first, healthcare services or policies can be described by their characteristics (or attributes), and secondly, an individual’s valuation depends on the levels of these characteristics. Within a DCE questionnaire, respondents are asked to choose their preferred scenario between status quo (using free healthcare services for the elderly which are free but have limited coverage of outpatient healthcare expenses; inpatient healthcare used in public hospitals covers only non-private rooms and accommodations, and there is no work compensation or long-term care expense benefits) and two alternative scenarios (with hypothetical health insurance after retirement) that vary along several attributes, one of which is the price of the alternative. The attributes and levels were developed by using in-depth interviews with health insurance agents, reviewing private health insurance policies, and focus groups with the workers under the SHI scheme whose age was over 40 years. The sample of 300 workers under the Social Health Insurance (SHI) scheme, whose age were greater than 40 years, were interviewed by using a structured questionnaire. The attributes and levels of health insurance benefits selected for the DCE questionnaire are shown below:

- Outpatients healthcare expenses: 3,000 Baht x 6 times per year (OPD1) and Outpatient’s healthcare expenses: 5,000 Baht x 12 times per year (OPD2).
- Inpatients healthcare expenses: 100,000 Baht per year (IPD1) and Inpatients healthcare expenses: 300,000 Baht per year (IPD2).
- Long-term care expenses: 500 Baht per day (Maximum 90 days) (LTC1) and Long-term care expenses: 1,000 Baht per day (Maximum 90 days) (LTC2).
- Work compensation per day during hospital admission: 1,000 Baht x 20 days per year (COMP1) and Work compensation per day during hospital admission: 1,000 Baht x 45 days per year (COMP2).
- Health insurance premium: 500, 800, 1,000, 2,000 Baht per month.

Non-probability sampling, that is, purposive sampling, was used to determine the distribution of the 300 samples in both Bangkok and outside Bangkok. In purposive sampling, the respondents should be aged between 40-69 years and have or previously had social health insurance. In addition, he or she should have income greater than 10,000 Baht per month. Therefore, a screening question in the structural questionnaire was used to ask the respondent to check his/her criteria. If the respondents passed the screening criteria, the interviewers asked the respondents further questions about their demographic and socioeconomic information, personal health status, current health insurance contract, and their preference choice sets regarding health insurance benefits. The respondents that did not pass the criteria were screened out and the interviewer stopped the questions, and then thanked the respondents for participation.

III. Results

A. Socioeconomic Characteristics

Of the 301 respondents from the survey, the majority were female (57.8%), with an average age of 49 years, and most had a fixed income (68.1%) with a median personal income of 17,500 Baht per month and a median household income of 35,000 Baht per month. More than 70% of the respondents were married, while only 30% were single. The average household size was 3.46 persons per family and the average number of children per household was 1.89 persons.

B. Willingness to Pay for Voluntary Health Insurance after Retirement

Choice data were modeled using a random utility maximization framework [4] and Limdep 7. As the data were binary choice data—“1” represented the option chosen, with “0” being not chosen—the conditional logit model-effect code was used for modeling. The model estimated was of the form:

\[
V_{in} = \alpha_0 + \beta_{outpatient} x_{in} + \beta_{inpatient} x_{in} + \beta_{compensation} x_{in} + \beta_{LTC} x_{in} + \beta_{premium} x_{in}
\]

where, \(\alpha_0\) is an alternative specific constant (ASC) and \(\beta_j\) refers to coefficients of the X vector of attributes describing health insurance benefits.
This is a linear in parameters main effects utility function, which is the functional form that has been used in the most of the DCE studies in the health economics literature [3]. The deterministic component of the utility function \( V \) is a function of the attribute levels between options, where the coefficients (part-worth utilities) \( \beta_j \) to \( \beta_k \) and the constant \( \alpha_0 \) (ASC) are estimated in the model. The path-worth utilities \( \beta \) can be summed to give an overall utility for each combination of attribute levels. This gives an indication of the relative social value of the scenarios in the experimental design, and allows consideration of the impact of changes in single attribute levels and combinations of attribute-level changes on the health insurance benefit scenarios described compared with a status quo scenario.

In order to investigate differences at the subgroup level regarding the choice between individual specific variables (respondent characteristics such as age, gender, etc.), the interaction variables between the specific subgroup variables and the attribute variables were constructed. The inclusion of individual specific variables in the model makes it possible to account for some of the heterogeneity in preferences between individuals, which can yield very important information, and to perform subgroup analysis. These subgroups were defined a priori based on a review of the DCE literature [4].

The model with interactive variables is shown below.

\[
V_{in} = \alpha_0 + \beta_{\text{outpatient}_{in}} + \beta_{\text{inpatient}_{in}} + \beta_{\text{compensation}_{in}} + \beta_{\text{LTC}_{in}} \\
+ \beta_{\text{premium}_{in}} + \sum_p \psi_p W_{pn},
\]

where, \( \alpha_0 \) is an alternative specific constant (ASC), \( \beta_j \) refers to the coefficients of the attribute vectors describing health insurance benefits, and \( \sum_p \psi_p W_{pn} \) is a series of interaction terms between attributes and socioeconomic variables.

