Econometrics: Homework 5

1) Suppose the true relationship is $Y = \beta_2 Z$. However, we cannot measure Z. We can only measure $X = Z + w$. w is a measurement error and $E[w] = 0$. We want to estimate β_2 with $b_2 = \frac{Y_1}{X_1}$. (Y_1, X_1) is a sample of X and Y. Is b_2 biased?

2) Suppose the true relationship is $Q = \beta_2 X$. However, we cannot measure Q. We can only measure $Y = Q + w$. w is a measurement error and $E[w] = 0$. We want to estimate β_2 with $b_2 = \frac{Y_1}{X_1}$. (Y_1, X_1) is a sample of X and Y. Is b_2 biased?

3) In a certain industry, firms relate their stocks of finished goods, Y, to their expected annual sales, X_e, according to a linear relationship

$$Y = \beta_1 + \beta_2 X_e$$

Actual sales, X, differ from expected sales by a random quantity u, that is distributed with mean 0 and constant variance:

$$X = X_e + u$$

u is distributed independently of X_e. An investigator has data on Y and X (but not on X_e) for a cross-section of firms in the industry. Describe the problems that would be encountered if a least square estimator were used to estimate β_2.

4) You want to estimate the model

$Y = a + b * X1 + c * X2.$

Use the data set to produce the following results:

- Graphs of scatter plot between Y-X1 and Y-X2. Is there the heteroscedasticity exists in the data? Why?
- Do the Park Test. Is there the heteroscedasticity exists in the data? Why?
- Do the White Test. Is there the heteroscedasticity exists in the data? Why?
- Estimate the model by applying White Heteroskedasticity Consistent Coefficient Covariance.