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Name:.....

Exam 2 (95 points)

(I) Optimal Subsidy/Tax

Consider the case of two firms (Firm 1 and Firm 2) from two different countries (Country 1 and Country 2) that export all their output to a third country. The firms produce differentiated products, compete in prices and have zero marginal costs.

The demands they face are of the form: $q_1 = A - 2p_1 + p_2$, $q_2 = A - 2p_2 + p_1$, where A is a positive constant, p_1 and p_2 are the prices charged by each firm, and q_1 and q_2 the resulting quantities demanded.

Assume that Country 1 is the only country able to use an export subsidy/tax per unit of output produced by Firm 1. Furthermore, Country 1 maximizes social welfare and is able to choose the subsidy/tax before the firms engage in price competition. So in stage 1, Country 1 chooses "s" and in stage 2 both firms choose their prices simultaneously.

As a benchmark, let's use the following notation for the NE in prices in stage 2 when there is **no government intervention** (i.e. the subsidy/tax is zero): p_1^B, p_2^B .

- (1) (4 pts) Do you think that in a SPNE country 1 will choose to tax or subsidize its firm? Justify clearly without making any calculations.
- (2) (8 pts) How do the resulting p_1 in the SPNE compares with the resulting p_2^B ? How does the resulting p_1 compare to p_1^B ? Justify clearly without making any calculations.

(II) Reciprocal Dumping Model

Consider two countries (Country 1 and Country 2) and two firms (Firm 1 and Firm 2) that produce a homogeneous product. Firm 1 is from country 1 (i.e. produces in country 1 and its owners are from country 1) and Firm 2 is from country 2 (i.e. produces in country 2 and its owners are from country 2).

Both firms have zero marginal costs of production and could potentially sell in each other's markets (i.e. firm 1 could export to country 2 and firm 2 could export to country 1). There is **no cost of physically transporting the goods from one country to another** and both markets have identical demands:

$$p_1 = 90 - q_1 \quad \text{and} \quad p_2 = 90 - q_2$$

(where p 's and q 's denote the price and total quantities in each country).

- (1) (14 pts) Assume each country charges a tariff $\tau = 15$ to the foreign good and firms compete in quantities. Calculate the NE in quantities in each country (you need to

- calculate prices and quantities).
- (2) (8 pts) Assume now that both countries remove the tariff and firms continue to compete in quantities. What market share will each firm have in each country (no calculations needed)? Do you think that Firm 1 is “dumping” its product in country 2? Justify.
 - (3) (10 pts) Assume now that firms compete in prices but that both countries keep the tariff equal to zero:
 - Do you think that firms will continue to export their products?
 - What will the market price be in each country?
 - Calculate each country’s welfare.

(III) Deardorff/ Scotchmer

Consider a variation of the Deardorff model for the case of multiple inventions . The attached diagram shows the amount of research investment (I) in the horizontal axes and **single period magnitudes** for a country: $s^o(I)$ (optimal consumer surplus per dollar of research obtainable from the last dollar of research investment), $\pi^m(I)$ (monopoly profits per dollar of research obtainable from the last dollar of research investment) and $s^m(I)$ (consumer surplus per dollar of research under monopoly obtainable from the last dollar of research investment) in the vertical axes.

PLEASE PUT YOUR NAME IN THE DIAGRAM PAGE.

Assume the world lasts **only one period**:

- (1) (4 pts) Identify the optimal amount of research investment for the country. Justify your choice.
- (2) (6 pts) Identify the Net gain for society (or country’s welfare) when the optimal amount of research investment is undertaken. Justify your choice.
- (3) (4 pts) Assume the country grants patents to inventors. Identify the amount of research investment will be undertaken. Justify your choice.
- (4) (6 pts) Identify the Net Gain for Society (or country’s welfare) when a patents are granted to inventors. Justify your choice.
- (5) (6 pts) Assume the country grants **no patent** to inventors. Identify the amount of research investment that will be undertaken. Justify your choice.

Assume now the world lasts **two periods** and that the interest rate is zero.

- (6) (10 pts) Assume the country grants inventors patents for two years (the cost of inventing /discovering something does not change). Show in the diagram the amount of research investment that will be undertaken.

(IV) Short Questions

- (1) (5 pts) How is the increase in the use of antidumping duties related to the problem of trade deflection according to Crowley?
- (2) (5 pts) How are Intellectual Property Rights related to trade? What is main goal of TRIP’s agreement?
- (3) (5 pts) Why are patents an imperfect incentive mechanism for innovation from society’s point of view?

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