14.54 International Trade
— Lecture 18: Consequences of Increasing Returns — Theory and Evidence

1. Predictions for the Pattern of Trade
2. Home-Market Effect
3. Firm Heterogeneity

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1. Predictions for the Pattern of Trade

Predictions for the Pattern of Trade

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Predictions for the Pattern of Trade (Cont.)

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- One could also assume that both clothing and food are differentiated products and produced by monopolistically competitive industries

Predictions for the Pattern of Trade: Summary

- Inter-industry trade reflects comparative advantage: based on differences in factor abundance or technology (Ricardian)
- Intra-industry trade need not reflect comparative advantage
- The pattern of intra-industry trade is unpredictable, but the volume of trade is determined by country size
    - Leads to gravity predictions for trade
- The relative importance of intra and inter industry trade depends on both differences in comparative advantage and country size
    - Given differences in comparative advantage and country size, intra-industry will be more likely in sectors where products are more differentiated
    - If more differentiated goods are produced with more skill/capital intensive technologies, then more developed countries will have relatively more intra-industry trade

Figures 6-6, 6-7, and Table 6-3 from *International Economics* removed due to copyright restrictions.
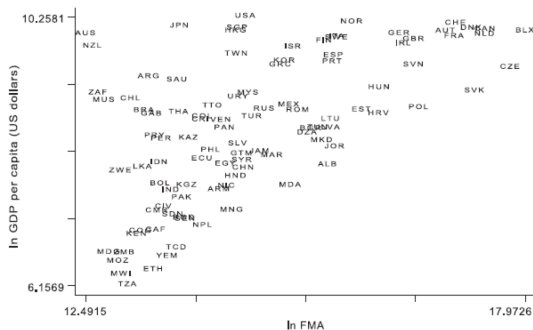
2. Home-Market Effect

Trade Costs and the Effects of Market Size

- Consider trade between two countries (or regions) of different size
- If there are no trade costs, then firms are indifferent about their choice of location (small or large market)
    - In equilibrium, wages will equalize across markets and firm location will be proportional to market size
- Now consider what happens if there are trade costs?
    - Are firms still indifferent about their choice of location?
        - No: At equal wages, firms will prefer to locate in the larger market
    - What effect will this have on wages and the aggregate pattern of production?
        - Either wages will rise in the larger market or more firms will locate in the larger market –or both!
        - This is often referred to as the home market effect
        - There is strong empirical evidence for both, but especially the effect on wages

Empirical Evidence on the Home Market Effect

- Large countries will be attractive locations for firms, and firms will thus pay higher factor prices (notably wages, but to other immobile factors) to locate there
- This effect will also be important for small countries that are located close to large markets (such as Belgium)
- How important is geography in explaining differences in factor prices (GDP per capita) across countries?
- Very important! Consider the effect on GDP per capita of moving developing countries next to Europe (specifically, the location of Hungary):
  - Paraguay: 58%
  - Sri Lanka: 67%
  - Zimbabwe: 80%

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Empirical Evidence on the Home Market Effect: Total Market Access (Including Domestic Market)

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3. Firm Heterogeneity

Adding Technology Differences Between Firms

- There are massive differences in both size and productivity (technology) across firms, even within narrowly defined sectors
- There are also very important interactions between firm characteristics and the effects of trade
  - Only a small proportion of firms in a sector export
  - The firms that export use very different technologies than the remaining firms that do not export
  - Trade liberalization (reductions in trade costs) affect these different firms in very different ways
    - Non-exporting firms are more likely to exit
    - Exporting firms are more likely to expand
    - This has very important consequences for the effects of trade

Exporting By U.S. Manufacturing Firms, 2002

NAICS industry	Percent of firms	Percent of firms that export	Mean exports as a percent of total shipments
311 Food Manufacturing	6.8	12	15
312 Beverage and Tobacco Product	0.7	23	7
313 Textile Mills	1.0	25	13
314 Textile Product Mills	1.9	12	12
315 Apparel Manufacturing	3.2	8	14
316 Leather and Allied Product	0.4	24	13
321 Wood Product Manufacturing	5.5	8	19
322 Paper Manufacturing	1.4	24	9
323 Printing and Related Support	11.9	5	14
324 Petroleum and Coal Products	0.4	18	12
325 Chemical Manufacturing	3.1	36	14
326 Plastics and Rubber Products	4.4	28	10
327 Nonmetallic Mineral Product	4.0	9	12
331 Primary Metal Manufacturing	1.5	30	10
332 Fabricated Metal Product	19.9	14	12
333 Machinery Manufacturing	9.0	33	16
334 Computer and Electronic Product	4.5	38	21
335 Electrical Equipment, Appliance	1.7	38	13
336 Transportation Equipment	3.4	28	13
337 Furniture and Related Product	6.4	7	10
339 Miscellaneous Manufacturing	9.1	2	15
Aggregate manufacturing	**100**	**18**	**14**

Sources: Data are from the 2002 U.S. Census of Manufactures.

