Supplementary Material for

A behavioral decomposition of willingness to pay for health insurance

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Online Appendices

Appendix 1. Balancing tests by attrition

Table A1.1 Means of baseline characteristics by follow-up status

	Followed up		p-value
	Yes	No	
Informal sector/poor at baseline			
Urban	0.424	0.617	0.000
Average per capita household expenditure	22351	29766	0.000
Head is working	0.876	0.844	0.079
Head has poor health	0.028	0.039	0.220
Head had at least college education	0.077	0.130	0.000
Health facility within 15 minutes	0.721	0.749	0.240
Has other insurance	0.026	0.043	0.065
Number of children under 21	1.851	1.517	0.000
Experienced adverse health outcome in the last year	0.264	0.268	0.864
National Capital Region	0.112	0.245	0.000
Rest of Luzon	0.440	0.483	0.103
Visayas	0.226	0.087	0.000
Mindanao	0.223	0.186	0.093
N	1513	462	
Formal sector at baseline			
Urban	0.652	0.523	0.000
Average per capita household expenditure	35592	57223	0.639
Head is working	0.891	0.912	0.314
Head has poor health	0.026	0.023	0.740
Head had at least college education	0.202	0.254	0.090
Health facility within 15 minutes	0.772	0.733	0.220
Has other insurance	0.127	0.093	0.118
Number of children under 21	1.843	1.952	0.355
Experienced adverse health outcome in the last year	0.255	0.270	0.635
National Capital Region	0.213	0.100	0.000
Rest of Luzon	0.554	0.436	0.001
Visayas	0.090	0.260	0.000
Mindanao	0.142	0.203	0.029
N	267	708	

Note: The intention was not to follow up all households in the formal employment sector at baseline. For this sector, the 'No' column includes those not selected for follow-up, plus those who were randomly selected but could not be interviewed.

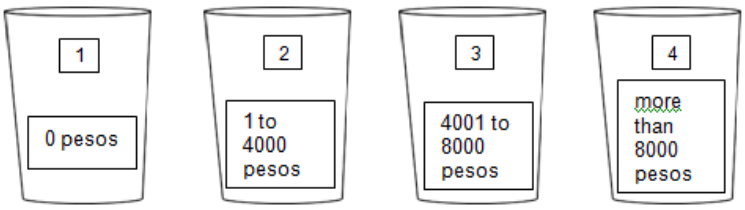
Appendix 2. Protocol for elicitation of subjective probabilities of medical expenditures

INTERVIEWER READS:

I am interested in the amount your household expects to spend out-of-pocket on medical and dental care, medicines and maintenance drugs, including transportation costs to health facilities in the next 12 months (1 year).

Out-of-pocket expenditures include spending from salary/income, loans, savings and donations or charity assistance, but exclude spending that will be reimbursed from any health insurance cover, if you have any. They also exclude the government benefits SSS, GSIS and ECC.

NOTE TO THE INTERVIEWER: PRESENT THE RESPONDENT WITH THE FOUR CUPS



These cups represent four possible amounts of expenditure on medical and dental care, medicines and maintenance drugs your household might face over the next 12 months (1 year) including transportation costs to health facilities, but not including any expenses that will be covered by all health insurance

1. spend nothing at all
2. spend between 1 and 4000 pesos
3. spend between 4001 and 8000 pesos
4. spend more than 8000 pesos

NOTE TO THE INTERVIEWER: GIVE THE RESPONDENT THE 10 STICKS.

I am interested in your beliefs about the chance that your household will incur the different levels of expenditure over the next 12 months (1 year). I would like you to distribute the 10 sticks over the cups to express what you think is the chance of each level of expenditure. One stick represents one chance out of 10. If you do not put any sticks in a cup, it means you think that you will NOT spend that amount. As you add sticks, it means that you think the chance of facing that level of expenditure increases. For example, if you put one or two sticks in a cup, it means you think it is unlikely that you will spend that amount but it is still possible. If you put 5 sticks in a cup, it means that there is an equal chance that you will spend that amount as it is that you will not (fifty-fifty). If you put 6 sticks in a cup, it means that there is slightly more chance that you will spend that amount. If you put 10 sticks in a cup, it means you think that you will spend that amount, and there is no chance that you will spend any of the other amounts. There is not a right or wrong answer, I just want to know what you think.

How would you distribute these 10 sticks now? Please remember that this concerns out-of-pocket expenditures for healthcare, medicines and maintenance drugs your entire household will face in the next 12 months (1 year), including transportation costs.

