WRITTEN PRELIMINARY Ph.D EXAMINATION

Department of Applied Economics

Trade, Development and Growth

January 2012

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.
* Put your code number on each page, and number each page of your answers.
* Write on one side of the paper only.
* 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)

1. Inter-Industry Trade

Answer two of the following three parts of this question (if you choose to do this one).

1. Consider two countries, two industries and one factor of interest to you. Illustrate the long run effects of trade liberalization across countries that differ in technologies. Specifically, consider the (a) patterns of trade and (b) gains from trade.

2. Consider two countries, two industries, and two endowments of interest to you. Illustrate the long run effects of trade liberalization across countries that differ in endowments. Specifically, consider the: (a) patterns of trade, and (b) gains from trade.

3. Consider two countries, two industries, and three specific factors of interest to you. Illustrate the short run effects of trade across countries that differ in immobile specific factors. Specifically, consider the income distribution effects of: (a) liberalization policies, and (b) protectionist policies.
II. Human capital, physical strength and work choices.

Answer all parts of this question if you choose to do this one.

Suppose that workers can be employed in different types of jobs (including self-employment work), each of which is indexed by $i$. Each worker possesses human capital, denoted by $H$, and physical strength, denoted by $B$ (“brawn”). Each job pays the following wage:

$$W(i) = \pi(i)H^{\alpha(i)}B^{(1-\alpha(i))},$$

where $\pi(i) > 0$ and $0 < \alpha(i) < 1$ for all $i$

Again, $i$ is an index for the different jobs, and $\pi(i)$, which is $> 0$, is the price of the good produced by activity $i$.

(a) Assume that there are many types of jobs, so that $i$ can be thought of as a continuous index, and hence a continuous variable. Without loss of generality, order the $\alpha(i)$ terms by $i$, so that a smaller $i$ implies a smaller $\alpha(i)$. That is, if $i < i'$ then $\alpha(i) < \alpha(i')$. So think of $\alpha$ as a continuous function of a variable $i$, such that $\partial \alpha(i)/\partial i > 0$. The worker chooses $i$, and thereby chooses $\alpha(i)$, to maximize his or her wages. Show the first order condition for a worker to maximize wages by choosing the type of job (choosing $i$). Note that $\pi(i)$ can also be thought of as a continuous function of $i$. Express your answer so that $\log(H/B)$ equals an expression involving one or more functions of $i$ (some of which could be derivatives of functions of $i$). [Hint: Maximizing the log of the wage is equivalent to maximizing the wage.]

(b) Consider your answer for a). Suppose that men have more strength ($B$) than human capital ($H$), while women have more human capital than strength. That is, $H/B > 1$ for women and $< 1$ for men. What happens to the price of the good when a woman moves to a more skilled (higher $\alpha(i)$) job? What happens to the price of the good when a man moves to a more skilled (higher $\alpha(i)$) job?

c) Consider the choice of child schooling and adult consumption made by the parent of a girl. Let the parent’s utility function be $U(C, W)$, where $C$ is the consumption of the parent and $W$ is the wage that the girl will earn when she is an adult. Assume $W = \pi H^{\alpha}B^{(1-\alpha)}$. [Note: for the rest of the problem ignore the choice of $i$ and focus on schooling and consumption choices.] Assume that $B$ is a constant but $H$ can be determined by $H = H(S)$, where $S$ is years of schooling. Finally, assume the family faces a budget constraint of $Y = pC + (1-S)\omega + S\rho$, where $Y$ is fixed parental income, $p$ is the price of the consumption good, $\omega$ is the child wage rate and $\rho$ is the price of schooling. (Note that $S$ has been normalized to be from 0 to 1.) Derive and interpret the first order conditions for the choice of $C$ and $S$.

d) This final question is harder. Suppose that for men strength ($B$) is also a choice, so that $B = B(C)$. That is, unlike women men can build up their strength by consuming more calories. In addition, calories have a direct effect on the child wage rate for boys: $\omega = \omega(C)$, where $\partial \omega/\partial C > 0$. Work out the first order conditions for the parent’s utility maximization problem for a boy, where their choices again are $S$ and $C$. Compare your answer to c); in particular will parents invest more in schooling for boys, or more schooling of girls?
SET TWO:

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

III. Trade Policy

Answer two of the following three parts of the question (if you choose to answer this one).

