

Name _____

Student Number _____

STA 431 Quiz 5

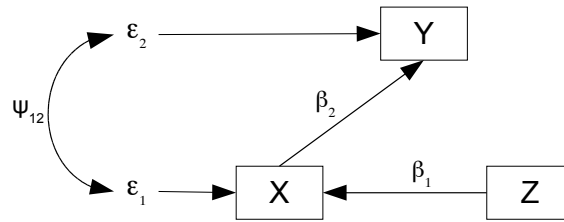
1. *Do not answer this question if you do not have a printout for Question 7 of this weeks's assignment.* In Question 7, you tested $H_0 : \alpha_1 = 0$.

(a) (2 points) Write the value of the test statistic and the p -value in the space below. These are numbers from your printout. On your printout, circle the numbers and write "Question 1" beside them.

(b) (2 points) In terms of the influence of smoking on cancer (which is the point of all this), what do you conclude from this test? If a conclusion is justified, draw a directional conclusion. *Be guided by the $\alpha = 0.05$ significance level, but do not mention it.* You have a lot mote room than you need.

2. In one version of the instrumental variables model, the instrumental variable z has a direct influence on the explanatory variable x . The model equations and path diagram are

$$\begin{aligned} X_i &= \alpha_1 + \beta_1 Z_i + \epsilon_{i1} \\ Y_i &= \alpha_2 + \beta_2 X_i + \epsilon_{i2} \end{aligned}$$



where $E(Z_i) = \mu_z$, $Var(Z_i) = \sigma_z^2$, $E(\epsilon_{i1}) = E(\epsilon_{i2}) = 0$, $Var(\epsilon_{i1}) = \psi_1$, $Var(\epsilon_{i2}) = \psi_2$ and $Cov(\epsilon_{i1}, \epsilon_{i2}) = \psi_{12}$.

- (a) (2 points) Calculate $\sigma_{12} = Cov(Z_i, X_i)$. Show a little work and **circle your answer**.

- (b) (2 points) Calculate $\sigma_{13} = Cov(Z_i, Y_i)$. Show a little work and **circle your answer**.

- (c) (2 points) Give the formula for a Method of Moments estimate of the parameter β_2 in terms of $\hat{\sigma}_{ij}$ values.

Please attach your printout to the quiz paper. The printout should show your *complete R input and output*. Make sure your name and student number appear on the printout.