

ECO 352 – International Trade – Spring Term 2010
FINAL EXAMINATION
ANSWER KEY

The distribution of grades was as follows:

Range	100	90-99	80-89	70-79	60-69	50-59	< 50
Numbers	2	5	7	11	5	2	1

The question-by-question performance statistics were

Question No.	Mean	Std. Dev.	Max	Min	Median
1	16.8	2.9	20	9	18
2	22.3	5.2	30	7	23
3	14.3	5.1	20	4	15
4	25.4	4.8	30	14	27
Total	78.8	13.2	100	45	79

The performance was generally very good. Here are some common errors:

- [1] In Q.1 (b), too many people forgot about the income and substitution effects in demand. This is an important part of your microeconomics learning.
- [2] In Q.2 (c), the fact that the statement comes from Oxfam is significant; too many people overlooked this. General lesson: read questions carefully.
- [3] The performance on Q.3 was the worst. Perhaps people did not pay serious attention to the fact that the final exam was cumulative, and reviewed the first half of the course less well.
- [4] In Q. 4, those who carried through the numerical calculations well did best. The whole question was so similar to that on the sample exam that more of you should have done better.

QUESTION 1: 20 points, 4 for each part

True/false/uncertain. The label is less important than the reasoning.

- (a) False. First, one country does not have to have an absolute productivity advantage at all for there to be gains from trade. Mere comparative advantage, which always exists, ensures that both will gain. One will gain more, but it is not a priori clear which one. Second, if there is a country with an absolute productivity advantage, it may be sufficiently large that its autarkic price equals the free trade price, in which case it has zero gain from trade.

(b) False. The increase in the relative price of the export good clothing (an improvement in terms of trade) will increase the volume of clothing production. The substitution effect of the price change will decrease the volume of its consumption and therefore increase the volume of its exports of clothing. But the income effect of the price change can increase the volume of its consumption of clothing so much as to more than offset the other two effects and so decrease the volume of exports.

(c) False. Intra-industry trade can occur even (especially) between identical countries that lack conventional comparative advantage. The reasons are scale economies and product differentiation.

(d) True. This is obvious in the case of a tariff. For a good that carries an export subsidy, domestic producers will not sell it at home unless the price is higher there by the amount of the subsidy than the price in the rest of the world; (re)imports of the subsidized good have to be prohibited so foreigners cannot sell the good at home at a lower price either.

(e) False. The Most Favored Nation principle says that when a country joins the WTO, it is required to offer the same policies to all other members as it offers to any one.

QUESTION 2: 30 points, 10 for each part

(a) No. When Abe buys a coat made in America, what America no longer has is the resources (labor, land, capital, materials ...) that went into making that coat, and which could have been used in producing other goods or services. So the question is whether making the coat was the best use of these inputs. Properly analyzed, that simply becomes the question of whether America has a comparative advantage in making coats.

(b) Participants in the political process can capture any attempt at strategic trade management by (i) obtaining the quota allocations or domestic monopolies and getting the rent associated with these, (ii) lobbying and voting for the policies that favor the factors one owns, under the guise of strategic trade asserted to be in the national benefit. The rules and procedures of policymaking can attempt to reduce or minimize such rent-seeking behavior by (i) laying down in advance clear rules about the circumstances that can justify intervention in trade and the manner of such intervention, and (ii) by increasing the transparency of the process and reducing the costs of participation in the process so unorganized interests have nearly equal information about and access to the process.

(c) The statement carries special force because it comes, not from the WTO or the IMF or the World Bank that have a long record of saying such things (Irwin calls them the usual “globalization cheerleaders”), or from some rich-country government that wants the LDCs to open up their markets so as to benefit the rich country's exporters, but from Oxfam, an NGO that had previously been skeptical about benefits of trade. But many less-developed countries retain trade barriers, for a mixture of reasons: [1] infant-industry arguments, even if erroneous, [2] correcting market failures, even though trade barriers are not optimal response, [3] remnants of anti-colonial and socialist ideologies, [4] special interest groups and urban voters favor protection, [5] negotiating ploy in international bargaining over trade policy liberalization.

