

# Intergenerational Altruism, Fertility, and Welfare Across Countries and Time

*Preliminary and Incomplete*

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# 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  $\implies$  large variations in utility derived from altruism

# 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):

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

- When parents expect  $U'_i = U_i$ ,

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

# Welfare Measure: Consumption Equivalence

- Denote factor  $\lambda$  as:

$$V_i(\lambda) = U_i(\lambda) + \Psi(n) \cdot \mathbb{E}U'_i(\lambda)$$

$$\text{where} \quad U_i(\lambda) = e_i \cdot u(\lambda \cdot c_i, l_i, \sigma_i)$$

- The consumption equivalent  $\lambda_i$  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  $\lambda_i$

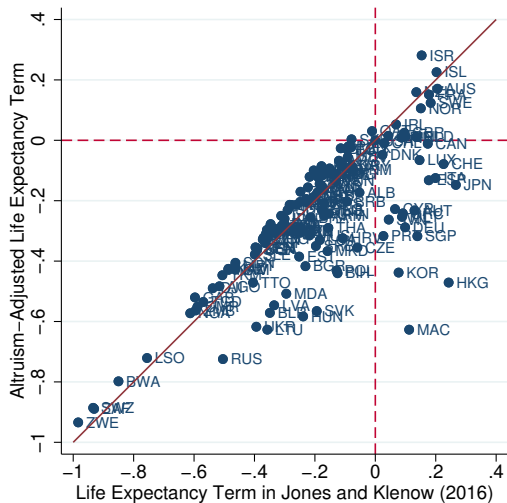
# Decomposition

- Decomposition of welfare differences across countries / over time:

$$\begin{aligned}
 \log(\lambda_i) &= \frac{\tilde{e}_t}{\tilde{e}_{\text{U.S.}}} \cdot \left( \bar{u} + \log C_i + v(l_i) - \frac{1}{2} \cdot \sigma_i^2 \right) - \left( \bar{u} + \log C_{\text{U.S.}} + v(l_{\text{U.S.}}) - \frac{1}{2} \cdot \sigma_{\text{U.S.}}^2 \right) \\
 &\stackrel{\text{decompose}}{=} \underbrace{\log(Y_i) - \log(Y_{\text{U.S.}})}_{\text{GDP per capita}} + \underbrace{\log(C_i/Y_i) - \log(C_{\text{U.S.}}/Y_{\text{U.S.}})}_{\text{consumption share}} \\
 &\quad + \underbrace{v(l_i) - v(l_{\text{U.S.}})}_{\text{leisure}} + \underbrace{\frac{1}{2} \cdot (\sigma_{\text{U}}^2 - \sigma_{it}^2)}_{\text{inequality}} \\
 &\quad + \underbrace{\frac{\tilde{e}_i - \tilde{e}_{\text{U.S.}}}{\tilde{e}_{\text{U.S.}}} \cdot \left( \bar{u} + \log C_i + v(l_i) - \frac{1}{2} \cdot \sigma_i^2 \right)}_{\text{altruism-adjusted life expectancy}}
 \end{aligned} \tag{2}$$

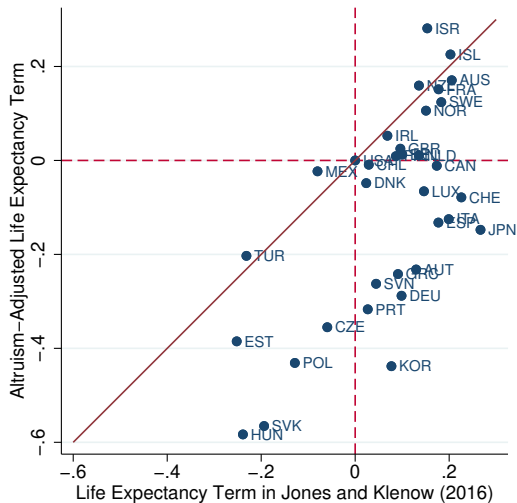
- Key difference from Jones and Klenow (2016):  $\tilde{e}_i$  rather than  $e_i$  in the life expectancy (LE) term

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

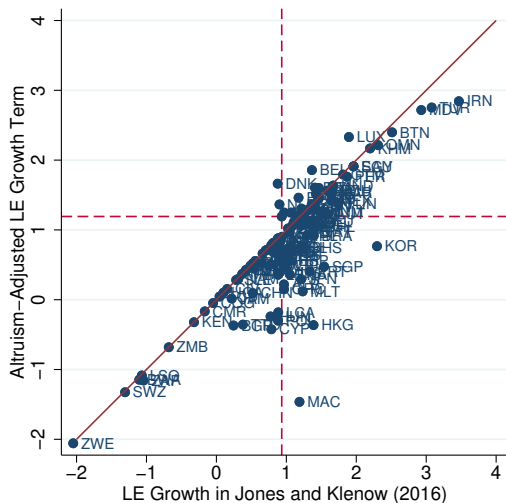
$$e_{\text{Japan}} = 82.5 > e_{\text{U.S.}} = 77.8$$

$$n_{\text{Japan}} = 1.34 < n_{\text{U.S.}} = 2.05$$

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

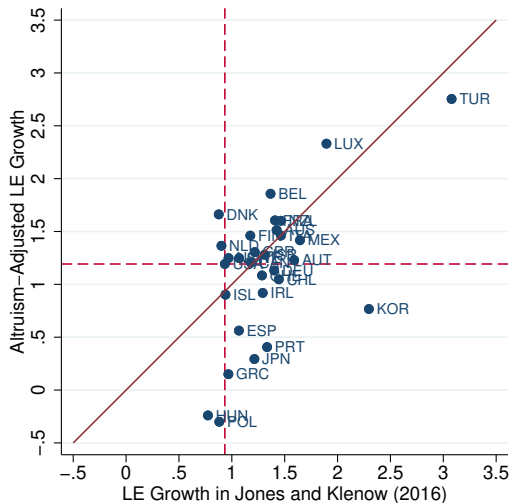


## Result 2: Welfare Growth from 1980-2007



- 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