POLS 6481, Spring 2021

Professor Scott Basinger

Reading Assignment Week 4

Distributed Friday, February 5

Due Thursday, February 11

Required reading: Wooldridge 2.5 + 3.3 + 3.4 + Appx. 3A.5 + 4.1 + 4.2 + 4.3 + 5.2

Fox, *Regression Diagnostics*, p. 10–21, 40–48

1. Compare the simple linear regression assumptions (SLR.1 – SLR.5) in Wooldridge’s **§**2.5 to the multiple linear regression assumptions (MLR.1 – MLR.5) in Wooldridge’s **§**3.3. Which one changes the most – and how?

2. According to Wooldridge, what are the possible risks of underspecifying a model? What are the possible risks of overspecifying a model?

3. Suppose you have two variables, *x*1 and *x*2, that are positively correlated and that each has a positive correlation to *y* – yielding a positive coefficient in a simple regression. Suppose further that *x*1 has a stronger association with *y* than *x*2 has. (These are the same assumptions we used in problem 4 last week.) Even after including *x*2 in a regression, the coefficient on *x*1 should retain its positive sign, but why might it become statistically insignificant?

4. When and why do we use the *t* distribution to find critical values instead of the Normal distribution?

5. What are the two components of the variance or standard error of a simple regression coefficient?

What are the three components of the variance or standard error of a multiple regression coefficient?

6. Write the equation for a *t* test of the hypothesis that a regression coefficient equals zero against a two-sided alternative, and then label each item in the equation. Next, expand the denominator, and explain how a *t* statistic changes as each of the components of the standard error increase or decrease.

7. What information does a VIF and/or the square root of a VIF provide? Why does Fox prefer to examine the square roots of the VIFs instead of the VIFs?