

Market access, economic geography
and comparative advantage: an
empirical test

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1. Introduction

AIM:

- Analysis of the effects of idiosyncratic local demand on domestic production in two models:
 - NEG model (Krugman, 1980)
 - Increasing returns to scale
 - Trade costs
 - Demand conditions and distribution
 - **Home-market effects**
 - Neoclassical model: Heckscher-Ohlin
 - Comparative advantages
 - Constant returns to scale
 - **No home-market effects**
- ...in order to identify, under which conditions, the home-market effect will occur.

2. Theoretical fundamentals (1)

- Model of Krugman (1980)
 - Monopolistic competition, 2 countries, 2 classes of goods, each with many varieties
 - 2 identical countries except their demand structure
 - 2 types of consumers: each specialized to consume all varieties of one of the 2 classes of goods
 - Constant mark-ups, free entry: same equilibrium output across countries
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2. Theoretical fundamentals (2)

- Relative output:

$$\mu = \frac{\lambda - \sigma}{1 - \lambda\sigma}$$

- Deviation of production structures with idiosyncratic demand:

$$\frac{\partial \mu}{\partial \lambda} = \frac{1 - \sigma^2}{(1 - \lambda\sigma)^2} > 1$$

3. Methodology and data (1)

- Heckscher–Ohlin model, output function:

$$(1) \quad X_{ngc} = \Omega_{ng} V_c$$

$$(2) \quad X_{nc} = \sum_{g=1}^{G_n} X_{ngc} = \overline{\Omega}_n V_c$$

- X_{ngc} : X_{ngROW} : total output in industry n of good g for country c and resp. the rest of the world
- V_c : vector of endowment of country c
- Ω : inverse of the technology matrix
- Ω_{ng} : the row corresponding to the g th good in industry n .
- Ω_n : the n th row for industry output
- G_n : the number of products in industry n

3. Methodology and data (2)

- 2 stages: **SHARE, IDIODEM (with endowments)**

$$X_{ngc} = \alpha_{ng} + \beta_1 \text{SHARE}_{ngc} + \beta_2 \text{IDIODEM}_{ngc} + \Omega_{ng} V_c + \varepsilon_{ngc}$$

$$\text{SHARE}_{ngc} \equiv \gamma_{ngROW} X_{nc} \quad \text{IDIODEM}_{ngc} \equiv (\tilde{\delta}_{ngc} - \tilde{\delta}_{ngROW}) X_{nc}$$

- 2 stages: **SHARE, IDIODEM (without endowments)**

$$X_{ngc} = \alpha_{ng} + \beta_1 \text{SHARE}_{ngc} + \beta_2 \text{IDIODEM}_{ngc} + \varepsilon_{ngc}$$

- D_{ngc} : country's demand for a good produced in many locations
- \tilde{D}_{ngc} \tilde{D}_{ngROW} : derived demand facing producers in a particular location resp. in ROW
- $\gamma_{ngROW} \equiv X_{ngROW} / X_{nROW}$: share of good g in industry n in ROW and varies with c
- $\tilde{\delta}_{ngc} \equiv \tilde{D}_{ngc} / \tilde{D}_{nc}$: share of good g in industry n 's derived demand in country c

3. Methodology and data (3)

- Estimations of β_2

- the location of demand does not matter for the pattern of production

$\beta_2 = 0$ Frictionless world (comparative advantage or IRS)

- demand and production are correlated, but production does not rise in a more than one-for-one manner

$\beta_2 \in (0, 1]$ Comparative advantage with frictions

- demand and production are correlated, but production rises in a more than one-for-one manner

$\beta_2 > 1$ Economic geography

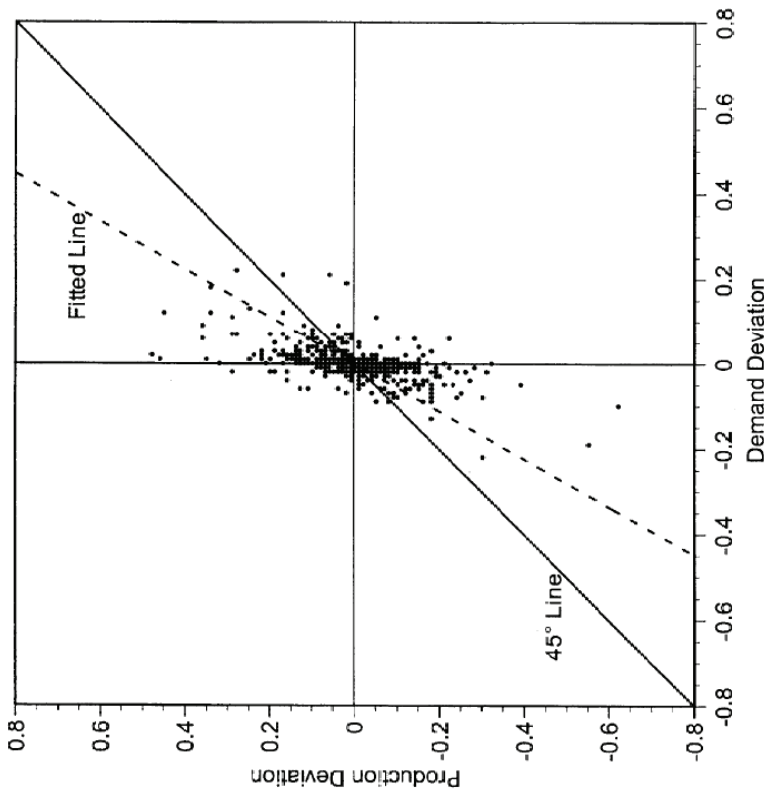
3. Methodology and data (4)

