Social Insurance and the Role of Private Insurance

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(*very preliminary*)

Introduction

- **Questions:**
  - What are the effects of *means-tested* social insurance on welfare and saving?
    - Social insurance: Medicaid, SSI, food stamps, etc. (83 programs in total)
    - In the form of a minimum consumption floor.
  - What role does private insurance play for understanding the questions above?
    - E.g. are the welfare gains from social insurance reduced when private insurance options are explicitly modeled?

Motivation

- The size of US (means-tested) social insurance is *large*.
  - Total expenditures are $583.315 billions (i.e. 5.0 % of GDP), in 2004.
  - It will expand further due to the recent policy reform (Obamacare).
- *Conventional wisdom:* social insurance can improve welfare *because*
  - it provides insurance to the poor against negative shocks, such as income and health expense shocks.
- *However*, recent studies found that social insurance has large crowding-out effects on private insurance. E.g.:
  - Brown and Finkelstein (2007): crowding out the demand for private health insurance.
  - Hubbard, Skinner and Zeldes (1995): reducing precautionary saving.
- These findings imply that the welfare benefits of social insurance may be overstated.

What I Do

- Develop an OLG, GE model with endogenous private health insurance choices.
  - A GE version of the Hubbard, Skinner, and Zeldes model (1995), with endogenous private health insurance choices.
  - private health insurance features asymmetric information and adverse selection.
- Quantify the welfare and saving effects of social insurance in the calibrated model
- Evaluate the role of private health insurance.
  - Replicate the exercises above in models with different private insurance market structures.
    (E.g. shut down the the private market)

Preview of Main Results

- Means-tested social insurance has large crowding-out effects on the demand for private health insurance and saving.
- Social insurance is still welfare-improving after taking into account of these crowding-out effects. In the benchmark model, the welfare gain is 9.8% of consumption.
- The welfare gain from social insurance is 15.2% if private health insurance market is shut down.

The Model

- A multi-period (T periods) OLG, GE model with
  - means-tested social insurance: consumption floor ($\underline{c}$) financed by a payroll tax (τ_w).
  - exogenous health expenses (m).
  - endogenous private health insurance choices.
- Other key elements
  - exogenous labor supply and retirement,
  - idiosyncratic income shock (ϵ),
  - pay-as-you-go Social Security: payments ($SS()$) financed by a payroll tax (τ_{ss}).
  - Medicare and employment-based health insurance.

The Individual's Problem

- **Before retirement** (age $j < R$): (no mortality risk ($P = 1$))

$$V(j, a, m, h_e, h, \epsilon, \bar{\epsilon}) = \max_{c,h'} u(c) + \beta E[V(j+1, a', m', h_e', h', \epsilon', \bar{\epsilon}')]$$

subject to

$$\begin{aligned} s + c + (1 - I_{h_e>0}\kappa_e)m(1-h) + p_j(h_e)h' &= (w\epsilon - pr(h_e))(1-\tau) \\ &\quad + a + Tr, \\ a' = s(1+r), m' = \Gamma_m(m), \epsilon' = \Gamma_\epsilon(\epsilon), \bar{\epsilon}' &= \Gamma_{\bar{\epsilon}}(\bar{\epsilon}), h_e' = h_e \end{aligned}$$

- **After retirement** (age $j \geq R$): (no earnings ($\epsilon = 0$))

$$V(j, a, m, h_e, h, \bar{\epsilon}) = \max_{c,h'} u(c) + \beta P_j E[V(j+1, a', m', h_e', h', \bar{\epsilon}')]$$

subject to

$$\begin{aligned} s + c + (1 - I_{h_e>1}\kappa_e - \kappa_m)m(1-h) + p_j(h_e)h' &= SS(\bar{\epsilon}) + a + Tr \\ a' = s(1+r), m' = \Gamma_m(m), \bar{\epsilon}' &= \bar{\epsilon}, h_e' = h_e \end{aligned}$$

