Intergenerational Altruism, Fertility, and Welfare Across Countries and Time

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October 5, 2021

Motivation

- A good welfare measure is important for understanding:
  - → Inequality: differences in living standard across countries
  - → Growth: evolution of living standard over time
- GDPPC is an imperfect measure of welfare (Fleurbaey 2009)
- Existing work (Becker et al. 2005; Jones and Klenow 2016) focus on consumption, leisure, life expectancy, and inequality

This Paper

- This paper incorporates intergenerational altruism into welfare analysis
- Why intergenerational altruism?
  1. Crucial in explaining fertility and parents' spending on children
  2. Reveal constraints not shown in traditional measures
- As the degree of altruism increases in fertility (Barro and Becker 1989), large gaps in fertility $\Longrightarrow$ large variations in utility derived from altruism
- Incorporating altruism, I find that relative to existing metrics,
  1. The welfare of many developed countries is adjusted downward by 40%
  2. Cross-country convergence in the past few decades is much slower

The Model

- Jones and Klenow (2016):

$$\underbrace{U_i}_{\text{country } i\text{'s lifetime utility}} = \underbrace{e_i}_{\text{life expectancy}} \cdot \underbrace{u(\underbrace{C_i}_{\text{consumption}}, \underbrace{l_i}_{\text{leisure}}, \underbrace{\sigma_i}_{\text{inequality}})}_{\text{flow utility}}$$

- Barro and Becker (1989):

$$\underbrace{V_i}_{\text{parents' welfare}} = \underbrace{U_i}_{\text{parents' utility}} + \underbrace{\Psi(\underbrace{n_i}_{\text{fertility}})}_{\text{degree of altruism}} \cdot \underbrace{U_i'}_{\text{child's utility}}$$

- When parents expect $U_i' = U_i$,

$$V_i = \underbrace{\frac{1}{1-\Psi(n_i)} \cdot e_i}_{\textbf{altruism-adjusted life expectancy } (\tilde{e})} \cdot \underbrace{u(c_i, l_i)}_{\text{flow utility}} \tag{1}$$

Welfare Measure: Consumption Equivalence

- Denote factor λ as:

$$V_i(\lambda) = U_i(\lambda) + \Psi(n) \cdot \mathbb{E}U_i'(\lambda)$$
$$\text{where} \qquad U_i(\lambda) = e_i \cdot u(\lambda \cdot C_i, l_i, \sigma_i)$$

- The consumption equivalent λ_i for country i solves:

$$V_i(1) = V_{\text{U.S.}}(\lambda_i)$$

  Rawls is indifferent between living in country i and living in the U.S. with consumption scaled by λ_i

Decomposition

- Decomposition of welfare differences across countries / over time:

$$\log(\lambda_i) = \frac{\tilde{e}_t}{\tilde{e}_{\text{U.S.}}} \cdot \left(\overline{u} + \log C_i + v(l_i) - \frac{1}{2}\cdot\sigma_i^2\right) - \left(\overline{u} + \log C_{\text{U.S.}} + v(l_{\text{U.S.}}) - \frac{1}{2}\cdot\sigma_{\text{U.S.}}^2\right)$$

$$\overset{\text{decompose}}{=} \underbrace{\log(Y_i) - \log(Y_{\text{U.S.}})}_{\text{GDP per capita}} + \underbrace{\log(C_i/Y_i) - \log(C_{\text{U.S.}}/Y_{\text{U.S.}})}_{\text{consumption share}}$$

$$+ \underbrace{v(l_i) - v(l_{\text{U.S.}})}_{\text{leisure}} + \underbrace{\frac{1}{2}\cdot\left(\sigma_{\mathbb{U}}^2 - \sigma_{it}^2\right)}_{\text{inequality}} \tag{2}$$

$$+ \underbrace{\frac{\tilde{e}_i - \tilde{e}_{\text{U.S.}}}{\tilde{e}_{\text{U.S.}}} \cdot \left(\overline{u} + \log C_i + v(l_i) - \frac{1}{2}\cdot\sigma_i^2\right)}_{\text{altruism-adjusted life expectancy}}$$

- Key difference from Jones and Klenow (2016): $\tilde{e}_i$ rather than e_i in the life expectancy (LE) term

Calibration

- Flow utility:

$$\overline{u} + \log C - \frac{\theta\epsilon}{1+\epsilon}(1-l)^{\frac{1+\epsilon}{\epsilon}} - \frac{1}{2}\cdot\sigma^2$$

