Optimal Progressivity with Age-Dependent Taxes

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Goal: Determine optimal \( \{ \lambda_j, \tau_j \} \) where \( j \) indexes age

\[
T_j(y) = y - \lambda_j y^{1-\tau_j}
\]

\[
y - T_j(y) = \lambda_j y^{1-\tau_j}
\]

Two Main Findings:
1. Optimal \( \tau_j > 0 \) and U-shaped in Figure 4.
2. Welfare gains of moving from the optimal age-invariant to the optimal age-dependent tax system are small (i.e. .15%).
Model and Method

1. Use GE model with labor-leisure choice and a one-time skill investment choice.
3. HSV (2017) is roughly Constantinides and Duffie (1996) permanent shock model but with labor choice and skill choice.

Current model (i) dispersion from initial conditions and period shocks, (ii) imperfect private insurance, (iii) matches US data and (iv) closed-form solutions.
What Forces Determine the U-shape Result?

Proposition 3 suggests U-shape arises because

1. rising wage rate dispersion via exogenous shocks is a force making $\tau_j$ rise with age.

2. average labor productivity rising with age is a force making $\tau_j$ decline with age.

Relation to Mirrleesian wedge literature? $(\lambda_j, \tau_j)$ govern the wedge level. Figure 4 implies optimal ave. wedge increases in age and income.
Perspective on Main Findings

Traditional issues (i) how much can current system be improved?, (ii) how to improve the current system? and (iii) main sources of welfare gains? Current paper does not address these issues but the companion paper HSV (2017) does.

HSV (2017): current system can be improved by 0.65% by reducing $\tau$ from $\tau^{US} = .181$ to $\tau = .084$.

HSV (2018): further gain of .15% to age dependent taxation with U-shaped $\tau_j$. 
Perspective on Age Dependence in US

Empirics: \( \log y^{disp} = \alpha + \beta \log y \Rightarrow R^2 = .93 \)

Message: US has little age dependence.

Question: Does US social security induce some age dependence? Yes, a little.

1. \( \tau_j = \tau_{SS} - \sum_{k>j} \frac{1}{(1+r)^{k-j}} \text{Marginal Benefit}_k \)
2. \( \tau_{SS} = .106 \quad \text{OASI rate} \)
3. \( \text{Benefit}_k = f_k(\text{average earnings}) \)
4. \( f_k \) is the social security benefit formula
Age dependence in current US system

![Graph showing Net Social Security Tax Rate against age](image-url)
Perspective on model earnings/wage process

Model: \( \log y_j = \log p(s) + x_j + \alpha_j + \log h_j \)
Empirical: \( \log y_j = \log \text{wage}_j + \log h_j \)

1. Empirical: HSV (2010) find most \( \text{Var}(\log y) \) not due to \( \text{Var}(\log h) \) and that most \( \Delta_j \text{Var}(\log y_j) \) due to \( \Delta_j \text{Var}(\log \text{wage}_j) \) and not \( \Delta_j \text{Var}(\log h_j) \)


3. HSV (2018): most of model rise in \( \Delta_j \text{Var}(\log y_j) \) is due to shocks \( \Delta_j \text{Var}(\alpha_j) \). Choices play almost no role.
Perspective on model earnings/wage process

\[ \log y_j = \log p(s) + x_j + \alpha_j + \log h_j \quad \text{and} \quad \alpha_j = \alpha_{j-1} + w_j \]

Question: Does the model match some non-targeted earnings moments that would help to make it a plausible model of top earners?

Answer: No.
SSA Data from Guvenen, Karahan, Ozkan and Song (2015)
HSV simulated model data on earnings and wage rates