Appendix 3. Sensitivity of estimates of subjection probability distribution moments

Estimation of the moments of the subjective probability distribution of medical expenditure, and so of the perceive fair price of insurance, requires a distributional assumption. We choose the lognormal since this allows a long tail without fixing the maximum. We explain the limitations of two other distributions that could have been used here.

Assuming a piecewise uniform distribution would require the imposition of a maximum value, which we did not ask the respondent to report. Estimation of the first moment is relatively sensitive to the chosen value. The impact is greatest on the estimates for respondents that put all the sticks in the cup indicating expenditure of more than 8,000 pesos. Such sensitivity to a parameter about which we have little information is a major disadvantage of using this distribution. The sensitivity carries over to estimates of the second moment. Even if we had elicited an upper bound on the top interval of medical expenditures each household contemplated incurring, it would be implausible to assume that the density is flat in the region preceding that value. For these reasons, the assumption of a piecewise uniform distribution is not attractive.

The beta distribution is stronger contender to the lognormal. The sample mean of the estimates of the expectation is robust to assuming each household's subjective probability distribution has a beta form rather than being lognormal (Table A3.1). The main difference between the sample distributions of estimates of the expectation obtained assuming lognormality and beta is that the latter produces fewer low-valued expectations. For example, the first quartile is 78 with lognormality and 568 with beta. The reason for choosing the lognormal over the beta distribution is because the latter does not allow for a tail and requires imposing a maximum on the distribution. Table A3.1 below further illustrates sensitivity to the distributional assumption.

Besides making a distributional assumption, we need to assume an upper bound on the last interval for which we elicited the likelihood of medical expenditures. The bottom panel of the Table A3.1 shows summaries of estimates of the first two moments of the subjective distributions under the assumption of lognormality with the upper bound of the last interval set at 20,000 pesos and 50,000 pesos. Comparing these with the estimates shown in the top panel using an upper bound of 12,000 pesos, which we use in the main analysis, reveals that the sample means are somewhat sensitive to the value imposed. Actually, the distribution of estimates of the first moment shifts little with the upper bound value up to the 75th percentile. But there are substantial differences at the top of the sample distribution, which affect the mean. These are generated by respondents who place many sticks in the cup indicating spending in excess of 8,000 pesos. The upper bound assumed for such spending obviously has a large impact on the expected value calculated. As would be expected, the distribution of estimates of the second moment is even more sensitive to the upper bound value. The median standard deviation obtained with a value of 50,000 pesos is 1.9 times that derived using 12,000 pesos.

In contrast, the median of the first moment essentially remains the same irrespective of the upper bound value imposed.

Table A3.1 Estimates of first two moments of subjective probability distribution of household medical expenditure – sensitivity to distributional assumption and upper bound imposed

	Mean	Std. Dev.	Percentiles			
			p25	p50	p75	p90
Upper bound 12000 pesos						
First moment (μ_s)						
Lognormal	3,341	3,291	78	3,217	5,670	8,171
Beta	3,379	3,140	603	2,979	5,514	8,189
Piecewise uniform	3,779	2,837	2,001	2,801	5,601	8,001
Second moment (σ_s)						
Lognormal	1,323	1,868	51	274	2,891	4,409
Beta	1,351	1,350	302	835	2,569	3,640
Piecewise uniform	1,885	1,089	1,154	1,291	2,921	3,517
Lognormal						
First moment (μ_s)						
Upper bound						
20.000 pesos	3,742	3,962	78	3,277	5,661	9,294
50.000 pesos	4,634	5,883	80	3,461	5,738	14,462
Second moment (σ_s)						
Upper bounds						
20.000 pesos	1,785	2,768	50	409	3,192	6,277
50.000 pesos	2,816	8,050	51	403	3,210	8,138
Sample size	1565					

Notes: Columns give summary statistics of the sample distribution of household-specific estimates of the first two moments of the subjective distribution of healthcare expenditures. The square root of the second moment $\left(\sigma^s = \left((1-p_0)\int_{-\max}^{0} x^2 f^s(x)\,dx - \left(\mu^s\right)^2\right)^{1/2}\right)$ is given. When fitting the Beta distribution we assume a uniform distribution for respondents that put all sticks in the last cup. All respondents used (insured and uninsured).

