**Econ 230B**

**Spring 2025**

**FINAL EXAM: 2 Hours**

**Closed notes exam (no computer or electronic device allowed). Write answers in spaces provided. Use dark pen as exams will be scanned for grading.**

**True/False Questions: 40 points**

Answer all 10 questions (4 pts each). Explain your answer fully, since all the credit is based on the explanation.

1. If an individual maximizes utility $u(c, z)$ subject to linear budget $c = (1 - \tau) \cdot z + R$ where $c$ is consumption and $z$ is earnings, then the effect on utility of a small tax rate change $d\tau$ is given by $-u_c \cdot d\tau \cdot z$ where $z$ is the earnings choice of the individual before the reform.

2. The 1987 tax-free year in Iceland generated a positive effect on earnings of young men who were just above school age at the time of the tax-free year.

3. The earnings test of the US social security retirement system is a tax on earnings above the disregard and generates substantial bunching in earnings precisely at the earnings disregard.

4. In addition to their traditional redistributive benefit, welfare benefits can also generate long-term benefits for children beneficiaries, which in turn can provide societal benefits.

5. If $r > n + g$, then privatizing social security is desirable.

6. Even if perfectly enforced, a tax on capital income cannot always replicate the effects of a wealth tax.

7. Studying bunching responses at kinks or notches in the wealth tax schedule is sufficient to inform the efficiency cost of progressive wealth taxation.

8. When setting the optimal linear tax rate in an open economy, the government should only take into account the migration responses to taxes of one segment of the population, top income earners.

9. The decision to move from country A to country B depends only on the characteristics of countries A and B and the migration costs between them.

10. VAT, corporate taxes, and payroll taxes are all trade-neutral and do not affect firms decisions to shift profits, production, or input sourcing abroad.

**PROBLEM (30 points):**

Consider an economy where the government sets a flat tax at rate $\tau$ on earnings to raise revenue. We assume that the economy is static: the total population remains constant and equal to $N$ over years and there is no overall growth in earnings.

Individual $i$ earns $z_i = z_i^0 \cdot (1-\tau)^e$ where the tax rate is $\tau$. $z_i^0$ is independent of taxation and is called potential income. $e$ is a positive parameter equal for all individuals in the economy. The government wants to set $\tau$ so as to raise as much tax revenue as possible.

a) (4 pts) What is the parameter $e$? Derive the tax rate $\tau^*$ that maximizes total tax revenue.

b) (4 pts) The government does not know $e$ perfectly and thus requests the help of an economist to estimate $e$. The government can provide individual data on earnings for two consecutive years: year 1 and year 2. In year 1, the tax rate is $\tau_1$. In year 2, the tax rate is *decreased* to level $\tau_2$. Suppose that the government can provide you with two cross-section random samples of earnings of the same size $n$ for each year. This is *not* panel data.

How would you estimate $e$ from this data? Provide a formula for your estimate $\hat{e}$.

c) (4 pts) Suppose now that the economy is experiencing exogenous economic growth from year to year at a constant rate $g > 0$. The population remains constant at $N$. How is the estimate $\hat{e}$ biased because of growth? Suppose you know $g$, how would you correct $\hat{e}$ to obtain a consistent estimate of $e$? (provide an exact formula of this new estimate).

d) (4 pts) Suppose now that you do not know $g$ but that the government gives you a new cross-section of data for year 0 in which the tax rate was equal to $\tau_1$ as in year 1. Using data on year 0 and year 1, provide an estimate of $g$.

e) (4 pts) We now assume again that there is no growth. Suppose that the parameter $e$ differs across individuals and is equal to $e_i$ for individual $i$. Assume that there are $N$ individuals in the economy. Individual $i$ earns $z_i = (1-\tau)^{e_i} z_i^0$. As above, $z_i^0$ is not affected by taxation.

As in question a), express the tax rate maximizing tax revenue $\tau^{**}$ as a function of the $e_i$ and the realized incomes $z_i$.

f) (6 pts) Suppose now that the parameter $e$ is the same for all individuals and that the government redistributes the tax collected as a lump-sum to all individuals. I denote by $R$ this lump-sum which is equal to average taxes raised. Suppose that the level of this lump-sum $R$ affects labor supply through income effects. More precisely, the earnings of individual $i$ are given by $z_i = (1-\tau)^e z_i^0(R)$. The potential income $z_i^0(R)$ now depends (negatively) on the lump-sum $R$.

Show that the compensated elasticity is larger than $e$.

Suppose that the government still wants to set $\tau$ so as to raise as much taxes as possible in order to make the lump-sum $R$ as big as possible. Should the government set the tax rate $\tau$ higher or lower than the $\tau^*$ obtained in question a)?

g) (4 pts) Suppose now that the behavioral response to taxes comes entirely from tax avoidance and evasion, i.e., real earnings are $z_i^0$ no matter what the tax rate is but that individuals report only $z_i = z_i^0 \cdot (1-\tau)^e$ when the tax rate is $\tau$. Is the revenue maximizing tax rate still the same as a) under this scenario?

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