

Experimental Economics I: Behavioral Game Theory Homework (15F)

For Risk and Time Preferences (9/21)

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 $u(\cdot)$, $v(\cdot)$, 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?