

PRELIMINARY EXAMINATION FOR THE Ph.D. DEGREE

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. Product Variety:

- (a) Using an additively separable utility function in the monopolistic competition model due to Krugman, prove that consumer welfare goes up as variety increases. Then illustrate graphically why opening trade increases product variety. Explain verbally how these results and graphs are modified in the CES case.
- (b) Consider an endogenous growth model in the CES case. Explain how increased input variety affects productivity. Then show analytically how country size affects the growth of input variety in an autarky model. Explain verbally whether this result continues to hold when we open trade, i.e. will a larger world necessarily have higher growth than the autarky growth rate in both countries?
- (c) Explain how we can measure product variety in practice, using the method due to Feenstra.

2. Trade Policy:

- (a) Explain why the price charged by a domestic monopoly will be higher under a quota than under a tariff, even when the tariff and quota have the same import level. Then analyze the impact of a quota when there is a duopoly, i.e. a domestic firm competing with a foreign firm. Explain how the impact of the quota depends on the form of market conduct.
- (b) Now consider the impact of an export subsidy when there is a duopoly, i.e. a domestic firm competing with a foreign firm for sales in a third market. For each type of market conduct, show graphically how the reaction curves are affected by the subsidy, and explain what happens to firm profits and national welfare in the exporting country.
- (c) Explain analytically how the empirical method due to Robert Hall can be used to measure the markups in an industry (and also measure productivity). What would you expect to find if you applied this method to the U.S. steel industry during periods when it had tariff protection, and during periods when it had quota protection?

Part B

3. Intra-firm imports.

- a) As in Hanson, Mataloni and Slaughter (2005) suppose the share (s) of a multinational firm's costs devoted to imported intermediate inputs is given by s_{aipc}^m , (The superscript m represents intermediate inputs imported from the parent, while the subscripts are as follows: a represents a particular affiliate, p represents the parent firm, i represents industry, and c represents the host country). Factor costs for the other inputs h , are w^h .

$$s_{aipc}^m = \alpha_{ip} + \gamma_{mm} \ln p_{aipc} + \sum_h \gamma_{mh} \ln w^h + \phi_{mY} \ln Y_{aipc} + \varepsilon_{aipc}^m.$$

- How would you rewrite this generic share equation if the relevant production factors were skilled labor, unskilled labor, capital, and imported intermediate inputs?
 - How is it possible to estimate the coefficient γ_{mm} in the absence of firm-affiliate level data on imported input prices p_{aipc} ?
 - How would you calculate the own price elasticity of demand for imported inputs (m)?
 - How would you calculate the cross price elasticity of demand between imported inputs and unskilled labor?
- b) Head and Ries (2002) study how the Japanese activities of Japanese multinational firms are related to the multinational firms' overseas employment. In one of their exercises they test how the share of Japanese multinational firm costs devoted to imported goods (brought to Japan) are related to the overseas employment of these firms. What do they find? And how could the result be interpreted in light of their findings about the effects of overseas employment on the relative compensation of non-production workers in Japan?
- c) Antras (2003) explores how the intra-firm share of U.S. imports is related to cross-country factor endowments and to cross-industry differences in factor intensities. What regularities does he note? How does he interpret these regularities?

4. Search

Consider Rauch and Trindade's (2003) model of search. Output for a partnership between i and j is given by $Y_{ij} = f(L_{ij}, Z_{ij})$, where Z_{ij} is used to represent the difference in expertise between two partners in a joint venture, and L_{ij} represents the amount of labor employed in the venture. If a domestic firm searches for a domestic partner, there is no uncertainty about partner expertise. In contrast, if the domestic firm searches for a partner in the foreign country, it will meet a single potential partner. Assume that the population of the home country L_i is smaller than the population of the foreign country L_i^* .

- a) How is the boundary of acceptable matches $\underline{z}(w^*/w)$ determined when a home firm searches for a partner in the foreign country? Describe the intuition and derive the solution.
- b) Derive the probability that the domestic firm will make a successful match in the foreign market, assuming that uncertainty is characterized by the variable k [$0 \leq k \leq 1$] which represents the range of partner introductions the entrepreneur may meet if he seeks a partner in the foreign country. Remember, k is centered around the "ideal" partner.
- c) Are there any conditions that would cause domestic firms in this framework to conduct partner searches *only* in the foreign country? Explain.
- d) Describe empirical work that supports the idea that information facilitates trade.
- e) Examination of product-level trade shows that the duration of trade is very short on average. Could this stylized fact also be explained by search models of trade? Explain.

Part C

5. Cross-Border Mergers and Acquisitions

(a) Describe a basic Nocke-Yeaple (2007) framework with cross-border mergers and acquisitions (M&As) and greenfield FDI in an industry where only the “mobile” technology (m) is heterogeneous. (There is no need to assume a specific distribution.) In particular, list and explain the necessary equilibrium conditions that determine various cutoffs.

(b) Graph and describe verbally which firms are expected to sell out, which will engage in cross-border M&As, and which in greenfield FDI. Why do some firms exit by selling out on the merger market?

(c) Suppose that instead of having a completely mobile technology, marginal cost in a merged firm will be an average of the parent and target firm marginal costs:

$$m_{merged} = \left(\tilde{m}_{parent}^{\frac{1}{d}} \tilde{m}_{target}^{1-\frac{1}{d}} \right)^{1-\sigma},$$

with $0 < d < 1$. How would you expect the outcomes in the merger market to change (if at all) with regard to the price of a target firm and which firms choose to sell out? Show analytically why this would be the case.

6. Ricardian Models

Consider the two-country case presented in Dornbusch-Fischer-Samuelson (1977, hereafter DFS). Let x denote the fraction of goods that the home country will export to the foreign country in equilibrium. Note that this fraction in the Eaton and Kortum (2002, hereafter EK) framework, $x \equiv \pi_{fh}$ (DFS call this fraction z^*). Denote the ratio of unit costs for home exports and foreign domestic production, using EK's notation, as

$$A = A(x) = \frac{c_h d_{fh}}{c_f},$$

where c_i represents unit costs of production for a particular industry in country i and $d_{ki} > 1$ is the trade cost involved in shipping goods from country i to country k .

(a) Suppose that the unit costs are based on efficiency levels drawn from the Fréchet distribution used in EK. Write down the formula for this distribution. Using the formula for π_{fh} from the EK model and the definition of A given above, derive the relationship between x and A .

(b) What parameter governs the dispersion of productivity levels across industries? Given a particular unit cost ratio, $A(x)$, does an increase in firm dispersion increase or decrease home exports? Why?

(c) Explain the role of technological growth in the Ricardian framework. Does it increase or decrease gains from trade in the DFS and EK models? Does it matter for your answer whether countries are growing at the same rate, or whether the growth occurs through technology transfer from one country to another?

(d) How does the formula for x change if firms operate not in a DFS-style perfectly competitive market, but in the duopolistically competitive framework of Bernard, Eaton, Jensen, and Kortum (2003)? Are trade patterns affected at all by the change in market structure? Are prices? Why or why not?