International Trade and Finance Prelim

Fall 2013

Instructions: Answer the question from Part I and two questions from Part II, for a total of three questions.

You will have five hours.
Part I
Answer the question in Part I.
Question I.1: Dynamic Heckscher-Ohlin Model

Consider a two-sector growth model in which the representative consumer has the utility function
\[ \sum_{t=0}^{\infty} \beta^t \log(c_{1t}^a c_{2t}^b). \]

The investment good is produced according to
\[ k_{t+1} = dx_{1t}^a x_{2t}^b. \]

Feasible consumption/investment plans satisfy the feasibility constraints
\[ c_{1t} + x_{1t} = \phi_1(k_{1t}, \ell_{1t}) = k_{1t}, \]
\[ c_{2t} + x_{2t} = \phi_2(k_{2t}, \ell_{2t}) = \ell_{2t}, \]

where
\[ k_{1t} + k_{2t} = k_i \]
\[ \ell_{1t} + \ell_{2t} = 1. \]

The initial value of \( k_i \) is \( \bar{k}_0 \). All of the variables specified above are in per capita terms. There is a measure \( L \) of consumer/workers.

a) Define an equilibrium for this economy.

b) Write out a social planner’s problem for this economy. Explain how solution to this social planner’s problem is related to that of the one-sector social planner’s problem
\[ \sum_{t=0}^{\infty} \beta^t \log c_i \]
\[ \text{s.t. } c_i + k_{i+1} = dk_i^a, \]
\[ c_i, k_i \geq 0, \]
\[ k_0 = \bar{k}_0. \]

[You can write done a proposition or propositions without providing a proof or proofs, but be sure to carefully relate the variables in the two-sector model to the variables in the one-sector model.]

c) Solve the one-sector social planner’s problem in part b. [Recall that the policy function for investment has the form \( k_{i+1}(k_i) = Adk_i^a \) where \( A \) is a constant that you remember or can determine with a bit of algebra and calculus.]

d) Suppose now that there is a world made up of \( n \) different countries, all with the same technologies and preferences, but with different constant populations, \( L' \), and with different initial capital-labor ratios \( \bar{k}_0 \). Suppose that goods 1 and 2 can be freely traded across countries, but that the investment good cannot be traded. Suppose too that there is no international borrowing. Define an equilibrium for the world economy.

Question I.1 continues on the next page.
Question 1.1 continued:

e) State and prove versions of the factor price equalization theorem, the Stolper-Samuelson theorem, the Rybczynski theorem, and the Heckscher-Ohlin theorem for this particular world economy.

f) Let $s_t = c_t / y_t$ where $y_t = p_t k_t + p_2 t = dk^a_t$ is world GDP per capita. Explain how you could show that

$$s_t = \frac{y_t - y_{t-1}}{y_t - y_{t-1}} = \frac{s_{t-1}}{s_0} \frac{y_t - y_0}{y_0},$$

That is, explain the logic of the argument. You do not need to go into details.

f) Use the solution to the one-sector social planner’s problem in part c to solve for $s_t$. Discuss the economic significance of the result that you obtain.
Part II

Answer two questions from Part II.
Question II.1: Less Developed Economy Savings

The simplest theories with well-functioning credit markets would imply that an economy that is currently poor but knows that it soon will be rich will borrow—not save—with the rest of the world, if the rest of the world is growing more slowly. Of developing economies would imply that a developing countries. Some developing economies, like China, have been saving funds on net with the rest of the world.

(a) Sketch out a model that can potentially get a less-developed economy to save from the rest of the world instead of borrow from it.

(b) What happens in your model if you now make the financial markets function perfectly?

(c) What happens if you make the less developed economy grow at a faster rate relative to the world?
Question II.2: Borrowing with Enforcement Constraints

Consider a simple pure exchange economy with two countries and identical consumers in each country and two goods per period (apples and oranges). Suppose that contracts enforced only in a limited way. Specifically, if an agent reneges on a contract than that agent is not allowed to borrow or lend in any future period, but that agent can engage in static trade (i.e. the agent can trade apples and oranges at any given date and state).

(a) Show the competitive equilibrium of this economy solves a certain type of planning problem, often referred to as the conditional efficiency problem.

(b) Write down the natural notion of constrained efficiency for this environment by way of writing down another planning problem.

(c) Discuss when the competitive allocations will be not be constrained efficient.
Question II.3: Explain One of the Outstanding Puzzles

Pick ONE outstanding puzzle in international macroeconomics, such as the Feldstein Horioka puzzle, the forward premium anomaly, the home bias in portfolios, the risk sharing puzzle, the Backus Smith puzzle relating the real exchange rate to marginal rates of substitution, the asset allocation puzzle, or another of your choosing.

(a) Carefully describe the set of facts that constitute this puzzle.

(b) Develop as carefully as possible a simple standard economy for which these set of facts are a puzzle.

(c) Describe as carefully as possible an economy which can produce the facts that constitute this puzzle.

(d) Describe precisely how you would evaluate the quantitative ability of your economy to generate these facts.

Include the equations of both the simple model that exhibits the puzzle and your proposed model that will generate these facts. It is important to develop the intuition of what goes wrong in the simple model and how your model will potentially account for these facts.
Question II.4: Government Intervention and Borrowing

(a) Describe an environment in which, absent government intervention, the private sector borrows an inefficient amount. Prove your result as carefully as you can.

(b) Discuss the intuition for the inefficiency. What government policy can remedy this problem? Describe the policy problem the government solves and discuss how the government improves on private allocations.

(c) Can a similar result occur if the only friction in the economy is enforcement constraints? Describe a notion of constrained efficiency for this economy. Describe a notion of competitive equilibrium without government intervention. Do the allocations in the competitive equilibrium solve the constrained efficient problem?

(d) What is the key difference between the economies described in parts (a) and (c)?