Written Exam for the M.Sc. in Economics, Winter 2011/2012-R

Advanced Development Economics – Macro Aspects

Master's Course

21.2.2012
(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 question (50%)

Question A1.

Does trade cause growth? Discuss the empirical evidence, including how the various studies propose to identify the impact of trade/openness on growth.

Question A2.

In a recent study Shasha Becker and Ludger Woessmann argues that "Weber was wrong". They propose that human capital (rather than thrift and hard work) is the key reason why Protestantism may have had a positive impact on growth. Provide details on their argument, including how they propose to identify the impact of "Protestantism" on prosperity.

Analytical question (50%)

Consider an economy in the process of development. The economy is inhabited by an infinite sequence of overlapping generations. The size of the labor force is constant, and of measure one. Time is discrete and extends into the infinite future, t=0,1,2 …

The economy is closed, and markets are fully competitive. People live for two periods. In period one they work and consume. In period two they retire, and life off their savings.

At the end of the first period individuals face a risk of dying prematurely. With probability ϕ they survive until the end of period 2 (where they die for sure); with probability 1-ϕ they die right after period 1 without being able to consume their savings.

To solve the problem of "unused savings" we introduce a non-profit life insurance company. All consumers provide it with their savings, which it in turn invests in the firms. Since all consumers (infinitely many) use the same insurance company it faces no uncertainty. No profits therefore dictates that the return obtained from savings by the survivors, ρ, is simply the real rate of return, r, divided by the survival probability, $\rho = r/\phi$.

We assume the representative firm uses the following Cobb-Douglas production technology, $Y_t = AK_t^{\alpha}L^{1-\alpha}$, where the notation is standard, and implicitly L=1 by assumption. The factor

prices of labor and capital are w and r+δ, respectively. The first order conditions from the profit maximization problem are

$$r_t = \alpha A k_t^{\alpha-1} - \delta, w = (1-\alpha) A k^{\alpha}_t$$

where δ is the rate of capital depreciation, and $k_t \equiv K_t / L$.

Households have preferences over consumption in the two phases in life, (c_t,c_{t+1}). The utility function is logarithmic: $u_t = \log(c_t) + \phi \log(c_{t+1})$. In period 1 (youth) the household is faced by the restriction $w_t = s_t + c_t$, and in period 2 (old age) the households are subject to $c_{t+1} = (1+\rho_{t+1}) s_t$.

B1. **Household problem**. (*i*) Comment on the utility function. (*ii*) Solve the maximization problem, and show that savings of the young are given by $s_t = \left[\phi / (1+\phi)\right] w_t$. (*iii*) Explain why the parameters enter into the savings function the way they do.

B2. **Law of motion for capital**. Derive the law of motion for the capital stock per unit of labor.

Definition: Let $k_{t+1} = \psi(k_t)$. A steady state is a sequence $k_{t+1} = k_t = k^*$, such that $k^* = \Psi(k^*)$.

B3. **Steady state analysis**. Examine the mathematical properties of the expression for $\Psi(k_t)$ that you derived in B2, and proceed to construct the phase diagram for the model in (k_t,k_{t+1}) space. Does a steady state exist? Is it unique? Is it stable?

B4. (i) Derive steady state income per capita, y*, and proceed to establish the impact from *reduced* mortality on long-run productivity. Provide intuition for the result. (*ii*) Discuss the empirical literature on the impact of changes in mortality on growth. Provide details on how identification is supposed to be attained in the studies you mention.