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. The concept of willingness to pay was needed to evaluate whether healthcare insurance benefits are worthwhile. The stated preference (SP) method, that is Discrete Choice Experiments (DCEs), were then employed in order to elicit consumer preferences and to estimate the value of services based on the individual's willingness to pay (WTP). In the DCE questionnaire, the 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 varied along several attributes, one of which was the price of the alternative. The study found that the workers under the SHI scheme were willing to pay for inpatient (IPD) and outpatient (OPD) health service expenses more than other healthcare benefits.

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Therefore, health insurance after retirement is proposed. The proposed health insurance after retirement will be organized by government authorities (Social Security Office) but provided by private issuers. The premium of health insurance is minimum at 1,000 Baht per month and maximum at 3,000 Baht per month depending on the policy the person selects.

Keywords: *Willingness to Pay, Discrete Choice Experiment (DCE), Health insurance after retirement, Thailand*

ความเต็มใจจ่ายต่อระบบประกันสุขภาพหลังจากที่ผู้ประกันตนในระบบประกันสังคมเกษียนอายุในประเทศไทย

*ปกา คณานุรักษ์**

บทคัดย่อ

การศึกษาชิ้นนี้จึงต้องการประเมินความเต็มใจจ่ายต่อระบบประกันสุขภาพหลังจากที่ผู้ประกันตนในระบบประกันสังคมเกษียนอายุในประเทศไทย โดยใช้วิธี Choice Experiment สอบถามความเต็มใจจ่ายเบี้ยประกันโดยสมัครใจในระบบประกันสุขภาพในรูปแบบสิทธิประโยชน์ต่างๆ ที่ครอบคลุมทั้งค่ารักษาพยาบาลผู้ป่วยนอก ค่ารักษาพยาบาลผู้ป่วยใน ค่าชดเชยเมื่อนอนพักรักษาตัวในโรงพยาบาล และค่าจ้างพนักงานดูแลสำหรับการเจ็บป่วยระยะยาว เทียบกับ Status quo หรือ การใช้บัตรทอง/การรักษาฟรีสำหรับผู้สูงวัย โดยใช้แบบสอบถามเป็นเครื่องมือในการสัมภาษณ์ กลุ่มตัวอย่าง จำนวน 300 ตัวอย่างที่อยู่ทั้งในกรุงเทพฯและต่างจังหวัด โดยกลุ่มตัวอย่างจะต้องเป็นผู้อยู่ในระบบประกันสังคมหรือเคยอยู่ในประกันสังคมจนถึงเกษียนอายุ นอกจากนั้นต้องเป็นผู้มีอายุตั้งแต่ 40-69 ปี และ มีรายได้มากกว่า 10,000 บาท

จากการศึกษาพบว่าผู้ประกันตนในระบบประกันสังคมส่วนใหญ่เต็มใจจ่ายเบี้ยประกันโดยสมัครใจในระบบประกันสุขภาพหลังเกษียนอายุ โดยผู้ที่เต็มใจจ่ายจะมีอายุเฉลี่ยประมาณ 40 ถึง 50 ปี มีการศึกษาดี มีความรู้ความเข้าใจเรื่องระบบประกันสุขภาพ มีสุขภาพแข็งแรงและมีจำนวนโรคเรื้อรังน้อยกว่าผู้ที่ไม่เต็มใจจ่าย

นอกจากนั้นผู้ประกันตนในระบบประกันสังคมยังมีความเห็นตรงกันในเรื่องสิทธิประโยชน์ในการรักษาพยาบาล โดยมีความเต็มใจจ่ายในค่ารักษาพยาบาลผู้ป่วยนอกและค่ารักษาพยาบาลผู้ป่วยใน มากกว่าสิทธิประโยชน์อื่นๆ แต่อย่างไรก็ตาม อายุ เพศ การศึกษา รายได้ ตลอดจนภาวะสุขภาพ ของผู้ประกันตนจะมีผลต่อความเต็มใจจ่ายเบี้ยประกันโดย

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สมัครใจในระบบประกันสุขภาพรวมทั้งรูปแบบสิทธิประโยชน์ของค่ารักษาพยาบาล ดังนั้น การจัดรูปแบบสิทธิประโยชน์ของระบบประกันสุขภาพจึงต้องพิจารณาในรายละเอียดทั้งอายุ เพศ การศึกษา รายได้ ตลอดจนภาวะสุขภาพ ของผู้ประกันตนเพื่อให้ตรงกับความต้องการของผู้ประกันตนมากที่สุด โดยสำนักงานประกันสังคม จะเป็นผู้จัดการให้การบริการแก่ผู้ประกันตนในระบบประกันสังคม เบี้ยประกันจะมีราคาต่ำสุดที่ 1,000 บาท สูงสุดที่ 3,000 บาท และมีรูปแบบสิทธิประโยชน์หลากหลายทั้งค่ารักษาพยาบาลผู้ป่วยนอกค่ารักษาพยาบาลผู้ป่วยในและค่าจ้างพนักงานดูแลสำหรับการเจ็บป่วยระยะยาว

คำสำคัญ: *ความเต็มใจจ่าย ระบบประกันสุขภาพหลังเกษียนอายุในประเทศไทย*

Introduction

Thailand is one of the countries that is experiencing high growth of the population of the elderly. The older population or the 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 (Banloo, 2009: 16). The increasing share of the elderly in the Thai population is due to the fact that the growth rate of the older-age population exceeds that of the overall population in conjunction with the declining proportion of the population of children. This is a result of an exceptionally rapid decline in fertility, in which the total fertility rate fell from above 6 children per woman in the 1960s to its current level below replacement (Knodel & Napaporn, 2008a, 2009). Furthermore, not only is the overall share of the ageing population increasing, but also the increases are large and rapid in the extreme age group of 80 years and older (Knodel & Napaporn, 2009: 33). From the year 2000 to 2050, the growth rate of the older adult population is projected to increase by 227% while the oldest-old population (age 80 and over) will increase by 686% (Jiraporn & Suthichai, 2009: 29).

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 (Kattika & Kusol, 2006: 114). As the numbers of the older population that need healthcare and long-term care services increase, 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.

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 for the elderly) and alternative conditions (with hypothetical health insurance benefits), and these vary according to several attributes, one of which is the price of the alternative (Gerard, Ryan, & Amaya-Amaya,

2008:13-46). Subsequently, the respondents will trade-off among the multiple attributes of health benefits that they most prefer.

This study uses the discrete choice experiment framework to consider the preferences of workers under the SHI scheme, and it specifically identifies the relative importance of the characteristics of voluntary health insurance benefits after retirement. This will help in the design of health insurance after retirement to meet consumer expectations.

