Growth and Development:

Human Capital

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Lecture Notes for PhD Growth and Development (EC8510)

Key Question(s)

- What explains productivity differences among workers within a country?
  - Need to identify and quantify knowledge, skills, habits, health ...
  - produced by investments in education, training, practice, exercise, environmental conditions, etc.
- What explains differences in worker productivity across countries?
  - Gets a lot more complicated.
  - The set of relevant characteristics increases
  - Institutional and environmental confounders.

Measuring Human Capital Differences

- Two assumptions allow us to make a lot of headway (Bils and Klenow, 2000)

  1. Perfect substitution among labor types (efficiency units)

  2. Competitive labor markets

- This allows us to use FOC to characterize demand for workers with h_i units of human capitam

$$
\begin{aligned}
w_{i,c} &= MPL_{i,c} \\
&= (1-\alpha) \underbrace{z_c}_{\left(\frac{K_c}{Y_c}\right)^{\frac{\alpha}{1-\alpha}} A_c} h_i
\end{aligned}
$$

Connection to Micro-Labor Literature

- The FOC implies a log-linear wage equation:

$$log(w_{i,c}) = \underbrace{log([1-\alpha]z_c)}_{\text{country effect}} + log(h_i)$$

- This relates to the large literature, estimating Mincer wage regressions within-country,

$$\log(w_i) = \beta_0 + \beta_1 s_i + \beta_2 e_i + \beta_3 e_i^2 + \varepsilon_i$$

Estimation Problems

- Suppose there are two types $\theta \in \{L, H\}$

$$\log W_i = \alpha + \beta s_i + \theta_i + \epsilon_i$$

- and that the cost of schooling is decreasing in ability,

$$c_i = \frac{1}{\theta_i} c$$

- People attend school if the return is greater than the cost:

$$\theta_i > \frac{c}{\beta}$$

- What happens if we run the regression,

$$\log W_i = \alpha + \beta S_i + \epsilon_i?$$

A Constructive Approach to Measuring Human Capital

- Four steps:

1. Select dimensions (attributes, proxies) for human capital to be measured.
2. Measure each nation's stock along relevant dimensions
3. Evidence from Mincer wage equations gives some information about value
4. Aggregate human capital

- Years of schooling is positively associated with income per capita
  - Return to a year of schooling is about 8-10% and pretty stable across countries (Jedwab et al., 2020; Rossi, 2020)
- Levels of experience are similar, but the returns vary.
- Education quality (Schoellman, 2012)and health (Weil, 2007) are positively associated with income per capita

Total Constructed Human Capital

- Cumulating, one step at a time, $\frac{cov(log(h),log(y))}{varlog(y)}$ metric:
  - Years of schooling: 19%
  - Years + quality of schooling: 38%
  - Total schooling + experience: 56%
  - Total schooling + experience + health: 59%

  human capital could be very important...
  - lots of assumptions
  - hard to be exhaustive
  - double-counting?

A Deductive Approach

- Human capital is, by definition, embodied within people.
  - Migrants carry their human capital to new countries.
  - Their outcomes allow us to deduce the importance of human capital
- Under maintained assumptions, wages are given by,

$$log(w_{i,c}) = log([1 - \alpha]z_c) + log(h_i)$$

- Two additional concerns need to be addressed:
  - Migrants are not randomly chosen (selection)
  - Migrants' human capital may not be the same (skill loss, discrimination, country specific human-capital)

Wage Gains at Migration

- The wage gain for a worker who migrates from c to c' is,

$$log(w_{i,c'}) - log(w_{i,c}) = log(z_{c'}) - log(z_c)$$

- The change in z_c is one part of the development accounting puzzle,

$$log(y_c) = log(z_c) + log(h_c)$$

- Intuition: Suppose the worker migrates from a poor country to a $10\times$ richer country
  - Wages increase $10\times$? Country z_c explains low wages
  - Wages don't change? Low human capital explains low wages
  - Selection, skill loss, school quality, parental influence, culture?

Implementation

- Need data on pre- and post-migration wages.
- Hendricks and Schoellman (2018) found two sources:
  - New Immigrant Survey: sample of adult LPR recipients to the US, May-November 2003
  - Migration projects: sample of communities in Mexico and Latin America with high migration rates
- Wages converted to PPP
  - Compare real wage gains to gap in real GDP per worker
- Large set of covariates
  - Demographics, education, occupation, industry, visa status

