INTERNATIONAL TRADE 1, FDPE
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PROBLEM SET

1. Take the basic two-sector (1, 2), two country (H, F) Ricardian model with one factor of production, labor. Instead of assuming homothetic preferences assume that in both countries consumers have the following preferences

$$U = (C_1 + \underline{C})^{\alpha} C_2^{1-\alpha}$$

where $\underline{C} > 0$. Markusen (2010) calls this (for good reasons) the modified Stone-Geary utility function. From this derive the demand functions for both of the goods. Show that one of the goods has income elasticity larger than 1 implying that the other has income elasticity less than unity.

Assume next that both countries are completely specialized. Derive the free trade equilibrium relative price of the good whose income elasticity is less than unity. What happens to this relative if the productivity of producing goods grows uniformly in the world? In particular, does the Prebisch-Singer-thesis (income growth reduces the relative price of goods the demand for which is income inelastic) hold? Can the country producing the good lose from the global productivity growth? Can it lose if one just looks at implications of productivity growth in that country alone?

2. Assume a small-open (takes world market prices as given) Heckscher-Ohlin economy producing two goods with capital and labor. Assume that the country is importing the capital-intensive good. Instead of assuming that the country uses tariff to reduce imports assume that it uses a quota system: Imports of good 2 are restricted to be below $\overline{Q}_2$ and it is assumed to be strictly binding. Instead of collecting tariff revenue the government auctions import licenses. Assuming the auctions are competitive the price of the license is such that the domestic price of good 2 is such that the domestic market for good 2 clears

$$\frac{\partial e(p,u)}{\partial p_2} - \frac{\partial g(p,K,L)}{\partial p_2} = \overline{Q}_2 \tag{1}$$

where $e(p,u)$ is the expenditure function, $g(p,K,L)$ the GDP-function. Denoting the world market prices as p_1^w, p_2^w the license price is

$$p_l = p_2 - p_2^w \tag{2}$$

giving

$$p_l \overline{Q}_2$$

as the government revenue assumed to be distributed to consumers as a lump sum transfer. The equations setting consumer expenditure equal to consumer income and (1) are a system of two equations with two unknowns u and p_l (or p_2). Is immiserizing growth, i.e.

$$\frac{\partial u}{\partial K} < 0$$

now possible? Intuition?

3. Consider the DFS Ricardian model with a continuum of goods. Extend the model by assuming the possibility of technology diffusion by allowing the possibility in each country of using the technology of the other country as follows. At country H the technology to be used in production of good z is

$$\widetilde{a}(z) = \min\{a(z), \gamma a^*(z)\}$$

and in F

$$\widetilde{a}^*(z) = \min\{a^*(z), \gamma a(z)\}$$

where $\gamma > 1$ indicates that the country adopting the foreign country technology cannot be as efficient in its use that the country initially using the technology.

For given wage rates, would both countries adopt technologies from the other? If not, which country would do it? Which technologies would be adopted? Formulate as long us you can the general equilibrium conditions for this world economy and analyze using them the implications of country size differences for the technology adoption!

(Motivation: Dani Rodrik has claimed that the export structure of China differs from the export structure of other countries with the same per capita income level: China is exporting same goods as high income countries do. Can this model provide an explanation? Also, it may say something about technological leapfrogging.).

4. In the Melitz-model of trade with heterogenous firms it is assumed that after producing the blueprint the firm will not enter in (domestic) markets if it gets a low productivity. This implies that the blueprint it has developed remains unused. Discuss what would be the implications of dropping this assumption and assuming instead that the firm can sell the blueprint to some other entrepreneur who then gets a possibility to a new draw of productivity!

5. Consider the Deardorffian law of comparative advantage in the following setting: Initially the world consists of $n+1$ countries, with n trading freely with each other and 1 (China) being completely closed. Let the (world) market prices be in this situation p^{woc}, and let the world market prices after China's entry be p^{wc}. Consider a single non-China country i. Assume its trade is balanced both before and after China's entry. Since the competitive economy is in the core we know that after China's entry welfare of the existing countries does not decline. Using this information show that the following comparative advantage relationship holds:

$$(p^{woc} - p^{wc})\, T^{chi} \leq 0$$

where T^{chi} = vector of net exports by country i.