Methods

Discrete Choice Experiment

Discrete Choice Experiments (DCEs) have been used widely to elicit preferences in a number of areas (Adamowicz, Boxall, Williams, & Louviere, 1998: 64), and they have been increasingly used in applied health economics research (Lancsar & Louviere, 2008: 661). DCEs draw upon Lancaster's economic theory of value (Lancaster, 1966: 132-157), and random utility theory (Ryan, Netten, Skatun, & Smith, 2006: 929). The random utility model provides a theoretical framework for analyzing the data from the choice experiment exercise. The utility function U_i is composed of a deterministic component (V_i) and an unobservable or stochastic (random) component (ε_i). The overall utility of alternative i is shown in equation (1).

$$U_i = V_i + \varepsilon_i \tag{1}$$

An individual will choose alternative i if $U_i > U_j$ for all $j \neq i$ (j is any other alternative). C is the set of all possible alternatives. All alternative j's are members of set C. However, since the utilities include a stochastic component, one can only describe the probability of choosing alternative i as:

$$P_i = \text{Prob}(U_i > U_j) = P(V_i + \varepsilon_i > V_j + \varepsilon_j) = \text{Prob}(V_i - V_j > \varepsilon_i - \varepsilon_j) \forall i \neq j, \forall j \in C \tag{2}$$

In the choice experiment, V_i contains the attributes of the situation. McFadden (1974 quoted in De Bekker-Grob et al., 2010: 6) showed that if the error terms in equation (2) are independently and identically distributed (IID) with a type I extreme value distribution (i.e., a Gumbel distribution), the conditional or

multinomial logit model can be applied to derive the probability outcomes across a choice set (Louviere et al., 2000: 15). However, the multinomial logit model focuses on the individual as the unit of analysis and uses the individual's characteristics as explanatory variables, while the conditional logit model focuses on the sets of alternatives for each individual and the explanatory variables are the characteristics of those alternatives (Hoffman and Duncan, 1988: 416). As the conditional logit model is appropriate for the analysis of discrete choices in the behavioral model, and the model can assess the utility of each choice alternative for the individual characteristics, this study uses the conditional logit model to analyze the DCEs.

Under the conditional logit model, the probability of individual n choosing alternative i from the set of j alternatives can be written as:

$$prob(i) = \frac{e^{\lambda V_i}}{\sum_{j \in C} e^{\lambda V_j}} \quad (3)$$

where λ is a scale parameter. However, the conditional logit model imposes two problems: 1) the alternatives are independent and 2) there is a limitation in the modeling variation regarding the taste among respondents (Champ, Boyle, & Brown, 2003: 190). The first problem arises from the IID assumption (constant variance), which results in the independence of the irrelevant alternatives (IIA) property. This property states that the ratio of choice probabilities between two alternatives in a choice set is unaffected by changes in that choice set. If this assumption is violated, the conditional logit should not be used because the parameter estimates are biased estimators. In this study, the alternatives are placed in subgroups and the variance is allowed to differ between the subgroups but is assumed to be the same within each group.

The second problem arises when there is taste variation among respondents due to observed and/or unobserved heterogeneity. Observed heterogeneity can be incorporated into the systematic part of the conditional logit model by allowing for interaction between individual characteristics and attributes of the alternatives or alternative-specific constants. An estimated linear-in-parameters utility function for alternative *i* often takes the form:

$$V_i = \alpha_i + \sum_{j=1}^{n} \beta_j X_j + \sum_{k=1}^{m} \gamma_k \alpha_i Z_k \quad (4)$$

where α_i is an alternative specific constant, X_j is the health insurance policy attributes associated with the alternative, Z_k is a vector representing individual characteristics, α_i, β_j and γ_k are parameters, and k is any individual characteristic.

Individual characteristics can be included in the model by having them interact with the alternative specific constants (as shown in equation 4) and/or the attributes (not shown). All attributes were entered into the model using effect codes (the utility of the status quo quality level is the negative sum of the utilities of the improvement quality levels).

As the conditional logit model (with heterogeneity) was used in this study, the two problems mentioned above were handled by having interaction terms between the individual characteristics and attributes of the alternatives or alternative-specific constants in the model.

Survey Instrument

This study was designed to investigate the preferences of workers under the SHI scheme regarding voluntary health insurance after retirement by using the DCE method. The DCE often asks respondents to make a sequence of choices. These choices of health insurance involve combinations of attributes and levels. Specifically, it seeks to determine how much people would be willing to pay for it. The WTP values in the DCE survey refer to the value of alternative changes for improvements in the positively-valued attribute compared to the status quo. Therefore, a face-to-face interview using a structured questionnaire was used in the DCE survey. Before the questionnaire was designed, focus groups were conducted in order to find the attributes that health insurance policyholders were concerned about.

Development of attributes

Selecting and defining healthcare benefit attributes requires a good understanding of the target population's perspective and experience (Mangham, Hanson, & McPake, 2008: 153). Therefore, focus groups are essential for selecting

and defining the attributes and levels of health insurance after retirement in order to gain understanding of consumer expectations.

Four focus groups were held from December 2011 to January 2012, addressing the opinions of several key user groups of health insurance after retirement. The participants were comprised of both males and females that were workers under the SHI scheme and aged above 40 years. Four focus groups were conducted, in which the characteristics of the respondents were different in relation to homogeneity on income and use/nonuse of a private health insurance contract. The aim was to produce a list of attributes and levels that could later be tested in the choice experiments' 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 and 5,000 Baht x 12 times per year.
- Inpatients healthcare expenses; 100,000 Baht per year and 300,000 Baht per year.
- Long-term care expenses; 500 Baht per day and 1,000 Baht per day (Maximum 90 days).
- Work compensation per day during hospital admission; 1,000 Baht x 20 days per year and 1,000 Baht x 45 days per year.
- Health insurance premium; 500, 800, 1,000, 2,000 Baht per month.

Based on the attributes and levels from the focus group, the hypothetical choice sets for the DCE questionnaire were designed, including the choice scenario, and their attributes and levels, in order to study the effects of the attribute levels on the stated preference (or dependent variable). The way in which the alternative levels were set and structured into choice sets is known as "experimental design" (Bennett, & Blamey, 2001; 57). Therefore, experimental design is one of the foundations for a successful DCE and requires considerable thought.

Experimental Design

In the study, the attributes and levels chosen from the focus group, including status quo (using free healthcare for the elderly), resulted in a total of

324 (3^4 x 4^1) possible outcome profiles. Since the attributes and their levels created a very large number of choice sets, experimental design techniques were used to reduce the 324 possible situations to a manageable number for which preferences could be elicited while retaining the ability to estimate the willingness to pay. Thus, fractional factorial designs are often used to consider a selection of possible alternatives. In selecting a fractional factorial design, the design that is both orthogonal (attributes are statistically independent of one another) and balanced (levels of attributes appear an equal number of times) is obtained (Huber & Zwerina, 1996: 307). Fractional factorial designs that are both orthogonal and balanced are known as orthogonal arrays and were used in this study. Consequently, it is important to consider the attribute and levels of the attributes, and to ensure that the alternatives in the choice sets provide more information about the trade-off between the different attributes. This is a useful approach for the selection of design attributes and levels in a choice experiment questionnaire.

