

# Life-cycle Human Capital Accumulation Across Countries: Lessons From U.S. Immigrants

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# Human Capital and Cross-Country Income Differences

**Motivating question: how important is human capital in accounting for cross-country income differences?**

**2005 conventional wisdom: not very. Logic:**

- Human capital = years of schooling
- Value of schooling = Mincer return
- $\implies$  small cross-country variation
- Hall and Jones (1999); Bils and Klenow (2000); Caselli (2005)

# Recent Literature

## **Expand scope of human capital measurement**

- Education quality, health, early childhood human capital..
- Generally, larger role for human capital

## **Current research: life-cycle human capital accumulation**

- Manuelli and Seshadri (2014): calibrated Ben-Porath model
- Companion paper: document cross-country facts
  - Profiles are steeper in richer countries
  - Multiple interpretations possible

# This Paper: Returns to Experience of U.S. Immigrants

## **We measure returns to experience among U.S. immigrants**

- Steeper returns to rich country experience

## **Use data on migrants, non-migrants to provide interpretation**

- Returns to experience similar among migrants, non-migrants
- Other comparisons do not support skill transfer or selection

## **Conclude that life-cycle wages reflect human capital**

- Update development accounting results
- Provide suggestive evidence on mechanisms

# Outline of Talk

1. **Returns to Experience, Simplified Sample**
2. **Returns to Experience, Full Sample**
3. **Interpretation**
4. **Development Accounting**
5. **Conclusion**

## **Data: 1980–2000 Census, 2005–13 ACS**

- Immigrant: born outside the fifty states
- Restrictions: employed, full-time, wage worker, men, private sector, age 16+, 0–40 years of experience
- Positive income, valid responses to other key variables

## **Nice feature: Extremely large sample**

- 770k immigrants from 120 countries
- 73 countries with 1,000+; 15 with 10,000+
- Wide variety of controls

# Simplified Sample: Only Foreign Experience

## Begin with a simple exercise

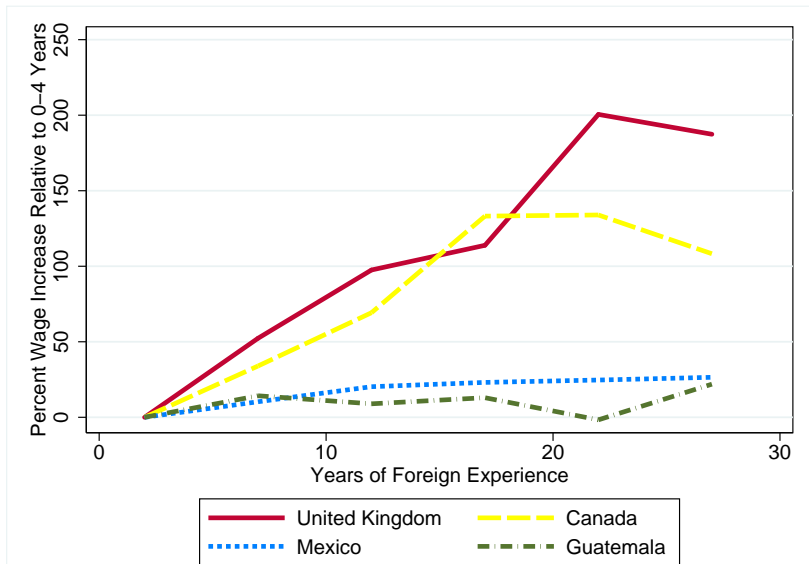
- Consider immigrants with only foreign experience
  - Immigrated the year prior to the Census
- Focus on four countries: UK, Canada, Mexico, Guatemala

## Estimate:

$$\log(w_{it}) = \alpha + \theta s_{it} + \sum_{x \in X} \phi_x D_{it}^x + \mu_t + \varepsilon_{it}$$

- Minimal controls
- Potential experience dummies  $x \in X = \{5 - 9, 10 - 14, \dots\}$

