Written Exam for M.Sc. in Economics autumn 2012-2013

Advanced Development Economics: The Macro Aspects

Master's Course

2.1.2012

(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

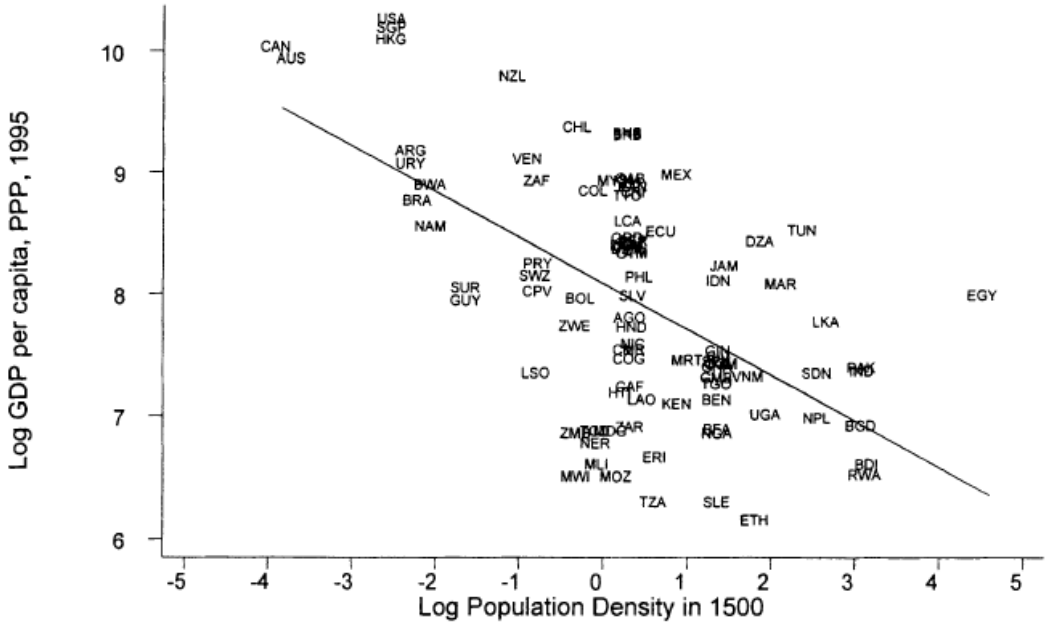

FIGURE II

Log GDP per Capita (PPP) against Log Population Density in 1500

Note. GDP per capita from the World Bank [1999]; log population density in 1500 from McEvedy and Jones [1978]. Details are in Appendix 2.

Verbal questions (40%):

In an influential study, Acemoglu, Johnson and Robinson (2002, Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *Quarterly Journal of Economics* 1231—1294), draw attention to the fact that there is a strong negative correlation between population density in 1500 and contemporary income per capita levels, for a selected group of countries. The cross-plot is reproduced above. A central claim of the study is that this pattern is inconsistent with the view that "Geography" is the central determinant of long-run development, whereas "institutions" are.

Question A1. Explain the logic of their argument. Do you agree with it? Explain why/why not.

In a recent contribution Guido Tabellini (2010, Culture and institutions: economic development in the regions of Europe*. Journal of the European Economic Association,* 8, 677--716) propose that cultural traits ("Trust", for instance) has had an important impact on long-run growth in Europe.

Question A2. (a) Why might trust be important to development? (b) What is the evidence that trust is a "cultural trait", and not simply a reflection of sound economic institutions (e.g., a well functioning court system) that makes it less costly to citizens to trust one another? (c) Explain how Tabellini proposes to identify the impact of trust on growth. Discuss the credibility of the identification strategy.

Analytical questions (50%)

B. Health and long-run growth

Consider the following simple model formulated in continues time

$$Y = AH^{\beta} \tag{1.1}$$

Where Y is GDP per capita, A is productivity (technology) and H is "health capital". Suppose further that productivity evolves in accordance with the differential equation

$$\dot{A} / A = \Delta H^{\alpha} (\bar{A} / A)^{\theta} \tag{1.2}$$

Where the "dot" over A signifies a time derivative (i.e., $\dot{A} = dA / dt$). $\bar{A}$ denotes the "world frontier level" of technology. The parameters β,α and θ are constant and bounded between zero and one; Δ is a positive constant.

Question B1. Comment on the presence of H in equation (1.1); is there evidence to suggest "health matters to productivity"?

Question B2. Comment on equation (1.2). That is, explain why the variables enter the equation the way they do.

Question B3. (i) Show that (1.1) and (1.2) implies the following law of motion for growth in GDP per capita

$$\dot{y} = \delta + \theta\bar{a} - \theta y + (\theta\beta + \alpha)h + \beta\dot{h} \tag{1.3}$$

where the generic variable z = log(Z). Hence $\dot{y} = d\log(Y) / dt, \bar{a} = \log(\bar{A})$ and so on. (ii) explain why the variables enter the equation the way they do.

Aghion, Howitt and Murtin (2009. The Relationship Between Health and Growth: When Lucas Meets Nelson-Phelps. NBER Working Paper) assume H in equation (1.3) can be measured by life expectancy, and proceeds to estimate equation (1.3) empirically by way of cross-country regression analysis.

Question B4. (i) How do the authors propose to identify the impact of health in their empirical study? (ii) What do they find? (iii) Discuss the identifying assumptions.

In an influential study Acemoglu and Johnson (2007. Disease and Development: The Effect of Life Expectancy on Economic Growth. *Journal of Political Economy* 115, 925-85.) also examine the impact of life expectancy on growth. They find that life expectancy has <u>not</u> served to increase growth over the last roughly 60 years.

Question B5. Compare the empirical strategy of the two studies (i.e., Aghion et al vs. Acemoglu and Johnson). Is there an explanation why the two studies reach different conclusions?

C. Optimal fertility choice

Consider a household with the following preferences

$$U(c,n) = (1-\gamma)\frac{c^{1-\sigma}-1}{1-\sigma} + \gamma\frac{n^{1-\sigma}-1}{1-\sigma} \tag{1.4}$$

where is *c* consumption and *n* family size (i.e., number of off-spring); the parameter $\sigma>0$; γ is bounded between zero and one. The household is subject to the budget constraint

$$c = (1-\tau n)\, y \tag{1.5}$$

Where τ is the unit time cost of children, and *y* is potential labor market income.

Question C1. Derive optimal family size, *n*, by maximizing (1.4) subject to (1.5). What is the impact of changes in y on fertility, *n*?

Question C2. Can this simple set-up help us understand the causes of the fertility transition? Why/Why not?