



AFRICAN ECONOMIC RESEARCH CONSORTIUM

Collaborative PhD Programme in Economics for Sub-Saharan Africa

COMPREHENSIVE EXAMINATIONS IN CORE AND ELECTIVE FIELDS

FEBRUARY – MARCH 2012

PUBLIC SECTOR ECONOMICS

Time: 08:00 – 11:00 GMT

Date: Friday, March 2, 2012

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%)

Answer only ONE Question from this Section

Question 1

Explain the following theories of public expenditure growth pointing out clearly how each of them could be used to explain the growth of public expenditure in Africa.

- (a) Musgrave – Rostow's model **(5 marks)**
- (b) Wagner's organic state model **(5 marks)**
- (c) Peacock –Wiseman's political constraint model **(5 marks)**

Question 2

- (a) Describe the ways by which the taxpayers use to commit tax fraud in your country. **(7 marks)**
- (b) Using your own country experience, explain the ways in which tax evasion can be reduced. **(8 marks)**



SECTION B (25%)

Answer only ONE Question from this Section

Question 3

- (a) Using a graphical illustration, explain Lindahl's approach to public goods provision. **(6 marks)**
- (b) Freetown has N people each of whom consumes a single private good, "rice (X_i)" and a single public good "beach (Y)". A developer is interested in building houses along the beach. The developer has offered to sell part of his developments of the beach to the city of Freetown at p per square foot. There are two types of people in Freetown the α 's and β 's. The α 's all have utility functions of the form $U(X_i, Y) = X_i^{1-\alpha} Y^\alpha$ and the β 's have utility functions of the form $U(X_i, Y) = X_i^{1-\beta} Y^\beta$ and their incomes are W_α and W_β respectively.
- (i) Find the Lindahl equilibrium prices. **(7 marks)**
- (ii) Find the Pareto optimal allocations in which all consumers of Freetown get to consume the same amount of rice. **(7 marks)**
- c) Explain why the Lindahl mechanism is hardly used in practice in spite of its theoretical appeal. **(5 marks)**

Question 4

- (a) There has been increasing pressure for African countries to decentralize their functions. Explain the reasons for this pressure and whether or not, in your opinion, this is the direction African countries should take. **(12 marks)**
- (b) The Tiebout (1956) Hypothesis asserts that in economic situations where it is optimal to have many jurisdictions offering competing packages of public goods, the movement of consumers to jurisdictions where their wants are best satisfied and competition between jurisdictions for residents will lead to near-optimal, market-like outcomes. Discuss the possible conditions that may hinder the application of this hypothesis in African countries. **(13 marks)**



SECTION C (60%)

Answer TWO Questions from this Section.

Question 5

- (a) The argument for interpersonal redistribution in a federal context is generally referred to as the Buchanan proposal. Buchanan pointed out that, although equals were treated equally at the federal and provincial level separately with respect to taxes and public expenditure benefits, they could be “unequally” treated in the collective public sector. By completing the following table, illustrate and explain Buchanan proposal. **(12 marks)**

Table 1

Horizontal Equity in a Federation

County 1

County 2

	A	B	C	D	E	F
1. Individual						
2. Personal Income	10,000	10,000	5,000	10,000	5,000	5,000
3. Federal Tax (10%)	1,000	1,000	500	1,000	500	500
4. County Tax (10 %)	1,000	1,000	500	1,000	500	500
5. Individual Total Tax	-----	-----	-----	-----	-----	-----
6. Benefits	-----	-----	-----	-----	-----	-----
7. Fiscal Residuum	-----	-----	-----	-----	-----	-----

- (b) Assume there are two goods X and Y and e_x is the price elasticity of the compensated demand for good X, P_x is the price of good X, X is quantity of good X consumed and t_x is a selective excise tax rate on good X. Assume further that e_y is the price elasticity of the compensated demand for good Y, P_y is the price of good Y, Y is the quantity of good Y consumed and t_y is a selective excise tax rate on good Y. Assuming that there are no cross-effects between these two goods (X and Y), state and derive the inverse elasticity **(10 marks)**
- (c) Explain, using examples from Africa, the sort of cases in which Ramsey theory of taxation may be applied. **(8 marks)**