# Returns to Foreign Experience Lower for Poor Countries





## Next Step: Standard Immigration Estimation

### **Add more countries, pool regressions:**

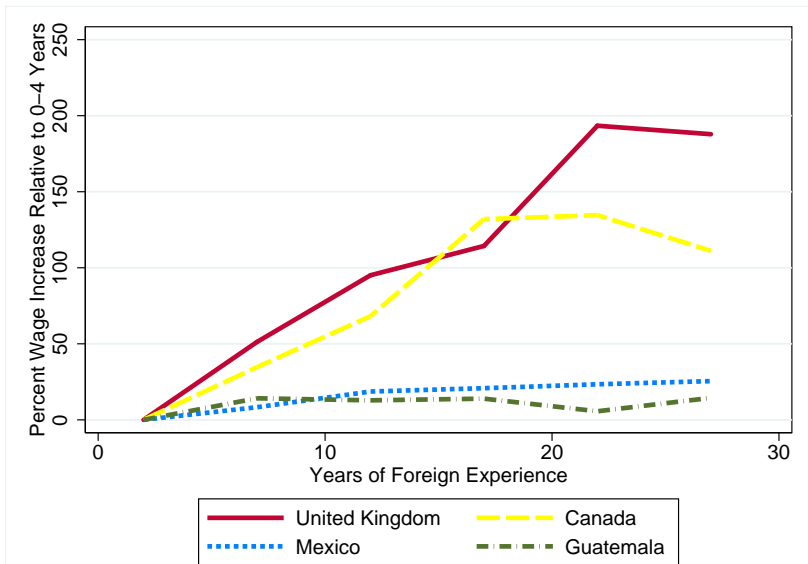
- Include all countries with 500+ immigrants
- Intercept, return to school & experience vary by country
- Include cohort of immigration controls (decade x country)
- Include natives (for identification)

### **Add controls:**

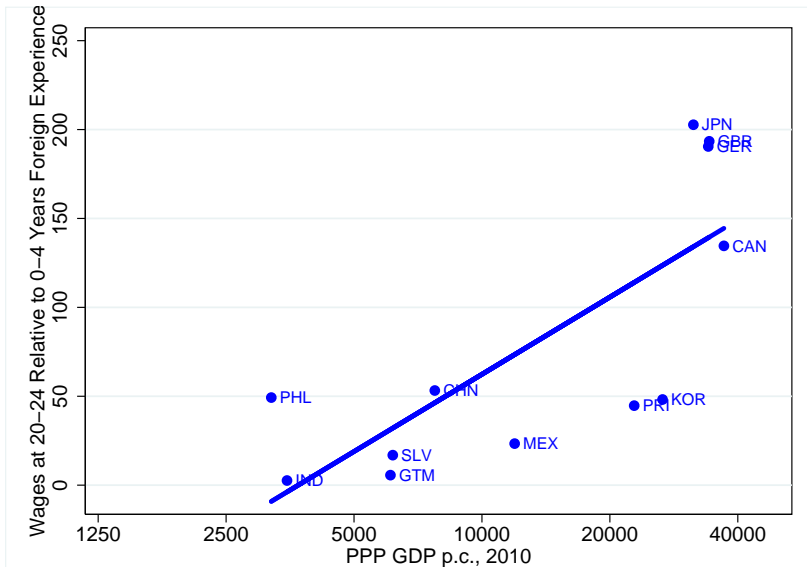
- State of residence, English language

**Retain focus on immigrants with only foreign experience**

# Returns to Foreign Experience Lower for Poor Countries



# Returns to Foreign Experience Lower for Poor Countries



# Outline of Talk

1. Returns to Foreign Experience, Simplified Sample
2. **Returns to All Experience, Full Sample**
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# Estimating Experience Profiles for All Immigrants

