

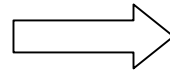
“Cheap Children and the Persistence of Poverty”

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INTRODUCTION

Theory of fertility and child educational choice



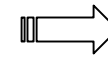
To explain persistence of poverty within and across countries

Evidence:

- Poor households

high fertility rates

low invest. education

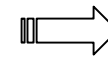


offspring are also poor

- High-income families

low fertility rates

high invest. education



offspring with high income

INTRODUCTION

Key assumption:

Individual's productivity as teachers increases with their own human capital.

Minimum time cost of raising a child regardless of the child's quality is not affected by parental education.

Result: $\frac{\textit{price of child quantity}}{\textit{price of child quality}}$ \uparrow *with individuals' wage*

INTRODUCTION: Value Added

- Simple model: dynasties within a country can converge to one of two equilibria.
 - Low education – high fertility
 - High education – low fertility
- Extended model: amplifies effect of quality choice on income per-capita capturing diluting effect of fertility on the accumulation of physical capital.
- Countries can converge to two different levels of income per capita.
 - Negative cross-country relationship between fertility-growth
 - Positive cross-country relationship between education-growth

INTRODUCTION: Value Added

Becker *et.al.*(1990)

- Representative agent model
- Trade-off between quantity and quality of their offspring
- Multiple steady states \implies return to education is lower in poor countries.
- Theoretical and empirical limitations:
 - Poverty trap equ. is a result of a market failure.
 - Fertility choices may amplify the negative impact of low education investment on income per capita, but they are not the source of multiple equilibria.
 - In poor economies all families eventually converge to a low-educational equilibrium.

INTRODUCTION: Value Added

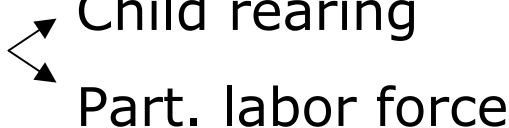
In this paper

- OLG model
- Multiple steady states \Rightarrow comparative advantage of educated workers in the production of educated children
- No restrictive assumptions.
- Correlation of education-income within a dynasty is testable.
- Educated individuals would invest highly in their offspring's education, even in poor countries.
- Poverty can persist in rich countries, and educated individuals can exist in the long run in poor countries.

Importance

- From the model we can have an explanation of a fact that we observe in many countries around the world: persistence of poverty with high fertility rates.
- Evaluation of policies.

Simple Model

- OLG model over infinite discrete time
- Single homogeneous good produced in the economy under CRS technology and using human capital.
- Individuals live 2 periods:
 - First: acquire human capital
 - Second: endowed with 1 unit time 

Simple Model

- Preferences:

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

where:

β : relative weight given to children (quantity and quality)

θ : relative weight given to child quality

n_t^i : number of children in a household

w : wage rate per efficiency unit of labor

h_{t+1}^i : level of human capital of each child; $h_{t+1}^i = h(e_{t+1}^i)$

e_{t+1}^i : level of investment in education of individual i at t .

c_t^i : consumption level

Simple Model

- Budget constraint:

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

where:

τ : min. time cost required for raising a child

wh_t^i : full income

we_{t+1}^i : real cost of investment in education (quality)

$w\tau h_t^i$: opp. cost of raising a child (cost of child quantity)

The cost of child quantity increases with h.

Simple Model

- Problem:
$$\text{Max } (1 - \beta) \log c_t^i + \beta (\log n_t^i + \theta \log wh_{t+1}^i)$$

$$s.t \begin{cases} n_t^i w (\tau h_t^i + e_{t+1}^i) + c_t^i \leq wh_t^i \\ h_{t+1}^i = h(e_{t+1}^i) \end{cases}$$

Choice variables: number and quality of children, and consumption.

