Optimal Progressivity with Age-Dependent Taxation (by HSV)

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Bank of Spain Workshop

Motivation

- Classic Question: How progressive should income taxation be?
- In a recent paper (QJE 2017) authors, find little role for progressive income taxation.
- Literature: In general, as long as hours/consumption of households vary over their life cycle, there are gains from allowing *taxes to depend on age* both in
  - Ramsey-approach
  - Dynamic-Mirrlees setting
- Key idea of paper: Bigger role for redistribution/insurance policies under age-dependent-progressive income taxation.

Contribution: evaluate welfare gains of optimal age-dependent non-linear taxation in a framework with the following tradeoffs

- favoring progressivity
  - redistribution with respect to initial conditions
  - intertemporal redistribution (life-cycle) due to borrowing constraints.
  - social insurance due to missing markets
- against progressivity
  - labor supply distortion
  - human capital distortion.

Welfare Gains

- Equivalent variation: % of lifetime consumption
- Computed relative to the US tax/transfer system

	Benchmark	U.S. BL	Natural BL
(λ^*, τ^*) constant	0.04	0.15	0.15
λ^* age-varying, τ^* constant	3.00	1.88	1.43
(λ^*, τ^*) age-varying	3.70	2.12	1.47

Why are gains of age-dependent taxes so large?

Labor supply is determined by FOC

$$\frac{1}{c}\frac{d[y-T(y)]}{dh} = \varphi h^{\sigma}$$

Using $c = \lambda y^{1-\tau}$ yields:

$$(1-\tau)\frac{1}{h} = \varphi h^{\sigma}$$

- Hours depend on preferences (φ, σ), tax parameter τ.
- $\tau = 0$ no distortion on labor supply.
- Optimal tax system will set $\tau = 0$ at the age when individuals are the most productive (net of disutility cost of labor)

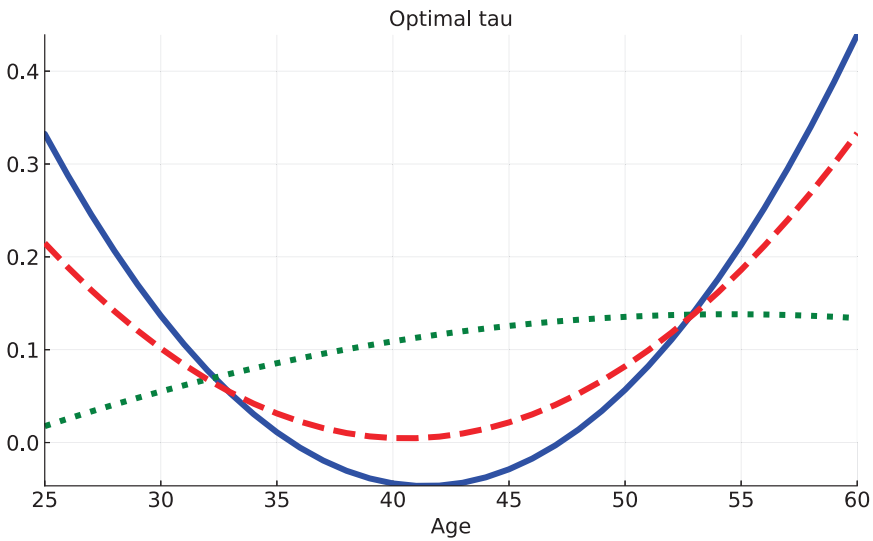
Non-linear consumption prices ($\tau \neq 0$)

