

Midterm Exam 2

Answer Any **Two Questions**. Answer all parts to each question.

1. Answers all parts to the question.

- a) (Labor movements). Consider a simplified model with two countries (US, Mexico) that use two inputs (land, labor) to produce a single identical good. Because there is just one good (and because we ignore time) there is no role for trade in goods. Let $\{T^{us}, L^{us}\}$ denote the endowments of land and people in the US, and $\{T^{mex}, L^{mex}\}$ denote the endowments of land and people in Mexico (each person works the same amount of time, so the number of people equals the number of workers). Assume the two countries have the same amount of land ($T^{us} = T^{mex}$), but Mexico has more people ($L^{mex} > L^{us}$). Finally, assume the **US has a more productive technology**, as described by:

$$Q^{us} = 60(T^{us})^{2/3}(L^{us})^{1/3}; \quad Q^{mex} = 30(T^{mex})^{2/3}(L^{mex})^{1/3}$$

(you do not have to use the actual production functions to answer the questions below)

- i. Assuming no labor mobility between countries, compare the wage rates, return on land and per capita income $\left\{ \left(Q^{us} / L^{us} \right); \left(Q^{mex} / L^{mex} \right) \right\}$ in the two countries (a verbal answer suffices. Pay attention both to the differences in technology and to the differences in endowments). **(7 points)**
- ii. Assume a guest worker program is implemented that allows workers to move between the two countries. Let I represent the number of people from Mexico who work in the US (if people from the US work in Mexico then $I < 0$), so that the US work force becomes $(L^{us} + I)$ and the Mexican work force is $(L^{mex} - I)$. If people choose where to work based solely on where net wages are higher, and if all workers were free to move between countries, then: **(1)**What determines how many workers move between the countries? **(2)**How does this labor movement affect wages, the return on land, and per capita income in each country? and **(3)**How does this labor movement affect world output? **(12 points)**
- iii. Suppose the country receiving the guest workers can impose an annual fee (F) on each guest worker, e.g., for the visa that allows the person to temporarily work in that county. The proceeds of this fee (or tax) go to the residents of the country receiving the guest workers. Given this fee, **(1)**How is the equilibrium number of guest workers determined, and how do increases in the fee change the number of guest workers? **(2)**How does this

fee affect world output? and (3) Can the fee increase per capita income in the country imposing the fee? Justify your answer. **(11 points)**

- b) Consider a small country (Ecuador) that produces, and consumes, two goods (food, clothing).
- Use the production possibility frontier and indifference curves to illustrate how autarky equilibrium prices and outputs are determined. **(6 points)**
 - Suppose Ecuador opens its economy to world trade. Let $\{P_f^w, P_c^w\}$ denote the world prices, which are unaffected by Ecuador's trade decisions. Show how this decision to trade with the world affects production and consumption decisions in the economy, and the welfare (utility) for the representative resident of Ecuador. Does the decision to trade necessarily affect everybody in Ecuador equally? **(7 points)**
 - For whatever reason, suppose Ecuador did not want domestic output to change from its autarky level. Given this constraint, is there any potential gain to trade for Ecuador? Explain. **(7 points)**

2. Answer all parts to the question.

- a) Consider a Heckscher-Ohlin (H-O) type model with two countries (US, Mexico), two inputs (labor, L ; and land, T) and two goods (clothing, food). Assume, as in the basic H-O model, that both production functions exhibit constant returns to scale and that food is always the land-intensive good. Assume that the US has more land per worker than does Mexico. Finally, assume that the US is **twice as productive in producing each good**. For example, the production functions for the two countries may look like:

$$\text{Mexico: } Q_c = (T_c)^{1/3} (L_c)^{2/3}; Q_f = (T_f)^{2/3} (L_f)^{1/3}; \text{ US: } Q_c = 2(T_c)^{1/3} (L_c)^{2/3}; Q_f = 2(T_f)^{2/3} (L_f)^{1/3}$$

(you do not actually need to use these functions to answer the parts below).

