Advanced Topics in Public Economics: Taxation
Problem Set

Question 1
Suppose that the social planner maximises $\sum_i u(c_i)$ subject to $\sum_i T(z_i) = 0$ with $c_i = z_i - T(z_i)$.

a) In the 19th century, British utilitarians proposed setting taxes such that post-tax incomes are equalised ($c_i = \bar{c}$ for all i). Under what conditions is this tax system optimal?

b) Under these conditions, show that taxing everyone at 100% and equalising consumption maximises social welfare.

c) The social welfare function in this question is utilitarian. Discuss three limitations of utilitarianism as a basis for tax policy. What advantages are there to it?

Question 2
Consider Saez (2001)'s formulation of the Mirrlees model, where individuals differ in their productivity level n_i and choose the number of hours worked l_i. Earnings are given by $z_i = n_i \cdot l_i$.

a) Suppose that the government can observe each individual's productivity. What would the optimal tax system look like?

b) Starting from the first order condition below derive the optimal marginal tax rate for the top bracket.

$$dSWF = \left[(1-g)(z-z^*) - \varepsilon z \frac{\tau}{1-\tau}\right] q\, d\tau = 0$$

c) Explain intuitively why and how the optimal marginal tax rate depends on $a = \dfrac{z}{z - z^*}$.

d) Suppose the government broadens the tax base for top earners. How does this affect their optimal marginal tax rate?

e) What is the optimal tax rate if the social planner is Rawlsian?

Question 3
Consider the classic Allingham–Sandmo model of tax evasion. An individual has true income y and chooses the reported income $\bar{y} \in [0, y]$. The tax rate is τ, the audit probability is p, and the penalty on the evaded tax liability is proportional at rate θ. Utility is $u(c)$ with $u' > 0$, $u'' < 0$.

a) Write down the individual's expected-utility maximization problem, defining clearly consumption in the no-audit case, $c^{\text{no audit}}$, and in the audit case, c^{audit}.

b) Derive the first-order condition for the optimal report $\bar{y}^*$. Show that it can be written as

$$\frac{u'\left(c^{\text{audit}}\right)}{u'\left(c^{\text{no audit}}\right)} = \frac{1-p}{p\,\theta}\,.$$

c) Use this first-order condition to argue qualitatively how the optimal level of evasion, $y - \bar{y}^*$, responds to (i) an increase in the audit probability p and (ii) an increase in the penalty rate θ.

d) Given plausible values for p and θ, what level of tax evasion does this model predict? How and why does this differ from existing estimates of the magnitude of tax evasion?

References
Saez, Emmanuel. 2001. "Using Elasticities to Derive Optimal Income Tax Rates." *Review of Economic Studies*, 68: 205–229.