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Content list available at: www.benthamopen.com/TOPHJ/

DOI: 10.2174/1874944501710010041

RESEARCH ARTICLE

The Effect of Medical Test to Belief Updating and Willingness to Pay for Health Insurance Premium: Evidences from Laboratory Experiment

Restiatun Massardi[1,*], Artidiatun Adji[2] and Rimawan Pradiptyo[2]

[1]*Department of Economics, Faculty of Economics and Business, Universitas Tanjungpura, West Kalimantan, Indonesia*
[2]*Department of Economics, Faculty of Economics and Business, Universitas Gadjah Mada, Yogyakarta, Indonesia*

Received: October 28, 2016 Revised: January 18, 2017 Accepted: January 24, 2017

Abstract:

Purpose:

The objective of this study is to analyze the effect of the results of medical tests on three health indicators, i.e. blood pressure, cholesterol level, and blood glucose level, for belief updating and willingness to pay for health insurance. Specifically, this study examined whether individuals update their belief on their health status after being informed the results of their medical tests. This study also investigated whether there is a significant difference between the willingness to pay for the individuals who were informed about the results of their medical tests and of individuals who were not informed about the results of their medical tests.

Approach:

This study utilizes laboratory experiments. There are two groups in the experiments: the treatment group and the control group. The individuals in the treatment group receive information on the results of the medical tests which cover blood pressure, glucose level and cholesterol level tests. The individuals in the control group do not receive any information. We compare the willingness to pay between the treatment group and the control group.

Results:

There are significant differences in the value of willingness to pay for health insurance premium based on prior belief (individuals' belief prior to the medical tests) and on posterior belief (individuals' belief after the medical tests) between control group and treatment group. Belief updating occurs when there is a difference between prior belief and posterior belief due the presence of an event.

Value:

This work contributes to the better understanding about the individual decision making on health insurance purchase.

Conclusion:

The medical tests on blood pressure, cholesterol level, and glucose level significantly affect the willingness to pay for health insurance premium. There are significant changes in individual's posterior belief due to the information provided by the medical tests. An individual's willingness to pay for health insurance premium may change due to a change in his or her health status belief.

Keywords: Health insurance , Laboratory experiment , Prior belief , Posterior belief , Willingness to pay .

* Address correspondence to this author at the Department of Economics and Business, Faculty of Economics, Tanjungpura University, JL. Dr Hadari Nawawi No. 1 Pontianak, West Kalimantan, Indonesia; Tel: 62 0561 766840; Fax: 62 0561 766840; E-mails: hariestya@yahoo.com, restiatun@untan.ac.id

I. INTRODUCTION

An individual's willingness to pay (WTP) for health insurance or prepayment for health care depends on his or her economic and demographic condition, including his or her health status. Several previous studies on willingness to pay for health insurance premium use the frequency of visits to the doctor or hospital during a specific time period as a proxy to health status [1, 2]. Existing literature shows that an individual or a household will purchase health insurance if they often suffer from sickness. Insurance companies will not be willing to establish a contract with individuals possessing high probability to suffer from sickness. According to the Prospect Theory [3], an individual will frame an option as a gain or a loss depending upon his or her situation. An individual's decision to buy health insurance is determined by, among others, his or her subjective belief on health status. An individual will buy health insurance when he or she believes that possessing health insurance is beneficial since he or she is in a bad state of health, facing high probability to suffer from sickness, especially acute sickness.

Beliefs are often built subjectively, ignoring the objective condition. Information on objective condition can be obtained from medical tests, such as blood pressure, cholesterol level, and glucose level. Many individuals do not have their health checked due to various factors such as the budget constraint, mental accounting, or worriness of knowing the bad state of their health condition. If an individual is exposed on information about the objective condition, he or she may change the belief on individual health status. There may be differences between prior belief and posterior belief due to the presence of information on the objective condition of health status.

Previous researches use survey method to estimate the willingness to pay for health insurance premium [2, 4 - 7]. The drawback of the survey method is that it is hard to ensure the presence of counterfactuals. A survey does not isolate what would happen without the intervention or the treatment. In addition, a survey often suffers from selection bias. One of the advantages of laboratory experiment is its ability to overcome selection bias. In addition, laboratory experiments provide replicability—the capacity to replicate existing experimental design and thereby independently verifying the results—and control—the capacity to set laboratory environment and institution to observe agents' behavior.

