Consider the model in Card (1995) where he investigates the relationship between logged wage ($log(wage)$) and education ($educ$). He also controls for geographical indicators in addition to race and job experience. His population model is given by the following equation:

$$\begin{aligned} log(wage) =& \beta_0 + \beta_1 educ + \beta_2 exper + \beta_3 exper^2 + \beta_4 black + \beta_5 south \\ &+ \beta_6 smsa + \beta_7 reg661 + \beta_8 reg662 + \beta_9 reg663 + \beta_{10} reg664 \\ &+ \beta_{11} reg665 + \beta_{12} reg666 + \beta_{13} reg667 + \beta_{14} reg668 \\ &+ \beta_{15} smsa66 + u \end{aligned} \tag{1}$$

1) Is it likely to be true that $E(u|x) = 0$? If not, why not? Be specific.

2) Using the output in Listing ??, what is the estimated APE of experience on expected log wage? How should we interpret the APE? Is this likely to be a consistent estimate?

3) Suppose the estimated average partial effect for experience is given by $g(\hat{\beta}_2, \hat{\beta}_3) = \hat{\beta}_2 + 2\hat{\beta}_3 \overline{exper}$ where $\overline{exper}$ is the sample average for experience. Using the required assumptions, *prove* that $g(\hat{\beta}_2, \hat{\beta}_3)$ is a consistent estimator.

4) *Derive* the limiting distribution for $g(\hat{\beta}_2, \hat{\beta}_3)$.

$= plim(\hat{\beta}_2 + 2\hat{\beta}_3 \overline{exper})$

$plim(\hat{\beta}_3) = \beta_3$