

Regional Trade Liberalisation in Developing Countries and Industrial Attractiveness: Evidence from the South-East Asia

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27 May 2010, WIOD Conference, Vienna

Issue discussed: Can RTA among developing countries promote regional industrialisation by increasing production share of manufactures inside the block?

The concept of the home-market effect (HME): tendency for large markets to attract disproportionate share of industry as a consequence of trade openness. (Krugman, 1980 AER; Helpman & Krugman, 1985 chap. 10)

How? constructing HME indicator in the multi-region setting.

The AFTA



Source: www.apecthai.org

Introduction

Multi-country HME concept

The model

Data and variables

Results

Conclusion

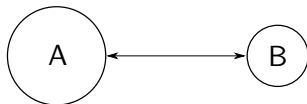
Why the multi-country setting?

- ▶ **Critics of the 2-country model:** no consideration of the 'third-country effect'.
- ▶ **Multi-country HME model:** Behrens, Lamorgese, Ottaviano, Tabuchi (2005, CORE)

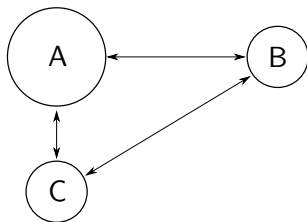
Appeal of a country as production site depends on:

- attractive factor (related to market size)
- accessibility factor (or accessibility to markets, related to trade openness).

Attractive factor (or HME in the 2-country model)

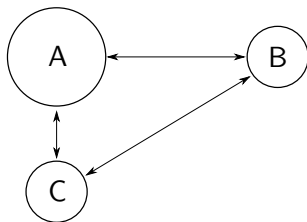


Accessibility factor and industry attractiveness

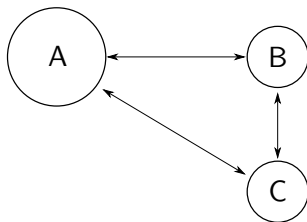


$$\phi_{AC} > \phi_{AB} > \phi_{BC}$$

Accessibility factor and industry attractiveness

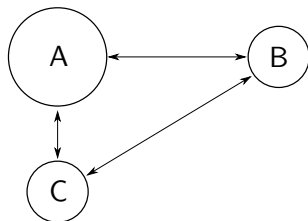


$$\phi_{AC} > \phi_{AB} > \phi_{BC}$$



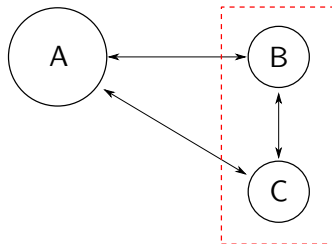
$$\phi_{BC} > \phi_{AB} > \phi_{AC}$$

Accessibility factor and industry attractiveness



$$\phi_{AC} > \phi_{AB} > \phi_{BC}$$

B and C form RTA



$$\phi_{BC} > \phi_{AB} > \phi_{AC}$$

- ▶ Economy: M countries and $S + 1$ industries (indexed by $i = 1, 2, \dots, M$ and $s = 1, 2, \dots, S + 1$)
- ▶ Monopolistic competition in international trade
- ▶ Firms are mobile internationally and choose location that maximises their profit.
- ▶ Consumer max. utility, provides labour (the only factor of production).
- ▶ **Endogenous variable:** number of firms n_i^s
→ production share $\lambda_i^s = n_i^s / \sum_s n_i^s$
- ▶ **Exogenous variables:** trade openness ϕ_{ij}^s and relative market size θ_i^s .

- ▶ Spatial equilibrium is defined as a situation in which no firms have incentive to relocate. This yields:

$$\lambda^{s*} = [\text{diag}((\Phi^s)^{-1}\mathbf{1})\Phi^s]^{-1} \theta, \quad (1)$$

with theoretical decomposition:

$$\lambda^{s*} = \alpha (\lambda^s)^{\text{size}} + \beta (\lambda^s)^{\text{hub}}. \quad (2)$$

- ▶ Attractive factor: production share when countries are assumed to differ only in market size:

$$(\lambda^s)^{\text{size}} = [\alpha]^{-1} \left[\underbrace{\lambda^{s*}}_{\text{observed}} - [\beta] \underbrace{(\lambda^s)^{\text{hub}}}_{\text{computed}} \right]. \quad (3)$$

- ▶ How to evaluate the HME in a multi-country setting?