QUESTION 3: 20 points, divided as stated below

- (a) (2 points) For the utility function $U(C,F) = C F$, the relative demand function is $F/C = P_C/P_F$.
- (b) (2 points) The productivity ratio of food to clothing in the Home country is $z / z = 1$; that in the Foreign country is $4/1 = 4$. Therefore Foreign has the comparative advantage in food. This is true for all values of z .
- (c) When $z = 2$:
- (i) (4 points) Assuming the countries are completely specialized, Home must specialize in clothing and Foreign in food. Therefore outputs are $1000 z = 2000$ for clothing and 4000 for food. The relative supply is $4000 / 2000 = 2$. Equating this to the relative demand in (a), we have the equilibrium relative price $P_C/P_F = 2$. This is between the limits of relative prices 1 at which Home is willing to produce some food and 4 at which Foreign is willing to produce some clothing, so the initial assumption of completely specialization is valid.
- (ii) (4 points) When Home is producing clothing, $w = 2 P_C$, the value of the marginal (equals average) product. Similarly, Foreign is producing food, so $w^* = 4 P_F$. Therefore
 $w/w^* = (\frac{1}{2}) P_C/P_F = \frac{1}{2} 2 = 1$.
- (d) When Home's productivity z increases, but that both countries remain completely specialized:
- (i) (4 points) Outputs are clothing in Home = $1000 z$, food in Foreign = 4000 . The ratio is $4 / z$. Equating this to the relative demand function, we get $P_C/P_F = 4/z$.
Also $w = z P_C$, and $w^* = 4 P_F$, so $w/w^* = (z/4) (P_C/P_F) = 1$.
- (ii) (4 points) $w/P_C = z$ and $w/P_F = (w/w^*) (w^*/P_F) = 4$, so an increase in z benefits Home
 $w^*/P_C = (w^*/w) (w/P_C) = z$, and $w^*/P_F = 4$, so the increase in z benefits Foreign, too.
Intuition: Foreign is importing clothing. When Home's productivity in this good increases, Foreign's terms of trade improve (P_C/P_F falls), making it better off. Home's wage in terms of the good it produces must increase. Its terms of trade worsen, but in this case not by enough to make it worse off (no immiserizing growth). And this is a one-factor model, so there is no distributional conflict.

QUESTION 4: (30 points)

(a) (i) (2 points) Profit expressions:

$$\begin{aligned}\Pi_A &= [P_A - (64 - S_A)] [(200 + \frac{1}{2} P_B) - P_A] \\ \Pi_B &= [P_B - 64] [(200 + \frac{1}{2} P_A) - P_B]\end{aligned}$$

(ii) (4 points) Using the result given in the statement of the question, Π_A is maximized when

$$P_A = \frac{(64 - S_A) + (200 + \frac{1}{2} P_B)}{2} = 132 - \frac{1}{2} S_A + \frac{1}{4} P_B.$$

Similarly, Π_B is maximized when

$$P_B = \frac{64 + (200 + \frac{1}{2} P_A)}{2} = 132 + \frac{1}{4} P_A.$$

(iii) (4 points) Solving

$$P_A = 132 - \frac{1}{2} S_A + \frac{1}{4} (132 + \frac{1}{4} P_A) = 132 + 33 - \frac{1}{2} S_A + \frac{1}{16} P_A,$$

or

$$\frac{15}{16} P_A = 165 - \frac{1}{2} S_A,$$

or

$$P_A = \frac{16 \times 165}{15} - \frac{16}{15 \times 2} S_A = 176 - \frac{8}{15} S_A.$$

Then

$$P_B = 132 + \frac{1}{4} \left[176 - \frac{8}{15} S_A \right] = 132 + 44 - \frac{2}{15} S_A = 176 - \frac{2}{15} S_A.$$

