# Experimental Economics II: Political Economy T&E Homework (19S)

## 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<br>2～10：Gain NT$160 | 1：Gain NT$385<br>2～10：Gain NT$10 | |
| Question 2 | 1～2 ：Gain NT$200<br>3～10：Gain NT$160 | 1～2 ：Gain NT$385<br>3～10：Gain NT$10 | |
| Question 3 | 1～3 ：Gain NT$200<br>4～10：Gain NT$160 | 1～3 ：Gain NT$385<br>4～10：Gain NT$10 | |
| Question 4 | 1～4 ：Gain NT$200<br>5～10：Gain NT$160 | 1～4 ：Gain NT$385<br>5～10：Gain NT$10 | |
| Question 5 | 1～5 ：Gain NT$200<br>6～10：Gain NT$160 | 1～5 ：Gain NT$385<br>6～10：Gain NT$10 | |
| Question 6 | 1～6 ：Gain NT$200<br>7～10：Gain NT$160 | 1～6 ：Gain NT$385<br>7～10：Gain NT$10 | |
| Question 7 | 1～7 ：Gain NT$200<br>8～10：Gain NT$160 | 1～7 ：Gain NT$385<br>8～10：Gain NT$10 | |
| Question 8 | 1～8 ：Gain NT$200<br>9～10：Gain NT$160 | 1～8 ：Gain NT$385<br>9～10：Gain NT$10 | |
| Question 9 | 1～9 ：Gain NT$200<br>10：Gain NT$160 | 1～9 ：Gain NT$385<br>10：Gain NT$ 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)?

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?