The Role of Human Capital: Immigrant Earnings

Econ821

Prof. Lutz Hendricks

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The Idea

How could one measure human capital without knowing the production function?

The problem: we only observe wages

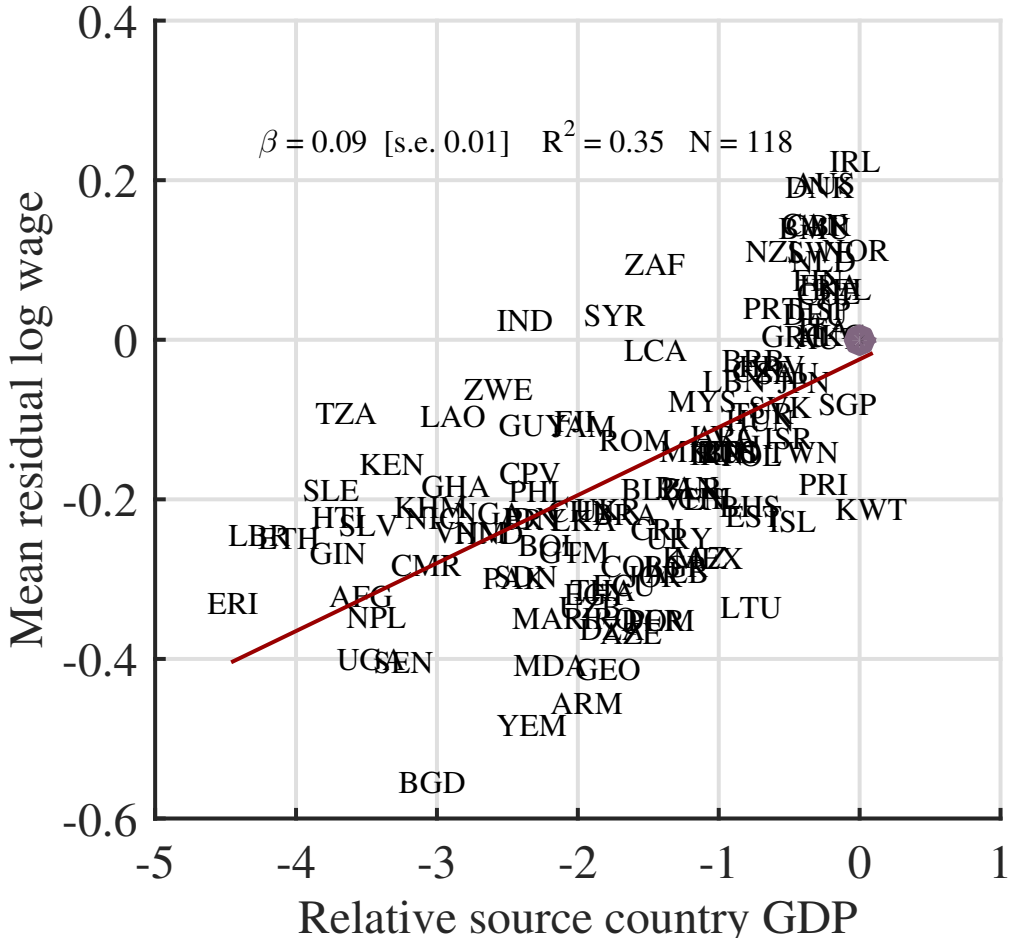
- wage = [skill price] * [human capital]
- skill prices (unobserved) differ across countries

A simple idea: observe workers from different countries in the same labor market

- with the same skill prices
- Hendricks (2002)

Immigrant Earnings in the U.S.

The motivating fact: immigrant earnings do not vary much across rich / poor source countries.



Source: 2010 U.S. Census

Approach

1. run a descriptive wage regression
   1.1 LHS: log hourly wage
   1.2 RHS: schooling, experience, sex, marital status, ...
2. for each person, compute residual log wage
3. sort workers by country of birth
4. for each country of birth: compute mean residual log wage
5. plot it against relative gdp per worker (PPP, PWT)

Main result:

A 1 log point increase in gdp is associated with a 0.09 log point increase in wages (given characteristics).

Migrant Selection

If migrants are similar to the average worker at home:

- the graph measures source country human capital relative to the U.S.