SPSS software was used to generate a parsimonious orthogonal array of 40 profiles numbers, which was greater than the minimum number of alternatives, thus ensuring orthogonality with respect to the main effects. A list of 40 orthogonal arrays profiles is provided in Table 1.

Table 1: List of 40 Orthogonal Array Profiles

Card ID	Version	OPD	IPD	LTC	Compensation	Premium
1	1	5,000x12	100,000	1,000x90	1,000x20	500x12
2	1	5,000x12	100,000	1,000x90	1,000x45	800x12
3	1	3,000x6	300,000	1,000x90	1,000x45	2,000x12
4	1	5,000x12	100,000	1,000x90	1,000x45	800x12
5	2	3,000x6	300,000	1,000x90	1,000x45	500x12
6	2	5,000x12	300,000	500x90	1,000x45	2,000x12
7	2	5,000x12	100,000	1,000x90	1,000x45	1,000x12
8	2	5,000x12	300,000	500x90	1,000x20	1,000x12
9	3	3,000x6	300,000	1,000x90	1,000x20	800x12
10	3	3,000x6	100,000	500x90	1,000x45	1,000x12
11	3	5,000x12	300,000	500x90	1,000x20	800x12
12	3	5,000x12	300,000	500x90	1,000x45	500x12
13	4	3,000x6	100,000	500x90	1,000x45	800x12
14	4	5,000x12	300,000	500x90	1,000x20	800x12
15	4	3,000x6	300,000	1,000x90	1,000x20	800x12
16	4	5,000x12	300,000	500x90	1,000x45	500x12
17	5	5,000x12	100,000	1,000x90	1,000x45	1,000x12
18	5	3,000x6	300,000	1,000x90	1,000x20	1,000x12
19	5	3,000x6	100,000	500x90	1,000x20	500x12
20	5	3,000x6	100,000	500x90	1,000x45	1,000x12
21	6	5,000x12	100,000	1,000x90	1,000x20	500x12
22	6	5,000x12	300,000	500x90	1,000x20	1,000x12
23	6	5,000x12	100,000	1,000x90	1,000x20	2,000x12
24	6	5,000x12	300,000	500x90	1,000x45	2,000x12
25	7	3,000x6	300,000	1,000x90	1,000x45	2,000x12
26	7	3,000x6	100,000	500x90	1,000x45	800x12
27	7	3,000x6	100,000	500x90	1,000x20	500x12
28	7	3,000x6	300,000	1,000x90	1,000x20	1,000x12
29	8	5,000x12	100,000	1,000x90	1,000x20	2,000x12
30	8	3,000x6	100,000	500x90	1,000x20	500x12
31	8	5,000x12	100,000	1,000x90	1,000x20	1,000x12
32	8	5,000x12	100,000	1,000x90	1,000x20	800x12
33	9	3,000x6	300,000	500x90	1,000x45	800x12
34	9	3,000x6	100,000	500x90	1,000x20	1,000x12
35	9	3,000x6	100,000	500x90	1,000x45	500x12
36	9	5,000x12	300,000	500x90	1,000x20	500x12
37	10	3,000x6	300,000	1,000x90	1,000x45	800x12
38	10	5,000x12	300,000	1,000x90	1,000x20	500x12
39	10	5,000x12	100,000	500x90	1,000x45	1,000x12
40	10	5,000x12	100,000	500x90	1,000x45	500x12

Source: SPSS Orthoplan

Where choices present two or more options, choice sets must be created. Louviere et al. (2000 quoted in De Bekker-Grob, Esther, Ryan, & Gerard, 2010: 4) proposed two methods to move from an orthogonal array to choice sets: "foldover" (e.g. 40 profiles are paired with their foldover to create 40 choice sets) or "foldover with random pairing" (e.g. an orthogonal array of 40 profiles are randomly paired with their foldover). Recently published DCEs in health economics have made more use of foldover methods and the D-efficient criterion for optimal design (De Bekker-Grob et al., 2010: 37). However, a foldover design which is defined as a systematic level change or cyclical shifting of the original design (i.e. 0 = 1, 1 = 2, 2 = 3, and 3 = 0) will result in a design that has a higher efficiency (Street, Burgess and Louviere, 2005: 468). Therefore, the study increasingly generated efficient choice design by using shifted or cyclic designs which were first developed for choice experiments by Bunch, Louviere, and Anderson (1994 quoted in Huber & Zwerina, 1996: 310). Cyclic designs are easily generated and have perfect level balance, orthogonality, and minimal overlap, which satisfy the principles of an optimal design for a choice experiment, except for utility balance. For the first process of the cyclic design, each of the alternatives in the orthogonal arrays generated from SPSS was allocated to different choice sets. Attributes of the additional alternatives were then constructed by cyclically adding alternatives into the choice set based on the attribute levels. The attribute level in the new alternative was the next higher attribute level to the one applied in the previous alternative and if the highest level was attained, the attribute level was set to its lowest level, for example, if the study had two attributes with three levels, 1 to 3, and an alternative with attribute levels 1 and 3. An additional alternative will then have the attribute levels 2 and 1. In this way, designs with the same number of alternatives as (or fewer alternatives than) the maximum number of levels can be generated easily. These cyclically-generated alternatives are beneficial because they mirror the perfect level balance and orthogonality of the seed array. That is, the frequency of occurrence of each pair of attribute levels is equivalent to the product of their marginal frequencies. Finally, because of the symmetry of the design, there is minimal overlap—each level occurs only once for each attribute within a choice set.

However, when there are many choice sets in a DCE questionnaire, experiments with DCE include problems of information overload that affect the validity of such

experiments. A problem with a high number of choice tasks is that respondents might become fatigued or bored and will not answer according to their preferences but randomly in order to complete the interview. Furthermore, by increasing the number of tasks the respondents' sensitivity to certain attributes might be artificially increased (e.g. increased price sensitivity) or respondents will choose none of the offers presented in a particular choice set more often (Sattler, Adriane, & Sonja, 2003:1). In many cases, respondents may develop "satisfying" decision rules that avoid the full cognitive cost of complexity by considering only a portion of the information available in the choice set. This implies an inverse relationship between complexity and the use of simplifying decision rules. There is a risk that respondents' preferences will change during the interview. Consequently, the number of choice tasks might have a strong effect on the validity of the DCE. Thus, multiple versions of the questionnaire were developed in order to increase the statistical validity of the study. The forty alternatives were split into 10 questionnaires, with 4 choices set per questionnaire. Each version was designed to present each participant with the same number of scenarios, each with the same attributes, but the levels of all attributes in each questionnaire differed. The questionnaires were randomly allocated across respondents.

