

# Redistributive Taxation in a Partial-Insurance Economy

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ESSIM, Tarragona, May 2010

# The analytical approach to incomplete markets

- HSV, JME 2007: “Insurance versus Opportunities”
- HSV, 2009: “Consumption and Labor Supply with Partial Insurance: an Analytical Framework”
- HSV, 2010: “Redistributive Taxation in a Partial Insurance Economy”

# The analytical approach to incomplete markets

- Constantinides-Duffie, JPE 1996
- HSV, JME 2007: “Insurance versus Opportunities”
- HSV, 2009: “Consumption and Labor Supply with Partial Insurance: an Analytical Framework”
- Benabou, Econometrica 2002
- HSV, 2010: “Redistributive Taxation in a Partial Insurance Economy”

- Assume:
  - CRRA consumption
  - Zero initial wealth
  - Idiosyncratic **random walk** process for **log endowment**
  - **Riskless bond** only
- **Solve analytically** for interest rate implying **no bond trade**
  - Just consume endowment

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- ... Nice problem set ...
- ... So what??

- HSV 2009, “Consumption and labor supply with partial insurance: an analytical framework”
  - CRRA consumption and labor
  - Zero initial wealth
  - Idiosyncratic **random walk** component in **log labor productivity**
  - **Riskless bond**
  - Idiosyncratic **iid** component in **log labor productivity**
  - **Complete markets** for iid shock
- **Solve analytically** for consumption, labor, interest rate implying **no bond trade**
  - Full insurance of iid shocks in equilibrium

- Wage process:

$$\log w_{it} = \alpha_{it} + \kappa_{it} + \theta_{it}$$

- $\alpha_{it} = \alpha_{i,t-1} + \omega_{it} \rightarrow$  Random walk, **uninsured** in equilibrium
- $\kappa_{it} = \kappa_{i,t-1} + \eta_{it} \rightarrow$  Random walk, assumed fully **insured**
- $\theta_{it} \rightarrow$  Transitory, fully **insured** in equilibrium

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- $\kappa_{it} = \kappa_{i,t-1} + \eta_{it} \rightarrow$  Random walk, assumed fully **insured** (or assumed fully **predictable**)
- $\theta_{it} \rightarrow$  Transitory, fully **insured** in equilibrium



# Problem set from hell

- HSV 2009, “Consumption and labor supply with partial insurance: an analytical framework”
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  - Zero initial wealth
  - Idiosyncratic **random walk** component in **log labor productivity**
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  - **Complete markets** for iid shock
- **Solve analytically** for consumption, labor, interest rate implying **no bond trade**
- Assuming normal shocks, **solve analytically** for **moments** of consumption, hours, wage; in levels/differences; aggregate and by age
- **Prove identification**, even with measurement error and age-specific variances
- **Estimate** by minimum distance using PSID/CEX

# Key findings

- Consumption fully insured, labor comoves positively with insurable shock
  - Uninsurable shocks are “risk”, insurable shocks are “opportunities”
- Fully insurable  $\kappa$  has identical implications to fully predictable  $\kappa$  in terms of consumption and hours
- But fully insurable  $\kappa$  and fully predictable  $\kappa$  have different implications for asset holdings
  - “Indeterminacy” of wealth distribution
- Wage-hours correlation informative about degree of insurance
- CRRA is roughly 2
- Elasticity of labor supply is roughly 0.4

- HSV 2010, “Redistributive taxation in a partial insurance economy”
  - CRRA consumption, labor, and public expenditure
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  - Idiosyncratic **random walk** component in **log labor productivity**
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  - Idiosyncratic **iid** component in **log labor productivity**
  - **Complete markets** for iid shock
  - Nonlinear **progressive labor tax/transfer** system (Benabou 2002)
- **Solve analytically** for consumption, labor, interest rate implying **no bond trade**

- Wage process:

$$\log w_{it} = \alpha_{it} + \epsilon_{it}$$

- $\alpha_{it} = \alpha_{i,t-1} + \omega_{it} \rightarrow$  Random walk, uninsured in equilibrium
- $\theta_{it} \rightarrow$  Transitory, fully insured in equilibrium

- After tax income:

$$\tilde{y}_{it} = \lambda (\exp(\alpha_{it} + \epsilon_{it}) h_{it})^{1-\tau}$$

- Tax/transfer specification from Benabou (2002)
- $\lambda \rightarrow$  Level parameter, adjusts in equilibrium to balance budget
- $\tau \rightarrow$  Progressivity parameter

# Problem set 2 from hell

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  - Idiosyncratic **iid** component in **log labor productivity**
  - **Complete markets** for iid shock
  - Nonlinear **progressive labor tax/transfer** system (Benabou 2002)
- **Solve analytically** for consumption, labor, interest rate implying **no bond trade**
- Solve analytically (?) for balance-budget tax level
- **Explicit formula** for **social welfare**

# Problem set 2 from hell

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- **Solve analytically** for consumption, labor, interest rate implying **no bond trade**
- Solve analytically (?) for balance-budget tax level
- **Explicit formula** for **social welfare**
- **Estimate tax system** from pre/post income data
- Solve static (and dynamic?) **optimal choice of tax system** and public spending
- **Comparative statics** of optimal taxes, depending on risks, with/without valued spending

# Key findings

- Elasticity of labor supply is decreased by tax progressivity:

$$\frac{1 - \tau}{\sigma + \tau} \text{ instead of } \frac{1}{\tau}$$

- Estimated progressivity in US:  $\tau = 0.26$
- Estimated transmission of permanent shocks to consumption: 0.6  
Less than 1 because of progressivity and labor supply adjustment
- If  $G$  worthless ( $\chi = 0$ ), then optimal progressivity like US:  $\tau^* = 0.21$
- If no income risk, optimal taxation is regressive:  $\tau^* = \frac{\chi}{1+\chi}$
- With income risk and valuable  $G$ , taxes should be close to flat:  
 $\tau^* = 0.07$

- Finish the paper, OK?



- Finish the paper, OK?
- Also, I'm somewhat worried about the “insurance versus opportunities” argument. If taken too far, isn't it a recipe for the creation of an underclass?

- Main weakness: **wage processes exogenous**.
  - Should be possible to extend to CRS production function with physical capital.
  - Should be possible to extend to CRS production function with human capital.
  - Seems harder to extend to entry/exit, matching, etc., because random walk property would not be preserved.
- Are there any dynamic incentive problems that can be solved like this?
- Still interesting, for realism and robustness, to consider some shocks that are “truly” partially insured
  - Might be possible to do a perturbation **around** this explicit solution to obtain analytical results on buffer stock saving

- HSV 2009 and HSV 2010 are not papers, they are **textbooks**.
- Consumption theory, public finance
- We will tinker with them for years before we learn everything they have to teach us.