I_{h_e} are the indicator functions, $h \in (0, 1)$, $h_e \in (0, 1, 2)$, $\tau = \tau_w - \tau_{ss} - \tau_{mc}$

Social Insurance and the Private Market

- **Welfare transfers: Tr**
  - before retirement:
    $Tr = \max\{0, \underline{c} + (1 - I_{h_e>0}\kappa_e)m(1-h) - a - (w\epsilon - pr(h_e))(1-\tau)\}$,
  - after retirement:
    $Tr = \max\{0, \underline{c} + (1 - I_{h_e>1}\kappa_e - \kappa_m)m(1-h) - a - SS(\bar{\epsilon})\}$,
  - $\underline{c}$: consumption floor.
  - financed by payroll tax τ_w.

- **Private health insurance market**
  - One-period health insurance policy: pays for the health expenses that are not covered by Employment-based HI and Medicare.
  - The price of health insurance, $p_j(h_e)$, only conditions on age j and employment-based health insurance h_e.
  - Provided by a competitive insurance firm. That is, $p_j(h_e)$ is equal to the present value of the average health expenses (not covered by EHI and Medicare) of all policyholders at age j, with h_e

The Shocks

- **Idiosyncratic income shock**

$$\ln \epsilon = \epsilon_a + y + \mu,$$

  - ϵ_a: the deterministic age component.
  - μ: the i.i.d. shock, $N(0, \sigma_\mu^2)$.
  - y: the persistent shock following an AR(1) process,

$$y' = \rho y + \nu',$$

  - ν: the white-noise innovation, $N(0, \sigma_\nu^2)$.
- **Health expense shock** (m): follow De Nardi et al. (2010).

$$\ln m = a_m + y_m + \mu_m,$$

  - a_m: the deterministic age component.
  - μ_m: the i.i.d. shock, $N(0, \sigma_{\mu m}^2)$.
  - y_m: the persistent shock following an AR(1) process,

$$y_m' = \rho_m y_m + \nu_m',$$

  - ν_m: the white-noise innovation, $N(0, \sigma_{\nu m}^2)$.

Borrowing Constraint, Accidental Bequests, and SS

- **Medicare**
  - covers a κ_m fraction of health expenses for the elderly.
  - financed by payroll tax τ_{mc}.
- **Employment-based HI**
  - $h_e = 1$: covers a fraction κ_e of health expenses until retirement, financed by $pr(1)$.
  - $h_e = 2$: covers a fraction κ_e of health expenses until retirement, a fraction κ_e^o after retirement, financed by $pr(2)$.
- **Pay-as-you-go Social Security**
  - SS payment to the elderly: $SS()$
  - financed by payroll tax τ_{ss}.
- **Borrowing Constraints**: $s \geq 0$
- **Accidental Bequests**: collected by the government, and redistributed back equally to the new-born.

The Representative Firm

- **The firm's profit maximization problem:**

$$\max_{L,K} Y - wL - (r+\delta)K,$$

with

$$Y = K^{\alpha}(T_L L)^{1-\alpha}.$$

  - K: capital; L: labor; Y: output; δ: capital depreciation rate.
  - T_L: labor-augmented technology.

- **Firm's FOCs imply,**

$$w = (1-\alpha)A\left(\frac{K}{T_L L}\right)^{\alpha}$$

$$r = \alpha\left(\frac{K}{T_L L}\right)^{\alpha-1} - \delta$$

Stationary Equilibrium (steady state) (sketch)

Definition: A stationary equilibrium for a given set of government parameters $\{\tau_w, \tau_{mc}, \tau_{ss}, \underline{c}, \tau_{mc}, SS(.)\}$, is a collection of value functions $V()$, individual policy rules, distribution function $\Phi()$, employment-based health insurance polices $\{pr(.), \kappa_e, \kappa_e^o\}$, prices $(r, w, \{p_j(.)\}_R^{T-1})$, such that,

1. given $(r, w, \{p_j(.)\}_R^{T-1}, \tau_w, \tau_{mc}, \tau_{ss}, \underline{c}, SS(.))$, the individual solves the utility-maximizing problem.
2. given prices $\{r, w\}$, the firm solves its profit-maximizing problem.
3. labor and capital markets clear.
4. Social insurance, Medicare, and Social Security are self-financing.
5. the distribution, Φ, evolves over time according to equation (..), and satisfies the stationary equilibrium condition: $\Phi' = \Phi$.

