Model Layout

Model layout

- i and n denote countries $i, n \in \mathcal{I}$
- 1 sector
- Trade elasticity θ
- Trade cost are iceberg d_{in}
- Migration elasticity κ
- Migration costs are iceberg μ_{ij}
- w_i are wages
- Initial conditions $N_{i,0}$
- $B_{i,t}$ and $T_{i,t}$ are amenity and productivity shifters, respectively

For this session, we will assume that you observe amenities and TFPs. But notice that recovering the amenity will be more complicated than before, because we need to separate $B_{i,t}$ from $\Omega_{i,t+1}$.

Static Equilibrium

Income

$$E_{n,t} = w_{n,t} N_{n,t}$$

Labor market clearing

$$w_{n,t} N_{n,t} = \sum_{i \in \mathcal{I}} X_{in,t}$$

Expenditure

$$X_{in,t} = \frac{\tilde{T}_{i,t} \left(w_{i,t} d_{in,t}\right)^{-\theta}}{\Phi_{n,t}} E_{n,t}$$

Multilateral resistance term

$$\Phi_{i,t} = \sum_{n \in \mathcal{I}} \tilde{T}_{n,t} \left(w_{n,t} d_{ni,t}\right)^{-\theta}$$

Price index

$$P_{i,t} = \Gamma \Phi_{i,t}^{-\frac{1}{\theta}}$$

Real income

$$y_{i,t} = \frac{w_{i,t}}{P_{i,t}}$$

TFP

$$\tilde{T}_{i,t} = T_{i,t} N_{i,t}^{\alpha}$$

Dynamic Equilibrium

Migration flows are given by

$$\lambda_{in,t} = \frac{\tilde{B}_{i,t} \left(\mu_{in,t} y_{i,t}\right)^{\kappa} \left(\Omega_{i,t+1}^{\delta}\right)^{\kappa}}{\Omega_{i,t}^{\kappa}}$$

where

$$\Omega_{i,t} = \left(\sum_{n} \tilde{B}_{n,t} \left(\mu_{ni,t} y_{n,t}\right)^{\kappa} \left(\Omega_{n,t+1}^{\delta}\right)^{\kappa}\right)^{1/\kappa}$$

Total population in t is

$$N_{i,t} = \sum_{n} \lambda_{ni,t} N_{n,t-1}$$

Amenity

$$\tilde{B}_{i,t} = B_{i,t} N_{i,t}^{-\beta}$$

Steady State Equilibrium

Income

$$E_n = w_n N_n$$

Labor market clearing

$$w_n N_n = \sum_{i \in \mathcal{I}} X_{in}$$

Expenditure

$$X_{in} = \frac{\tilde{T}_i \left(w_i d_{in}\right)^{-\theta}}{\Phi_n} E_n$$

Multilateral resistance term

$$\Phi_i = \sum_{n \in \mathcal{I}} \tilde{T}_n \left(w_n d_{ni}\right)^{-\theta}$$

Price index

$$P_i = \Gamma \Phi_i^{-\frac{1}{\theta}}$$

Real income

$$y_i = \frac{w_i}{P_i}$$

TFP

$$\tilde{T}_i = T_i N_i^{\alpha}$$

Migration flows are given by

$$\lambda_{in} = \frac{\tilde{B}_i \left(\mu_{in} y_i\right)^{\kappa}}{\Omega_i^{\kappa(1-\delta)}}$$

where

$$\Omega_i = \left(\sum_{n} \tilde{B}_n \left(\mu_{ni} y_n\right)^{\kappa} \left(\Omega_i^{\delta}\right)^{\kappa} \right)^{1/\kappa}$$

Total population in t is

$$N_i = \sum_{n} \lambda_{ni} N_n$$

Amenity

$$\tilde{B}_i = B_i N_i^{-\beta}$$