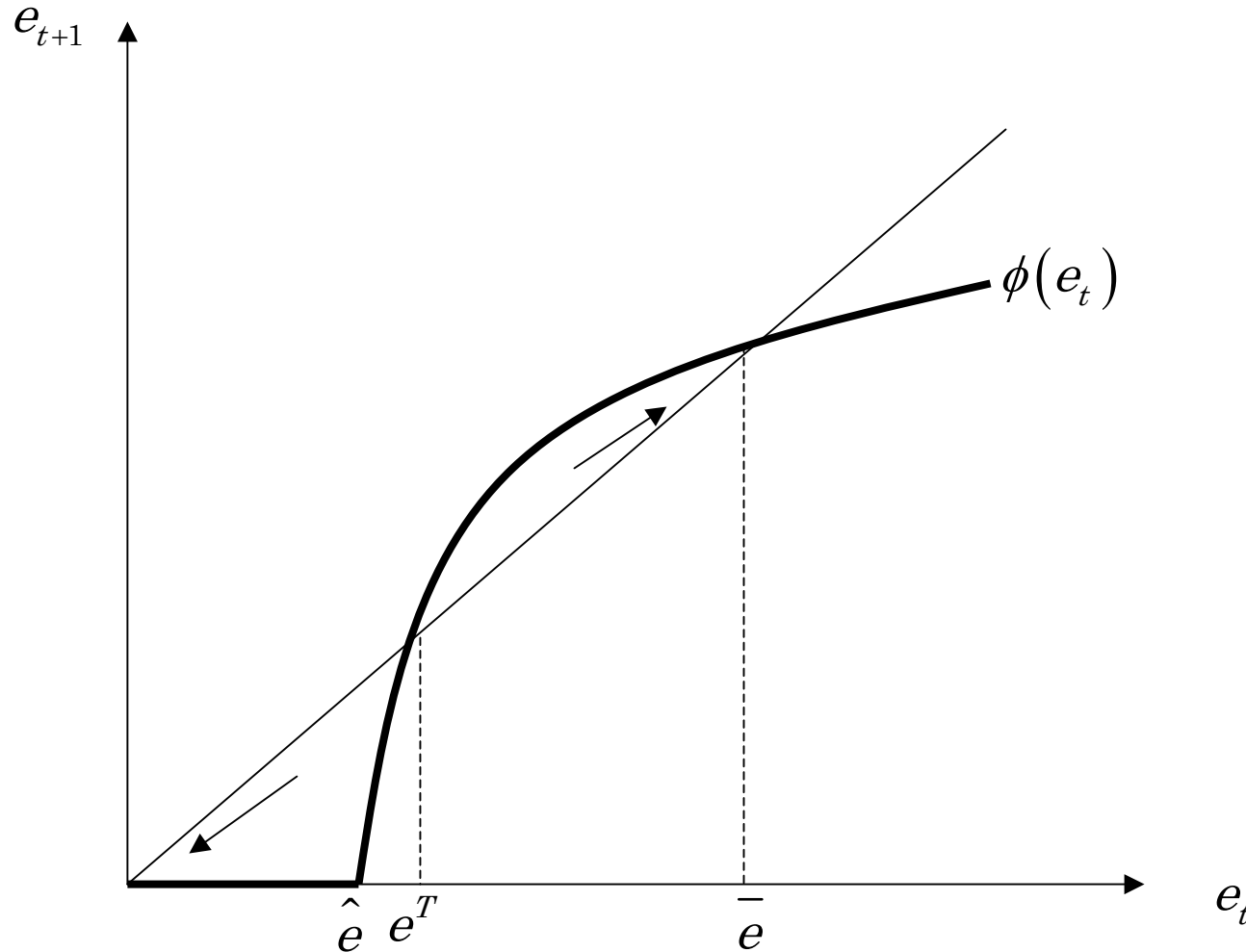
- Solution: $[c_t]: c_t^i = (1 - \beta) wh_t^i = (1 - \beta) wh(e_t^i)$

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

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

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

Dynamic System Simple Model



$e_0^i > e^T \Rightarrow$ convergence to high-education, high-income, and low fertility SS