II. LITERATURE REVIEW

An individual's WTP for health care is defined as the maximum amount of money that he or she is willing to pay for health treatment which can improve his or her health while maintaining the same level of utility [8]. Sickness can be considered as a direct shock to the individual's utility level [9, 10]. Risk averse individuals will have a tendency to buy health insurance. They ensure the financial risks associated with the purchase of health care: they pay a premium ex-ante and receive repayment (reimbursement) when sickness occurs.

There have been a few studies which investigate the determinants of health insurance purchase [see 1, 5, 6, 7, 11, 12, 13]. Previous researchers utilized similar variables, such as demographic characteristics of individuals or households, *i e*. education level, income level, health status, age, and risk preferences. Machnes showed that the higher the income and risk preferences, the higher the health insurance ownership [1]. These findings provided an overview of differences in risk preferences on employment status and loss caused by illness and are supported by Kerssens and Groenewegen [5] and Saver and Doescher [6]. On the other hand, Lindahl [11], Barsky *et al*. [7] and Friedman [13] found different results. Lindahl found that higher income will lower health insurance ownership since an increase in income can reduce the risk of mental weakness, cardiovascular diseases and headaches [11]. High income also enables the individual to perform a balanced diet, reduce obesity, which in turn, may lower the probability of death. The findings of Barsky *et al*. [7] showed that individuals who are self-employed are less likely to buy health insurance. It implies that there is no difference in risk preferences in jobs terms and the risk of losing. Likewise, Friedman found that individuals with higher level of income will less likely to purchase health insurance since their savings can cover health care costs when there is a risk [13].

Ballinger *et al*. examined the social learning process in the presence of precautionary savings which do not include insurance behavior [14]. They found that the third generation has the best savings behavior which is based on what they learned from the first generation's behavior. Meanwhile, Cafferata found that individuals who were informed on the health insurance benefits will tend to buy health insurance to finance health care expenses [12].

The above researches are ex-post researches where the behavioral decision-making process of individuals or households in purchasing health insurance was not taken into account. Individuals will purchase a good or service when they are convinced that the utility gained from consuming goods or services exceeds the costs to be incurred to acquire

goods or services. At a certain income level, the higher the benefits of a good or service to the individual, the higher the individual's WTP values for goods or services.

Viscussi and Evans utilized a laboratory experiment where individuals are faced with risky conditions at their workplace [9]. They found that when individuals are placed at risky work sites, they ask for higher salary. Individuals demand for insurance due to the presence of risk at the work sites.

There have been only a very few studies using laboratory experiments in examining the willingness to pay for health insurance. By setting a laboratory experiment, the behavioral decision-making process in purchasing health insurance can be observed.

III. EXPERIMENTAL DESIGN AND HYPOTHESIS

The experiments involved 100 participants, i.e. 50 participants in the treatment group and 50 participants in the control group. Participants (subjects) who qualify in this experiment are those who are at least thirty-five years old and have jobs. The participants in the treatment group were informed about the results of the their medical tests. The medical tests cover blood pressure, glucose level and cholesterol level tests. In the control group, the participants were not given any information. In this experiment, each participant was given five vouchers as their endowments. Each voucher is worth Rp20,000. The exchange rate was Rp1 is equivalent to ε100 where ε is Experimental Rupiah and Rp is Indonesian Rupiah.

The experimenters obtained the consent to conduct the experiments from the Board of Directors of the Graduate Program at Faculty of Economics and Business, Universitas Gadjah Mada, Indonesia. The consent acts as the approval for ethical consent. Prior to entering the lab, the participants submitted their informed consent. Before the experiment started, each participant filled in their biographical data, including medical history and hereditary factors on acute disease, such as stroke, coronary heart and diabetes mellitus. Participants also answered questions about prior or subjective beliefs on their health status: whether they are healthy or not. In addition to the subjective beliefs on health status, participants also filled in questions about subjective beliefs on their weight: whether they are normal, overweight, or obese. Then, the participants filled the data on their height and weight. The computer program automatically calculated the body mass index and will determine whether the relevant participants had normal weight, overweight, or obese. If the subjective belief of participants on their weight did not correspond to objective facts, then the vouchers was substracted. The subtraction of the voucher was induced in the experiment to ensure the saliency in the experimental design. Saliency is an essential element for the validity of the laboratory experiments. The participants' decisions making have to correlate to the monetary payments that they receive at the end of the experiments.