Main concern:

- Immigrants from low income countries are more positively selected than immigrants from rich countries.

Indirect evidence on selection

1. Studies that follow migrants across borders show little selection
   1.1 but mostly Latin American countries
2. Return migrants earn roughly the same as never-migrants
3. Refugees earn roughly the same as other migrants
4. For some countries (SLV, JAM), a large fraction of workers migrates to the U.S. at some point
   4.1 lots of back and forth migration

Not everyone is convinced ...

Schoellman (2012)

Schoellman (2012)

An extension of the immigrant earnings approach by Schoellman (2012)

The idea: use returns to schooling in the U.S. to measure school quality.

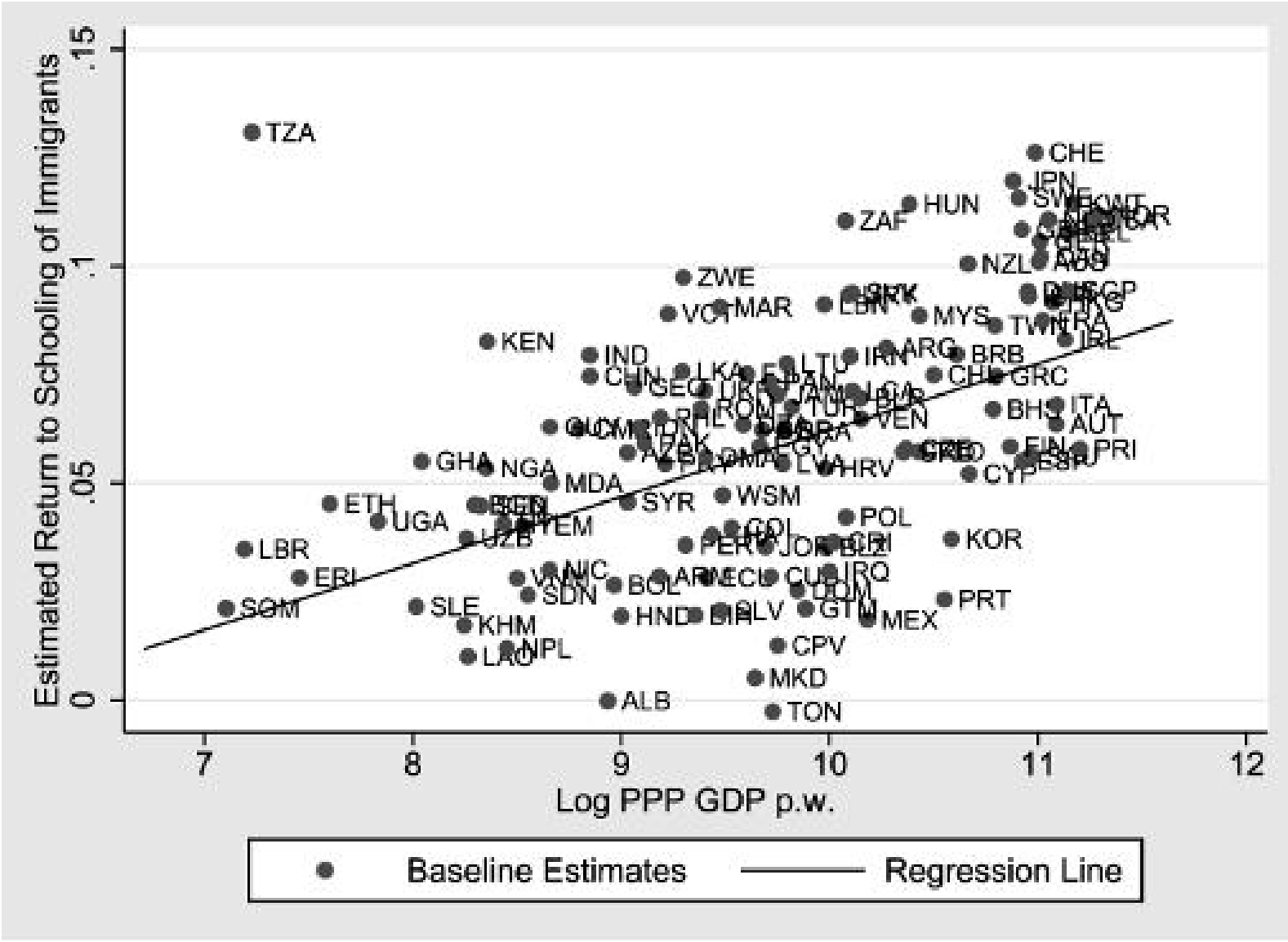
Implementation

- Run a simple wage regression where coefficient on schooling varies by source country.

