

# Written Exam for the M.Sc. in Economics 2010

International Trade and Investment

Final Exam/ Elective Course/ Master's Course

Fall 2010

4-hour closed book exam

- There are pages in this exam paper, including this instruction page
- You need to answer all FOUR questions, so manage your time accordingly.
- If a question asks you to list three things, please underline the list with preceding numbers as exemplified 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. Identify whether these statements are true or false. If false, rewrite the sentence to make it true, changing maximum 1 or 2 words.

- (a) The Leontief paradox questioned the validity of the Ricardian model.  
A:False. Ricardian =Heckscher-Ohlin
- (b) The Stolper-Samuelson theorem suggests that free international trade should lead to wage increases in labor-abundant countries. A:True
- (c) The presented model in Dornbusch-Fischer-Samuelson (1977) is a model of outsourced intermediate goods. False. Dornbusch-Fischer-Samuelson (1977)=Feenstra-Hanson's (1995) , or intermediate=final
- (d) Autarky is a state of the economy where trade in goods do not exist.  
A:True
- (e) The existence of Factor Intensity Reversals are necessary for Factor Price Insensitivity to exist. A: False. existence =nonexistence.
- (f) An increase in the level of outsourcing increases wages for low, medium, and high-skilled workers in Danish firms. A: False (delete low)

2. Tefler (1995) suggests this amended HOV equation:

$$F_j^c = \pi_j^c V_j^c - s_c \sum_{n=1}^N \pi_j^n V_j^n$$

where  $F$  is the factor  $j$  content of trade for country  $c$ ,  $V$  is country  $c$ 's endowment of factor  $j$ , and  $s$  is country  $c$ 's share in world GDP.

- (a) What does  $\pi_j^c$  stand for in Trefler (1995)? A: Factor  $j$ 's productivity in country  $c$  relative to factor  $j$ 's productivity relative to the US (or benchmark country)
- (b) Suppose  $F_{Labor}^c = 0 \forall c$ . Solve for the implied relative value  $\frac{\pi_{Labor}^{DK}}{\pi_{Labor}^{US}}$  between countries  $DK$  and  $US$ . How would you measure  $\frac{\pi_{Labor}^{DK}}{\pi_{Labor}^{US}}$  in the data? A:  
 $\frac{\pi_{Labor}^{DK}}{\pi_{Labor}^{US}} = \frac{GDP^{DK}}{Labor^{DK}} / \frac{GDP^{US}}{Labor^{US}}$ . It is the relative per capita GDP of  $DK$  and  $US$ .
- (c) What are the two mysteries in Trefler (1995)? Briefly explain each. A: Missing Trade and Endowment paradox.

3. Consider Krugman (1980)'s monopolistic competition setup with 1 differentiated good industry. There are 2 countries, A and B, and they trade with each other. The utility function is  $u = \sum_{n=1}^N c_n^{\frac{\sigma-1}{\sigma}}$ , where  $c_n$  denotes the quantity consumed of good  $n$ . There is a ice-berg transport cost  $\tau$  to ship between countries A and B. Firms require  $l = \alpha + \beta x$  to produce  $x$  units of output. The wages of both countries is 1. The two countries have labor endowments of  $L_A$  and  $L_B$ .

- (a) Country B's total imports of country A's goods can be written as  $X_{AB} = \frac{N_A p_{AB}^{1-\sigma} I_B}{P_B}$ . Write down the zero-profit equilibrium expressions for  $N_A$ ,  $p_{AB}$ ,  $I_B$ , and  $P_B$  in terms of the parameters of the model in the description above.

$$\begin{aligned} N_A &= \frac{L_A}{\sigma \alpha} \\ p_{AB} &= \frac{\sigma}{\sigma - 1} \tau \beta \\ \frac{I_B}{P_B} &= \frac{L_B}{\frac{L_A}{\sigma \alpha} \left( \frac{\sigma}{\sigma - 1} \tau \beta \right)^{1-\sigma} + \frac{L_B}{\sigma \alpha} \left( \frac{\sigma}{\sigma - 1} \beta \right)^{1-\sigma}} \end{aligned}$$

(Any  $N_A$ ,  $p_{AB}$ ,  $I_B$  and  $P_B$  where the product is the same will work)

- (b) Write down expressions for  $X_{BA}$ ,  $X_{AA}$ ,  $X_{BB}$ , where  $X_{ij}$  denotes the total sales of goods produced in  $i$  and sold in  $j$ . Use only model parameters

$$\begin{aligned} X_{ij} &= \frac{L_i L_j (\tau_{ij})^{1-\sigma}}{L_i (\tau_{ij})^{1-\sigma} + L_j} \\ \tau_{ij} &= 1 \text{ if } i = j, \tau_{ij} = \tau \text{ if } i \neq j. \end{aligned}$$

- (c) How can you measure the term  $\mu = \tau^{\sigma-1}$  using only the data on the volumes of bilateral trade (i.e. values of exports and imports) between A and B plus data on domestic sales of the good in countries A and B?

$$\mu = \sqrt{\frac{X_{BB} X_{AA}}{X_{BA} X_{AB}}}$$

4. A country produces two goods: Legos and cells using two factors K and L under the standard assumptions of Heckscher-Ohlin. Suppose Legos are more L/K intensive than cells.

- (a) Draw a production possibilities frontier for the two goods, labelling axes correctly. Add a world price vector. Label it P1

- (b) Find the optimal production point. Label that point A.
- (c) On top of your previous drawing, draw another production possibilities frontier resulting from an increase in the endowment of L.
- (d) How does the world price vector change with the increase in L? It does not change (it has the same slope)
- (e) Draw the new world price vector on top of your graph and label it Q
- (f) Find the new optimal production point. Label that point B.
- (g) Production changed from A to B. Did the production of Cells increase or decrease? decrease.
- (h) What is the name of the theorem that provides the answer to part g? A: *Rybczynski*