Appendix 4. Protocol for eliciting past medical expenditures

TOTAL HEALTH CARE EXPENDITURES PAST 12 MONTHS
[SHOWCARD]

How much did your household spend out-of-pocket on medical and dental care, medicines and maintenance drugs including transportation costs to health facilities in the past 12 months (1 year)?

Out-of-pocket expenditures include spending from salary/income, loans, savings and donations or charity assistance, but exclude spending that will be reimbursed from any health insurance cover, if you have any. They also exclude the government benefits SSS, GSIS and ECC.

NOTE TO INTERVIEWER: IF THE RESPONDENT IS HAVING DIFFICULTY ESTIMATING THE TOTAL EXPENDITURES, ASSIST HIM/HER IN ADDING UP THE EXPENSES THAT HE/SHE RECALLS.

NOTE TO THE INTERVIEWER: IN CASE NECESSARY, REPEAT THAT WE ARE ASKING FOR OUT-OF-POCKET EXPENDITURE OF HEALTHCARE, MEDICINES AND MAINTENANCE DRUGS THE ENTIRE HOUSEHOLD FACED IN THE PAST 12 MONTHS (1 YEAR)

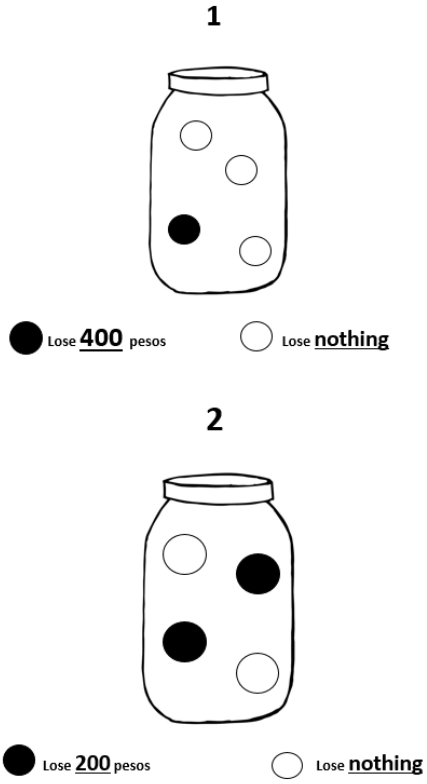
Nothing at all	1
Between 0 – 4,000 pesos	2
Between 4,001 – 8,000 pesos	3
More than 8,000 pesos	4

Appendix 5. Method for eliciting risk attitude parameters

This appendix is a summary of the description of the method of eliciting the risk attitude parameters given in Van Wilgenburg et al (2018).

We elicit the utility curvature parameter γ of the power function and the likelihood insensitivity parameter α of the Prelec (1998) probability weighting function for each respondent from choices made in two independent sets of hypothetical lotteries in the domain of losses. In each lottery, the respondent is asked to choose between two jars. Each jar contains 4 balls, with different colors indicating different sizes of losses (Figure A5.1). The respondent is told that one ball will be drawn randomly from whichever jar is selected. This representation avoids reference to probabilities.

Figure A5.1: Visual device used to represent lotteries



From the first set of lotteries, we elicit a loss x that the respondent is indifferent between incurring with certainty and facing a 50% chance of losing 400 pesos.

$$\text{Lottery 1:} \qquad x \sim -400_{0.5}0$$

In the second set, we elicit the loss z such that the respondent is indifferent between facing a 50% chance of incurring that loss and facing a 25% chance of losing 400.

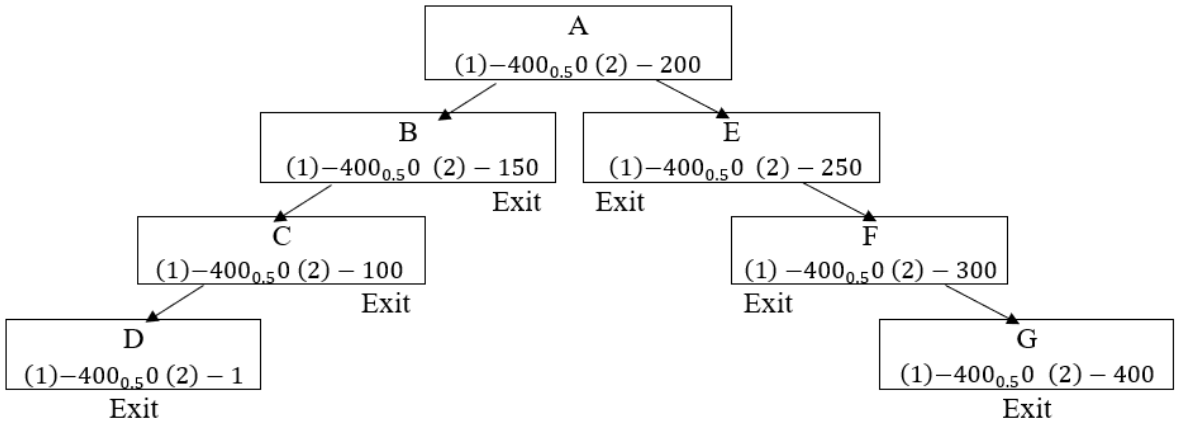
$$\text{Lottery 2:} \qquad z_{0.5}0 \sim -400_{0.25}0$$

