Skilled Labor Productivity and Cross-country Income Differences

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June 26, 2019

The Question

Development accounting:

How important is human capital for cross-country income differences?

Context

Early literature: perfect skill substitution
$\Longrightarrow$ small contribution of human capital

- Hall and Jones (1999); Bils and Klenow (2000); Caselli (2005)

Recently: imperfect skill substitution
$\Longrightarrow$ large contribution of human capital

- important: human capital of skilled vs. unskilled
- Jones (2014), Hendricks and Schoellman (2018)

Open question:
are relative skilled labor productivity differences due to human capital?

- Caselli and Ciccone (2019), Jones (2019)

This Paper

We perform development accounting allowing for several shifters of skilled labor productivity:

1. human capital;
2. factor augmenting technologies that may be
   - 2.1 exogenous (Katz and Murphy, 1992)
   - 2.2 chosen from a technology frontier (Caselli and Coleman, 2006)
   - 2.3 due to directed technical change (Acemoglu, 2007)
3. capital skill complementarity (Krusell et al., 2000)

Main Result

Human capital accounts for close to 60% of output gaps.

Allowing for other shifters of skilled labor productivity does not diminish the role of human capital.

Baseline Model

Two countries: rich r, poor p.

Aggregate production function

$$y_c = k_c^{\alpha} \left(z_c L_c\right)^{1-\alpha} \tag{1}$$

Labor aggregator (Jones, 2014)

$$L_c = \left[\sum_{j=1}^{2} \left(\theta_{j,c} h_{j,c} N_{j,c}\right)^{\rho}\right]^{1/\rho} \tag{2}$$

Technology frontier (Caselli and Coleman, 2006)

$$\left[\sum_{j=1}^{J} \left(\kappa_j \theta_{j,c}\right)^{\omega}\right]^{1/\omega} \leq B_c^{1/\omega} \tag{3}$$

Analytical Results

The model is equivalent to one with exogenous skill bias and a higher elasticity of substitution.

Intuition: Technology choice is equivalent to increasing the elasticity of substitution.

- "short-run" elasticity: for fixed technology; likely $1.5-2$.
- "long-run" elasticity: with endogenous skill bias; calibrated $4-7$.

Development Accounting

How to perform development accounting when the skill bias of technology differs across countries?

We attribute induced changes in skill bias to labor inputs.

- similar to induced changes of k

Development accounting now works as with fixed skill bias.

- endogenous skill bias does not change development accounting

Human capital accounts for close to 60% of output gaps.

- similar to Hendricks and Schoellman (2018)

A useful finding: the contribution of human capital has a closed form solution.

Relative Skilled Labor Productivity

What fraction of skilled labor productivity differences is due to human capital?

We can estimate rich/poor human capital gaps without much model structure:

$$\frac{h_{j,r}}{h_{j,p}} = \frac{w_{j,r}/w_{j,p}}{wg_j} \tag{4}$$

- w: observed wages
- wg: migrant wage gains

Empirically, we find $2 < h_{j,r}/h_{j,p} < 3.7$.

Therefore:

- relative human capital $h_{2,c}/h_{1,c}$ is only about 1.6 times higher in the rich versus the poor country
- at most $1/3$ of relative skilled labor productivity differences are due to h

Exogenous Skill Bias

The contribution of human capital to output gaps now depends on the skill bias of technology.

Two counterfactuals:

1. $share_L^{poor}$: Increase poor country labor inputs to rich country levels.
   1.1 ranges from 50% to 57%
2. $share_L^{rich}$: Decrease rich country labor inputs to poor country levels.
   2.1 ranges from 59% to 74%

Minor changes with capital-skill complementarity.

Thank you.

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