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Econometrics 1

Homework 1

With this exercise, you will generate a sampling distribution for **b**.

1. Set sample size equal to T. Then, generate **y.**

(1) Generate **X** (to be treated as numbers). Say **X** ~ N(1,3)
(2) Generate **ε** ~ N(0,1)
(3) Generate **y** = .8 **X** + **ε**
(4) Generate b = $(\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{y}$

2. Second repeat steps (2)-(3) B times. Let B be 100; 1,000; and 10,000.
For each value of B, use T = 50; 100; and 1,000.

3.
(a) Draw a histogram of **b** for each pair (B,T)
(b) Compute the mean of **b**, Var(**b**|X) and excess kurtosis of **b**.
(c) What do you see when R increases? What do you see when T increases?

4. You need to turn in:
(i) The histograms of **b** for each pair (B,T)
(ii) The computed the mean of b, Var(b|X) and kurtosis.
(iii) Brief conclusions
(iv) The computer code.

You can use R, Phyton, Matlab, SAS/IML and/or Gauss to program the sampling distribution of **b**. R is recommended; it is popular in the finance industry, since it has thousands of econometric and statistical packages.