

ECON 7040
Spring '09
Assignment #3

Consider the problem of optimal fiscal policy in an economy where households derive utility from private consumption goods and public goods. Household preferences are described by

$$\sum_{t=0}^{\infty} \beta^t \left(\frac{c_t^{1-\sigma}}{1-\sigma} + \frac{g_t^{1-\sigma}}{1-\sigma} - \frac{l_t^{1+\phi}}{1+\phi} \right)$$

where c denotes private good consumption, g denotes public good consumption and l stands for work effort. The homogenous good is storable as capital $k > 0$ (which depreciates at a constant rate $\delta > 0$) and, in each period, is produced by competitive firms who use a Cobb-Douglas production technology:

$$y_t = k_t^\alpha l_t^{1-\alpha}$$

Factor markets are competitive. Households have also access to a bond market where they can trade one-period real government bonds. The government has to finance an optimally chosen sequence of public goods $\{g_t\}_{t=0}^{\infty}$ by imposing capital income taxes $\{\tau_t^k\}_{t=0}^{\infty}$ and/or labor income taxes $\{\tau_t^n\}_{t=0}^{\infty}$ or by borrowing from households.

- a) Define a competitive equilibrium.
- b) Define the Ramsey problem.
- c) Adopting the *sequential approach*, write down a Lagrangian for the optimal policy problem.
- d) Find the optimal capital income tax rate at a non-stochastic steady-state.
- e) Is the optimal policy time-consistent? Explain.