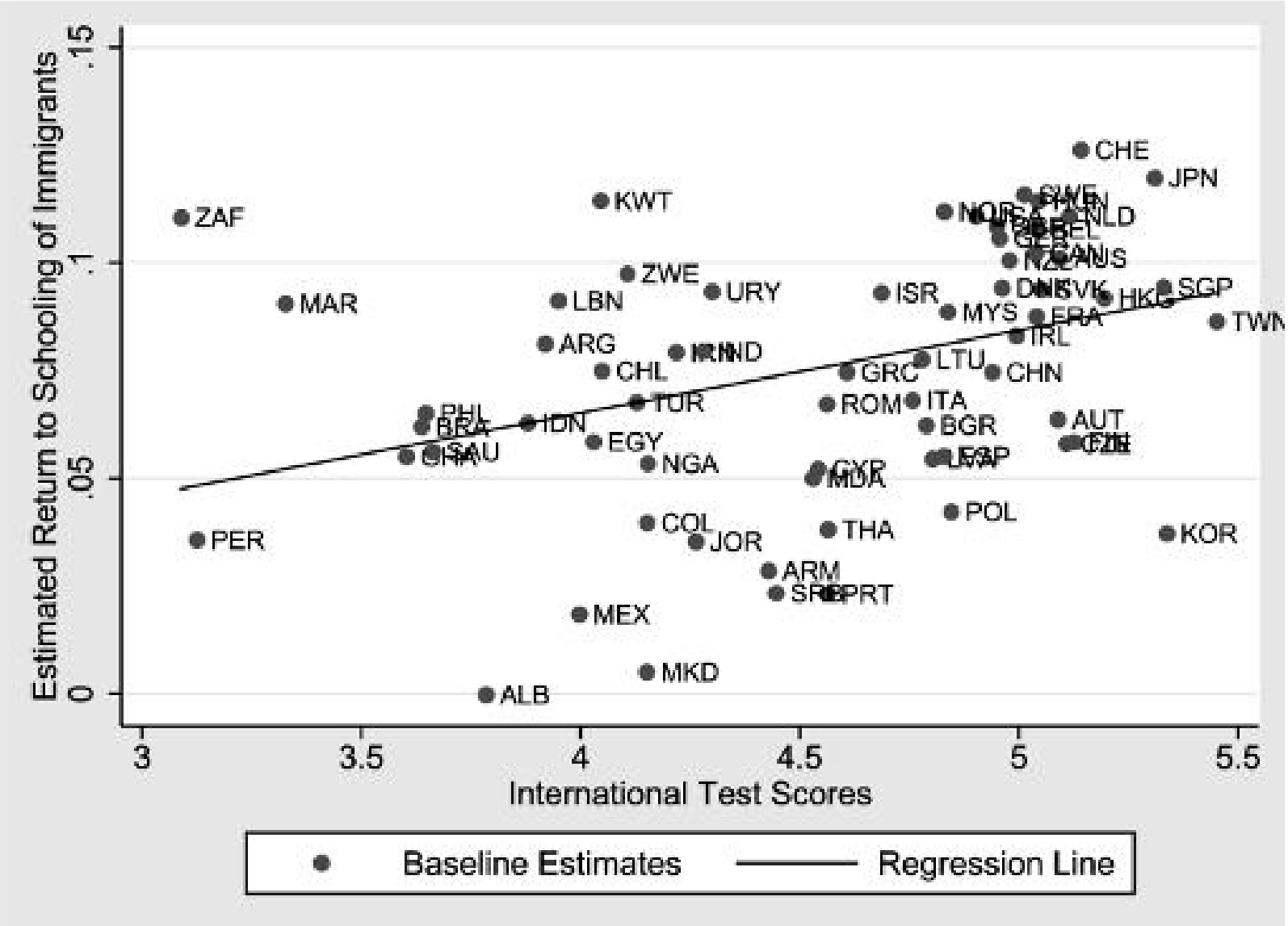
Result:

- school coefficient varies from 0 (ALB, TON) to 12% (CHE, JPN)

Richer countries have higher returns



Countries with higher test scores have higher returns



What about selection?

