WRITTEN PRELIMINARY Ph.D EXAMINATION

Department of Applied Economics

Summer – 2008

Trade, Development and Growth

For students electing

Macro (8701) & New Trade Theory (8702) 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 requested to answer a total of FOUR questions

· Answer TWO questions from Set One

· Answer TWO questions from Set Two

· You have four hours to complete this examination
Answer TWO of the following THREE Questions (2 out of questions I, II or III).

I. Growth Theory

A. Environment

Consider the environment of the three sector, small open economy. For consistency in notation, agents produce and consume three goods, indexed \( j = m, s, a \), at each instant in time at price \( p_j \). The services of labor, \( L(t) \), and capital, \( K(t) \), are employed in the production of all three goods while land, \( H \), a sector specific factor, is also employed in the production of the agricultural good, \( j = a \). The manufactured good, indexed \( j = m \), is both a consumption and a capital good that is internationally traded. The rural good is also traded internationally. The home good, indexed \( j = s \), is a pure consumption good and only traded within the domestic economy. Labor services experience an exogenous rate of augmentation \( x \). These services are not traded internationally and domestic residents own the entire stock of domestic assets. Households earn income from providing labor services \( L \) in exchange for wages \( w \), earn interest income at rate \( r \) on capital assets \( A \), and receive rents from agriculture's sector specific resource, land \( H \). From these earnings, they save and spend

\[
E = q_m + p_a q_a + p_s q_s
\]
on the manufactured good \( q_m \), the agricultural good \( q_a \) and the service good \( q_s \), per worker.

B. Primitives

\[
( m = \text{manuf.}, \ a = \text{ag}, \ s = \text{service})
\]

\[
Y_m = Y^m(AL_m, K_m) = A_m(A(t)L_m(t))^\alpha K_m^{1-\alpha}; \quad \text{Non-farm economy}
\]

\[
Y_a = Y^a(AL_a, K_a, A_aH) = A_a(A(t)L_a(t))^{\alpha_a} K_a^{1-\alpha_a} (A_a(t)H)^{1-\beta_a}; \quad \text{Farm economy}
\]

\[
Y_s = Y^s(AL_s, K_s) = A_s(A(t)L_s(t))^{\alpha_s} K_s^{1-\alpha_s}; \quad \text{Service economy}
\]

with the restriction that \( A_a(t) = A(t)L(t) = e^{(x+a)t} \), and the rate of growth in workers is \( n \).

Felicity is

\[
q = q_m^\lambda_1 q_a^\lambda_2 q_s^{1-\lambda_1-\lambda_2}
\]

The rate of time preference is \( \rho \).

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C. The household

1) The Euler Equation for the case where the inter-temporal elasticity of substitution \(1/\theta\) is unity:
   a) Derive this equation
   b) Discuss its economic meaning in the context of transition growth

D. Equilibrium

1) Characterize, in general terms, i.e., not algebraically, the intra-temporal equilibrium of this economy.

2) Show (as opposed to solve for) how you would obtain the steady - state solutions for \(\hat{w}, r, p, \) and \(\hat{k}\)

E. Selected comparative statics

Make assumptions regarding the relative factor intensity of the three technologies, and assume a level of capital stock \(\hat{k}(0)<\hat{k}^{ss}\). From the intra-temporal equilibrium above, suppose you have derived the supply functions

\[
\begin{align*}
\hat{y}_m &= y^m(p_s, \hat{k}) \\
\hat{y}_s &= y^s(p_s, \hat{k}) \\
\hat{y}_a &= y^a(p_a, \hat{w}, r^k)H
\end{align*}
\]

1) Show whether the price of the home good \(p_s\) converges to its long run equilibrium \(p_s^{ss}\) from above or below this value.

2) In transition growth, discuss the "expected" effects of changes in \(\hat{w}\) and \(r^k\) on \(\hat{y}_a / \hat{y}_a\)

3) In long-run equilibrium, what is the rate of growth in \(K, Y_m, Y_a, Y_s, \) and \(w\)?
II. Agriculture's Role in Economic Growth: a growth accounting-like exercise

The World Bank's 2008 Word Development Report (WDR) identifies a number of pathways through which agriculture stimulates economic growth. In small open economy models in which agriculture's price is determined in world markets, the direct effect of growth in agricultural output leading to lower food prices does not occur. However, the other effects remain. This question deals with these effects.

As a point of departure, consider an economy in transition growth. Consider an economy whose production technologies are neoclassical CRS, land specific to agriculture, and an intra-temporal GDP function that can be stated as

\[ GDP = G(p_m, p_a, p_s, L, K, A(t)H) \]

where:
- \( p_m, p_a \) are exogenous prices for manufacturing and agriculture
- \( p_s \) is an endogenous price of home goods
- \( L \) is exogenous, and for purposes here, a constant
- \( K \) is endogenous
- \( A(t)H \) is land augmentation at rate \( \eta \), and the stock of land \( H \) is exogenous

Our key focus is on how an exogenous increase in agricultural technological change \( A(t) \) affects economy-wide GDP, and by implication, the welfare of the economy in the process of growth.