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Exporter Premia in U.S. Manufacturing, 2002

|	Exporter premia		
	(1)	(2)	(3)
Log employment	1.19	0.97	
Log shipments	1.48	1.08	0.08
Log value-added per worker	0.26	0.11	0.10
Log TFP	0.02	0.03	0.05
Log wage	0.17	0.06	0.06
Log capital per worker	0.32	0.12	0.04
Log skill per worker	0.19	0.11	0.19
Additional covariates	None	Industry fixed effects	Industry fixed effects, log employment

Sources: Data are for 2002 and are from the U.S. Census of Manufactures.
Notes: All results are from bivariate ordinary least squares regressions of the firm characteristic in the first column on a dummy variable indicating firm's export status. Regressions in column 2 include industry fixed effects. Regressions in column 3 include industry fixed effects and log firm employment as controls. Total factor productivity (TFP) is computed as in Caves, Christensen, and Diewert (1982). "Capital per worker" refers to capital stock per worker. "Skill per worker" is nonproduction workers per total employment. All results are significant at the 1 percent level.

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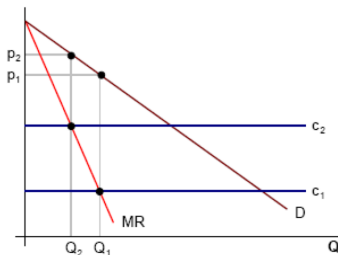
Technology Differences and Monopolistic Competition

- Now assumes that there are a large number of firms in a sector that have different technologies, hence different levels of marginal cost c
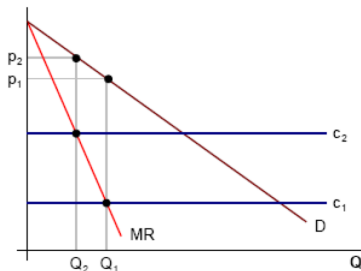
- A firm with better technology (lower c) will
  - Be bigger: higher output Q and revenues pQ
  - Set a lower price, but at a higher markup $p - c$
  - Earn higher profits $\pi = pQ - cQ - F$ (assume same F across firms)
- There will be a cost cutoff c^* such that any firm with higher cost c would earn negative profits and exit

Technology Differences and Trade

- Assume that 2 identical countries with similar technology differences across firms open up to trade
- What if there are no trade costs? Then all firms will export
- What happens when there are trade costs?
  - Either per-unit trade costs (transport, tariff, insurance) or fixed trade costs (marketing, distribution, product regulation)

- Then only more productive firms (lower c) will export

Technology Differences and Trade Liberalization

- What happens when trade costs fall?
- More entry on domestic market and more import competition: so residual demand curve shifts in
- What happens to cutoff firm with cost c that was just breaking even?
- It exits, as do some other firms with high cost c (there is a new higher cutoff c)
- Export sales for exporting firms increase (lower trade costs) and this effect dominates lower sales on the domestic market
- What happens to aggregate productivity?
    - It rises, due to composition effect: exit of least productive firms, and expansion of more productive exporting firms
    - This composition effect may also explain differences in perception concerning the effects of trade

Evidence on the Effects of Trade Liberalization

There is now mounting evidence that trade liberalization induces such composition effects:

- Chilean trade liberalization 1979-85: two-thirds of 19% productivity increase is driven by composition effects
- U.S.: a 1% decrease in trade costs is associated with a 4% increase in the probability of exit of non-exporting firms in that sector (overall exit probability is 27%). (There is virtually no change in the probability of exit of exporting firms.)
- Canada: US-Canada free trade agreement 1989-96
  - Lower Canadian tariff effects on import competing Canadian sectors:
    - A 12% employment decrease and 15% increase in productivity (half comes from composition effects)
  - Lower US tariff effects on Canadian export sectors:
    - No employment change and 14% increase in productivity

Evidence on the Effects of Trade Liberalization

- There is also mounting evidence that trade liberalization leads to substantial increases in the number/variety of products traded
- Percentages represent varieties imported by the US from Mexico as a fraction of the total varieties imported by the US

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