Selection could be a problem if immigrants with low schooling are more positively selected than those with high schooling

Then returns to schooling among immigrants could be lower than among non-migrants

- perhaps a priori not too plausible

Restrict sample to countries with high fraction of refugees (50%+)

Transferability

There really isn't good evidence to rule out that the human capital acquired in low income countries is a poor match for rich country labor markets.

But we are living in a model with only 1 type of human capital.

Accounting Model

Next task: translate school quality differences into output differences.

Aggregate production function:

$$Y_j = A_j K_j^{\alpha} \left[h\left(S_j, Q_j\right) L_j \right]^{1-\alpha} \tag{1}$$

Observed:

- Y_j, K_j: PWT
- S_j: Barro and Lee (2013)

Human capital production function

$$h(S_j, Q_j) = \exp\left[(S_j Q_j)^{\eta} / \eta\right] \tag{2}$$

This is an invention, due to Bils and Klenow (2000).

We need to estimate Q_j and η.

Then we can construct h for each j and perform levels accounting.

Estimating Q_j

The idea:

- immigrant returns to schooling reveal Q_j

We want to estimate Q_j by running the regression

$$\ln W\left(S^j_{US}\right) = c + M_{US}\frac{Q_j}{Q_{US}}S^j_{US} \tag{3}$$

In words:

- Run a Mincer regression with country specific returns to schooling
- Then j's Mincer coefficient is proportional to its Q_j

This is really based on intuition, not a model.

Motivating Model for the Wage Regression

To motivate this regression, we develop a simple model.

Workers maximize lifetime earnings:

$$\max_{S} pvEarn - sCost \tag{4}$$

where

$$pvEarn = h(S, Q_j) \int_{\tau+S}^{\tau+T} e^{-r_j t} w_j(0) e^{g_j t} dt \tag{5}$$

$$sCost = \int_{\tau}^{\tau+S} e^{-r_j t} \lambda_j w_j(0) e^{g_j t} h(t-\tau, Q_j) dt \tag{6}$$

They take Q_j as given.

The cost of schooling is proportional to foregone earnings.

Optimal Schooling

Optimal schooling satisfies

$$S_j = \left[Q_j^{\eta} / M_j \right]^{1/(1-\eta)} \tag{7}$$

where

$$M_j = \frac{(r_j - g_j)(1+\lambda_j)}{1 - \exp\left[-(r_j - g_j)(T - S_j)\right]} \approx (r_j - g_j)(1+\lambda_j)$$

Claim: M_j is the Mincer return in country j.

- This is a bit fishy b/c in the model everyone is the same (no variation in S).
- Not clear what is supposed to change to induce changing S (likely Q) within a country

Some poorly explained messing around with the equilibrium wage in the US then yields the desired regression equation.

Now we have Q_j as a function of M_j (roughly the same everywhere) and S_j.

Estimating η

The idea:

Use the equilibrium schooling equation

$$\ln S_j = \frac{\eta}{1-\eta} \ln Q_j + \frac{1}{1-\eta} \ln M_j \tag{8}$$

Set $M_j = \bar{M}$ based on estimated Mincer regressions.

Instrument Q_j with test scores.

Development Accounting

Main result: Quality differences are as important as school quantity differences.

	This paper			Literat
	$\eta = 0{\cdot}42$	$\eta = 0{\cdot}5$	$\eta = 0{\cdot}58$	Hall and Jones (1999)
h_{90}/h_{10}	6·3	4·7	3·8	2·0
$\frac{h_{90}/h_{10}}{y_{90}/y_{10}}$	0·28	0·21	0·17	0·09
$\frac{\text{var}[\log(h)]}{\text{var}[\log(y)]}$	0·36	0·26	0·19	0·06

Comments

The empirical idea is quite nice:

- use immigrant returns to schooling as a proxy for source country school quality

Quantitatively, it's a bit hard to make this work

We run again into the two issues that plague the entire literature:

1. What is the production function for h?
2. How do deal with migrant selection?

The only clear way out (I think): direct measures of migrant selection

NIS Data

NIS data

This is based on Hendricks and Schoellman (2016).

