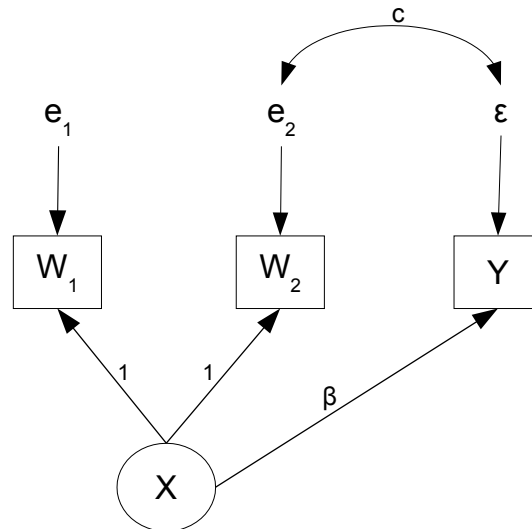


STA 431 Quiz 7

1. In this double measurement path diagram, data for W_2 and Y were collected in the same setting and at the same time. They were influenced by common omitted variables, and so their error terms are correlated.



- (a) (1 point) Write the model equations. Just write three equations and nothing else.

- (b) (1 point) Using the notation $Var(X) = \phi$, $Var(e_1) = \omega_1$, $Var(e_2) = \omega_2$ and $Var(\epsilon) = \psi$, what is the parameter vector θ for this model?

- (c) (1 point) Does this model pass the test of the Parameter Count Rule? Answer Yes or No and give the numbers.

(d) (3 points) Give the covariance matrix of the observable data as a function of the model parameters. Show any necessary calculations.

(e) (2 points) Is the parameter β identifiable? If Yes, show it. If No, give two parameter vectors that have *different* values of β , but produce the same covariance matrix. A simple numerical example would be best.

2. (2 points) For the R part of the assignment, you analyzed the Pig Birth data. In a path diagram of the model (which you do *not* have to give here), there would be a curved double-headed arrow connecting the measurement error terms for Questionnaire One.

What is the value of the test statistic for testing whether the arrow is present? The answer is a number on your printout. Write the number in the space below. On your printout, circle the number and write “Question 2” beside it. *Do not answer this question if you do not have a printout for Question 3 of this weeks’s assignment.*

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.