Under expected utility, $x = z$. A difference between the two amounts identifies probability weighting.

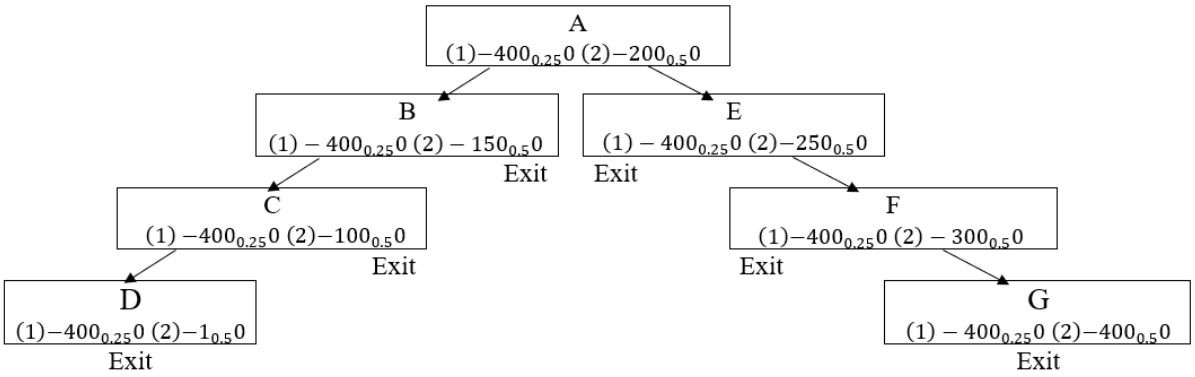
We start each elicitation process with a choice between two options with the same expected value.[1] Depending on the answer, we then either increase or decrease the expected value of the second option while keeping the first option constant until the respondent switches from one to the other. If there is no switching, the procedure ends after offering four choices. Figure A5.2 depicts the process.

Figure A5.2 Summary of lottery choices used to elicit risk attitudes

Lottery 1



Lottery 2



Van Wilgenburg et al (2018) summarize the lottery choices made and explain that 76 respondents who make a dominated choice in either lottery are dropped. These respondents are similar to the others with respect to insurance uptake and most other characteristics. We do not drop around 40 percent of respondents who exhibit what appears to be extreme risk seeking – reaching D and not switching. In pretesting, respondents who made this choice explained it by an attraction to gambling.

From the switching point, we locate an interval within which the point of indifference lies and use the midpoint as the estimate of x (or z).[2] Given each combination of the points of indifference x

[1] The expected value of this choice, 200 pesos, coincides with the monthly premium of the insurance on offer.

[2] For those who do not switch in Question D we infer a switching point of -0.5.

and z, we can determine the parameters γ and α, as shown in Table A5.1 (see also Van Wilgenburg et al (2018) Appendix 5).

Table A5.1 Utility curvature (γ) and probability weighting (α) for all combinations of answers

γ

Set 1 $x\sim -400_{0.5}0$ \ Set 2 $z_{0.5}0\sim -400_{0.25}0$	-0.5	-50	-125	-175	-225	-275	-350
-0.5	0.10	0.13	0.14	0.14	0.14	0.15	0.15
-50	0.22	0.33	0.38	0.40	0.42	0.44	0.47
-125	0.31	0.50	0.60	0.65	0.70	0.74	0.81
-175	0.38	0.62	0.76	0.84	0.91	0.99	1.12
-225	0.45	0.77	0.97	1.09	1.20	1.33	1.56
-275	0.57	0.99	1.26	1.44	1.63	1.85	2.27
-350	0.94	1.70	2.25	2.64	3.10	3.69	5.19

