Human Capital and Development Accounting: New Evidence from Immigrant Earnings

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Question

Variation in per capita income across countries: **factor 30**
How much is due to **human capital**?
The Challenge

How to measure a country’s human capital stock?

Observed wages confound skill prices and human capital: \( \hat{w} = wh \)

Mincer approach (Hall and Jones, 1999)

- observe years of schooling \( s \)

- \( h = \exp(\phi s) \)

- one concern: differences in “school quality”
**GE approach**

- calibrate a model of human capital production
- Erosa, Koreshkova, and Restuccia (2010); Manuelli and Seshadri (2014)
- controversial: the human capital production function

**Immigrant earnings** approach

- hold $w$ constant and vary $h$
- Hendricks (2002); Schoellman (2012)
- controversial: migrant selection
Our Approach

Observe wages of U.S. immigrants pre and post migration
Hold $h$ constant and vary $w$

- pre-migration wage: $w_c h$
- post-migration wage: $w_{US} h$
- ratio: $w_{US}/w_c$

measures the contribution of factors other than $h$ to the gap in output per worker

Data: New Immigrant Survey
Main Result

Focus on income gap between U.S. and countries with less than 1/10th of U.S. gdp per worker.

40% of this gap is due to human capital.

Previous results:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Fraction due to $h$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mincer</td>
<td>1/5</td>
</tr>
<tr>
<td>Immigrants</td>
<td>1/3</td>
</tr>
<tr>
<td>This paper</td>
<td>1/2.5</td>
</tr>
<tr>
<td>$h$ production function</td>
<td>up to 1</td>
</tr>
</tbody>
</table>
Contributions

A new approach for measuring country human capital stocks

No need to estimate $h$ production functions

Our approach yields estimates of **migrant selection**

- migrants from low income countries earn about 3 times more than average non-migrants

- migrants from rich countries earn roughly the same as non-migrants

Our approach yields measures of **human capital by schooling**

- relative human capital varies about uniformly across school levels

- implications for multi-skill models (Jones, 2011)
One Skill Model

There is one type of labor (we relax this later): \( L \)

Aggregate production function:

\[
Y_c = A_c K_c^\alpha (h_c L_c)^{1-\alpha}
\]  

(1)

Output gap between rich and poor countries:

\[
\frac{y_{US}}{y_c} = \left( \frac{A_{US}}{A_c} \right)^{1/(1-\alpha)} \left[ \frac{k_{US}/y_{US}}{k_c/y_c} \right]^{\alpha/(1-\alpha)} \frac{h_{US}}{h_c}
\]

(2)

\( h_{US}/h_c \) is the contribution of \( h \) to output gaps
Measurement

Assumption: the labor share does not vary across countries (Gollin, 2002). Then: the output gap equals the gap in average wages

\[
\frac{y_{US}}{y_c} = \frac{w_{US}}{w_c} \frac{h_{US}}{h_c}
\]  

(3)

\(w = \frac{\partial Y}{\partial (hL)}\) is the unobserved skill price (marginal product of labor)

The fraction of the output gap due to \(h\) is then

\[
\frac{\ln (h_{US}/h_c)}{\ln (y_{US}/y_c)} = 1 - \frac{\ln (w_{US}/w_c)}{\ln (y_{US}/y_c)}
\]  

(4)

We measure \(w_{US}/w_c\) as the ratio of post to pre-migration wages
Data: New Immigrant Survey

Nationally representative sample of new permanent residents in 2003
Surveyed between June 2003 and June 2004
Sample size: about 12,000 adults
Information on:

1. Demographic characteristics (age, sex, education)
2. Visa status
3. Current employment in U.S. \( \rightarrow w_{US} h \)
4. Last job prior to migration \( \rightarrow w_c h \)
Data Steps

1. $w_{c,t}$: wage on last pre-migration job (various currencies)
2. currency conversion: $w_{\$,t} = w_{c,t}x_{c,t}$ (dollar wage in $t$)
3. time shifting: $w_{\$,2003} = w_{\$,t} \times y_{US,2003}/y_{US,t}$
4. Wage gain: post-migration wage / $w_{\$,2003}$

Drop observations with ambiguous currencies (revaluations)
Drop employment visa migrants (reasons below).
Group countries into bins by $y_{c,2005}$ (confidentiality)
Results

Wage gains for low income migrants: 8
Fraction of Output Gap Due to $h$

Details: Distribution of Wage Gains, Distribution of Post-Migration Wages, Distribution of Pre-Migration Wages, Including Employment Visa Migrants
Robustness Checks

Exclude observations with

- high inflation
- unusual currencies.
- any U.S. education
- many years since last pre-migration job
Potential Concerns

1. **Quality** of NIS wage data
   Checks to be completed
   - comparison with Census wages
   - comparison with source country non-migrant wages

2. Are wage gains = skill price gaps?
Skill Transferability

Do specialized skills have value in the U.S.?

- example: a law degree from India

Implication: wage gains understate skill price gaps

- our results **overstate** the role of human capital

Suggestive evidence:

- wage gains are similar across education levels
- wage gains are larger for employment visas
Selection on Wage Gains

Are migrants more likely to migrate when their home wages are low / their U.S. wages are high?

Suggestive evidence: differences between visa categories
Migrant Selection

A rough first pass:
Selection factor = \[ \text{pre migration wage} / \left( \frac{2}{3y} \right) \]
Migrant Selection

Migrants from low income countries are strongly selected
Selection is far from uniform across gdp levels

**Direct measures** of selection:

- average years of schooling of low income migrants: 14.5
- most common occupations: white collar
- almost no immigrants with agricultural jobs
Two Skill Model

Jones (2011) argues that imperfect substitution of high and low skill workers amplifies the role of $h$.

Intuition:

- skilled workers are scarce in low income countries
- this drives down the wages of the majority of unskilled workers

Implications:

- skill price gaps are small for skilled / large for unskilled workers
- especially for low income countries
Evidence

Migrant wage gains are slightly **larger** for skilled workers

Gap between skilled and unskilled wage gains is **largest** for low income countries
An Interpretation

Roughly equal wage gains for skilled and unskilled workers

\[ h_{\text{skilled}}/h_{\text{unskilled}} \] is roughly equal in rich / poor countries.

In that case, the one skill model correctly measures the role of \( h \) regardless of the elasticity of substitution.

To see this:

\[
y = A^{1/(1-\alpha)} \left( k/y \right)^{\alpha/(1-\alpha)} G(h_L L_L, h_H L_H)
\]

Why does a high \( L_H/L_L \) not drive down the skill premium?

- one answer: skill-biased differences in technology
Thank you
Detail Slides
Distribution of Wage Gains
Distribution of Post-Migration Wages

- Post-Migration Hourly Wage
- GDP per Worker (US = 1)
- 10th Percentile
- Median
- 90th Percentile
Distribution of Pre-Migration Wages

![Graph showing the distribution of pre-migration wages vs. GDP per worker. The graph includes points representing the 10th percentile, median, and 90th percentile of pre-migration hourly wages across different GDP per worker values.]
Including Employment Visa Migrants

![Graph showing median wage (USD, 2003) vs. GDP per worker relative to the U.S.](image)

- **Pre migration wage**
- **Post migration wage**
- **Wage gain**

**Median wage (USD, 2003):**
- 0
- 5
- 10
- 15
- 20
- 25

**GDP per worker relative to the U.S.:**
- 1/61
- 1/28
- 1/13
- 1/9
- 1/4
- 1/2
- 1/1
Including Employment Visa Migrants

Fraction of gap due to $h$

GDP per worker relative to the U.S.
References


