ECON 462 - International Trade — Professor Elliott Parker
Midterm Exam — October 31, 2006

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 only one resource, labor, constant returns to scale, and perfect competition. Home has 200 million identical workers, and one worker can produce either four units of X or three units of Y. Foreign has 300 million workers, and one worker can produce either one unit of X^* or two units of Y^*.

a) In two separate diagrams, graph the PPFs for both Home and Foreign, putting X on the horizontal axis. What is the autarky relative price ratio ($RP = P_X/P_Y$) in each country? Which country has the comparative advantage in which good? Which country has the higher real wage rate? What does the Ricardian Theorem predict?

b) Let Relative Demand be defined by the equation $RQ = 2/RP$, where $RQ = Q_X/Q_Y$, and these preferences are identical for both countries. What is the utility-maximizing autarky production combination of X and Y? Show these combinations on your graphs using indifference curves, and label them as A (and A^*).

c) Graph the Relative Supply (RS) and Relative Demand (RD) curves for both countries together. Solve for the free trade equilibrium values of RQ and RP.

d) On your PPF diagrams from (a) and (b), show the free trade equilibria, labeling the new production points Q (or Q^*), the consumption point C (C^*), and the consumption possibility frontier CPF (CPF^*).

e) Using an Edgeworth distribution 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. Make sure that your diagram is consistent with your previous numerical solutions.

2. (20%) Consider a model of trade between China and the USA, in which the only resources are skilled labor (L_S) and unskilled labor (L_U). The USA has 200 million workers, and 50% of them are skilled. China has 800 million workers, but only 10% are skilled. Each country produces only machines (M) and textiles (T) under perfect competition, and each sector uses both L_S and L_U with constant returns to scale and diminishing marginal returns, since L_S and L_U are not perfect substitutes. Machine production is relatively skilled-labor-intensive. Due to country-specific differences in technology and the economy, skilled workers are ten times more productive in the USA than in China, while unskilled workers in the USA are five times more productive. Assume consumer preferences are identical.

a) Adjusting for "effective factors," which country is abundant in which factor? Under perfect free trade between the two countries, what would the Heckscher-Ohlin theorem predict?

b) Graph the PPFs for both countries, with M on the horizontal axis, and use indifference curves to show the autarky equilibria. How does the relative autarky price ($RP = P_M/P_T$) differ?

c) According to the Stolper-Samuelson theorem, how would free trade affect the relative wage of skilled to unskilled labor (W_S/W_U) in each country, and how would this in turn affect the ratio of unskilled to skilled labor (L_U/L_S) in each sector, in each country? Forgetting for a moment about differences in productivity, show this on the two-sector graph relating (P_M/P_T) to (W_S/W_U) to (L_U/L_S).

d) Considering the differences in factor productivity, would you expect to see either absolute or relative factor price equalization between countries? You may assume $W_S > W_U$. If not, what would you predict? Would the wage gap between countries widen or shrink for skilled labor? For unskilled labor?

3. (15%) Assume the Home country produces steel (S) and clothing (C) using labor and capital, and its economy is engaged in free trade with the rest of the world under the general assumptions of the Heckscher-Ohlin model. Home is relatively capital-abundant, and steel is capital-intensive.

a) Suppose Home increases its capital stock through investment. If the Home country is a small participant in world markets, what would the Rybczynski Theorem predict would happen to Home's output of each good, S and C? Assuming Home's demand for both goods is normal, what would happen to the volume of trade? Show the effects of this growth on a PPF diagram.

b) If Home is instead a large participant in the market, how would this growth affect its terms of trade?

c) Suppose Foreign, one of Home's major trading partners, now increases its capital stock through investment. How would this growth affect Foreign's terms of trade and its volume of trade, assuming foreign is a large country? How would this growth affect the wage-rental ratio in Foreign? How would this growth in Foreign affect Home, i.e. Home's terms of trade, volume of trade, and wage-rental ratio?

d) In which case could immiserizing growth be possible? Why? What other conditions would need to be met?

4. (15%) Compare the predictions of (a) the Ricardian constant-costs model, (b) the Samuelson-Jones fixed factors model, and (c) the Heckscher-Ohlin model, for a country with two products, which you can call Q_X (an exportable good) and Q_I (an importable good). Specifically, how does international trade affect the welfare of specific groups within a country? What assumptions does each model make about the factors of production? How would your answer be different if all of the country's factors were twice as productive as its trading partners, all things being equal? How would the availability of compensation affect the willingness of these specific groups to support free trade? No graphs are necessary.

5. (15%) In perfect competition models with constant returns to scale, gains from trade result from different relative autarky prices that converge towards some relative price in between. Explain why monopolistic competition with economies of scale may lead to different results. Using the Krugman-Obstfeld one-sector model, give the equations for the CC and PP curves, and on a single graph show the autarky equilibria for two countries with identical costs and identical market size. Then show how free trade between these two countries affects your CC-PP diagram, how prices change in the short-run, and describe how prices and the number of firms reach the long-run free trade equilibrium. What happens to the overall number of firms in the long-run, the average firm size, and consumer welfare?

6. (10%) Under which of the following scenarios are mutually-beneficial gains from trade likely? Explain briefly why or why not, where necessary.

a) Countries are identical, with constant returns to scale and perfect competition.

b) Countries are identical, with economies of scale in some tradeable goods.

c) One country has a monopoly in its comparative-advantage good.

d) Countries have immobile factors.

e) Countries have identical PPFs but different preferences.

f) Countries have identical preferences but different PPFs.

g) Countries have different PPFs and different preferences which are biased towards their own comparative advantage good.

h) Countries have different PPFs and different preferences which are biased towards their own comparative disadvantage good.