# Inside the intergenerational inequality black box

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# Motivation (I)

- Persistent inequality; large intergenerational persistence of income differences; low intergenerational income mobility
- Knowledge of IIM in LAC limited by the data
- Is the available data useful in any sense ?
- Low IIM whenever current and past wealth are highly associated
- Then, the elasticity of adult income with respect to the human capital accumulated and physical capital inherited must play a role here
- A model of human and physical capital accumulation might tells us something about IIM, and allow us to estimate it using alternative data sources

# Motivation (II)

Intergenerational mobility across families within a country is similar to intergenerational mobility across countries and regions

$$\log Y_j^i = \log \Phi + \beta \log Y_{j-1}^i + z_j^i$$

$$z_j^i \approx N\left(0, \sigma^2\right)$$

Mulligan (1997) $\beta \in [0.6, 0.71]$

Barro & Sala i Martín (1992) $\log Y_t^i = \phi + \exp(-0.0175) \log Y_{t-1}^i + u_t^i$

Mulligan (1997) $\beta = \exp(-0.0175 * 25) \cong 0.65$

# Outline

- A macro model is introduced to study intergenerational inequality across economies
- Family decisions; physical capital inheritances and human capital investments: main determinants of income
- Key parameters determining IIM are identified
- Application to the US case
- Tentative values are applied for groups of economies OECD, South East Asia, and Latin America
- Next steps: this project

# Model: one parent- one child family

$$u(c_j, q_{j+1}, a_{j+1}) = \log c_j + \log q_{j+1} + \theta \log a_{j+1}$$ Parental preferences

$$y_j = B_j (h_j l_j)^{1-\alpha} k_j^{\alpha}$$ Technolgy for goods production

$$B_j = \exp(z_j), \quad z_j \approx N(0, \sigma^2)$$ Stochastic process for productivity

$$h_j = q_j, \quad k_{j+1} = a_{j+1}, \quad all\ j \geq 0$$ Law of capital accumulation

$$q_{j+1} = (x_{j+1})^{\gamma} (1 - l_j)^{1-\gamma}$$ Household production of child quality

$$c_j + x_{j+1} + a_{j+1} = y_j$$ Budget constraint

# Equilibrium: definition

An equilibrium in this economy is a set of feasible sequences of adult consumption $\{c_j^*\}_{j=0}^{\infty}$ , child consumption $\{x_{j+1}^*\}_{j=0}^{\infty}$, bequests $\{a_{j+1}^*\}_{j=0}^{\infty}$, parental labor supplied to the market $\{l_j^*\}_{j=0}^{\infty}$ , child quality $\{q_{j+1}^*\}_{j=0}^{\infty}$, physical capital stock $\{k_j^*\}_{j=0}^{\infty}$, and an initial $k_0$ , such that: 1.- $c_j^*,\ x_{j+1}^*,\ a_{j+1}^*,$ and $l_j^*,$ are the optimal choices for an adult who begins with capital stock $k_j^*,$

2.- the quality of its child is determined by $q_{j+1}^* = \left(x_{j+1}^*\right)^{\gamma}\left(1-l_j^*\right)^{1-\gamma}$

And 3.- $k_{j+1}^* = a_{j+1}^* \ all\ j \geq 0$

# Equilibrium conditions (I)

First order condition for time allocation is

$$\left[\gamma\left(1-l_j\right)\right]^{-1}\left(1-\gamma\right)x_{j+1}=PM_L$$

The rest of the first order conditions imply

$$c_j=\left(1+\theta+\gamma\right)^{-1}y_j$$

$$x_{j+1}=\gamma\left(1+\theta+\gamma\right)^{-1}y_j$$

$$a_{j+1}=\theta\left(1+\theta+\gamma\right)^{-1}y_j$$

$$l=\left[\left(1-\gamma\right)+\left(1-\alpha\right)\left(1+\theta+\gamma\right)\right]^{-1}\left(1-\alpha\right)\left(1+\theta+\gamma\right)$$

# Equilibrium conditions (II)

Then child quality is given by

$$q_{j+1} = \Omega\, y_j^{\gamma}$$

Then income in one generation is linked to income in the previous one

$$y_{j+1} = \Lambda y_j^{\gamma(1-\alpha)+\alpha}$$

or

$$\log y_j = \log \Lambda + [\gamma(1-\alpha)+\alpha] \log y_{j-1} + z_j$$

Then model without human capital yields

$$\log y_j = \log \Theta + \alpha \log y_{j-1} + z_j$$

# Measures of IIM (I)

From the f.o.c, child consumption and time in human capital accumulation are chosen so that the following equation holds

$$\frac{x}{MP_L(1-l)+x}=\gamma$$

From Haveman and Wolfe (1995)

| Values of $\gamma$ | | |
|---|---|---|
| $x$ | low $1-l$ | high $1-l$ |
| Food only | 0.47 | 0.27 |
| Food + other goods | 0.73 | 0.54 |
| Total consumption | 0.82 | 0.65 |

# Measures of IIM (II)

| $\beta$ values for the US | |
|---|---|
| | $\alpha = 0.4$ |
| $\gamma = 0.27$ | 0.56 |
| $\gamma = 0.54$ | 0.72 |

# Measures of IIM (III)

| $\beta$ elsewhere | | | | |
|---|---|---|---|---|
| | OECD | G7 | SEA | LATAM |
| | $\alpha = 0.4$ | $\alpha = 0.41$ | $\alpha = 0.38$ | $\alpha = 0.58$ |
| $\gamma = 0.27$ | 0.56 | 0.57 | 0.54 | 0.69 |
| $\gamma = 0.54$ | 0.72 | 0.73 | 0.71 | 0.81 |

# Next steps: this project

- Introduce a government; analyze policy: supply and demand issues, how is the measure of persistence affected ?
  - Restuccia and Urrutia (AER, 2004); by calibrating a QGEM address this issue for an US-like society

- Use *micro* data to estimate the key parameters of the model- either by studying the distribution of the parameters values or by estimating expenditures a là Haveman & Wolfe

- Get measures of IIM by country, and identify policy options

# The End

Thank you