

**Economics 433: Advanced International Trade  
Fall, 2006**

**Practice Problems, Set 2**

1. The following are (*very* approximate) data on the national income and population of the United States and the world as a whole (including the United States) in 2001:

	Population (millions)	Income (billions of US\$)
United States	300	8,000
Entire World	6000	32,000

Assume for simplicity that in all countries, the available labor force equals exactly  $1/3$  of the population and that the U.S. trade is balanced. Further, assume that factor prices equalize across countries.

- a) Applying the factor content theorem, what should the net labor content of U.S. trade be?

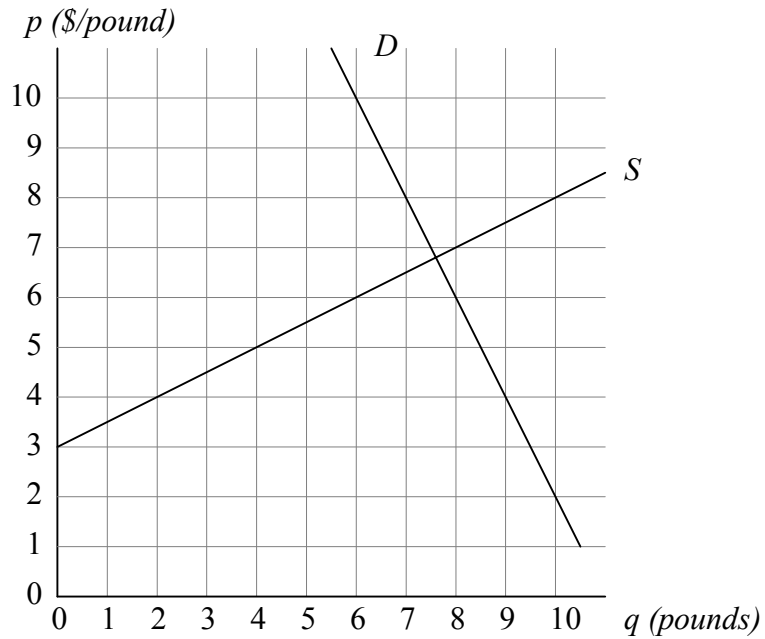
The US share in income =  $8,000/32,000 = 1/4$ , the U.S. labor force is  $L_{US} = (1/3)300 = 100$ , and the world labor force is  $L^* = (1/3)6000 = 2000$ . Thus, using the formula from lecture 13,  $T_{L(us)} = L_{us} - s_{us}L^* = 1/3 * 300 - 1/4 * 1/3 * 6,000 = 100 - 500 = - 400$  (millions)

- b) Using your answer to part (a), does the factor content theorem predict that the United States will be a net exporter or a net importer of capital services? (You may assume that labor and capital are the only two factors of production.)

According factor content theorem, the country is a net exporter of the abundant factor and importer of the scarce factor. From a), we may conclude that labor is a scarce factor. That means that means that capital must be an abundant factor. As a result, US are expected to be a net exporter of capital services. Put differently, if the U.S. generates  $1/4$  of the world's income, and holds *less* than  $1/4$  of the world's labor force, it must hold *more* than  $1/4$  of the other factor—capital.

