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International Economics

Date: June 24, 2003  
Time: 3 hours  
Reading Time: 20 minutes

**PRELIMINARY EXAMINATION FOR THE Ph.D. DEGREE**

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Instructions. You should answer a total of 4 questions, including at least one question from each of the parts (A, B, and C).

**Part A**

1. (a) For a single country, derive a sufficient condition to obtain Pareto gains under *partial reform* of tariffs, comparing one tariff vector  $t^0$  to another  $t^1$ , while using lump sum transfers to compensate consumers.
- (b) Now consider a group of countries  $i=1, \dots, C$ , forming a *customs union*. State a sufficient condition (from Kemp and Wan) for each of these countries to gain from the customs union, and for the rest of the world to be no worse off. Now show how this condition meets the criterion that you derived in part (a).
- (c) Suppose instead that the countries  $i=1, \dots, C$ , form a *free trade area*. What is the difference between a free trade area and a customs union? Now state a sufficient condition (from Krishna and Panagariya) for each of these countries to gain from the free trade area, and for the rest of the world to be no worse off. Show how this sufficient condition meets the criterion that you derived in part (a).

**Part A (continued)**

2. Consider a foreign firm selling  $i=1, \dots, M$  product varieties, each of which have characteristics  $z_i$  and unit-costs of  $g_i(z_i)$ . The price of each product variety is  $p_i$ , demand is  $c_i$ , and the consumer's quality is  $f(z_i)$ . For simplicity, we define the quality-adjusted prices  $q_i \equiv p_i/f(z_i)$ , and quality-adjusted demand as  $d_i \equiv f(z_i)c_i$ . The profit-maximization problem for this firm is then:

$$\max_{p_i, z_i} \sum_{i=1}^M [p_i - g_i(z_i)]c_i = \max_{q_i, z_i} \sum_{i=1}^M \left[ q_i - \frac{g_i(z_i)}{f(z_i)} \right] d_i(q, I).$$

- (a) Derive the first-order condition for the optimal choice of characteristics  $z_i$ , and interpret this condition (*Note*: you may treat  $z_i$  as a scalar rather than a vector).
- (b) Now suppose that there is a voluntary export restraint (VER), which limits the *total quantity* sold by the foreign firm. Show how the profit-maximization problem is re-stated when this constraint is introduced, and derive the new first-order condition for the optimal choice of characteristics  $z_i$ . Then, show the effect of the VER on the characteristics chosen by the firm, i.e. differentiate  $z_i$  with respect to  $\lambda$ , which is the Lagrange multiplier on the VER constraint.
- (c) Now suppose that instead of the VER, there is an *ad valorem* tariff applied to each variety sold by the foreign firm. Again show how the profit-maximization problem is re-stated when this tariff is introduced, and derive the new first-order condition for the optimal choice of characteristics  $z_i$ . Then, show the effect of the tariff on the characteristics chosen by the firm, as compared to part (a).

## **Part B**

### **Question 1**

- (a) Outline the debate among the advocates of the gold standard, of the Bretton Woods pegged exchange rate regime, and of the floating exchange rate regime.
- (b) Evaluate these three positions in light of the post-1973 experiences of North America, western Europe and Japan. Do the experiences suggest that the formation of the European Monetary Union was the logical outcome?

### **Question 2**

Consider the perfect capital mobility case, i.e. domestic bonds and foreign bonds are perfect substitutes, with  $r^* = 10$  percent per year. The government now announces that it will keep the exchange rate at the current value for one year but is free to change it after that. Say that the market now believes that there is a 50 percent chance of a 40 percent devaluation immediately after one year, and a 50 percent chance that the government will implement a currency board to keep the exchange rate unchanged.

- (a) Analyse the short-run consequences of the above situation.
- (b) What will happen to the capital account balance?
- (c) What is the implication for stabilization policy that is committed to keeping output at the present level?

### Part C

1. Consider an economy where consumers buy land ( $X$ ) and computers ( $Y$ ) and are characterized by the utility function  $U = Y^d X^{1-d}$ . Suppose the computer production requires a homogenous input  $z$ , and a service composite  $v$  which is created from differentiated services  $s$ . They are combined according to the production function for computers:  $Y = v^a z^{1-a}$ , where  $v = (\sum s_i^\sigma)^{1/\sigma}$ . Labor is used in producing differentiated services  $s$ , according to  $L_i = a + bs_i$ , while a single unit of labor is required for each unit of  $Z$  produced, or  $Z = L_z$ .

- a) Assume further that  $z$  is tradable across borders, while services are not. Explain and show how agglomeration economies arise in this context.
- b) Suppose the country has 10 regions, one of which is the center where computers are produced. Each region has an equal endowment of land, while the nation's labor force is free to migrate to any region within the country. Will migration result in the equalization of nominal wages across regions? Show and explain why or why not.
- c) Now suppose that a pioneer firm from the center decides to extend production to another region. While there is a fixed cost for pioneering activities, pioneering activities reduce the transportation costs associated with the shipment of the homogenous input  $z$  across regions. Provide examples of pioneering investments that are specific to the pioneering firm versus those that will provide spillovers to other firms.
- d) How could you empirically test whether pioneering activities appear to affect the geographic distribution of economic activity? Propose an empirical specification, and explain what you would expect to find if pioneering activities matter.

### **Part C (continued)**

2. Consider the North American Auto market as represented by a U.S. and German firm, both of which are located in North America and producing for North American customers. When the NAFTA was implemented, it specified that firms purchase least  $\gamma$  percent of their inputs from NAFTA partners (US/Mexico/Canada) to qualify for preferential NAFTA benefits.
- a) Consider the case of the German firm and its assembly of cars in Mexico. The firm's production process requires it to combine an engine with a specified set of parts. Show how the shadow price for Mexican and German-origin auto parts depends on the content requirement  $\gamma$ . What is the intuition for your result?
- b) Now assume that the production functions for the U.S. and German firm are given by  $X_{us} = Z_b^\alpha Z_{nb}^{1-\alpha}$  and  $X_g = Z_b^\beta Z_{nb}^{1-\beta}$ , where  $Z_b$  represents inputs that are from the NAFTA block, and  $Z_{nb}$  represents inputs that originate outside the block, and  $(\beta < \gamma < \alpha)$ . Inputs prices are  $q_b$  and  $q_{nb}$  respectively. The inverse demand for autos is  $p = a - bX$ , where  $X = X_{us} + X_g$  and competition is Cournot. Suppose NAFTA regulations raise  $\gamma$ . Show how increasing  $\gamma$  will affect total industry profits, and the distribution of profits between firms.
- c) Suppose you were asked to provide an economic analysis of the predicted welfare effects for the NAFTA region associated with an increase in the content requirement  $\gamma$  from 62.5% to 64%. [i.e., policy makers want you to predict and quantify the economic effects associated with the policy change.] Discuss the approach you would take and the economic issues that would influence the interpretation of your results.
- d) How would you change your analysis in part c) if the content requirement were instead raised from 62.5% to 95%?