(iv) (4 points) Substituting,

$$\begin{aligned}Q_A &= 200 - \left[176 - \frac{8}{15} S_A \right] + \frac{1}{2} \left[176 - \frac{2}{15} S_A \right] = 112 + \frac{7}{15} S_A \\ Q_B &= 200 + \frac{1}{2} \left[176 - \frac{8}{15} S_A \right] - \left[176 - \frac{2}{15} S_A \right] = 112 - \frac{2}{15} S_A\end{aligned}$$

and

$$\begin{aligned}\Pi_A &= [176 - \frac{8}{15} S_A - (64 - S_A)] (112 + \frac{7}{15} S_A) = (112 + \frac{7}{15} S_A)^2, \\ \Pi_B &= [176 - \frac{2}{15} S_A - 64] (112 - \frac{2}{15} S_A) = (112 - \frac{2}{15} S_A)^2.\end{aligned}$$

(b) (i) (2 points) When $S_A = 0$,

$$P_A = P_B = 176, \quad Q_A = Q_B = 112, \quad \Pi_A = \Pi_B = 112^2 = 12544.$$

The EU and US surpluses equal the respective firms' profits, so 12544 each.

(ii) (6 points) EU wants to maximize

$$\begin{aligned}
W_{EU} &= \Pi_A - S_A Q_A = (P_A - 64 + S_A) Q_A - S_A Q_A = (P_A - 64) Q_A \\
&= \left[176 - \frac{8}{15} S_A - 64 \right] (112 + \frac{7}{15} S_A) \\
&= (112 - \frac{8}{15} S_A) (112 + \frac{7}{15} S_A) \\
&= 112^2 + 112 (\frac{7}{15} - \frac{8}{15}) S_A - \frac{7}{15} \frac{8}{15} (S_A)^2 \\
&= 12544 - \frac{112}{15} S_A - \frac{56}{15 \times 15} (S_A)^2
\end{aligned}$$

The first-order condition is

$$-\frac{112}{15} - \frac{56}{15 \times 15} 2 S_A = 0.$$

The second-order condition is

$$-2 \frac{56}{15 \times 15} < 0,$$

which is true. Solving the first-order condition, the optimal subsidy is

$$S_A = -\frac{112 \times 15 \times 15}{2 \times 56 \times 15} = -15.$$

The subsidy is negative, so EU's optimal strategic policy is in fact an export tax.

(iii) (2 points) With $S_A = -15$, we have

$$P_A = 176 + 8 = 184, P_B = 176 + 2 = 178, Q_A = 112 - 7 = 105, Q_B = 112 + 2 = 114,$$

and

$$W_{EU} = (112 + \frac{8}{15} 15) (112 - \frac{7}{15} 15) = 120 \times 105 = 12600,$$

$$W_{US} = \Pi_B = (112 + \frac{2}{15} 15)^2 = 114^2 = 12996.$$

The EU surplus is higher than it would be without the policy, but the US surplus (Boeing's profit) is higher still.

(iv) (6 points) In the quantity-setting (Cournot) duopoly of Problem Set 5, EU's optimal strategic policy was an export subsidy. This increased Airbus's sales and lowered Boeing's. The EU surplus was higher, and the US surplus (Boeing's profit) was lower, than they would be in the absence of the policy. Here the EU's optimal strategic policy is an export tax. It lowers Airbus's sales and increases Boeing's.

In the quantity-setting (Cournot) duopoly of Problem Set 5, Airbus benefits if Boeing offers a smaller quantity for sale. EU's strategic subsidy yields this outcome by shifting out Airbus's best response function and driving Boeing down its best response function. With price-setting, Airbus benefits if Boeing charges a higher price. Boeing's best response function in prices is upward-sloping. Therefore the way for the EU to get Boeing to charge a higher price is to commit Airbus to charging a higher price, which is done by shifting its price best-response function outward by means of the export tax. Such a policy at the optimal level does increase EU's welfare above its no-policy level (after all, 0 is a feasible choice for the policy, so the optimal choice could do no worse). But it gives Boeing the advantage of the second move in price-setting: Boeing's price rises by only 2 when Airbus's rises by 8.

Therefore Boeing's profits and the US surplus go up by even more. (In reality, in such a situation the governments playing non-cooperatively may each wait for the other to move, or they may cooperate and cartelize the world market.)

See Slides 17 of April 6, p. 5 remark [4], and Precepts Week 10 April 12 reading, the first bullet point on p. 173 and Fig. 46 on p. 174.