Industrial Structure and Financial Capital Flows

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Reading Group Presentation

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Question

- Lucas: "why doesn't capital flow from rich to poor countries?"
- Standard models: $\frac{K}{N} \uparrow \Rightarrow \text{MPK} \downarrow$
  $\Rightarrow$ capital should flow to countries with low capital-labor ratios
- Two pronounced changes in the past few decades:
  - Increased integration between countries
  - Demographic changes

  $\Rightarrow$ Stronger impetus for capital to flow to poor countries

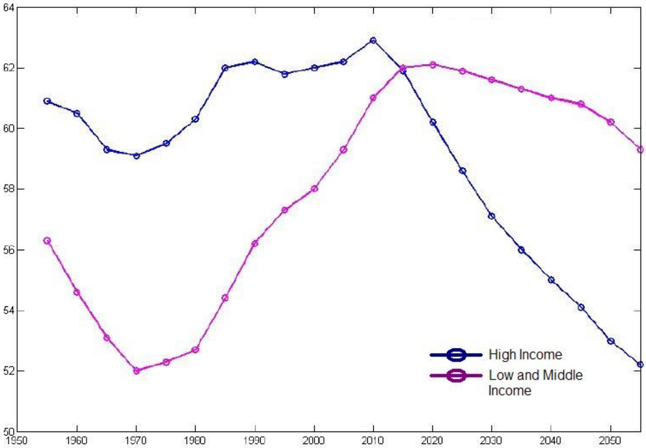

Figure: Share of working age population

- Source not clear, think it is Freeman (2004)

Answer (1)

- Standard models: only one sector, no intratemporal trade
- Romalis (2004) finds support for:
  - "Quasi-Heckscher-Ohlin prediction": abundant factor $\Rightarrow$ more production and trade of goods that use it intensively
  - "Quasi-Rybczynski effect": accumulation of a factor $\Rightarrow$ production and exports shift towards industries that use it intensively

$\Rightarrow$ Factor proportions important determinants of trade

- This paper: capital-intensive production and demand for global financial capital may be interrelated

Answer (2)

- When goods trade is included, two forces determine financial capital flows:
  1. capital tends to flow towards highest MPK
  2. capital tends to flow towards capital-intensive production ("composition effect")
- Labor abundant "South" shifts production towards labor-intensive goods, and demand for capital drops
- Capital abundant "North" shifts production towards capital-intensive goods and demand for capital increases
- Answer to Lucas: composition effect dominates

The Model

- Two-country world (n and s)
- Each country: two-period OLG economy
- Produce same set of intermediate goods $i = 1, \ldots, m$ (freely traded)
- Intermediate goods ordered by capital intensity $\alpha_1 < \alpha_2 < \ldots < \alpha_m$
- Preferences and technologies same across countries

Production

- Intermediate good:

$$Y_{it}^{j} = (K_{it}^{j})^{\alpha_i}(A_t^j N_{it}^j)^{1-\alpha_i}$$

- Final good:

$$Y_t^j = \left[\sum_{i=1}^{m} \gamma_i^{\frac{1}{\theta}} (Y_{it}^j)^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}}$$

- Indeces:
  - j: country (n or s)
  - i: intermediate good
  - t: time

Market clearing

- Output of final good:

$$Y_t^g = \sum_{j=n,s} Y_t^j = \sum_{j=n,s} C_t^j + \sum_{j=n,s} \sum_{i=1}^{m} I_{it}^j$$

- Intermediate good i:

$$Y_{it}^g = \sum_{j=n,s} Y_{it}^j = \sum_{j=n,s} c_{it}^j + \sum_{j=n,s} \sum_{k=1}^{m} I_{ki,t}^j$$

where c_{it} is the consumption demand of good i, and $I_{ki,t}$ is the investment demand of good i in sector k

Uncertainty

- Country-specific TFP:

$$ln(A_t^j) = ln(A_{t-1}^j) + \varepsilon_{A,t}^j$$

- Labor force growth:

$$ln(N_t^j) = ln(N_{t-1}^j) + \varepsilon_{N,t}^j$$

- Shocks are independent

Sector-specific capital adjustment

- Log-linear specification, incorporates adjustment costs (follows Abel (2003))

$$K^j_{i,t+1} = a \cdot (I^j_{it})^{\phi}(K^j_{it})^{1-\phi} \qquad 0 \leq \phi \leq 1$$