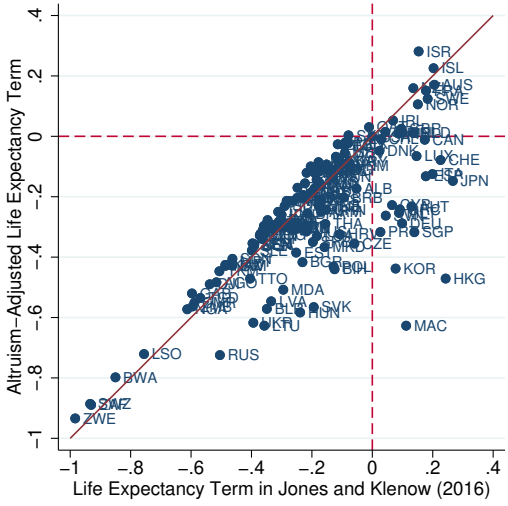
  where $\overline{u} = 5.23$, $\theta = 14.17$, and $\epsilon = 1$ following Jones and Klenow (2016)

- Intergenerational altruism, :

$$\Psi(n) = \psi \cdot \exp(-\rho \cdot n)$$

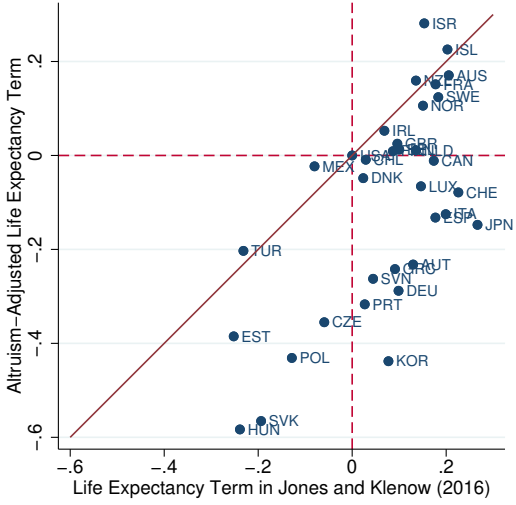
  where $\psi = 0.62, \rho = 1.85$ following Cordoba, Ripoll and Liu (2016)

Result 1: Welfare Across Countries in 2007



- Upward (downward) adjustment when total fertility rate is high (lower) than the U.S.
- Welfare of many countries is adjusted downward, and such adjustments are usually sizable because $\Psi(n)$ is concave

Result 1: Welfare of OECD Countries in 2007

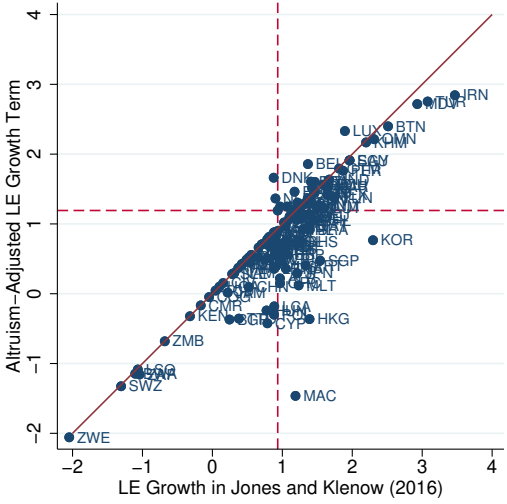


- Welfare of 19 countries is adjusted upward in Jones and Klenow (2016) due to higher life expectancy, but are adjusted downward with intergenerational altruism
- Example: Japan vs United States:

$$e_{\text{Japan}} = 82.5 > e_{\text{U.S.}} = 77.8$$
$$n_{\text{Japan}} = 1.34 < n_{\text{U.S.}} = 2.05$$

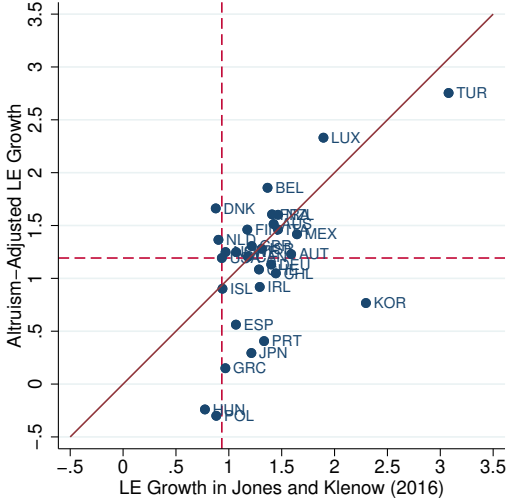
$$\text{LE}_{\text{Japan}} = 0.24 \gg -0.16 = \widetilde{\text{LE}}_{\text{Japan}}$$

Result 2: Welfare Growth from 1980-2007



- 112 out of 125 countries have $g < \tilde{g}$ due to lower fertility in demographic transition ($e \uparrow$ and $n \downarrow$)
- 69 countries have $g > g_{\text{U.S.}}$ in Jones and Klenow, but only 38 countries have $\tilde{g} > \tilde{g}_{\text{U.S.}}$

Result 2: Welfare Growth of OECD Countries from 1980-2007



- 29 (out of 34) countries have $g > g_{\text{U.S.}}$, but only 20 countries have $\tilde{g} > \tilde{g}_{\text{U.S.}}$ after considering fertility and intergenerational altruism
- Cross-country convergence of welfare might have been much slower than previously thought