α

Set 1 $x\sim -400_{0.5}0$ \ Set 2 $z_{0.5}0\sim -400_{0.25}0$	-0.5	-50	-125	-175	-225	-275	-350
-0.5	1.00	0.39	0.23	0.17	0.12	0.08	0.03
-50	2.08	1.00	0.64	0.48	0.35	0.24	0.09
-125	2.75	1.48	1.00	0.77	0.58	0.40	0.16
-175	3.18	1.81	1.27	1.00	0.76	0.54	0.22
-225	3.66	2.21	1.60	1.28	1.00	0.72	0.30
-275	4.24	2.71	2.04	1.68	1.34	1.00	0.44
-350	5.67	4.05	3.28	2.85	2.41	1.93	1.00

Appendix 6. Protocol for eliciting willingness to pay for full health insurance coverage

WILLINGNESS TO PAY FOR FULL HEALTH INSURANCE COVERAGE

NOTE TO INTERVIEWER: WE HAVE TWO QUESTIONS FOR AMOUNT WILLING TO PAY. QUESTION A WILL BE ASKED TO HALF OF THE RESPONDENTS. QUESTION B WILL BE ASKED TO THE OTHER HALF OF THE RESPONDENTS (RANDOMLY SELECTED)

FOLLOW TICKMARK

[ ]	**ASK QUESTION A**
[ ]	**ASK QUESTION B**

A. AMOUNT WILLING TO PAY

Think of the amount you are willing to pay per month for a membership in a health insurance programme which covers all costs your entire household will incur for medical and dental care, medicines and maintenance drugs including transportation costs to health facilities.

For a full membership in this health insurance programme, would you be willing to pay (MENTION AMOUNT)?

NOTE TO THE INTERVIEWER: PLEASE START BY ASKING FOR THE AMOUNT OF 500 PESOS (Q504A). THEN DEPENDING ON THEIR ANSWER ASK IN INCREMENTS AS PROVIDED BY THE INSTRUCTIONS IN THE TABLE

	AMOUNT IN PESOS	**WILLINGNESS**		**FINAL ANSWER WILLINGNESS TO PAY =**
		YES	**NO**	
A	500	1	2	
		SKIP TO F	CONTINUE TO B	
B	400	1	2	
		STOP. RECORD FINAL ANSWER AS PHP400. SKIP TO Q506.	CONTINUE TO C	
C	300	1	2	
		STOP. RECORD FINAL ANSWER AS PHP300. SKIP TO Q506.	CONTINUE TO D	
D	200	1	2	
		STOP. RECORD FINAL ANSWER AS PHP200. SKIP TO Q506.	CONTINUE TO E	
E	100	1	2	
		STOP. RECORD FINAL ANSWER AS PHP100. SKIP TO Q506.	STOP. RECORD FINAL ANSWER AS PHP0. PROCEED TO Q505	
F	600	1	2	
		CONTINUE TO G	STOP. RECORD FINAL ANSWER AS PHP500. SKIP TO Q506.	
G	700	1	2	
		CONTINUE TO H	STOP. RECORD FINAL ANSWER AS PHP600. SKIP TO Q506.	
H	800	1	2	
		CONTINUE TO I	STOP. RECORD FINAL ANSWER AS PHP700. SKIP TO Q506	

I	900	1	2	
		CONTINUE TO J	STOP. RECORD FINAL ANSWER AS PHP800. SKIPTO Q506.	
J	**HIGHER THAN 900?**	1	2	
		ASK MAXIMUM AMOUNT AND RECORD AS FINAL ANSWER.	STOP. RECORD FINAL ANSWER AS PHP900 SKIP TO Q506	

NOTE TO INTERVIEWER: QUESTION B (WITH SHOWCARD) WILL BE ASKED TO SELECTED HOUSEHOLDS (HALF OF THE RESPONDENTS).

B. AMOUNT WILLING TO PAY
SHOWCARD
How much are you willing to pay per month for a membership in a health insurance programme which covers all costs your entire household will incur for medical and dental care, medicines, and maintenance drugs including transportation costs to health facilities?