The Quantitative Strategy

- Calibrate the benchmark model to match the US data in 2004 along some key dimensions.
- Evaluate the welfare and saving effects of social insurance.
  - reduce the consumption floor $\underline{c}$ to 10% of its current level, $0.1\underline{c}$.
  - steady states comparison.
- Welfare measure: compensating variation in consumption required to give the same expected lifetime utility to a new born.

Preliminary Calibration

- One period: 1 year. Born at age 21, retire at 65, and die at 85.($R = 45$ and $T = 65$)
- The **social insurance** program.
  - consumption floor $\underline{c}$: 20% of average earnings.(Kopecky and Koreshkova (2011))
  - the payroll tax τ_w: endogenously determined by the SI budget constraint.
- **Idiosyncratic income shock**
  - use the estimates from the heterogenous-agent macro literature
  - persistent shock: $\rho = 0.99$, $\sigma_\nu^2 = 0.007$.
  - transitory shock: assume away for now (to reduce the computational burden)
  - deterministic age components: census data on earnings by age.
- **Health expense shock**
  - use the estimates from De Nardi, French, and Jones (2010) for persistent shock y and transitory shock μ_m
  - deterministic age components: match the life-cycle profile of health expenses in the data. (Meara et al. (2004))

Calibration (continue)

- **Pay-as-you-go Social Security**
  - τ_{ss} is set to 10%
  - Social Security benefits $SS()$: benefits-defined. (follow Fuster et al. (2007))
  - rescale the benefits to satisfy the SS budget constraint.
- **Medicare and Employment-based HI**
  - Follow Attanasio, Kitao, and Violante (2008)
  - $\kappa_e = 0.7$, $\kappa_e^o = 0.3$. $\kappa_m = 0.5$ and τ_{mc} is endogenously determined.
  - 30 % no EHI before retirement, 30% still have EHI after retirement.
- The utility function is CRRA, $\frac{c^{1-\sigma}}{1-\sigma}$ with $\sigma = 3.0$
- Survival probabilities match the data in 2004.
- Other parameters: discount factor $\beta = 0.98$, depreciation rate $\delta = 0.07$.

Statistics of the Calibrated Economy

- Interest rate: 2.3%. Aggregate medical expenses: 14% of GDP.
- Private health insurance market:
  - Only 13% of the population purchase private health insurance.
  - Participation rate increases by income.

Earning Shock	1	2	3	4
Participation rate	4%	13%	16%	17%

  - Market participation rate increases with medical expenses
    (most policy holders are those with the highest persistent medical shock)

