GEOGRAPHICAL ECONOMICS "B"

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week 5

The background of geographical economics: trade theories

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1 Economic Geography and Trade

The background and basis of Geographical Economics

1. Urban Economics
2. International Trade Theory
3. Macroeconomics and Growth
4. Microeconomics – spatial competition

1.0.1 Neoclassical Trade Theory

International Trade Theories

The actors of the economy are countries

- Each country has characteristics, but no spatial expansion

Main theoretical schools

1. Ricardo and comparative advantages
2. Heckscher-Ohlin and factor abundance
3. Krugman, Grossman-Helpman: New trade theory
4. Melitz: New-new trade theory

Ricardo

- Two countries (England, Portugal), workers with different abilities
- Two products: clothes and wine
- Two inputs: high- and low-skilled workforce
- England: relatively more high-skilled
- Consumers: identical preferences
- Autarchy: Since England produces clothes easier, they will be cheaper there; for the same reason wine will be cheaper in Portugal
- Open economy: prices equalize, more expensive clothes and cheaper wine in England

- Thus England has an incentive to specialize in clothes
- Factor prices equalize between the two countries
- = inter-industry trade

Heckscher-Ohlin – Factor Abundance

- 2x2x2 model (2 countries, 2 factors, 2 products
- Heckscher, Ohlin, Samuelson, Vanek
- Two countries (England, Portugal), this time with the same production technology
- But: different factor abundance (e.g. capital) and the two products have different factor demand
- = Endogeneous difference in productivity (Ricardo: exogeneous)

Heckscher-Ohlin – Factor Abundance
Assumptions

- Identical production technology in the two countries (Ohlin: long run model)
- Factor mobility within countries (between the two sectors), but no mobility between countries
- CRS technology (first order homogeneous),e.g. Cobb-Douglas: α,$1-\alpha$
- The two products have different factor use
- $$T = K^{0.7}L^{0.3}, \quad B = L^{0.6}K^{0.4} \tag{1}$$
- Competitive market
- product prices equalize internationally
- There are no transportation and transaction costs

Heckscher-Ohlin – Factor Abundance
Main results

- The country rich in capital (England) exports capital intensive goods (textile) (**H-O theorem**)
- When the quantity of a factor grows (e.g. immigration) the production of the good intensive in that factor (wine) grows more than proportionally (**Rybczynski theorem**)
- If the price of a product (e.g. wine) grows in the world market, then this will increase the relative price of the factor (labor) intensively needed for the production (**Stolper-Samuelson theorem)**
- If there is free trade, the factor prices equalize in the world (**theorem of price equalization**)

Heckscher-Ohlin – Factor Abundance
The empirical results are mixed

- Holding all the assumptions the results are weak
- Main problem is factor price equalization
- Transportation and transaction costs
- Other aspects, e.g. agglomeration

1.1 New Trade Theory

New Trade Theory
Krugman (1979, 1980), Helpman-Krugman (1985)

- Reality 1: the results of H-O tests are that similar countries trade a lot
- Reality 2: Grubel and Lloyd (1975) shows, that intra-industry trade is very important
- Reality 3: Large firms: internal returns to scale are very important (Ohlin had already said it)
- **Krugman talk**

New Trade Theory
Krugman (1979) "Increasing Returns, Monopolistic Competition and International Trade" JIE

- Two countries with similar size: Germany, France
- Same factor abundance and technology
- But: there is internal returns to scale: linear cost function plus fixed costs
- = Thus, a firm can endogeneously reduce its costs by producing more
- Dixit-Stiglitz (1977) monopolistic competition (*next week*): there are more types of goods *within* an industry
- Consumers love variety (*next week*), the certain goods are not perfect substitutes of each other

New Trade Theory
Krugman (1979) basis

- The firms would like to be as big as possible – market size is the constraint
- Trade liberalization: good for both countries' firms – they can produce more and cheaper
- But: the number of products/country decreases, while the number of products available for a consumer increases
- Welfare effects: lower prices and more goods/consumer

New Trade Theory
Krugman (1980) "Scale Economies, Product Differentiation, and the Pattern of Trade, AER

- The continuation of the former, but there are transportation costs and the welfare effect is caused only by the increased number of goods (no increasing production/firm is needed)
- Different country size!

New-new Trade Theory

Melitz, Marc 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity". Econometrica

- Firms trade not countries
- Appearance of micro database
- Firm heterogeneity, each firm produces a distinct product, monopolistic competition, continuation of Krugman (1980)
- Export is concentrated at few firms, only productive firms are capable of exporting
- The variation of products available for a consumer depends on the characteristics of the country and the transportation costs
- Economic policy: distribution of resources across firms – the more productive will survive competition (liberalization)

1.2 Applications and examples

International Trade – Applications

Market potential (Harris 1954)

- $$MP_i = \sum_{j=1}^{n} \frac{M_j}{T_{ij}}, \; T_{ij} = f(D_{ij}) \tag{2}$$
- where M_j is the demand of region j, T_{ij} is the transportation cost, which is a function of distance, D
- Advantage: good empirical results: in the case of US states production correlates with market potential
- Disadvantage: lack of theory

International Trade – Applications

Gravity

- Introduction of transaction/transportation costs (Tinbergen, 1962)
- The trade between two countries depends simply on the size of the countries and the distance between them:
$$TF_{ij} = a\frac{M_i M_j}{D_{ij}} \tag{3}$$
- $$\ln(TF_{ij}) = a + \beta_1 \ln(M_i) + \beta_2 \ln(M_j) - \beta_3 \ln(\mathbf{D}_{ij}) + \epsilon_{ij} \tag{4}$$
- where $\mathbf{D}_{ij}$ is the vector of transportation parameters
- e.g. distance, port, language, colonial connections, etc.