PhP 0	1	**ASK Q505**
PhP 1-100	2	**SKIP TO Q506**
PhP 101-200	3	
PhP 201-300	4	
PhP 301-400	5	
PhP 401-500	6	
PhP 501-600	7	
PhP 601-700	8	
PhP 701-800	9	
PhP 801-900	10	
If more than PhP 900, specify: _____	11	

Appendix 7. Additional figures and tables

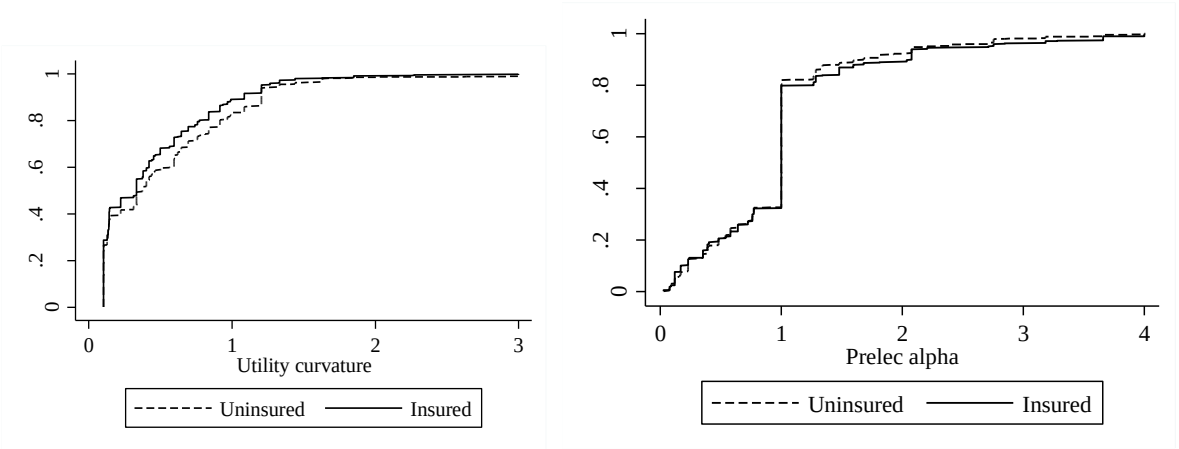


Figure A7.1: Distributions of elicited risk attitude parameters by insurance status

Notes: Left-hand chart shows the CDF of the elicited γ parameter of the utility power function. Right-hand chart shows the α parameter from Prelec's probability weighting function. Sample size is 969 for the insured and 545 for the uninsured.

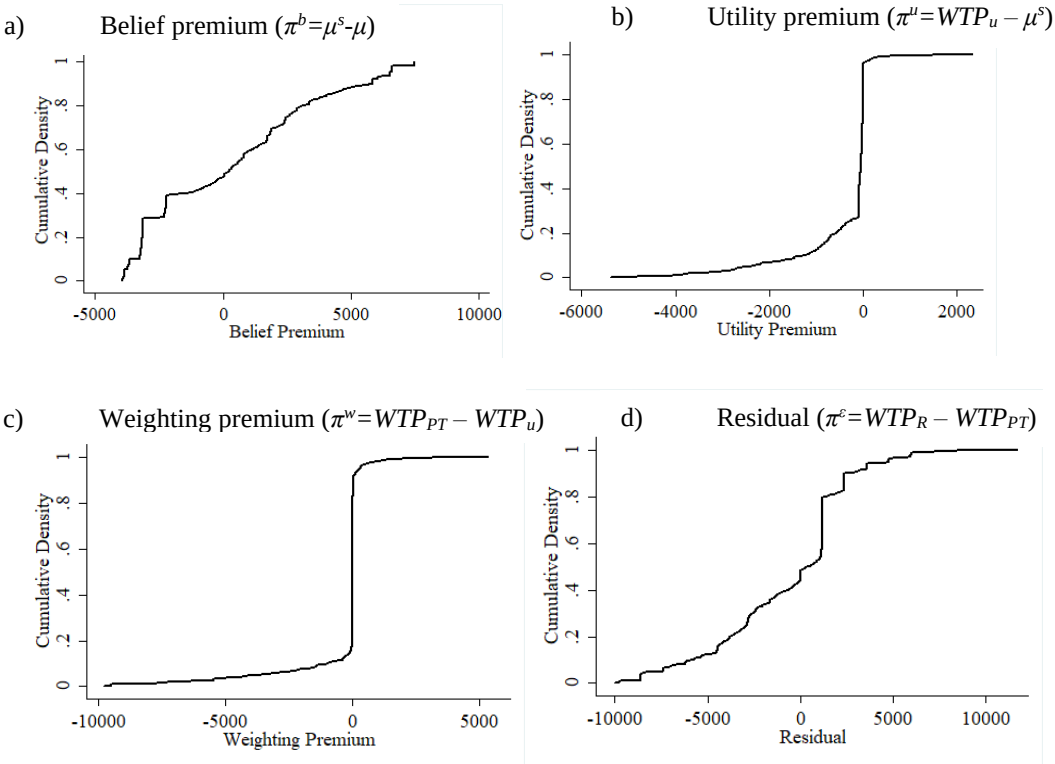


Figure A7.2: Distributions of components of decomposition of WTP less fair price– insured households

