Border effect and market potential in the European Union

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Outline

- Introduction: “accessibility” and “border effect”
- Our objective: improving accessibility measures
- Background: market potential and border effect
- Methodology: market potential with border effect
- Results: the effect of borders on market potential
- Conclusions: relevance for EU policies
- Further research: disaggregating the border effect
Introduction

Access to GDP by car

Schürmann & Talaat, 2002.

Potential accessibility to markets

ESPON, 2009
Introduction

Border effect

<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Location</th>
<th>Other things being equal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>McCallum</td>
<td>US-Canadian border</td>
<td>22 times</td>
</tr>
<tr>
<td>1996</td>
<td>Wei</td>
<td>Europe</td>
<td>1.7 times</td>
</tr>
<tr>
<td>2000</td>
<td>Nitsch</td>
<td>European countries</td>
<td>7 to 10 times</td>
</tr>
<tr>
<td>2004</td>
<td>Chen</td>
<td>EU countries</td>
<td>6 times on average</td>
</tr>
</tbody>
</table>
Our objective

• To improve current measures of accessibility to markets in an international framework

HOW?

• Accounting for borders as trade barriers
Background

Defining accessibility

The potential for interaction

- Distance
- Transport infrastructure

- Opportunities at destination
- Mass of destination

- Other barriers to trade
Defining other barriers to trade

The border effect

Trade decreases with distance

Borders exaggerate this trend
Methodology

Measuring accessibility

The market potential indicator

\[ A_i = \sum_j M_j \frac{\alpha}{t_{ij}} \]

Distance
Transport infrastructure

Opportunities at destination
Mass of destination
Methodology

Measuring accessibility with border effect

The market potential indicator

Distance + Opportunities at destination

Transport infrastructure Mass of destination

Other barriers to trade

\[ A_i = \sum_j \frac{1}{b} \frac{1}{M_j} \frac{1}{t_{ij}^\alpha} \]
Methodology

Measuring the border effect

Our choice of a gravity model

\[ \ln X_{ij} = \beta_0 + \beta_{1\text{home}} + \beta_2 \ln Y_i + \beta_3 \ln Y_j + \beta_4 \text{adj}_{ij} + \beta_5 \ln D_{ij} + \epsilon_{ij} \]

- Mass at origin (*National production*)
- Mass at destination (*GDP*)
- Distance (*Euclidean, Network, Travel time, Cost*)
- Existence (or not) of an international border: *home*
- Adjacency (or not) between countries

Chen, 2004
Methodology

Estimating the border effect

Data sources - Country

- Export flows: Manufactured goods, 2009 (COMEXT, EUROSTAT)
- Mass at origin: National production, 2009 (SBS & COMEXT, EUROSTAT)
- Mass at destination: GDP, 2009 (RGA, EUROSTAT)
- Distance (Ferry and road network, travel time and GTC, TRANSTOOLS)
Methodology

Estimating the market potential

Data sources – NUTs 2 & 3

– Mass at destination: GDP, 2010 (EUROSTAT)
– Distance and travel time (Ferry and road network, ETISPlus)
### Results

**Border effect**

<table>
<thead>
<tr>
<th></th>
<th>EU24 (exc. CY LU MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Euclidean</td>
</tr>
<tr>
<td>Home</td>
<td>0.795*</td>
</tr>
<tr>
<td>Ln Distance ij</td>
<td>-1.520*</td>
</tr>
<tr>
<td>Ln Production i</td>
<td>0.860*</td>
</tr>
<tr>
<td>Ln GDP j</td>
<td>0.792*</td>
</tr>
<tr>
<td>Adj ij</td>
<td>0.214**</td>
</tr>
<tr>
<td>Observation</td>
<td>24 x 24</td>
</tr>
<tr>
<td>S.E.R.</td>
<td>0.726</td>
</tr>
<tr>
<td>R²</td>
<td>0.893</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.892</td>
</tr>
<tr>
<td>Border effect [exp.home]</td>
<td>2.215</td>
</tr>
</tbody>
</table>

*, ** denote significance value of t-statistics at 0.01 and 0.05, respectively.
Results. Market potential NUTs 2
Results. Market potential NUTs 3

Market potential

Market potential with border effect

Source: Own work from ETISplus and EUROSTAT.
Results. Market potential NUTs 3

Market potential

Market potential with border effect

Source: Own work from ETISPlus and EUROSTAT.
Results. Market potential NUTs 3

Source: Own work from ETISPlus and EUROSTAT.
Results. Loss of market potential

Network Distance (ND)

Travel Time (TT)

Percentage

- < 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- > 50
Conclusions

• International borders still affect intra-European trade

• International accessibility needs to be calibrated with border effect estimations to avoid overestimation

• The border effect also needs to be integrated in distance decay estimations
Conclusions

• Some regions and countries are more influenced by the border effect than others:
  ▪ Low internal potential
  ▪ Small size
  ▪ Close to large economies
Further research

• What is the role of the MAUP in estimating the border effect and the market potential?

• Estimating and integrating per country and bilateral country-to-country border effect
Questions?

Thank you for your attention

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