The welfare measurement to value health insurance after retirement can be then estimated. The method of calculating the Hicksian compensating variation (CV) in the discrete choice random utility model was recently introduced to health economics in order to calculate welfare measures in the context of DCEs [11]. The CV method or mean willingness to pay (Mean WTP) can calculate measures of welfare gain, or WTP, for health insurance policies, and can measure the relative impacts of each health insurance benefit attribute using a common monetary metric such as the WTP or accept compensation for changes in a given attribute. For a conditional logit model, both forms of welfare measures were calculated using the utility estimates and attribute levels in the following expression:

\[
CV = \frac{1}{\mu} \ln \frac{\sum_{i \in C} e^{V_{in}}}{\sum_{i \in C} e^{V_{in}}} - \ln \frac{\sum_{i \in C} e^{V_{in}}}{\sum_{i \in C} e^{V_{in}}}
\]

where, \( \mu \) is the marginal utility of income, \( V_{in} \) and \( V_{in} \) represent the indirect observable utility before and after the change under consideration, and \( C \) is the choice set. When the choice set includes a single before and after policy option, equation (3) reduces to:

\[
CV = \frac{1}{\mu} \ln \frac{e^{V_{in}}}{e^{V_{in}}} = \frac{1}{\mu} [V_{in} - V_{in}]
\]

From equation (4), it is easily seen that for a linear utility function, the marginal rate of substitution between two attributes is simply the ratio of their coefficients [7], and that the marginal willingness to pay (MWTP) for a change in attribute is given by equation (5).

\[
MWTP_j = -\beta_j / \mu
\]

where, \( \beta_j \) is a parameter and \( \mu \) is the marginal utility of income.

C. The Results from Willingness to Pay

An important indicator derived from this study was that the preferences of the health benefits attributes of health insurance after retirement were heterogeneous. Around one-fourth of the respondents opted for the status quo, whereas the remaining fraction was willing to pay for voluntary health insurance after retirement. Although most of the respondents were willing to pay for health insurance, the design of health benefits and price premiums should be modified according to the heterogeneous groups of worker (i.e. income level, age). Previous researches have also shown that people with readily-identifiable characteristics (such as age) that affect health utilization are more likely to have generous health insurance coverage; therefore they select different health plans based on health and the propensity to utilize services [2].
Figure 1 Marginal WTP of Health Insurance after Retirement Benefits Attributes 
(Baht per person per month).

- Overall Marginal WTP of Respondents Under 50 Years of Age (L_age) and Over 50 Years of Age (H_age)
- Marginal WTP of Low-educated (L_edu) and High-educated (H_edu) Respondents
- Marginal WTP of Low-income (L_inc) and High-income (H_inc) Respondents
- Marginal WTP of Respondents that Live in Bangkok (BKK) and Outside Bangkok (Upcountry)
- Marginal WTP of Respondents that have Chronic Illness (Ch_illness) and that have No Chronic Illness (No_ch_illness)
The key findings from the empirical study of the willingness to pay for health insurance after retirement were as follows:

- In general, workers under the SHI scheme prefer a greater health benefit coverage (IPD2 and OPD2) than a lower one (IPD1 and OPD1). Furthermore, the price premium always shows a negative significant sign—meaning the greater the voluntary health insurance premium that it is offered, the more disutility workers have. As a result, the workers prefer greater health benefits with lower premiums, similar to the principle consumer behavior pattern.

- In addition, workers under the SHI scheme are willing to pay for inpatient (IPD) and outpatient (OPD) health service expenses more than other healthcare benefits. As people purchase health insurance if the utility of the expected benefits of health insurance coverage exceeds the premium, they will then pay for coverage. The IPD expenses are more catastrophic and more risky from overall healthcare expenses, while people usually go to the OPD every time they feel ill. Moreover, inpatient and outpatient services are complementary services but they are not substitute services [12]. Therefore, they are more willing to pay for the IPD and OPD health benefits than other health benefits.

- There is the potential demand for health insurance after retirement with the mean willingness to pay depends upon the health benefits. The mean WTP was highest at IPD2 (777.13 Baht per month) followed by OPD2 (724.94 Baht per month) and OPD1 (702.04 Baht per month). The lowest mean WTP was at LTC2 (369.70 Baht per month).

- Considering age (over 50 and under 50 years), both respondent groups preferred the higher level of health insurance benefits, as the OPD2 and IPD2 exhibited a remarkably positive, significant sign. The higher level of benefits will cover the expected healthcare expense that they should pay if they used the healthcare services during the retirement period.

- Considering by education (below bachelor degree and above bachelor degree), the mean WTP in all healthcare attributes of high- and low-educated respondents showed a positive sign, indicating that all of these attributes increases social welfare. The mean WTP of these two groups was the highest on inpatient and outpatient healthcare expense benefits. However, the mean WTP of high educated workers for inpatient healthcare expenses were higher than low educated workers, whereas the mean WTP of low-educated workers for outpatient healthcare expenses were higher than high-educated workers. High educated workers are more aware of chronic illness and the utilization of health services at the old age. Therefore, they are willing to pay for IPD expenses more than OPD expenses in order to protect for the catastrophic health risk and avoid for financial loss.

