Social Security and Trends in Wealth Inequality
Additional slides for Q&A

– Model for risk-adjusted discount rates
– Why valuation increased so much?
– Private valuation for financially constrained households
– Implications for the racial wealth gap
– Effect of life expectancy differences

Systematic risk of Social Security (1)

- **Market Beta of Social Security**
  - For workers, taxes and expected benefits scale up with the wage-index
  - Stable labor share implies a long run covariance between Social Security returns and market returns

- **Cointegration between wage index and stock market** (Benzoni et al. (2007))
  - Dynamics of log wage index:

$$dl_{1,t} = \left((\phi - \kappa) y_t + \mu - \delta - \frac{\sigma_l^2}{2} \right) dt + \sigma_l dz_{1,t},$$

  - Stock market returns:

$$ds_t = \left(\mu + \phi y_t - \frac{\sigma_s^2}{2} \right) dt + \sigma_s dz_{2,t},$$

  - State variable keeping track of labor market performance relative to stock market:

$$dy_t = -\kappa y_t + \sigma_l dz_{1,t} - \sigma_s dz_{2,t},$$

Systematic risk of Social Security (1)

- Returns on PAYG contributions depend on growth rate of population and per-capita earnings (Samuelson (1958))
- For US Social Security, wage-indexation explicitly ties returns to the performance of the labor market
  - Tax cap follows wage index
  - Parameters of benefit function (bend points) scale up with the wage index

  → Before age 60, +1% to wage-index ⇒ +1% to all Social Security cash flows
- Long-run relationship between the labor and stock markets implies that Social Security participants are exposed to long-run systematic risk of the market portfolio (Geanakoplos and Zeldes (2010) and Catherine (2019))

Systematic risk of Social Security (2)

– Evolution of log wage-index

$$dl_{1,t} = \left((\phi - \kappa) y_t + \mu - \delta - \frac{\sigma_l^2}{2} \right) dt + \sigma_l dz_{1,t},$$

– Log stock market gains

$$ds_t = \left(\mu + \phi y_t - \frac{\sigma_s^2}{2} \right) dt + \sigma_s dz_{2,t},$$

– Log wage-to-stock gains ratio (detrended)

$$dy_t = -\kappa y_t + \sigma_l dz_{1,t} - \sigma_s dz_{2,t},$$

– Expected return of cash flow proportional to wage index in n years:

$$\mathrm{E}_t \left[r_t^{L_1,n} \right] = \beta_t^{L_1,n} (\mu - r) + r$$

$$\beta_t^{L_1,n} = \left(1 - \frac{\phi}{\kappa} \right) \left(1 - e^{-\kappa n} \right) \xrightarrow{n \to \infty} 0.5$$

Effects of different channels on log aggregate Social Security wealth

Decomposing the increase in Social Security wealth

	Valuation method	
	Risk-free	Risk-adjusted
Change in yield curve	0.847	0.805
Shift in age distribution	0.156	0.183
Life expectancy	0.120	0.121
Social Security exansion & other	0.286	0.302
Log total per capita	1.409	1.411
Population growth	.323	.323
Log total	1.732	1.734

Private valuation

- **Concern: Because Social Security is a non-tradable asset, it may be worth less to liquidity constrained households**

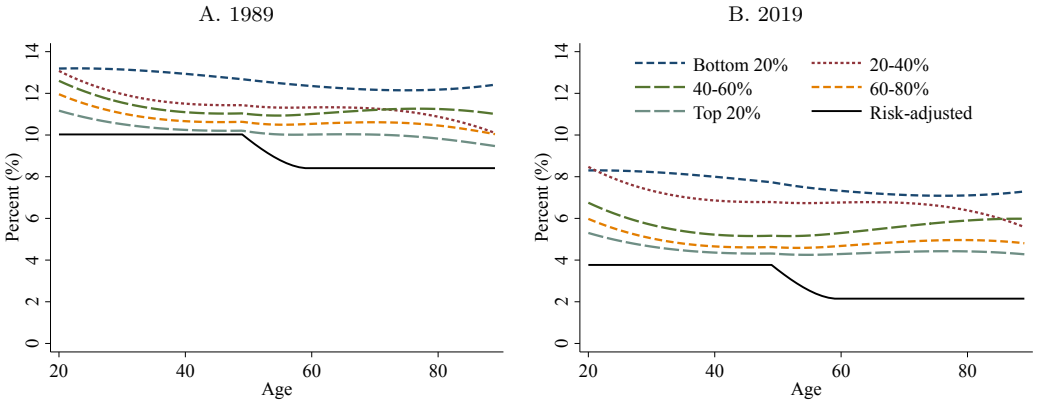
- **What we do: discount Social Security cash flow at household's cost of borrowing for constrained households**

