

Use a blue book to answer all of the following questions. Use graphs where requested, and be sure to clearly label them and briefly explain them. Neatness and organization can affect your grade! You have until 2:25 PM. Manage your time well, and don't go into more detail than necessary to answer the questions asked.

1. (25%) Consider two countries, Home and Foreign, each producing two goods, X and Y, with constant costs (there is only one resource, labor, with constant returns to scale and perfect competition). Home has 600 workers, and requires one worker to produce one unit of X, or two workers to produce one unit of Y. Foreign has 1200 workers, and requires three workers to produce one unit of X*, or four workers to produce one unit of Y*.

- In two separate diagrams, graph the PPFs for both Home and Foreign, putting X on the horizontal axis. Using indifference curves, show an example autarky equilibrium for each.
- What is the autarky price ratio (P_X/P_Y) in each country? Which country has the absolute advantage in which good? Which country has the comparative advantage in which good? Which country has the higher real wage rate?
- Letting $RP = P_X/P_Y$ and $RQ = X/Y$, graph the Relative Supply (RS) curve for both countries together. Assuming Relative Demand (RD) is given by the equation $RQ = 1/RP$, solve for the free trade equilibrium values of RQ and RP.
- Using an Edgeworth Box with X on the horizontal axis and Y on the vertical axis, show and explain how specialization can increase total production, and how international trade can be Pareto-improving. Indifference curves are necessary here.

2. (15%) What is monopolistic competition? Why do high fixed costs lead to barriers to entry and economies of scale? What are the equations for the CC and PP curves in the Krugman-Obstfeld model of international monopolistic competition, and what basic assumptions do we make to get them? Suppose that the software market has high fixed costs and low marginal costs. There are two countries, Large and Small, where Large has a market for software twice that of Small but technologies, factor prices, and market conditions are otherwise similar. On only one diagram, show each country's autarky equilibrium, and compare it to the free trade equilibrium. How does free trade affect the price and the variety of software available in each country? How does free trade affect the combined number of firms, the average firm size, and the index of intraindustry trade?

3. (10%) Consider three countries, Argentina, Brazil, and Colombia, and assume they only trade with each other. Assume Argentina's GDP is \$50 billion, Brazil's is \$200 billion, and Colombia's is \$18 billion. The distance from Colombia to Brazil is 1000 miles, from Colombia to Argentina is 3000 miles, and from Argentina to Brazil is 2000 miles. Consider a gravity model of the form

$$T_{ij} = 0.2 * \frac{\sqrt{Y_i Y_j}}{D_{ij}}$$

where Y_i is the GDP of country i (in billions of comparable dollars), D_{ij} is the

average distance (in thousands of miles) between country i and country j , and T_{ij} is total trade between country i and country j . Draw a 3 by 3 matrix, and fill in the total predicted trade between each country (remember, a country has no international trade with itself). Add up the total predicted international trade for each country. What is the trade ratio for each country? Which country has the highest predicted international trade, and which country has the highest trade ratio? Why?

4. (20%) Consider an model of trade between China and the USA, in which the only resources are labor (L) and capital (K). Suppose the USA has 150 million workers and \$12 trillion in capital, while China has 600 million workers and \$1 trillion in capital. Each country produces only machines (M) and textiles (T) under perfect market conditions, using both labor and capital with constant returns to scale and diminishing marginal returns, though machine production is relatively capital-intensive. Assume preferences and available technologies are identical, and factors are equally productive between the two countries.
- Graph the PPFs for both countries, with T on the horizontal axis, and show the autarky equilibria. Which country has the higher (P_T/P_M) ratio? Under perfect free trade between the two countries, what would the Heckscher-Ohlin theorem predict? Compare the free trade equilibria to the autarky equilibrium on your PPF graphs for the two countries.
 - According to the Stolper-Samuelson theorem, how would free trade affect the wage-rental (W/R) ratio in each country, and how would this in turn affect the (K/L) ratios in each sector, in each country? Show this on the three-axis graph relating P_T/P_M to W/R to K/L .
 - In words, not graphs, explain how your predictions would be different if labor in the USA was five times as productive as in China.
5. (20%) Assume that China and the USA have free trade between them, more or less, and that all other assumptions of the Heckscher-Ohlin model hold. Then China grows...
- Assume – for this part (a) only – that China is a small country in terms of its effect on world market prices. Now suppose that China increases its labor supply (while somehow holding its overall population fixed). How would this affect its PPF, and its production of machines and textiles? What will happen to the volume of its international trade? What will happen to its overall welfare?
 - If China is instead a large country in the world market, how will the increase in its labor supply affect its terms of trade? How will this affect the (W/R) ratio in China?
 - Could China's increase in labor supply make China worse off overall? If so, what other conditions would need to be met?
 - How will the growth in China's labor supply affect the USA's terms of trade, its (W/R) ratio, and its overall welfare?
 - Assume, instead of an increase in labor supply, that China's high savings rate led to a significant increase in its capital stock. Briefly explain how this would change your answers to a, b, c, and d.
6. (10%) Explain, compare, and contrast (a) internal economies, (b) external economies, and (c) the learning curve arguments for trade. In which case might free trade prevent a small developing country from specializing in a good with a potential comparative advantage? Assuming in this case that the long-run returns to the small country exceeded the short-run losses, under what conditions would the private sector be unwilling or unable to take such losses? How might government intervention best be able to help?
7. Bonus Question. (10%) What are the main arguments for and against the causal connection between international trade, per-capita income, and economic growth? What does research on the actual evidence prove or imply?

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