Negative Externalities of Structural Vacant Offices

Philip Koppels and Hilde Remøy
Introduction

Negative Externalities and Structural Vacancy

• High levels of (structural) vacancy
• Concentration in specific areas and buildings
• Social security & criminality

• Negative externalities related to structural vacant buildings?

• Positive externalities are often assumed
  • Landmark buildings
  • Public space: proximity to parks & water bodies

• Difficult to measure and quantify: spatially lagged variables
  • Function of distance
Introduction

Negative Externalities and Structural Vacancy

Source: Thibodeau (1990)
Introduction

Negative Externalities and Structural Vacancy

- Isolating the effect:
  - Market conditions: rental adjustment equation
  - Omitted variables: proxy for neighborhood quality
Structural Vacancy

Operationalization

- “Structural” nature: three consecutive years
- Visibility of vacancy: at least 50% of the building is vacant
Number of Structural vacant buildings = 1
2004
Number of Structural vacant buildings = 8
2005
Number of Structural vacant buildings = 17
2006

Number of Structural vacant buildings = 34
2007

Number of Structural vacant buildings = 32
2008

Number of Structural vacant buildings = 29
2009

Number of Structural vacant buildings = 38
2010
Number of Structural vacant buildings = 54
Research Method

Hedonic Pricing

Data sample:
- 152 buildings
- 334 transactions
- 2003-2010
Model Specification

Spatial Segmentation

- Discrete spatial Heterogeneity
- 12 submarkets
- Modelled by random effects
Model Specification

Discrete Spatial Heterogeneity

Rent

Submarket A  Submarket B  Submarket C  X coordinate
Model Specification
Omitted Variables

- Nested model:
  - Submarkets
  - Postcode area’s
  - Buildings
- Modelled by random effects
Model Specification

General Economic Trend (City-wide)

Nominal Rent Level

Model Specification
Sub-market Specific Economic Trends

Nominal Rent Level

- Centre
- South-East
- South-axis

Map indicating geographical locations.
Building size (GFA)

- 40,000 m²
- 500 m²

- office buildings
- structural vacant office buildings
Model Specification
Spatially Lagged Variable

How to measure distance:
- As the crow-flies
- Along the road network
Model Specification

Spatially Lagged Variable

Weight factor

Distance

R=150m.  R=250m.  R=500m.  R=750m.
$$= \frac{1}{450} \times 1 \times 10,000 +$$

$$= \frac{1}{300} \times 1 \times 10,000 +$$

$$= \frac{1}{50} \times 1 \times 1,000$$

$$= 22.22 + 33.33 + 20 = 75.55$$

Impact depends on:
- Distance
- Building size
Negative Externalities of Structural Vacant Offices

- Best performing model assumes:
  - Constant distance relationship with threshold distance at 250m.
  - Distance measured: as the crow-flies

- Impact: independent of the size of the structural vacant building
<table>
<thead>
<tr>
<th>Effect</th>
<th>Transformation</th>
<th>Estimate</th>
<th>Std. Err.</th>
<th>Pr &gt;</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>51.167</td>
<td>0.2667</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Building age</td>
<td>Logarithmic</td>
<td>-0.06412</td>
<td>0.01621</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>Travel time to highway</td>
<td>Logarithmic</td>
<td>0.01296</td>
<td>0.02816</td>
<td>0.6457</td>
<td></td>
</tr>
<tr>
<td>Intercity location (r=250m): Yes</td>
<td></td>
<td>0.03733</td>
<td>0.05951</td>
<td>0.5310</td>
<td></td>
</tr>
<tr>
<td>Intercity location (r=250m): No</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Distance tram/metro stop</td>
<td>Logarithmic</td>
<td>-0.01702</td>
<td>0.02837</td>
<td>0.5491</td>
<td></td>
</tr>
<tr>
<td>Daily amenities</td>
<td>Logarithmic</td>
<td>0.02676</td>
<td>0.02033</td>
<td>0.1901</td>
<td></td>
</tr>
<tr>
<td>Employment industry</td>
<td>Logarithmic</td>
<td>-0.00001</td>
<td>0.000027</td>
<td>0.5967</td>
<td></td>
</tr>
<tr>
<td>Employment F&amp;B</td>
<td>Logarithmic</td>
<td>0.03777</td>
<td>0.02738</td>
<td>0.1707</td>
<td></td>
</tr>
<tr>
<td>Inverse parking ratio</td>
<td>Logarithmic</td>
<td>0.1154</td>
<td>0.03405</td>
<td>0.0008</td>
<td></td>
</tr>
<tr>
<td>Garage: No</td>
<td></td>
<td>-0.09504</td>
<td>0.03125</td>
<td>0.0025</td>
<td></td>
</tr>
<tr>
<td>Garage: Yes</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Number of floors</td>
<td>Logarithmic</td>
<td>0.05236</td>
<td>0.02718</td>
<td>0.0549</td>
<td></td>
</tr>
<tr>
<td>Façade: Low/Standard</td>
<td></td>
<td>-0.03755</td>
<td>0.02961</td>
<td>0.2056</td>
<td></td>
</tr>
<tr>
<td>Façade: High</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Company logo: No</td>
<td></td>
<td>-0.02808</td>
<td>0.02359</td>
<td>0.2348</td>
<td></td>
</tr>
<tr>
<td>Company logo: Yes</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Size of entrance as % of total LFA</td>
<td>Logarithmic</td>
<td>0.02787</td>
<td>0.01406</td>
<td>0.0482</td>
<td></td>
</tr>
<tr>
<td>Numb. Structural Vacant offices (r=250m)</td>
<td></td>
<td>-0.02332</td>
<td>0.01203</td>
<td>0.0537</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion & Discussion

**Negative Externalities and Structural Vacancy**

- Base model seems plausible
- Significant relationship structural vacant offices and rent prices nearby buildings
- Vicious circle?
- Collective action

- Some issues to consider
  - Proxy
  - Weight matrix specification
  - Submarket dummies
Questions?

Contact author:

p.w.koppels@tudelft.nl