

Written Exam for the M.Sc. in Economics winter 2016-17
Advanced Development Economics – Macro aspects
Master's Course
December 15th, 2016
(3-hour closed book exam)

Please write all your answers in English.

The exam has 4 pages, and consists of 3 questions (each one with multiple parts).

Each question (A, B, and C) has a total weight of 1/3 in the final grade.

QUESTION A. Population dynamics in the pre-modern era.

Consider an overlapping-generations economy in pre-modern times, where time is discrete and the time horizon is infinite ($t = 0, 1, \dots, \infty$).

Individuals are identical and live for two periods. In the first period they are children and live of the resources they receive from their parents. In the second period they are adults, and generate an income level of y if they allocate their entire unit-time endowment to work.

The typical adult individual has a utility function u_t of the form

$$u_t = \gamma \ln(n_t) + (1 - \gamma) \ln(c_t)$$

where $\gamma \in (0, 1)$, and c_t and n_t are the levels of consumption and the number of children per adult in period t , respectively.

Raising children requires an amount ρ of goods, but also a fraction τ of the parent's unit-time endowment. Therefore, the individual's budget constraint can be written as

$$(\rho + \tau y_t) n_t + c_t = y_t$$

where y_t is the average level of income per capita in the economy in period t .

Each period, a single homogeneous good is produced using land, labor, and the existing technology in the economy. The supply of land is exogenous and fixed at a level X . The supply of labor is the outcome of individuals' fertility decisions in the preceding period, and therefore each period

$$L_{t+1} = n_t L_t$$

where L_{t+1} and L_t are total levels of adult population or total levels of labor supply in periods $t + 1$ and t , respectively; and n_t is the result of the individual's optimization problem.

Total output in period t (Y_t) is thus given by

$$Y_t = (A_t X)^\alpha L_t^{1-\alpha}$$

where $\alpha \in (0, 1)$; and A is the level of technological sophistication, which we assume to be fixed, to reflect that the rate of technological growth during the pre-modern period was low.

A.1. What is the optimal number of children for each individual?

A.2. What is the effect of y_t on the optimal number of children? Interpret your results.

Now suppose that the time-costs of raising children can be disregarded (which means we now assume $\tau = 0$, for example because the absence of technological progress does not affect wages and therefore the time-costs of raising children). In that case, the individual's budget constraint becomes

$$\rho n_t + c_t = y_t$$

A.3. What is the optimal number of children for each individual, under this new assumption?

A.4. What is the effect of y_t on n_t now? Interpret your results, and compare them with your answer to question **A.2.**

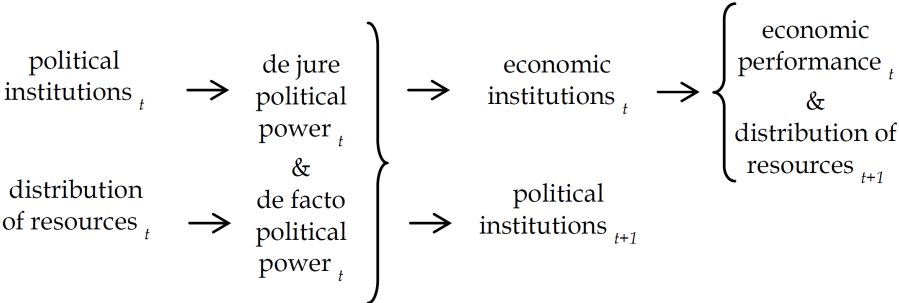
A.5. Compute the level of y_t , which is defined as the average level of income per capita in the economy: $y_t \equiv \frac{Y_t}{L_t}$. Use the results from question **A.3.**, and assume that $L_0 > 0$ is the initial level of total population. Describe the law of motion for the total population size in the economy, and show that it has a unique and stable steady-state level, \bar{L} , by checking if the Inada conditions are fulfilled. Illustrate your results in a phase-diagram.

A.6. Determine the equilibrium level of total population, \bar{L} , and the equilibrium level of population density, defined as $\bar{P} \equiv \frac{\bar{L}}{\bar{X}}$.

A.7. Assuming that the economy is in a steady-state, what is your prediction about the level of \bar{P} if the level of technological sophistication increases exogenously, as a one-time jump in A , from a level A_0 to a level $A_1 > A_0$? Explain your prediction in terms of the new equilibrium level, and describe the process of convergence to that new equilibrium. Is your explanation consistent with the overall prediction of Malthusian theories, that technological progress created larger but not substantially richer populations during pre-industrial times? Why?