**For all immigrants, we estimate:**

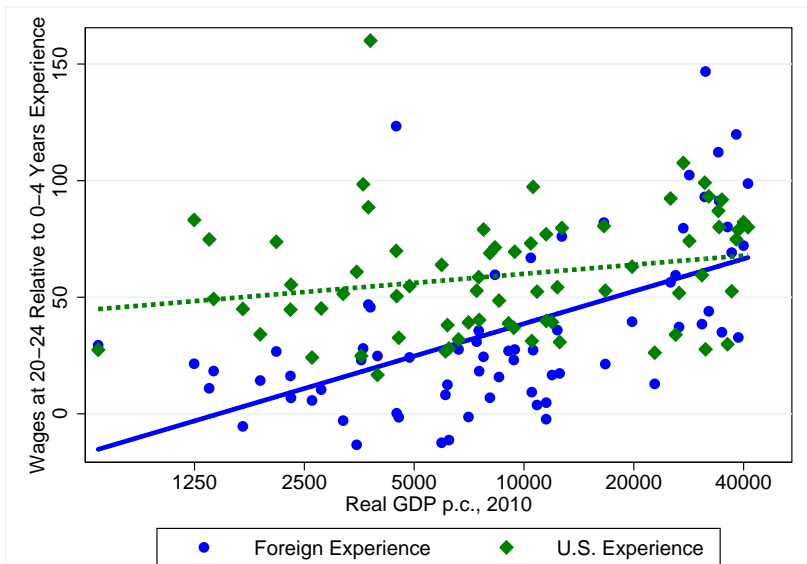
$$\log(w_{it}) = \alpha + \beta z_{it} + \sum_{x \in X} \phi_{f,x} D_{it}^{f,x} + \sum_{x \in X} \phi_{u,x} D_{it}^{u,x} + g(x_f, x_u) + \varepsilon_{it}$$

- $z_{it}$ : vector of controls
- $x_f$ : years of foreign experience
- $x_u$ : years of U.S. experience

$g(x_f, x_u)$ : **controls for interaction effects**

- Necessary since experience profiles are concave
- Quadratic interactions, but results are robust

# Returns to Experience with Entire Sample



## Robustness

Experience:	Foreign	U.S.
Baseline	20.0***	5.61*
35–39 Years Experience	23.3**	7.2
Discounted Average Height of Profile	8.4***	2.7**
Include Women	20.1***	3.6
Include All Part-Time	23.8***	7.8***
Include Public Sector	21.5***	6.3**
Manufacturing	15.7***	5.4
Service Industry	23.2***	11.6***
Excellent English	26.4***	6.7*
Year 2000+	21.9***	6.4**

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# Interpreting This Result

## **Related facts are known in literature since Chiswick (1978)**

- Early focus: immigrants vs. natives, immigrants by region
- Coulombe, Grenier, Nadeau (2014): by birth country income

## **Interpretation is debated. Three hypotheses:**

1. Differences in human capital accumulation
2. Differences in skill transferability
3. Differences in selection

# Learning-By-Doing Model

**Human capital accumulation in birth country and US given by:**

$$\dot{h}_{ic}(t) = z_{ic}\phi_c x_{ic}(t)h_{ic}(t)$$

$$h_{ic}^* = \gamma_c h_{ic}^{\theta_c}$$

$$\dot{h}_{ic}^*(t) = z_{ic}\phi_c^* x_{ic}^*(t)h_{ic}^*(t)$$

- $x_{ic}$  is experience
- $z_{ic}$  is ability to learn
- \* denotes U.S.

