



AFRICAN ECONOMIC RESEARCH CONSORTIUM (AERC)

Collaborative MA Programme in Economics for Anglophone Africa
(Except Nigeria)

JOINT FACILITY FOR ELECTIVES
JUNE – OCTOBER 2004

PUBLIC SECTOR ECONOMICS

Second Session: Special Examination

Time: 9 a.m. – 12 noon

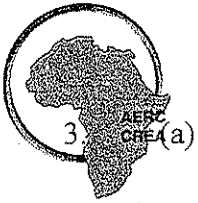
Date: Saturday, September 25, 2004

Instructions: Answer **THREE** Questions; **TWO** Questions from Section A, **ONE** Question from Section B. Each Question Carries 20 Marks.

Allocate your time accordingly. Be brief and to the point.

SECTION A: Theory of Taxation

1. (a) Under what circumstances will the income tax induce more labour supply? (5 Marks)
- (b) Given a utility function $U = U(Y, L_o - L)$ and budget constraint $Y = wL + I$; where Y is net income, L is hours spent working, L_o is total number of available hours so that $L_o - L$ is equal to leisure hours, w is wage rate and I is non-wage income; show how the introduction of a proportional income tax affects the labour supply. (15 Marks)
2. (a) Assuming constant elasticity of demand function ($Q = P^{-\eta}$, where $\eta > 0$ is the elasticity of demand) show using derivation that a single-firm monopolist will over-shift the tax. How would this appear graphically? (10 Marks)
- (b) “For any given revenue raised by the government, the monopolist’s output will be higher with *ad valorem* tax than with a specific tax. On this ground, an *ad valorem* tax is superior to a specific tax”. Verify. (10 Marks)



3 (a)

What is the conclusion of *the Ramsey rule*? Show that in certain circumstances Ramsey rule result is attained when tax rates are set inversely proportional to the price elasticity of demand. **(12 Marks)**

- (b) “When there are two commodities, efficient taxation requires taxing the commodity that is complementary to leisure at a relatively high rate”. Explain why this statement contrasts the fairness objective of taxation. **(8 Marks)**

SECTION B: Tax Policy and Other Issues

4. There are three major principles of tax design, namely: equity, efficiency, and administrative feasibility.
- (a) What is the importance of the administrative feasibility in the design of optimal tax structure? **(8 Marks)**
- (b) What is tax evasion? Why is the level of marginal tax rate, the level of marginal penalty rate and a probability of detection important variables in curbing tax evasion? **(12 Marks)**
5. (a) What are the advantages of decentralization? Show that compared to centralization, decentralization of government allocative function may lead to welfare gains. **(12 Marks)**
- (b) Why do central governments give grants to local authorities? **(8 Marks)**



3. The personal income tax (PIT) in Afria is progressive, with rates ranging from 3% to a maximum of 40%, but many forms of income are excluded (including interest on government bonds, most fringe benefits, and capital gains). GOA proposes to lower the top rate to 30% for incentive reasons, while at the same time raising the present threshold amount (at which income begins to be taxed) from 200,000 to 300,000 Afranos, thus freeing 100,000 low-income Afrians (of the 500,000 currently subject to the tax) from paying PIT. To maintain revenues, the base of PIT is to be expanded to include the three items mentioned above that are currently excluded.
 4. Finally, to ensure that revenues increase GOA proposes both to impose a new 20% excise tax on mobile phones air-time and also to raise its existing excise taxes on tobacco, alcohol and cars. As the budget statement declares, "people should drink less alcohol and smoke less; and cars should cause less pollution."
- (a) What criteria would you use to evaluate these proposals?
 - (b) Evaluate the proposed tax changes in terms of the criteria you choose.
 - (c) Given your limited knowledge of Afria – all you know is what you have been told above – can you come up with a better tax proposal than the Afrians.

