Neue Erkenntnisse der Außenwirtschaftstheorie – von Ricardo bis Melitz

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Institute for International Economics and Development
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Interindustry Trade between different countries: Comparative Advantage – Ricardo + Heckscher Ohlin
Austria and Germany

Interindustry Trade between similar countries:
New trade theory – Krugman + Melitz

Austrian Exports

Austrian Imports
Gains from Trade

Lower prices because of lower costs!

Theories differ in focusing on different reason for lower costs

Traditional trade theories: Ricardo and Heckscher Ohlin

New trade theory: Krugman Melitz
Traditional Trade Theories

Ricardo: Differences in technology

Heckscher Ohlin: Differences in factor endowment → Differences in factor prices

Comparative, not absolute Advantage
Technology: Labour input

<table>
<thead>
<tr>
<th></th>
<th>1 unit of wine requires labour</th>
<th>1 unit of cloth requires labour</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>1.25</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

Absolute advantage:
Portugal

Comparative advantage:
Portugal – wine
England - cloth

Labour endowment: England = Portugal = 125
Production Possibility

<table>
<thead>
<tr>
<th></th>
<th>Wine</th>
<th>Cloth</th>
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<tbody>
<tr>
<td>England</td>
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<td></td>
</tr>
<tr>
<td>Labour input per unit</td>
<td>1.25</td>
<td>1</td>
</tr>
<tr>
<td>Output</td>
<td>100</td>
<td>125</td>
</tr>
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<td>Labour input per unit</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Output</td>
<td>250</td>
<td>125</td>
</tr>
</tbody>
</table>
### Relative prices without trade

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</table>

\[
\frac{P_C}{P_W} = 0.8
\]

\[
\frac{P_C}{P_W} = 2
\]

Production = Consumption

- \[
\text{England: } \frac{-1}{1.25} = -0.8
\]
- \[
\text{Portugal: } \frac{-1}{0.5} = -2
\]
International trade

\[
0.8 = \left( \frac{P_C}{P_W} \right)_{\text{England}} < \left( \frac{P_C}{P_W} \right)_{\text{World}} = 1 < \left( \frac{P_C}{P_W} \right)_{\text{Portugal}} = 2
\]
Comparative advantage: Consequences of international trade

- Specialisation in production: sector with comparative advantage is increased
- Trade pattern: commodity with comparative advantage is exported
- Welfare gain: consumption above production possibilities
Comparative advantage: Consequences of international trade 2

- Distribution of gains: might be uneven within a country
  factors in export sector gain
  factors in “import sector” loose

Upgrading

might be uneven between countries
small countries gain more
unequal factor remuneration
between countries may persist
Comparative advantage: Consequences of international trade 3

- **Adjustment requirements:** workers have to switch sector rigid wages – unemployment – lower gains

- Trade in components and trade in services

- Adjustment of factor remuneration versus adjustment of (un)employment rates
Simple empirical tests-1: Seminal study by Stern (1962)

Fig. 1. Scatter diagram of American and British ratios of output per worker and quantity of exports, 1950.
Simple empirical tests-2: Revealed comparative advantage

Brändle, Vautier: Schweizer Exportwirtschaft langfristig gut positioniert. Die Volkswirtschaft, 2009)
Intraindustry Trade between similar countries

International trade lowers prices because

Bigger markets – higher output
  – lower per unit cost

Fixed costs – eg R&D

Monopolistic pricing
Bigger firms

Intraindustry trade

Welfare gain: lower prices
increased product variety

Less distributive conflicts

Adjustment processes simpler
Simple empirics: Grubel Lloyd index of intra-industry trade

\[
\text{(index of intra-industry trade)} = \frac{\text{Minimum of imports and exports}}{\frac{1}{2} (\text{Imports} + \text{exports})}
\]