The experimental procedures are as of the followings.

For the Treatment Group:

Stage 1: Subjects received a posted offer bidding to determine the value of willingness to pay for health insurance premiums. The participants were asked the question of " Will you pay a certain nominal amount for health insurance premiums to cover 100 percent of health care costs when you are sick?". The initial nominal value in this experiment was Rp500,000. The value continued to increase until no participants express that they are willing to pay the amount asked. The participants then face open-ended questions such as how the actual maximum value they are willing to pay for health insurance. Each value above the initial bid value implies that the participants had to buy a premium for that value. The total bid value at this stage did not reduce the amount of their vouchers.

Stage 2: The participants conducted medical tests; blood pressure checks and blood sampling to determine the levels of cholesterol and glucose. The medical test results were informed to the participants. In addition to the information on their current health condition, participants also received information on healthy threshold of blood pressure, cholesterol and glucose levels as well as the probability of suffering from stroke, diabetes mellitus and coronary heart disease in the next five to ten years. The magnitude of the probability of suffering from the disease was based on the criteria in NCEP3ATP.

Stage 3: The objective of this stage is to observe whether the participants performed belief updating on the health status, represented by the changes in beliefs and willingness to pay bidding values. If participants did not change their willingness to pay, it implied that they did not update their beliefs or did not perform belief

updating. As in the previous stage, if the participant's beliefs are incompatible with the objective probability of health status, the participants's voucher was subtracted. To determine whether participants perform belief updating or not, participants will face again the questions about their health status. The subjective belief after the medical tests is referred to as posterior belief. The bidding of health insurance premiums were conducted. The participants' answers will then be compared to the answers of the same questions given before the administration of treatments carried out. If there was a change in the subjective beliefs and values of willingness to pay for health insurance premiums, belief updating occured.

Stage 4: At this stage, each participant was randomized based on the probability of occurrence of the cardiovascular disease in accordance with the results of the medical test. The diseases were stroke, diabetes mellitus, and corronary heart disease. Randomization was done by taking one of one hundred hand-rolled pieces of paper containing number of one percent to one hundred percent, where some of the first numbers (according to the probability of occurrence of disease) showed the occurrence of certain diseases. When participants were exposed to the disease as a result of randomization then they would issue health care costs, in which each disease requires medical care costs for ε2.000.000. If a participant decided to buy the insurance, the health care costs would be paid by the insurance company. On the other hand, if a participant decided not to buy the insurance premium, the entire cost of health care would be paid by himself or herself, i.e. there would be substraction of the participant's voucher.

At the end of the period, the voucher owned by participants was exchanged for an amount of money according to the specified exchange rate in the experiment.

For the Control Group: The stages carried out in the control group were similar to the treatment group, except at Stage 2, the participants were given a refreshment break, instead of medical tests in the treatment group. This scenario was conducted to examine whether the change in the willingness to pay was caused by the medical test results. The control group was the counterfactual of what happens if there were no medical tests treatment. To determine whether the participants suffer from diseases, the participants in the control group were randomized twice in order to get the probability of the occurrence of sickness and the incidence of contracting the disease. The magnitude of this probability was determined by gender, age and heredity risk factors, based on data from the NCEP3ATP. These results were then used as the basis for determining whether a participant would suffer from a disease or not in the experiment. If the number drawn in the second randomization was less than or equal to the number drawn in the first randomization, the participant was stated as suffering from sickness. Randomization was carried out for the three kinds of diseases separately. For the control group, when a participant suffered from at least one sickness, the number of voucher subtracted was increased by one. This was conducted also to equalize the amount of compensation received in the treatment group and the control group.

The hypothesis of the experiments is stated as follows.

