

Economics 312

Daily Problem #14

Spring 2020
February 20

In your earlier project, you used Monte Carlo simulations to examine the properties of the OLS estimator when the error term u was constructed to be independent of the regressor. This simulation uses the same data set of 157 observations.

The properties of x are:

```
. summarize x
```

Variable	Obs	Mean	Std. Dev.	Min	Max
x	157	1.031624	.1699803	.573	1.384

In place of the `olstest.do` file that we used in the first part of that project, suppose that we use `xucorr.do` below:

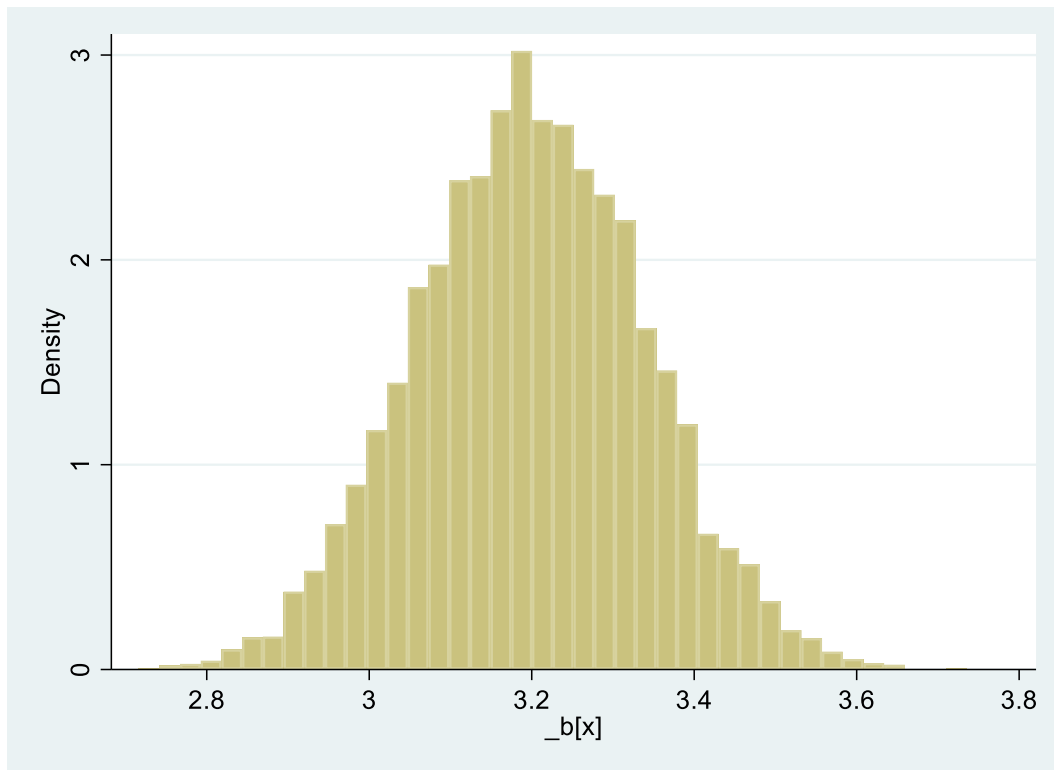
```
program xucorr
    g u = rnormal(0,0.3)+0.2*(x-1.031624)
    g y = 10+3*x+u
    reg y x
    drop u
    drop y
end
```

1. What is the nature of the error term u that is created and how does it differ from the “classical” error term of the MLR assumptions that we used in `olstest.do`?
2. What results would you expect from regressing y on x ? Why?

Below are the summary statistics and histogram for 10,000 replications of $\hat{\beta}_1$ from this model.

```
. summarize b
```

Variable	Obs	Mean	Std. Dev.	Min	Max
b	10,000	3.198666	.1406039	2.716112	3.735804



3. Characterize these results. Are they what you expect? Is $\hat{\beta}$ unbiased? If not, would you expect it to be consistent, so that the bias goes away as n gets large? Explain.