The interview on the willingness to pay questionnaire began with an introduction of the choice experiment, and brief background information on health insurance programs for the elderly. The respondents were informed that insurance plans proposed in the choice experiment were to be considered as covering only the respondent and that it was voluntary. Respondents were then ask to choose between the 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 (defined by the cyclically varying levels of the attributes and the levels described in Table 2) presented in the choice-based questions on the visual show-cards that they preferred. Each person had to choose only one alternative health insurance plan that he/she preferred from one choice set. The amount of insurance premium per month was used as the WTP attribute. The attributes and attribute levels in this choice experiment survey are presented in Table 2.

Table 2: Attributes and Attribute Levels in the Choice Experiment Survey

Attributes	Description	Level
Outpatient healthcare expenses	Outpatient care describes medical care or treatment that does not require an overnight stay in a hospital or medical facility. Outpatient healthcare expenses include serious and chronic illness.	Level 1: 3,000 Baht x 6 times per year Level 2: 5,000 Baht x 12 times per year
	Status quo Free but limited coverage outpatient healthcare expenses only in standard package. Drugs are referred to National list of essential drugs.	Level 0: Status quo
Inpatient healthcare expenses	A hospital patient that occupies a bed for at least one night in the course of treatment, examination, or observation. Inpatient healthcare expenses include room rate, meals and accommodations, nursing care services, medicine and drugs, doctor or physician expense and miscellaneous medical expenses.	Level 1: 100,000 Baht per year Level 2: 300,000 Baht per year
	Status quo Inpatient healthcare in public hospitals cover only non-private rooms and accommodations.	Level 0: Status quo
Work compensation	Work compensation per day during hospital admission.	Level 1: 1,000 Baht x 20 days per year Level 2: 1,000 Baht x 45 days per year
	Status quo No work compensation per day during hospital admission.	Level 0: Status quo

Table 2: Attributes and Attribute Levels in the Choice Experiment Survey (continued)

Attributes	Description	Level
Long-term care expenses	The provision of medical, social, and personal care services on a recurring or continuing basis for persons with chronic physical or mental disorders. Caregivers such as nurse-aids, training caregivers or professional nurse are included in long-term care expenses.	Level 1: 500 Baht per day (Maximum 90 days) Level 2: 1,000 Baht per day (Maximum 90 days)
	Status quo No long-term care expenses	Level 0: Status quo
Health insurance premium	Premium of proposed voluntary health insurance after retirement (pay annually)	500 Baht per month x 12 month 800 Baht per month x 12 month 1,000 Baht per month x 12 month 2,000 Baht per month x 12 month

Examples of choice scenarios in the questionnaire for one person are shown in Table 3 and Table 4.

Table 3: Example of a Choice Situation

Please kindly answer questions 3.1 to 3.4. You can choose only one health insurance benef it that you prefer for each question.

3.1 From alternative 1, 2 and alternative 3, please select the health insurance benefit and premium that you prefer the most.

Alternative 1	Alternative 2	Alternative 3
Use free healthcare for the elderly. • Free but limited coverage of outpatient healthcare expenses only in standard package. Drugs are referred to National list of essential drugs.	*Health insurance premium pays annually but roughly 500 Baht per month.* • Outpatient healthcare expenses cover serious and chronic illness: 5,000 Baht per time x 12 times per year. (Level 2)	*Health insurance premium pays annually but roughly 800 Baht per month.* • Free but limited outpatient healthcare expenses only in standard package. Drugs are referred to National list of essential drugs. (Level 0)
• Inpatient healthcare in public hospitals covers only non-private rooms and accommodations.	• Inpatients healthcare expenses, especially for medicine and drug, doctor or physician expenses, nursing care services, room rate, meals and accommodation in private and public hospital: 100,000 Baht per year (Level 1)	• Inpatient healthcare expenses, especially for medicine and drugs, doctor or physician expenses, nursing care services, room rate, meals and accommodations in private and public hospitals: 300,000 Baht per year (Level 2)
• No work compensation per day during hospital admission • No long-term care expenses	• Work compensation per day during hospital admission: 1,000 Baht per day x 20 days (Level 1) • Long-term care expenses 1,000 Baht per day (Maximum 90 days) (Level 2)	• Work compensation per day during hospital admission: 1,000 Baht per day x 45 days (Level 2) • No long-term care expenses (Level 0)

Table 4: An Example of Discrete Choice Experiment Using Cyclic Design (Card no 1)

Choice	Alternative	OPD	IPD	LTC	Compensation	Premium
1	1	Free	Free	No	No	Free
	2	5,000x12	100,000	1,000x90	1,000x20	500x12
	3	Free	300,000	No	1,000x45	800x12
2	1	Free	Free	No	No	Free
	2	5,000x12	100,000	1,000x90	1,000x45	800x12
	3	Free	300,000	No	No	1,000x12
3	1	Free	Free	No	No	Free
	2	3,000x6	300,000	1,000x90	1,000x45	2,000x12
	3	5,000x12	Free	No	No	500x12
4	1	Free	Free	No	No	Free
	2	5,000x12	100,000	1,000x90	1,000x45	800x12
	3	Free	300,000	No	No	1,000x12

At the end of the questionnaire, comments and suggestions about public healthcare insurance for the elderly were elicited as open-ended questions. All respondents were welcome to discuss these issues in this section.

Following the focus group, a pilot survey was conducted with a group of 50 target respondents similar to the ones which would be used in the final survey and under the same conditions to be used in the final survey and took place from February to March 2012. The aims of pilot survey were to test of the survey sample and obtain information about the distribution of valuation choice sets of healthcare benefits. The results indicated that the attributes and their levels that were chosen adequately captured the salient features of the assignment systems from the respondents' point of view.

Sample and Sample Size

The size of the sample normally depends on the number of questions given each respondent, the size of the population, and the statistical power that is required of the model derived (Kjaer, 2005: 104). The general rule of thumb for the

DCE is usually a minimum of 200-300 completed surveys. Based on 10 versions of the questionnaire, each containing 4 different choice sets, we should be concerned about the number of samples in each choice set. According to the Central Limit Theorem, it allows the use of normal distribution to approximate the statistics, as long as the sample size is greater than 30. Based on this, the minimum sample size required was determined to be 300 respondents or 30 respondents per version of questionnaire.

