



Max Planck Institute for Demographic Research

**David de la Croix and Axel Gosseries,
“The Natalist Bias of Pollution Control”**

Discussant: Miguel Sanchez-Romero, MPIDR,

Workshop on “Optimal Fertility in Ageing Societies”, December 10th, 2010 (VID)

Research Question

Could pollution caps impoverish today's poor?

- ▶ Historical pollution, S^*
- ▶ Constant pollution cap, E^*
- ▶ Per capita pollution emission, $q^* = E_t/N_t$



Relevance

- ▶ Future agreement for developing countries
- ▶ Current agreement for developed countries



Summary

Economic model

- ▶ World represented by homogeneous economies (probably less developed countries?)
 - heterogeneity within households (2 generations, children and working adults)
 - homogenous households
- ▶ Provided an initial stock of human capital, each economy decides consumption, leisure, number of children, and bequests (human capital for the next generation).
- ▶ Tradable pollution right system, similar to the Kyoto Protocol

$$y_t \geq c_t + n_t b_t + p_t (y_t - q_t), \text{ with } p_t, q_t \geq 0.$$

Important assumptions

- ▶ Non selfish individuals (quantity-quality tradeoff!!) \Rightarrow necessary condition for $n > 0$
- ▶ Children do not pollute.
- ▶ Only investment in physical capital (human capital) pollutes.
- ▶ Population become stationary in the long run.



Main Results and Intuition

Main Result

A reduction in pollution emissions leads to a lower investment in human capital

$$\frac{\partial k_{t+1}}{\partial q_t} = \underbrace{\frac{\partial k_{t+1}}{\partial b_t}}_{>0} \underbrace{\frac{\partial b_t}{\partial p_t}}_{<0} \underbrace{\frac{\partial p_t}{\partial q_t}}_{<0} > 0$$

The substitution effect is greater than the income effect

$$\frac{dn_t}{dq_t} = \underbrace{\frac{\partial n_t}{\partial q_t} \Big|_{p>0}}_{>0} + \underbrace{\frac{\partial n_t}{\partial p_t}}_{>0} \underbrace{\frac{\partial p_t}{\partial q_t}}_{<0} < 0, \left(\text{KEY!! } \frac{\partial n_t}{\partial p_t} > 0 \right)$$

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Intuition

- ▶ When $p > 0$, more stringent pollution caps, ∇q , lead households to move from production functions to invest more in leisure and in having children.



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Intuition

- ▶ When $p > 0$, more stringent pollution caps, ∇q , lead households to move from production functions to invest more in leisure and in having children.
- ▶ Because production is reduced, the opportunity costs of leisure and childbearing is reduced. Therefore, it is optimal for households to invest in leisure and number of children.



Comments

“The results rest on two assumptions:”

- ▶ “Only physical capital good production generates pollution”
- ▶ “Children do not consume physical goods”



Extensions



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- ▶ Alternative degrees of altruism
- ▶ Allow for non-stationary populations ($\dot{n} \neq 0$).



THANK YOU.

