

THE UNIVERSITY OF MANCHESTER

Public Economics

Semester 1 2019/20

1 HOUR 30 MINUTES

Date: 17 January 2020

Time: 14:00 - 15:30

PART A: Answer **ALL** parts.

PART B: Answer **ONE** question from two.

Electronic calculators may be used, provided that they cannot store text

PART A [50 points] Answer ALL Parts

Question 1 [50 points]

- (a) [15 points] If the elasticity of taxable income with respect to the net-of-tax rate of upper income taxpayers is high, it is self-defeating for the government to impose a very high top marginal tax rate on the rich. Discuss.
- (b) [15 points] How can non-convex budget sets rationalize the presence of large extensive labour supply responses to variations in taxes? Explain where such non-convexities in the budget set may come from.
- (c) [10 points] The marginal deadweight loss of income taxation is, to a first order approximation, equal to zero when we start from a situation with zero tax. True or false? Explain.
- (d) [10 points] Can setting the income tax rate above the revenue-maximizing tax rate lead to a Pareto efficient allocation? Explain.

PART B [50 points] Answer ONE question only

Question 1 [50 points]

Optimal Commodity Taxation

- (a) [10 points] Illustrate the marginal deadweight loss of commodity taxation in a supply-demand diagram, assuming a horizontal supply curve.
- (b) [10 points] Show that the marginal deadweight loss can be written as

$$\frac{dDWL}{dt} = \frac{t}{P} \cdot \epsilon \cdot x$$

where t is the per unit tax rate, P is the consumer price, and x is the quantity demanded at price P .

- (c) [10 points] The government wants to satisfy its fixed revenue need \bar{R} by imposing per unit tax rates t_i on N commodities $i = 1, 2, \dots, N$, minimizing the excess burden on the representative consumer. Demand in each market is independent of the others. Write down the Lagrangian of the government's optimization problem, assuming that μ is the multiplier on the government's budget constraint.
- (d) [20 points] Show that the optimal tax rates in the problem at (c) take the following form

$$\frac{t_i}{P_i} = \frac{\mu}{1 + \mu} \cdot \frac{1}{\epsilon_i}$$

Discuss the intuition behind this formula.

Question 2 [50 points]

Labour Supply and Taxation

- (a) [10 points] Show labour supply's response to income taxation in a simple indifference curve diagram in $c-h$ space, where c denotes consumption and h the number of hours worked. Indicate both income and substitution effects in the diagram.
- (b) [40 points] A researcher runs the following regression

$$\ln h = \beta_0 + \beta_1 \cdot \ln(1 - \tau)w + \beta_2 \cdot \ln y + \beta_3 \cdot \mathbf{x} + u$$

to estimate the uncompensated elasticity of labour supply. Here $(1 - \tau)w$ denotes the net-of-tax wage rate, y the non-labour income, and \mathbf{x} a set of observables. A researcher points out that $\hat{\beta}_1$ is unlikely to provide an unbiased estimate of the elasticity given that (1) the marginal tax rate faced by an individual is endogenous to the chosen amount of labour supply; (2) the wage itself is endogenous; and (3) the estimate may be sensitive to the functional form chosen for the regression. Discuss if each of these concerns is valid. Explain one method that can be used to overcome these identification concerns.

END OF EXAMINATION