# Possible Sources of Differences

## Three possible sources of differences in experience profiles:

1. **Human capital:**  $\phi_c$  increasing in GDP per capita
2. **Skill loss:**  $\theta_c$  increasing in GDP per capita
3. **Selection:**  $z_{ic}$  increasing in GDP per capita for immigrants
  - Distribution of  $z_{ic}$  increasing in GDP p.c. (FOSD)

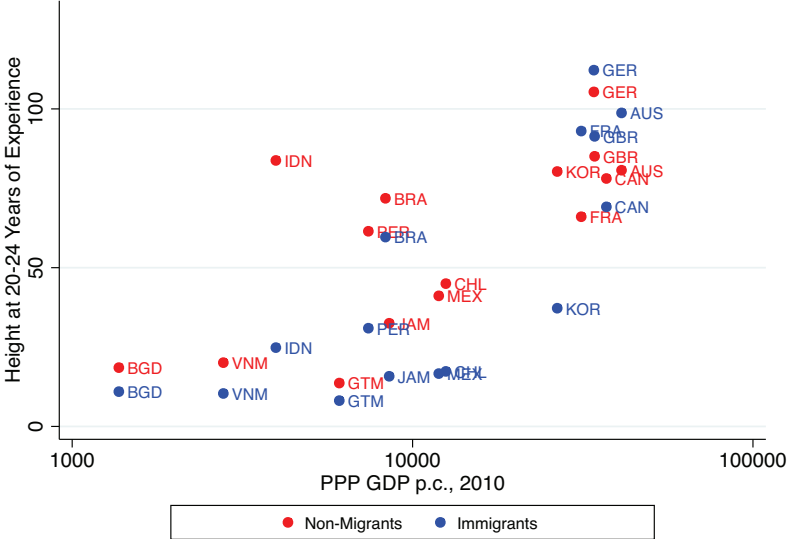
## Key Contribution: Interpretation

**We compare immigrants, non-migrants along several dimensions:**

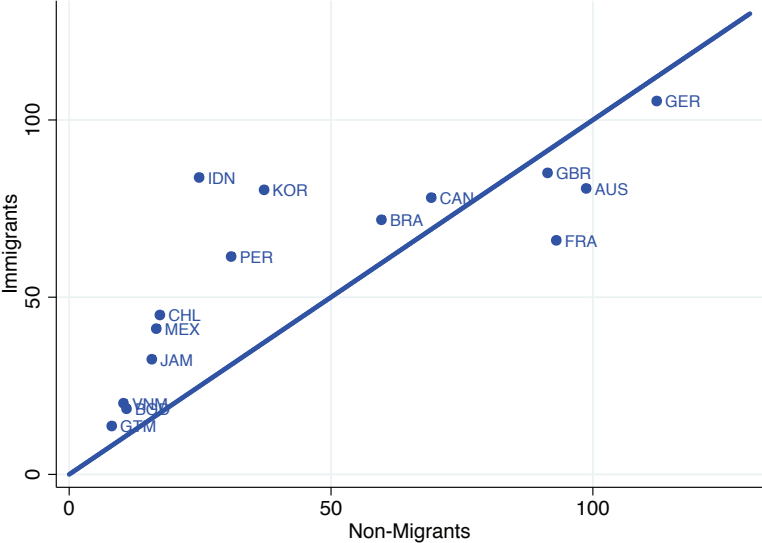
1. Returns to foreign experience
2. Education utilization
3. Schooling, income

