

Cheap Children and the Persistence of Poverty

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Macro Student Seminar

Outline

- 1 Overview and Empirical Evidence
- 2 The Model
- 3 Solution

Overview

- Growth model with fertility choice
- Quality-quantity trade-off for children
- Comparative advantage for educated parents to educate their children
- Main result: two steady states (high fertility low education and low fertility high education)
- Extension with physical capital

Empirical Evidence

- Hanushek (1992): movements in family size can explain over half the variance in some test scores
- Lam and Dureyeva (1999): strong negative effect of women's schooling on fertility and positive effect of parental schooling on children's schooling
- Behrman et al. (1999): children with literate mothers study one hour more per day
- Ahituv (2001): cross country fertility distribution has twin-peak structure

Basic Structure

- Infinite discrete time OLG
- Single homogenous good, Input human capital, CRS technology
- Each period a generation of individuals is born (each with one parent)
- Individuals live two periods
 - Period 1: acquire human capital
 - Period 2: labor market participation and child rearing (1 unit of time)

Preferences

Preferences:

$$u_t^i = (1 - \beta) \log c_t^i + \beta (\log n_t^i + \theta \log wh_{t+1}^i)$$

- c_t^i : consumption
- n_t^i : number of children
- h_t^i : efficiency units of labor
- $\beta \in (0, 1)$: relative weight for children
- $\theta > 0$: relative weight for quality

Human capital technology

Education technology:

$$h_{t+1}^i = h(e_{t+1}^i)$$

with h_{t+1}^i strictly increasing, strictly concave and

$$h(0) = 1, \quad \lim_{e \rightarrow 0} h'(e^i) = \gamma$$

$$\lim_{e \rightarrow \infty} h(e_t^i) > 1/\tau\theta\gamma, \quad \lim_{e \rightarrow \infty} h'(e_t^i) = 0$$

Budget Constraint

Budget Constraint:

$$n_t^i w(\tau h_t^i + e_{t+1}^i) + c_t^i \leq wh_t^i$$

- τ : minimum time cost of raising a child
- $w\tau h_t^i$: opportunity cost of raising each child
- we_{t+1}^i : cost of quality of each child

Steady States

- Partial equilibrium - household decisions independent of each other
- CRS $\rightarrow w = P = 1$
- Looking for a steady state (fixed point) in household's education decision, i.e. $e^j = \phi(e^j)$

Optimization

- Consumption:

$$c_t^i = (1 - \beta)wh(e_t^i)$$

- Quality-quantity trade-off:

$$\frac{\theta h'(e_{t+1}^i)}{h(e_{t+1}^i)} - \frac{1}{\tau h(e_t^i) + e_{t+1}^i} \begin{cases} \leq 0 & \text{if } e_{t+1}^i = 0, \\ = 0 & \text{if } e_{t+1}^i > 0. \end{cases}$$

$$\frac{\partial U / \partial e_{t+1}^i}{\partial U / \partial n_t^i} \leq \frac{MC_e}{MC_n}$$

Results I: Education investment

Lemma 1: optimal policy function

$$e_{t+1}^i = \phi(e_t^i) \begin{cases} = 0 & \text{if } e_t^i \leq \hat{e}, \\ > 0 & \text{if } e_t^i > \hat{e}, \end{cases}$$

with $\phi'(e_t^i) > 0$ for $e_t^i > \hat{e}$ and \hat{e} unique, given by $1/\theta\gamma = \tau h(\hat{e})$

Results II: Number of children

Number of children:

$$n_t^i = n(e_t^i) = \begin{cases} \beta/\tau & \text{if } e_t^i \leq \hat{e}, \\ \beta h(e_t^i)/[\tau h(e_t^i) + \phi(e_t^i)] & \text{if } e_t^i > \hat{e} \end{cases}$$

with $\beta/\tau \geq \beta h(e_t^i)/[\tau h(e_t^i) + \phi(e_t^i)]$

Results III: Dynamic System

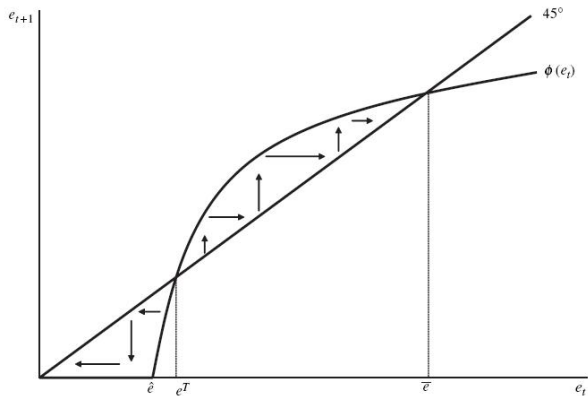


Fig. 1. *The Evolution of Education*

Policy Implications

- If average initial income and human capital above \hat{e} , then more equal distribution \rightarrow higher growth
- An increase in time cost of children $\tau \rightarrow$ higher relative cost of quantity \rightarrow more dynasties converge to high steady state
- Public Schooling: if $e_t^g > \phi(e_t^i)$ then positive effect on offspring's level of education, but reallocation of resources for increased fertility

Summary

- Growth model with quantity-quality trade-off
- Two steady states, high outcome and poverty trap
- Policies towards less children vs. current social system (long-run vs. short-run interests of poor)