

Example 3: Estimations of the panel logit models explaining female labor participation using a fictitious dataset

The definitions of variables are inherited from those in the manuals “dfelrtna.pdf” and “dfelrtnb.pdf”.

Dataset

fls_{it} : fls1986 - fls1993 (female labor supply: 1=supply; 0=no supply, from 1986 to 1993)

$hdbt_{it}$: hdbt1986 - hdbt1993 (log of husband's debt, from 1986 to 1993)

$hinc_{it}$: hinc1986 - hinc1993 (log of husband's income, from 1986 to 1993)

(Number of individuals $N = 60000$)

The model when using the program “dfelrtna.tsp” described later is appropriate for this dataset. True values of parameters generating this dataset are

$$\gamma = \gamma_{fls(-1)} = 0.8$$

$$\beta_{(1)} = \beta_{hdbt} = 0.2$$

$$\beta_{(2)} = \beta_{hinc} = -0.6.$$

In the file “prma.tsp”, the command

```
set tds = 0 ;
```

is used in order to rule out the time dummies from the model and further the statements of setting the starting values are commented out using “?” to avoid any misunderstanding, as follows:

```
?set dtd1988_min = -2 ; set dtd1988_max = 2 ;
```

```
?set dtd1989_min = -2 ; set dtd1989_max = 2 ;
```

```
?set dtd1990_min = -2 ; set dtd1990_max = 2 ;
```

It should be noted that the Wald test statistics are not calculated after running “dfelrtna.tsp” and “dfelrtnb.tsp”, because the time dummies are ruled out. Outputs of the Wald test statistics, their degree of freedom, and their p-values are all “-99999”.

In both files “prma.tsp” and “prmb.tsp”, the command

```
set ig2 = 0 ;
```

is used for the purpose of using the randomly generated starting values in the optimization for obtaining the 2-step GMM estimates.

Model, Moment conditions, and Parameters to be estimated when using the program “dfelrtna.tsp”

Model

$$y_{it} = \frac{\exp(\eta_i + \gamma y_{i,t-1} + \beta_{(1)} x_{(1)it} + \beta_{(2)} x_{(2)it})}{1 + \exp(\eta_i + \gamma y_{i,t-1} + \beta_{(1)} x_{(1)it} + \beta_{(2)} x_{(2)it})} + v_{it}, \quad \text{for } t = 1987, \dots, 1990.$$

$$y_{it} = fls_{it}$$

$$x_{(1)it} = hdbt_{it}$$

$$x_{(2)it} = hinc_{it}$$

Moment conditions

Used moment conditions based on g-form

$$E[hU_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } t = 1988, 1989,$$

$$E[y_{is} hU_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } s = 1986, \dots, t-2; \quad t = 1988, 1989,$$

$$E[\Delta x_{(1)is} hU_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } s = t-1, t, t+1; \quad t = 1988, 1989,$$

$$E[\Delta x_{(2)is} hU_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } s = t-1, t, t+1; \quad t = 1988, 1989,$$

where $hU_{it}(\gamma, \beta_{(1)}, \beta_{(2)})$ is defined as $hU_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})$ with $\Delta TD_t = 0$ and $\Delta TD_{t+1} = 0$.

Used moment conditions based on h-form

$$E[hY_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } t = 1988, 1989,$$

$$E[y_{is} hY_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } s = 1986, \dots, t-2; \quad t = 1988, 1989,$$

$$E[\Delta x_{(1)is} hY_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } s = t-1, t, t+1; \quad t = 1988, 1989,$$

$$E[\Delta x_{(2)is} hY_{it}(\gamma, \beta_{(1)}, \beta_{(2)})] = 0, \quad \text{for } s = t-1, t, t+1; \quad t = 1988, 1989,$$

where $hY_{it}(\gamma, \beta_{(1)}, \beta_{(2)})$ is defined as $hY_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})$ with $\Delta TD_t = 0$ and $\Delta TD_{t+1} = 0$.

Parameters to be estimated

$$\gamma = \gamma_{fls(-1)} : g_fls_lag1$$

$$\beta_{(1)} = \beta_{hdbt} : b_hdbt$$

$$\beta_{(2)} = \beta_{hinc} : b_hinc$$

Model, Moment conditions, and Parameters to be estimated when using the program “dfelrtnb.tsp”

Model

$$y_{it} = \frac{\exp(\eta_i + TD_t + \gamma y_{i,t-1})}{1 + \exp(\eta_i + TD_t + \gamma y_{i,t-1})} + v_{it}, \quad \text{for } t = 1987, \dots, 1990.$$

$$y_{it} = fls_{it}$$

Moment conditions

Used moment conditions based on g-form

$$E[hU_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } t = 1988, 1989,$$

$$E[y_{is} hU_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = 1986, \dots, t-2; \quad t = 1988, 1989.$$

Used moment conditions based on h-form

$$E[hY_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } t = 1988, 1989,$$

$$E[y_{is} hY_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = 1986, \dots, t-2; \quad t = 1988, 1989.$$

Parameters to be estimated

$$\gamma = \gamma_{fls(-1)} : g_fls_lag1$$

$$\Delta TD_{1988} : dtd1988$$

$$\Delta TD_{1989} : dtd1989$$

$$\Delta TD_{1990} : dtd1990$$