Abbott, B. and Gallipoli, G. (2019). Permanent-Income Inequality. Working Paper

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March 26, 2019

Overview of the Paper

- Literature on income inequality focuses on measurement and understanding the forces that shape differences in economic wellbeing of individuals.
- This paper takes a broad assessment of the concept of income inequality.
  - In Milton Freedman's **permanent income hypothesis**, individuals smooth their consumption over their lifetime conditional on their expected future earnings.
- For individuals the value of their future earnings is likely to be a strong determinant of their economic wellbeing.
  - A young person who expects a strong increase in future earnings is much better off than what can be inferred from their current wealth or income.

Overview of the Paper

- This paper looks to estimate pecuniary measures of both human capital and wealth to:
  1. Evaluate the change of wealth over the lifecycle.
  2. Evaluate the change in wealth since 1989 (U.S.).
  3. Explore the relationship between HH consumption and permanent-income.

- This is done through nonparametric estimation of a concept the authors refer to as **Human Wealth**.
  - Estimates are obtained by combining data from the Panel Study of Income Dynamics (PSID) and the Survey of Consumer Finances (SCF).

Human Wealth

- What is **human wealth**?
  - The value to individuals of their yet-to-be realized earnings.
  - Reflects the value of an individual's human capital.
    - A recent graduate may have low current wealth but high human capital, so therefore high yet-to-be realized earnings (human wealth).
- **Human wealth + current asset wealth = lifetime wealth**.
- The age-adjusted annuity value of lifetime wealth is the **permanent income**.

Valuation of Human Wealth

- Human Capital Value:
  - Equivalent to the price of a non-traded asset that pays dividends equal to an individual's income.
- An individual's valuation of the uncertain stream of earnings their human capital produces in the future is their **human wealth** θ_{it}.
- From a standard pricing formula:

$$\theta_{it} = \mathbb{E}_{it}\left[\beta \frac{u_c(c_{it+1}, v_{i+1t})}{u_c(c_{it}, v_{it})}(y_{it+1} + \theta_{it+1})\right]$$

Estimation of Human Wealth

- 1st step: nonparametric estimates are obtained for marginal utility functions and the discount factor β.
  - β represents state-dependent stochastic discounting.
    - Being credit constrained or facing high risk decreases the valuation of future earnings (human wealth).
    - β captures the losses from incomplete markets.
- 2nd step: nonparametric estimates of human wealth θ_{it}.

1st Step - MU and β Identification

- The intertemporal Euler equation can be written as:

$$u_c(q) = \beta \mathbb{E}\left[u_c\left(q'\right) R' | q\right]$$

- Replacing the expectations with an integral where utility is weighted by expected returns given Markov transitions between states:

$$u_c(q) - \beta \int u_c\left(q'\right) \psi\left(q, q'\right) dq' = 0$$

- This can be solved for MU given β, but we don't have β.
- Rewrite the integral as a sum and then solve the linear system:

$$\left(A u_c\right)(q) = \beta \int u_c\left(q'\right) \psi\left(q, q'\right) dq'$$

gives $\beta = 1/\rho(A)$, where $\rho(A)$ is the largest real eigenvalue of the linear operator A.

2nd Step - Human Wealth Identification

- Human wealth depends on the entire distribution of possible future outcomes, but this is not observed.
- Estimating the distribution of possible outcomes uses outcomes for individuals who are ex-ante the same regarding observed characteristics and unobserved types.
  - Identification relies on **conditional equivalence of expectations:**

$$\mathbb{E}_{it}\left[\beta\frac{u_c\left(q'\right)}{u_c(q)}\left(y'+\theta'\right)\right]=\mathbb{E}\left[\beta\frac{u_c\left(q'\right)}{u_c(q)}\left(y'+\theta'\right)|\mathbf{z}=\mathbf{z}_{it},j=j_{it}\right]$$

- If this holds we can write the human wealth equation as:

$$\theta(j,\mathbf{z})=\mathbb{E}\left[\beta\frac{u_c\left(q'\right)}{u_c(q)}\left(y'+\theta\left(j+1,\mathbf{z}'\right)\right)|\mathbf{z}\right]$$

and to solve for θ in a similar manner as step 1.