- OECD's Compatible Trade and Production (COMTAP) data set
 - 13 members of the OECD with 4-digit ISIC level
(Australia, Belgium/Luxembourg, Canada, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, UK, USA)
 - 22 members of the OECD with 3-digit ISIC level
(+ Austria, Denmark, Greece, Ireland, New Zealand, Portugal, Spain, Turkey, Yugoslavia)
 - average demand over the period 1970–1975 and other variables for 1985
 - 4 estimations exercises
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4. Estimations

- First view of data (without endowments) and $\beta_F = 1$

$$\gamma_{ngc} - \gamma_{ngROW} = \frac{\alpha_{ng}}{X_{nc}} + \beta_2 \left(\tilde{\delta}_{ngc} - \tilde{\delta}_{ngROW} \right) + \tilde{\varepsilon}_{ngc}$$



5. Results (1)

■ Test 1: Pooled runs (with output equation with endowments)

Pooled runs (Dependent variable is 4-digit output; standard errors below estimates)

	1	2	3	4
IDIODEM	1.67	1.67	1.57	1.57
	0.05	0.05	0.10	0.10
SHARE	0.96	0.92		
	0.01	0.02		
EXPORTD		0.07		0.01
		0.02		0.04
FACTORS	No	No	Yes	Yes
Observations	650	650	650	650

IDIODEM is idiosyncratic demand, SHARE is the share of 4-digit output in 3-digit output in the rest of the world, EXPORTD is a dummy variable that is one if the country is a net exporter of the good, and FACTORS indicates whether the coefficients on factor endowments were allowed to differ across 4-digit sectors. No indicates that the coefficients on factor endowments were constrained to be the same for every 3-digit sector; Yes means they varied by 4-digit sector.

5. Results (2)

- Test 1: Limits

- Problem of simultaneity

Solutions:

- demand variable based on an **average of demands** in the countries 10 to 15 years prior to the estimation period
 - **EXPORTD**, variable that controls for some of the potential price effects in the regression.
- Differences in technologies across countries

5. Results (3)

■ Test 2: Individual sectors runs (4-digit)

- half of the sectors have coefficients on IDIODEM > 1
- Some industries are constant and others increasing returns to scale.
- **Home market effects** are very much in evidence

Industry	Adj. R^2	IDIODEM
Canning and preserving of fruits and vegetables	0.91	12.08 3.46
Soap and cleaning preparations, perfumes,	0.90	12.95 4.35
Radio, television and communication equipment	0.97	13.45 1.54
Tanneries and leather finishing	0.92	5.87 0.63

5. Results (4)

- **Test 3: Industry-pooled runs**
 - over half of the industries have coefficients on IDIODEM > 1
 - **Home market effects**, except for « other chemicals » and « non-electrical machinery »
 - **Home market effects** for electrical machinery and transportation equipment sectors although they do not have estimates > 1 (while high value added sectors)

Industry	IDIODEM	Obs.
Food products	2.51	104
Beverage industries	0.28	26
	1.11	
	0.61	
Textiles	1.79	78
	0.20	
Leather	2.17	26
	0.39	
Wood products	2.16	39
	0.23	
Paper and pulp	0.89	39
	0.57	
Industrial chems.	1.02	39
	0.86	
Other chemicals	0.28	52
	0.77	
Other non-metallic mineral product	0.91	39
	0.30	
Fabricated metals	1.49	52
	0.48	
Machinery, except electric	0.11	78
	0.36	
Electrical mach.	0.42	52
	0.44	
Transportation equip.	0.69	26
	0.92	

5. Results (5)

■ Test 4: 3-digit runs

- 9 of 26 sectors have point estimates > 1
- **Home market effects** are in evidence, but it is disappointing for some sectors (“Machinery”)

Industry	Adj. R^2	IDIODEM
Food products	0.72	18.28
Textiles	0.83	17.41
Machinery except electrical	0.92	62.64
Transport equipment	0.91	20.35
		-5.40
		2.48
		1.42
		1.25

6. Conclusion

Economic significance:

- Pooled runs:
 - β -coefficient around 0.15
- Sectors runs:
 - β -coefficients typically around 0.5
- **Home market effects** are important for a broad segment of OECD countries.