WRITTEN PRELIMINARY Ph.D EXAMINATION

Department of Applied Economics
Trade, Development and Growth
June 2013

For students electing
APEC 8702 and APEC 8703 option

Instructions

* Identify yourself by your code letter, not your name, on each question.
* Start each question’s answer at the top of a new page.
* You are required to answer a total of FOUR questions.
* Answer ONE question from Set One.
* Answer THREE questions from Set Two.
* You have four hours to complete this examination.
SET ONE:

Required Question: Answer ONE Question (I or II, but not both)

I. Trade Theory

Answer all parts of this question. Use intuition and relevant models/diagrams to illustrate and support your conclusions. Be sure to write clearly and label your diagrams precisely. Feel free to use abbreviated notation to simplify your answers. Be sure to: (1) note all assumptions that you make, (2) indicate how your conclusions change if you relax these assumptions, and (3) consider both theoretical and empirical analyses/literature.

1. Briefly discuss the sources of comparative advantage in the following models: (a) Ricardian, (b) Heckscher-Ohlin, (c) Specific Factors, and (d) Monopolistic competition models of intra-industry trade.

2. Choose two of these models to illustrate the concept of “gains from trade.”
II. Choice between working for wages or self-employment work

Answer all parts of this question.

Suppose that workers choose between being employed for a wage, W, or being self-employed (i.e., an entrepreneur). The wage, W, is certain, but income from self-employment, Y, occurs with probability p. That is, self-employment income is Y with probability p and 0 with probability 1 - p.

There are two time periods in the model. Income is earned only in the second time period. Each worker has assets A in time period 1. Those who choose to become entrepreneurs must purchase K units of capital in time period 1, where K > 0.

Utility is given by:

\[ u(c_1) + u(c_2) \]

where \( c_1 \) is consumption in time period 1 and \( c_2 \) is consumption in time period 2.

Each person has the opportunity to save or borrow in time period 1, but if borrowing is done it must be paid back in time period 2. For simplicity, assume an interest rate of 0.

Finally, in addition to income from work, the government provides every worker a cash transfer of \( T_1 \) in time period 1 and \( T_2 \) in time period 2.

a) Write the expected “life cycle” utility for a wage worker. Do the same for a worker who becomes an entrepreneur. Use the notation \( S^w \) to denote saving of a wage worker and \( S^e \) do denote the saving of the entrepreneur. (This includes borrowing, which simply means that \( S^e \) or \( S^w \) are < 0.) [Note: Your answers should not have \( c_1 \) or \( c_2 \) in it, but they should have variables such as A, W, Y, K, \( T_1 \), \( T_2 \), \( S^w \), \( S^e \) and p. Also, assume that the utility function has the standard (von Neumann – Morgenstern) expected utility properties.]

b) Define \( D \) as the expected utility of being an entrepreneur minus the expected utility of being a wage worker. Calculate the marginal impact of \( T_1 \) on \( D \), and the marginal impact of \( T_2 \) on \( D \).

c) Consider the savings choices made by both types of workers. Assuming the credit constraints are not binding, which implies an interior solution, derive the first order conditions with regard to the optimal amount of savings for both types of workers. Using this result, compare the relative sizes of \( \partial D / \partial T_1 \) and \( \partial D / \partial T_2 \), using your answer in part b). What is the intuition for your result?

(This question is continued on the next page.)
d) Consider a person who is risk neutral. Under what condition does that person prefer to be an entrepreneur instead of a wage worker? Simplify your result as much as possible, and briefly explain the intuition. Also, is there any situation where such a person would prefer to be an entrepreneur but credit constraints (inability to borrow) prevent that person from doing so? [Hint: What does risk neutrality imply for the utility function?]

e) (Difficult) Consider the case where expected income is the same for being a wage worker and being an entrepreneur. For simplicity, assume no transfers, and also assume that for either type of occupation the person would like to borrow but cannot do so, so that $S^e = 0$ and $S^w = 0$. Which occupation does a risk neutral person prefer? Suppose there is a risk averse person with quadratic utility: $u(c) = c - \gamma c^2$, $\gamma > 0$. Show which occupation this risk adverse person prefers.
SET TWO:

Answer THREE of the following four questions (III to VI)

III. Trade Policies

Answer all of the following questions. Use intuition and relevant models/diagrams to illustrate and support your conclusions. Be sure to write clearly and label your diagrams precisely. Feel free to use abbreviated notation to simplify your answers. Be sure to: (1) note all assumptions that you make, (2) indicate how your conclusions change if you relax these assumptions, and (3) consider both theoretical and empirical analyses/literature.

