ECON 7115
Assignment 1

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1.1

1.1.1 Compare the Eq'm Outcomes w

- Solution by Newton's method: [0.6018;0.2338;0.1644]
- Solution by *fsolve*: [0.6018;0.2338;0.1644]
- They are almost the same

1.1.2 If $\tau_{in} = 1.2, i \neq n$

- If $\tau_{in} = 2, i \neq n$: welfare = [1.8163;0.8263;0.4202]
- If $\tau_{in} = 1.2, i \neq n$: welfare = [2.1885;1.0759;0.4504]
- When the iceberg trade cost decreases, both the individual and overall welfare increase.

1.2 $t_{in} \neq 0, i \neq n$

The GE effect in structural estimation is demonstrated:

$$GE = 1 - \sigma - \lambda_{in}$$

- When $t_{in} = 0.05, i \neq n$:

$$\begin{bmatrix} -3.7872 & -3.1166 & -3.0523 \\ -3.0522 & -3.6632 & -3.0321 \\ -3.1606 & -3.2202 & -3.9155 \end{bmatrix}$$

- When $t_{in} = 0.25, i \neq n$:

$$\begin{bmatrix} -3.8499 & -3.0847 & -3.0277 \\ -3.0299 & -3.7283 & -3.0153 \\ -3.1201 & -3.1870 & -3.9570 \end{bmatrix}$$

- In the reduced-form estimation: $GE = 1 - \sigma = -3$

2 Extensions

2.1 The General Eq'm System

Since $c_i = \frac{w_i^\beta P_i^{1-\beta}}{A_i}$,

$$\lambda_{in} = \frac{X'_{in}}{X'_n} = \left[\frac{w_i^\beta P_i^{1-\beta}\kappa_{in}}{A_i}\right]^{1-\sigma} * \left[\sum_{i=1}^N \left[\frac{w_i^\beta P_i^{1-\beta}\kappa_{in}}{A_i}\right]^{1-\sigma}\right]^{\frac{1}{1-\sigma}} \tag{1}$$

Where $\kappa_{in} = \tau_{in}(1 + t_{in})$.

$$w_i L_i = \sum_{n=1}^N \frac{1}{1+t_{in}} \lambda_{in} X_n \tag{2}$$

$$X_n = w_n L_n + \sum_{i=1}^N \frac{t_{in}}{1+t_{in}} \lambda_{in} X_n \tag{3}$$

2.2 Linear System

We denote $\tilde{Z} = logZ, \forall Z > 0$

$$\tilde{w}_i + \tilde{L}_i = \sum_{n=1}^N \chi_{in}\left(\tilde{\lambda}_{in} + \tilde{X}_n - \widetilde{1+t_{in}}\right), \quad \chi_{in} \equiv \frac{\frac{1}{1+t_{in}}\lambda_{in}X_n}{w_i L_i}$$

$$\tilde{\lambda}_{in} = (1-\sigma)\left(\tilde{w}_i + \tilde{\kappa}_{in} - \tilde{A}_i\right) - \sum_{k=1}^N \lambda_{kn}\left(\tilde{w}_k + \tilde{\kappa}_{kn} - \tilde{A}_k\right), \quad \tilde{\kappa}_{in} \equiv \tilde{\tau}_{in} + \widetilde{1+t_{in}}$$

$$\tilde{X}_n = \frac{w_n L_n}{X_n}\left(\tilde{w}_n + \tilde{L}_n\right) + \sum_{i=1}^N \left[\frac{t_{in}\lambda_{in}}{1+t_{in}}\left(\tilde{\lambda}_{in} + \tilde{X}_n\right) + \frac{\lambda_{in}}{1+t_{in}}\widetilde{1+t_{in}}\right]$$