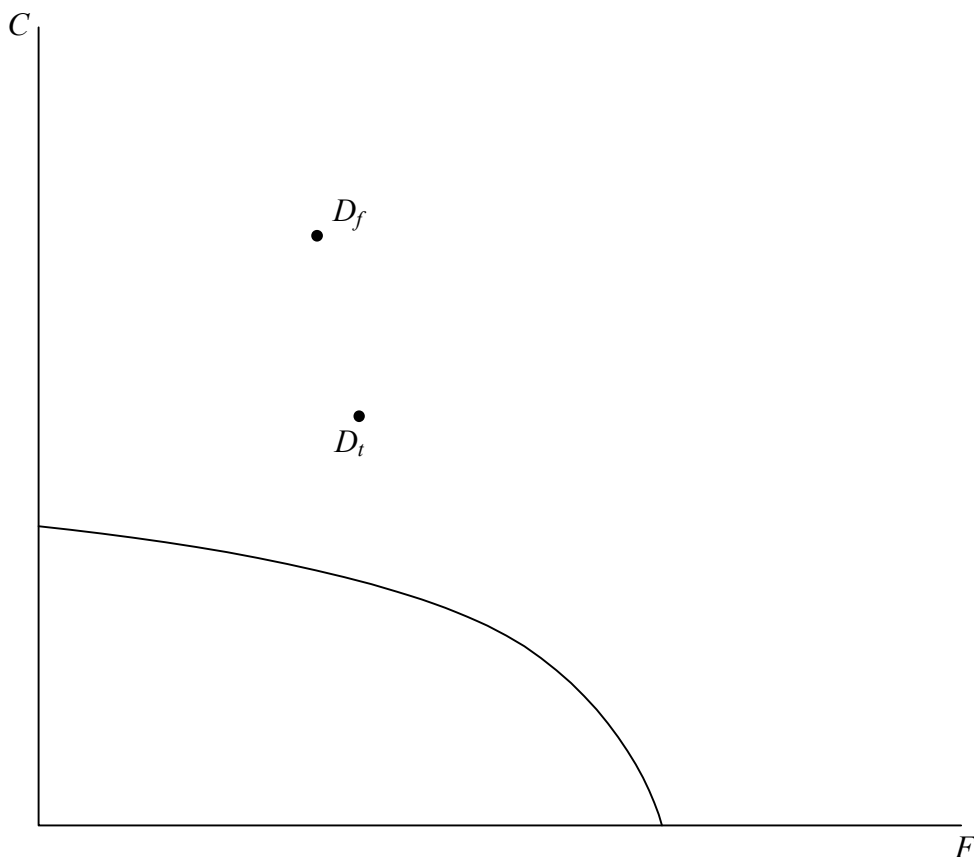
2. The graph below shows domestic supply and demand for sugar in a small country. Suppose that the world price of sugar is \$4 per pound. Show the effects on this market of a 50% *ad valorem* tariff on sugar by drawing the equilibria with and without the tariff, then using the grid lines in the figure to calculate the following effects of the tariff:

change in quantities supplied \_\_\_\_\_  
 change in quantity demanded \_\_\_\_\_  
 change in quantity imported \_\_\_\_\_  
 change in producer surplus \_\_\_\_\_  
 change in consumer surplus \_\_\_\_\_  
 change in government revenue \_\_\_\_\_  
 change in net welfare \_\_\_\_\_



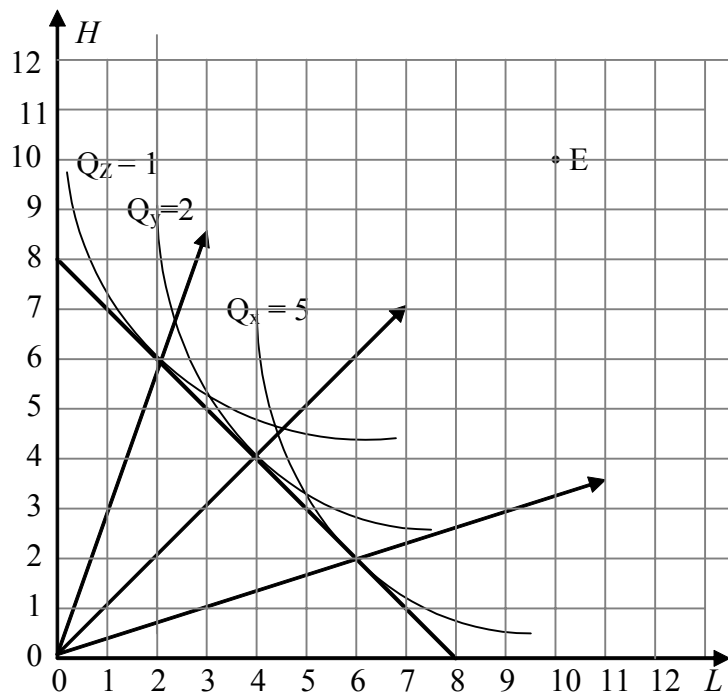
3. Suppose that a country is initially in equilibrium with a certain non-prohibitive tariff. (“Non-prohibitive” means that, despite the tariff, some imports still come into the country.) Suppose further that there is shift to the right in the domestic demand curve. Using the partial equilibrium model of a small importing country, and assuming that the tariff rate does not change, what will be the effects of this shift on prices (up, down, unchanged) \_\_\_\_\_, quantity produced (up, down, unchanged) \_\_\_\_\_, and imports (up, down, unchanged) \_\_\_\_\_ ?
4. Suppose that the reason the United States re-imposed apparel quotas in 2005 was to increase employment in the apparel industry to a certain level. Using a general equilibrium diagram of a small-open economy (i.e., a diagram with a production possibility frontier), explain why this policy is not the economically optimal way for the United States to accomplish this objective? What policy or policies might have achieved it at lower cost to the American economy? Do you think these policies would have been politically acceptable?

