Problem Set 1

due October 17

1. **Affluence traps, poverty traps, and data**

   Suppose aggregate economies can obtain one of three states, poverty, middle, income and affluence. Suppose the Markov chain transition matrix for these three states is

$$\begin{bmatrix} 1 & 0 & 0 \\ .3 & .4 & .3 \\ 0 & 0 & 1 \end{bmatrix}$$

   i.   If I have data on one economy that is stuck in a poverty trap, what can I learn about the possibility is might have become permanently affluent?

   ii.   Suppose I have information on different economies, what might be learned, assuming the economies obey the same economic model?

   2. **Principle of insufficient reason, ambiguity aversion**

Suppose that there is a coin with an unknown probability of a heads.

   i.   What would the principle of insufficient reason assign as the prior on the coin?

   ii.   Suppose the coin produces a random variable such that a heads wins $110 and a tails loses $100. Would a risk neutral gambler be willing to make this bet

if the density characterizing the probability of heads is not known? (For this question risk neutral means expected profit maximizer which is equivalent to the expected loss minimizer.)

iii. Suppose that the risk neutral gambler were informed that the true probability of the coin is .5. Would this gambler assess the bet differently than if they employed principle of insufficient reason?

iv. Suppose that the coin probability is known to be drawn from a uniform $[0,1]$ density. How would a gambler with Hurwicz preferences assess the bet differently from a risk neutral gambler if the bet is to be taken prior to the draw of the coin probability?

v. Suppose that the probability density of heads will, with probability ½ be drawn from the uniform density on $[0,.5]$ and probability ½ on $(.5,1]$. Would an expected profit maximizer behave any differently than if they were told the coin is uniform on $[0,1]$?