Econ 230B
Spring 2025
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Problem Set 2

DUE DATE: April 28 end of day, on gradescope

1. Chasing Natural Experiments within a Country

As seen in class, many of the best papers on migration responses to taxes and transfers exploit a policy change (a so-called "Natural Experiment") in order to obtain convincing estimates. This exercise asks you to find a Natural Experiment and propose an estimation methodology.

Download the pdf copy of the EU Tax Observatory report on "New Forms of Tax Competition in the European Union" (link here). Chapter 3 of this publication describes preferential individual income tax schemes for new high income migrants.

a) Find the introduction of one such scheme in one country that could be used to estimate migration responses to taxes for some group of interest in the population. Make sure the scheme is large enough to be useable for compelling identification. Describe the scheme you have picked.

b) Look for the papers cited in the EU tax observatory report and on google scholar to check whether the scheme you have picked has already been analyzed. Ideally, you want to be the first one to analyze this scheme. If there are already existing papers studying this scheme, explain why your proposed analysis would complement or add to the existing research on your chosen scheme.

c) Describe the methodology you would use to estimate such migration responses. In particular, make sure to be fully explicit about the assumptions you need to identify the migration responses.

d) Describe the data you would need to carry out the analysis. Survey or administrative data, variables, realistic sample size, time period, panel or repeated cross section, etc. Search online to investigate whether such data exist and how they could be obtained for the research analysis you are proposing. In particular, discuss whether you would need to follow the same people as they move across countries or whether data from a single country would be sufficient for your analysis.

2. Social Security Privatization

Consider an OLG model where individuals live for 2 periods, work only in period 1, earn a wage w, and have utility $u(c_1^t) + \delta u(c_2^t)$, where the upper script t denotes the generation born in period t. Suppose that population grows at rate n ($N_{t+1}/N_t = 1+n$). The market rate of return on private savings is denoted by r. Assume that $r > n$. Assume that r and w are exogenously given and constant over time.

There is a pay-as-you system which imposes a tax at rate τ on earnings w of generation t equal to $d = \tau w$ in period t to pay benefits b_{t-1} to generation $t-1$ (old in period t).

a) Express b_t as a function of w, τ, and n. Write the life-time budget constraint of generation t and show that the pay-as-you go system (assuming no credit constraints) amounts to a tax on earnings w at rate $\tau(r-n)/(1+r)$.

b) Derive the FOC for individual optimal savings (or borrowing) on top of the forced pay-as-you system. Denote by s private savings. Show that $-1 < \partial s/\partial d < 0$ (in steady state equilibrium where $d_t = d_{t+1}$, and that $\partial s/\partial d = -1$ if $r = n$.

The economy is in steady-state in the pay-as-you-go system and the government decides to switch from a pay-as-you go system to a fully funded system at period t_0. The young in period t_0 will invest a fraction τ of their earnings in a private account with market return r. On top of this forced funded retirement, individuals can also save or borrow at market rate r.

c) Suppose that the government finances the transition by reneging to pay benefits for generation $t_0 - 1$ (old in period t_0). Show that generation $t_0 - 1$ is hurt but that all future generations are better off.

d) Suppose instead that the government issues debt a_{t_0} per capita (at market rate r) to pay the promised benefits to generation $t_0 - 1$. Moving forward, the government will keep the debt per capita constant, and each generation will pay (in old age) the amount needed to keep the debt constant per capita.

Write down how much each generation has to pay per capita to keep the debt constant.

Show that in net, there is no change in welfare for ANY generation relative to the former pay-as-you-go system.

e) (General equilibrium) Suppose now that r and w are endogenous and equal to $r_t = f'(k_t)$, $w_t = f(k_t) - k_t f'(k_t)$ where k_t is the capital stock per capita, and that $k_{t+1} = s_t/(1+n)$ (see Blanchard and Fischer (1989), Section 3.2 if you are not familiar with this).

Show that the privatization scheme from question d) (starting from the pay-as-you-go steady state) has no effect on the capital stock, on wages, and on welfare of ANY generation.

3. Bunching at kink points

a) Consider a utility function based on consumption c and hours of work h of the form:

$$u(c,h) = c - \frac{h^{1+k}}{1+k}$$

Individuals have a pre-tax wage rate w, supply hours of work h, and earn $z = w \cdot h$.

The tax schedule depends on earnings $z = w \cdot h$ and takes the following form:

$T(z) = 0$ if $z \leq \bar{z}$

$T(z) = \tau \cdot (z - \bar{z})$ if $z > \bar{z}$,

where τ is the constant marginal tax rate in the top bracket. Draw the budget set for a given individual and solve for the optimal (c^*, z^*) choice as a function of w. Make sure to distinguish cases where the individual is on the first bracket, bunches at the kink, or is on the second bracket.