Question 6

Consider Dale, who expects to live for two periods: “now” (period 0) and the “future” (period 1). Dale has an income of I_0 dollars now and knows that his income will be I_1 dollars in the future. Think of “now” as “working years,” when I_0 is labor earnings; and the “future” as retirement years, when I_1 is fixed pension income. When Dale decides how much to consume in each period, he simultaneously decides how much to save or borrow. If his consumption this period exceeds his current income, he must borrow. If



his consumption is less than current income, he saves. Dale's intertemporal budget constraint depicts the possible combinations of present consumption (c_0) and future consumption (c_1) available to him. Assume that one option available to Dale is to consume all his income just as it comes in. Thus he consumes I_0 in the present and I_1 in the future. Furthermore, assume that the individual can borrow and lend at an interest rate of r , such that the constraint is a straight line whose slope in absolute value is $1 + r$.

- (a) Draw a diagram showing utility maximizing choice for future consumption for Dale. **(3 marks)**
- (b) Explain the effect on Dale's saving when:
 - (i) Interest is subject to a proportional tax at rate t , and interest payments by borrowers are deductible. **(10 marks)**
 - (ii) Interest receipts are taxable but interest payments by borrowers are nondeductible **(12 marks)**
- (c) Suppose Dale leaves in Africa where target saving is the order of the day. Will your observations in part (b) be different? Explain. **(5 marks)**

Question 7

- (a) There are two activities that interest the residents of Nairobi. These are driving cars and eating Fish. Each resident, i , in Nairobi has an initial wealth, W_i . Fish costs one dollar each. The cost of the fuel used per unit of driving is P_f . Driving also causes congestion. Let H be the amount of highways in Nairobi and let D be the total amount of driving by the n citizens of Nairobi. The level of congestion is a function $C(D;H)$. Denote the partial derivatives of $C(D;H)$ with respect to D and H respectively by $C_D(D;H)$ and $C_H(D;H)$ and assume that $C_D(D;H) > 0$ and $C_H(D;H) < 0$ for all $D > 0$ and $H > 0$. Let D_i and M_i denote respectively the amount of driving and the number of fish consumed by resident i . Preferences of Nairobi resident i are represented by a utility function:

$$U^i \left(D_i, M_i, C \left(\sum_i D, H \right) \right)$$

where U is an increasing function of its first two arguments and a decreasing function of its third argument. The price of maintaining the highways is P_h .

- (i) Write the budget constraint for the residents of Nairobi. **(2 Marks)**
- (ii) Derive the optimal conditions for the efficient amount of highway expenditures. **(15 marks)**
- (iii) Derive the optimal toll fees appropriate to decongest the city of Freetown. **(5 Marks)**



- (b) Consider an individual voter whose utility function is $U_i(C_i, G_i)$ where C_i is consumption of private goods and G_i is consumption of public goods by voter i . The consumption of the public good is related to total expenditure by government by $G^i = f^i(E)$ and the supply of public goods is financed directly by taxing individual wealth $E = \tau Y$ where τ is tax rate and Y is local tax base. Demonstrate using this simple model that the proposals by the medium voter will always be supported. **(8 marks)**

Question 8

- (a) Consider an economy with two-party political system. Economy has a private good X and government supplies one public good G which it finances through taxes on individuals income. Income of individual Y_i is devoted to tax payment and consumption of good X_i where $Y_i = (1 - t_i)X_i$.
- i) Using the probabilistic voting model derive the equilibrium conditions for the choice of G and t_i . **(10 marks)**
 - ii) Explain the intuition behind the two first order conditions. **(5 marks)**
- (b) Explain the income and substitution effects of an increase in income tax on supply of labour **(10 marks)**
- (c) How do your results in (b) change for negative income tax? **(5 marks)**
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