The samples of 300 respondents in this study represent insured persons under the Social Health Insurance Scheme, with the assumption that there is no difference in opinion about health insurance after retirement between persons in Bangkok and outside Bangkok, Thailand. As it was desired to spread the sample size to each area of Thailand; fifty percent of the sample size was decided for collection in Bangkok and the remaining were collected outside of the Bangkok area, including major provinces in the vicinity of Bangkok (Nonthaburi, Pathum Thani); the central region (Ayuthaya, Chonburi, Chachoengsa); the north (Chiang Mai, Lampang); the north-east (Udon Thani, Khon Kaen); and the southern (Surat Thani, Songkhla) area of Thailand.

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 should have or previously have 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.

The Econometric Approach

Choice data were modeled using a random utility maximization framework (Green & Gerard, 2009) 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

$$V_{in} = \alpha_0 + \beta_1 outpatient_{in} + \beta_2 inpatient_{in} + \beta_3 compensation_{in} + \beta_4 LTC_{in} + \beta_5 premium_{in}$$

where α_0 is an alternative specific constant (ASC), and β_j refers to the coefficients of the X vector of attributes describing health insurance benefits.

In order to summarize the information in the data, effect codes were set up following. Louviere, Hensher and Swait recommend using effects codes instead of dummy variable codes (Louviere, Hensher, & Swait, 2000; 119). Effects codes avoid correlations with the ASCs/intercepts, allowing the ASCs/intercepts to be interpreted as reflecting aggregate shares of choices and minimizing collinearity in the estimation matrices used to estimate interactions.

Table 5 shows an example of effects coding for a three-level attribute. As can be seen in the table, this is very similar to dummy coding in that only L-1 levels (two in this case) are coded, with the status quo L^{th} level on each effects coded variable coded –1 rather than 0.

Table 5: Effects Coding for Three-level Attributes

Alternative 1	Alternative 2	Alternative 3
Use free healthcare for the elderly	*Health insurance premium pays annually but roughly 500 Baht per month.*	*Health insurance premium pays annually but roughly 800 Baht per month.*
• Free but limited coverage outpatient healthcare expenses only in standard package. Drugs are referred to National list of essential drugs. (Level 0 : Coding =-1)	• Outpatient healthcare expenses cover serious and chronic illness: 5,000 Baht per time x 12 times per year. (Level 2 : dummy level1=0, level2=1)	• Free but limited outpatient healthcare expenses only in standard package. Drugs are referred to national list of essential drugs. (Level 0 : Coding =-1)
• Inpatient healthcare in public hospital covers only non-private rooms and accommodations. (Level 0 : Coding =-1)	• Inpatient healthcare expenses, especially for medicine and drugs, doctor or physician expenses, nursing care services, room rate, meals and accommodations in private and public hospitals: 100,000 Baht per year (Level 1 dummy level1=1, level 2=0)	• Inpatient healthcare expenses, especially for medicine and drugs, doctor or physician expenses, nursing care services, room rate, meals and accommodations in private and public hospitals: 300,000 Baht per year (Level 2 dummy level 1=0, level 2=1)
• No long-term care expenses (Level 0 : Coding =-1)	• Long-term care expenses 1,000 Baht per day (Maximum 90 days) (Level 2 dummy level1=0, level 2=1)	• No long-term care expenses (Level 0 : Coding =-1)
• No work compensation per day during hospital admission (Level 0 : Coding =-1)	• Work compensation per day during hospital admission: 1,000 Baht per day x 20 days (Level 1 dummy level 1=1, level 2=0)	• Work compensation per day during hospital admission: 1,000 Baht per day x 45 days (Level 2 dummy level 1=0, level2=1)

From the three alternatives in choice set, the effect coding is as follows:

Alternative	OPD1	OPD2	IPD1	IPD2	LTC1	LTC2	COMPEN1	COMPEN2	Premium
Alternative 1 Status quo	-1	-1	-1	-1	-1	-1	-1	-1	0
Alternative 2	0	1	1	0	0	1	1	0	500
Alternative 3	-1	-1	0	1	-1	-1	0	1	800

where OPD1= Outpatient healthcare expenses of 3,000 Baht x 6 times per year,
OPD2= Outpatient healthcare expenses of 5,000 Baht x12 times per year,
IPD1= Inpatient healthcare expenses of 100,000 Baht per year,
IPD2= Inpatient healthcare expenses of 300,000 Baht per year,
LTC1= Long-term care expenses of 500 Baht per day (Maximum 90 days),
LTC2= Long-term care expenses of 1,000 Baht per day (Maximum 90 days),
COMPEN1= Work compensation of 1,000 Baht x 20 days per year,
COMPEN2= Work compensation of 1,000 Baht x 45 days per year, and
Premium = Health insurance premium pay annually; 500 Baht per month x 12 month, 800 Baht per month x 12 month, 1,000 Baht per month x 12 month and 2,000 Baht per month x 12 month.

A description of the variables used in the model of willingness to pay and demand for voluntary health insurance is shown in Table 6.

Table 6: A Description of the Variables Used in the Model

Variables	Description
Demographic and Socioeconomic	
Male	Gender = 1 if male, 0 if otherwise (Female as a base)
BKK	Living location: BKK =1 if living in BKK, 0 otherwise (Living in province as a base)
Age	Age of respondents (continuous, years)
Edu	Education level (year of schooling) (continuous, years) Secondary school (6th grade) = 7 High school (12th grade) =12 Technical diploma =14 Bachelor's degree = 16 Master's degree = 18 Doctorate =22
Employ	Employment status=1 if employed with fixed salary (employee, employer, temporary government employee), 0 otherwise (Employed without fixed salary as a base)
Income	Personal monthly income (continuous, Baht)
Single	Marital status = 1 if single, 0 otherwise (Divorced/Widowed/ Separated as a base)
Children	Number of sons or daughters in family (continuous, person)
Fmsize	Number of persons in household (continuous, person)
Health Status	
Health	Health status =1 if respondents evaluated good or excellent self-health assessment, 0 otherwise (have below or average health status as a base)
Illness	The number of chronic illnesses (continuous, illness)
Insurance awareness	
Insurance awareness	Aware =1 if respondents were aware of health insurance, 0 otherwise (were not aware of insurance as a base)
Interest	**WTP for health insurance after retirement=1 if willing to pay, 0 otherwise** **(were not willing to pay for health insurance after retirement as a base)**

Results

Socioeconomic Characteristics

Of the 301 respondents from the survey, the majority were female (57.8%), with an average age of 49 years, around half of the respondents lived in Bangkok, the average years of schooling was approximately 13.6 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.

