

Globalization and General Worker Training

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General Worker Training: supplies workers with skills that are not only applicable to a particular firm (apprenticeship or ongoing)

Empirical Studies:

- Firms finance GWT
Caution: Many apprentices finance themselves
(low wage, perform normal tasks)
- Decreasing number of apprentices
(Euwals and Winkelmann 01, Büchel 02)

Introduction: Explanations for decreasing GWT

Standard:

- compositional factors
- demographical factors
- changing skill requirements

Here: Globalization as alternative explanation
Globalization threatens apprenticeship systems

Introduction: Main Issues and Approach

Issues

- How does globalization affect firms' incentives to invest in general or industry-specific human capital?
- Will apprenticeship system (as e.g. in Germany) survive under global competition?
- Should governments change education policies?

Approach

- Asymmetric information in labor market (large literature) (no role of globalization)
- **Strategic interaction of firms**

Literature: Strategic Firms

Gersbach and Schmutzler (ET 2003, WP 2004)

Payoff of a firm = $\pi_i - t_i w - g_i T$

Firm i trains workers if	
Wages of trained workers decrease	Gross profits increase when all firms hire additional trained workers
Decline depends on product market competition (firms bid for trained workers)	Increase depends on product market competition and technology

Autarky: In each country k ($k = 1, 2$)

- Stage 1: $I_k \geq 2$ Firms decide on general training: $g_i \in \{0, 1\}$
- Stage 2: Turnover Game: Firms can hire each other's workers (first-price auction with competing auctioneers, wage offers w_{ij})
- Stage 3: Product market competition takes place

Globalization Scenarios:

- Full Integration: \sum firms; \sum demands; \sum workers
- Pure product market integration
- Pure labor market integration (e.g. soccer)

Assumption

Decreasing Average and Marginal Returns to Poaching

Globalization and Training Incentives: Result and Intuition

Main Result

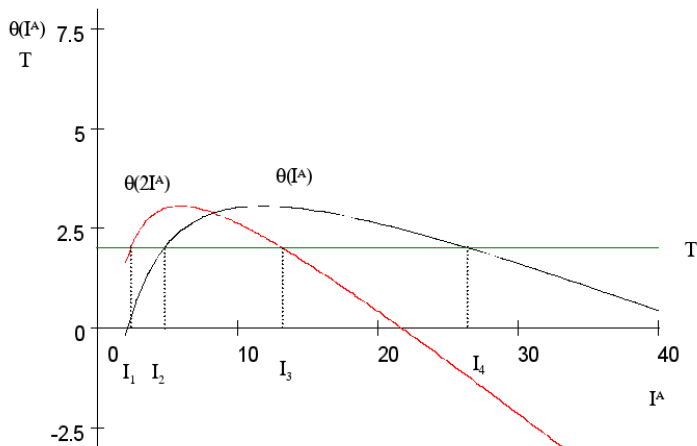
Effects of (product) market integration on training incentives are positive when the initial country sizes are small and negative when sizes are large

Intuition

- Increasing market size increases returns to training
- Increasing competition decreases them
- Product market integration raises wages of trained workers which reduces training incentives

Remark: Application for managers

Globalization and Training Incentives: Full Integration



Globalization and Training Incentives: Pure Product Market Integration

Result:

- Pure product market integration has the same effect as full integration

Intuition:

- Even though turnover game only occurs within national borders, wages depend only on willingness of two firms to bid for a worker. Willingness of firms is determined in the global product market.

Definition: Welfare = consumer surplus + producer surplus + wages

Note: Wages cancel out with costs of producers

Welfare: Without Training Effect (middle-sized countries)

Proposition

Suppose that integration does not affect training behavior. Then integration

- (iii) increases welfare*
- (iv) reduces gross profits.*

Proposition

Suppose that integration induces training,

- (ii) Prices fall*
- (iii) Welfare increases unless firms switch to a Pareto-dominated training equilibrium as a result of integration.*

Proposition

Suppose that integration destroys training. Then integration tends to decrease welfare.

Conclusion and Policy Issues: Extensions

- Similar results hold when a country opens up to another one where either
 - training is publicly funded
 - all workers have low skill
- In particular, apprenticeship systems break down if large countries integrate

- Apprenticeship systems are threatened by large scale globalization
- Policy Responses: Rebalancing costs and benefits for firms of GWT.
- Open Issues:
 - Countervailing effects (exit of firms) → Industry characteristics are key
 - General equilibrium feedback effects
 - Relative weight of explanation for GWT

- Literature
- Model and Game Structure
- Why do Firms train?
- Training Equilibria
- Globalization and Training Incentives
- Welfare
- Appendix

Literature: Globalization and human capital accumulation

Emphasis: *worker* incentives

Returns:

- Higher skill premium (Feenstra and Hanson 01)
- Higher uncertainty reduces incentives for *specific* training (Rodrik 97, Kim and Kim 00)

Costs (Cartiglia 97)

- Income effects \implies liquidity constraints
- Skill premium for instructors

We:

- Firm incentives (a considerable part of training is financed by firms)