Main Results Simple Model

- Lower parent's education \implies cheaper the children



parent's choice shifts to higher fertility rates



lower investment in offspring's human capital

- $\uparrow \tau$ (quantity cost) \implies \uparrow relative cost of quantity



move to child quality

Extended Model

- Introduce endogenous physical capital accumulation
 - ⇒ capture effect of fertility on capital per worker
 - ⇒ amplify effect of quality choice on econ. growth
- Explain cross-country income differences and club convergence.
- Allow bequeath capital to offspring
- 2 inputs: physical and human capital

$$Y_t = F(K_t, H_t) = H_t f(k_t) = H_t A k_t^\alpha$$

$$w(k_t) = (1 - \alpha) A k_t^\alpha$$

$$r(k_t) = \alpha A k_t^{\alpha-1}$$

Extended Model

- Problem:
$$\text{Max } (1 - \beta) \log c_t + \beta \left(\log n_t + \log (w_{t+1} h_{t+1} + r_{t+1} s_{t+1}) \right)$$

$$s.t. \begin{cases} n_t (w_t \tau h_t + w_t e_{t+1} + s_{t+1}) + c_t \leq w_t h_t + r_t s_t \\ h_{t+1} = h(e_{t+1}) \end{cases}$$

Choice variables: number and quality of children, consumption, and quantity of physical capital transferred to each child.

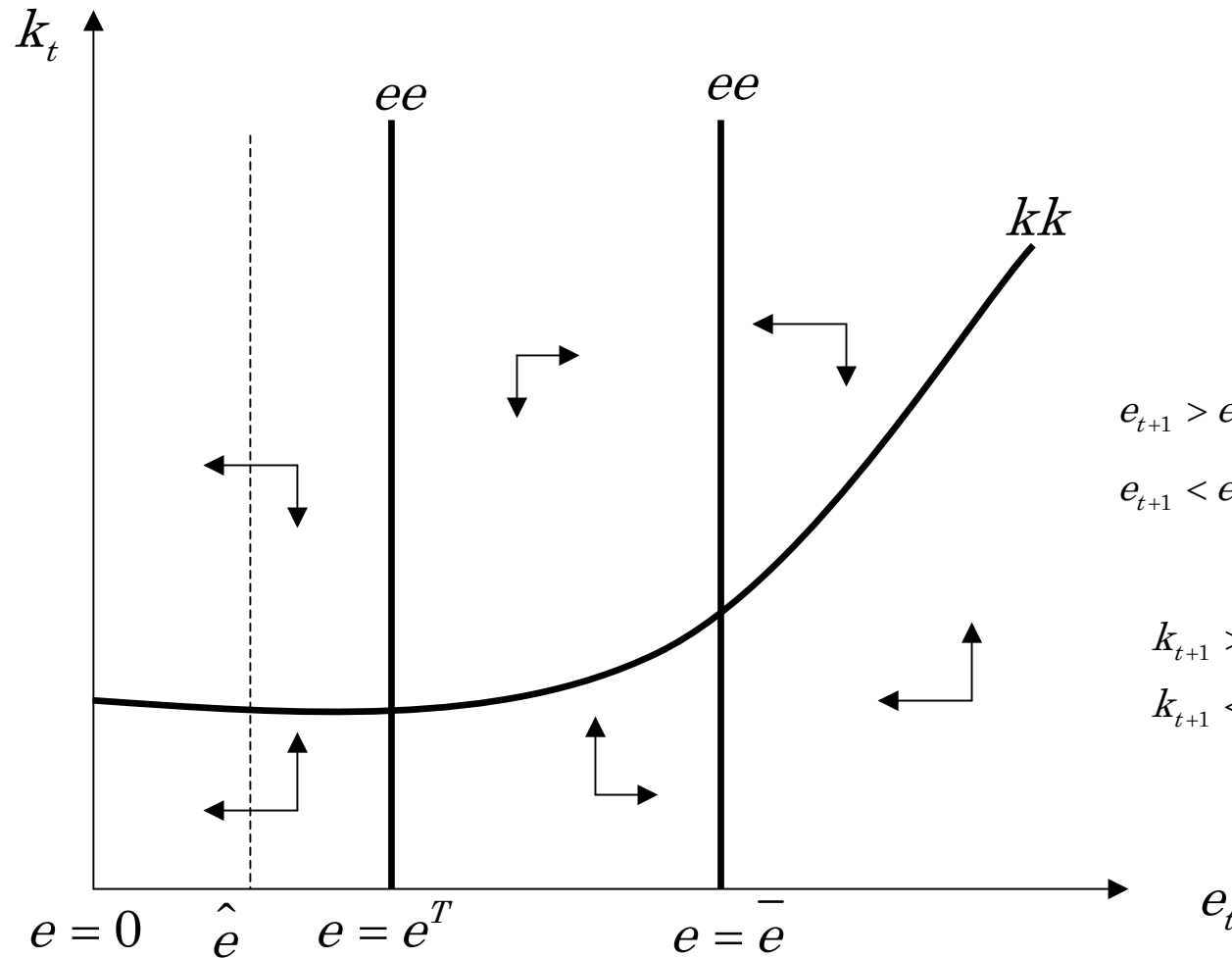
- Solution:

