



AFRICAN ECONOMIC RESEARCH CONSORTIUM

Collaborative PhD Programme in Economics for Sub-Saharan Africa

COMPREHENSIVE EXAMINATIONS IN CORE AND ELECTIVE FIELDS

FEBRUARY 10 – FEBRUARY 29, 2016

HEALTH ECONOMICS

Time: 08:00 – 11:00 GMT

Date: Friday, February 19, 2016

INSTRUCTIONS:

Answer a total of FOUR questions: ONE question from Section A, ONE question from Section B, and TWO questions from Section C.

The sections are weighted as indicated on the paper.

SECTION A (15%): 27 Minutes

Answer only ONE Question from this Section

Question 1

- (a) Define a public good and provide a healthcare example of such a good. [2 Marks]
- (i) Can the private market provide this good on its own? Explain. [2 Marks]
- (ii) Would people consume too much or too little of this good without government intervention? Explain graphically. [3 Marks]
- (b) Although there are many indicators of health status of a population, they do not measure health from the same perspective.
- (i) What is your understanding of Healthy Life Expectancy (HALE) as a measure of health status? [3 Marks]
- (ii) What kind of data do you need to compute HALE? [2 Marks]
- (iii) What is the relationship between Life Expectancy (LE) and HALE? [3 Marks]



Question 2

- (a) Some AIDS activists believe that health insurance companies should not be allowed to ask applicants if they are infected with the HIV virus that caused AIDS.
- (i) Would this rule help or hurt those who are not HIV-positive **[5 Marks]**
 - (ii) What economic problem can this create in the market for health insurance? **[5 Marks]**
- (b) It is commonly acknowledged that the fundamentals which inform or dictate the health outlooks of countries across the world significantly differ. Therefore, the consideration of any country's health situation in relation to another could be seen to constitute an unjust comparison.
- (i) In the light of the above, why has international comparison of health been given prominence? **[3 Marks]**
 - (ii) Are there shortcomings to the comparison? Explain. **[2 Marks]**

SECTION B (25%): 45 Minutes

Answer only ONE Question from this Section

Question 3

Suppose we have a labor market that is in equilibrium. The labor demand curve is

$$L_d = 1000 - 25W$$

And the labor supply curve is $L_s = 100 + 20W$

Where L and W are labor and wage, respectively.

Suppose the government decides that everyone who works ought to exercise. One way to do this is through a payroll tax on workers of \$3 per hour per worker, which would then be used to provide workers with free, health-club memberships.

- (a) What is the equilibrium price and what is the equilibrium quantity before the policy is implemented? Comment on price elasticities of labor demand and supply. **[7 Marks]**
- (b) Now suppose the policy is implemented through the above payroll tax. What is the new equilibrium wage and total employee compensation? Who bears more of the burden of the tax? **[8 Marks]**
- (c) What is a 'job lock'? Is it a good or bad thing? Explain. Discuss how the issue of job lock could be handled in the healthcare market. **[10 Marks]**



Question 4

Consider the following tables from the article by Davis and Kuritsky (2002), 'Violent Conflict and Its Impact on Health Indicators in Sub-Saharan Africa 1980 to 1997.'

Dependent Variable	Constant	Conflict	Wealth	Wald Chi Sq.	Number of Obs.
DPT Immunization	42.43	-6.17(1.422)	0.517**(3.59)	15.44(0.01)	212
Fertility Rates	6.65	0.02 (0.08)	-0.044** (7.26)	53.77 (0.00)	197
Infant Mortality	114.96	1.719 (0.77)	-0.919** (5.20)	28.76 (0.00)	200
Life Expectancy	47.59	-0.79* (2.15)	0.165** (2.83)	13.31 (0.00)	193
Attended Births	28.54	0.10 (0.02)	0.932** (11.00)	161.94 (0.00)	107

Dependent Variable	Constant	Severe Conflict	Wealth	Wald Chi Sq.	Number of Obs.
DPT Immunization	40.18	3.80(0.51)	0.513**(3.69)	13.63(0.00)	202
Fertility Rates	6.67	0.31* (3.95)	-0.042** (7.54)	84.93 (0.00)	188
Infant Mortality	115.54	12.14**(3.55)	-0.907** (5.05)	44.36 (0.00)	191
Life Expectancy	47.24	-2.35* (2.90)	0.159** (2.86)	16.14 (0.00)	184
Attended Births	29.39	-9.20 (1.77)	0.915** (10.40)	213.34 (0.00)	102

- The data set in the study was characterized by missing data. How was this problem handled by the author? **[5 Marks]**
- Present an interpretation of the results reported in the two tables above. **[5 Marks]**
- What general conclusion can you draw from these results? **[5 Marks]**
- What other method of analysis was applied by the author, and what are the general findings from it? **[5 Marks]**
- Why are the effects of severe conflict different from those of the conflict variable? **[5 Marks]**



SECTION C (60%): 108 Minutes

Answer Any TWO Questions from this Section.