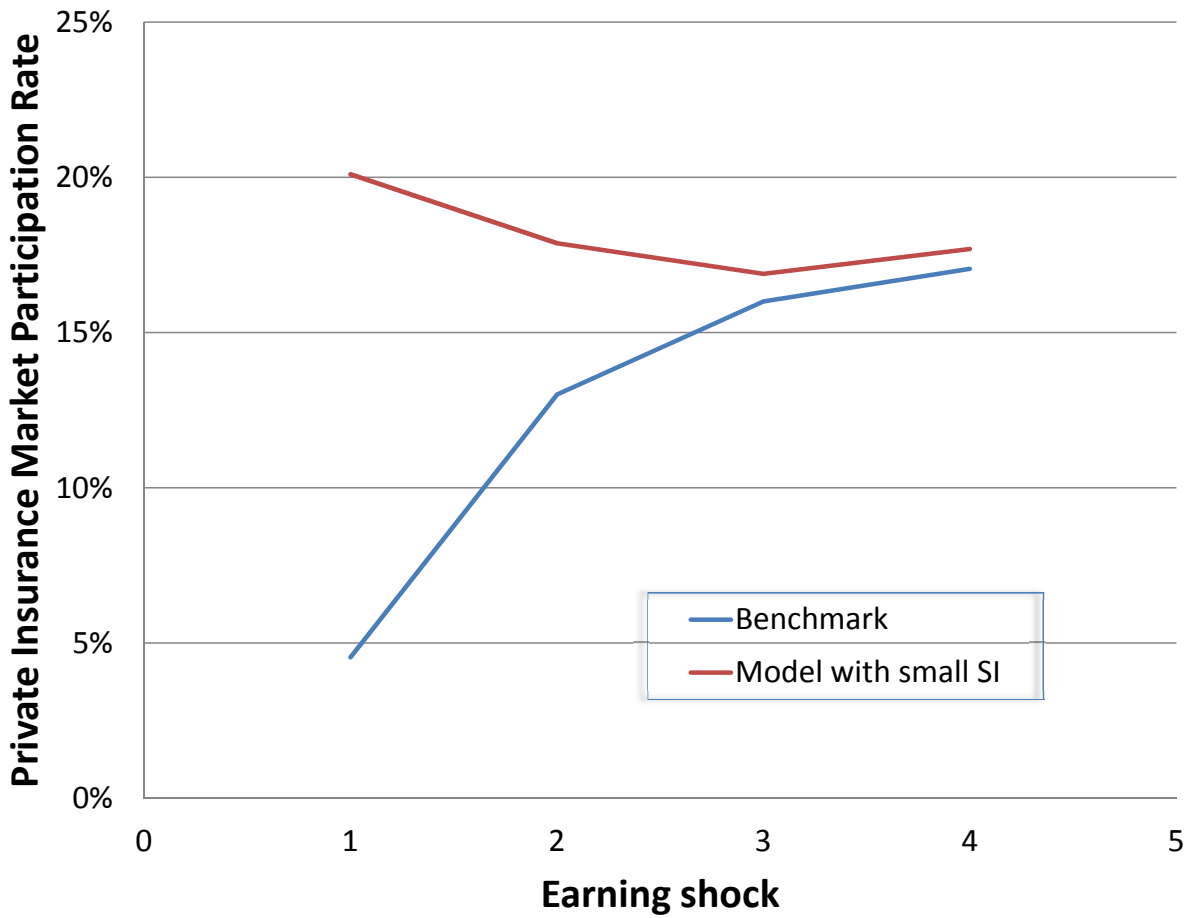
The welfare effects of SI in the benchmark model

- The benchmark model has a very small private health insurance market
  - due to adverse selection and the presence of SI.
- When the consumption floor is reduced to $0.1\underline{c}$.