Hypothesis 1. The prior belief willingness to pay of the treatment group, i.e. group who received information on their medical tests results (blood pressure, cholesterol level, and blood glucose level) is different from the prior belief willingness to pay of the control group, i.e. group who did not receive such information. Specifically:

H_0: $\bar{x}_{wtp_1^T} = \bar{x}_{wtp_1^C}$

H_a: $\bar{x}_{wtp_1^T} \neq \bar{x}_{wtp_1^C}$

where

$\bar{x}_{wtp_1^C}$ is the mean value of the priof belief willingness to pay of the control group

and

$x_{wtp_2^T}$ is the mean value of the priof belief willingness to pay of the treatment group

Hypothesis 2. The posterior belief willingness to pay of the treatment group, i.e. group who received information on their medical tests results (blood pressure, cholesterol level, and glucose level) is different from the posterior belief willingness to pay of the control group, i.e. group who did not receive such information. Specifically:

H_0: $\bar{x}_{wtp_2^C} = \bar{x}_{wtp_2^T}$

H_a: $\bar{x}_{wtp_2^C} \neq \bar{x}_{wtp_2^T}$

where

$\bar{x}_{wtp_2^C}$ is the mean value of the posterior belief willingness to pay of the control group

and

$\bar{x}_{wtp_2^T}$ is the mean value of the posterior belief willingness to pay of the treatment group.

Hypothesis 3. The prior belief willingness to pay of the control group is same as the posterior belief willingness to pay. Specifically:

H_0: $\bar{x}_{wtp_1^C} = \bar{x}_{wtp_2^C}$

H_a: $\bar{x}_{wtp_1^C} \neq \bar{x}_{wtp_2^C}$

Hypothesis 4. The prior belief willingness to pay for the treatment group is different from the posterior belief willingness to pay. Specifically:

H_0: $\bar{x}_{wtp_1^T} = \bar{x}_{wtp_2^T}$

H_a: $\bar{x}_{wtp_1^T} \neq \bar{x}_{wtp_2^T}$

Hypothesis 5. The differences between prior belief willingness to pay and posterior willingness to pay of the treatment group are different from the differences between prior belief willingness to pay and posterior willingness to pay of the control group. Specifically:

H_0: $\bar{x}_{Dwtp^T} = \bar{x}_{Dwtp^C}$

H_a: $\bar{x}_{Dwtp^T} \neq \bar{x}_{Dwtp^C}$

where

$\bar{x}_{Dwtp^C}$ is the differences between prior belief willingness to pay and posterior willingness to pay for the control group.

And

$\bar{x}_{Dwtp^T}$ is the differences between prior belief willingness to pay and posterior willingness to pay for the treatment group.

These differences are referred to as net effect (NE) variable.

IV. THE EXPERIMENTAL RESULTS AND THE REGRESSION RESULTS

Table **1** shows the prior belief willingess to pay (WTP1) and the posterior belief willingness to pay (WTP2) for the treatment and control groups. The experimental evidences show that the prior belief willingness to pay (WTP1) for the treatment group and the one of the control groups is significantly different. Similarly, the values of posterior belief willingness to pay (WTP2) of the treatment group are different from the one of the control group.

Table 1. The prior and posterior willingness to pay of the treatment and control groups.

Group	Mean			Dev. Stan		Median	
	WTP_1	WTP_2	Difference	WTP_1	WTP_2	WTP_1	WTP_2
Treatment	529,500	632,400	102,900	322,129.79	283,812.0	500,000	550,000
Control	430,900	450,800	19,900	265,717.73	256,903.4	435,000	470,000

There is no significant change in the value of WTP1 and WTP2 of the control group. As for the treatment group, the WTP1 value is significantly different from the one of WTP2. This suggests that the individuals' willingness to pay change due to the information about current health status based on the medical tests. The difference-in-difference (DID)

estimation indicates that the change in the value of WTP is caused by the information about current health status. The DID estimation is supported by the regression results. The net effect (NE) significantly affects the WTP value of health insurance premiums, while the time variable (Time) was insignificant, implying that in the absence of the treatment, time changes alone cannot significantly alter the value of the individual's willingness to pay on health insurance. Only information on the current health status of the participants was able to change the perception of risk on their health status which further affects the value of the individual's WTP and health insurance purchasing decisions.