<table>
<thead>
<tr>
<th>Product</th>
<th>Value of Imports ($ millions)</th>
<th>Value of Export ($ millions)</th>
<th>Index of Intra-Industry Trade (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf clubs</td>
<td>$284</td>
<td>$226</td>
<td>89%</td>
</tr>
<tr>
<td>Vaccines</td>
<td>2,027</td>
<td>2,763</td>
<td>85</td>
</tr>
<tr>
<td>Whiskey</td>
<td>1,166</td>
<td>752</td>
<td>78</td>
</tr>
<tr>
<td>Mattresses</td>
<td>133</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>Golf carts</td>
<td>29</td>
<td>86</td>
<td>50</td>
</tr>
<tr>
<td>Small cars</td>
<td>40,527</td>
<td>11,778</td>
<td>45</td>
</tr>
<tr>
<td>Natural gas</td>
<td>12,391</td>
<td>2,790</td>
<td>37</td>
</tr>
<tr>
<td>Sunglasses</td>
<td>848</td>
<td>184</td>
<td>36</td>
</tr>
<tr>
<td>Frozen orange juice</td>
<td>3</td>
<td>17</td>
<td>33</td>
</tr>
<tr>
<td>Apples</td>
<td>139</td>
<td>752</td>
<td>31</td>
</tr>
<tr>
<td>Large-passenger aircraft</td>
<td>4,955</td>
<td>31,322</td>
<td>27</td>
</tr>
<tr>
<td>Telephones</td>
<td>761</td>
<td>71</td>
<td>17</td>
</tr>
<tr>
<td>Men’s shorts</td>
<td>542</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

US 2009; Source: Feenstra, Taylor, 2011
Simple empirics: gravity equation

- Newton’s law of gravitation:
  \[ F = G \frac{m_1 m_2}{\text{dist}^2} \]

- Trade analog:
  \[ T_{ij} = c \frac{\text{GDP}_i \cdot \text{GDP}_j}{\text{dist}_{ij}^\gamma} \]
Simple empirics: gravity equation

\[ \text{Trade} = 93 \frac{GDP_1 \cdot GDP_2}{\text{dist}^{1.25}} \]

(a) Trade between U.S. States and Canadian Provinces

Lower GDP or farther apart: \( \text{Gravity term} = \frac{GDP_1 \cdot GDP_2}{\text{dist}^{1.25}} \)

Higher GDP or closer together

Source: Feenstra, Taylor, 2011
Simple empirics: gravity equation

\[
\text{Trade} = 1,300 \frac{GDP_1 \cdot GDP_2}{dist^{1.25}}
\]

Lower GDP or farther apart

Gravity term \(= \frac{GDP_1 \cdot GDP_2}{dist^{1.25}}\)

Higher GDP or closer together

Source: Feenstra, Taylor, 2011
Melitz – Basic idea: Heterogenous firms

- Firm productivity $\varphi$ is distributed;
- Fixed entry cost $f \Rightarrow$ firms enter only if $\varphi \geq \varphi^*_a$ (zero cutoff productivity)
- Revenue and profits are increasing in firm productivity $\varphi$
- With trade: additional fixed cost to enter export market $f_x \Rightarrow$ firms enter export market only if $\varphi \geq \varphi^*_x$
- Zero cutoff profit increases $\varphi^*_a < \varphi^*$ (selection effect of trade)
Melitz – Consequences of international trade

- average firm productivity increases
- only firms with high productivity export (2nd firm selection effect)
- firms active only on domestic market lose revenue and market shares
- firms active on both markets gain revenue and market shares

FIGURE 2.—The reallocation of market shares and profits.
Dynamic effects of international trade 1

Growth effects – learning and human capital accumulation

ambiguous arguments
<table>
<thead>
<tr>
<th>Trade fosters economic growth</th>
<th>Trade hinders economic growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade offers additional learning possibilities</td>
<td>Trade hinders learning at home</td>
</tr>
<tr>
<td>Export, import and FDI offer access to foreign technology</td>
<td>Trade may lead to a specialisation in „wrong“ sector</td>
</tr>
<tr>
<td>Melitz: selection of more productive firms</td>
<td>Trade may prevent a sheltered learning period „Late comer“ „infant industries“</td>
</tr>
</tbody>
</table>
Costs and Benefits of a Tariff: Importing country Situation without tariff

The diagram illustrates the market conditions before the imposition of a tariff. The graph shows the supply (S) and demand (D) curves for imports.