  - Unconstrained := no debt, and, either more than $10,000 in liquid wealth or $50,000 in illiquid assets

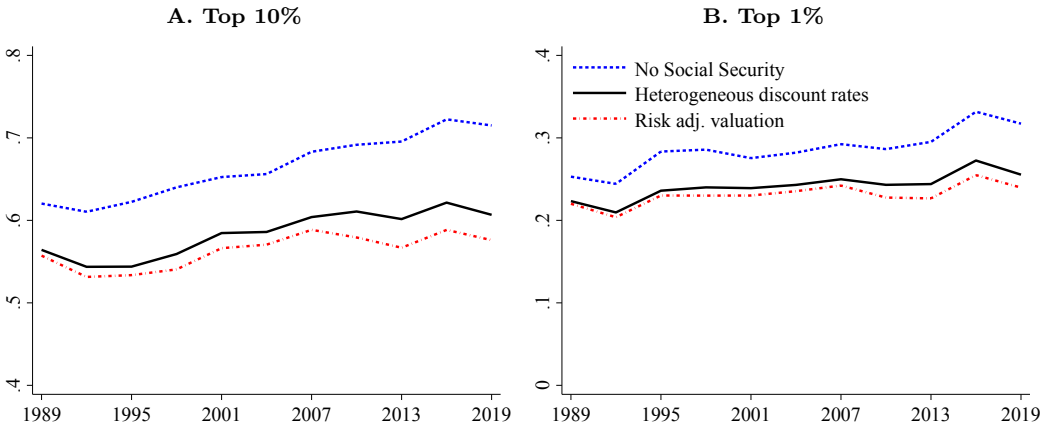
  - Cost of borrowing := risk-adjusted yield curve plus spread empirically observed on debts by earnings quintile, age and survey year

- Unconstrained households value Social Security at its fair present value

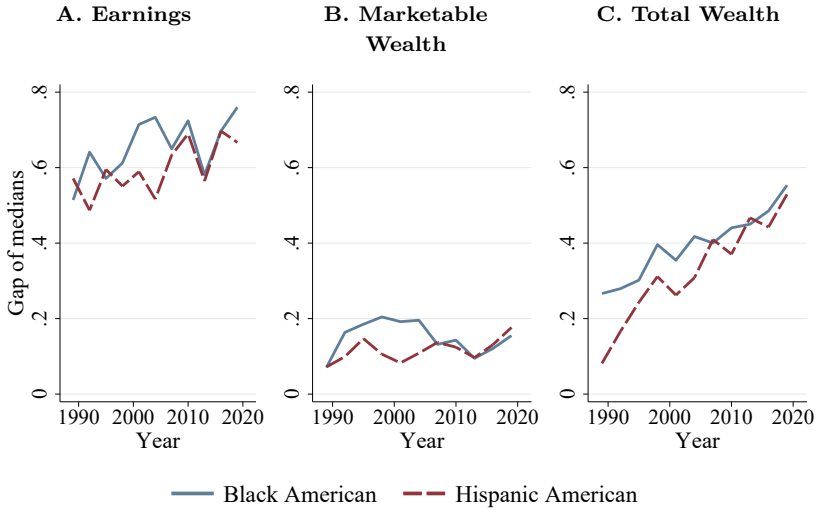
10-year yield under heterogeneous discounting



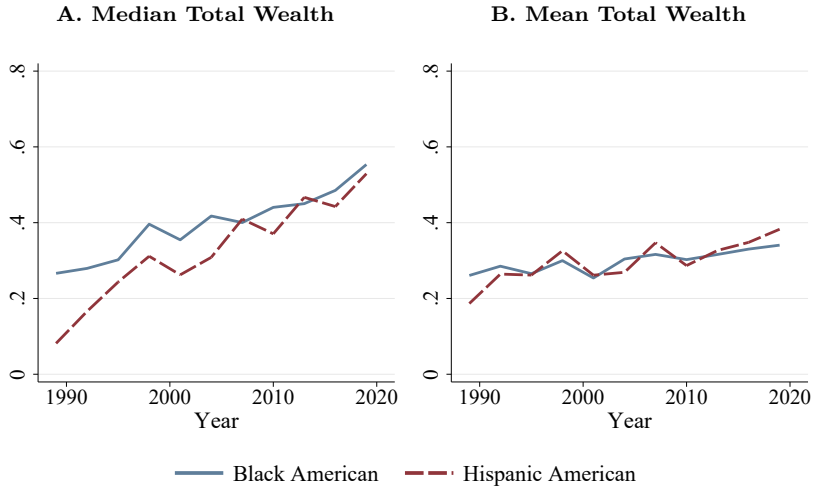
Top wealth share heterogeneous discounting



Social Security's equalizing effect



Gaps – Means vs. Medians



Middle class convergence