

## Exercise 5

### Problem 1: Trade Policy Issues.

- a) Derive the optimal tariff in the large country, perfect competition case mathematically, and demonstrate it graphically. Also explain why the optimal tariff for a small country is zero.
- b) Show that there are Pareto gains from trade, using Dixit-Norman taxation. Briefly discuss the advantages and disadvantages of this scheme, compared to a lump-sum compensation.
- c) Demonstrate the strategic trade policy argument in the imperfect competition case, namely that an import tariff can shift rents in favor of the domestic firm.

### Problem 2: Consider the "Protection for Sale" model as introduced by Grossman and Helpman (AER 94).

- a) Derive equations (13), (14), (15), and proposition 2 in the original article. In equation (13), please indicate where each term comes from, ie consumer surplus, tariff revenue etc.
- b) Whereas the original model is formulated in tariffs, many empirical implementations use non-tariff barrier (NTB) data. However, with NTBs, only a share  $\gamma < 1$  of the rent from protection (tariff revenue, if it were a tariff) is actually captured by the government. Modify your calculations in a) to account for this fact.

### Problem 3: GATT/WTO

- a) Consider a tariff game between two large countries, as in the work of Bagwell and Staiger. Let the welfare of each country be given by

$$W_i(t_i, t_{-i}) = 0.125 + 0.25(t_i - t_{-i}) - t_i(t_{-i} + t_i) \quad (1)$$

where  $i \in \{home, foreign\}$ . Find the optimal tariffs as a best response to the tariff set by the other country. Are tariffs strategic complements or substitutes? Determine the Nash equilibrium in tariffs, as well as the globally optimal tariff regime(s)

- b) Continuing from part b), let this be a repeated game, and suppose both governments have the same discount factor. What is the critical discount factor that is required to render the symmetric cooperative outcome self-enforcing under the threat of Nash-reversion?