

# Systems Competition Fall 2005

## Assignment #1 (related to chapter II.1 - MK)

Notation as in class!

### Public Good Provision / Redistribution

1. In class we assumed that the government levies a tax (a unit tax in our case) on capital used in production. Though this type of taxation also exists in practice, one usually has the corporate tax (i.e. a tax on profits) in mind when considering capital tax competition. As in class profits are  $\pi = f(k, l) - wl - rk$ .
  - (a) Characterize capital demand if a unit tax  $t$  is levied on the capital stock.
  - (b) How is capital demand affected if corporate profits are taxed at an ad-valorem rate of  $\tau_c$ ?
  - (c) Assume that capital expenditures,  $rk$ , are not tax deductible. Characterize capital demand under a corporate tax regime.
  - (d) If  $rk$  is not deductible, under which condition are the capital tax and a corporate tax regime equivalent, i.e. capital demand is identical?
2. Modify the basic tax competition model in two respects. First, there are two types of individuals: capitalists and workers. For simplicity there is only one worker and one capitalist. The capitalist has a capital endowment  $\bar{k}$  and the worker supplies one unit of labor. Second, capital tax revenues are transferred to the worker which gives him/her an income of  $w + T$  where  $T$  denotes a lump-sum transfer. The capitalist has an income of  $r\bar{k}$ .
  - (a) What is the worker's preferred tax rate in a closed economy?
  - (b) How does the integration of capital markets affect the worker's preferred policy choice?
  - (c) What happens in a small open economy? Explain the intuition for the prevailing policy choice. Draw a diagram in addition to the analytical reasoning.

### Infrastructure Provision (chapter 2 in Sinn (2003))

3. Provide the intuition for why infrastructure good provision is efficient if a lump-sum tax and a tax on capital is available.
4. Suppose capital taxes in the competitive equilibrium are considered to be too low. Governments collude and harmonize capital taxes at a higher level. Each regional government can still choose the level of wage taxes and the level of infrastructure.

- (a) Compute the capital response to a rise in  $W$ ,  $\frac{dk}{dW}$ .
  - (b) Derive the first-order condition for the provision of infrastructure!
  - (c) Does the efficiency of infrastructure provision depend on whether capital taxes are harmonized? Provide an intuition for the result.
5. As an alternative to tax harmonization consider the imposition of a self-financing constraint  $\omega \equiv 0$ , i.e.  $tk = \rho W$ .
- (a) Compute the capital response to a rise in  $t$ ,  $\frac{dk}{dt}$ .
  - (b) Derive the first-order condition for the provision of infrastructure!
  - (c) Evaluate the efficiency implications of the self-financing constraint!

### Capital Tax Competition and Fiscal Equalization

6. Assume that the government of region  $i$  receives equalizing transfers determined according to the formula

$$\beta (N^i - t^i k^i), \quad \beta \in (0, 1], \quad (1)$$

where  $N^i$  denotes the “fiscal needs” of region  $i$  and  $\beta$  determines to what extent the difference between the “fiscal needs” and tax revenues is equalized. Public expenditures on local public goods are  $g^i = t^i k^i + \beta (N^i - t^i k^i)$ . The rest of the model is the same as discussed in class.

- (a) Compute the marginal cost of public funds. Is the public good efficiently provided?
- (b) How does the equalization system affect taxing incentives? Which aspect of the equalization formula (1) accounts for the result?
- (c) Suggest a modification of the equalization formula (1) such that public good provision is efficient!