**We use these as tests of the three hypotheses**

# Comparison 1: Returns to Experience



# Comparison 1: Returns to Experience



# Fact 1: Returns to Experience Similar

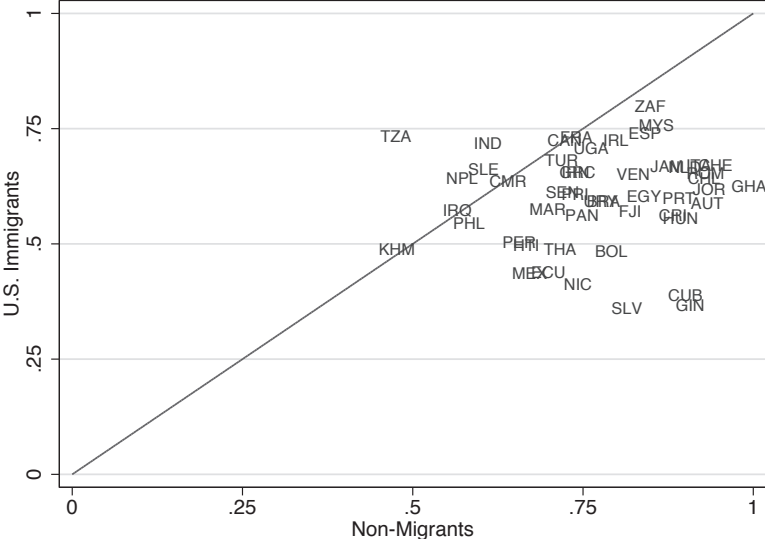
## **Simplest explanation:**

- Less experience human capital in poor countries.
- Consistent with additional evidence from existing literature:
  - Mexican return migrants: Reinhold and Thom (2012)

## **Alternative explanation:**

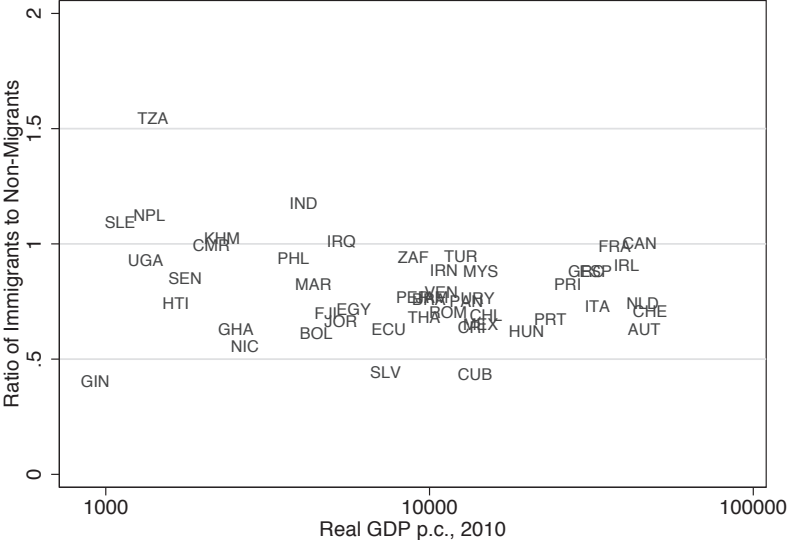
- Non-migrant returns reflect some other force
  - Labor market frictions, implicit contracts, measurement error
- Immigrant returns reflect some other force
  - Skill transferability, selection
- These biases line up in magnitude

# Comparison 2: Education Utilization

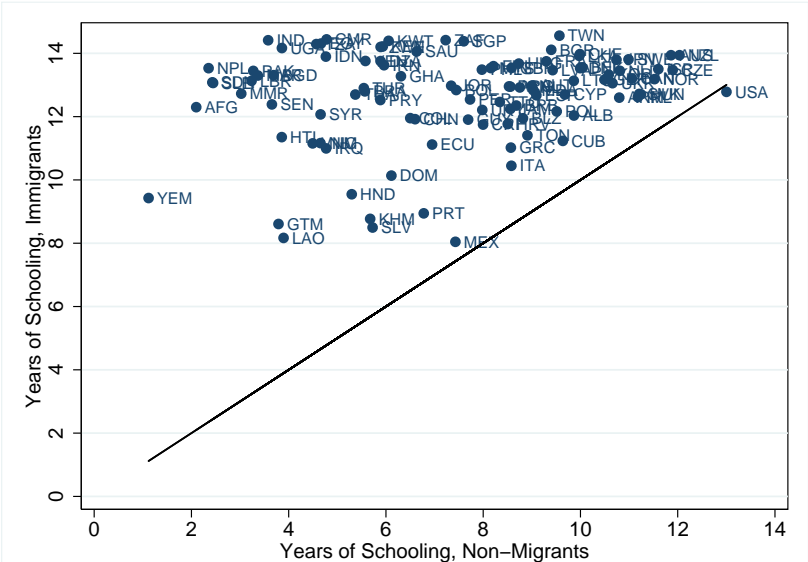




# Comparison 2: Education Utilization



# Comparison 3: Education Selection



# Summary so Far

## **Lower returns to poor country experience**

- Equally true for immigrants, non-migrants
- Simplest explanation: human capital