Drawing upon your knowledge of growth accounting, growth theory and the envelope properties of the GDP function

- Make explicit assumptions about the relative factor intensity in the three sectors of this economy
- Assume that \( K(0) < K^{*} \)
- Assume agents have homothetic preferences so that \( \dot{K} / K \geq \dot{L} / L \)
- Posit, based on these assumptions, the following reduced form functions (where we only note the exogenous variable of interest)
  \[ p_s = P^*(A(t), \cdot) \]
  \[ K = K(A(t), \cdot) \]

- and postulate/indicate the sign of \( \partial P^*(A(t))/\partial t, \partial K(A(t))/\partial t. \)

1) Provide a brief economic justification for the signs you have chosen for \( \partial p_s(A(t))/\partial t, \partial K(A(t))/\partial t \)
2) Evaluate and explain the effect on GDP of an increase in \( A(t) \). These are some of the "path ways" discussed in the WDR

(this problem is continued on next page)
3) Evaluate and explain the direct and indirect effects of an increase in $A(t)$ on either
   a) agricultural supply OR
   b) farm profits, BUT NOT BOTH

4) Evaluate and explain the effect of an increase in $A(t)$ on payments to labor, $w$

5) Evaluate and explain the effect of an increase in $A(t)$ the returns to capital $r^k$

6) Given these effects, discuss (as opposed to show) how an increase in $A(t)$ is likely to affect the representative agent's discounted present value of utility, i.e.

\[\int_{0}^{\infty} \frac{u^{1-\theta}}{1-\theta}e^{-\rho t}dt\]

Hint: indicate what is likely to be with a small $\eta$ as opposed to a large $\eta$. 

III. Analysis of trade reform and economic growth

The shock in prices of petroleum, metals and agricultural commodities are at levels not seen since the first primary commodity price shocks of the early 1970s. The UN and other agencies have expressed major concerns for how these shocks are likely to impact low income economies that are net food importers. Many of the net food importing countries are responding to the food price shocks by importing agricultural commodities at world prices, and then selling those commodities to their domestic food distribution system at prices lower than world prices. The financial loss from importing at world prices and selling at lower domestic prices has been paid for by the government. The sources of revenues vary, some governments borrow on world markets, some cross subsidize (tax their exports and use this revenue to pay for the subsidy on food imports), and various other combinations.

For the purpose of this question, consider:

• A country that borrows on world markets to finance the higher world price of food SUCH THAT THE RELATIVE DOMESTIC PRICE OF THE EXPORTED GOOD TO THE IMPORTED GOOD (food) REMAINS UNCHANGED. Effectively, by borrowing from external sources, the country's internal terms of trade remain unchanged.

1) Use a graphic analysis to show the nature of the equilibrium of a country pursuing this food subsidization policy.

2) Presume that the country continues this strategy for a number for \( t^* \) years and accumulates foreign debt. Also, the country experiences economic growth. Depict and briefly discuss the new equilibrium at \( t^* \).

3) Now, suppose that at \( t^* + 1 \), foreign creditors demand repayment of the accumulated debt. Depict and discuss this "new" equilibrium.

4) Suppose the country had not pursued a food subsidization strategy but instead had permitted world prices to prevail in the domestic economy, even though these prices implied a negative external terms of trade change. Depict and discuss what the country's equilibrium might have been in \( t^* + 1 \) RELATIVE to the equilibrium in \( t^* + 1 \) above.
SET TWO

Answer TWO of the following THREE questions (2 out of questions IV, V and VI)

IV. Evolution of theory

The literature on international trade includes bodies of research referred to as: (1) traditional trade theory, (2) factor content theory, (3) New Trade theory, and (4) trade and multinationals theory. Recent research seeks to integrate these four literatures. Use your knowledge of these literatures to answer the following questions:

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

b) Generally, how do the predictions of the models change as the assumptions are relaxed?

V. OLI concepts

Dunning (1977) introduced the concepts of ownership, location, and internalization (OLI). These concepts have been integrated in the trade and multinationals literature. Use your knowledge of this literature to interpret these concepts:

a) Ownership

b) Location

c) Internalization.
VI. Theory vs. empirics

Use your knowledge of the trade and multinationals literature to explain the stylized facts below.

a) A large proportion of trade and direct investment occurs between relatively similar economies—similar in size and relative endowments. That is, flows tend to be North-North or South-South rather than North-South or South-North.

b) A large proportion of trade and direct investment is two-way trade in similar products (i.e., intra-industry).

c) Direct investment has grown faster than trade in recent years.

d) A sizable portion of intra-industry trade (IIT) is intra-firm trade (IFT).