

## International Economics Exam

Last name (in capital letters):

First name (in capital letters):

Student registration number:

Signature:

*General instructions:*

1. Answer all questions from sections A and C, and answer only one question out of two from section B;
2. Exam papers that are missing either name, student number, or signature are not valid;
3. Write your name, student number, and signature also on the sheets employed to solve the exam; these sheets, together with scratch paper, have to be handed back;
4. Questions are to be answered in pen; pencil is allowed only for graphs;
5. Available time: 1 hour and 30 minutes.

### **SECTION A**

**Multiple choice questions (2 points for correct answer – including the graphs where required, 0 for blank answer, -1 for wrong answer)**

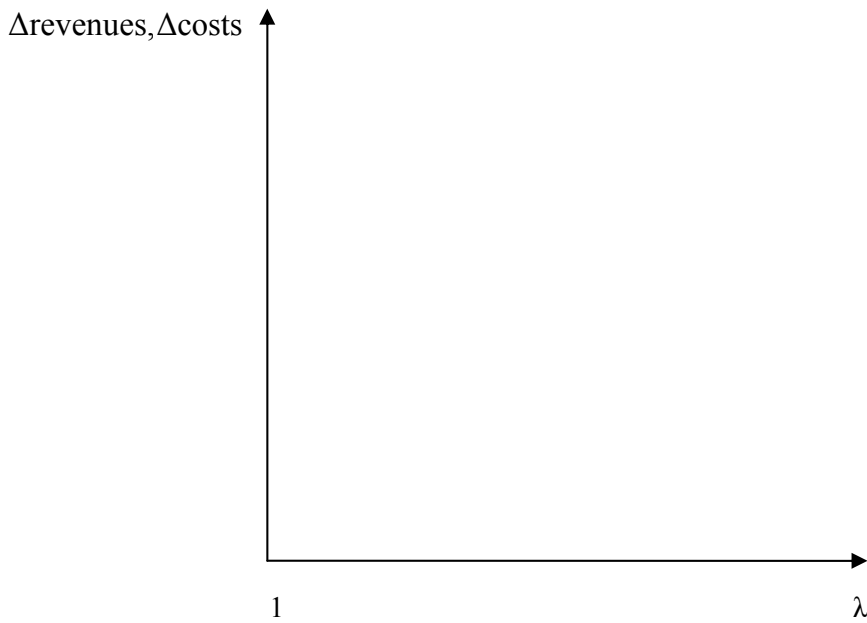
1. In the Ricardian framework the unit labor requirement for good  $X$  is  $a_X=4$  hours/liter and that of good  $Y$  is  $a_Y=2$  hours/Kg. The marginal productivity of labor in industries  $X$  and  $Y$  is, respectively,
  - a)  $MPL_X=1/4$  liters/hour and  $MPL_Y=1/2$  Kg/hour
  - b)  $MPL_X=4$  liters/hour and  $MPL_Y=2$  Kg/hour
  - c)  $MPL_X=1/2$  liters/hour and  $MPL_Y=1/4$  Kg/hour
2. In the Ricardian framework with two countries (Home and Foreign) and labor as factor of production consider the following unit labor requirements for the Cheese and Wine industries:

	<b>Cheese</b>	<b>Wine</b>
<b>Home</b>	1 hour/pound	3 hours/gallon
<b>Foreign</b>	5 hours/pound	4 hours/gallon

If in the free-trade equilibrium the relative price of cheese and wine is equal to 1, the wage in Home relative to the wage in Foreign is:

- a) 4
  - b) 5/4
  - c) 1
3. Consider trade policy with two big countries. Country  $H$  is an exporter of good  $Y$  while country  $F$  is an importer. If country  $H$  guarantees a subsidy on exports
    - a) the relative world price (terms of trade) between  $X$  and  $Y$ ,  $p_X/p_Y$ , will go up
    - b) the relative world price (terms of trade) between  $X$  and  $Y$ ,  $p_X/p_Y$ , will go down
    - c) the relative domestic price between  $X$  and  $Y$  inclusive of the subsidy,  $p_X/(p_Y(1+s))$ , is higher than the relative world price between  $X$  and  $Y$

4. Consider the model about the choice between licensing and horizontal FDI. In this model the profit differential between the multinational and national form is  $\Pi^{MNE} - \Pi^{NE} = p - (\lambda - 1)(c + F) - (c + F + H)$ . Represent graphically in the following space the  $\Delta$ revenues of the MNE form (net of production costs of the additional plant) and the  $\Delta$ costs (due to headquarters):



Trade liberalization (**lower  $p$** ) is conducive to

- a) shifting to the left the threshold of the excludability parameter  $\lambda^*$  above which it is convenient to stay national
- b) shifting to the right the threshold of the excludability parameter  $\lambda^*$  above which it is convenient to stay national
- c) changing the additional costs of being multinational

**SECTION B:** Answer only one question out of the following two (answer either B.1 or B.2).

**Question B.1: Import tariffs with big countries**

Let us consider two big countries,  $H$  and  $F$ , that are trading with each other a good  $X$  and a good  $Y$ .

