Econ 444 Exercise for Wednesday October 22
De Jong, Fall 2003

For October 22, read Chapter 4 of Studenmund up to the point where you get lost, and read Chapter 2, p. 49 onwards. Also, answer the following questions that will be discussed in class.

The question below concerns the model assumptions, as listed in Chapter 4 of Studenmund.

1. Assume that we have variables “apgar” and ”weightgain”, containing the apgar scores of newborns and the mother’s weightgain during pregnancy. “apgar” is our dependent variable - i.e. our $y$. If we assume that too much weightgain is not good for a baby’s health, but too little weightgain is no good either, then which model assumption is likely to fail ?

2. In the above example, assume that there is much more variation in apgar scores for women who have high weightgain during pregnancy. Which model assumption is likely to fail ?

3. Suppose that we have 60 observations: apgar scores for 60 newborns, but our data set consists of 30 mothers who all had two children in a period of two years. That is, all children in the dataset have a brother or a sister who is also in the dataset. For such a dataset, which model assumption may be problematic ? (Assume that the problems of Questions 1 and 2 are no longer an issue).

4. Consider a data set consisting of yearly observations on $y$: national consumption, and $x$: national income. Explain which model assumptions may be violated, and why.

5. Consider the following phrases:

   (a) “we estimate the model $Y_i = \hat{\beta}_0 + \hat{\beta}_1 X_i + \varepsilon_i$.”

   (b) “our estimates were $\beta_0 = 1.02$ and $\beta_1 = -6.98$.”

   (c) “we need a statistical test to see whether $\hat{\beta}_1 = 0$.”

Explain why you instructor would not be happy to see any of these phrases on term papers.