- Given free trade in goods but no factor mobility (and still assuming food is the land-intensive good and the US has more land per worker), what prediction would you make about the pattern of trade between the two countries? Will free trade equalize factor prices? If not, how will they differ between the two countries? Explain. **(8 points)**
- Suppose that, in addition to free trade, some labor mobility between the US and Mexico were allowed. How would labor flows from Mexico to the US affect output of each good in each country and world output? How would these labor flows affect the US terms of trade? Be as specific as possible. **(12 points)**

b) Consider the trade in steel between two large countries, the US and Japan (they are assumed to be the only countries trading in steel). Suppose that the autarky price of steel in the US is $P_s^{us} = 800$ and the autarky price of steel in Japan is $P_s^j = 400$.

i. Assuming free trade in steel between the US and Japan, what can you conclude about the possible range for the equilibrium world price? Do both countries gain from trade? Explain. **(6 points)**

ii. Suppose the US imposes an import tariff on steel of 90 ($t = 90$). How will this tariff affect steel prices in the US and Japan, the volume of trade in steel, Japanese welfare and US welfare? Use diagrams to help illustrate your answer (only a qualitative answer is possible; you cannot calculate how much prices change due to the tariff). **(7 points)**

iii. To illustrate part (ii), suppose you have the following supply and demand curves:

$$US: S^{us} = 3P_s^{us}; D^{us} = 3200 - P_s^{us} \quad Japan: S^j = 2P_s^j; D^j = 1600 - 2P_s^j$$

Given trade between the two countries, calculate how a US tariff of 90 affects prices in each country and US welfare – as compared to free trade (you do not have to calculate the impact on Japanese welfare). **(10 points)**

iv. Suppose Japan, in response to the US tariff, imposes an export tariff on steel of 90. How will this tariff affect US and Japanese prices and the volume of world trade in steel? Is it possible that **both countries are better off** with **both** tariffs in place than under free trade? Is it possible both countries are worse off? Explain your answer (no calculations are required for this part). **(7 points)**

3. Consider the market for oranges in a small country (e.g., Honduras). The domestic supply and demand curves are given by:

$$S = 20P^f; D = 1500 - 10P^c$$

where P^f is the price orange producers in Honduras receive for their output and P^c is the price orange consumers in Honduras pay for oranges (if there are no production subsidies or taxes, and no consumption subsidies or taxes then $P^f = P^c$).

a) Assuming no domestic taxes or subsidies, find the autarky price in Honduras. **(6 points)**

b) Assume Honduras can trade at the world price $P^w = 100$ and that its imports or exports (or trade policy) have no affect on world prices. Find the volume of Honduran exports or imports under free trade. Also, calculate the changes in producer surplus, consumer surplus

and overall welfare due to the movement from autarky to free trade. **(12 points)**

- c) Suppose that Honduras imposes a tariff of $t = 20$ on Honduran exports of oranges. Calculate how this tariff affects prices within Honduras and Honduran exports. Also, calculate the changes in consumer surplus, producer surplus and overall Honduran welfare due to this tariff. **(10 points)**
- d) Suppose the export tariff were eliminated, but in its place the government imposed an export quota of 900 (this represents the maximum amount of orange exports the government would allow). Compare the effects of this export quota to the export tariff. **(6 points)**
- e) Given the export quota of 900, suppose the government decides to also impose an export tariff of 10. Given the export quota, what impact does this tariff have on Honduran prices, consumption, production and welfare? Be specific. **(7 points)**
- f) Suppose the main rationale for export tariffs (or quotas) used by the Honduran government was to prevent domestic consumers from being hurt too much by the higher prices caused by exports. Is there a domestic policy that would have the same effect on Honduran consumers as the export tariff of 20? If so, find what it is and compare the welfare loss with this policy to the welfare loss from the tariff. If the goal is to help domestic consumers, which is the better policy? **(9 points)**