Human Capital and Development Accounting

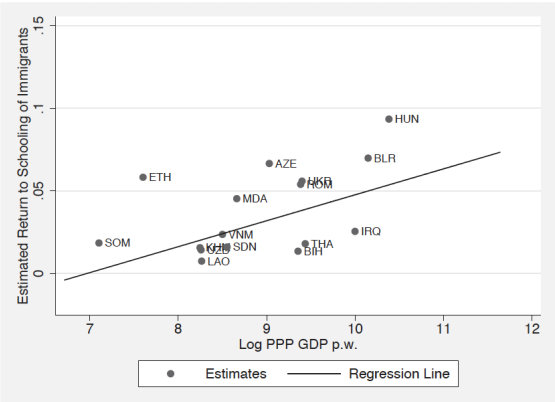
Group	Hourly wage		Development accounting			
	Premig.	Postmig.	Wage gain	GDP gap	h share	95% C.I.
Panel A: NIS sample by GDP per worker category						
$< \frac{1}{16}$	\$2.82	\$8.91	3.2	31.8	0.66	(0.60, 0.73)
$\frac{1}{16} - \frac{1}{8}$	\$4.19	\$11.83	2.8	11.9	0.58	(0.54, 0.62)
$\frac{1}{8} - \frac{1}{4}$	\$4.95	\$9.48	1.9	5.6	0.63	(0.55, 0.71)
$\frac{1}{4} - \frac{1}{2}$	\$5.05	\$9.11	1.8	3.0	0.48	(0.34, 0.62)
$\frac{1}{2} - 1$	\$12.64	\$15.18	1.2	1.3	0.48	(−0.23, 1.19)
Panel B: MP sample by subsample						
Latin American MP	\$4.84	\$7.05	1.5	7.0	0.79	(0.71, 0.87)
Mexican MP	\$2.96	\$6.04	2.0	2.9	0.33	(0.29, 0.37)

Notes. Each row shows results for immigrants from the respective subgroup of the NIS or MP samples. Columns show the categories; the mean hourly pre- and postmigration wages, reported in 2003 U.S. dollars; the wage gain at migration; the average gap in GDP per worker, relative to United States; the implied human capital share; and the corresponding 95% confidence interval.

What About Selection? (Schoellman, 2012)

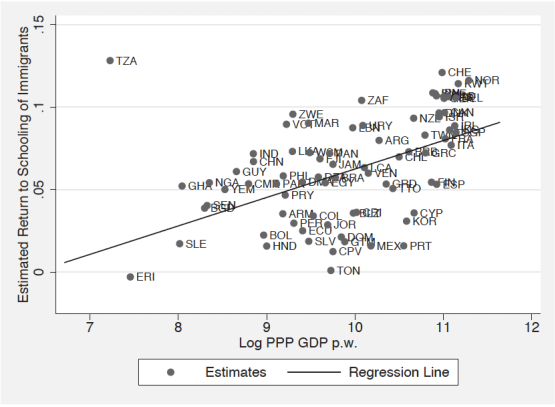
- Immigrants are selected in two ways:
  1) They are self-selected (chose to come to U.S.
  2) They are selected by U.S. immigration policy
- The concern is that immigrants may be selected on unobservables.
- The origin fixed effects help account for level differences across countries, but the concern is differential selection.
- To explore this Schoellman looks at migrants who selected for non-economic reasons.

Returns Lower in Poor Countries for Refugees (Schoellman, 2012)



(a) Refugees/Asylees

Returns Lower in Poor Countries for Economic Migrants (Schoellman, 2012)

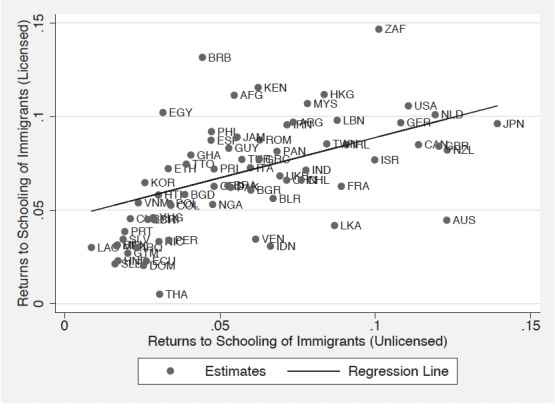


(b) Economic Migrants

Perhaps Migrants' Skills are Not Transferable?

- You learn a set of skills in your country
- But these skills are not valued in the U.S. for some reason
- This would show up erroneously as low human capital.
- To explore this Schoellman (2012) looks at licensed vs. unlicensed immigrants.
  - Licensure is the strongest form of occupational restriction.
  - Those that secure a license should earn a rate of return commensurate to their quality of education.
  - Those that don't should earn a lower rate of return.

Formal Licensure Does Not Explain Why Returns to Schooling Are Lower in Poorer Countries (Schoellman, 2012)



Summary

- Deductive Approach: strengths and weaknesses
  - Exhaustive, but not constructive
  - Avoids double counting
  - Requires additional assumptions about migrants
- Quantitatively similar results
  - Human capital accounts for 50-60% of income differences
- Lots of room for further work
  - Parenting & early childhood (Schoellman, 2016; De Philippis and Rossi, 2021)
  - Culture (Ek, 2020)
  - Specific skills (Hjort et al., 2021)

Models: Going from What to Why

- What are the mechanisms that can help explain large human capital differences
  - Benchmark models deliver no differences (Becker, 1964; Ben-Porath, 1967)
  - Several mechanisms can induce differences:
    - Credit constraints (Becker and Tomes, 1986)
    - Goods inputs into human capital production (Manuelli and Sheshadri, 2014)
    - Skill-biased technical change (Goldin and Katz, 2008)
    - Life expectancy (Cordoba and Ripoll, 2013)
    - Structural transformation (Buera et al., 2018)
    - ...
  - Models can be calibrated or estimated to quantify the importance of mechanisms.

Sidebar: Differences in Quality of Physical Capital?

- Government investment could lead to less productive capital than private investment
- Poor countries could be investing more in older machines
- There may be important complementarities between public investments (e.g., electricity/roads) and private investment (true also for human capital)
- The role of capital in development accounting is still largely unexplored (black box)