The idea:

- a direct measure of the importance of things other than human capital: the wage gain experienced by migrants
- migrants take their h with them, but leave capital and tfp behind.

This deals with selection: we observe the same worker in 2 labor markets.

Accounting Model

Aggregate production function:

- $Y_c = K_c^{\alpha} \left[A_c H_c\right]^{1-\alpha}$
- $y_c = Y_c / L_c = \left(K_c / Y_c\right)^{\alpha/(1-\alpha)} A_c h_c = z_c h_c$

Contribution of h to output gaps: $h_{c'}/h_c$.

Share of output gap due to h:

$$share_h = \frac{\ln\left(h_{c'}/h_c\right)}{\ln\left(y_{c'}/y_c\right)} \tag{9}$$

Migrant wage gains

Observed wage: $w_c = (1-\alpha) z_c h_c$

Wage gain: z_{US}/z_c

- directly measures the contribution of h to output gaps

NIS data

New Immigrant Survey

12,000 new permanent residents in 2003

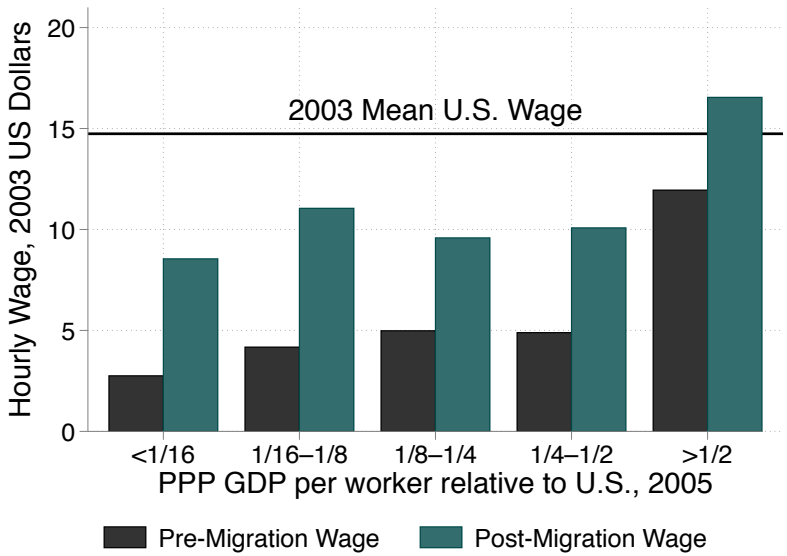
- About half are new arrivals
- The others are adjustments of status

Data on:

- jobs and wages pre and post migration
- demographics: age, sex, schooling
- visa status

Results: Pre- and post migration wages

(a) Pre- and Post-Migration Wages



(b) Wage Gains at Migration

Key: wage gains are small relative to output gaps.

Example:

- Output gap 21
- Wage gain 3
- Contribution of h: $\ln(7)/\ln(21) = 0.64$

Main Result

Table 2: Implied Human Capital Share in Development Accounting

GDP p.w. Category	Human Capital Share	95% Confidence Interval	N
$< 1/16$	0.71	(0.64, 0.78)	178
$1/16 - 1/8$	0.61	(0.57, 0.66)	415
$1/8 - 1/4$	0.58	(0.48, 0,67)	295
$1/4 - 1/2$	0.52	(0.34, 0.70)	168
$> 1/2$	0.83	(-0.11, 1.76)	299

Main result:

h accounts for 2/3 of output gaps!

Robustness

Contribution of h is similar for:

- different visa categories (H1B, family visas,...)
- different school levels
- recent / non-recent arrivals

Why so different from previous research?

