Measuring regional and global integration

Foundations of structural gravity

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Module 2 — Part 4

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Armington-Anderson-type gravity

General setup

- Armington assumption: each $i \in S$ produces distinct variety of a good
  $\rightarrow$ goods will be indexed by country name
- Set of S countries, with origin i and destination j
  $\rightarrow$ discrete here, but no need actually
- Goods are produced by workers, who are also the consumers
- Iceberg trade cost τ_{ij}
  $\rightarrow$ need to ship τ_{ij} units to receive 1 unit at destination
- (Usually) assumptions on τ_{ij}: $\tau_{ij} \leq 1, \tau_{ii} = 1, \tau_{ij}\tau_{jk} \leq \tau_{ik} \; \forall i, j, k$

Supply

- Country i is populated by L_i workers

  $\rightarrow$ labor is supplied inelastically

- Productivity in country i is A_i, workers earn a wage w_i
- We investigate three different types of market structures

Demand

- CES preferences (hurray!)

→ with minor adjustment: index j for importing country

$$U_j = \left(\sum_{i \in S} a_{ij}^{\frac{1}{\sigma}} q_{ij}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

→ *total* welfare of country j

→ homotheticity makes per-capita welfare simple

Optimal demand

- analogous to above: optimization problem yields

$$X_{ij} = p_{ij}q_{ij} = a_{ij}p_{ij}^{1-\sigma}Y_jP_j^{\sigma-1} \quad \text{with} \quad P_j = \left(\sum_{\ell} a_{\ell j}p_{\ell j}^{1-\sigma}\right)^{\frac{1}{1-\sigma}} \tag{1}$$

- almost looks like gravity equation already, but p_{ij} still needs to be solved on the supply side

Market structures

1. Perfect competition
2. Endowment economy
3. Monopolistic competition