To estimate the determinants of individuals' WTP, probit regression models and OLS (Ordinary Least Square) were utilized. Following previous studies [4, 15, 16] the estimated model for prior belief is

$$wtp = \beta_0 + \beta_1 Age + \beta_2 Edu + \beta_3 Empl + \beta_4 Gnder + \beta_5 Inc + \beta_6 ls + \beta_7 Stat + z_i \quad (1)$$

where stat = $\alpha_0 + \alpha_1 dsick + z$ hence,

$$wtp_i = \beta_{0i} + \beta_{1i} age + \beta_{2i} edu + \beta_{3i} empl + \beta_{4i} gnder + \beta_{5i} inc + \beta_{6i} ls + \beta_{7i} stat + \varepsilon_i$$

$$= \beta_{0i} + \beta_{1i} age + \beta_{2i} edu + \beta_{3i} empl + \beta_{4i} gnder + \beta_{5i} inc + \beta_{6i} ls + \beta_{7i} (\alpha_{0i} + \alpha_{1i} dsick + z_i) + \varepsilon_i$$

$$= (\beta_{0i} + \beta_{7i}\alpha_{0i}) + \beta_{1i} age + \beta_{2i} edu + \beta_{3i} empl + \beta_{4i} gnder + \beta_{5i} inc + \beta_{6i} ls + \beta_{7i}\alpha_{1i} dsick + (\beta_{7i} z + \varepsilon_i)$$

$$= (\beta_{0i} + \gamma_{0i}) + \beta_{1i} age + \beta_{2i} edu + \beta_{3i} empl + \beta_{4i} gnder + \beta_{5i} inc + \beta_{6i} ls + \gamma_{1i} dsick + \theta_i$$

$$= \delta_{0i} + \beta_{1i} age + \beta_{2i} edu + \beta_{3i} empl + \beta_{4i} gnder + \beta_{5i} inc + \beta_{6i} ls + \gamma_{1i} dsick + \theta_i$$

Since the WTP values cannot be observed in the bidding game then equation (1) above cannot be estimated. If B_1, ..., B_m is the value that divides the range of WTP into m + 1 categories, and y_h is a categorical variable, hence [see 2]

$$y_h = \begin{cases} 1 \text{ if } wtp < B_1 \\ 2 \text{ if } B_1 < wtp < B_2 \\ M+1 \text{ if } wtp > B_2 \end{cases} \quad (2)$$

If i=1,...,M+1, then from equation (1) will be obtained y_h=i if:

$$B_{i-1} < \alpha_0 + \beta_i x_h + z_i < B_i \quad (3)$$

$$\text{Or } B_{i-1} - \alpha_0 < \beta_i x_h + z_i < B_i - \alpha_0 \quad (4)$$

$$\text{Or } (B_{i-1} - \alpha_0 - \beta_i x_h)/\sigma < (B_i - \alpha_0 - \beta_i x_h)/\sigma, \quad (5)$$

where σ is the standard deviation of z_i. z_i is assumed to follow a standard normal distribution, then

$$P(y=i) = P(B_{i-1} < wtp < B_{i-1}) \quad (6)$$

$$= P(u_{i-1} - \beta_i x_h < z_i < u_i - \beta_i x_h)$$

$$= F(u_i - \beta_i x_h) - F(u_{i-1} - \beta_i x_h)$$

where $u_i = B_i - \alpha_O$ and F(.) is the standard normal cumulative density function. Equation (6) is a probit equation to explain the variation in willingness to pay for the bidding value. Estimates are consistent with u_i and x_h is maximum likelihood.

The estimated model for posterior belief is as follows (see Table **2**):

Table 2. The description of the explanatory variables.

Variable	Description	Value
Inc	Subject's income per month	1 if 2 Million ≤ inc < 4 Million Rupiah; 2 if 4 Million ≤ inc < 7 Million Rupiah; 3 if inc > 7 Million Rupiah
Age	Subject's age	Year
Edu	A dummy which describes the level of last education	1 if under S1; 2 if S1; 3 if S2; 4 if S3
Empl	A dummy which describes whether a subject is a civil servant	1 if civil servant; 0 if non-civil servant
LS	A dummy which describes the lifestyle	1 if healthy; 0 if unhealthy
Gnder	A dummy which describes gender	1 if man; 0 if woman
Stat	A dummy which describes subjective beliefs on health status	1 if healthy; 0 if unhealthy;
Dsick	Average number of sick days in the month (twenty working days)	Days
MAP[1]	A dummy which describes systolic and diastolic blood pressure	1 if normal, 0 if abnormal

(Table 2) contd.....

