Assignment Panel Data

Model for GPP can be stated as follows:

1. Pool Ordinary Least Squares

The model can be stated as:

$$GPP_{it} = \beta_0 + \beta_1 G_{it} + \beta_2 LOAN_{it} + \beta_3 AGRI_{it} + u_{it} \quad (1)$$

where:

GPP_{it} = Gross of provincial product of province *i* at time *t*.

G_{it} = Government spending on province *i* at time *t*.

$LOAN_{it}$ = Loan outstanding of province *i* at time *t*.

$AGRI_{it}$ = Agricultural production of province *i* at time *t*.

u_{it} = Disturbance term of province *i* at time *t*.

2. Fixed Effect Model

From the above model, we can apply fixed effect model as:

$$GPP_{it} = \beta_{i0} + \beta_1 G_{it} + \beta_2 LOAN_{it} + \beta_3 AGRI_{it} + u_{it} \quad (2)$$

where: β_{i0} = cross-section fixed-effect coefficients

3. Random Effect Model

From the above model, we can apply random effect model as:

$$GPP_{it} = \beta_0 + \beta_1 G_{it} + \beta_2 LOAN_{it} + \beta_3 AGRI_{it} + u_{it} \quad (3)$$

and $u_{it} = v_i + w_t + \varepsilon_{it}$

where: v_i = cross-section random effect

w_t = time random effect

ε_{it} = residual term

From the given data set (assign_panel):

1. Estimate the above three models including Pool Ordinary Least Squares model, Fixed-effect model, and Random-effect model.
2. Perform hypothesis testing whether there exist significant fixed effects.
3. From the three estimated model, select the most appropriated model, get explanation of the choosing criteria, and make interpretation of the estimated model.