

Economic Approach to Intergenerational Mobility: Measures, Methods, and Challenges in Developing Countries

M. Shahe Emran

Forhad Shilpi

October 5, 2022

UNU-WIDER Conference: Reducing inequality – the great challenge of our time

Intergenerational Mobility: An underdeveloped area of Development Economics

- Intergenerational mobility is an under-researched area in development economics. Curious, given the focus on poverty and inequality
- Leading textbooks such as Ray (1998), Schaffner (2014), and Todaro and Smith (2014) devote full chapter(s) on inequality, but no discussion on intergenerational mobility
- Interest in the recent literature: partly because of the increase in inequality after liberalization. Evidence on China: IGE of income is higher for the younger cohorts (Fan et al. (2019)).
- Most of the literature on developing countries follow closely the literature on developed countries in terms of measures and methods used

Measuring economic status with limited data

- Literature on Developed Countries: Permanent income as the most informative measure of economic status. Many years of high-quality income data are required to estimate permanent income (measurement error and life-cycle bias)
- In Developing Countries, income data is limited. Most surveys have only one year of income data. Estimating household and individual income is challenging: informal sector, home-based activities, extended family, fuzzy property rights
- Limited number of studies use income as the measure of economic status. Two examples: Mohammed (2019) on rural India (single-year income data) and Fan et al. (2019) on China (average of 4 years)
- Attenuation Bias: compare with estimates of IGE from USA.
- Mohammed (2019, Labor Economics): $IGE = 0.30$ (Solon (1992): 0.30 with single-year income data)
- Fan et al. (2019, AJE: Policy, forthcoming) : $IGE=0.390$ (older cohorts) and 0.442 (younger cohorts); Solon (1992): 0.41 with 5 years income data

Measuring economic status without (good) income data

- Almost all the surveys (LSMS, DHS, etc.) collect data on education and occupation at the individual level
- Education is the most widely-used indicator of economic status in developing countries. to a lesser extent occupation is used
- Two separate sub-stands: intergenerational educational mobility and intergenerational occupational mobility.
- When there are multiple indicators of economic status: two methodological issues arise:
 - How to combine them?
 - Are there interaction effects? For example, does intergenerational educational mobility depend on parent's occupation (say, farm vs. Nonfarm)

Aggregation and Interaction (Heterogeneity)

- Principal Components? DHS Wealth Index.
 - No correlation between the measurement errors in different indicators
 - Difficult to give economic interpretation to the linear weights
 - Maximum explained variance. But does not minimize the attenuation bias due to measurement error
- Alternative approach developed by Lubotsky and Wittenberg (2006, Re Stat): Focus on how to minimize the attenuation bias
 - No “index”. Use different indicators separately and the combined effect is a weighted average of the OLS coefficients.
 - The weights are calculated by an IV-like procedure to minimize the attenuation bias (without external instruments)
 - 3 papers so far, one on developing countries (Neidhofer et al. 2018, JDE)

Interaction: Heterogeneous effects (later)

Measures of Mobility in a world of limited data

- Three measures of Relative Mobility (slope coefficients)

- IGRC :

$$E_i^c = \beta_0 + \beta_1 E_i^p + \Pi X_i + \varepsilon_i$$

- IGC

$$\frac{E_i^c}{\sigma_{Ec}} = \rho_0 + \rho_1 \frac{E_i^p}{\sigma_{Ep}} + \Pi X_i + \epsilon_i$$

- IRC

$$R_i^c = \delta_0 + \delta_1 R_i^p + \Pi X_i + v_i$$

- Most widely used in developing countries is IGRC.
- Conflicting conclusions based on IGRC and IGC

Which measures of Relative Mobility are better?