Variable	Description	Value
Kol	A dummy which describes blood cholesterol level	1 if normal, 0 if abnormal
GD	A dummy which describes blood glucose level	1 if normal, 0 if abnormal
InfMAP	A dummy which describes the knowledge on the threshold of healthy blood pressure	1 if know, 0 if does not know
InfKol	A dummy which describes the knowledge on the threshold of healthy cholesterol levels in the blood	1 if know, 0 if does not know
InfGD	A dummy which describes the knowledge on the threshold of healthy blood glucose levels in the blood	1 if know, 0 if does not know
UndMAP	A dummy which describes an individual who has received current information of blood pressure conditions and have knowledge about the threshold of healthy blood pressure	1 if he/she has received updated information and understands to the threshold of healthy blood pressure; 0 if *otherwise*.
UndKol	A dummy which describes an individual who has received current information of cholesterol conditions and have knowledge about the threshold of healthy cholesterol in the blood	1 if he/she has received updated information and understands to the threshold of healthy cholesterol in the blood; 0 if *otherwise*.
UndGD	A dummy which describes an individual who has received current information of blood glucose conditions and have knowledge about the threshold of healthy blood glucose	1 if he/she has received updated information and understands to the threshold of healthy blood glucose; 0 if *otherwise*.
Time	A dummy which describes stage in the experiment	1 if he/she was ini stage 2; 0 if he/she was ini stage 1
Ne	A dummy which describes net effect is received by participants	1 if he/she was participant in treatment group and has received medical check; 0 if other wise

Table 3. The estimation results for the determinants of the WTP.

Variable	WTP[2]	HI[3]
C	412353.5 (2.92)*	-0.42 (-0.47)
Age	-1363.71 (-0.51)	0.00 (0.04)
Edu	-30777.01 (-1.37)	0.032 (0.22)
Empl	-42366.57 (-1.24)	-0.44 (-1.99)**
Gnder	6209.37 (0.17)	0.28 (1.17)
Inc	262893.17 (7.91)*	1.01 (4.19)*
Ls	56196.17 (1.44)	0.56 (2.18)**
Statf	-270469.0 (-4.46)*	-1447232 (-3.18)**
Time	31831.48 (0.81)	0.09 (-0.38)
Ne	99136.32 (2.06)**	0.59 (1.89)***
	R Squared 0.43 F statistic 15.87 Prob (F statistic) 0.00	McFad R Squared 0.23 LR statistic 62.32 Prob (LR statistic) 0.00
*** denotes significance at α = 1%** **** denotes significance at α = 5%** ***** denotes significance at α = 10%**		

[1]Mean Arterial Pressure (MAP) is the average blood pressure in an individual. Hypertension or high blood pressure is a chronic cardiac medical condition in which the systemic arterial blood pressure increases. It means that the heart has to work harder than it should to pump blood throughout the body. MAP can be measured as ((2xDP) + SP) / 3 (Wikipedia.com)

[2]WTP variable indicates the magnitude of the maximum value an individual is willing to pay each month for health insurance premiums that cover one hundred percent of health care costs.

[3]HI variables indicate individuals' decisions to purchase of health insurance. HI = 1 if the value of the bidding on the Rp500.000,00 (buy health insurance); HI = 0 if the value is less than Rp500.000,00 bidding (do not buy health insurance).

The regression results presented in Table **3** show that income (inc) and health status (statf) variable significantly affect the WTP. Income is a key factor that determines the value of the individual WTP on health insurance premiums. Starting from income level of Rp2,000,000.00, *ceteris paribus*, the higher the income, the higher the value of WTP, and

hence, the individuals' chances to buy health insurance increases. When the individual's WTP is greater than or equal to the price premium offered by the insurance company, the individuals will certainly buy health insurance.

Health status variable (statf) is a function of the number of sick days in a month (twenty working days). Estimation result of health status (statf) for control group and treatment group is presented in Table **4**. Number of sick days significantly affects health status negatively. Longer sick days decrease the chances of an individual possessing a subjective belief that he or she is healthy. The health status significantly and negatively affects the WTP and insurance decisions. Longer sick days increase the value of WTP and the probability of insurance premium purchase.

Table 4. The estimation results of the health status1.

