Homework #3

Due 8am EST Wednesday Oct 7, 2015

Econ B2000, MA Econometrics

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Each student should submit a separate assignment, even if it is an identical computer file to the rest of your study group. When submitting assignments, please include your name and the assignment number as part of the filename. Please write the names of your study group members at the beginning of your homework.

1. What are the names of the people in your study group?
2. The section of lecture notes, "Is That Big?" asked you to play with a little R program (reproduced below). Can you show some "law of large numbers" (LLN) results with it? Can you break the LLN? Explain.
3. Use the CEX data provided to find out something interesting about spending patterns (we started discussing it in class).
4. Try the machine learning K-nearest-neighbor algorithm on the CEX data to get another view of the "interesting pattern" from above. (As usual, step one is to replicate my code, then gradually morph it into your own.)
5. Next a linear regression, to continue looking at the interesting pattern. Explain.

```
# create the population of people
set.seed(1)
prob_of_yes <- 0.45
population_values <- runif(1000)
pop_yes <- (population_values < prob_of_yes)

# check that value should be near 0.45 although not exactly
mean(pop_yes)

# now do this the long way, for a sample of size 30 from the population
sampl_size <- 30
s1 <- sample(pop_yes,sampl_size)
mean(s1)
# you could go through and create s2, s3, etc or get lazy and do this...

# number of times to do this
NN <- 100

samples_from_pop <- matrix(data = NA, nrow = 1, ncol = NN)
for (i in 1:NN){
  samples_from_pop[i] <- mean(sample(pop_yes,30))
}
hist(samples_from_pop)
```

you can go through and play with sample size, population size, and how many different samples to take (NN)