Willingness to Pay for Voluntary Health Insurance after Retirement

Determinants of willingness to pay

The study found that the respondents were willing to pay the most for IPD2, which provides higher inpatient healthcare expenses, followed by OPD2, OPD1, and LTC2. Introducing IPD2 increases respondent utility as compared to status quo benefits, while IPD1 is insignificant and does not impact the willingness to pay for health insurance after retirement of workers under the SHI scheme. However, outpatient healthcare expenses seemed to offer greater benefits than the status quo scenario since both the OPD1 and OPD2 had significant coefficients and a positive sign. In addition, the respondents were more willing to pay for LTC2, which provides long-term care expenses of 1,000 Baht per day, but not for LTC1, which offered a smaller amount. Nevertheless, COMPEN1 and COMPEN2 were insignificant, and the respondents may not be interested in work compensation per day when admitted to the hospital, and these kinds of benefits did not affect the willingness to pay for the health insurance scheme. As expected, the premium provides a negative significant sign—meaning that the greater the premium charged, the more disutility workers had.

Table 7: Econometric Results of Choice Experiment (coding effect)

Variable	Model with no interaction		
	Coefficient	t-ratio	P-value
ASC	-0.350536*	-2.06835	0.0386
Premium	-0.00106**	-10.16410	0.0000
OPD1	0.23031*	2.02117	0.0433
OPD2	0.26908**	4.90277	0.0000
IPD1	0.05498	0.47826	0.6325
IPD2	0.38849**	6.79602	0.0000
LTC1	0.09714	0.86242	0.3885
LTC2	0.14836**	2.61289	0.0090
COMPEN1	0.00569	0.05266	0.9580
COMPEN2	0.06722	1.22357	0.2211
Pseudo R^2		0.06664	
Log-likelihood		-1157.4344	
AIC		2334.87	
BIC		2385.80	
No. of respondents		301	
No. of observations		1204	

Note: * Significant at the 10% level; ** Significant at the 5% level

+Pseudo R^2 (McFadden's R^2) is defined as 1-(LL/LL_0), where LL is the value of the (simulated) log-likelihood function evaluated at the estimated parameters, while LL_0 is the value of the log-likelihood function for a base model that only contains non-random alternative-specic intercepts.

Marginal Willingness to Pay

The goal of DCE valuation studies is to estimate welfare impacts so that they can be used in policy analysis. The welfare estimates were obtained from choice experiment studies using the following general formula, described by Hanemann (Hanemann, 1984: 332-334):

$$CV = \frac{1}{\mu}[\ln \sum_{i \in C} e^{V_{i1}} - \ln \sum_{i \in C} e^{V_{i0}}] \quad (5)$$

where μ is the marginal utility of income, V_{i0} and V_{i1} 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 (5) reduces to:

$$CV = \frac{1}{\mu}[\ln e^{V_{i1}} - \ln e^{V_{i0}}] = \frac{1}{\mu}[V_{i1} - V_{i0}] \quad (6)$$

From equation (6), it is easily seen that for a linear utility function, the marginal rate of substitution between two attributes is simply the ratio of their coefcients (Hensher and Johnson, 1981: 313), and the marginal willingness to pay (MWTP) for a change in attribute was given by equation (7).

$$MWTP_j = -\beta_j / \mu \quad (7)$$

where β_j is a parameter and μ is the marginal utility of income.

The marginal willingness to pay (MWTP) for a change in attribute of health insurance benefit shows how much money an individual is willing to pay for a unit change in that attribute (McIntosh and Ryan, 2002: 376). The positive MWTP should be interpreted as the amount of money respondents are willing to pay for a unit change in the respective attribute levels describing health insurance benefits compared to the status quo. On the other hand, the negative MWTP indicates how much the respondents should on average be compensated per month for a given health insurance benefits attribute level relative to the status quo level.

The results presented in Table 8, then, provide relevant input for a policy maker when designing health insurance after retirement. The MWTP was highest on IPD2 (365.24 Baht per month), followed by OPD2 (249.26 Baht per month) and OPD1 (225.82 Baht per month). The lowest MWTP was on LTC2 (136.50 Baht per month). Nevertheless, they exhibited a positive insignicant MWTP for LTC1, IPD1 and COMPEN2 and a negative insignicant sign for COMPEN1, indicating no effect on the willingness to pay of respondents for health insurance after retirement.

Table 8 Marginal WTP for Health Insurance Benet Attributes (Baht per month)

Attribute	Calculation	Marginal WTP (Baht/person)
$MWTP_{STATUS\ QUO->>OPD1}$	$\frac{-2.24571}{-0.00109}$	225.82**
$MWTP_{STATUSQUO->>OPD2}$	$\frac{-0.27121}{-0.00109}$	249.26**
$MWTP_{STATUSQUO->>IPD1}$	$\frac{-0.05062}{-0.00109}$	46.52
$MWTP_{STATUSQUO->>IPD2}$	$\frac{-0.39741}{-0.00109}$	365.24**
$MWTP_{STATUSQUO->>LTC1}$	$\frac{-0.10534}{-0.00109}$	96.81
$MWTP_{STATUSQUO->>LTC2}$	$\frac{-0.14853}{-0.00109}$	136.50**
$MWTP_{STATUSQUO->>COMPEN1}$	$\frac{-(-0.00550)}{-0.00109}$	-5.05
$MWTP_{STATUSQUO->>COMPEN2}$	$\frac{-0.06796}{-0.00109}$	62.46

Note: * Significant at the 10% level and ** Significant at the 5% level

According to the survey results, the respondents preferred the benefit of inpatient (IPD) expenses more than outpatient (OPD) expenses, although they normally use the OPD. The data from the Social Security Office showed that the health service utilization rate of the OPD in 2010 was 2.70 visits/person/year, while the medical service utilization rate of the IPD in 2010 was 0.053 visits/person/year. According to the survey, the average healthcare utilization (times per person per year) for the OPD and the IPD was higher because the age range of the target sample for the survey was from 40 to 69 years. Additionally, according to the respondents that went to the OPD, the average heath utilization was 3.01 times

per person per year, with an average health expenditure accounting for 1,572.33 Baht per time. On the other hand, for the respondents that were inpatients during one year, the average heath utilization was 1.14 times per person per year and 3.89 days per time, with an average health expenditure accounting for 15,656.25 Baht per time. People purchase health insurance if the utility of the expected benefits of the insurance coverage, in the form of expected covered expenditures plus the value of protection from financial risk, exceed the premium; they will then pay for the coverage. Further, the IPD expenses are more catastrophic and more risky from the overall healthcare expenses. Therefore, they were more willing to pay for IPD than other health benefits.

Table 9 represents the MWTP of health insurance benefits at each level. The respondents preferred a higher level of health insurance benefits, as OPD2, IPD2, and LTC2 have a notable positive significant sign. The higher level of benefits will cover the expected healthcare expenses that they would have to pay if they use the healthcare services during the retirement period.

