

UNIVERSITY OF OSLO

DEPARTMENT OF ECONOMICS

Exam: ECON4620 – Public Economics, autumn 2004

Date of exam: Thursday, November 25, 2004

Time for exam: 9 a.m. – 12:00 noon

The problem set covers 2 pages

Resources allowed:

- No resources allowed

The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

Problem 1

Consider the following economy. There are two types of individuals. For simplicity we may assume there is one of each type. Each individual faces an exogenous wage-rate reflecting her skill (productivity). Each person's wage rate is private information not available to the tax authorities. The government wants to collect a fixed amount of revenue.

Answering the questions below you should *not* derive a characterisation by means of mathematical calculus, but may use graphical tools where it is useful. You may make those additional assumptions that you find appropriate for your discussion.

- a) Assuming that social efficiency is pursued, discuss how the government should design a non-linear income tax? Specify in particular the constraints facing the government.
- b) Explain what may be a case for supplementing the non-linear income tax with a commodity tax within the model above. (You are *not* supposed to discuss the optimum value of the commodity tax.)

Problem 2

Consider the following economy (modelled in the curriculum). There is a population of homogeneous individuals whose labour is the only input in production, and we assume a constant marginal product of labour. There are two goods, a private good provided in the market and a publicly provided public good financed by a value added tax. We use the following notation:

N is the number of individuals

X is the amount of the private good per individual

G is the amount of the public good

L is the individual supply of labour

Ω is the wage rate (= marginal product of labour)

t is the tax rate (VAT rate)

$\omega = \frac{\Omega}{1+t}$ is the after-tax real wage rate

p is the marginal cost of G

μ is the marginal effect on utility of the tax revenue requirement

λ is the marginal utility of private income

ε is the wage elasticity of the labour supply

$U(X,L,G)$ is the utility function of an individual

Partial derivatives are indicated by subscripts.

The transformation function of the economy is

$$N\Omega L = NX + pG \quad (1)$$

It is shown that the social optimum is characterised by

$$N \frac{U_G}{\lambda} = \frac{\mu}{\lambda} p - \frac{\mu}{\lambda} t \omega N \frac{\partial L}{\partial G} \quad (2)$$

where

$$\frac{\mu}{\lambda} = \frac{1}{1-t\varepsilon} \quad (3)$$

- a) Discuss the interpretation of $\frac{\mu}{\lambda}$ and discuss the role of ε and t in determining its size.

Now consider the special case above that $\frac{\partial L}{\partial G} = 0$ so that (2) reduces to

$$N \frac{U_G}{\lambda} = \frac{\mu}{\lambda} p. \quad (4)$$

- b) Explain the economic content of (4).
- c) Discuss how suitable you find the model above (as presented prior to question a) for the purpose of determining the socially efficient provision of a public good.

Problem 3

Present verbally some major arguments for public (rather than private) provision of certain private goods.