ECON3510 Formula Sheet

2019

Symbols

* refers to foreign

$\text{variable}_1, \text{variable}_2$ refer to goods 1 and 2

a_i refers to labor hours required to produce good i

General Equations

Gravity Model: $T_{i,j} = \frac{A \times Y_i \times Y_j}{D_{i,j}}$

Wage: $w_1 = \frac{P_1}{a_1}$

Relative Wage: $\frac{w}{w^*} = \frac{P_1}{a_1} \div \frac{P_2}{a_2^*} = \frac{P_1}{a_1} \cdot \frac{a_2^*}{P_2}$

Relative Productivity: $\frac{a_1}{a_1^*}$

Marginal Rate of Substitution: $MRS_{1,2} = \frac{MU_1}{MU_2} = \frac{P_1}{P_2}$

Production: $a_1Q_1 + a_2Q_2 = L$

Production Possibility Frontier: $Q_1 = \frac{L}{a_1} - \frac{a_2}{a_1}$

Marginal Productivity of Labor: $MPL_1 = \frac{1}{a_1}$

Opportunity Cost: $OC_1 = \frac{a_1}{a_2}$

Relative Price in Autarky: $\frac{P_1}{P_2} = \frac{a_1}{a_2}$

Autarky Equilibrium Occurs When: $\frac{P_1}{P_2} = \frac{a_1}{a_2} = \frac{Q_2}{Q_1}$

Closed Trade Specialization of Good 1 Occurs When: $w_1 = \frac{P_1}{a_1} > \frac{P_2}{a_2} = w_2 \Rightarrow \frac{P_1}{P_2} > \frac{a_1}{a_2}$

Free Trade Specialization of Good 1 (World Price is Autarky Price) Occurs When:

$$\frac{a_1}{a_2} < \frac{a_1^*}{a_2^*} \equiv wa_1 < w^*a_1^* \equiv \frac{a_1^*}{a_1} > \frac{w}{w^*}$$

Free Trade Specialization with Actual World Prices (three cases):

- Case 1: $\frac{P_1}{P_2} = \frac{a_1}{a_2} < \frac{a_1^*}{a_2^*}$ then foreign specializes in good 2 and home does not specialize

- Case 2: $\frac{P_1}{P_2} < \frac{a_1}{a_2} < \frac{a_1^*}{a_2^*}$ then both home and foreign specialize in good 2
- Case 3: $\frac{a_1}{a_2} < \frac{P_1}{P_2} < \frac{a_1^*}{a_2^*}$ then home specializes in good 1 and foreign specializes in good 2