- Price of capital in terms of final good:

$$q^j_{it} = \left(\frac{\partial K^j_{i,t+1}}{\partial I^j_{it}}\right)^{-1} = \frac{1}{a\phi}\left(\frac{I^j_{it}}{K^j_{it}}\right)^{1-\phi}$$

- Parameter ϕ captures both depreciation and adjustment costs
- For certain choice of parameters, this specification is equivilant to standard capital adjustment up to the second order

Return to investment

- Rental earned in production of intermediate goods:

$$v_{it}^{c,j} = p_{it}\alpha_i \frac{Y_{it}^j}{K_{it}^j}$$

- Rental earned in capital adjustment:

$$v_{it}^{k,j} = q_{it}a(1-\phi)\left(\frac{I_{it}^j}{K_{it}^j}\right)^{\phi} = \frac{1-\phi}{\phi}\frac{I_{it}^j}{K_{it}^j}$$

- Total rental:

$$R_{it}^j = \frac{v_{it}^{c,j} + v_{it}^{k,j}}{q_{i,t-1}^j} = \frac{p_{it}\alpha_i Y_{it}^j + \frac{1-\phi}{\phi} I_{it}^j}{q_{i,t-1}^j K_{it}^j}$$

Consumers in country n

- Maximize lifetime utility:

$$U = u(c_t^y) + \beta \sum_{s^t} \pi(s^t) u(c_{t+1}^o)$$

- Budget constraint when young in country n:

$$c_t^{y,n} = w_t^n - \sum_{j=n,s} \sum_{i=1}^{m} q_{it}^j k_{i,t+1}^{n,j} - \sum_{s^t} p(s^t) b_{t+1}^n(s^t)$$

- Budget constraint when old in country n:

$$c_{t+1}^{o,n} = \sum_{j=n,s} \sum_{i=1}^{m} R_{i,t+1}^j k_{i,t+1}^{n,j} + b_{t+1}^n(s^t)$$

Assumptions ⇒ analytic solution

1. Production of intermediate and final goods is Cobb-Douglas ($\theta = 1$)
2. There is intragenerational trade in state-contingent assets
3. Capital-adjustment technology is log-linear
4. Log preferences

Implications of assumptions (1)

- Aggregate investment-output ratio: $\frac{I_t^g}{Y_t^g} = \psi s_l$ constant, s_l: share of labor income
- Industry investment $I_{it}^g = \mu_i I_t^g$ where $\mu_i = \frac{\alpha_i \gamma_i}{\sum_i \alpha_i \gamma_i}$, constant and increasing in α_i
- Country n's share in industry investment $I_{it}^n = \eta_{it} I_{it}^g$

$$\eta_{it} = \lambda \sum_{k=0}^{\infty} (1-\lambda)^k E_t \left[\frac{Y_{i,t+k+1}^n}{Y_{i,t+k+1}^g} \right]$$

where $\lambda < 1$ is a function of parameters

Implications of assumptions (2)

- I_{it}^n determined by n's expected, PDV of the share of future output in i
- *Aggregate* investment in n, η_t:

$$I_t^n = \sum_i I_{it}^n = \sum_i \mu_i \eta_{it} \psi s_l Y_t^g$$

$\Rightarrow \eta_t = \sum_i \mu_i \eta_{it}$

- More weight put on capital-intensive sectors
- With a labor force shock in s:
  - Compositional shifts $\Rightarrow$ less weight on sectors that contract in n (labor-intensive)
  - η_t may rise

Central predictions

- Do countries that are more specialized in capital-intensive industries run greater current account deficits?
- Do demographic patterns affect specialization patterns?

Empirics

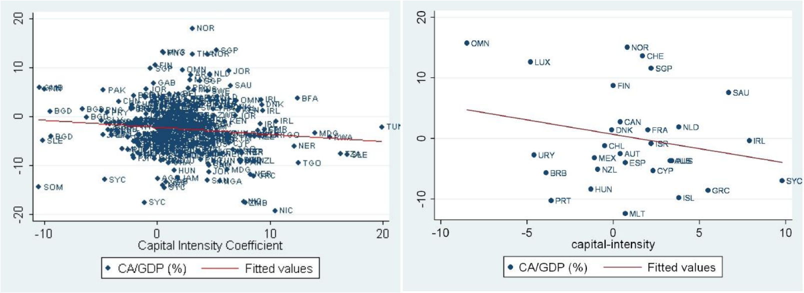

Figure: All observations (left), Rich countries in 2000 (right)