Table 9 Marginal WTP for Health Insurance Benefit at Each Level (Baht per month)

Attribute	Status quo	Level1	Level2
OPD	-475.07	225.82**	249.26**
IPD	-411.76	46.52	365.24**
LTC	-233.31	96.81	136.50**
Work compensation	-57.41	-5.05	62.46

Note: * Significant at the 10% level and ** Significant at the 5% level

Figure 1 shows the MWTP for health insurance benefit at each level. It was found that the IPD has a steeper slope. As the level of the IPD increases, the MWTP increases accordingly. The slope of the IPD increases both at level 1 and level 2. In addition, the IPD at level 2 has the highest MWTP, while the slope of the OPD and LTC increased at level 1 but at level 2 the MWTP was downwards. Nevertheless, COMPEN had a flat slope and was insignificant.

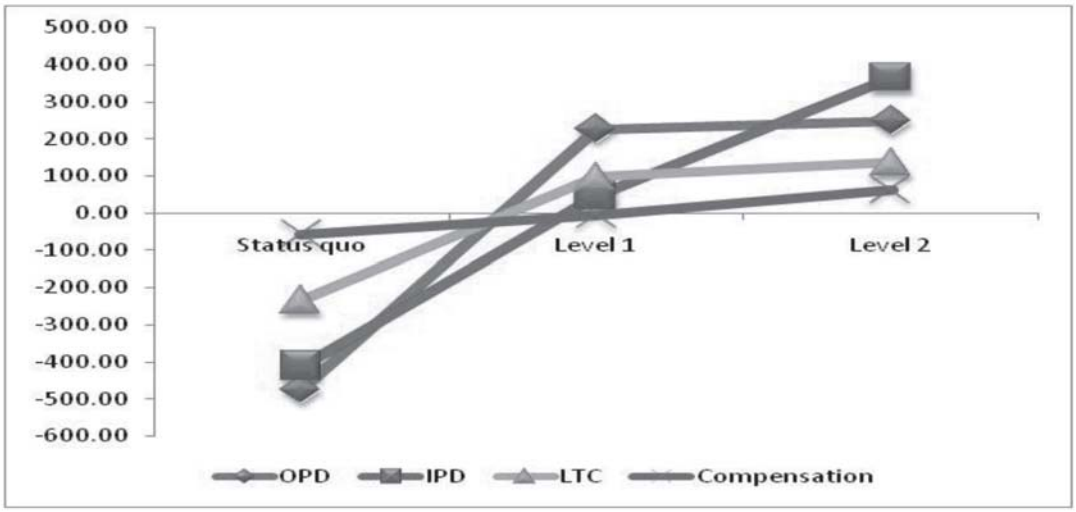

Figure 1: Marginal WTP for Health Insurance Benefit at Each Level

Welfare Measures to Value Health Insurance after Retirement

The welfare measurement to value health insurance after retirement can be 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 (Lanscar and Louviere, 2008: 673). The CV method 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 as WTP or accept compensation for changes in a given attribute.

Table 10 presents the mean welfare estimates (CV) and the calculating procedure for each healthcare benefit attribute.

With regard to the mean WTP values for the health insurance benefit attributes, a remarkable result is the high value attached to the IPD2, which indicates that respondents were on average willing to pay 777.00 Baht for a monthly IPD2 benefit. For the OPD, the respondents were willing to pay 724.33 Baht per month for out-patient healthcare expenses for OPD2 and 700.89 Baht per month for OPD1. The value of LTC2 was significant but a little bit low as compared to other attributes. The average willingness to pay for LTC2 was around 369.81 Baht per month.

Nevertheless, they exhibited a positive insignificant MWTP for LTC1, IPD1, COMPEN2, and COMPEN1, indicating no effect on the willingness of respondents to pay for health insurance after retirement.

Table 10 The Mean WTP for Health Insurance Benefit Attributes (Baht per month)

Attribute	Calculation	Mean WTP (Baht/ person/month)
Mean $WTP_{STATUS\ QUO->>OPD1}$	= 225.82 -(-475.07)	700.89**
Mean $WTP_{STATUSQUO->>OPD2}$	= 249.26 -(-475.07)	724.33**
Mean $WTP_{STATUSQUO->>IPD1}$	= 46.52 -(-411.76)	458.27
Mean $WTP_{STATUSQUO->>IPD2}$	= 365.24 -(411.76)	777.00**
Mean $WTP_{STATUSQUO->>LTC1}$	= 96.81 -(233.31)	330.12
Mean $WTP_{STATUSQUO->>LTC2}$	= 136.50 -(-233.31)	369.81**
Mean $WTP_{STATUSQUO->>COMPEN1}$	= -5.05 -(-57.49)	52.36
Mean $WTP_{STATUSQUO->>COMPEN2}$	= 62.46 -(-57.49)	119.87

Note: * Significant at 10% level and ** Significant at 5% level

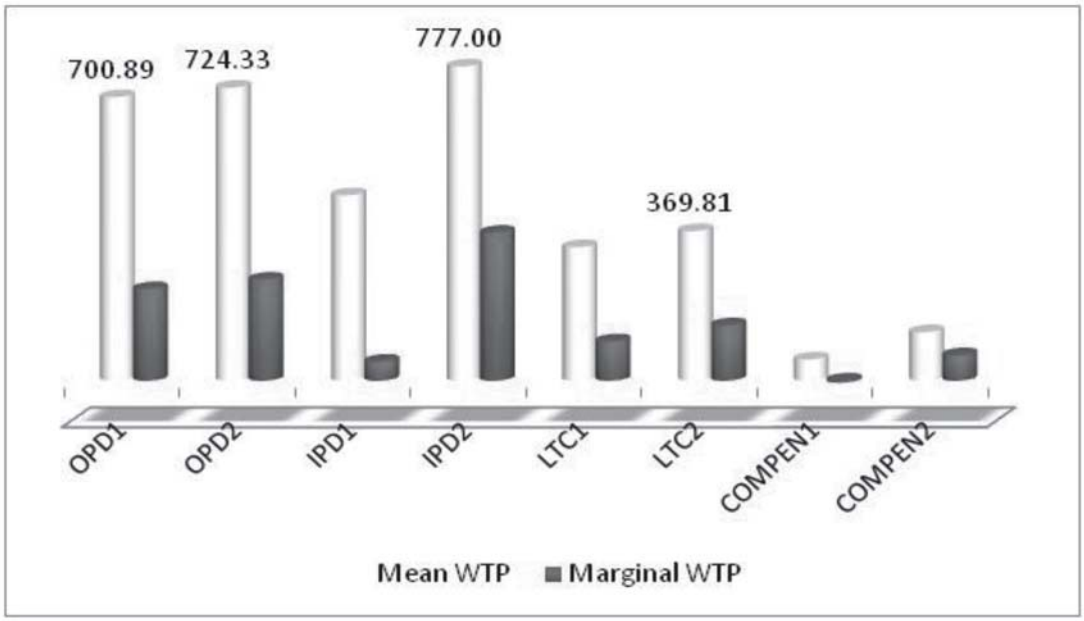

Figure 2: Marginal WTP and Mean WTP (Baht per person per month) for Health Insurance Benefit Attributes

Discussion

An important indicator derived from this empirical 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 workers (i.e. income level, age). Therefore they will select different health plans based on their health and the propensity to utilize the services (Ettner, 1996: 544).