An industry displays the HME if:

- ▶ HME indicators are positive:

$$Z_{ij}^s \equiv \underbrace{\left(\frac{(\lambda_i^s)^{size}}{\theta_i^s} - \frac{(\lambda_j^s)^{size}}{\theta_j^s} \right)}_{\neq \text{ in industry densities}} \overbrace{(\theta_i^s - \theta_j^s)}^{\neq \text{ in market sizes}} \geq 0;$$

$$Z^s \equiv \sum_{i=1}^M \sum_{j \neq i}^M \left(\frac{(\lambda_i^s)^{size}}{\theta_i^s} - \frac{(\lambda_j^s)^{size}}{\theta_j^s} \right) (\theta_i^s - \theta_j^s) \geq 0$$

- ▶ there is no ‘industrial leap-frogging’ (ranking of industry density and market sizes match):

$$\theta_i^s > \theta_j^s \longrightarrow \frac{\lambda_i^{size}}{\theta_i^s} > \frac{\lambda_j^{size}}{\theta_j^s}. \quad (4)$$

- ▶ **Necessary variables:** production share λ_i^{s*} ; expenditure share θ_i^s ; trade openness matrix Φ^s .

- ▶ **Construction of variables:**

- Country- i production share in good- s :

$$\lambda_i^s = \frac{PROD_i^s}{\sum_j PROD_j^s} \quad \text{PROD: country-}i\text{'s output of good-}s;$$

- Expenditure share of country- i in good- s :

$$\theta_i^s = \frac{Y_i + \sum_s (M_i^s - X_i^s)}{\sum_j \left[Y_j + \sum_s (M_j^s - X_j^s) \right]} \quad M_i^s = \sum_j M_{ij}^s \quad X_i^s = \sum_j X_{ij}^s$$

- Trade openness

$$\widehat{\phi}_{ij}^s = \sqrt{\frac{X_{ij}^s X_{ji}^s}{X_{ii}^s X_{jj}^s}} \quad X_{ii}^s \text{ and } X_{jj}^s \text{ are export to oneself.}$$

- ▶ **Required data:** industry-level production and bilateral trade flows, GDP (for the year 2004)
- ▶ **Sources:**
 - Trade and Production database by the CEPII (the CEPII's BACI + the OECD's STAN to expand the World Bank's database);
 - Trade, Production and Protection database by the World Bank (COMTRADE + UNIDO);
 - World Economic Outlook database by the IMF.
- ▶ **Country sample:**
 - AFTA: IDN, MYS, PHL, SGP, THA (merged together as the ASEAN-5);
 - Selected EU countries: AUT, DEU, ESP, FIN, FRA, GBP, ITA, POR, SWE;
 - Asia and the Pacific countries: AUS, CHI, IND, JPN, KOR, USA.

Table: Classification of manufacturing industries at the 3-digit ISIC Rev. 2 level

Tech. int.	ISIC	Name	Tech. int.	ISIC	Name	
Low	311	Food products	ML	362	Glass and products	
	321	Textiles		369	Other non-metal min. prod.	
	322	Wearing apparel		371	Iron and steel	
	323	Leather products		372	Non-ferrous metals	
	324	Footwear		381	Fabricated metal products	
	331	Wood prod. expt. furniture		390	Other manufactured prod.	
	332	Furniture expt. metal		MH	351	Industrial chemicals
	341	Paper and products			382	Machinery expt. electrical
342	Printing and publishing	385	Prof. and sci. equipment			
ML	355	Rubber products	MHH	352	Other chemicals	
	356	Plastic products		383	Machinery electric	
	361	Pottery china earthenware		384	Transport equipment	

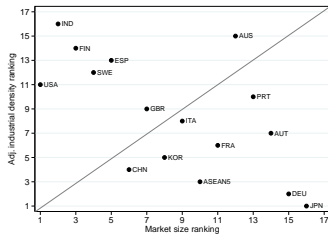
Table: The Z^S indicators at the 3-digit ISIC level in 2004