Question 5

- (a) According to a version of Grossman's Human Capital Model, the first-order condition describing an individual's optimal choice of health stock (H_t^*) is as follows:

$$\frac{W_t G_t}{\pi_{t-1}} \equiv \gamma_t = r - \tilde{\pi}_{t-1} + \delta_t.$$

- (i) How does the wage rate affect the demand for health and healthcare? **[8 Marks]**
- (ii) What version of the Grossman model is this? Explain. **[7 Marks]**
- (b) Another version of the Grossman model shows the first-order condition describing the individual's optimal choice of health stock as:

$$\frac{U h_t G_t}{\lambda} = \frac{U H_t}{\lambda} = \frac{\pi(r + \delta_t)}{(1+r)^t}$$

- (i) Interpret the above expression. **[4 Marks]**
- (ii) How does the wage rate now affect demand for health and healthcare? **[4 Marks]**
- (iii) What version of the Grossman model is this? Explain. **[7 Marks]**

Question 6

With the assumption of two health characteristics represented by “z” and “ π ”, both affecting observed health indicator “I” but only “z” relevant to labour market productivity, while “ π ” is not. Given two (2) countries having vectors X_1 and X_2 , the difference in their level of human capital “h” and health indicator “I” can be respectively stated as follows:

$$\ln h_2 - \ln h_1 = \lambda_H [z(X_2) - z(X_1)]$$

$$I_2 - I_1 = \lambda_I^z [z(X_2) - z(X_1)] + \lambda_I^\pi [\pi(X_2) - \pi(X_1)]$$



- (a) Determine the return (ρ) to characteristic “I”. [7 Marks]
- (b) Show step by step that the following expression is true, and interpret the expression. [10 Marks]

$$\hat{\rho}(I_2 - I_1) = \left[\lambda_h (z(X_2) - z(X_1)) \right] \frac{\left\{ 1 + \frac{\lambda_I^\pi (\pi(X_2) - \pi(X_1))}{\lambda_I^z (z(X_2) - z(X_1))} \right\}}{1 + \frac{\lambda_I^\pi \left(\frac{d\pi}{dx} \right)}{\lambda_I^z \left(\frac{dz}{dx} \right)}} \dots (B5)$$

- (c) Identify the actual gap in human capital (in the form of health) between the two countries and the bias in estimating the gap. [3 Marks]
- (d) What are the observations you can possibly outline about the “bias term”? [10 Marks]

Question 7

Genetic factors may pre-dispose individuals to a particular health problem, leading to a situation with differential health risks, e.g., low-risk individuals and high-risk individuals.

where:

expected wealth (EW) = $(1-\pi)y_h + \pi y_s$

and expected utility (EU) = $(1-\pi)u(y_h) + \pi u(y_s) = (1-\pi)u(Y-P) + \pi u(Y-P-M+I)$

$1-\pi$ = probability of good health ($0 < \pi < 1$)

π = Probability of illness

M = cost of treatment

P = health insurance premium

I = insurance benefits received in the event of illness ($0 \leq I \leq M$)

y_h = disposable income if the individual is healthy = $(Y-P)$

y_s = disposable income when sick = $(Y-P-M-I)$

- (a) Show what the equilibrium will be (the type of insurance contracts) if the insurance company in such a world is fully informed, i.e., they can identify each risk type and the insurance premiums are actuarially fair. [15 Marks]
- (b) Explain the equilibrium condition if insurance companies were less informed about the individuals' risks than the individuals themselves. [15 Marks]



Question 8

Going by a standard conflict modelling framework, N_A and N_B can be assumed to be respective population sizes of group A and group B that makes up the entire population ($N=N_A + N_B$) of a country. If it is further assumed that each member of the country possesses two types of endowments: in-appropriable human resource (y_A and y_B) and appropriable resources of Z for the entire country. If group A decides to go for conflict by appropriating the entire appropriable resource Z to itself, it will require “ δ ” fraction of the country’s resources, while the other group B, will require a proportion “ φ ” of their income to switch identity. Given this background information, and the fact that *conflict negatively affects health*, you are required to determine the following:

- (a) What will be the payoffs for each of the groups should both decide to choose “peace”?
[5 Marks]
- (b) What will be the payoffs of each of the two groups should group A decide to go for “conflict” while group B maintains “peace”?
[5 Marks]
- (c) Derive the “conflict/exploitation threshold” ($\tilde{\eta}$) for group A.
[10 Marks]
- (d) Given that group B has the option of switching identity, derive the “Switching Threshold” ($\tilde{\eta}$) for group B.
[5 Marks]
- (e) Assuming group B decides to respond to group A’s choice of conflict with conflict, what will be the payoffs of each group?
[5 Marks]