- i) Draw the graph for the excess demand curves **for good  $Y$**  for these two countries under free trade, under the hypothesis that  $p_A^H > p_A^F$ ; that is, the equilibrium relative price  $p_X/p_Y$  in autarchy is higher in country  $H$  with respect to country  $F$ . Determine also graphically the equilibrium terms of trade,  $\hat{p}$ . What is the condition that equilibrium terms of trade  $\hat{p}$  satisfy?

Country  $F$  decides to levy an *ad valorem* tariff equal to  $t$  on imports. After the introduction of the tariff, equilibrium terms of trade change, and they assume a new value that we indicate with  $\hat{p}_t$ .

- ii) Write the analytic expression for the domestic relative price in country  $F$ ,  $p_t^F$ , after the import tariff is levied, as a function of the new international terms of trade  $\hat{p}_t$ .
- iii) Show graphically through the excess demand curves for good  $Y$  in country  $H$  and country  $F$  how to determine the new terms of trade,  $\hat{p}_t$ , after the tariff is levied.
- iv) Redo points ii) and iii) in the case of an import tariff levied by country  $H$  on good  $X$ .

**Question B.2: Theories of trade with imperfect competition**

Let us consider the Brander and Krugman (1983) model with imperfect competition. In country  $H$ , in a given sector with homogeneous final output, there are two firms: one is domestic and the other is foreign. The marginal cost for production in country  $H$  of the domestic firm is  $c$ , while the marginal cost for production of the foreign firm is

$$\hat{c} = \frac{c}{\tau},$$

where the parameter  $\tau < 1$  represents freeness of trade, which is inversely related to the level of trade barriers (transport costs, tariffs, etc.). Let us also recall that, when the domestic firm has market power, the profit maximizing price is  $p$ , being equal to

$$p = \frac{\sigma}{\sigma - s} c$$

where  $\sigma$  is the market demand elasticity, and  $s$  is the market share of the domestic firm in country  $H$ .

- i) When there is autarchy there are no competitors for the domestic firm in market  $H$ . What is the autarchy price,  $p_A$ , that she charges in this case?
- ii) Write the expression of the price,  $p^*$ , charged by the foreign firm in  $H$ , as a function of  $\sigma$ ,  $s$ ,  $c$ ,  $\tau$ , when trade is allowed.
- iii) Since we are dealing with a homogeneous good, in equilibrium, when there is trade, it has to be that  $p_T = p = p^*$ , where  $p_T$  is the equilibrium price when there is trade. Starting from this condition, write

the analytic expression of the market share,  $s$ , held by the domestic firm. Write also the analytic expression of the equilibrium price  $p_T$  as a function of the exogenous parameters  $\sigma$ ,  $c$ , and  $\tau$  only (the variable  $s$  is endogenous and disappears).

- iv) Derive the analytic condition that has to be satisfied by the freeness of trade parameter,  $\tau$ , in order to have trade; that is, derive the analytic condition that allows the foreign firm's market share to be positive in country  $H$ . Why does this condition depend on the parameter  $\sigma$  of market demand elasticity.
- v) Compare the equilibrium price in  $H$  under autarchy,  $p_A$ , and the equilibrium price under trade,  $p_T$ . What price is the largest? Why?

## **SECTION C**

### **Traditional theories of trade**

Consider the following Ricardian framework. There are two countries,  $E$  and  $P$ , two tradable goods,  $v$  and  $c$ , and one factor of production, labor, which is immobile across countries. Good  $c$  is the numeraire good in both countries; that is,  $p_c^E = p_c^P = 1$ . Country  $E$  and country  $P$  are endowed with 100 units of labor each. We have the following technologies in each country (unit labor requirements):

$a_c^E = 3$ ;  $a_v^E = 1$ ;  $a_c^P = 2$ ;  $a_v^P = 2$ . Preferences over the two goods are of the Leontief type in both countries.

- i) Compute the autarchy equilibrium for  $E$  and  $P$ ; that is, compute the quantities produced (and consumed), the total amount of labor employed, wages, and prices in each sector.
- ii) Draw the world PPF and determine **graphically** the world production and consumption under free trade, the free trade price ratio, the pattern of specialization of the two countries.