Estimation

- Estimation is done nonparametrically, using locally weighted average (Nadaray-Watson) estimator. Equation (1) can be estimated by using a linear estimator of the integral for expections:

$$\left(\hat{A}u_c\right)(q) = \sum_{i=1}^{N} \sum_{t \in \tau_\sigma(i)} u_c\left(q'_{it}\right) R'_{it} \phi_{it}(q)$$

giving a solution for MU and the stochastic discount factor:

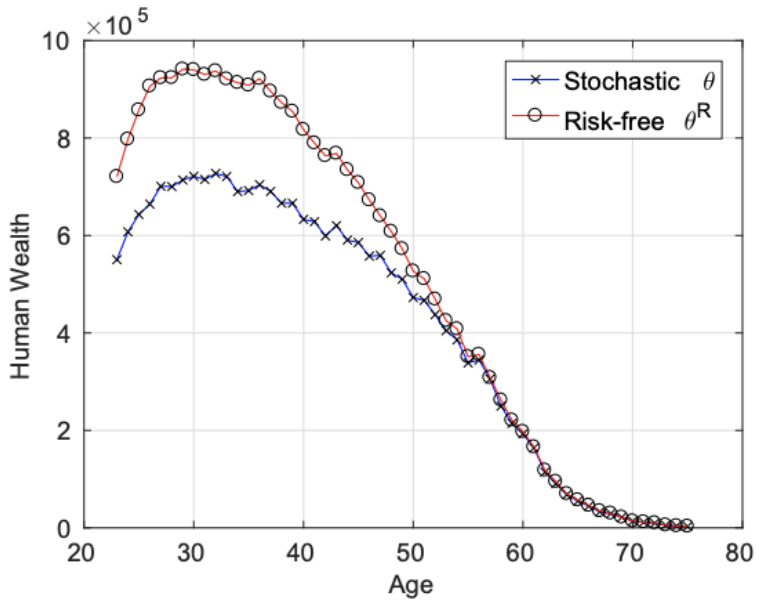
$$\hat{\beta} = \frac{1}{\lambda^*}, \quad \hat{u}_c(q) = \sum_{i=1}^{N} \sum_{t \in \tau_o(i)} b^*_{it} \phi_{it}(q)$$

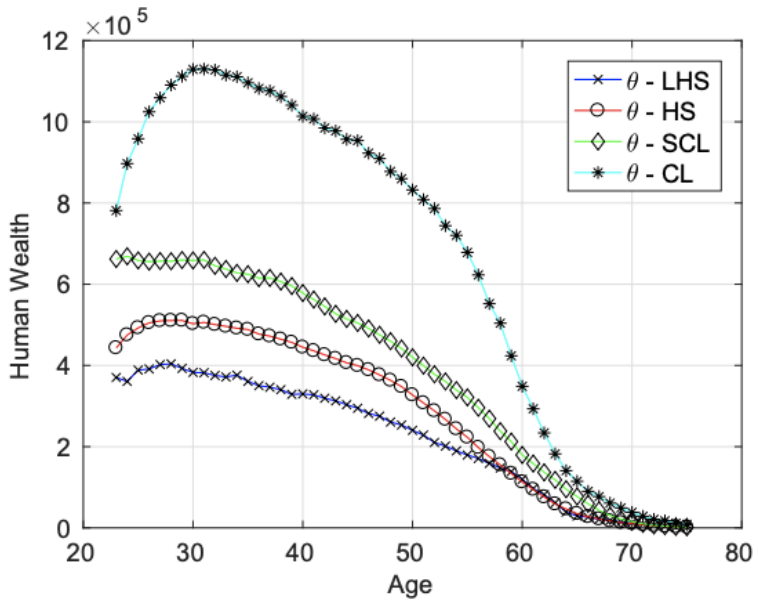
- Human wealth can be recovered after estimating:

$$\hat{g}(j, \mathbf{z}) = \sum_{i=1}^{N} \sum_{t \in \tau_o(i)} \hat{\beta}^t \frac{\hat{u}_c\left(q'_{it}\right)}{\hat{u}_c\left(q_{it}\right)} y'_{it} \gamma_{it}(\mathbf{z})$$

