Econ 230B
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Problem Set 3

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1. Inequality and tax reform in the United States

This exercise uses the data in T. Piketty, E. Saez and G. Zucman Distributional National Accounts: Methods and Estimates for the United States, NBER working paper 2016, to study inequality and tax policy in the United States. A link to a Stata micro-file of synthetic adult-level observations representative of the U.S. economy for the year 2010 will be sent to you by e-mail. The variables are labelled in the Stata file (type describe in Stata); see also the Online Appendix of the paper available at [LINK]

a) Define national income. What is the difference between pre-tax national income and post-tax national income?

b) Using the 2010 micro-file, compute the Gini coefficient among (equal-split) adults for pre-tax national income, post-tax national income, and household net wealth. Draw the corresponding Lorenz curves. Interpret the difference between the three Gini coefficients.

c) Using Table B4 in [LINK], compute the Gini coefficient among (equal-split) adults for pre-tax national income in 2010. Can you recover the Gini coefficient computed using the 2010 micro-file? How are the results modified if you exclude adults with negative pre-tax national income (in the micro-file) and quantiles with negative average pre-tax national income (in the Excel file)?

d) Congress is considering introducing a federal tax on household net wealth (total household assets net of debts) at a marginal rate of 0.01% for wealth below $20 million, and 1.0% for wealth above $20 million. Assuming no behavioral responses in the first year of implementation, use the micro-file to compute how much revenue would have been collected by such a tax if it had been imposed in 2010 for the first time. Is the assumption of no behavioral response in year 1 justifiable?

e) Congress is considering using all the revenue from the wealth tax to fund a payroll tax cut for wage earners. More specifically, the marginal payroll tax rate (employer + employees) would become 0 below wage income T, 13% in between T and $106,800, and 0 above $106,800. Find what is the exemption threshold T for wage (variable *flwag*) such that the revenue from the new payroll tax plus the revenue from the wealth tax would have equalled the revenue from the old payroll tax (variable *ssuicontrib* in the microfile) in 2010.

f) In light of theory and available empirical evidence, what would be the overall growth and distributional impacts of the combined tax reform described in d. and e.? How would it affect the overall tax burden of bottom 50% pre-tax income earners?

2. Tax Enforcement

We consider a linear individual income tax at flat rate t. We denote by w real income and $\underline{w}$ reported income. We assume that $w \geq 0$ and $\underline{w} \geq 0$.

If individuals are caught evading taxes, the government forces them to pay the evaded tax due, $t \cdot (w - \underline{w})$, and further imposes a fine proportional to taxes evaded. The fine is equal to $f \cdot t \cdot (w - \underline{w})$, where f is the fine factor parameter. We assume that individuals are **risk neutral** with utility equal to income net of taxes and penalties if caught evading taxes. Assume that individuals who cheat are caught with exogenous probability p

a) Suppose p and f are constant parameters. Solve for the optimal tax-evading behavior of the individual as a function of p and f. Suppose that $f = 0.2$ (a realistic number). Discuss what a realistic p would be in the United States. Does the model generate a realistic prediction of the actual level of tax evasion in the United States given the actual audit rate in the United States?

b) Suppose now that f is constant but that p depends on the level of evasion. Assume that p is an increasing function of unreported income $w - \underline{w}$. Derive the optimal reporting behavior w in that case for the individual. Express this as a function of the elasticity e of p with respect to $w - \underline{w}$. Explain why in that situation even with no fines ($f = 0$), it may not be optimal for the individual to report $w = 0$

c) Explain (informally) what third-party-reporting means in the context of tax enforcement and how it affects the likelihood p of being caught when evading. Discuss briefly empirical evidence on the evasion rate of income that is third-party reported versus income that is not third-party reported. Explain the shape that the function $p \cdot (w - \underline{w})$ from question b. is expected to take in that case and whether the model generates realistic predictions.

d) Suppose the individual earns wage w and can deduct charitable giving d from income so that the tax rate t applies to net reported income $\underline{w} - \underline{d}$. The individual reports $\underline{w}$ and $\underline{d}$ to the government. Assume $w \geq 0$, $\underline{w} \geq 0$, $\underline{d} \geq 0$, $d \geq 0$, $w - d \geq 0$, and $\underline{w} - \underline{d} \geq 0$. Fines for tax evasion apply to underreported net income $[w - d - (\underline{w} - \underline{d})]$. Suppose that the probability of being caught underreporting w is p_w while the probability of being caught over-reporting d is p_d. Suppose p_w and p_d are constant parameters such that $p_w > p_d$. Derive the optimal reporting behavior of the individual as a function of p_w, p_d, and f.

e) Suppose that $p_d \cdot (1 + f) < 1$ and $p_w \cdot (1 + f) > 1$. Discuss why this is a realistic assumption in the United States. What is the prediction from part d. in that case? Is this a realistic prediction? If not, what is the key factor that is missing from the model?

f) Suppose the government wants to improve enforcement by increasing scrutiny of individuals who report charitable giving larger than 10 percent of income. As a result, for those reporting more than 10 percent of income, over-reported d is now caught with probability p_w (instead of p_d). What happens to optimal evasion behavior in that case? (Consider the case where $p_d \cdot (1 + f) < 1$ and $p_w \cdot (1 + f) > 1$ as in part e.).

g) Suppose instead that the government only allows charitable deductions up to 10 percent of earnings. Does this generate the same outcome as in part f.?