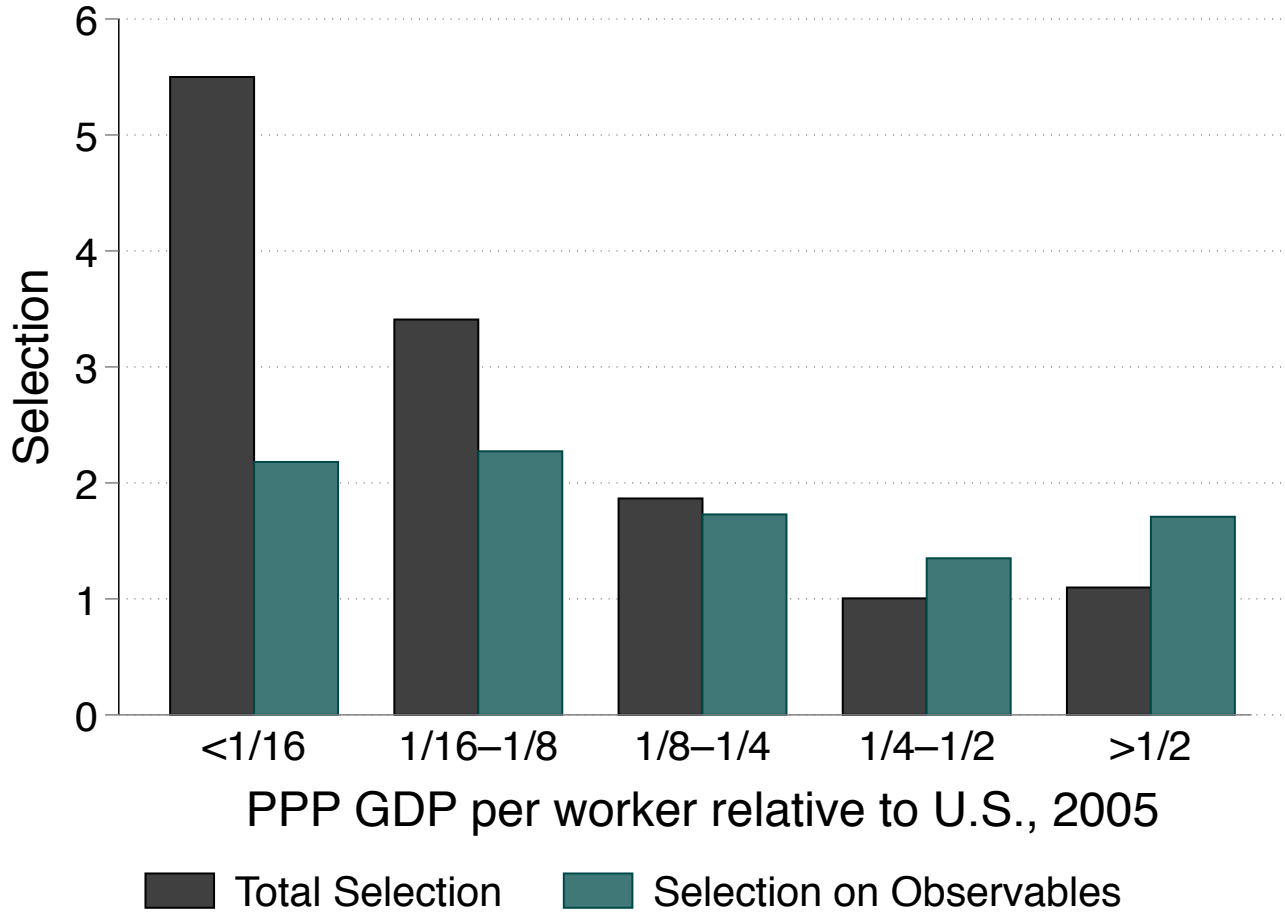
Migrant selection is massive

- average years of schooling: > 13 (even for poor countries)
- typical pre-migration occupations: white collar
- no migrants that previously worked in ag

Pre-migration wages are much higher than average source country wages.

Migrant selection

Figure 4: Selection of Immigrants by GDP per worker



Interpretations

Migrants are very different from the typical worker.

If wage gains are similar for people with low schooling / self-employed / people in ag:

- then wage gains are small relative to gdp gaps
- h accounts for more than half of output gaps

Key question:

Do wage gaps between the kinds of people we see in NIS and typical workers reflect human capital or barriers?

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