

# "Insurance and Taxation over the Life Cycle" by Farhi & Werning: A Discussion

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NBER PE Meeting: November 4, 2010

# Quantitative Properties of Optimal Dynamic Taxes

# Quantitative Properties of Optimal Dynamic Taxes

- ▶ Existing results:
  - ▶ Albanesi & Sleet (2006), Kapicka (2008), Golosov, Troshkin & Tsyvinski (2009)
- ▶ Challenges with persistent productivity shocks:
  - ▶ Theoretical: Validity of first order approach (Kapicka 2008, Pavan, Segal & Toikka 2009)
  - ▶ Computational: Curse of dimensionality in recursive solution (Phelan and Fernandez 2000)

## FW Main Results

- ▶ Optimal labor wedge formula:

$$\begin{aligned} \mathbb{E}_{t-1} \left[ \frac{\tau_{L,t}}{1 - \tau_{L,t}} \frac{q}{\beta} \frac{\hat{u}^{t-1'}(c_{t-1})}{\hat{u}^{t'}(c_t)} \right] \\ = \rho \frac{\tau_{L,t-1}}{1 - \tau_{L,t-1}} + \alpha \text{Cov}_{t-1} \left( \log(\theta_t), \frac{q}{\beta} \frac{\hat{u}^{t-1'}(c_{t-1})}{\hat{u}^{t'}(c_t)} \right) \end{aligned}$$

- ▶ Short run “regressivity” property of labor wedge
- ▶ Intertemporal wedge approximately equal to the variance of consumption growth & wedge declines with autocorrelation of productivity shocks

## FW Main Results

- ▶ Optimal labor wedge formula:

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$$= \rho \frac{\tau_{L,t-1}}{1 - \tau_{L,t-1}} + \alpha \text{Cov}_{t-1} \left( \log(\theta_t), \frac{q}{\beta} \frac{\hat{u}^{t-1'}(c_{t-1})}{\hat{u}^{t'}(c_t)} \right)$$

- ▶ Short run “regressivity” property of labor wedge
- ▶ Intertemporal wedge approximately equal to the variance of consumption growth & wedge declines with autocorrelation of productivity shocks
- ▶ Life cycle implications
  - ▶ Labor wedge increases with age, intertemporal wedge declines with age
  - ▶ Variance of consumption grows at decreasing rate with age, variance of consumption growth declines over time
  - ▶ Variance of income grows at an increasing rate with age

## Basic Findings: Static Models

- ▶ Sensitivity to utility function and skill distribution
  - ▶ Mirrlees 1971: constant marginal taxes with log-normal productivity
  - ▶ Diamond 1998 & Saez 2000: U-shaped marginal taxes with Pareto productivity

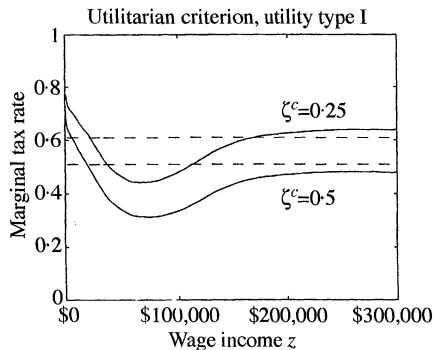
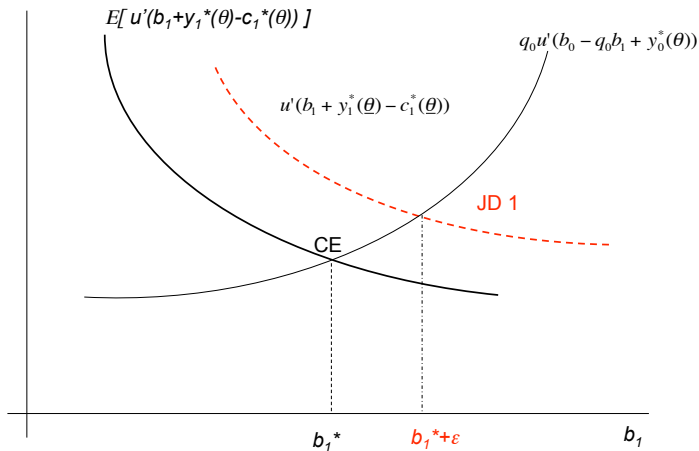


Figure: Saez 2000

## Basic Findings: Dynamic Models

- ▶ Complementarity between saving and labor supply



**Figure:** Intertemporal wedge: Incentive to save too much and shirk tomorrow (joint deviation JD 1)

## Basic Findings: Dynamic Models

- ▶ Candidate optimal tax system:  $T_t(b, y)$
- ▶ Regressivity result:

$$0 < E_t \left[ \frac{\partial T_{t+1}}{\partial b} \frac{u'(c_{t+1}^*)}{u'(c_t^*)} \right] = E_t \left[ \frac{\partial T_{t+1}}{\partial b} \right] E_t \left[ \frac{u'(c_{t+1}^*)}{u'(c_t^*)} \right] \\ + \text{Cov}_t \left[ \frac{\partial T_{t+1}}{\partial b}, \frac{u'(c_{t+1}^*)}{u'(c_t^*)} \right]$$

- ▶  $\text{Cov}_t \left[ \frac{\partial T_{t+1}}{\partial b}, \frac{u'(c_{t+1}^*)}{u'(c_t^*)} \right] > 0$  required to implement optimal allocation

