Experimental Economics I: Behavioral Game Theory Homework (18S)

For Risk and Time Preferences

Consider the relationship between Professor Joseph and Student Yu. Professor Joseph has expected utility function satisfying $u'(x) = x^{-R}$ where $R > 0$, while Student Yu has expected utility function satisfying $v'(x) = x^{-r}$ with $r < R$. Consider the ten lottery choices of Holt and Laury (2002) listed below:

You will roll a ten-sided die and get paid according to your decision (choice A or B):

Decision	Lottery A	Lottery B	Your choice (A or B)
Question 1	1：Gain NT$200 2～10：Gain NT$160	1：Gain NT$385 2～10：Gain NT$10	
Question 2	1～2 ：Gain NT$200 3～10：Gain NT$160	1～2 ：Gain NT$385 3～10：Gain NT$10	
Question 3	1～3 ：Gain NT$200 4～10：Gain NT$160	1～3 ：Gain NT$385 4～10：Gain NT$10	
Question 4	1～4 ：Gain NT$200 5～10：Gain NT$160	1～4 ：Gain NT$385 5～10：Gain NT$10	
Question 5	1～5 ：Gain NT$200 6～10：Gain NT$160	1～5 ：Gain NT$385 6～10：Gain NT$10	
Question 6	1～6 ：Gain NT$200 7～10：Gain NT$160	1～6 ：Gain NT$385 7～10：Gain NT$10	
Question 7	1～7 ：Gain NT$200 8～10：Gain NT$160	1～7 ：Gain NT$385 8～10：Gain NT$10	
Question 8	1～8 ：Gain NT$200 9～10：Gain NT$160	1～8 ：Gain NT$385 9～10：Gain NT$10	
Question 9	1～9 ：Gain NT$200 10：Gain NT$160	1～9 ：Gain NT$385 10：Gain NT$ 10	
Question 10	1～10：Gain NT$200	1～10：Gain NT$385	

1. Show that both Professor Joseph and Student Yu exhibit constant relative risk aversion. Hence or otherwise, solve for their Von Neumann-Morgenstern utility functions $u(.)$, $v(.)$, and corresponding degree of relative risk aversion $R(x)$.

2. Show that a risk neutral person would choose lottery A for Questions 1~4 and lottery B otherwise.

3. Would Professor Joseph choose more or less lottery A's than a risk neutral person? Why or why not? What about Student Yu (compared to a risk neutral person and/or to Professor Joseph)?

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4. Show that if Professor Joseph chooses lottery B in Question k, he would also choose lottery B in Question $(k+1)$.

5. Show that if a person follows expected utility theory and chooses lottery B in Question k, he would also choose lottery B in Question $(k+1)$.

6. What is the critical assumption required for the above statement to be true? Is expected utility theory really required? Why or why not?