Problems on Decision Theory

1. Risk Aversion in the Lab

From experimental data of Peter Boessarts and Charles Plott, individuals in the laboratory are indifferent between getting nothing for sure, and a gamble which pays:
\$9.75, –\$3.00, –\$2.25 each with probability 1/3.
Assume the standard approximation for the absolute risk premium p using a fixed coefficient of relative risk aversion ρ

$$p = -\frac{\rho}{x}\frac{\sigma^2}{2}.$$

- If wealth is \$350,000, what is the coefficient of relative risk aversion?
- If the coefficient of relative risk aversion is 20, what is wealth?

2. Present Bias and Quasi-hyperbolic Discounting

Suppose that you are indifferent between receiving 175 euros today and 225 euros in four weeks time. You are also indifferent between receiving 175 euros in twenty six weeks time and 180 euros in thirty weeks time. Assume that you are a quasi-hyperbolic discounter so that your objective function has the form $u_0 + \theta \sum_{t=0}^{\infty} \delta^t u_t$. You are also risk neutral. What are θ, δ.

3. Maurice at the Casino

Suppose that you go to the casino and at the entrance a French gentleman introduces himself as Maurice Allais and offers you a choice of either 2400 euros for sure or a gamble with a 33% chance of winning 2500 euros and a 66% chance of winning 2400 euros. You choose the 2400 euros for sure. The next night, the same gentleman again greets you and offers you a choice between 33% chance of winning 2500 euros and a 34% chance of winning 2400 euros. You choose the 2500 euro gamble. Prove that you are not an expected utility maximizer.

4. Gambling Professors

An economics professor from Big U is watching about to watch a basketball game between Big U and State U. His friend proposes a bet on the outcome – whoever loses

has to purchase beer at the pub after the game. The economics professor is reluctant because he always loses whenever he bets with this friend on basketball games. The friend in a spirit of fairness offers the professor the chance to choose either team, but insists he must bet. What should the professor do and why?

5. Where to Drink?

In Berlin there are many nightclubs of varying quality $q \in (0, \infty)$. If you spend amount m at a nightclub of quality q you receive utility

$$u(m|q) = \log \mathrm{q} - \frac{(m/q)^{1-\rho}-1}{\rho-1}$$

where $\rho \geq 1$.

a. If you gamble at the nightclub what is your coefficient of relative risk aversion? [here you gamble after choosing a nightclub]

b. If you have a budget of w to spend at the nightclub which quality should you choose? We may imagine that if you go to a nightclub that sells expensive wine you will not get much satisfaction if you have a very limited budget, while if you go to a nightclub that sells cheap beer and have a very large budget you will find that much of your entertainment budget is wasted. Does this utility function capture that idea?

c. If you choose between risky investments for your budget what is your coefficient of relative risk aversion for your investments? [here you gamble before choosing a nightclub]

6. Investment

An investor may either be wealthy or bankrupt. If he is bankrupt he receives zero and has no choices. If he is wealthy he may choose to invest in stocks or bonds. If he invests in bonds, he remains wealth, but receives a utility of only one. If he invests in stocks, he has a p chance of going bankrupt each period but receives a utility of two. For what values of p, δ should the investor buy stocks?