Comment on "Income Risk, Consumption Inequality, and Macroeconomy in Japan" by Tomoaki Yamada

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Summary

- Develop an OLG model calibrated to Japanese economy 1980-2000
- Numerically simulate the earning/income/consumption inequality
- Identify the demographic effect on the development of inequality
- Timely contribution, well-executed with cutting-edge methodology and realistic calibration

Model Household

- Household i lives up to maximum age 100 with survival rate $\phi_{j,t}$ for age j and year t
- works from age 20 to 65
- Instantaneous utility $\left((c^i_{j,t})^\sigma(\bar{h}_t - h^i_{j,t})^{1-\sigma}\right)^{1-\gamma}/(1-\gamma)$

Household's idiosyncratic risk

- Wealth $a_{j,t} > 0$ (no borrowing) accumulates as:
  $c_{j,t} + a_{j+1,t+1} = (1 + (1 - \tau_t^{cap}) r_t)(a_{j,t} + b_t) + (1 - \tau_t^{ss}) y_{j,t}$
- Earning: $y_{j,t}^i = \kappa_j e_j^i h_{j,t}^i w_t$
  - κ_j: age-effect on productivity
  - e_j^i: idiosyncratic shock on productivity
- Idiosyncratic risk: $e_j^i = \xi_t^f \alpha^i + z_j^i + \xi_t^t \epsilon_j^i$
  - Persistent component $z_j^i = \rho z_{j-1}^i + \xi_t^p \eta_j^i$
  - Random shocks: fixed α^i, transitory ϵ_j^i, persistent η_j^i
  - Loading factors $\xi_t^f, \xi_t^t, \xi_t^p$ (normalized to 1 at year zero)
- Retirees receive pension $\varphi_t w_t H_t$ and pays no social security tax

Firms and government

- Production function $Y_t = A_t K_t^{\theta_t} H_t^{1-\theta_t}$
- Time-varying TFP (A_t) and capital share (θ_t)
- Competitive factor prices r_t, w_t
- Government
  - Social security $\varphi_t w_t H_t$, financed by $\int \tau_t^{ss} y_{j,t} dj$
  - Expenditure G_t, financed by capital tax τ_t^{cap}
  - Collects accidental bequests and redistributes b_t

Equilibrium path

- Starting from a stationary state in 1980
- Ending at a new stationary state in 2200
- Population distribution and other aggregate parameters evolve exogenously
- Households choose consumption/leisure paths, given the prices and time-varying parameters perfectly forecasted
- Market-clearing price sequence is computed numerically

Estimation of the earning process

- Estimates draw on Abe and Yamada (2006)
- Method developed by Storesletten, Telmer, and Yaron (2004)
- Construct the cohort cross-section dispersions that are *not* explained by observable variables
- Match the dispersions by the variances of fixed, transitory, and persistent income shocks and their time-varying loading factors
- Estimated process explains the upward sloping and convex age-profile of income dispersions (Deaton and Paxson 1994; Ohtake and Saito 1998)

Calibration

- Demography
  - Population moves as realized for 1980-2005 and as projected for 2006-2055
  - Population growth stops at 2055. Stationary age distribution is reached by 2200.
- Constants: Preference (β, γ, σ), pension replacement rate (φ)
- Time-varying macro factors: Capital share (θ_t), depreciation (δ_t), capital tax (τ_t^{cap})
- Time endowment $(\bar{h}_t)$ decreases from 5.5 days to 5 days from 1988 to 1993
- Time-varying TFP (A_t) exogenous a la Hayashi and Prescott (2002). Assumed to converge to 2%
- Chosen parameters well mimic the paths of interest rate, capital-output ratio, Hours worked, and saving rate

Comments

- Exogenous TFP innocuous
  - Income/consumption dispersions less likely affect TFP
- Time-varying time endowment
  - Did the workweek reduction decrease leisure?
  - Hayashi-Prescott specification
    - $U = log c_t + \alpha(1 + (h_t - 40)/40)e_t$
    - Forced to work 44h before workweek reduction
  - Here, the workweek reduction reduces endowment – causes wealth and substitution effects

Inequality accounting

- Obtain the evolution of inequality by numerically computing the equilibrium path
- and match with previous findings (Ohtake and Saito 1998; Kohara and Ohtake 2006)
- Decompose the evolution movements into time-varying factors...
- by counterfactual simulations where each time-varying factor is knocked out