Results - Human Wealth Estimates

- Human wealth with the stochastic discount factor is compared to a risk-free discounted human wealth
  - The difference is the loss due to incomplete markets
- At the peak, college graduates hold twice as much human wealth as high-school graduates, and three times as much human wealth as high-school drop-outs.





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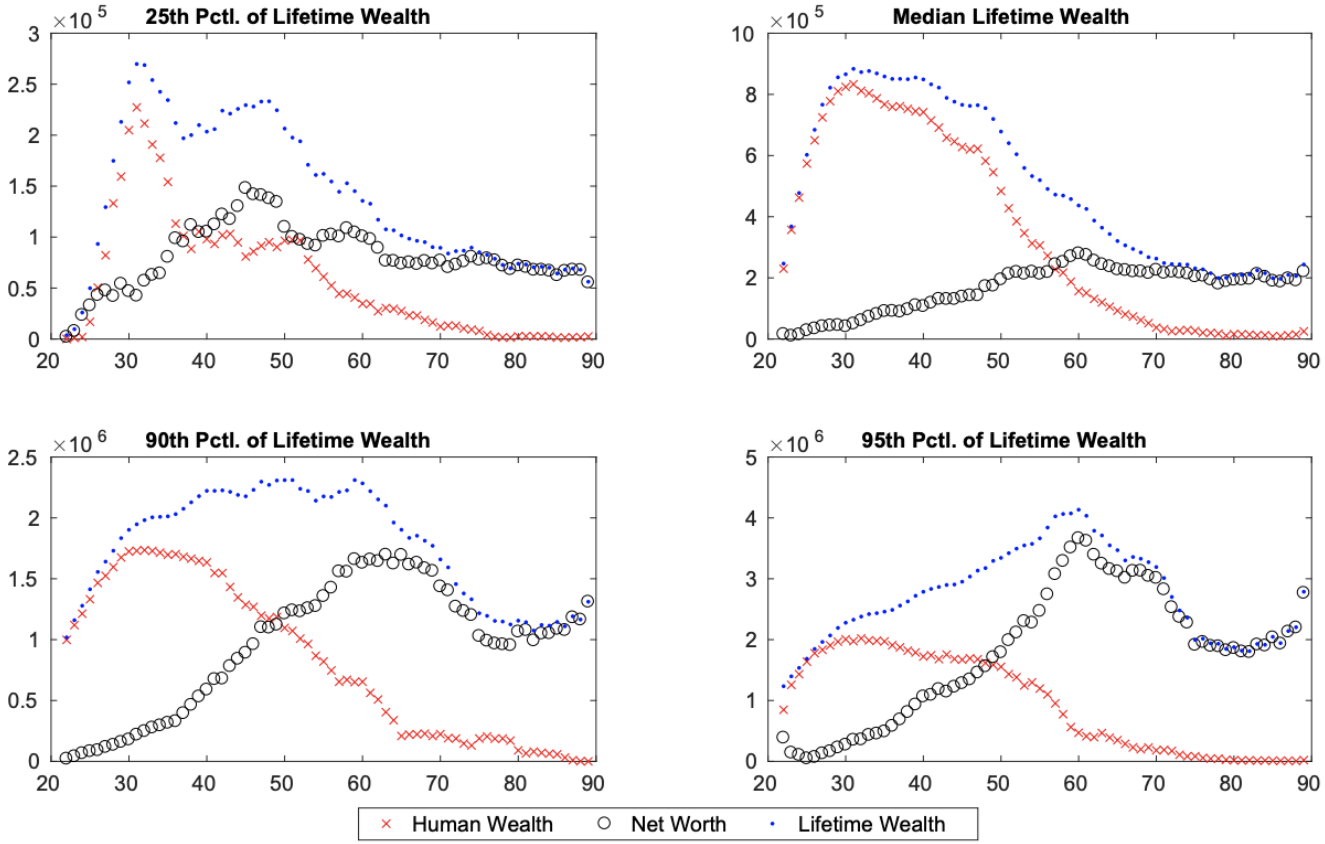
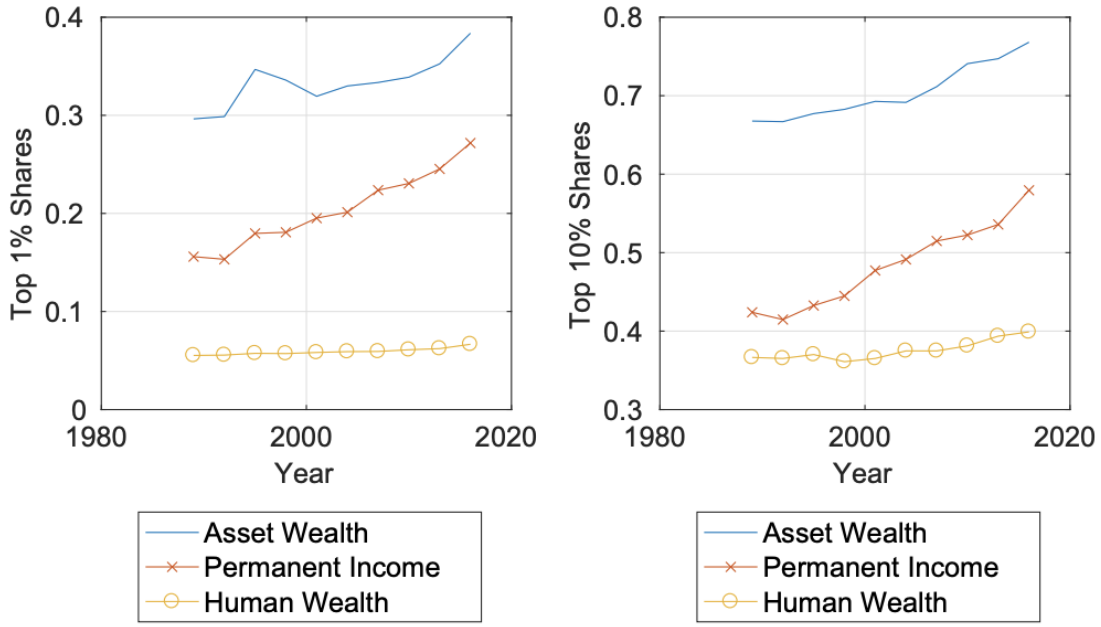
Results - Wealth over the Life-Cycle

- Lifetime wealth peaks early among poorer households.
  - Human wealth does not translate into equivalent amounts of net worth later in life - suggests luck plays a role.



Evolution of Inequality

- Since 1989 the pace of increase in concentration of permanent income towards the richest households has been twice as fast as the increase in the share of asset wealth.
  - **A prounounce growth in the share of asset wealth in household portfolios is the key driver of the sustained increase in permanent-income concentration.**



Conclusions

- Human wealth is less concentrated than net worth.
- Rich households have increased their share of permanent income over the past decades and this concentration has grown much faster than concentration of net worth.
- Effective inequality has increased more than previously thought, albeit from a lower initial level.
- The crucial driver in increasing wealth inequality is the growing value of assets as a share of lifetime wealth portfolios of the rich.
- High net worth households account for a larger share of total permanent-income in 2016 then they did in 1989.