5. The diagram below shows the PPF of a small economy that produces food ( $F$ ) and clothing ( $C$ ), together with the free trade consumption point ( $D_f$ ) and a tariff-distorted consumption point ( $D_t$ ). Perhaps surprisingly, this is sufficient information for you to derive the free-trade relative price of food,  $P_F^W / P_C^W$ , and the domestic relative price of food under the tariff,  $P_F / P_C$ . Indicate these relative prices as slopes of lines on your graph. Also identify the points on your graph that indicate the quantities of food and clothing produced both with (point A) and without (point B) the tariff. Now assume homothetic preferences, and make a good guess at what the indifference curves look like through  $D_f$  and  $D_t$ . Finally, explain how you could use your graph to estimate the ad valorem size of the tariff.



6. The “tariff equivalent” of an import quota is the tariff that would have led to the same quantity of imports as the quota. Use a partial equilibrium diagram (i.e., a diagram with supply and demand curves) to show how the tariff equivalent of a particular quota changes in response to an increase in (rightward shift of) the importing country’s demand for the good. Now draw a new diagram to show how it changes in response to an increase in the importing country’s supply of the good. Is it possible for either of these changes to cause the tariff equivalent of the quota to become negative?

7. In Technoland, there are two types of factors—human capital ( $H$ ) and unskilled labor ( $L$ ). There are also two basic sectors: industry and services. Services, denoted by  $X$ , are non-traded and very unskilled-labor intensive. Industry encompasses involve two types of activities, both of which are more human-capital intensive than services: product development and operations management ( $Z$ ), which is very human capital-intensive; and component manufacturing/assembly ( $Y$ ), which is somewhat human-capital intensive. Isoquants for services and the two industrial activities are presented in the graph below. (Note the quantities associated with the isoquants.) Arrows represent factor intensities of production for each activity, given the \$1 isocost line that is depicted.



- a) When there is no cheap way to do manufacturing and assembly abroad, all three stages of production are done within the country, and the prevailing factor prices are given by the \$1 isocost line graphed above. What is the price for a unit of human capital in this “un-fragmented” equilibrium?  $w_h = \underline{\hspace{2cm}}$  What is the price for a unit of unskilled labor?  $w_l = \underline{\hspace{2cm}}$ .
- b) In the un-fragmented equilibrium, what are the prices associated with each type of activity?  $P_x = \underline{\hspace{2cm}}$ ,  $P_y = \underline{\hspace{2cm}}$ ,  $P_z = \underline{\hspace{2cm}}$ . (Recall that prices reflect the costs of producing *one* unit of output.)
- c) If each unit of product development and management leads to 1 unit of manufacturing and assembly (that is,  $Y$  and  $Z$  are always produced in a one-to-one ratio), and the endowment point is  $E$  (that is,  $H = 10$ ,  $L = 10$ ), how much of

each good is produced in the un-fragmented equilibrium described above?  $Q_x =$  \_\_\_\_\_,  $Q_y =$  \_\_\_\_\_,  $Q_z =$  \_\_\_\_\_.

- d) Now suppose that, because of improved education and infrastructure in developing countries, it becomes possible to manufacture and assemble goods abroad at some price below the  $P_y$  that you calculated in part b. This is true even after accounting for transport costs, so firms shift their manufacturing operations to low-wage countries. Presuming for the moment that the prices of  $x$ -type activities and  $z$ -type activities don't change, what happens to the volume of  $X$  activity and  $Z$  activity in Technoland?  $Q_x$  goes (up, down) \_\_\_\_\_,  $Q_z$  goes (up, down) \_\_\_\_\_.
- e) Assume that management and product development are globally traded services—that is, managers, scientists and engineers from any country can develop products and business plans for goods that are produced in *any* country. So if Technoland is small, any change in the amount of  $z$  activities that it supplies is unlikely to affect the world price for  $z$ . But services are not traded, so their price is not pinned down by global supply and demand conditions. Given these facts and your answer to part (d) above, how is the price of  $x$  likely to adjust to the offshore shifting of manufacturing and assembly?  $P_x$  (*goes up, goes down, doesn't change*) \_\_\_\_\_ How are skilled wages likely to adjust?  $w_h$  (*goes up, goes down, doesn't change*) \_\_\_\_\_ Unskilled wages?  $w_l$  (*goes up, goes down, doesn't change*) \_\_\_\_\_.