

**Take-Home Final Exam**  
**Due 5:00 PM, Monday, December 16**

**Instructions:**

The exam is open book and open notes. That is, you are free to look at anything that was written by others before you got this -- books, articles, working papers, lecture notes, etc. Do not, however, talk to each other about these questions. If you are uncertain about how to interpret any of the questions, ask me, not other members of the class. I will be available by e-mail, and you should check your own e-mail periodically in case I have sent clarifying comments to the course group.

You should answer all questions, being guided by the points in parentheses to suggest how much effort you should put into each (there are 100 points total). You may give me your answers in blue books, if you wish, or on either handwritten or printed 8½ by 11 sheets. In either case, be sure that the pages are attached to each other. Put your name **only** on the cover or cover sheet, starting your answers on the page after that, so that I can fold the cover back and read the exams anonymously.

1. (20 points) **True-False Explain (Answer any four of the following five):** Indicate whether each of the following statements is true or false, and provide either a proof (if true) or a counter-example (if false). If the model is not stated, specify and use whatever model seems most appropriate for the purpose.
  - a) If a country's trade satisfies the Law of Comparative Advantage, then it must gain from that trade relative to autarky.
  - b) In the Dornbusch-Fisher-Samuelson Ricardian continuum of goods model with free and frictionless trade, an increase in the productivity of all the workers in one country increases the real wages of workers in both countries.
  - c) If the two-factor Heckscher-Ohlin Model with free and balanced trade had been a valid characterization of the U.S. situation at the time he wrote, Leontief would have been correct in inferring from his measurements of the factors embodied in trade that the U.S. was labor abundant.
  - d) The rise in the wage of skilled labor relative to unskilled labor in the United States in the early 1980s could have been caused by the increase in the U.S. trade deficit during that period.
  - e) A large country has less to gain from trade than a small country.

2. (10 points) Suppose that a country starts from an equilibrium in which it faces real transport costs in its international trade and that it initially has no government intervention (tax or subsidy) in trade. Its government then learns of the purported advantages of “free” international trade, and it misunderstands that term to mean the net absence of *all* barriers to trade. It therefore institutes a system of trade subsidies that exactly offset all transport costs in international trade. Compare the resulting equilibrium to the equilibrium without this policy and also to autarky, both in terms of the welfare of the country as a whole and of different groups within it. You may assume, if it is helpful for your analysis, any standard model of trade that you find convenient, and also that transport costs take Samuelson’s iceberg form.
3. (35 points) Use a Heckscher-Ohlin Model with two factors, labor and land, to determine how each of the following variables behaves over time as the country’s labor force grows from just above zero to very large. Assume that the country is small and faces fixed world prices, that it has free trade and perfect competition, and that preferences are homothetic.
- I) Output of each good
  - ii) Net exports of each good
  - iii) Real price of each factor
- a) Assume first that there are two goods, that there are no factor intensity reversals, and that transport costs are zero. You may use whatever analytical tool or tools you like, but give your answers by means of graphs of each of the above variables as functions of the labor force, and be sure to show how you get your results.
- b) Indicate briefly how your answers to part (a) would be changed if there were each of the following changes (one at a time) in the above assumptions. For this you do not need to derive your results, and you need only provide enough graphs to indicate which variables behave differently from part (a) and the nature of that difference.
- I) There is a single factor-intensity reversal.
  - ii) There are three goods, and world prices **do** permit production of all three at common factor prices.
  - iii) There are three goods and world prices **do not** permit production of all three at common factor prices.
  - iv) There are positive transport costs.

4. (15 points) Consider a two-factor (labor and land), two-sector (clothing and food) economy with the following unusual features: production of clothing requires only labor, while production of food requires only land; workers derive utility from only food, while land-owners derive utility from only clothing (that is, each wants only what the *other* produces). Otherwise the economy has the usual features: constant returns to scale, perfect competition, absence of distortions, etc.
- a) Determine the autarky relative price and the free trade offer curve for this economy.
  - b) Starting from a free trade equilibrium in which the country exports clothing, work out the effects on quantities produced, consumed and traded of an increase in the world price of clothing.
  - c) In what sense, if any, does the country gain from this “improvement” in its terms of trade?
5. (15 points) Consider a two-country, international Cournot duopoly in which, initially, two identical firms with constant marginal cost, one from each country, sell a homogenous product both into their own and into each other’s markets, where there is identical linear demand. Derive the effects of a fall in the constant transport cost on the volume of trade and on consumer welfare and profits of each firm in both countries. Can you tell what happens to total profits?
6. (5 points) This is a freebie, or should be: Go back and read the instructions at the start of the exam, and take a moment, before you hand it in, to make sure you are following them.