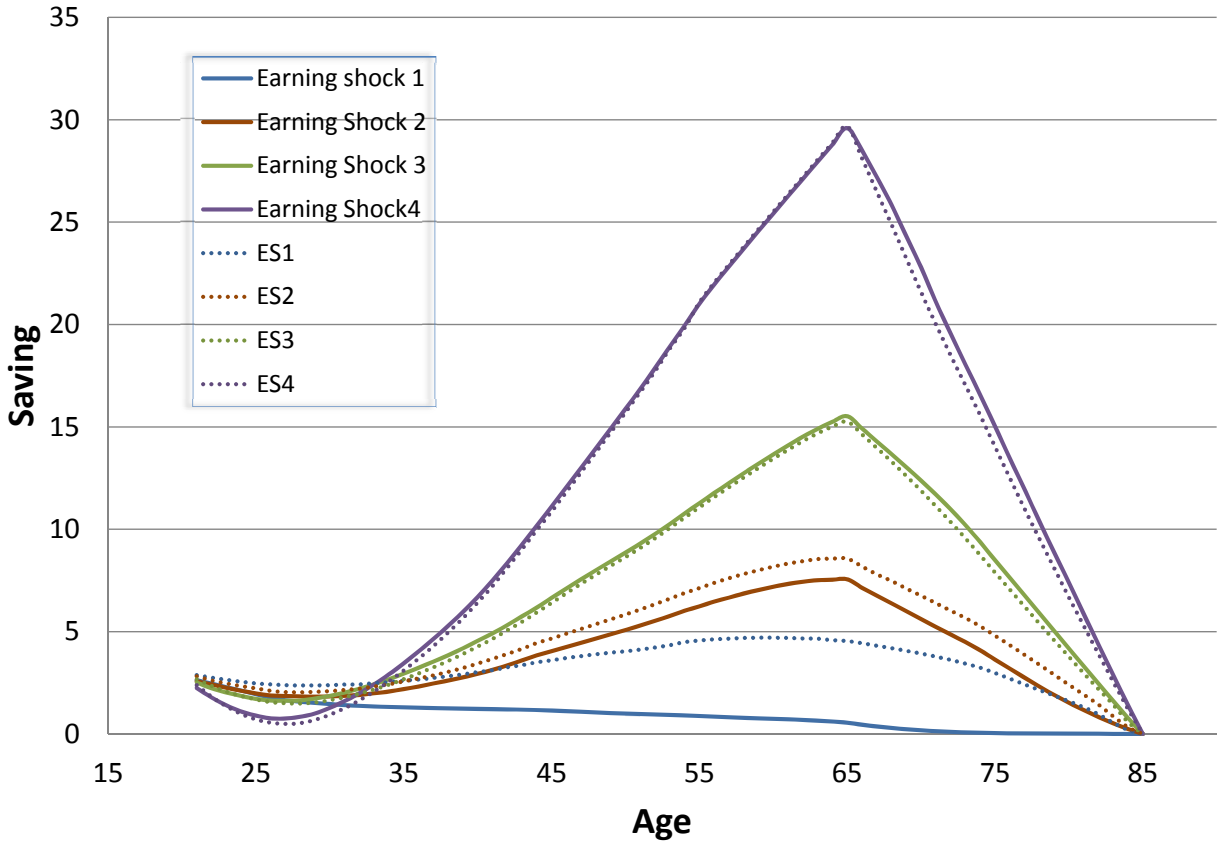
	Benchmark	Model(with $0.1\underline{c}$)
Private HI market Participation rate	13%	19%
Expected lifetime utility	-27.6	-33.4
Aggregate Capital	6.2	6.7 (9%↑)
Welfare Gain	..	+9.8%

- Most of the welfare gain is from those with the lowest income. Small welfare loss for those above average.

Effects of SI on private HI



Effects of SI on saving



The role of private health insurance

- Shut down the private health insurance market in the benchmark, and replicate the exercise ($\underline{c} \Rightarrow 0.1\underline{c}$).

	Benchmark	Model(with $0.1\underline{c}$)
Private HI market Participation rate	..	..
Aggregate Capital	6.2	7.4 (19%↑)
Welfare Gain	..	15.2%

Conclusion

- Private insurance plays an important role for understanding the welfare effects of means-tested social insurance.
- The welfare gain of SI is much smaller when private health insurance options are modeled (9.8% vs. 15.2%).
- Future work
  - The negative effect on labor supply (to be added)
  - Policy experiments, e.g. evaluating some elements of the Obamacare reform.

The Details of US SSN

- US Social Safety Nets consist of
  - 83 programs in total
- Major programs:
  - Medicaid
  - Supplemental Security Income (SSI)
  - Earned Income Tax Credit (EITC)
  - Food stamps
  - Subsidized housing
  - Temporary Assistance to Needy Families (TANF)
  - Child care
  - Head start
  - Jobs and training