

Oct-16-2007

hw 3-2: Multivariate Probit Model for Binary Correlation

$$Y = \begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_J \end{bmatrix}, \quad Z = \begin{bmatrix} Z_1 \\ Z_2 \\ \vdots \\ Z_J \end{bmatrix} \sim N_J \left(\begin{bmatrix} 0 \\ 0 \\ \vdots \\ 0 \end{bmatrix}, \Omega \right)$$

$$\Rightarrow \begin{cases} \text{if } Z_j \leq X_j \beta_j \Rightarrow Y_j = 1 \\ \text{if } Z_j > X_j \beta_j \Rightarrow Y_j = 0 \end{cases}$$

Please show that, In order to identify parameters (β, Ω) (unique solution), where, $\beta = (\beta_1, \beta_2, \dots, \beta_J)$. We need restrict Ω to be standard "Correlation" matrix.

(hint:) Find a Standardization transformation for the general variance-covariance matrix Ω , which applies in some way to both β and Ω , and get new parameters (β^*, Ω^*) . Show that

$$\Pr(Y=y | \beta, \Omega) \equiv \Pr(Y=y | \beta^*, \Omega^*)$$

hw-3-1: (Lec 11 - page 6)