ISIC	Name	M	Dropped countries	Z^S	No. of Z_{ij}^S computed	% of $Z_{ij}^S > 0$	ϕ^S ($\times 10^{-3}$)
311	Food	16		-40.19	120	22	0.269
321	Textiles	16		-35.04	120	18	0.220
322	Apparel	16		-21.76	120	22	0.169
323	Leather	15	FIN	-22.50	105	20	0.040
324	Footwear	13	AUT, FIN, PRT	-47.96	78	18	0.028
331	Wood	15	PRT	-33.80	105	19	0.068
332	Furniture	14	FIN, PRT	-30.33	91	18	0.099
341	Paper	15	PRT	-39.49	105	17	0.191
342	Printing	15	PRT	-37.92	105	11	0.080
351	Ind. Chem.	16		-55.15	120	19	0.306
352	Oth chem.	16		-50.74	120	18	0.177
355	Rubber	16		-49.89	120	13	0.108
356	Plastic	16		-37.05	120	18	0.120
361	Pottery	13	FIN, PRT, SWE	-31.17	78	15	0.014
362	Glass	16		-46.36	120	11	0.076
369	Non-metal	16		-39.34	120	13	0.068
371	Iron/steel	14	FIN, PRT	-30.84	91	18	0.413
372	Nf. metals	14	AUT, PRT	-44.82	91	5	0.341
381	Metal prod.	16		-47.05	120	18	0.196
382	Machines	16		-70.32	120	25	0.289
383	Mach. elec.	16		-56.02	120	27	0.268
384	Transport	16		-107.82	120	21	0.355
385	Prof./sci.	16		-56.68	120	23	0.177
390	Misc.	16		-26.84	120	23	0.125

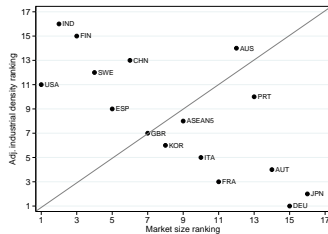
→ On average, all industries display reverse HME.

Ranking of adjusted densities $\lambda_i^{size}/\theta_i$ and market sizes θ_i shows 'industrial leap frogging', thus no HME.

- ▶ However, the ASEAN5 is still a relative attractive production site.



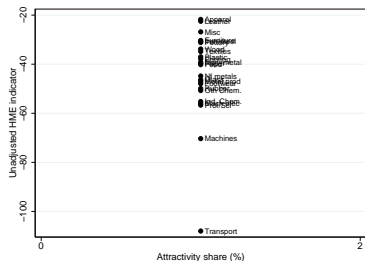
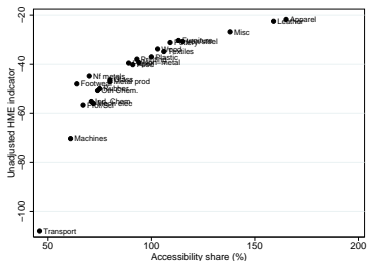
(a) 383: Machinery electrics



(b) 384: Transport equipment

Figure: Market size ranking and industry agglomeration in 2004

Attractive factor cannot explain spatial distribution of industries in our country sample (no HME) but accessibility factor can:



Decomposition of the unadjusted HME indicators $Z(\lambda^{S*})$ into accessibility factor $Z((\lambda^S)^{hub})$ and attractive factor $Z((\lambda^S)^{size})$

Conclusion

- ▶ RTA can make the ASEAN-5 a fairly attractive region to manufacturing firms though industry attractiveness (or observed industrial density) is not associated with market enlargement mechanism (no HME).
- ▶ Accessibility factor can explain industrial attractiveness in the ASEAN-5.
 - Trade openness induces dispersion force of agglomeration from relatively large markets to the benefit of the smaller ones.

Instead of increasing market size, the ASEAN-5 can promote accessibility factor. How?

- ▶ Increase trade freeness by reducing intra- and inter-regional trade costs (transport and non-transport frictions)

- ▶ Behrens *et al.* (2007)
 - Transport frictions (transportation network & tech.)
 - benef. locally and globally, yields high attractive capacity;
 - Non-transport frictions (tariffs & standard regulations)
 - benef. locally, yields less attractive capacity.

Further issues:

- ▶ Including comparative advantage in the model (Behrens *et al.*, 2009) esp. when considering trade among asymmetric economies.
 - Here, C.A. is included in the accessibility factor.
- ▶ Econometric application (gravity specification of monopolistic competition model in int'l trade).
- ▶ Consider firm heterogeneity for the HME in order to understand firm strategy on location (potential problem: firm-level data in ASEAN countries).

Thank you for your attention