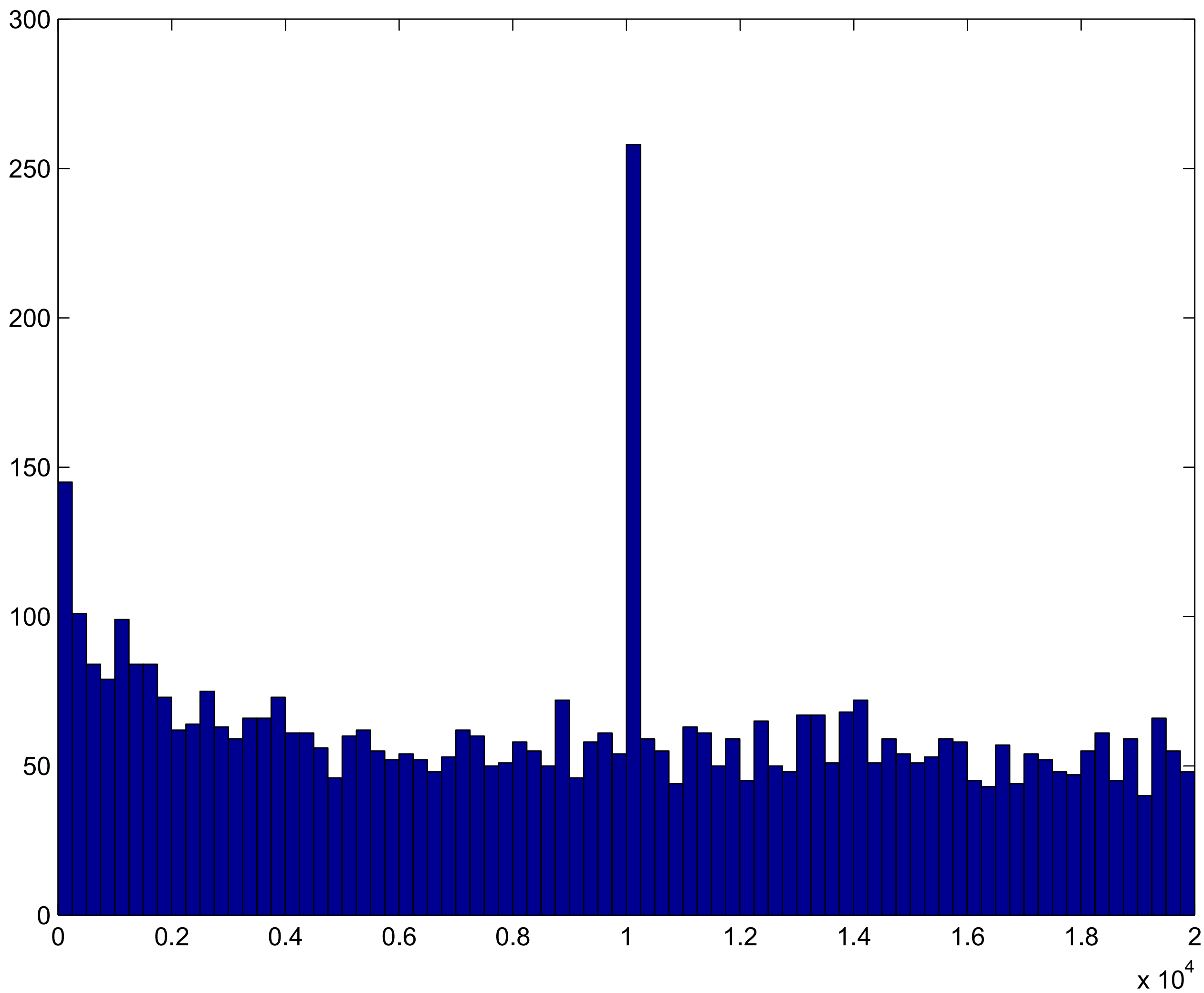
b) Derive the compensated elasticity of hours of work with respect to net of tax wages for this utility function.

Suppose that wages are distributed according to a density function $f(w)$ (with population normalized to one). Give a formula for the fraction of individuals bunching at the kink point.

c) I have created a data-set of 5,000 observations of earnings outcomes for a such a population of individuals assuming that $\tau = 0.3$, and that w is distributed according to some distribution $f(w)$. I have then graphed a histogram of earnings by \$250 bands (\$0-\$249, \$250-\$499, \$500-\$749, ..., \$19,750-\$19,999). What is $\bar{z}$ and why?

d) Using the histogram from c) and your answers to a) and b), try to give an estimate of the compensated elasticity of hours of work with respect to net of tax wages. You do not need to provide standard errors, just a point estimate.

e) Is this estimation subject to the recent Blomquist-Newey-Kumar-Liang JPE'21 critique? Why or why not?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