

Exam ARE 201
Fall 2004

Answer all questions. The value of each question is shown in parentheses next to the question number.

1. (20 points) Use a two country trade model, and graphical methods. Suppose that Home's preference for its import good increases. (In other words, for any relative price and nominal income, Home wants to consume more of its import good.) Home and Foreign allow free trade. Show how this change in preferences affects world price and Foreign's level of aggregate welfare. Briefly explain the role of the Marshall-Lerner condition in your answer.

2. (20 points) State (without proof or discussion) the effects of a small tariff on aggregate welfare within a country and on the distribution of welfare within that country in the following three models: (i) Ricardian, (ii) Ricardo-Viner, and (iii) HOS.

3. (25 points) Consider the following partial equilibrium model. The Home and the Rest-of-World (ROW) supply functions are positively sloped. The Home demand function is negatively sloped. The ROW demand function is infinitely elastic at all "relevant" prices. Production of each unit of the good *anywhere in the world* creates γ units of environmental damage in Home.

Home has the option to use either a tariff or a production tax/subsidy.

(a) Which of these two policies gives Home a higher level of welfare – or is the comparison ambiguous? (Explain your answer.)

(b) Either graphically or mathematically, determine the optimal levels of the two policies. Explain why the levels of the two policies are different.

4. (25 points) Use the two-sector HOS model with food and cloth. A large country exports cloth, which is capital intensive. There is an exogenous increase in the domestic stock of labor. Briefly describe (using only words) the effect of this increase on national income and on real factor returns within the country. If you use any theorems, state them.

5 (10) What is "dumping"? Briefly describe how anti-dumping cases are decided within the US?

Sketch of answers and comments on your answers:

A general comment: A few people do not believe me when I write "*Briefly describe (using only words)...*" or "*State (without proof or discussion)...*". These people insist on using something other than words, or in providing a proof or discussion. This is not a good strategy!

1) Use a PPF and IEP's to show that at any world price, the change increases Home's demand for imports. Thus, the change shifts out Home's import demand function. The M-L condition (equivalently, the stability condition) implies that this shift must increase the relative price of Home's imports (regardless of whether the intersection of Home import demand and Foreign export supply occurs at a point where the Foreign supply function has a positive slope). Using the PPF for Foreign, show that the increase in its export price must increase aggregate welfare in Foreign.

Common mistakes: I told you to assume a change in Home preferences. Most of you did not explain why this change shifted out Home's demand for imports. Most of you did not show that Foreign's improved terms of trade increased its welfare – you merely asserted this. A few of you appeared uncertain of what the M-L condition means.

2) I forgot to tell you to assume that the country was small. I did not take off any points if you made this assumption without stating it, and I gave you a point if you recognized that the assumption was needed.

For each model, the tariff reduces aggregate welfare. For the Ricardian model there is only one factor of production, so all workers lose. In the Ricardo-Viner model, the fixed factor in the import competing sector gains, the fixed factor in the export competing sector loses, and the effect on the mobile factor is ambiguous. In the HOS model, the factor that is used intensively in the import competing sector gains and the other factor loses.

Common mistakes. Some people insisted on providing a justification for the answer, despite my specific advice not to do so.

Several of you said things like "the real return goes down in terms of" a particular price. This kind of statement *makes no sense*. The real return is a function, and the ratios $\frac{w}{p_i}$ are arguments of that function. You can say that the function is increasing in the argument, and that a higher price causes the argument to fall, thus reducing the value of the function. But it

makes no sense to say that the value of the function "goes down in terms of the price". I am not sure whether this mistake was due to a problem with English or Economics.

Some people did not recognize that in the RV model there are two types of capital – the capital that is specific in each sector. In this model it makes no sense to say that one sector is capital intensive. The capital-labor ratios in the two sectors are not comparable, since they involve different units. (The numerators are in different units.)

The most common mistake was that some people fundamentally did not understand the comparative statics of the RV model. Some people appear not to have recalled the Stolper-Samuelson theorem, used to evaluate the effect of the relative price on real returns in the HOS model.

I have asked some version of this question on nearly every final exam that you have a record of. In view of this regularity, I would have thought that you would have the answer down cold.

3) I forgot to tell you to assume that home imports the good under all policies. So you could have given two answers, depending on whether you assumed that Home is an importer or an exporter. However, the two answers are essentially the same.

Since ROW demand is infinitely elastic, world price is fixed. Since ROW supply depends on world price, ROW *supply* is also fixed. *Home has no way to affect ROW supply, so it must take it as exogenous.* (Home can only determine how much it imports, and can thus determine the amount that ROW consumes.) The only source of environmental damage that home can influence is that arising from domestic supply. Therefore, the first best policy is a production tax equal to γ .

A tariff – be it positive or negative – introduces a consumption distortion. The objective here is to reduce domestic production. If the country imports the good, the reduction in producer price requires an import subsidy, i.e. a negative tariff. Note that an import subsidy of γ would cause the domestic producer price to fall by the same magnitude as the optimal (first best) production tax. However, because the trade policy causes a consumption distortion, the optimal level of the trade policy is smaller (in absolute value) than the production tax. The logic here is essentially the same as in the problem set that this question resembles. If the country exports the good, it wants to tax exports. Again, the optimal export tax is less than the optimal

production tax.

Common mistakes:

No one came close on this question. A few of you realized that the assumptions of the question imply that Home is small: its actions cannot affect the world price of the commodity. People who didn't recognize this point did not make much progress on the question. Unfortunately, everyone who recognized that Home is small, concluded that the level of ROW demand was fixed. A simple supply and demand curve, with a flat demand function, should convince you that the level of ROW *supply* is fixed, whereas ROW demand adjusts to pick up the slack. Simple points such as this are key!

4) Since this is a large country, you have to recognize that the change in factor supply will change the commodity price. Evaluate the effect of the change in factor supply at the initial (relative) commodity price, in order to determine how the change in factors affects the commodity price – and thereby affects everything else.

Holding fixed the initial price, the increase in the stock of labor increases the production of food and decreases the production of cloth, by the Rybczynski Theorem. At constant prices, the higher stock of factors mean that national income (equal to $wL + rK$) has increased (because L increases and w, r, K are constant at the constant commodity price). Therefore, demand for both goods must have increased (since no goods are inferior). Thus, at the initial price, the demand for the export good has increased and its supply has decreased. At the initial price, exports are lower.

Therefore, the change in factor supply unambiguously shifts in the country's export supply function. Since it is a large country, the price of its exports must increase in order to restore equilibrium (assuming that the initial equilibrium was stable).

The improvement in the terms of trade, and the increased stock of labor (shifting out the PPF), both increase the country's real income. National income rises.

Since the relative price of exports rises, the real return to capital (the factor used intensively in the export sector) rises and the real return to labor falls, by the Stolper Samuelson Theorem.