

## Assignment 10

### Multivariate Probit Models

#### The model

In the study of financing choice, three choices have been studied including capital restructuring, dividend cut, and issue new stock. The probit model can be stated as:

$$I_{ji} = \beta_{j0} + \beta_{j1}x_{1i} + \beta_{j2}x_{2i} + \beta_{j3}x_{3i} + u_{ji} \quad (1)$$

and

$$\Pr(Y_{ji} = 1) = \Phi(I_{ji})$$

where:  $I_{ji}$  is index variables.

$Y_{ji}$  is decision to choose financial choice  $J$ , value equals to 1 if choosing choice  $J$  or 0 if not.  $J = 1$  for capital restructuring, 2 for dividend cut, 3 for issue new stock.

$x_{ki}$  is independent variable  $k$ .

$\Phi(\cdot)$  is multivariate normal probability distribution function.

$u_{ji}$  is disturbance term.

**Requirements** From data file – assign10.dta:

- 1 Estimate models for  $Y_{1i}$ ,  $Y_{2i}$ , and  $Y_{3i}$  assuming that the probability functions follow separate normal distribution function. Interpret your estimated result (sign and meaning, overall test, pseudo  $R^2$ , individual test).
- 2 Estimate models for  $Y_{1i}$ ,  $Y_{2i}$ , and  $Y_{3i}$  assuming that the probability functions follow multivariate normal probability distribution function (MV Probit models). Determine whether MVProbit is appropriated. Why?