Original

**Examination:** International Trade (1004) Summer Term 2006

**Examiner**: Ludwig v. Auer

**The following aids may be used**: Calculator, dictionary

This examination comprises three questions. All of them are to be answered. The available amount of time is two hours. The maximum score that can be achieved is 120 points.

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**Question 1:**

Consider a *small* country called *Home* that produces two different goods, namely manufactures (output denoted by $Q_M$) and an agricultural product ($Q_A$).

a) (*6 points*) Draw for Home the usual type of production possibility curve, such that the maximum possible output of the agricultural product (horizontal axis) is roughly half as large as the maximum possible output of manufactures (vertical axis). Add to your diagram an isowelfare line (denoted as $W^1$) such that the resulting autarky equilibrium is characterized by an autarky price ratio of $(P_A/P_M)^A \approx 2$. Also indicate in your diagram the associated consumption bundle $D^1$, the output bundle $Q^1$, and the autarky equilibrium price ratio $(P_A/P_M)^A$.

b) (*6 points*) Suppose that the world equilibrium price ratio $\tilde{P}_A/\tilde{P}_M$ is smaller than $(P_A/P_M)^A$ and that Home fully integrates into the world market. What is the resulting pattern of trade and what are Home's terms of trade (no number is asked for)? Verbally explain the mechanism that pushes Home's price ratio towards $\tilde{P}_A/\tilde{P}_M$.

c) (*10 points*) Using your diagram of question 1a, explain why the small country Home increases its welfare when it fully integrates into the world market. Indicate in your diagram the new consumption bundle $D^2$, the new output bundle $Q^2$, Home's exports and imports, and the new welfare level $W^2$. Also indicate in your diagram the decomposition of Home's overall welfare gain into the gain from exchange and the gain from production adjustment.

d) (*11 points*) Suppose that Home (a *small* country!) introduces an (ad valorem) export tax $t$ on its exports, that is, when exporting a unit of its export product, Home's government receives the tax revenues $t$ times the world market price of the export good. As a result, how large will be the price of the export good paid in Home relative to the price of the export good paid on the world market? Using a fresh copy of your diagram of question 1c (showing again $Q^2$, $D^2$, the national budget constraint, and the associated isowelfare line $W^2$), add the new output bundle $Q^t$ and the associated national budget constraint of Home. Verbally justify the slope of this national budget constraint. Which two conditions must the new consumption bundle $D^t$ satisfy? Indicate in the diagram the new consumption bundle $D^t$ and the new welfare level $W^t$.

e) (*7 points*) Suppose that Home, instead of the export tax, develops a better technology for producing manufactures. Indicate in a new diagram (a copy of the diagram of question 1c, but showing only the production possibility frontier, the national budget constraint, $D^2$, $Q^2$, and the isowelfare line $W^2$), how this technological progress affects Home's production possibility frontier, output bundle, national budget constraint, consumption bundle, and welfare. What is the effect on Home's terms of trade?

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## Question 2:

Consider a partial equilibrium analysis of the oil market of the large oil exporting country *Russia*. Suppose that in Russia a specific export tax $t$ on the export of oil exists.

a) (*6 points*) Draw the supply and demand curves of Russia, such that with and without the export tax Russia is an exporter of oil. Indicate in your diagram the price that Russian oil consumers pay ($P^t$), the price Foreign oil consumers pay ($\tilde{P}^t$), and the export tax $t$. Also indicate the free trade price of oil ($P^*$).

b) (*10 points*) Suppose that the Russian government abolishes its specific export tax $t$ on Russian oil exports. Show in your diagram of question 2a the abolition's effect on Russia's demand, supply, and exports. Also indicate how the abolition of the export tax affects the welfare of Russia's consumers, producers, and government. What is the net welfare effect in Russia?

c) (*5 points*) The net welfare effect of the export tax's abolition can be decomposed into a "negative terms of trade effect" and two disappearing "distortionary effects". In your diagram of question 2b, which areas correspond to these effects? Explain verbally why "negative terms of trade effect" is a suitable name.

d) (*4 points*) Suppose that after the export tax's abolition all Foreign governments impose a specific import tariff $z$ on Russian oil, where $z = t$. What can be said about the consumer prices that, as a result of the tariffs, prevail in Russia and in Foreign? Explain whether the resulting welfare in Russia deviates from the welfare that prevailed in Russia when the export tax $t$ was in place (but no import tariffs on Russian oil existed).

## Question 3: Shorties

a) (*6 points*) Draw an isowelfare line of the usual type (consumption of apples $D_A$ on the horizontal axis and consumption of bananas $D_B$ on the vertical axis). Using this diagram, illustrate that the marginal rate of substitution between bananas and apples is decreasing.

b) (*4 points*) Free trade leads to an overall gain for the participating countries. Nevertheless, the world is full of protectionist measures. Provide an explanation for the existence of these measures.

c) (*13 points*) Consider two large countries (Home and Foreign) that both produce two goods, namely clothing and food. Suppose that the national relative supply curves of the two countries are identical, and that for each given price ratio $P_C/P_F$ Home's relative demand $D_C/D_F$ is smaller than Foreign's relative demand $\tilde{D}_C/\tilde{D}_F$. Draw a diagram showing these national relative demand and supply curves. Indicate also the associated world relative supply and world relative demand curves and the resulting free trade equilibrium. What is the resulting pattern of trade? Demonstrate graphically the effect on Foreign's terms of trade resulting from a fall in Home's relative demand $D_C/D_F$.

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d) (*4 points*) Demonstrate *algebraically* that outside the initial free trade equilibrium described in question 3c, it is not possible that

$$Q_C - D_C = \tilde{D}_C - \tilde{Q}_C \qquad \text{and simultaneously} \qquad \tilde{Q}_F - \tilde{D}_F = D_F - Q_F \,.$$

e) (*4 points*) When a country introduces a specific import tariff, this leads to a waste of resources ("distortionary loss" on the producer side) in that country. Why is it appropriate to speak of a "waste of resources"?

f) (*8 points*) Suppose that the country Estonia is in autarky. Suppose also that the available labour units for the production of the differentiated good *dishwashers* is $L = 2,000$ and that the production technology is defined by $l_i = 400+10x_i$, with $x_i$ denoting the produced quantity of dishwashers of type $i$, and $l_i$ denoting the labour units necessary to produce this quantity. Demonstrate numerically that with this production function doubling inputs leads to more than double output. In a suitable diagram, depict as precisely as you can the resulting trade off between Estonia's total output of dishwashers and the variety of choice. What would happen to this trade off, when the dishwasher market of Estonia were opened up to free trade?

g) (*11 points*) Consider two large countries (Home and Foreign) that both produce home appliances and machinery tools. Suppose that there are two factors of production (labour and capital) and that home appliances are labour intensive and machinery tools are capital intensive. Suppose also that Home is labour abundant. In the Heckscher-Ohlin model, what is the resulting pattern of (interindustry) trade. Which groups gain from free trade and which groups lose? Next suppose that both goods are differentiated goods. As a result, also intraindustry trade arises. In a suitable diagram (showing interindustry and intraindustry trade flows), depict the resulting pattern of trade.

h) (*5 points*) Using a suitable numerical example, demonstrate that joining a free trade area may lead to trade diversion.

Good luck!