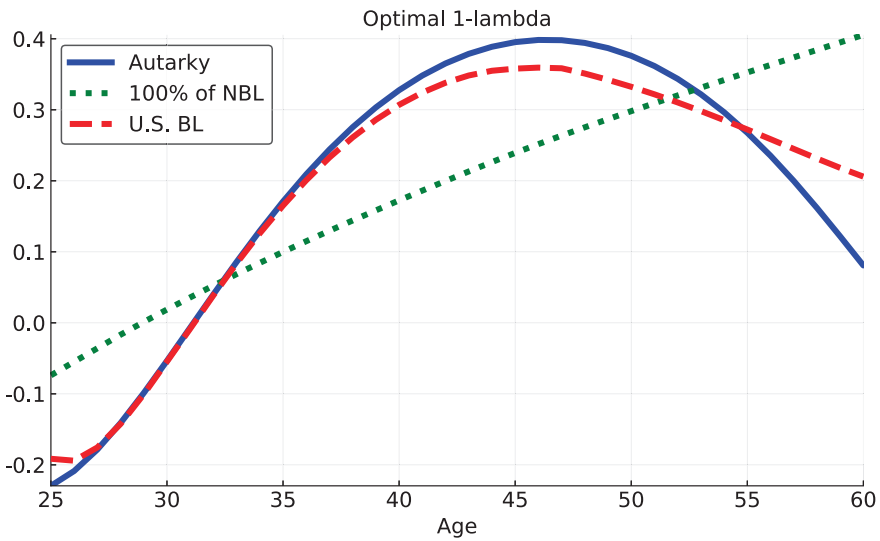
- Tax system imply: $c = \lambda[\text{after tax cost of c}]^{1-\tau}$
- Average price of consuming c goods at age a:

$$p_a^c = \frac{\text{after tax cost of c}}{c} = \frac{\lambda_a}{c^{\tau_a}}$$

  - age variation in λ_a important for redistribution over the life cycle.
  - $\tau_a >$ allows for social social insurance.
  - Key: age-dependent taxes allow for more redistribution/insurance.

No distortion at the top





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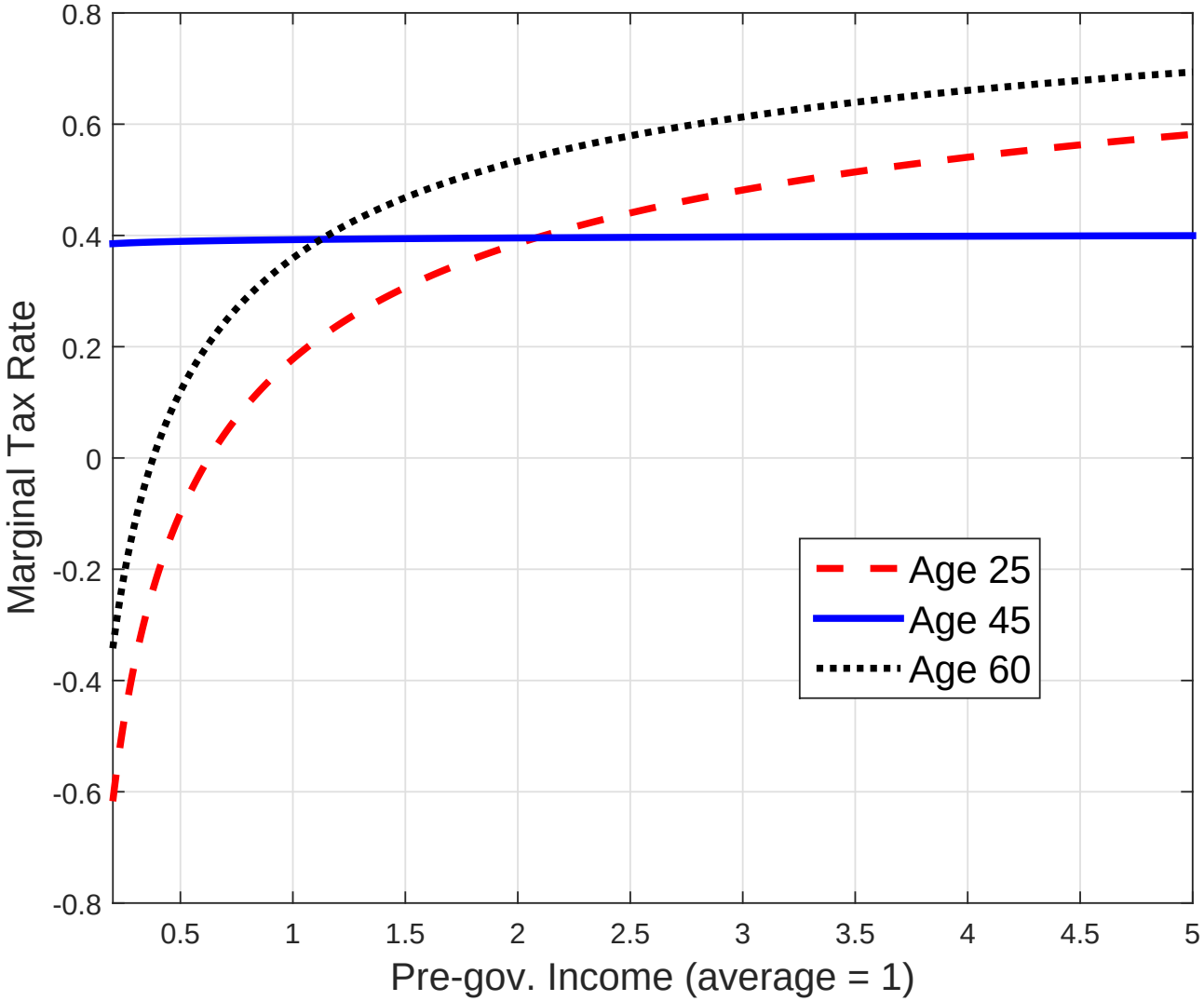