## **Little support for alternative explanations**

- Skills transfer equally well from poor, rich countries.
- Poor country immigrants more selected on education
  - Income & occupation: Hendricks and Schoellman (2015)

# One Hypothesis: Experience-Education Complementarity

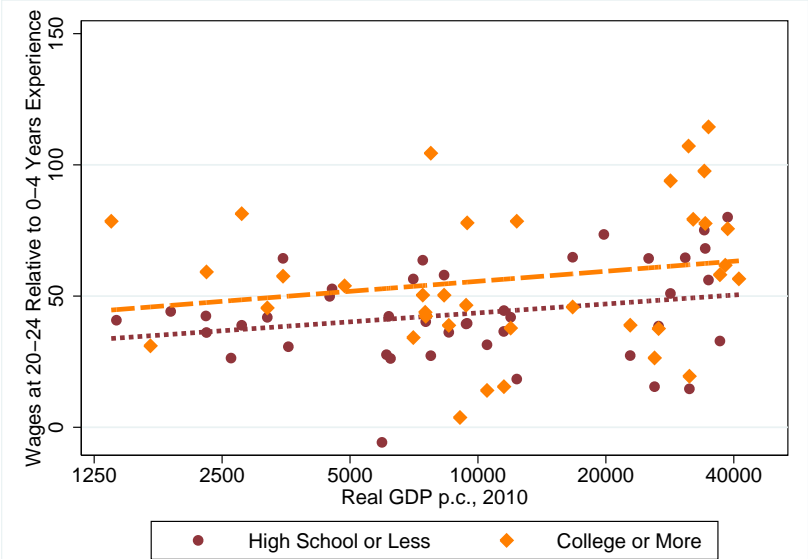
## **Recent literature: education-experience complementarity**

- Heckman, Lochner, and Todd (2006); Lemieux (2006); LMPQS (2015)
- Different from Mincer (1974)

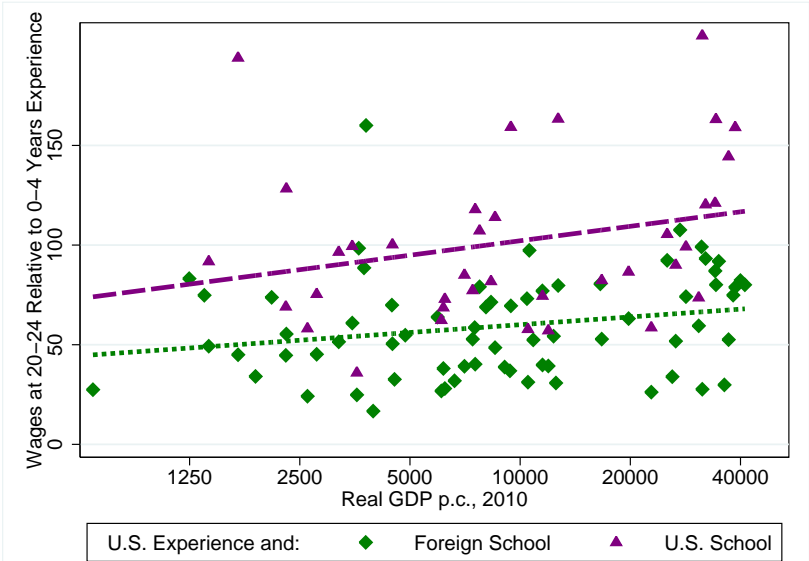
## **Unique opportunity to explore two dimensions of education**

- Quantity (college vs. high school)
- Location/quality (where it was received)

