Comparing a revealed insurance-choices-based classification with the Holt & Laury risk attitude measures

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The Multiple Price List (MPL) procedure of Holt and Laury (2002) is one of the most widely used methods to measure risk attitudes. It enables to size, in the Lab, the intensity of risk aversion of subjects, both in the gain and loss domains (Chakravarty and Roy (2009)). In particular, owing to the reflection effect of Kahneman and Tversky (1979), such a measure, when implemented in the loss domain, makes it possible to segment the population into two groups: risk lovers[1] and risk averters. As shown in Corcos et al. (2017), this segmentation of risk attitudes contributes to the understanding of the insurance demand behavior. However, several papers, as in Hershey and Schoemaker (1980), documented the fact that individuals were more risk averse when the same decisions were framed as insurance choices rather than decontextualized risky choices.

To go further, our paper aims at comparing two methods of classification of risk attitudes. The first results from the standard procedure of Holt and Laury (2002) implemented in the loss domain, while the second is based on the contextualized hedging choices observed in the lab for insurance and self-insurance.

[1] In the loss domain, risk lovers account for 30 to 40% of the subjects.

1. Experiment:

Our experiment involved a two-randomized-steps procedure.

- **In step H&L**, we measured the subjects' risk aversion coefficient in the loss domain. We used the following decisions to elicit risk attitudes (risk aversion or risk loving):

Table 1: Measurement of risk aversion

Decision	Option A				Option B			
	% likelihood	Loss (in $)	% likelihood	Loss (in $)	% likelihood	Loss (in $)	% likelihood	Loss (in $)
1	10	-4	90	-6	10	0	90	-10
2	20	-4	80	-6	20	0	80	-10
3	30	-4	70	-6	30	0	70	-10
4	40	-4	60	-6	40	0	60	-10
5	50	-4	50	-6	50	0	50	-10
6	60	-4	40	-6	60	0	40	-10
7	70	-4	30	-6	70	0	30	-10
8	80	-4	20	-6	80	0	20	-10
9	90	-4	10	-6	90	0	10	-10
10	100	-4	0	-6	100	0	0	-10

- **The step I/SI** consisted of three treatments. In each repetition, the subjects were first endowed with a wealth of 1000 EMU (experimental monetary units) facing a 10% chance of losing all of it. Subjects were simultaneously given the opportunities to buy an insurance coverage and to invest in a self-insurance activity. They could use both schemes, only one of them, or none of them.

  On insurance hedging side, in exchange for an insurance premium P, the subject was guaranteed to receive an indemnity I in the loss state. The premium was an increasing function of the indemnity chosen level, in compliance with the following equation: $P = pI + C$, where P stands for the insurance premium, p for the unit price of insurance, and I for the indemnity (namely the demand for insurance I).

  Table 2 provides an example of the offered premiums and their indemnities for an actuarial unit price and with a fixed cost of 50 EMU. While the fixed cost was always equal to 50, three unit insurance prices were successively proposed: p=0.05, p=0.1 and p=0.15.

Table 2: Insurance premium grid

Premium = Total cost of insurance	**Indemnity: Demand for Insurance**	**Additional indemnity**
P = 0.1 C = 50	Reimbursement in the event of damage	from an additional UME of premium
0	0	-
55	50	10
60	100	10
65	150	10
70	200	10
75	250	10
80	300	10
85	350	10
90	400	10
95	450	10
100	500	10
105	550	10
110	600	10
115	650	10
120	700	10
125	750	10
130	800	10
135	850	10
140	900	10
145	950	10
150	1000	10

Simultaneously, as shown in Table 3, the subject had also the opportunity to self-insure: in return for an investment A in SI, she would secure a part of her wealth in the event of damage. The 1st column of Table gives the possible values for A; Column (2) gives the corresponding SI. For example, if she decided to secure an amount SI = 630 UME, the subject would have to invest the relevant amount in SI, i.e. A = 60 EMU. Then, when facing a damage, she would lose 370 UME instead of 1000 UME. The column (3) provides the marginal return of additional investment in SI.

Table 3: Self-insurance investment

Investment in the SI activity A	Secured amount of wealth *SI*	Additional secured amount of wealth per additional UME of SI
(1)	(2)	(3)
0	0	_
5	90	18
10	170	16
15	240	14
20	305	13
25	365	12
30	415	10
35	460	9
40	500	8
45	535	7
50	570	7
55	600	6
60	630	6
65	655	5
70	680	5
75	700	4
80	715	3
85	725	2
90	730	1
95	730	0
100	730	0

Table 2 and 3 were simultaneously displayed on the subject's computer screen. A device allowed the subjects to test as many combinations of P and A as desired, to better adjust their desired final wealth where W_1 stands for the no loss state and W_2 for the loss state:

$$\begin{cases} W_1 = 1000 - P - A \\ W_2 = 1000 - P - A - 1000 + I + SI \end{cases}$$

Once made, the subjects confirm their choices by clicking the button provided for this purpose.

At the end of the period and after the subjects had made their decisions, a random draw determined whether a damage occurred during the period. The computer calculated their final wealth displayed on their screens.

Subjects repeated their decisions three times, corresponding to three different levels of the unit insurance price (lower than actuarial (p = 0.05), actuarial (p = 0.1) and higher than actuarial (p = 0.15)). Subjects were not informed that their decisions would be repeated. The fixed cost was equal to 50 to rule out loss-making insurance contracts.

2. Method of classification of risk attitudes :

We used the elicitation phase of I and SI demands to qualify risk loving and risk averse behaviors. The basic intuition has been to categorize our subjects, as risk-averters (RA) or risk-lovers (RL), according to their decisions to buy or not a positive hedging for I and/or SI. At a second level of characterization, the degree of coverage should reflect the intensity of the identified risk attitude (and it would also contribute to diagnose a possible behavioral incoherence).

Thus, subjects were classified according to this hedging criterion and were also classified according to the measure of Holt and Laury. A preliminary statistical analysis shows the robustness of the Holt and Laury's measure: most risk lovers (resp. risk averters) in the sense of Holt and Laury are also risk lovers (resp. risk averters) according to their revealed insurance choices.

References

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