Age-dependent taxes reduce labor distortions allowing for more redistribution/insurance.

Comments on explanation of findings

Paper has an extensive discussion on how different model features affect age-profile of tax parameters ($\{\lambda_a, \tau_a\}_{a=25}^{60}$).

- How do model features affect welfare gains? (nice summary statistic)
- How do welfare gains vary across initial types? (high learning types may not like age-dependent taxes!)
- Report statistics on moments of labor wedges and intertemporal wedges.
- Compare answers to question above in age-dependent versus age-independent tax system

Discussion on Intertemporal Wedge

- Tax function is effectively a progressive consumption tax: $c_a = \lambda_a [p(s) exp(x_a + \alpha) h_a + (1 + r) b_a - b'_a]^{1-\tau_a}$.

- Consider Euler equation in a model with linear taxation on consumption:

$$\frac{u'(c_a)}{1+\tau_a^c} = \beta(1+r)\frac{u'(c_{a+1})}{1+\tau_{a+1}^c}$$

$$u'(c_a) = \beta(1+r)\underbrace{\frac{1+\tau_a^c}{1+\tau_{a+1}^c}}_{1+r(1-\tau_a^k)} u'(c_{a+1})$$

- An interest income tax τ_a^k gives exactly the same intertemporal tradeoff.

- $\tau_{a+1}^c > \tau_a^c \Rightarrow \tau_a^k > 0$.

$\triangleright$ Consumption taxes should play a crucial role in an economy with capital (tax capital of initial old!).

Discussion on US Tax Function

Paper estimates a tax function for the US that fits pretty well data on effective taxes paid at different level of incomes.

- Welfare benefits of reforms are compared relative to US estimated tax function.
- However, I suspect that tax function understates tax distortions in the US. Why?
- If so, welfare gains of tax reforms in the paper may be much larger.
- Alternative baseline: Solve for the initial equilibrium under us statoury tax rates (various tax brackets) and allow for a fixed deduction for each tax bracket (that might depend on age).
- Probably the US tax code has embedded age-dependent features: might be interesting to estimate a tax function that varies by age.

Preferences

- Disutility from hours (rather than utility from leisure) imply
  - constant Frisch-elasticity of labor supply over the life cycle
  - all variation in labor supply is on the intensive margin
- Enhance role for age dependent taxation if model
  - preference for leisure.
  - retirement (extensive margin)

Education

Probably the education decision is over-simplistic (utility cost, no modeling of time/goods input)

- Nonetheless, predictions of theory are consistent with standard results in taxation of human capital when human capital requires time inputs(linear taxes do not affect education decisions but progressive taxed do).
- Model can't address issues on the deductability of expenditures in education.
- Life cycle profile or productivity and labor shocks might across education/occupation groups.

Conclusions.

- Nice paper addressing an important question.
- Elegant and rich model that incorporate important tradeoffs.
- Transparent results.
- Large gains welfare from age-dependent progressive taxation.