WRITTEN PRELIMINARY Ph.D EXAMINATION

Department of Applied Economics
June. - 2011
Trade, Development and Growth

For students electing
Macro (8702/Prof. Smith) & Macro (8701/Prof. Roe) 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 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 policies

What are the effects of liberalizing trade policies (such as tariffs, quotas, voluntary export restraints, bans, and export subsidies)? In your answer to this question, be sure to consider:

1. Modeling assumptions and implications of relaxing assumptions
2. Theoretical and empirical analyses
3. National, sub-national, and global perspectives

II. Growth accounting

Let 
\[ Y_n (t) = G (p_1 (t), p_2 (t), K (t), A (t) L (t)) \]

denote a country’s nominal GDP function where \( Y_n (t) \) is nominal GDP, \((p_1 (t), p_2 (t))\) are prices of final good \( Y_1 \) and \( Y_2 \) respectively.

1. What are the "typical" assumptions/restrictions imposed on this function that correspond to competitive economy?

2. Consider the following PPF at two different points in time, where point A is \( Y_n (t = 0) \), and B is \( Y_n (t > 0) \). Calculate/derive Solow’s residual with the maintained hypothesis that the data are generated by an economy whose nominal value of final good production can be characterized by the nominal GDP function \( G (p_1 (t), p_2 (t), K (t), A (t) L (t)) \)
2. Explain your results in 1 above as a movement from point A to point B. Discuss and distinguish between the "real" component of adjustment and the nominal component of adjustment.

3. The typical growth accounting exercise presumes an economy-wide production function

\[ Y(t) = F(K(t), A(t) L(t)) \]

where \( Y(t) \) is real GDP.

(a) Compare the results you would obtain presuming a production function as the basis for your growth accounting exercise with the results obtained from presuming a GDP function.

(b) Explain/discuss the advantage of basing your analysis on the GDP function for the empirical analysis.

4. If the economy is in long-run balanced growth-path equilibrium, the rate of growth of \( L \) is constant at rate \( n \), and the rate of Harrod neutral technological change is also constant at rate \( x \), what is the contribution of the growth in \( K \), technological change \( A \), and labor force \( L \) to the long-run growth in real GDP?
SET TWO:
Answer THREE of the following four questions (III to VI)

III. Analyze the effects of cross-country differences in policies.

Answer for three of the policies below. Be sure to consider at least two effects for each of the three policies.

1. Intellectual property rights
2. Investment policies
3. Environmental policies
4. Labor policies
5. Growth and development policies
6. Administrative, technical, and regulatory policies

IV. Theory: The household optimization problem

Fundamental to modern growth theory is the concept of a representative - "Ramsey household". The household’s felicity function is expressed as

\[ q(t) = u \left( [q_a(t) - \gamma] , q_m(t), q_s(t) \right) \] (1)

where \( q_a, q_m, \) and \( q_s \) denote the quantities of food, manufactures and a service good consumed per household member, respectively, and \( \gamma > 0 \). We omit the \( t \) notation to reduce clutter. The service good is not traded internationally so that its price is endogenous, while the prices of \( q_a \) and \( q_m \) are unchanging (presumably world prices).

The household is presumed to maximize the discounted present value of utility subject to a budget constraint. Utility is

\[ U = \int_0^\infty \frac{q^{1-\theta} - 1}{1-\theta} e^{(\kappa - \rho)t} dt \] (2)
where \( n \) denotes the annual net growth in household members, \( \rho \) is the time rate of discount, and \( \theta \) is the inverse of the intertemporal elasticity of substitution. The budget constraint is

\[
\dot{k} = w + k(r - n) + \pi H - \epsilon
\]

(3)

where expenditure at each instant in time is: \( (p_m = 1 = \text{numeraire}) \)

\[
\epsilon = \mathcal{E}(1, p_a, p_s) q + \gamma p_a \equiv \min_{q_a, q_m, q_s} \left\{ \sum_{j = a, m, s} p_j q_j : q \leq u([q_a - \gamma], q_m, q_s), (q_a, q_m, q_s) \in \mathbb{R}^3_{++} \right\}
\]

and \( w, r, \) and \( \pi = \mathbf{\pi}(p_a, w, r^k) \beta(t) \) denote rental payments to labor, capital \( k \) and land \( H \), respectively. Here, \( r^k = r + \delta \) (\( \delta = \text{depreciation} \)), and \( \beta(t) \) is exogenous technological change augmenting land \( H \).

For purposes here, you may assume a specific functional form for the felicity function (1). Otherwise, let the function be increasing and strictly concave in its arguments \( (q_a, q_m, q_s) \), and everywhere, continuous and twice differentiable.

1. What is the "standard" interpretation of the \( \gamma \) parameter in (1)?

2. How is the \( \gamma \) parameter likely to affect behavior over time as capital deepening occurs?

3. Derive the Euler equation.

4. Provide an intuitive interpretation of this equation’s depiction of consumer behavior over time. In particular, discuss the effects of \( \theta, \rho \) and \( \dot{p}_s/p_s \) on the household’s incentives to forego and to smooth consumption over time.

5. A common feature of the primitives associated with production of the goods \( a, m, s \) is exogenous technological change that augments labor at a constant Harrod rate, \( x \). Show how this feature changes the Euler condition derived in 3. above.

6. If a steady state exists, how does \( \gamma \) affect, if at all, the long-run level of \( r \)?
7. Show how an exogenous technological change that augments labor at a constant Harrod rate, \( x \) "alters" the budget constraint (3). (note, you need to replace \( \epsilon \) in (3) with \( E(1, p_a, p_s)q + \gamma p_a \))

8. Speculate as to how your answer in 7. above is likely to affect the models equations of motion (i.e., the differential equations that are needed to solve numerically for the economy’s transition path to long-run equilibrium)

V. Trade policies and welfare

Assume that optimal trade policies seek to maximize global welfare. Use your knowledge of theoretical and empirical analyses to evaluate:

1. Arguments for free trade
2. Arguments for protectionism
3. Institutional arrangements for trade policy

VI. Analysis: economic growth and poverty

While the literature clearly shows that poverty alleviation is strongly associated with economic growth, effort has been made to pursue "pro-poor" growth strategies (See Chapter 3 in Nallari and Griffith (2011) Understanding Growth and Poverty, IBRD). One of the many dimensions of this strategy is to increase the productivity of labor intensive sectors of the economy, which for many countries is agriculture where a majority of a country’s poor typically reside. For purposes here, this question focuses on a very stylistic and rather narrow aspect of this strategy.

A "snap-shot" of an economy depicted in the accompanying social accounting matrix provides essential insights into its basic economic structure. The first panel of the data give the base solution results using the basic "platform" three sector growth model. The second panel shows the results from an increase in the base year of ten percent in scale parameter of the agricultural production function. The third panel is just the simulated values of panel two divided by the corresponding values in panel one (the base solution).
1. Discuss/explain the fundamental economic forces of underlying the transitional dynamics of the base solution. In your answer, give particular attention to agriculture, and some attention to wage income since the poor typically have relatively little access to capital but they may have rights to land.

2. Now, consider the simulation (second panel). Essentially, explain how the "fundamental" economic forces discussed in 1. are modified by a once and forever costless increase in agriculture’s scale parameter. Give special attention to the "pro-poor" side of this issue.

In answering these questions, be "analytical," using your knowledge of the theory to explain the results.