Model and Game Structure: Example

Stage 1: Firms I choose $g_i \in \{0, 1\}$; training costs T

Stage 2: Wage offers $w_{ij} \implies t_i$ trained workers; costs

$$c(t_i) = \frac{c}{\delta t_i + 1}, \delta > 0$$

Stage 3: Inverse demand $p = a - \frac{B}{I}x$, Cournot competition \implies Profits

$$\pi_i(t_i, G) = \frac{I}{B(I+1)^2} \left(a - I c(t_i) + \sum_{j \neq i} c_j(t_j) \right)^2$$

Assumption

- Suppose two firms decide whether to train one worker
- Training lowers cost net of wage increase

Equilibria with Training

- Suppose firm 2 trains

Why do firms train?: Intuition for a simple example

- If firm 1 also trains (and no turnover occurs) the profit is $\pi(1, 2)$ - wage for trained worker ($w(2)$) - training costs
with $w(2) = \pi(2, 2) - \pi(1, 2)$
- If firm 1 does not train, competition for one trained worker (“double negative effect”). The profit is either $\pi(0, 1)$ or $\pi(1, 1)$ - wage for trained worker ($w(1)$)
with $w(1) = \pi(1, 1) - \pi(0, 1)$

Why do firms train?: Intuition for a simple example

- Training by firm 1 if
 $\pi(1, 2) - w(2) - \text{training costs} > \pi(0, 1) = \pi(1, 1) - w(1)$
- If product market competition is imperfect, we have
 $w(1) > w(2)$ and training may be profitable

Proposition

A training equilibrium in a country with I firms exists if:

$$\theta(I) \equiv \pi(1, I) - MP(1, I) - T \geq \pi(0, I - 1)$$

Main Ideas:

- $\pi(1, I)$ equilibrium gross profit
- $MP(1, I) = \pi(2, I) - \pi(1, I)$ wage in resulting turnover game
- $\pi(0, I - 1)$ net deviation profit

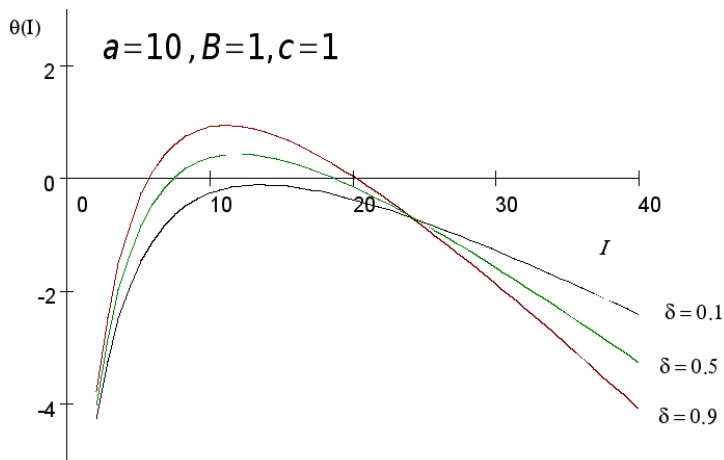
Lemma

Suppose each firm has trained one worker in period 1. Suppose $\theta(I) > T$.

Then there is an equilibrium of the turnover game where the highest wage offer for each worker is $w^ = MP(1, I)$.*

In any equilibrium each firm employs exactly one trained worker.

Globalization and Training Incentives: Typical Form of Training Incentives



Globalization and Training Incentives: Pure Labor Integration

Compare:

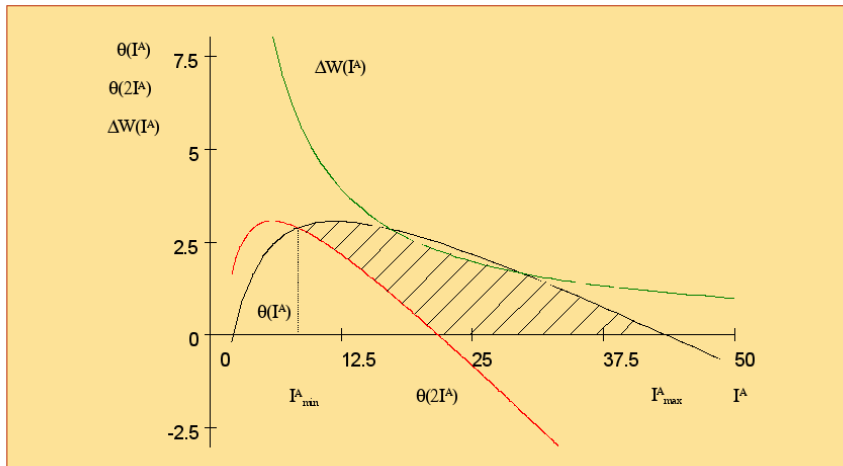
- Autarky case with I_A
- Two isolated product markets with I_A firms each, but national and international wage offers

Then:

- “No Turnover” requires robustness against international hirings
- But: International hirings are unattractive because they do not raise rival costs

Hence: Integration has little effect

Welfare: Example: Destroyed Training



$$AP(h_i, I) \equiv \frac{\pi(1 + h_i, I) - \pi(1, I)}{h_i}$$
$$MP(h_i, I) \equiv \pi(1 + h_i, I) - \pi(h_i, I)$$

Assumption

$$\max_{h_i \in \{1, \dots, I-1\}} AP(h_i, I) \leq MP(1, I);$$
$$\max_{h_i \in \{1, \dots, I-1\}} AP(h_i, I-1) \leq MP(0, I-1)$$