

## Exam 4620 spring 2022

1. **Short true, false or uncertain statements - explain briefly your answer. (30%, same weight on each statement)**

- (a) Standard economic models imply that capital taxes fully fall on labor.
- (b) It is optimal for the government to impose high commodity taxes on price inelastic goods.
- (c) A government that maximizes a utilitarian social welfare function would impose a tax schedule such that every person obtains the same level of consumption.
- (d) Suppose individuals (indexed  $i$ ) have private information about their risk  $0 < \gamma_i < 1$  of losing their income. This risk is exogenously given (no moral hazard). In this case it is always better to have public mandatory social insurance than private voluntary insurance.
- (e) The government should always carry out projects where the aggregate willingness to pay is larger than the costs of the project.

2. **Income taxation (50%, weights indicated after each question)**

Consider a static (one period) society in which a person  $i$  who earns income  $z_i = w_i l_i$  pays an income tax  $T(z_i)$ , where  $w_i$  is the wage rate and  $l_i$  is the hours a person works. The wage  $w_i$  is given, equal to the innate ability of a person, and  $l_i$  is chosen by  $i$ . People are born with different abilities (wages). Suppose all individuals have the same utility function  $u(c_i, z_i)$  with  $c_i = z_i - T(z_i)$ . The utility function is increasing and concave in  $c$  and decreasing and concave in  $z$ .

- (a) Draw indifference curves for a person  $H$  with a high wage ( $w_H$ ) and a person  $L$  with low wage ( $w_L < w_H$ ) in a diagram with  $c$  on the vertical axis and  $z$  on the horizontal axis. Explain why for any point in this diagram that  $H$  has flatter indifference curves than  $L$ . (10pts)
- (b) Draw a progressive income tax schedule  $T(z)$  in this diagram. (5 pts)
- (c) The government wants to redistribute income from  $H$  to  $L$ . Does it matter whether the government can observe  $w_i$  or only can observe  $z_i$ ? Explain your answer. (15 pts)
- (d) Suppose the tax schedule  $T(z)$  is piecewise linear. It has three income brackets  $j = (1, 2, 3)$ . For income from 0 to  $z_1 > 0$  the tax rate  $\tau_1 = 0$ . For income between  $z_1$  and  $z_2 > z_1$  the tax rate is  $\tau_2 > 0$  and for the top bracket  $z > z_2$  the tax rate is  $\tau_3 > \tau_2$ . Draw this tax schedule in a diagram with  $c$  on the vertical axis and  $z$  on the horizontal axis. (5 pts)
- (e) Suppose the government wants to increase the top bracket from  $\tau_3$  to  $\tau_3 + \Delta$ . Illustrate this reform in a diagram and explain how this will change the social welfare in the economy. (hint use the perturbation argument and show that there are effects on government revenue and

on the income and utility of income earners and on social welfare)  
(45 pts)

- (f) Assume alternatively that the government makes a small increase in  $\tau_2$ , would that effect the behavior of those who prior to the reform earn income above  $z_2$ ? (20 pts)

3. **Distributional effects of wealth taxation. (20%)** The graph below shows the distribution of the annual wealth tax as share of gross income for four different rankings: yearly individual income, yearly household income, household income over a longer time period (8–19 years), and household income over the lifetime.

(a) Household income is obtained by the use of an equivalence scale. Explain what an equivalence scale is.

(b) The graph shows the distribution of the same measure of the tax burden, annual wealth tax over gross income, for four different income concepts. The tax burden for decile 1 according to the “annual individual income” concept (annual income ranking) is relatively high. Explain why the tax burden is higher when the ranking is based on “annual individual income” than for the other income concepts.

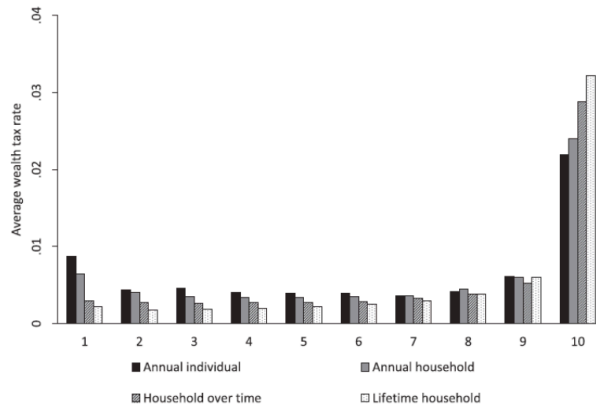


Fig. 2. Annual wealth tax as a share of income, for rankings (in deciles) by different income concepts