- **Price (P):** The depicted price is $P_W$.
- **Quantity (Q):** The quantities before and after the tariff are represented by $Q_{S1}$ and $Q_{D1}$, respectively.
- **Imports:** The shaded area indicates the volume of imports.

The diagram does not include specific numbers or data points, focusing instead on the conceptual representation of how tariffs affect the market equilibrium.
Costs and Benefits of a Tariff: Importing country Situation with tariff

Price increase – Imports decline

consumer loss = \((a + b + c + d)\)

producer gain = \((a)\)

government revenue gain = \((c)\)

Net effect = \((-b - d)\)
New Economic Geography NEG – Central question

How does the spatial distribution of economic activity look like in the long-run?

- Equally distributed among regions
- Agglomerated in one region
- Unevenly distributed over regions
GDP per head, PPP, 2007
Spatial distribution of economic activity: Explanation patterns

- Solow growth model
- Heckscher-Ohlin model of international trade
- New Economic Geography model
Explanation patterns: Solow growth model in a multi-country setting

Factor endowments: labour, capital, technical knowledge – growing

Connection between regions: not much,
sometimes technological spill-overs
No commodity trade and no factor mobility

Differences between regions: growth rate of population
and technical knowledge
“savings rate” for physical and human capital
distance to steady state

Consequence: countries grow at specific rates;
con-/divergence
Explanation patterns: Heckscher Ohlin model of international trade

Factor endowments: labour, capital – given

Sectors: agriculture and manufacturing

Connection between regions: commodity trade, but no factor mobility

Differences between regions: factor endowment

Consequence of deeper integration: specialization in production according to factor endowment
Explanation patterns: New Economic Geography

Factor endowments: labour, capital – given

Sectors: agriculture and manufacturing

Connection between regions: commodity trade and factor mobility

Differences between regions: no differences

Consequence of deeper integration: Self-reinforcing agglomeration processes (in most NEG models via factor mobility)
Explanation patterns: New Economic Geography
1. Dixit Stiglitz monopolistic competition with iso-elastic demand functions
   Price setting: Constant mark-ups on (constant) marginal costs including transport cost
   Profits are higher in the bigger market

2. Iceberg trade cost: Location of firm matters
   Firms are selling to all markets, but profits are higher if local market is bigger

3. Factor mobility: according to profit rate differentials
Krugman’s story: Self reinforcing agglomeration processes

Footloose entrepreneur model: firm, capital and expenditure
Move simultaneously

Pivotal: Size of local market for a single firm
depends on overall market size in the region
number of firms in region

Interplay between
- Market size effect (positive feed-back – agglomeration)
- Competition effect (negative feed-back – dispersion)
- Price index effect (positive feed-back – agglomeration)
Krugman’s picture: Tomahawk diagramme

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Krugman’s picture: Tomahawk diagramme

- Competition effect dominates
- Market size effect dominates

Share of capital in region 1

Trade Freeness

Catastrophic Agglom.
Endogen.
Asymmetr.
History matters
Irreversibil.
Hysteresis
Krugman’s picture: Tomahawk diagramme

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- Catastrophic Agglom.
- Endogen.
- Asymmetric
- History matters
- Irreversibility
- Hysteresis
Conclusions 1: explanation patterns for regional disparities

- regional Solow growth
- Heckscher Ohlin
- New economic geography
Conclusions 2: New Economic Geography

- NEG mechanism: Factor relocation – market potential – market crowding
  not Marshallian externalities

- NEG implications:
  sudden and irreversible agglomeration
  circular causation
  depending on small differences
Thank you for your attention!

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