International Trade and Geography: an example
Barbie doll, 1990's

Example 1 *"The raw materials for the doll (plastic and hair) are obtained from Taiwan and Japan. Assembly used to be done in those countries, as well as the Philippines, but it has now migrated to lower-cost locations in Indonesia, Malaysia, and China. The molds themselves come from the United States, as do additional paints used in decorating the dolls. Other than labor, China supplies only the cotton cloth used for dresses. Of the $2 export value for the dolls when they leave Hong Kong for the United States, about 35 cents covers Chinese labor, 65 cents covers the cost of materials, and the remainder covers transportation and overheads, including profits earned in Hong Kong." (Feenstra, 1998, p. 35-36)*

Key terms

- Comparative advantages (R)
- Factor abundance (H-O)
- Market potential
- Gravity equation
- Intra-industry trade

Bibliography
Fundamental work:

- Paul Krugman és Elhanan Helpman: Market Structure and Foreign Trade, Cambridge, MA: MIT Press, 1985.

A good summary about some important innovations

- http://web.mit.edu/krugman/www/dixit.html

http://nobelprize.org/nobel_prizes/economics/laureates/2008/ecoadv08.pdf
Required reading :-)

- http://web.mit.edu/krugman/www/mushy.html

2 Geography and transportation costs

2.1 Iceberg

Basis

- BGM Chapter 3.6
- Transportation cost – a necessary element
- Samuelson (1952) iceberg transportation costs – a part melts. Cost = what does not arrive
- = von Thünen – wheat falling off from the wagon
- $T > 1$ units of good need to be shipped to ensure that 1 unit arrives, e.g. $T_{AB} = T^{D_{AB}}$, where D_{AB} is the distance between A and B. If $D = 0$, $T = 1$
- Advantage: there is no separate transportation sector

Trade costs

- Transportation costs matter
- Why? Suppose there are no costs.
- The output of Hungarian industry is $85.8 billion (2006)
  - $40 billion was selled in Hungary, $46 billion is export
  - But: the Hungarian GDP: $138bn, world GDP$54600bn. Thus 99.7% have to be foreign.
  - 99.7%-46/85.8= 46% is "missing"
- An other example: Hungary vs Slovak Rep. (thanks to Miklós Koren)
  - $2bn (out of 46 –>4.3%) Slovak R. But: Slovakian GDP is 54.4% of the Hungarian
  - Thus, 92% is "missing"(1-4.3/54.4%)

Trade costs

- Source: James E. Anderson - Eric van Wincoop (2004) TRADE COSTS, http://www.nber.org/papers/w10480
  - Limao, Nuno and Anthony J. Venables (2001), "Infrastructure, Geographical Disadvantage, Transport Costs and Trade," World Bank Economic Review, 15, 451-79.
  - Hummels, David (2001), "Toward a Geography of Trade Costs", working paper, Purdue University
- How can we measure them?

1. Directly asking about transportation costs and time from suppliers
2. From the volume of trade
3. From prices

Direct measuring

- From shipping firms
- The prices are subscribed differently, e.g.:
  - Ex works (EXW) before the shipping
  - Free on board (FOB) the product is already on board
  - Cost, insurance, freight (c.i.f) the product has already arrived (tranportation and insurance costs have already been payed)
- Generally:
- export: FOB
- import: cif

Trade costs

- Barbie doll example: the price of materials is $1, the final price (USA) is $10.
- Regarding an average developed country the transportation cost is 170% $T = 2.7$
- Three main components of total transportation costs
  - the local distribution (55%)
  - approximately half of international transportation (21%) is transportation costs, the other half waiting etc. – inverted costs
  - the costs connected to the border passing (44%)
- $T = T_{he} * T_{tr} * T_{hat} = 1.55 \cdot 1.21 \cdot 1.44 = 2.7$
- Interesting: in the case of an ordinary country without ocean port, the costs are 55% higher
- Interesting: Air transportation costs (tons/km): $1250 (1955) — $100 (2004)

Border

- All in all 44%
- Out of which
  - 8% trade-policy obstacles (e.g. tariffs, dumping)
  - 7% linguistic obstacles
  - 14% different currency
  - 6% information
  - 3% security
- There are great differences according to country/product
- Felbmayer-Toubal – make it more precise

Fixed costs

- Trade does not only have variable (proportionate) costs
- = Critique of the model
- Reality: plenty of 0s in bilateral trade
- Firm level: fixed costs for exporting

The thing that has changed the world