

Final Exam for Trade Module, 1998

Assumptions cumulate: the assumptions made in parts a and b of a question continue to hold for part c of that question, unless you are told explicitly otherwise. Attempt to answer all questions. Where indicated, you should provide explanations. (Guessing the correct sign is worth nothing, in the absence of an explanation.) If you use a theorem, tell me the name of the theorem. Be brief. Including irrelevant information detracts from your answer.

1) Home produces two goods (cloth and umbrellas) with two factors (capital and labor) using a constant returns to scale (CRTS) technology. Factors are freely mobile across sectors, but do not flow from one country to another.

[10 points] a) What is the meaning of “no factor intensity reversals”? The absence of factor intensity reversals implies a monotonic relation between which two endogenous variables?

[10 points] b) Suppose that there are no factor intensity reversals and Home is incompletely specialized in a free trade equilibrium. The Rest of World also produces the two goods and is incompletely specialized. What additional assumption(s) are sufficient to insure that the factor returns are the same in the two countries in a free trade equilibrium?

[10 points] c) Suppose that Home has a positive externality associated with the production of cloth. Cloth is the imported good, and is relatively capital intensive. Home considers using either an import tariff  $t$  or a production subsidy  $s$  for cloth, with  $t = s$ . Do these two policies have the same effect on the return to capital? Explain.

d) Now discard the assumption that capital is internationally immobile. Suppose instead that capital is internationally mobile, that Home imports capital, and that the world price of capital is  $r^w$ . Home is small.

[15 points] i) Home decides to use a tariff to correct the production externality. It considers using a capital tax/subsidy in conjunction with the tariff. I want you to compare two cases: (a) Home uses only a tariff, or (b) Home uses a tariff and also taxes/subsidizes capital imports. All policies

are constrained optimal; that is, given the choice of the policy instrument(s), the *levels* are optimal.<sup>1</sup>

Does option (a) or (b) leads to higher welfare?  
Compare the optimal tariff in the two cases: which is higher?  
Does the optimal policy in (b) involve a tax or a subsidy on capital?  
Explain your answers.

[15 points] ii) Suppose that instead of the tariff, Home decides to use a cloth production subsidy to correct the production externality. As in part (i), it also considers using a tax/subsidy on capital imports (together with the production subsidy).

Is the optimal value of the capital import tax positive, negative, or zero (i.e., is the policy a tax, a subsidy, or set equal to zero)? Explain why your answers to parts i) and ii) are either different or the same.

[10 points] iii) Compare the *level* of the optimal tariff in part (ia) and the production subsidy in part (ii). Which is higher - and why?

2) (The Ricardian model) Columbia produces automobiles and coffee using one unit of labor to obtain one unit of output of each good. (Labor is internationally immobile.) The world relative price of automobiles is  $P_{auto}/P_{coffee} = 2$ . (These are the only two goods in the world.)

[10 points] a) For which good does Columbia have a comparative advantage?

[20 points] b) Columbia has 10 units of labor. The representative worker has the Cobb-Douglas utility function  $U = A^{.5}C^{.5}$  where  $A$  equals consumption of automobiles and  $C$  equals consumption of coffee. What is the equilibrium consumption of automobiles and coffee under autarky and under free trade?

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<sup>1</sup>In part (c) I told you that the levels for two different policies were equal. We have now discarded that assumption.