Notes: CDFs of the four terms on the right hand side of Eq. 5. Insured households. Sample size is 969.

Table A7.1: Summary of distributions of elicited risk attitude parameters by insurance status

	Uninsured	Insured: All	Insured: Voluntary	Insured: Mandatory	Insured: Sponsored + Indigent
Utility curvature (γ)					
Mean	0.544	0.455	0.499	0.496	0.438
Std. Dev.	0.562	0.449	0.520	0.458	0.444
10th percentile	0.104	0.104	0.104	0.104	0.104
25th percentile	0.104	0.104	0.104	0.13	0.104
Median	0.377	0.333	0.333	0.355	0.225
75th percentile	0.838	0.647	0.742	0.76	0.596
90th percentile	1.205	1.085	1.205	1.205	1.085
Probability weighting (α)					
Mean	0.993	1.045	1.134	1.077	1.01
Std. Dev.	0.663	0.776	0.782	0.811	0.769
10th percentile	0.231	0.168	0.352	0.231	0.168
25th percentile	0.641	0.641	0.762	0.762	0.539
Median	1	1	1	1	1
75th percentile	1	1	1.267	1	1
90th percentile	1.681	2.075	2.075	2.075	2.075
< 1 (%)	32.48	32.20	28.89	31.58	34.15
= 1 (%)	49.54	47.57	45.93	47.70	46.68
> 1 (%)	17.98	20.23	25.19	20.72	19.16
N	545	969	135	304	407

Table A7.2: Decomposition of willingness to pay for supplementary insurance – insured households

	Derived WTP_{PT}	Stated WTP_R	Fair price (μ)	Premium			
				belief (π^b)	utility (π^u)	weighting (π^w)	residual (π^ε)
Mean	2735	2066	3202	309	-382	-395	-669
Std. Dev.	3226	1730	576	3324	869	1600	3554
10th percentile	0	1200	2304	-3675	-1275	-991	-5835
25th percentile	1	1200	3201	-3123	-318	0	-2888
Median	714	1200	3201	219	-40	0	416
75th percentile	5063	2400	3753	2535	-4	0	1200
90th percentile	8006	4800	3944	5867	0	33	2596
N	969	969	969	969	969	969	969

Notes: Table excludes respondents who reported being uninsured or not knowing if they are insured. *Derived* WTP_{PT} is obtained from Eq. 4 using the subjective distribution of medical expenses and elicited risk attitudes. *Fair price* is the insurance group (mandatory, sponsored, indigent, voluntary and other) specific mean of past expenditures. Its mean is the weighted (by group size) average of the means across the groups. Statistics other than the mean are currently missing for this column. Columns under heading 'Premium' give the components of the decomposition (Eq. 5). The belief premium is the difference between a respondent's subjective expectation and the mean past expenditure across all households in the same insurance group.

Table A7.3: Robustness of risk attitude premiums to order of decomposition - insured

	Utility then weighting		Weighting utility curvature	
	utility (π^u)	weighting (π^w)	utility (π^u)	weighting (π^w)
Mean	-382	-395	-719	-59
Std. Dev.	869	1600	1576	1053
10th percentile	-1275	-991	-2733	-487
25th percentile	-318	0	-555	-42
Median	-40	0	-36	0
75th percentile	-4	0	-3	0
90th percentile	0	33	0	35
N	969	969	969	969

Notes: In columns headed 'Utility then weighting', utility premium is calculated first by applying power utility with linear probability weighting. Then the weighting premium is calculated by introducing the probability weighting function to weight power utility. In the columns headed 'Weighting then utility' the weighting premium is calculated first by applying the probability weighting function to linear utility. Then the utility premium is calculated by changing linear to power utility. The main estimates presented in the paper follow the 'utility then weighting' approach.