# Basic Findings: Dynamic Models

i.i.d. productivity

- ▶ Marginal income taxes  $\frac{\partial T_t(b,y)}{\partial y}$  decreasing in wealth, marginal asset taxes  $\frac{\partial T_t(b,y)}{\partial b}$  decreasing in labor income

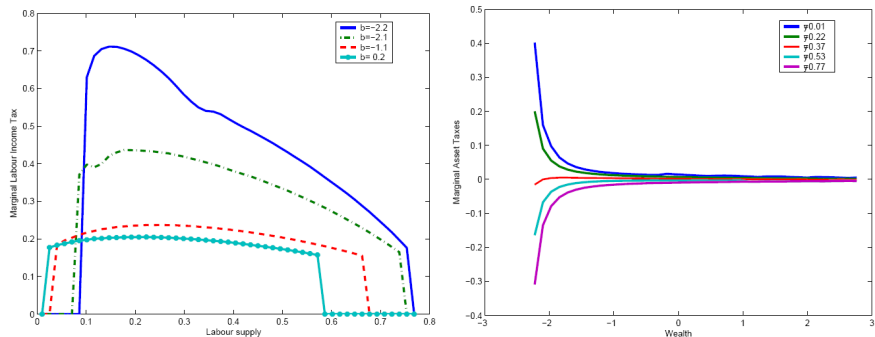


Figure: Albanesi & Sleet 2006

# What Changes with Persistence?

- ▶ Complementarity between saving and labor supply

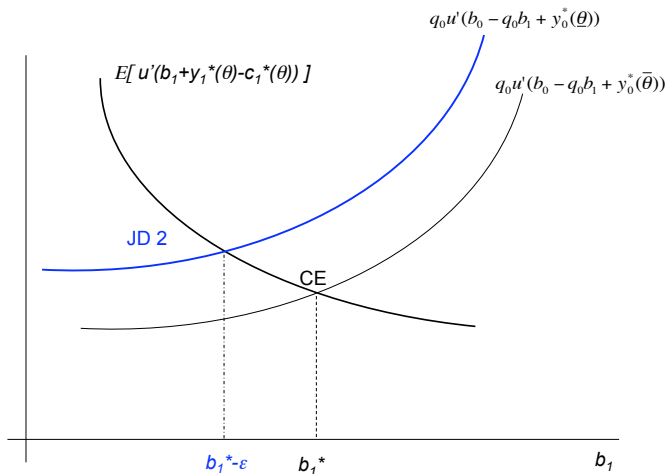


Figure: New with persistent shocks: Incentive to save too little and shirk today (JD 2)

## What Changes with Persistence?

- ▶ Double joint deviation (JD) generates double intertemporal distortion
- ▶ Usual intertemporal wedge (JD 1) *for all productivity types*
  - ▶ Implications for optimal allocations: Downward tilted consumption path
  - ▶ Implications for optimal taxes: “Regressive” asset income taxes

## What Changes with Persistence?

- ▶ Double joint deviation (JD) generates double intertemporal distortion
- ▶ Usual intertemporal wedge (JD 1) *for all productivity types*
  - ▶ Implications for optimal allocations: Downward tilted consumption path
  - ▶ Implications for optimal taxes: “Regressive” asset income taxes
- ▶ With persistent shocks (JD 2) *only for high productivity types*
  - ▶ Implications for optimal allocations: To discourage under saving, income will be lower if productivity is high tomorrow than without JD 2  $\implies$  Labor distortion exacerbated in second period
    - ▶ Consistent with GTT: Labor wedge higher in second period for agents with high productivity in period 1
    - ▶ Consistent with FW: Labor wedge tomorrow higher than labor wedge today
  - ▶ *Implications for optimal taxes?*

# What Changes with Persistence?

## Implications for optimal taxes

- ▶ Asset taxes used to deal with JD 1
- ▶ To deal with JD 2:
  - ▶ Time variation in labor wedge as in GTT & FW
  - ▶ Regressivity result: Labor wedge inversely related to consumption future periods
- ▶ Alternative: Income contingent consumption tax?
- ▶ *Interesting to explore alternative implementations*

## Life Cycle Results

- ▶ Variance of consumption grows at decreasing rate with age, variance of consumption growth declines over time
- ▶ Variance of income grows at an increasing rate with age
- ▶ *Intuition?* Role of increasing dispersion in productivity over time.

# Life Cycle Results

- ▶ Variance of consumption grows at decreasing rate with age, variance of consumption growth declines over time
- ▶ Variance of income grows at an increasing rate with age
- ▶ *Intuition?* Role of increasing dispersion in productivity over time.
- ▶ Age dependent taxes close to optimal (Weinzierl, 2008)
  - ▶ Intuition?
    - ▶ Very persistent productivity shock in quantitative analysis  $\implies$  Due to low cross-sectional dispersion of the labor wedge conditional on age.
    - ▶ Age  $\sim$  cross-sectional dispersion of productivity  $\implies$  Main driver of labor wedge?

# Wrap up

- ▶ Interesting paper
- ▶ Quantitative analysis:
  - ▶ Explore role of degree of persistence to develop intuition on optimal allocation properties
- ▶ Fiscal policy:
  - ▶ Explore asset taxes, not just wedges
  - ▶ Explore alternative implementations, possible implications for consumption taxes with restrictive labor income taxes