Question 2 (worth 20 marks)

A comparison of buoyancy and elasticity coefficients gives a tax policy analyst a useful insight into the tax system of a particular country before making further policy changes. The table below provides buoyancy and elasticity estimates of different countries.

| Country A | Buoyancy | Elasticity |
|-----------------------|----------|------------|
| Overall tax structure | 0.99 | 0.71 |
| Country B | | |
| Overall tax structure | 1.23 | 0.50 |
| Country C | | |
| Overall tax structure | 0.80 | 0.50 |
| Country D | | |
| Import duties | 1.46 | 0.90 |
| Excises | 0.66 | 0.17 |
| Turnover taxes | 1.64 | 0.90 |
| PIT | 1.12 | 1.19 |
| CIT | 1.05 | 0.91 |
| Overall tax structure | 0.92 | 0.74 |

Using the information provided in the table, answer the following questions.

- (a) Explain
 - (i) The difference between buoyancy and elasticity of a tax system in discussing productivity of taxes in a given country.
 - (ii) Which among the four countries has the most productive tax system?



- (iii) How would you empirically estimate the buoyancy and elasticity of a country's tax system?
- (b) If the national income in country A grew by 5% per annum over the entire period captured in the estimated buoyancy and elasticity,
 - (i) By how much should the tax revenues have increased per year assuming no changes in the tax system?
 - (ii) If changes in the tax system were included, by how much should the revenue collections have gone up?
 - (iii) What was the net effect of the structural changes made in Country A's tax system?
- (c) The governments in the four countries in the table have been undertaking tax reforms over the period captured by the estimated buoyancies and elasticities.
 - (i) Would you say based on the information in the table that the reforms have been successful?
 - (ii) The government of Country D is thinking of raising more revenues to fund programmed expenditures that have been occasioned by a very ambitious poverty reduction strategy. What advice would you give this government on which taxes would be best candidates for raising the extra revenues based on the current tax system?

SECTION B – ANSWER ANY TWO QUESTIONS FROM THIS SECTION

Question 3 (worth 10 marks)

- (a) Taxation is a costly exercise. This is because the burden of a tax is usually greater than the revenue that the government raises. With an appropriate diagram show how you would algebraically measure the excess burden of an ad valorem tax assuming a non-linear demand curve of commodity X and a perfectly elastic supply curve of this commodity. Using algebra, show the effect of changing the tax rate facing this commodity.
- (b) Suppose you are an advisor to the government which would like to establish the optimal tax rates for the different commodities in the economy. Using optimal taxation theory show that the optimal commodity tax of good k is given by the following inverse elasticity rule: $\frac{t_k}{1+t_k} = \frac{\theta}{\varepsilon_k^d}$ where $\theta = \lambda/(1+\lambda)$ (λ is the Lagrangian multiplier) and ε_k^d is the elasticity of demand for good k .



Question 4 (worth 10 marks)

The level of savings in developing countries is not sufficient to meet the level of investment rates considered necessary for rapid economic growth. Consequently, governments try to use taxation policy in order to mobilize savings to finance development.

- a. Explain how income taxes affect
 - i. Household savings
 - ii. Business investments
- b. As an advisor to your Minister for Finance, what would be your recommendation on the choice between income and consumption taxes as instruments to stimulate investments? Explain.
- c. Give two tax incentives that you would recommend in addressing the question of low investments highlighting any caution you would give to the policy makers on your recommended incentives.

Question 5 (worth 10 marks)

In designing tax systems, Governments try to use tax instruments to reduce the tax burden of the poor. These various tax instruments differ in their effectiveness in reducing the tax burden on the poor. Discuss with specific examples three ways in which a Government can use the individual income tax system to address poverty issues.

Question 6 (worth 10 marks)

The concept of decentralisation has important theoretical underpinnings and there are also various reasons for its current popularity.

- (a) Explain the main arguments for decentralisation following the Public Choice and the New Political Economy theories.
- (b) Define and explain with examples THREE typologies of decentralisation highlighting how each differs from the others.