1. Use your knowledge of the welfare effects of tariffs to explain why policy makers interested in maximizing national and world welfare support free trade while select agents within countries (e.g., consumers, government, producers) do not support free trade.

2. Examine the effect of liberalizing export subsidies on prices, quantities supplied, quantity demanded, and trade in both importers and exporters. Make an assumption about whether your countries can affect the world price.

3. Assume that you are an advocate for producers and license holders with an interest in maximizing rents to license holders and producer welfare. Furthermore, assume that your advocacy organization works to maximize rents and producer welfare from a global perspective. Explain whether your organization would support the liberalization of import quotas world wide.
IV. Intra-industry and Intra-firm trade

Answer all parts of this question if you choose to do this one.

The trade theory literature has evolved to include traditional trade theory, factor content theory, New trade theory, and trade and multinationals theory. Use your knowledge of these literatures to answer the questions below.

1. What are the key assumptions of each of the literatures? In other words, what assumptions are relaxed relative to previous literatures?

2. How do the predictions of the models change as the assumptions are relaxed?
V. Measuring the Welfare Effects of R&D

Answer all three parts to the question if you choose to do this one.

In a two-country world where a large exporting country (called Home) innovates, use a clearly labeled figure of a multi-market model and associated explanation to evaluate the following questions:

1. Does the welfare of producers in the Foreign (i.e., non-innovating) country increase or decrease as a consequence of R&D spillovers emanating from the Home country compared with a situation of no spillovers? Illustrate and discuss.

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

3. Research spillovers to the rest of the world increase the national welfare of the Home country compared with a situation of no spillovers. True, false, explain.
VI. Land Contracts

Answer all parts of this question if you choose to do this one.

Consider a simple model of efficient land contracts. Assume that there are 3 possible outcomes, and call them high, medium and low. Total output = H in the high case and = L in the low case. In the medium case let output = M, where H > M > L. Assume that the probabilities of the three cases be:

- \( \text{Prob}[M] = \mu \) (for some exogenous \( \mu \) such that \( 0 < \mu < 1 \))
- \( \text{Prob}[H] = e(1-\mu) \) (\( e \) is the tenant’s effort)
- \( \text{Prob}[L] = (1-e)(1-\mu) \)

Assume that rental contracts take the simple form of different payments to the tenant from the landlord depending on whether L, M or H occurs:

- \( l \) = payment to tenant when L occurs (and the landlord gets the rest)
- \( m \) = payment to tenant when M occurs (and the landlord gets the rest)
- \( h \) = payment to tenant when H occurs (and the landlord gets the rest)

The “payoff” (expected utility) of the tenant is the expected payment minus the disutility of effort, \( d(e) \), and the “payoff” of the landlord is his/her expected payment. Assume that \( d'(e) > 0 \) (greater effort implies greater disutility).

a) Derive the equation that (implicitly) solves for the socially optimal level of tenant effort, where social welfare is the sum of the “payoffs” of the tenant and the landlord. You can assume that the social welfare function is strictly concave in \( e \).

b) How does this level of effort compare to the level of effort for the case where there is no “medium” category? Assume that \( d''(e) > 0 \) and \( \text{Prob}[L] = (1-e)\rho \) and \( \text{Prob}[H] = e \). Give the intuition behind this result.

c) Show the modified versions of the two constraints to the landlord’s optimization problem given in class (modified to allow for three outcomes instead of two). To avoid confusing notation, denote the income that the tenant could earn elsewhere by \( \gamma \), instead of \( m \). In this model with 3 outcomes, is it in the landlord’s interest to set the values of \( l \), \( m \) and \( h \) so that the tenant chooses the socially optimal level of effort? Explain your answer. [Hint: To answer the question about what is in the landlord’s best interest you don’t need to do anything mathematical, just think of the logic of the question.]

d) Show at least one set of solutions for \( h \), \( l \) and \( m \) that characterize the solution to the landlord’s optimization problem. Is this the only possible solution, or are other solutions possible?