

## Introduction to Econometrics

Fall 2004

### Assignment 2

*Today's Date: 9/20/2004*

*Due Date: 9/27/2004*

*Please show all of your work and clearly indicate your final response to each question.*

1. A random variable  $Y$  takes the value 1 with probability  $\pi$  and 0 with the probability  $1 - \pi$ , where  $0 < \pi < 1$ . (You might think of this as representing the event that someone in the population is unemployed at a particular moment in time.) You have access to a random sample of size  $N$  from the population.
  1. Write down the log likelihood function for the sample, and derive the maximum likelihood estimator of  $\pi$ .
  2. Find the population mean of the random variable  $Y$ ,  $\mu_Y$ . Now write down the sample mean for a sample of size  $N$ . Is the sample mean an unbiased estimator of  $\pi$ ? Is it a consistent estimator (Hint: Use the Law of Large Numbers to argue that the sample mean is a consistent estimator of the population mean and then use the relationship between the population mean and the parameter  $\pi$  to complete the argument)?
2. Question 5 from Assignment 1
3. W 2.2
4. W 2.3
5. W 2.7
6. W 2.8