Professor Joyce Jacobsen

Economics 385
Spring Semester 2014-15

Assignment #3

Due Friday 2/13/15 by 6 p.m.

Always explain and show the calculations used to arrive at your answers.

1) i) Two variables y and x are believed to be related by the stochastic equation $y = \beta_0 + \beta_1 x + u$, where u is the usual random disturbance with zero mean and constant variance σ^2. To check this relationship, one researcher takes a sample size of 8 and estimates β with OLS. A second researcher takes a different sample, also of size 8, and also estimates β with OLS. The data they used and the results they obtained are as follows:

Researcher 1		Researcher 2	
y	x	y	x
4.0	3	2.0	1
4.5	3	2.5	1
4.5	3	2.5	1
3.5	3	1.5	1
4.5	4	11.5	10
4.5	4	10.5	10
5.5	4	10.5	10
5.0	4	11.0	10

$\hat{y} = 1.875 + 0.750x$ (1.20) (0.339)

$\hat{y} = 1.5 + 0.970x$ (0.27) (0.038)

$r^2 = 0.45$

$r^2 = 0.99$

$\hat{\sigma} = 0.48$

$\hat{\sigma} = 0.48$

Can you explain why the standard error of $\hat{\beta}$ for the first researcher is larger than the standard error of $\hat{\beta}$ for the second researcher?

ii) Since the variance of the regression coefficient $\hat{\beta}$ varies inversely with the variance of x, some commentators have suggested that we should drop all the observations in the middle range of x and use only the extreme observations on x in the calculation of $\hat{\beta}$. Is this a desirable procedure?

iii) Suppose you are attempting to build a model that explains aggregate savings behavior as a function of the level of interest rates. Would you rather sample during a period of fluctuating interest rates or a period of stable interest rates? Explain.

Wooldridge pp. 106-108: #3, 9

Wooldridge p. 111: #C3, C6

Kennedy p. 438: #S-1, S-3

Kennedy p. 440: #T-11