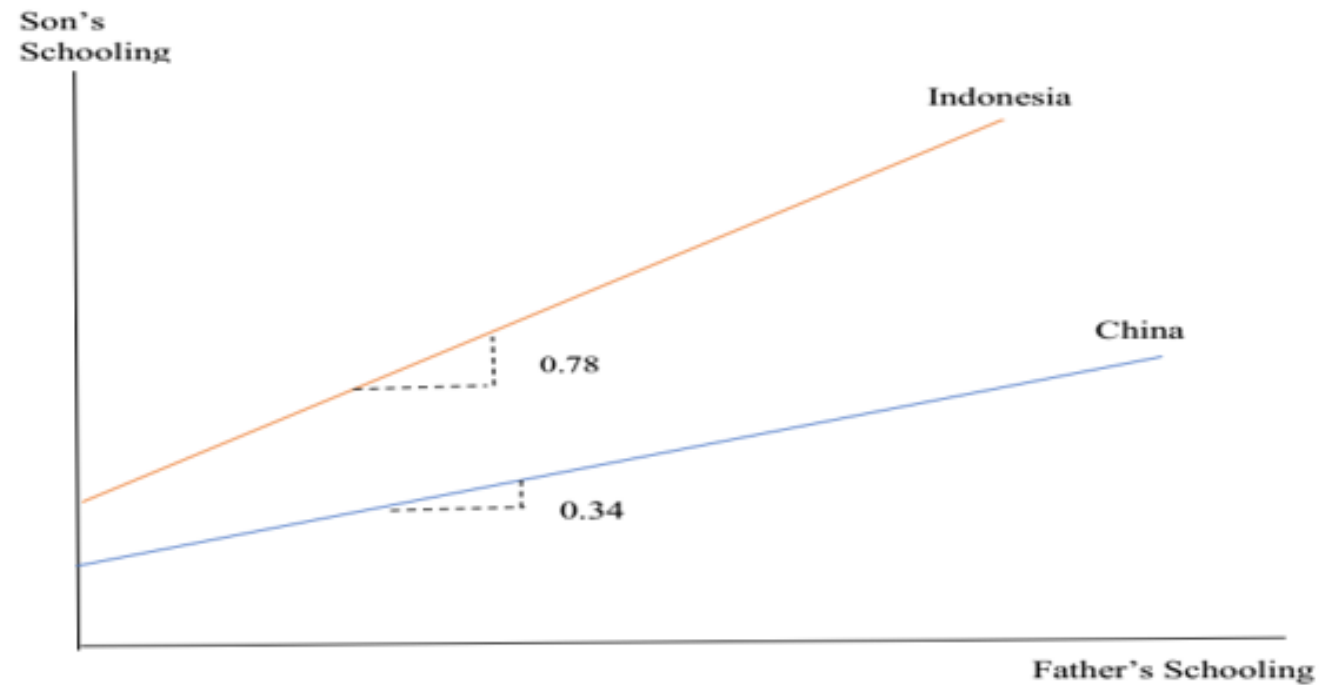
- Measurement Error:
 - Evidence on the effects of measurement error in the context of intergenerational income mobility in Sweden: IRC is the least affected by attenuation bias (Nybom and Stuhler, 2017, JHR)
 - Not aware of similar evidence on education and occupation, especially in developing countries. Implicit assumption in the current literature: measurement error is not a first-order issue
- Coresidency Bias:
 - Evidence using education data from India and Bangladesh (Emran, Greene and Shilpi, 2018, JHR), and Emran and Shilpi (2018). IGRC the most widely-used measure is severely biased downward, the bias in IGC and IRC is much smaller and comparable
 - Bangladesh data: IGRC bias 29 percent, IGRC/IRC about 8 percent.
 - Evidence by Moahmmed (2019) for income in rural India: Estimate for coresident sample biased upward. Data differences and nonresident parents vs. nonresident children.

Understanding Heterogeneity: Inter-group, Spatial (Cross-Country, Cross-region), and Intertemporal (Cohorts)

- Relative Mobility measures are based on the slopes (IGRC, IGC, and IRC) and can be misleading when analyzing heterogeneity
- To see this, consider the estimates of IGRC for education in China and Indonesia reported by Hertz et al. (2007): China= 0.34 and Indonesia=0.78
- Do the children in China enjoy better educational opportunities? Depends on the intercept
- See Figures 1 and 2