The key findings from this empirical study on 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 more premiums charged, the more disutility the

workers have. As a result, the workers prefer greater health benefits with lower premiums, similar to the principle consumer behavior pattern.

- 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 health benefits coverage. The IPD expenses are more catastrophic and more risky compared to the overall healthcare expenses, while people usually go to the OPD every time they feel ill. Moreover, inpatient and outpatient services are complementary but they are not substitute services (Manning et al., 1987: 271). Therefore, they are more willing to pay for the IPD and OPD health benefits than other health benefits.
- There is potential demand for health insurance after retirement, with the mean willingness to pay depending 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).

In summary, the healthcare benefits that workers under the SHI scheme 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 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.

Policy Recommendations

Based on the analysis, the study results suggest some key policy recommendations as follows:

1. The cooperation of government authorities and private insurance company on providing health insurance after retirement.

Health insurance is a means of financial protection against the risk of unexpected and expensive healthcare. The access value of insurance is related to the value to the consumer of healthcare that the person would not otherwise be able to afford. Recently, the Thai government has guaranteed healthcare coverage to all Thai elderly in a program funded from general tax revenues (Siripen quoted in Global Marketplace for Private Health Insurance, 2010: 220-221). Most low-income people, in urban and rural areas, use public facilities and are covered by a public insurance scheme; namely, the Universal Coverage Scheme (UC). In contrast, medium- to high-income people usually use private facilities, and they are the group that can buy private health insurance. The private insurance gives them access to "premium" services provided by private facilities while being insured. The private insured are decidedly better off than others with respect to both service accessibility and financial hedge against cost. However, most people cannot afford private health insurance. In addition, the voluntary health insurance schemes in Thailand are still under early development and have yet to seriously address the questions of equity and efficiency, while private health insurance is limited to people that can afford the premium (Siripen, 2000: 85-88). This study wants to design voluntary health insurance after retirement for workers under the SHI scheme, it should be provided by a private insurance company which may have raised the problem of adverse selection. The workers after retirement as a population at risk for access to private insurance – have chronic illness with increasing with age. Furthermore, people in worse health may have greater difficulty than those in better health in obtaining health insurance coverage, either because they face higher premiums that make health insurance unaffordable or because they are often denied coverage by insurers (Simantov, Schoen, & Bruegman, 2001: 139-146). While the decision about buying private health insurance is likely to be made before 50 years of age during the earlier working life, as a result, government authorities should provide support to the issuers of health insurance after retirement. The workers after retirement with or without chronic illness then can buy health insurance at an affordable premium rate. Similar to ElderShield, which provides long-term care insurance to the elderly in Singapore, the three private insurers are promoted to run ElderShield under government control. This study proposes health insurance after retirement for workers under the SHI scheme organized by government authorities but provided by private issuers.

However, the market of private health insurance is relatively small because of:

- Lack of direct government promotion or incentive for buying insurance
- Limited consumer awareness

Actually, knowledge regarding the benefits of the program, and better knowledge about the principle of health insurance and the health system among the workers are more important regarding health insurance after retirement in terms of the encouragement of workers to participate in the program, and the sustainability of the program. Consequently, government authorities should help to promote or give incentives to the workers that are interested in buying health insurance after retirement before the retirement period. This will assist insurers in terms of influencing the demand of health insurance after retirement.

2. Insurance need not be uniform across various health benefits.

The government typically provides uniform healthcare and universal coverage to the entire population. Nevertheless, it is conceivable that difficulties will appear in meeting the expectations of heterogeneous groups demanding "personalized" healthcare, and greater choice and promptness of delivery. In addition, there are specific behavioral motivations which illustrate why individuals may display heterogeneous preferences regarding the willingness to pay for health insurance. Therefore, insurance need not be uniform but differs according to the various types of health insurance benefits. Basically, most market failure of health insurance plans comes from adverse selection and moral hazard (Paully, 1968: 630). In order to avoid adverse selection, the insurance plan should offer more choices that meet the customers' needs in each segment (Anderson & Knickman, 1984a: 135-138). As the study proposes voluntary health insurance after retirement provided by private companies but managed by government authorities, the various types of health services benefits associated with the premium will be segmented by target customers (such as age) according to their needs and expectations.

3. Price premiums should be affordable with government intervention

A premium is a significant determinant when people make a decision to purchase health insurance. Additionally, the purchase of health insurance is

influenced by individual characteristics and health risks. Health risks as an individual's expected health expenditures in the next period based on his or her health in the current period are hypothesized to influence the rates of coverage because consumers compare the expected benefits of coverage, in the form of covered health expenditures, with the premium they pay for coverage. Risk-averse consumers will be willing to pay a premium that exceeds their expected benefits, reflecting the value they obtain from protection from the financial risk associated with healthcare spending. While high-risk consumers are more likely to purchase coverage for a given premium than low-risk consumers, health insurance premiums in competitive markets will vary with the health risk (Arrow, 1963: 945-950). In addition, insurance premiums are "actuarially fair" when they are equal to expected health expenditures. However, when premiums increase with risk, high-risk consumers are less likely to purchase insurance than low-risk consumers facing lower premiums. There are also potential utility gains from making insurance available to the risk-averse consumer, who might otherwise need to make large out-of-pocket payments (Zweifel & Pauly, 2006: 369-379). The private gain for people from protecting themselves from rare but very high medical expenses might motivate voluntary insurance if that insurance can be offered at attractive price premiums. As a result, unless the Thai government subsidizes voluntary health insurance after retirement schemes so that the price is lower and the demand of insurance will created. Subsidy levels become critical and research suggests that substantial subsidies will be required to induce a desired enrollment response (Buchmueller & Monheit, 2009: 187-202). However, the government should consider how much substantial subsidy is required for the issuer in order to induce the demand for health insurance after retirement for workers under the SHI scheme.

Proposed health insurance after retirement

Since the workers under the SHI scheme are not covered for healthcare or long-term care services after retirement, this study proposes a form of voluntary health insurance after retirement; namely, Postretirement Shield for those that want to pay for better-quality healthcare services in their old age. Postretirement Shield will be organized by government authorities (Social Security Office) but provided by private issuers. Postretirement Shield has many policies, including OPD, IPD and LTC benefits and coverage. The premium of "Postretirement Shield"

is minimum at 1,000 Baht per month and maximum at 3,000 Baht per month, depending on the policy the person selects.

Future research should investigate workers' preferences, especially regarding the 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.

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