

# **Market incompleteness and redistribution policies in the U.S.**

Very preliminary

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# Questions

- What are the costs of "market incompleteness," defined as the lack of insurance against idiosyncratic income risks?
- How well does the U.S. redistribution system insure people against the risks?

# Related literature

## Assessment of incomplete market risk

- Levine and Zame (2002), Heathcote, Storesletten and Violante (2006), Pijoan-Mas (2006)

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⇒ *Evaluate the gain from completing the market, upon the benchmark without government and redistribution policies.*

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## Evaluation of redistributive policies against income shocks

- income tax: Conesa and Krueger (2006), Conesa, Kitao and Krueger (2006), Floden and Linde (2001)
- consumption tax: Nishiyama and Smetters (2005)
- social insurance: Hubbard, Skinner and Zeldes (1995)
- social security: Conesa and Krueger (1998), Huggett and Parra (2005)

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⇒ *Evaluation of each policy in isolation. No comprehensive study that evaluates the insurance role of "U.S. redistribution system" as a whole.*

# What I do

- Quantitatively assess the gains from completing the market in an OLG model calibrated to the U.S. economy
- Focus on the idiosyncratic wage risk
- Compare welfare and macroeconomic variables under alternative asset markets
  - complete market with state contingent assets
  - incomplete market without redistribution system
  - incomplete market with redistribution
- Evaluate the "U.S. redistribution system"
  - progressive income taxation
  - earned income credit (negative labor income taxation)
  - social insurance (food stamp, TANF, Medicaid, etc)
  - (social security)

# Model overview

- OLG of 80 generations
- households maximize total expected lifetime utility by choosing consumption, saving and labor supply over the lifecycle
- flow utility from consumption and leisure (separable)
- idiosyncratic labor productivity risks (the only uncertainty in the model)
- production by competitive firms
- asset market
  - complete market: households trade with an insurance company the state-contingent assets that insure against the idiosyncratic income risk
  - incomplete market: only riskless savings
- perfect annuity market and no mortality risk



# Model overview

- government
  - expenditures financed by progressive income tax and consumption tax
  - social security system: self-financed by a payroll tax
  - earned income credit: provides tax credit for households with low (but strictly positive) labor income
  - social insurance: guarantees minimum consumption

# Household problem: incomplete market

$$v(j, e_j, a) = \max_{c, l, a'} \left\{ u(c, l) + \beta s_j \sum_{e_{j+1}} \pi(e_j, e_{j+1}) v(j+1, e_{j+1}, a') \right\}$$

s.t.

$$c + s_j a' = (1 + r)a + e_j w l - T \quad (1)$$

$$c > 0, \quad a' \geq 0, \quad l \in [0, 1] \quad (2)$$

# Household problem: complete market

$$v(j, e_j, b) = \max_{c, l, b'} \left\{ u(c, l) + \beta s_j \sum_{e_{j+1}} \pi(e_j, e_{j+1}) v(j+1, e_{j+1}, b') \right\}$$

s.t.

$$c + s_j \sum_{e_{j+1}} b'(e_j, e_{j+1}) q(e_j, e_{j+1}) = b + e_j w l - T$$

$$c > 0, \quad l \in [0, 1]$$

# Household problem: complete market

$$v(j, e_j, b) = \max_{c, l, b'} \left\{ u(c, l) + \beta s_j \sum_{e_{j+1}} \pi(e_j, e_{j+1}) v(j+1, e_{j+1}, b') \right\}$$

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$\Rightarrow$  price of a contract  $q(e_j, e_{j+1}) = \frac{1}{1+r} \pi(e_j, e_{j+1})$  by solving a problem of an insurance company:

$$\max_{b(e_j, e_{j+1})} \left\{ q(e_j, e_{j+1}) b(e_j, e_{j+1}) - \frac{1}{1+r} \pi(e_j, e_{j+1}) b(e_j, e_{j+1}) \right\}.$$

# Calibration overview

## • preference

- $u(c, l) = \frac{c^{1-\sigma} - 1}{1-\sigma} + \chi \frac{(1-l)^{1-\nu} - 1}{1-\nu}$
- set  $\sigma = 2$  and  $\nu = 4$  (Frisch elasticity = 0.5)

## • endowment process

- data: wage per hour from PSID (1993-1997)
- samples: households (both male- and female-headed), with positive labor income and work hours above 520 per year
- wage rate computed as the sum of labor income of household members (head and spouse if any) divided by the sum of work hours
- 5-dimensional Markov transition matrix computed by grouping households into quintiles
- separate grids and transition matrices for households of age groups 20-29, 30-39, 40-49 and 50-64

# Calibration overview

## ● Government

- general expenditures set to 18.7% of the total output
- income tax

$$T_y(y) = a_0 \left[ y - (y^{-a_1} + a_2)^{-1/a_1} \right] \times a_{adj} + \tau_y y$$

- consumption tax 5.67%
- earned income credit ("negative income tax")
  - estimate a polynomial using the statutory EITC schedule
- social security
  - payroll tax 12.4% up to \$90,000
  - benefits determined so that the system is self-financed
- social insurance
  - minimum consumption  $\bar{c}$  is guaranteed so that to match the share of households with assets less than \$5,000, 20%.
- general expenditures + EIC + social insurance financed by the consumption and income tax

# Some results (PRELIMINARY)

## 1. Case with no government

- compare two economies without government
  1. complete market with state contingent assets
  2. incomplete market with only riskless savings
  
- upon completing the insurance market,
  - welfare gain 12% in consumption equivalent variation (CEV)
  - capital -43%
  - labor productivity +16% (agg. labor +6.5% and work hours -8.0%)

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- compare to Pijoan-Mas (2006) with an economy with infinitely-lived agents (Frisch elasticity=0.7 (vs 0.5) and CRRA=1.5 (vs 2.0) ):
  - welfare gain 16%
  - capital -19%
  - labor productivity +24% (agg. labor +4.9% and work hours -15.2%)



# Some results (PRELIMINARY)

## 2. Case with government

- comparison across
  1. "incomplete market without redistribution system" : benchmark
  2. "U.S. redistribution system"
  3. "complete market"
- benchmark
  - only riskless savings
  - government expenditures financed by a proportional income tax and consumption tax
  - with social security system
- in complete market, government expenditures are financed through lump-sum tax

# Some results (PRELIMINARY)

	welfare	capital	labor prod
'US redistribution system'	+1.81%	-19.7%	+5.3%
- progressive tax	+0.68%	-11.4%	-0.8%
- social insurance	+1.13%	-6.9%	+8.4%
- earned income credit	+0.43%	-0.6%	+0.5%
'complete market'	+6.96%	-28.6%	+9.4%

# Next steps (among many)

- is complete market a good benchmark?
  - limited enforcement on the trade of state-contingent assets?
- family structure
  - married and single household
  - female labor participation
  - insurance within a household
- decomposition of income shocks
- policies to get closer to the complete market
- other insurance device
  - bankruptcy
  - unemployment insurance



# Issue: social security

## 2. Case with government

- Benchmark: same as before but **with no social security system.**

	welfare	capital	labor prod
'US redistribution system'	-13.83%	-38.6%	+6.0%
- social security	-15.30%	-23.6%	+0.7%
- progressive tax	+1.24%	-10.2%	-0.8%
- social insurance	-3.25%	-13.8%	+5.8%
- earned income credit	+0.20%	-0.3%	+0.4%
'complete market'	+13.84%	-30.6%	+12.3%