H-W:1

6th February 2003

In this exercise we will use a Monte Carlo study (simulations) to confirm empirically two finite sample results: the unbiasedness and the efficiency of the OLS estimator.

1. Generate data from a model where β=$\{10,0.8\}$ and $\sigma^2 = 1$. Sample size $n = 50$. Generate y from X non-stochastic. You can do that generating x_{i2} from a certain distribution and then keeping it fixed for all the repetitions $m = 100$, 500, 1000.

2. Do a histogram to obtain the empirical distribution of $\widehat{\beta}$. You should observe (if *m is big enough)* that the mean of this distribution is arbitrarily close to the true values β.

3. Consider now another lineal and unbiassed estimator, for example divide the sample in 5 subsets: first 10 observations, 2nd 10 observ. etc. Calculate the OLS estimator for each subsample and then average the estimates. Obtain now the empirical distribution of this alternative estimator, let's say $\widetilde{\beta}$. At every replication you should calculate the two estimators. Comment the results.