Written Exam for the M.Sc. in Economics, Winter 2010/2011

Advanced Development Economics – Macro Aspects

Master's Course

6.1.2011

(3-hour, closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

The percentage weights assigned to each question should only be regarded as indicative. The final grade will ultimately be based on an assessment of the quality of the answers to all questions in the exam in their totality

A. Verbal questions (40%)

Question 1.

Does trade stimulate growth? Discuss briefly why trade in theory may influence growth, and proceed to explain carefully how the impact of trade on growth might be identified econometrically.

Question 2.

Why might the timing of the Fertility Transition have special significance in explaining contemporary income per capita differences?

B. Analytical questions (60%)

Consider an economy where people live – at most – for two periods. Everyone survives period one, but only with probability π will the individual live to the end of period two.

In period one individuals are children, and live off the consumption of their parent. In period two the individual is an adult, supplies her labour in the market and decides on family size as well as the education of her offspring (for simplicity, we assume people reproduce asexually). Each child costs τ units of time, regardless of education. However, if – in addition – the individual wishes to educate the child additional costs have to be carried: e units of time, per child. As an adult each individual

receives a labour market compensation of – if she survives throughout period two – h; h is in turn determined by optimization by her parent, and thus predetermined.

Preferences, for individuals born at time t-1, are defined over consumption, c_t, as well as surviving offspring, human capital weighted ($n_t \pi_{t+1} h_{t+1}$). In sum, the utility function is

$$W_t = U(c_t) + V\left[n_t \pi_{t+1} h_{t+1} \right]$$

When maximizing utility the individual is subject to the following constraints

$$\pi_t h_t = c_t + (\tau + e_{t+1}) n_t h_t$$
$$h_{t+1} = h(e_{t+1})$$

The utility functions U and V are both twice differentiable, strictly increasing and strictly concave.

Question 1.
(i). Comment on the budget constraints. (ii) Is it reasonable to assume that individuals can control fertility today? What about in a pre-industrial setting?

Question 2.
Derive the first order conditions for e_{t+1} and n_t. Comment on their economic interpretation

Question 3
(i). Derive an expression for optimal investments in education, e_{t+1}. (ii) what is the impact of increases in child *longevity* (π_{t+1}) on optimal educational investments? Explain why this result obtains.

Question 4.
What is the impact of longevity on economic growth *empirically*? Be sure to explain how the empirical study(ies) you refer to propose to identify the impact econometrically.

Suppose we now modify the problem above by assuming that *morbidity* influences the production of human capital. That is, we now assume $h_{t+1} = h(e_{t+1}, \theta_{t+1})$, with $h'_\theta > 0, h''_{e\theta} > 0$. Hence, θ parameterizes "health".

Question 5.
(i). Comment on the assumptions $h'_\theta > 0, h''_{e\theta} > 0$. (ii) Solve the optimization problem above with respect to optimal educational expenditures, with the new human capital production function. We assume that individuals take θ (like π) as given. (iii) Under what condition will an increase in θ increase educational spending?

Question 6.
What is the impact of morbidity (health) on productivity *empirically*? Be sure you explain how the study(ies) you refer to reach this conclusion.

Question 7. Explain how a mechanism involving health and schooling can propel a country from (virtual) stagnation to sustained growth and generate the fertility transition along the way.