

Please answer all questions

1. Consider the monopolistic competition model with constant-elasticity-of-substitution (CES) preferences. The utility function is given by

$$U = \sum_{i=1}^n c_i^{(\sigma-1)/\sigma},$$

where c_i is the consumption level of good i and $\sigma > 1$ is the elasticity of substitution. The labor requirement to produce y_i units of good i is $l_i = \alpha + \beta y_i$, where $\alpha, \beta > 0$. The total labor supply L is fixed.

- Assuming n is big, show that the price elasticity of demand is equal to σ .
 - Derive the equilibrium values of p/w , y and n .
 - Explain how an increase in the labor force L affects the equilibrium values of p/w , y and n .
 - What is the source of the gains from trade? Explain.
 - The monopolistic competition model provides a possible theoretical foundation for the use of the gravity equation. Explain which feature of the monopolistic competition model accounts for this. Is the gravity equation consistent with the predictions of trade models other than the monopolistic competition model? Explain.
2. Consider the two-country Ricardian model with a continuum of goods (Dornbusch, Fischer, Samuelson, 1977). The unit labor requirement in the home country is given by $a(z)$, that in the foreign country by $a^*(z)$, with $0 \leq z \leq 1$. The goods are ranked from 0 to 1 by home country comparative advantage, so that $A(z) \equiv a^*(z)/a(z)$, $A'(z) < 0$. The wages in home and foreign are denoted by w and w^* , respectively. The home country has L workers, foreign has L^* . Workers in both countries provide one unit of labor each, and have identical Cobb-Douglas preferences. Assuming that in equilibrium home produces all goods between 0 and \tilde{z} , the fraction of income spent on home's good is given by $\phi(\tilde{z})$ with $\phi'(\tilde{z}) > 0$. The free-trade equilibrium is characterized by the following two conditions:

$$\frac{w}{w^*} = A(\tilde{z}) \quad (1)$$

$$\frac{w}{w^*} = \frac{\phi(\tilde{z}) L^*}{1 - \phi(\tilde{z}) L} \quad (2)$$

- Explain the economic meaning of each equilibrium condition.
- Draw a diagram with \tilde{z} on the horizontal and $\frac{w}{w^*}$ on the vertical axis, to characterize the equilibrium.
- Use the diagram to explain how an increase in L^*/L would change the equilibrium. Discuss the economic reason for these changes.

3. Consider the two-good, two-factor model discussed in class, and assume that industry 1 is labor intensive:

$$\frac{a_{1L}}{a_{1K}} > \frac{a_{2L}}{a_{2K}}.$$

- (a) Write down the four equilibrium conditions.
- (b) Use a diagram to argue that, when both goods are produced and product prices are fixed, an increase in the labor endowment raises the output of good 1 and reduces the output of good 2. Label all relevant axes, curves,....
- (c) Holding product prices fixed, use Cramer's Rule to prove formally that a marginal increase in the labor endowment ($dL > 0, dK = 0$) raises the output of good 1 and reduces the output of good 2.