$$[c_t]: c_t = (1 - \beta)(w_t h_t + r_t s_t)$$

$$[s_{t+1}]: \frac{h(e_{t+1}) w_{t+1}}{(\tau h_t + e_{t+1}) w_t} - r_{t+1} \begin{cases} > 0 \text{ if } s_{t+1} = 0 \\ = 0 \text{ if } s_{t+1} \in [0, \infty) \\ < 0 \text{ if } s_{t+1} \rightarrow \infty \end{cases}$$

$$[e_{t+1}]: \frac{h(e_{t+1})}{\tau h_t + e_{t+1}} - h'(e_{t+1}) \begin{cases} \geq 0 \text{ if } e_{t+1} = 0 \\ = 0 \text{ if } e_{t+1} > 0 \end{cases}$$

Dynamic System Extended Model



$$e_{t+1} > e_t \quad \forall e_t \in (e^T, \bar{e})$$

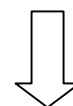
$$e_{t+1} < e_t \quad \forall e_t < e^T \text{ and } e_t > \bar{e}$$

$$k_{t+1} > k_t \quad \forall k_t < k^{SS}(e_t)$$

$$k_{t+1} < k_t \quad \forall k_t > k^{SS}(e_t)$$

Main Results Extended Model

- Lower parent's education \implies cheaper the children

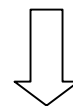


parent's choice shifts to higher fertility rates



amplified reallocation from child quality to quantity

- $\uparrow \tau$ (quantity cost) \implies \uparrow relative cost of quantity



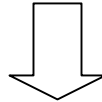
move to child quality (amplified by the diluting effect on physical capital).

Conclusions and Implications

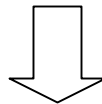
- Model offers explanation for the persistence of poverty consistent with the relationship fertility-education, and the cross-country relationship fertility-education-economic growth.
- Generation of multiple steady states based on the trade-off between child quality and quantity without imposing restrictive assumptions.
- Poor countries fail to catch up with the rich because of insufficient progress in education due to high fertility rates.

Conclusions and Implications

- Dynamic system generates a poverty trap along with a high-income equilibrium.



poor (rich) dynasties with income below (above) a threshold level converge to the low-income (high-income) steady state.

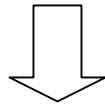


if initial average income in society is above the threshold, then in a more equal society, more individuals are above the threshold and more dynasties converge to the high SS

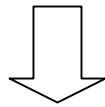
- Inequality affects economic growth negatively via its interaction with fertility choice.

Conclusions and Implications

- An increase in the cost of quantity induces a reallocation of resources to child quality.



this would positively affect economic growth and could release an economy from the poverty-trap.



it can be achieved through canceling or reversing policies that reduce child quantity cost (i.e. tax discount for large families, child allowances, subsidized day care and meals, and unregulated child labor) and reallocate them to the financing of schools.

Thank you