Main results

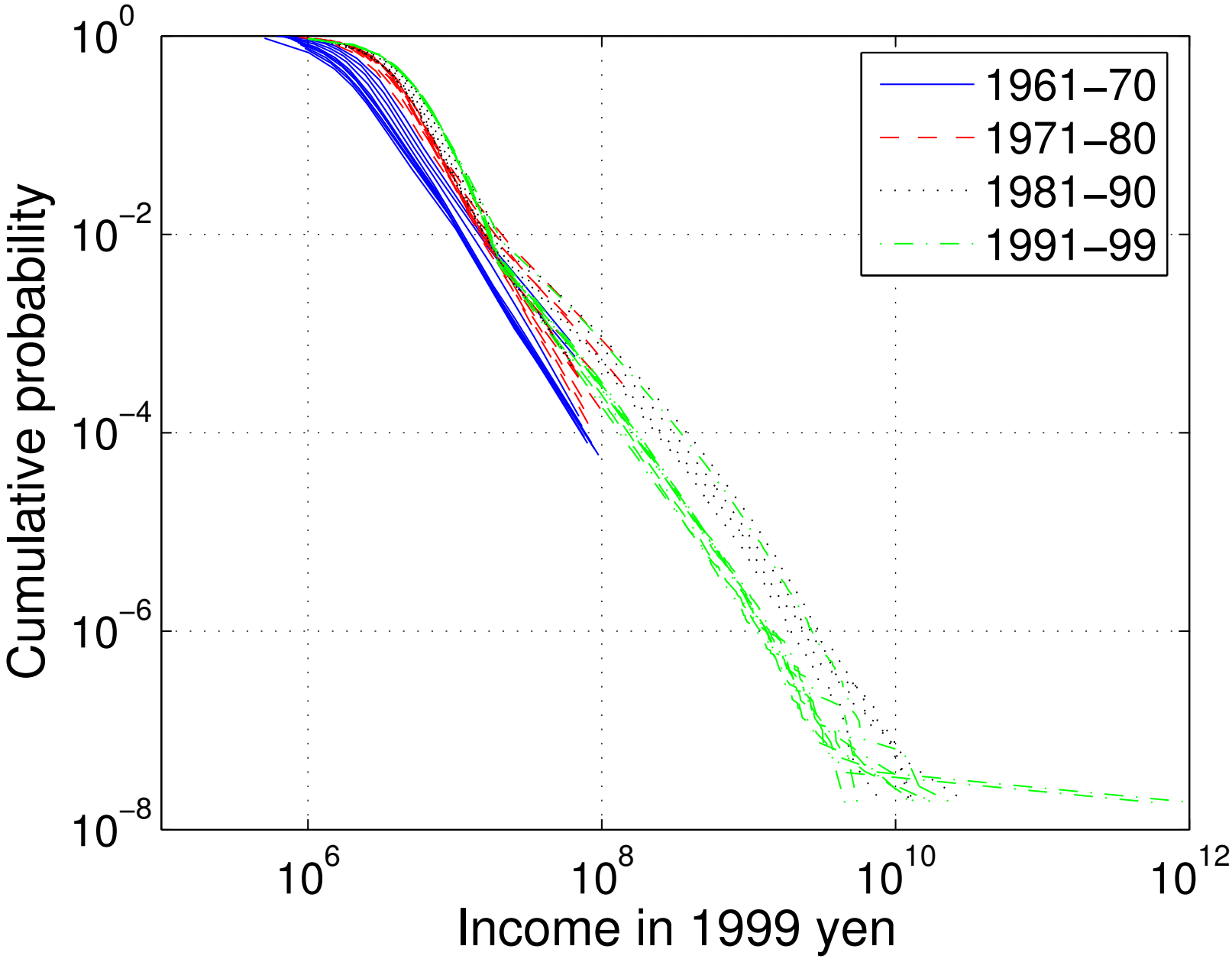
- Calibrated simulations show that:
  - simulations reproduce the upward trend in earning/income inequality in 1985-2000
  - but consumption inequality rises not until 1988
- Decomposition shows that:
  - aging drove the rise in income inequality
    - Inequality is sloping up in age, so aging drives up overall inequality
    - Aging does not fully explain earning inequality somehow
  - depressed TFP helped reduce consumption inequality
  - the increase in capital share until 1990 raised consumption inequality in the period

Comments

- Economic explanations are in due course here
- $\bar{h}_t$ drives consumption inequality down until 1988, up until 1993, and then stabilizes
- Depressed TFP lowers consumption inequality
- $c \propto w(\bar{h} - h)$. So $\tilde{c} = -1/(\bar{h}/h - 1)\tilde{h}$.
  - h fluctuates by idiosyncratic shocks
  - Reduction in $\bar{h}$ increases $\tilde{c}/\tilde{h}$
  - Reduction in w reduces h and decreases $\tilde{c}/\tilde{h}$

Comments cont'd

- Surprising that the income inequality largely explained by aging, rather than by other observable variables
  - Some suspicion on contaminated loading factors
- Missing households – singles, self-employed
- ...and abstracted dimensions – idiosyncratic asset returns, bequests



(Nirei and Souma 2007)