Variable	Control Group		Treatment Group	
	Coefficient	Z-stat	Coefficient	Z-stat
C	8.57	2.54	8.73	2.95
Dsick	-2.24	-2.39**	-2.80	-2.93*
	McFadden R Squared 0.61 LR statistic 16.98 Prob (LR statistic) 0.00		McFadden R Squared 0.75 LR statistic 43.08 Prob (LR statistic) 0.00	
*** denotes significance at α = 1%** **** denotes significance at α = 5%**				

Table **5** shows that in the treatment group at stage one, income and health status variables significantly affect WTP1. However, health insurance purchase decisions are only significantly influenced by income. For health status, as well as health status 1 and 2 in the control group, the number of sick days is significant (dsick). As for stage two, where previous participants of this group receive medical tests treatment, health status is significantly and negatively affected by the number of sick days and is significantly and positively influenced by the blood pressure (MAP) and glucose level (GD).

Table 5. The estimation results of WTP1 and HI1.

Variable	WTP1 (Control)	HI1 (Control)	WTP1 (Treatment)	HI1 (Treatment)
C	-38391.39 (-0.12)	-2.17 (-1.09)	299344.80 (0.84)	-0.89 (-0.39)
Age	7573.83 (1.31)	0.01 (0.21)	-669.11 (-0.10)	0.01 (0.12)
Edu	1690.47 (0.03)	0.01 (0.02)	-71877.89 (-1.45)	-0.21 (-0.65)
Empl	127794.70 (2.35) **	0.34 (1.00)	19037.48 (0.26)	0.15 (0.33)
Gnder	-66092.22 (-0.79)	0.50 (0.94)	-119817.30 (-1.34)	-0.57 (-0.88)
Inc	174020.80 (2.03) **	1.20 (2.15)**	349498.50 (4.93)*	1.55 (2.85)*
Ls	94436.16 (1.02)	0.42 (0.71)	44345.95 (0.53)	0.59 (1.12
Stat 1f	-355618.10 (-2.23) **	-1.06 (-1.11)	-177444.50 (-1.82) ***	-1.01 (-1.36)
R Squared 0.28 **F statistic 2.37** **Prob (F statistic) 0.04**		McFad R Squared 0.17 LR statistic 11.69 Prob (LR statistic) 0.11	R Squared 0.46 F statistic 5.12 Prob (F statistic) 0.00	McFad R Squared 0.28 LR statistic 16.37 Prob (LR statistic) 0.02
*** denotes significance at α = 1%** **** denotes significance at α = 5%** ***** denotes significance at α = 10%**				

Estimation result of health status2 for control group is presented in Table **6** and for treatment group is presented in Table **7**. The closer those indicators to normal conditions of the health indicators, *ceteris paribus*, the subjective beliefs of individuals on their health status will increase. In addition, individuals who were informed about the glucose levels and the threshold of healthy glucose perceived risk perception of health status differently from individuals who were informed about their blood glucose levels but were not informed about the threshold.

Table 6. The estimation result of the health status 2 for control groups.

Variable	Coefficient	Std. Error	z-statistik	Prob
C	7.91	3.20	2.47	0.01
Dsick	-1.89	0.86	-2.20*	0.03
McFadden R Squared 0.52 **LR statistic 11.76** **Prob (LR statistic) 0.00**				
*** denotes significance at α = 5%**				

Table 7. The estimation results of the health status 2 for treatment groups.

Variable	Coefficient	t-statistik
C	0.35	1.66***
Dsick	-0.14	-3.83*
Map	0.43	2.54**
GD	0.45	3.17*
Kol	0.03	0.21
InfMAP	0.18	1.20
InfGD	0.24	0.76
InfKol	0.24	0.94
UndMAP	-0.29	-1.11
UndGD	-0.53	-1.64***
UndKol	-0.21	-0.65
R squared = 0.51 **F statistic = 4.09** **Prob (F stat) = 0.00**		
*** denotes significance at α = 1%** **** denotes significance at α = 5%** ***** denotes significance at α = 10%**		

Table **8** shows that the WTP2 is significantly affected by income and health status, while the insurance holdings stage 2 (HI2) is affected significantly only by health status (stat2). It implies that the current health status information received by participants significantly alters the participants' perception of risk on their health status, hence, given their current income, the participants began to consider measures in anticipation of the possibility of health risks, in this case with the purchase of health insurance.

Table 8. The estimation results of the WTP2 and HI2.