- The mean WTP classified by income level (income less than 20,000 Baht and more than 20,000 Baht per month) is similar to the mean WTP classified by education (below bachelor degree and above bachelor degree). Since income has relation with education [13], there is no significant difference of the mean WTP between the high-income and the high-educated workers under SHI scheme.

- However, there is a difference between the people that live in Bangkok and outside Bangkok regarding attitude towards risk. The differences in attitude towards risk are the main factor affecting differences in behavior. These disparities can be explained by income, education, culture, and lifestyle. Although, most of mean WTP of healthcare benefit attributes showed a positive sign, indicating these attributes
increase social welfare, excluding long-term care expenses for the respondents living in Bangkok showed a negative sign but it was insignificant, indicating little impact on the willingness to pay of this group. Whereas, the workers that live outside Bangkok are willing to pay on long-term care expenses and work compensation per day when admitted to the hospital. It tends to be that those workers that live in Bangkok are more willing to pay for inpatient expenses, which mainly benefitted them in terms of avoiding catastrophic health risks. In addition, the value of long-term care coverage is less of benefit for respondents that live in Bangkok and they want more coverage than what the benefit offers. While, workers live outside Bangkok are interested in all of the health insurance benefits that insurers provided.

- Gender has an effect on the demand for voluntary health insurance after retirement. It was also found that the life expectancy at birth was on average 5 years higher among the females than the males [9]; that is, 71.45 years for males and 76.33 years for females [1]. In addition, from the study it was found that the workers under the SHI scheme that used OPD services tended to be female more than male. Consequently, the female respondents were more likely to have chronic illness while the male respondents were more likely to have severe illness. Therefore, the female respondents are willing to pay on outpatient healthcare expenses benefit while male respondents are more willing to pay on inpatient healthcare expenses benefit. The mean WTP of female was highest at OPD2 (741.6 Baht per month), while the mean WTP of male was highest at IPD2 (960.1 Baht per month). Interestingly, the female respondents were more willing to pay for long-term care benefits while the males were not because females live longer than males, so they need long-term care services during their old age.

- The number of child and family size might approximate the availability of care-givers within the family; it seems to affect the WTP for health insurance after retirement. If the number of dependents in a household increases, it is more likely that the household would like to reduce the risk of incurring high health costs by enrolling in the insurance scheme and also prefer various kinds of health benefit in order to avoid those risks. However, the mean WTP of workers that have no-children were much higher than workers that have children particularly on inpatient, outpatient, and long-term healthcare expenses benefit.

- Interestingly, workers that have chronic illness prefer on health insurance benefit different from workers that have no chronic illness. The workers that have chronic illness were willing to pay for outpatient and long-term care expenses benefits while workers that have no chronic illness were willing to pay for inpatient healthcare expenses benefit. In addition, the mean WTP of workers that have chronic illness for outpatient and long-term care expenses benefits were significant higher than that of workers that have no chronic illness whereas the mean WTP of workers that have no chronic illness for inpatient healthcare expenses were a little bit higher than that of workers that have chronic illness. As the person gets older, he or she has a high probability of being afflicted by chronic conditions that lead to disability and require healthcare/long-term care: Alzheimer’s disease and other forms of dementia, Parkinson’s disease, hypertension, diabetes, osteoarthritis, hip fractures and peripheral vascular diseases [8]. It was found that 74.3 percent of the Thai elderly had at least one chronic illness and that most of them suffered from many chronic illnesses simultaneously [15]. Therefore, workers that have chronic illness have high probability of frequency using healthcare and long term care services more than workers that have no chronic illness.

IV. Conclusions and Recommendations

In summary, when the workers make a decision to purchase health insurance after retirement, there are two stages of the decision-making process. First, the workers must decide whether or not to buy an insurance policy. This decision depends on a variety of factors related to the demographic profile of the individual such as age, education, living location, number of children in the family; health status (the presence of chronic illnesses); and awareness of insurance. Once this decision is made, the workers then choose the level of coverage desired from among a menu of health benefits and insurance premiums, which depends on risk-aversion, risk of future health problems, and potential healthcare expenditures. The healthcare benefits that they most prefer are inpatient and outpatient expenses, followed by long-term care expenses. In addition, most of the workers also prefer a higher level of healthcare expenses benefits than a lower one. However, as the price or premium increases, the level of healthcare benefits increases, but the demand for insurance will decrease. This is the challenge of government policy—the tradeoff between equity and efficiency when providing health insurance after retirement. Future research should investigate workers’ preferences, especially regarding long-term care benefits of health insurance after retirement. Since long-term care expenditures represent one of the largest uninsured financial risks facing the elderly, the limited insurance coverage for long-term care expenditures has important implications for the welfare loss for the elderly in most countries in the world. It is thus hoped that the lessons drawn from this study will provide a useful guide for other countries in developing health insurance after retirement or in reforming health insurance benefit schemes for the elderly in order to meet their needs and preferences.
VI. References


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