Restricted housing supply, house prices and household preferences

Evidence from the Netherlands

Jan Möhlmann

Joint work with Mark van Duijn and Jan Rouwendal
Background and research questions

- Strong influence of (local) government on land use in the Netherlands
- What are the preferences of households for local amenities and housing types?
- Can policies on housing types affect the regional distribution of the population?
Structure

- Sorting model

Data description
  - Households
  - Regions

Results
  - Willingness to pay
  - Scenario simulation

Conclusions
Sorting model

- Logit model estimates the probability a household locates in region $n$ (1...118) and housing type $j$ (1...4)
Sorting model

- Logit model estimates the probability a household locates in region $n$ (1...118) and housing type $j$ (1...4)

- Utility depends on:
  - Regional characteristics
  - Housing type (rental, apartments, terraced, detached)
  - Interaction with household characteristics

$$u_{i,j,n} = a_{0,i} Price_{j,n} + \sum_{k=1}^{K} a_{k,i} \text{ Regional characteristics}_{k,n} + \varphi_i \text{ House type}_j + \xi_n + \epsilon_{i,j,n}$$
Sorting model

- Endogeneity problem with unobserved characteristics

- Solution: two-step model
  - Step 1: estimate parameters for interaction terms and obtain alternative specific constants
  - Step 2: use alternative specific constants to estimate the household-independent parameters with 2SLS

\[ u_{i,j,n} = \alpha_{0,i} Price_{j,n} + \sum_{k=1}^{K} \alpha_{k,i} \text{Regional characteristics}_{k,n} + \varphi_{i} \text{House type}_{j} + \xi_{n} + \epsilon_{i,j,n} \]
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Data (households)

- Data come from Dutch Housing Survey 2012

- 57,276 households

Household characteristics:

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple</td>
<td>0.63</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Children</td>
<td>0.35</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Average education</td>
<td>0.30</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Average age</td>
<td>51.7</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>
Data (regions)

- 118 regions based on 415 municipalities

- Regional characteristics independent of dwelling type (except prices)

Regional characteristics:

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<tr>
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<th>Min.</th>
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</tr>
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<tbody>
<tr>
<td>Distances to nearest 100,000 jobs (in km)</td>
<td>12.6</td>
<td>3.6</td>
<td>32.8</td>
</tr>
<tr>
<td>Distance to nearest intercity train station (in km)</td>
<td>7.5</td>
<td>1.5</td>
<td>27.8</td>
</tr>
<tr>
<td>Distance to nearest highway onramp (in km)</td>
<td>4.1</td>
<td>1.0</td>
<td>20.3</td>
</tr>
<tr>
<td>Share of surface being nature (in %)</td>
<td>13.8</td>
<td>0.4</td>
<td>65.8</td>
</tr>
<tr>
<td>Size of historical city centre (in km²)</td>
<td>0.9</td>
<td>0</td>
<td>13.3</td>
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</tbody>
</table>
Data (regions)

- Prices are based on hedonic price model, adjusted for size, # of rooms, etc.

Prices of a ‘standard house’ for detached houses
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Willingness to pay

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
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<tbody>
<tr>
<td>Proximity to jobs (km)</td>
<td>4167</td>
</tr>
<tr>
<td>Proximity to station (km)</td>
<td>-800</td>
</tr>
<tr>
<td>Proximity to highway (km)</td>
<td>38</td>
</tr>
<tr>
<td>Nature (%)</td>
<td>673</td>
</tr>
<tr>
<td>Historical city</td>
<td>3845</td>
</tr>
<tr>
<td>Terraced house</td>
<td>667</td>
</tr>
<tr>
<td>Detached house</td>
<td>39104</td>
</tr>
</tbody>
</table>
WTP for detached houses differs between households

- Model
- Data
- Results
- Conclusions
Simulating housing stock in Amsterdam

<table>
<thead>
<tr>
<th>Owner-occupied houses</th>
<th>Existing housing stock</th>
<th>Scenario 1</th>
</tr>
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<tr>
<td>Apartments</td>
<td>73.2%</td>
<td>63.2% (− 10%)</td>
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<tr>
<td>Terraced housing</td>
<td>21.1%</td>
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Simulating housing stock in Amsterdam

### Existing housing stock vs. Scenario 1

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### Results

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<td>Apartments</td>
<td>280,000</td>
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+ 0.7%  
0%  
- 4.5%
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## Owner-occupied houses

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### Results

- **Couples**
  - **Existing housing stock**: 30%
  - **Scenario 1**: 35.6%
  - Increase: +5.6%

- **Households with children**
  - **Existing housing stock**: 20%
  - **Scenario 1**: 24.3%
  - Increase: +4.3%

- **Higher education**
  - **Existing housing stock**: 20%
  - **Scenario 1**: 20.1%
  - Increase: +0.1%

- **Age**
  - **Existing housing stock**: 20%
  - **Scenario 1**: 20.9%
  - Increase: +0.9%

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**Data**

- **Model**
- **Results**
- **Conclusions**
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- Positive WTP for detached housing, not much difference between apartments and terraced housing
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- Positive WTP for detached housing, not much difference between apartments and terraced housing

- Large differences in WTP for housing types depending on single/couple, children and age, smaller effect for education
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- Positive WTP for detached housing, not much difference between apartments and terraced housing

- Large differences in WTP for housing types depending on single/couple, children and age, smaller effect for education

- Housing stock has significant impact on population demographics
Questions?

Thanks for your attention!