# Returns to Experience by Education Quantity



# Returns to Experience by Education Location



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# Development Accounting

**Extend Caselli (2005). Construct output, human capital:**

$$Y_c = K_c^{1/3} (A_c H_c)^{2/3}$$

$$H_c = f(s_c)g(x_c)$$

**Measure contribution of inputs as:**

$$Y_{KH,c} = K_c^{1/3} H_c^{2/3}$$

$$success_1 = \frac{\text{var}(\ln Y_{KH,c})}{\text{var}(\ln Y_c)}$$



# Development Accounting

## Two views on experience:

1. Learning-by-doing: it comes for free.
  - Experience human capital = integral of life-cycle wage profile
  - Upper bound on role of human capital.
2. Ben-Porath: result of active investment
  - Experience human capital < integral of age-earnings profile
  - Paper: provide a lower bound on role of human capital.

# Development Accounting

Human Capital Measure	Success <sub>1</sub> (1)	Slope(log(Y <sub>KH</sub> ), log(GDP)) (2)
(a) Upper Bound		
Schooling	0.44	0.64
Experience	0.53	0.68
Schooling + Experience	0.81	0.84
(b) Lower Bound		
Schooling	0.44	0.64
Experience	0.41	0.61
Schooling + Experience	0.65	0.77

# Conclusion

## **Less experience human capital in poor countries.**

- Wages rise little with poor country experience
- Equally true for migrants, non-migrants
- Little support for alternative theories.
- Development accounting: larger role for human capital

## **Some possible mechanisms**

- Much of effect explained by country of work
- Some due to quantity, country of education

EXTRA SLIDES

# Benchmark Ben-Porath Model [▶ Back](#)

- Individual born in U.S. solves

$$\max_{\{\ell_c(t)\}} \int_0^T e^{-rt} w_c(t) dt \quad \text{s.t.}$$

$$w_c(t) = \omega(1 - \ell_c(t))h_c(t)$$

$$\dot{h}_c(t) = B_c \phi(\ell_c(t))h_c(t) - \delta h_c(t)$$

$$0 \leq \ell_c(t) \leq 1$$

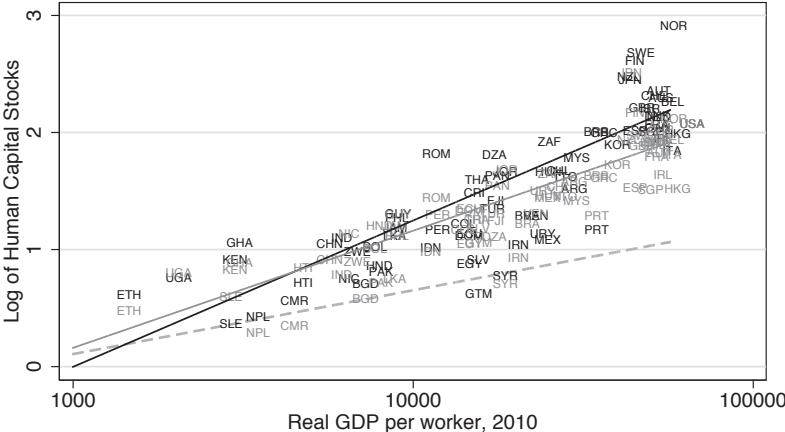
- Workers abroad solve analogous problem (with \*'s)...
- ... migrate at some experience level  $x^*$

# Possible Sources of Differences

## Three possible sources of differences in experience profiles:

1.  $B_c$  increasing in GDP per capita
2.  $\theta_c$  increasing in GDP per capita
3.  $z_{ic}$  for immigrants is increasing in GDP per capita
  - Distribution of  $z_{ic}$  increasing in GDP per capita (FOSD)

# Development Accounting



- Upper Bound of Cross-Country Variance
- - - Lower Bound of Cross-Country Variance
- ..... Human Capital Stocks from Schooling Only