Written Exam for the M.Sc. in Economics 2011

International Trade and Investment
Final Exam/ Elective Course/ Master's Course
Winter 2011/2012
20 Februar 2012

3-hour closed book exam

- There are pages in this exam paper, including this instruction page
- You need to answer all THREE questions, so manage your time accordingly.
- If a question asks you to list three things, please underline the list with preceding numbers as exampled below.

  1. Thing number 1
  2. Thing number 2
  3. Thing number 3

- Make your math legible and easily followed, with the final answer boxed.
- Partial credit may be given.

Good Luck!

1. We can look at extensions of the Melitz (2003) model by examining the effects of different utility structures. For example, suppose a consumer's utility U follows this function, where good 0 is a homogenous numeraire good and Ω is a set of differentiated goods indexed by i:

$$U\left(c_o, \{c_i\}\right) = c_0 + \nu \int_{i\in\Omega} c_i di - \frac{\gamma}{2} \int_{i\in\Omega} c_i^2 di,$$

and $\nu > \gamma > 1$. Firms $i \in \Omega$ set their monopolistically determined prices p_i while the numeraire price $p_0 = 1$. There are L consumers in the economy who are each endowed with an income W. We consider the set $\{p_i, W\}$ such that consumers have positive demands for all goods and varieties. That is, the demand for good 0 and each $i \in \Omega$ is strictly positive. Firm i producing q_i units of its variety has total production costs $= \beta_i q_i$. The marginal cost β_i is firm-specific and drawn from a distribution with pdf $g(\beta)$ over support $[1, \infty]$

   (a) Given the prices $(p_0, \{p_i\})$, the consumer's (inverse) demand for a good i can be expressed as $p_i = A - Dc_i$, where A and D are functions of the model parameters. Derive A and D. A: $A = \nu$, $D = \gamma$.

$$\frac{p_i}{p_0} = \frac{dU}{dc_i} \Big/ \frac{dU}{dc_0}$$
$$p_i = \nu - \gamma c_i$$

   (b) If each consumer consumes c_i units of variety i, then the total market consumption is $q_i = c_i L$. Therefore, the firm's market demand can be written as $p_i = A - D\frac{q_i}{L}$. Find the firm's profit maximizing price, quantity, and revenues.

$$p_i = \frac{A + \beta_i}{2} \tag{1}$$
$$q_i = \frac{L}{2D}\left(A - \beta_i\right) \tag{2}$$
$$p_i q_i = \frac{L}{4D}\left(A^2 - \beta_i^2\right) \tag{3}$$
$$\pi_i = \frac{L}{4D}\left(A - \beta_i\right)^2 \tag{4}$$

   (c) We can find firm i's profit $= \frac{L}{4D}\left(A - \beta_i\right)^2$, conditional on the firm supplying to the market. Which firms supply to the market? Find a condition that characterizes the set of marginal costs β_i of domestic firms in Ω.

$$\pi\left(\bar{\beta}\right) > 0 : \bar{\beta} < A$$

(d) Suppose there is an foreign market with identical market demand, and firms can export their output to the foreign country for an iceberg transport cost $\tau > 1$. Which firms will export? Find a condition that characterizes the set of marginal costs β_i of the exporting firms.

$$\pi\left(\bar{\beta}_x\right) > 0 : \bar{\beta}_x < A/\tau$$

(e) Consider a firm i that exports. Compare the domestic markup versus the foreign markup for firm i. Does the firm make more profit per unit selling domestically or exporting? A: The domestic markup is higher, and the firm makes more profit selling to the domestic market.

$$MU = \frac{p}{\beta_i} = \frac{v + \beta_i}{2\beta_i} = \frac{v}{\beta_i} + \frac{1}{2}$$
$$MU_x = \frac{v}{\tau\beta_i} + \frac{1}{2} < MU$$

2. Let's discuss the decomposition of trade into products and/or firms. For your answers, you may want to refer to the following table of regression results for Danish exports in 2003. The dependent variables are $Export_c$, the value of Danish exports to country c, NFP_c, the number of firm-product pairs exported to country c, NF_c, the number of firms exporting to country c, and NP_c,the number of products exported to country c. The logarithms of all values are used for the regressions.

	$Export_c$	NFP_c	NP_c	NF_c
	(1)	(2)	(3)	(4)
(log) GDP	1.013	.692	.639	.633
	(.058)***	(.044)***	(.040)***	(.038)***
(log) Distance	-.958	-.888	-.817	-.640
	(.159)***	(.120)***	(.110)***	(.103)***
Obs.	174	174	174	174
R^2	.808	.801	.793	.802
F statistic	141.317	135.009	128.903	135.907

Table 1: Breakdown of Danish Exports, Cross Country Variation, 2003. All variables are in log.

(a) Which recent paper (name the authors) decomposed trade into product specific intensive and extensive margins? Which recent paper (name the authors) decomposed trade into firm specific intensive and extensive margins? Hummels and Klenow (2005) , Eaton Kortum Kramarz (2004)

(b) In reality, there are many firms that export multiple products. Suppose we treat each firm-product as a distinct variety v. Exports from Denmark to country c can then be defined as the sum of all the exports of all varieties: $\text{Export}_c = \sum_{v=1}^{V_c} \text{Export}_{vc}$. We can then define a firm-product extensive margin as V_c, the number of firm-product pairs exported to country c. Given this definition, define a firm-product specific intensive margin A: $\text{EM}=\frac{1}{V_c} \sum_{v=1}^{V_c} \text{Export}_{vc}$

(c) Let's define $VarietyExport_c = \frac{1}{V_c} \sum_{v=1}^{V_c} \text{Export}_{vc}$ as the average value of a firm-product sold to country c. Suppose you regress (log) $VarietyExport_c$ on (log) GDP and (log) distance. What coefficients should you expect to find? A: GDP: 1.013-.692 =.321. Distance: .007.

(d) Consider two countries Angoia and Bothun, which are equidistant from Denmark. Angoia has a GDP that is 10% higher than Bothun. Which country is expected to have higher total Danish exports? By how much (be as precise as possible)? Angoia, by about 10.13%.

(e) Suppose 1000 Danish firm-products are sold to Bothun. How many Danish firm-products do you expect are sold to Angoia? Be as precise as possible. A about 1069.

(f) From this table, do Danish exports expand via the extensive or intensive margin? Quantify your answer. Be as precise as possible. About .692/1.013=68% is through the extensive margin.

3. Discuss each of these comments in a clear and precise manner. Clearly identify what model or empirical work to which you are referring.

(a) The inflow of capital through FDI increases the return to labor (wages) for a country freely trading within the FPE set. A: Not true. In FPE, factor prices do not change with endowments.

(b) Unbalanced trade can account for Leontief's Paradox. A: True, Leamer (1980) showed this.

(c) The direction of trade in final goods is indeterminate in HOV. Partially true: This is only in the case where the number of goods $>$ number of factors.

(d) Informal ethnic trade networks decrease the measured trade between countries. A: Not true. Rauch and Trindade (2002) show the opposite for Chinese networks.

(e) Larger countries export a higher number of HS6 products as well as a higher value within each product category. A: True (Hummels and Klenow 2005)