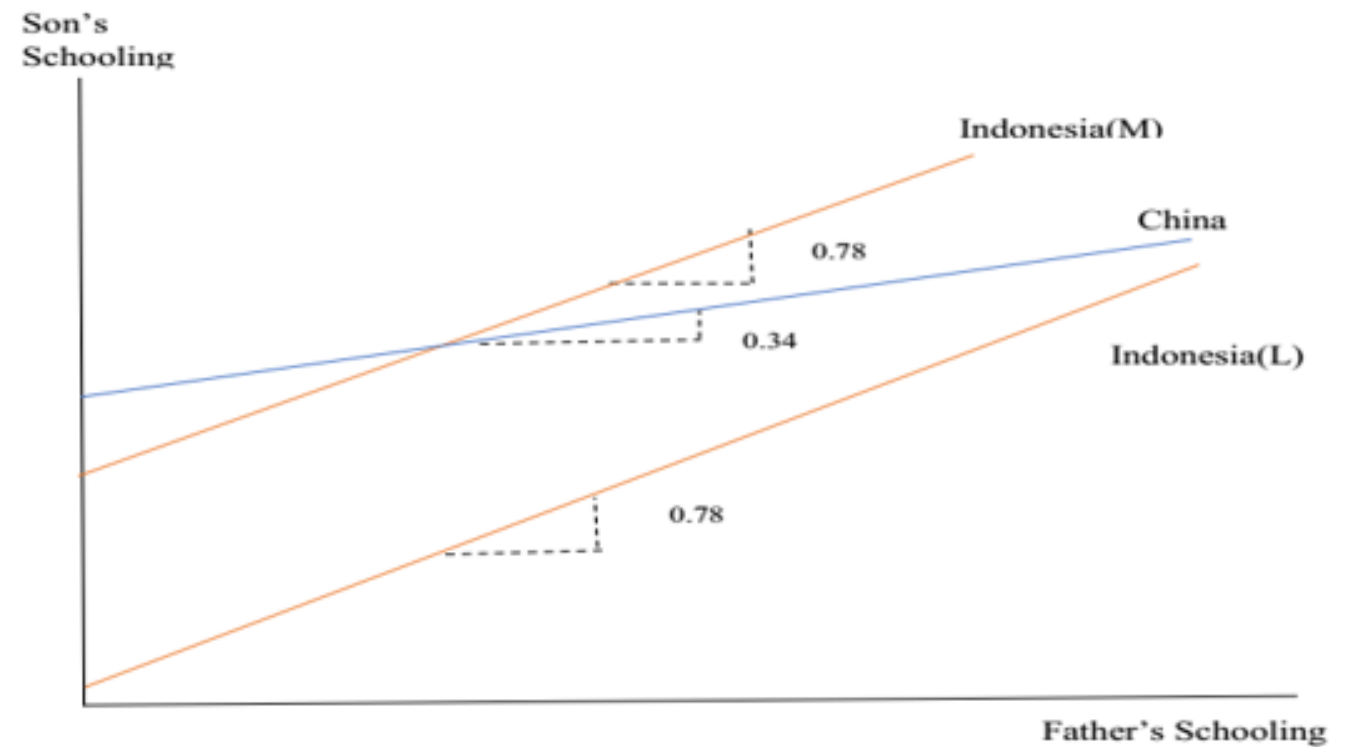
China vs. Indonesia: Educational Mobility

Figure 1



China vs. Indonesia: Educational Mobility

Figure 2



Intercepts and limited Data

- So, we need the intercept estimates (very few studies report the intercepts)
- Measurement Error: Econometric theory tells us that we should expect the intercept estimate to be biased upward but by how much? Not aware of any evidence.
- Coresidency and Sample Truncation: Again, the intercept estimate is biased upward, but different measures are affected differently. Emran and Shilpi (2018) on educational mobility in India and Bangladesh: The highest bias is found in the intercept estimate of IGC regression, the lowest in Rank-Rank regression.
- No similar evidence on income or other indicators of economic status.
- PUNCH LINE: Use Rank-based measures with limited data

Choice of measurement depends on the context

- IRC/IGC: purges out changes in marginal distributions due to economic changes. More appropriate to study factors such as changes in social norms
- IGRC: can be related directly to models of human capital accumulation. More appropriate to study policies that shift the marginal distributions. Also better suited to pinpoint different mechanisms

Sibling Correlation

- Education of child i :

$$E_{ij}^c = \mu + a_j + b_{ij}$$

- **Sibling correlation:**

$$SC = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_b^2}$$

- **Under a set of assumptions:**

$$SC = \frac{\sigma_a^2}{\sigma_{Ec}^2} = \frac{\beta^2 \sigma_{Ep}^2 + \sigma_Z^2}{\sigma_{Ec}^2} = (IGC)^2 + \text{orthogonal family factors}$$

Challenges in causal interpretation

- The main issue: how to deal with possible positive bias in the estimates because of genetic transmissions of ability and preference?
- Standard Triangular Model set-up:

$$E_i^c = \beta_0 + \beta_1 E_i^p + \Pi X_i + \varepsilon_i$$

$$E_i^p = \gamma_0 + \Pi_1 X_i + \zeta_i$$

- IV approach: Policy experiment (Indonesia school construction, Mazumder et al. (2019)). LATE: Does not quite give us what we want

Causal interpretation: Alternatives

- AET (2005, JPE) Sensitivity Analysis: No a priori information on the correlation parameter ρ . Likely to give wide bounds.
- Use a priori information from economics and behavioral genetics: Estimates of correlation in cognitive and non-cognitive ability between parents and children.
- Cognitive Ability: ρ [0.20-0.40]. Emran, Ferreira, Jiang and Sun (2019) first to use this approach in the context of rural India and rural China. In China, estimates can be explained away when $\rho=0.40$, but not in India.
- Recent strand of the literature: focus on the causal effects of policy, no attempt to disentangle the genetic component. for example, does better access to urban markets (road construction) increase the IGRC in education in rural India?
- More use of structural models to understand various channels through which policies affect mobility