1. Consider trade policies including tariffs and export subsidies. Examine and compare the effects of eliminating each of these policies on the welfare of importers and exporters (and their consumers, producers, and governments).

2. What conclusions can you draw about who would support the liberalization of tariffs, and of export subsidies?
IV. Trade Arrangements

Answer all parts of this question. Use intuition and relevant models/diagrams to illustrate and support your conclusions. Be sure to write clearly and label your diagrams precisely. Feel free to use abbreviated notation to simplify your answers. Be sure to: (1) note all assumptions that you make, (2) indicate how your conclusions change if you relax these assumptions, and (3) consider both theoretical and empirical analyses/literature.

1. Discuss what international trade economist mean by “trade creation” and “trade diversion.”

2. Consider a multilateral trade arrangement such as the World Trade Organization, where only a small number of countries remain outside the arrangement.
   a) Do the excluded countries have an incentive to join the arrangement?
   b) Do the included countries benefit from a broadening of membership?
V. Productivity, and Research and Development

Answer all parts to this question.

Measuring Productivity:

a) Using a Laspeyres indexing procedure to aggregate inputs will cause measured multi-factor productivity to decrease in response to changes in relative factor prices, even in the absence of technical change. True or false? Illustrate graphically and explain in a one output, two input world.

Measuring the Welfare Effects of R&D:

b) In a two-country world where a large exporting country (called Home) innovates, use a multimarket model to evaluate the magnitude and incidence of the economic consequences of international (i.e., cross-country) R&D spillovers in answering the following two questions:

1. Are benefits to consumers in the innovating (i.e., Home) country increased or decreased as a consequence of R&D spillovers? Illustrate (graphically) and discuss.

2. Does overall welfare in the Foreign (i.e., non-innovating) country increase or decrease as a consequence of spillovers? Illustrate (graphically) and discuss.
VI. Consumption, farming, wage work and migration

Answer all parts of this question.

Consider an economy where each individual has one unit of labor, and can choose either to work for wages in the city or work as a farmer in rural areas. Regardless of the job taken, each individual \( i \) has the following utility function:

\[
U_i = \frac{1}{(1-\sigma)}(c_{ai}^i)^{1-\sigma} + c_{mi}^i
\]

where \( c_{ai}^i \) is individual \( i \)'s consumption of the agricultural good produced by farmers, \( c_{mi}^i \) is individual \( i \)'s consumption of the manufactured good produced by workers in cities, and \( \sigma > -1 \).

The individual’s “wage” if working in the city is one unit of the manufactured good, which has a price of 1. His or her income as a farmer is \( y \) units of the agricultural good, which has a price of \( p \).

a) Set up the constrained optimization problem of a person who becomes a farmer, and do the same for a person who becomes a wage worker. To avoid confusion, denote the consumption of the agricultural good and the manufactured good of the farmer by \( c_{af} \) and \( c_{mf} \), respectively, and denote the consumption of the agricultural good and the manufactured good of the wage worker by \( c_{aw} \) and \( c_{mw} \), respectively.

b) Use your answer to part a) to derive the farmer’s optimal consumption of the agricultural good, and the wage worker’s optimal consumption of the agricultural good. You do NOT have to solve for the optimal consumption of the manufactured good, so please do not show that. You can assume an interior solution.

c) Assume free migration of labor, so that movement of labor continues until the income of farmers and the income of wage workers is equal. What does this imply about the equilibrium price of the agricultural good (\( p \))? Assume that free trade in the manufactured good requires its price to be 1, while the price of the agricultural good can adjust.

d) Let the total labor force be \( L^T \), and the agricultural labor force be \( L^f \). Assume that the market for the agricultural good functions well, so that supply equals demand. For the economy as whole, show the equation that equates supply with demand for the agricultural good. [Hint: This expression should include the following terms: \( L^T \), \( L^f \), \( c_{af} \), \( c_{aw} \), and \( y \). It should not include \( p \).]

(This question is continued on the next page.)
e) Using your answers to b), c) and d), write the equilibrium rural labor force, \( L_f \), as a function of exogenous variables and parameters. [Hint: In this model there are only 3 exogenous variables and parameters.]

f) The price elasticity of the demand for the agricultural good is defined as
\[
(\partial c_a / \partial p) \times (p/c_a).
\]
Calculate this price elasticity. Assuming that the price elasticity of demand for this good is inelastic (so that its absolute value is < 1), use your answer to e) to explain what happens to the share of the population working as farmers when agricultural productivity (\( y \)) increases.