Graduate Trade (II): ECON 8433

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Plan

WEEK	TOPIC
Week 1	Introduction to Structural Gravity Equation
Week 2	Calibration and Estimation
Week 3	Mapping Models to the Data
Week 4	Designing Counterfactual Experiments in General Equilibrium
Week 5	Presentations (I) and Catch-up
Week 6	Heterogeneous Firms (I)
Week 7	Heterogeneous Firms (II)
Week 8	Ricardian Models
Week 9	Multi-Sector Models
Week 10	Global Value Chains
Week 11	Presentations (II) and Catch-up
Week 12	Extensions: Demand Side
Week 13	Extensions: Supply Side
Week 14	Extensions: Migration and Geography
Week 15	Presentations (III) and Catch-up

Calibration

$$\widehat{c}_i^j = \widehat{w}_i^{\gamma_i^j} \prod_k (\widehat{P}_i^k)^{\eta_i^{k,j}} \tag{1}$$

$$\widehat{P}_i^j = \left(\sum_n \pi_{ni} (\widehat{c}_n^j \widehat{\tau}_{ni}^j)^{-\theta^j} \right)^{-\frac{1}{\theta^j}} \tag{2}$$

$$\pi_{in}^{j'} = \pi_{in}^j \left(\frac{\widehat{c}_i^j \widehat{\tau}_{in}^j}{\widehat{P}_n^j} \right)^{-\theta^j} \tag{3}$$

$$Y_i^{j'} = \sum_k \eta_i^{j,k} \sum_n \pi_{in}^{k'} Y_n^{k'} + \alpha_i^j I_i' \tag{4}$$

$$I_i' = (L_i w_i) \widehat{w}_i + D_i \tag{5}$$

$$D_i = \sum_j \sum_n \pi_{ni}^{j'} Y_i^{j'} - \sum_j \sum_n \pi_{in}^{j'} Y_n^{j'} \tag{6}$$

Calibration

To solve for $Y_i^{j'}$ consider:

$$Y_i^{j'} = \sum_k \eta_i^{j,k} \sum_n \pi_{in}^{k'} Y_n^{k'} + \alpha_i^j l_i' \left((L_i w_i) \widehat{w}_i + D_i \right)$$

Rewrite the equation in the matrix form:

$$\mathbb{Y} = \mathbb{Z} \odot \Pi \mathbb{Y} + \mathbb{B},$$

where $\mathbb{I}$ is identity matrix; $\mathbb{B}$ is a stacked matrix of consumer expenditures; $\mathbb{Z}$ is a stacked matrix of γ_i^j and $\eta_i^{j,k}$; Π is a stacked matrix of trade shares. We can solve for a vector of $\mathbb{Y}$ as:

$$\mathbb{Y} = (\mathbb{I} - \mathbb{Z} \odot \Pi)^{-1} \mathbb{B},$$

Calibration

To solve for w_i rewrite the trade balance:

$$D_i + EXP_i = IMP_i \qquad (7)$$

The wage update:

$$update = (D_i + EXP_i - IMP_i) \qquad (8)$$

Multi-sector models: In class

- ▶ For an arbitrary change in trade costs, quantify how predictions of the multi-sector and single-sector models differ from each other given the same underlying data.

- ▶ What is the intuition behind the results?

Multi-sector models: Assignment

Explore the importance of sector-to-sector linkages:

▶ Show how trade liberalization in one sector affects other sectors and the economy overall

▶ Show how improvements in technology in one sector affect other sectors and the economy overall