Variable	WTP2 (Control)	HI2 (Control)	WTP2 (Treatment)	HI2 (Treatment)
C	622032.90 (1.79)*	-0.72 (-0.33)	696435.30 (2.52)**	2.65 (1.00)
Age	-5477.05 (-0.89)	-0.00 (0.07)	-1113.20 (-0.22)	-0.01 (-0.12)
Edu	8218.66 (0.13)	0.119787 (0.34)	-35929.25 (-0.96)	-0.00 (-1.28)
Empl	99536.73 (1.71)***	0.61 (1.72)***	-22247.91 (-0.40)	-0.16 (-0.35)
Gnder	-70994.72 (-0.80)	-0.02 (-0.03)	-95125.21 (-1.40)	-0.90 (-1.22)
Inc	258676.70 (2.83)*	1.06 (1.89)***	201612.90 (3.56)*	0.74 (1.36)
Ls	18257.32 (0.18)	0.55 (0.91)	36846.63 (0.58)	0.63 (1.22)
Stat 2f	-438045.00 (-1.96) **	-2.35 (-1.72)***	-364072.00 (-4.00) *	-2.18 (-1.82)***

(Table 8) contd.....

Variable	WTP2 (Control)	HI2 (Control)	WTP2 (Treatment)	HI2 (Treatment)
R Squared 0.31		McFad R Squared 0.19	R Squared 0.56	McFad R Squared 0.23
F statistic 2.69		LR statistic 13.23	F statistic 7.59	LR statistic 12. 16
Prob (F statistic) 0.02		Prob (LR statistic) 0.07	Prob (F statistic) 0.00	Prob (LR statistic) 0.10
*** denotes significance at α = 1%** **** denotes significance at α = 5%** ***** denotes significance at α = 10%**				

V. DISCUSSION

This research investigated how the medical test involve blood pressure, cholesterol level, and glucose levels influence the WTP for health insurance premium. The WTP is influenced by the individual's subjective belief on their health status, and along with income, will determine the individual's decision to purchase health insurance.

The results show that the medical test information will encourage the subjects in the treatment group to perform belief updating. However, the presence of belief updating does not automatically push them to buy health insurance, despite the increase of the WTP for health insurance. If the WTP is below the premiums offered by insurance companies, the decision is not to purchase health insurance. It suggests that health insurance benefits based on the individual's subjective belief are still lower than its premiums. Meanwhile, health insurance benefits for individuals are influenced by several factors such as education and income.

Given the benefits of health insurance, it is very likely that individuals with high income will have a higher WTP than individuals with low income. Income is an important factor in individuals' decision making to purchase health insurance. The nature of the laboratory experiments is the ability to mimick the real world and institutionalize it to the laboratory. Therefore, the medical test is conducted one shot. A future agenda worth to consider is to conduct field experiments where the medical test can be provided to the treatment group in a more regular basis.

CONCLUSION

The evidences from the experiments show that there are differences between the mean value of the prior belief willingness to pay of the individuals who received information on their medical tests results and the mean value of the willingness to pay for the individuals who did not have medical tests and hence had no information about their medical status. In addition, the mean value of the posterior belief willingness to pay of the individuals who received information is also statistically and significantly different from the mean value of the posterior belief willingess to pay of the individuals who received no information.

The regression results suggest that the change in individual's subjective belief on his or her health status is caused by the information about the individuals' health status and the number of sick days in one month. Information on medical results tests, i.e blood pressure and glucose level, significantly affects the belief updating of an individual's health status and along with income significantly affect the magnitude of the value of the willingness to pay for health insurance.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The experimenters obtained the consent to conduct the experiments from the Board of Directors of the Graduate Program at Faculty of Economics and Business, Universitas Gadjah Mada, Indonesia.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

ACKNOWLEDGEMENTS

Declared none.

LIST OF ABBREVIATIONS

WTP1	=	Prior belief willingness to pay for health insurance premium
WTP2	=	Posterior belief willingness to pay for health insurance premium
HI1	=	Purchasing health insurance decision based on WTP1
HI2	=	Purchasing health insurance decision based on WTP2
Health Status 1	=	Prior belief of health status
Health Status 2	=	Posterior belief of health status
Stat1F	=	The fitted value of health status based on prior belief
Stat2F	=	The fitted value of health status based on posterior belief

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