QUESTION B. Institutional development.

B.1. Acemoglu and Robinson (*REI* 2010, "The Role of Institutions in Growth and Development") present a theory of institutional development, which they illustrate with the diagram below. Explain the how their theory is built, by explaining the rationale behind the different links in their diagram:



Economic outcomes depend to an important extent on the type of economic institutions that prevail in a country. When countries identify dysfunctional elements in those institutions, they have the potential to embark on processes of institutional reform. However, the observed success rate of economic reforms is not always 100%.

B.2. Why do reforms of *specific* economic institutions may be ineffective?

QUESTION C. The effects of humanitarian aid.

Humanitarian aid is an important international policy tool to alleviate endemic poverty. However, it has sometimes been criticized by observers that claim that humanitarian aid, and in particular food aid, may actually promote conflict. Nunn and Qian (*AER* 2014, "US Food Aid and Civil Conflict") present a study on this topic, in which they examine the relationship between the incidence of conflict and the amount of food aid received in a sample of 125 non-OECD countries during the period 1971-2006.

The authors explain that the main difficulties in identifying a causal effect of food aid on the incidence of conflict arise from reverse causality and joint determination, which tend to bias the OLS estimates in ex ante ambiguous directions. They also mention that measurement error may be another potential source of bias.

C.1. In which direction do the presence of (i) reverse causality, (ii) joint determination, and (iii) measurement error, bias the OLS coefficients in this study?

The authors find that an increase of US food aid increases the incidence and duration of civil conflict – and that these results are robust, and not driven by other factors (for instance they are not driven by food aid crowding out other types of aid). However, the authors also report that the effect of US food aid on the incidence of civil conflict is not the same everywhere: they show that it is statistically insignificant in countries that have been peaceful during the last 20, 15, 10, and 5 years.

These results are illustrated in their Table 11 below, which shows that the unconditional effect of US food aid on the incidence of conflict is in general statistically significant (column 1), but that it turns insignificant and has the opposite sign in countries *without* a recent past conflict, which in the end makes all the combined or net effects statistically indistinguishable from zero (columns 2-5).

C.2. Which conclusions should a policy maker draw from these results?

TABLE 11—HETEROGENEOUS EFFECTS OF FOOD AID ON CIVIL CONFLICT: CONFLICT PRIOR TO FOOD AID

Dependent variable: Incidence of civil conflict	(1)	20 year window (2)	15 year window (3)	10 year window (4)	5 year window (5)
US wheat aid (1,000 MT)	0.00252 (0.00089)	0.00320 (0.00128)	0.00376 (0.00132)	0.00381 (0.00149)	0.00446 (0.00262)
US wheat aid × no past conflict		−0.00579 (0.00353)	−0.00782 (0.00517)	−0.00735 (0.00462)	−0.00607 (0.00369)
US wheat aid + (US wheat aid × no past conflict)		−0.00259 (0.00300)	−0.00406 (0.00468)	−0.00355 (0.00388)	−0.00160 (0.00166)
Kleibergen-Paap <i>F</i> -statistic(s)	11.68	5.30; 0.45	4.15; 0.36	3.34; 0.46	2.15; 1.62
Observations	4,071	4,071	4,071	4,071	4,071

Notes: 2SLS estimates are reported. The baseline sample in column 1 includes 125 non-OECD countries for the years 1971–2006. The sample size in columns 2–5 is slightly smaller due to the availability of past conflict data. US wheat aid in year t and the interaction of wheat aid and the indicator variable are instrumented with US wheat production in year $t - 1$ × the probability of receiving any US food aid during 1971–2006, and the triple interaction of the indicator × US wheat production in year $t - 1$ × the probability of receiving any US food aid during 1971–2006. The regressions also include the relevant double interaction terms. All regressions control for the full set of baseline controls (see Table 2 columns 5–7 for the full list). Coefficients are reported with standard errors clustered at the country level in parentheses. The joint estimate for US wheat aid + US wheat aid × no past conflict indicator are reported at the bottom of the table. Kleibergen-Paap *F*-statistics are reported. When multiple *F*-statistics are reported, the first *F*-statistic is from the first-stage regression with US wheat aid as the dependent variable and the second from the first-stage with US wheat aid × indicator variable as the dependent variable.

Source: Nunn and Qian (AER 2014), "US Food Aid and Civil Conflict".