Master PPD - Public Economics: Tax & Transfer Policies

Final Exam, November 22, 2011 - 14h-17h. No document allowed.

Exercise 1: Carbon Taxation (4 points)

1) What is the rationale for a carbon tax? (1 point)

2) How should the optimal tax rate on carbon be determined? What's the difference between a carbon tax and standard energy taxes, e.g. on fuel? (1 point)

3) Discuss the idea that carbon taxes have a "double dividend" (1 point).

4) According to basic public economic theory, what could be expected from a financial transaction tax? Can such a tax be compared to a carbon tax? (1 point).

Exercise 2: Inheritance and Capital Taxation (6 points)

1) What is approximately the amount of capital tax levied on average in the European Union as a fraction of GDP? (0.5 point) The amount of estate/inheritance taxes as a fraction of GDP? (0.5 point).

2) What's the difference between an estate (or bequest) tax and an inheritance tax? (0.5 point). Name one country with an estate tax, one country with an

inheritance tax. (0.5 point).

3) Explain briefly the logic of the Atkinson-Stiglitz (1976) result on the optimality of 0 capital taxation. (1 point).

4) Why does the Atkinson-Stiglitz result not hold anymore in the presence of inheritance? (1 point)

5) Do you think that capital should only be taxed at death? Or that lifetime capital incomes should also be taxed? Explain why (1 point).

6) Give one example of international tax competition on capital. How can policy makers react to international tax competition? (1 point).

Exercise 3: Optimal Taxation of Top Labor Incomes (10 points)

Consider a nonlinear income tax system in which pre-tax earnings z pay $T(z)$ in taxes. Assume that in the last bracket, that is above a given earnings threshold $\bar{z}$, the marginal tax rate is constant. We denote by τ the constant top marginal tax rate: for $z \geqslant \bar{z}$, $T(z) = T(\bar{z}) + \tau \times (z - \bar{z})$. The goal of this exercise is to determine the optimal tax rate τ under different sets of assumptions.

Part 1: Standard Real Economic Responses

We start with a model where top earnings z are entirely determined by efforts e, that is for individual i, $z_i = e_i$. Assume that each agent i has utility function:

$$u_i(c_i, z_i) = c_i - exp(z_i)$$

where z_i denotes pre-tax earnings, $c_i = z_i - T(z_i)$ is disposable income, and

$exp(z_i)$ reflects the cost of earning z_i.

1) Compute the optimal level of effort (that is, of pre-tax earnings z_i) that agent i makes (1 point).

2) Now, assume that each agent i nas utility function:

$$u_i(c_i, z_i) = c_i - h(z_i)$$

where z_i still denotes pre-tax earnings, $c_i = z_i - T(z_i)$ still denotes disposable income, and $h(z_i)$ is a convex and increasing function reflecting the cost of earning z_i. Show that i's optimal pre-tax earnings is an increasing function of the net-of-tax rate $1 - \tau$ (1 point).

3) Aggregating over all top bracket taxpayers, we now denote by z the average income reported by top bracket taxpayers. As shown in question 2, z is an increasing function of the net-of-tax rate $1-\tau$, which we write $z(1-\tau)$. We define:

$$e_1 = \frac{1-\tau}{z} \frac{dz}{d(1-\tau)}$$

What does e_1 measure? (1 point).

4) We assume that the government wants to maximize the tax resources it gets from top bracket taxpayers. Write the program of the government (0.5 point).

5) To solve the program of the government, it is useful to define $b = z/\bar{z}$ and a=b/(1-b). What does b capture? (0.5 point) Name two countries where b has increased since the 1980s. (0.5 point)

6) Express the optimal tax rate τ^* as a function of a and e_1 (1 point). Interpret (0.5 point).

Part 2: Putting Tax Avoidance in Optimal Tax Formulas

We now assume that taxpayers can avoid paying the regular income tax on a fraction of their earnings, and that they pay a smaller (possibly 0) income tax on this sheltered income.

7) Give two concrete examples of the way taxpayers can avoid paying the regular income tax (1 point).

8) We now denote y_i the total earnings of agent i, and x_i the earnings that avoid paying the regular income tax (sheltered income). $z_i = y_i - x_i$ is taxed at rate τ in the top bracket, and x_i is taxed at the constant and uniform marginal rate $t < \tau$. Assume that each agent i has utility function:

$$u_i(c_i, y_i, x_i) = c_i - h(y_i) - d(x_i)$$

where c_i denotes i's disposable income after taxes, $h(.)$ is a convex and increasing function reflecting the cost of earning y_i, and d(.) a convex and increasing function reflecting the cost of avoiding to pay the regular income tax on x_i.

Show that at the optimum, $h'(y_i) = 1 - \tau$ and $d'(x_i) = \tau - t$ (0.5 point). Interpret the formula $d'(x_i) = \tau - t$ (0.5 point).

9) Aggregating over all top bracket taxpayers, we now denote by $y = y(1 - \tau)$ the average real earnings of top bracket taxpayers, by $x = x(t - \tau)$ the average sheltered income of top bracket taxpayers, and by z the average income of top bracket taxpayers that is taxable according to the regular schedule. Show that z is an increasing function of $(1 - \tau)$ and t (0.5 point).

10) We define the total elasticity of taxable income z with respect to $1 - \tau$ when keeping t constant as:

$$e = \frac{1 - \tau}{z} \frac{\partial z}{\partial (1 - \tau)}$$

We define the tax avoidance elasticity as:

$$e_2 = \frac{1-\tau}{z}\frac{dx}{d(\tau - t)}$$

Show (1 point) that for a given t, the optimal regular tax rate on top bracket income is:

$$\tau^* = \frac{1 + tae_2}{1 + ae}$$

11) Interpret this formula. (0.5 point).