

Written Exam at the Department of Economics summer

## **International Economics**

Final Exam

June 14, 2018

(3-hour closed book exam)

Answers only in English.

**This exam question consists of 2 pages in total**

*NB: If you fall ill during an examination at Peter Bangsvej, you must contact an invigilator in order to be registered as having fallen ill. In this connection, you must complete a form. Then you submit a blank exam paper and leave the examination. When you arrive home, you must contact your GP and submit a medical report to the Faculty of Social Sciences no later than seven (7) days from the date of the exam.*

### **Be careful not to cheat at exams!**

- You cheat at an exam, if during the exam, you:
- Make use of exam aids that are not allowed
- Communicate with or otherwise receive help from other people
- Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text
- Use the ideas or thoughts of others without making use of source referencing, so it may appear to be your own idea or your thoughts
- Or if you otherwise violate the rules that apply to the exam

## Problem 1

Answer whether each statement is true, false or uncertain. Defend your answer, but not need to use math! Answers without comments can at most get half points.

1.1. Consider a Ricardian model with two sectors, one factor of production, and two countries. Let productivity in the foreign country increase uniformly across both sectors, but insufficiently to change comparative advantage. This will benefit both home and foreign.

1.2. Consider one country which trades with the rest of the world and is described by the two-factor model with capital and labor. Keep the world price fixed. Suppose there is a positive immigration inflow but that these immigrants are wealthy and bring with them more capital per person than the native population. This will decrease production of the capital-intensive good but keep the wage and return on capital constant.

1.3. Consider the Dornbusch/Fisher/Samuelson model of continuous goods and two countries. Suppose there is an increase in productivity abroad. This will benefit home.

1.4. Suppose Denmark and Spain are modeled as the Heckscher–Ohlin model. Both countries are in the cone of diversification (they produce both goods). Trade is costless. Denmark is capital abundant. Then wages will be higher in Spain

1.5. The classical trade models (the Heckscher–Ohlin model and the Ricardian model) are suited to explain all three of the following facts: The increase in income inequality in the developed world, the decrease in the labor share in the developed world, the rise in income inequality in the developing world.

1.6. Brexit is expected to help low-wage workers

1.7. Total welfare in the world is always improved when countries form regional trade agreements.

1.8. Imposing an import quota or imposing an import tariff are equivalent when markets are competitive and the home government sells the quota (and gets the revenue).

1.9. In a competitive market, a foreign country strictly prefers a voluntary export constraint to an import tariff that reduces imports by the same amount.

## Problem 2

Consider a market in country  $C$  with an inverse demand function of:

$$p(D),$$

where  $p$  is the price that results from total consumption of  $D$  units.  $p'(D) < 0$  and  $p''(D) \leq 0$ .

Country  $C$  does not itself have a firm that can service this market. Country  $A$  and  $B$  each have one firm that can. They each have constant marginal costs of  $c_A$  and  $c_B$ , with  $c_A \geq c_B$  where for simplicity we suppose that  $c_A$  and  $c_B$  are

close enough that both firms will be producing throughout. The two firms choose how much to produce,  $q_A$  and  $q_B$ , simultaneously, i.e. they play a simultaneous move game where actions are quantities.

a) Show that (a) Nash equilibrium is given by:

$$p'(q_A + q_B)q_A + p(q_A + q_B) - c_A = 0,$$

$$p'(q_A + q_B)q_B + p(q_A + q_B) - c_B = 0,$$

and show what the necessary constraint is for firm  $A$  to have positive production.

b) Show that the response functions ( $A$ 's best response to production by firm  $B$  and  $B$ 's best response to production by firm  $A$ ) are downward sloping and argue that this means the equilibrium is unique. Interpret

c) Show that firm  $B$  will be producing (weakly) more than firm  $A$ . Interpret

d) Suppose that country  $A$  imposes an export subsidy of  $s$  per unit exported to country  $C$ . Show that this will increase firm  $A$ 's production and reduce firm  $B$ 's production. Interpret

In the following suppose the inverse demand function is given by:

$$p(D) = A - BQ,$$

e) From now on, assume that both country  $A$  and country  $B$  impose subsidies of  $s_A$  and  $s_B$ , respectively. Show that the equilibrium is now given by:

$$q_B = \frac{A + (c_A - s_A) - 2(c_B - s_B)}{3B},$$

$$q_A = \frac{A + (c_B - s_B) - 2(c_A - s_A)}{3B}.$$

f) Consider equal costs  $c_A = c_B = c$ . The home governments  $A$  and  $B$  seek to maximize home welfare (export profits minus government subsidies). Formally, we set up the following game: first stage, the two governments simultaneously set subsidies  $(s_A, s_B)$ , second stage: the two firms simultaneously set quantities  $(q_A, q_B)$ . Consumption takes place and profits are earned. Show that this equilibrium is worse for both countries  $A$  and  $B$  than an equilibrium with no subsidies ( $s_A = s_B = 0$ ). Interpret.