Location choices of highly educated foreign workers: the importance of urban amenities

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Or Levkovich and Jan Rouwendal

Abstract

Current developed economies’ growth becomes increasingly dependent on the performance of innovation and skill-intensive industries. Therefore, the ability of cities to attract skilled or highly-educated individuals becomes more and more important for their growth and economic development. In this research we estimate a residential sorting model in order to shed light on the factors that determine the location choices of foreign skilled workers. We do so by estimating their valuation of various urban amenities in the municipalities of the densely populated province of Zuid-Holland, and investigating which amenities increase the attractiveness of these municipalities. We also consider heterogeneity in individual preferences, and compare housing preferences and marginal willingness to pay for amenities between groups based on skill levels and origin. We find that work related amenities such as jobs, accessibility and concentration of knowledge intensive industries, are highly valued by both domestic and migrants with high-education. Our results also provide evidence that social amenities, such as an existing community of migrants in a municipality, has an important role in determining the attractiveness of a location.
Location choices of highly educated foreign workers: the importance of urban amenities

Or Levkovich and Jan Rouwendal
Vrije Universiteit - Amsterdam
Introduction

• Current developed economies are increasingly dependent on innovation and skill-intensive industries.
• Cities’ growth potential depend on their ability to attract workers with high human capital.

• In this research we use estimations of the sorting model to:
  • Investigate the location preferences of skilled migrants, and their valuation of urban amenities.
  • Compare preferences of different population groups.
  • Calculate marginal willingness to pay for urban amenities.

• Preliminary stages of research
Method

• **Residential sorting model** (Bayer, McMillan, Rueben, 2004)
  
  • Households maximize their utility by choosing a residential location.
  
  • Households with different characteristics have different preferences, and they value urban amenities differently.
  
  • The sorting model allows estimating choice probabilities, and calculating (average and individual) marginal willingness to pay values.
Method (II)

• Two step estimation: ★
  • First step – Estimating multinomial logit to obtain:
    1. Choice probabilities (assuming housing market equilibrium)
    2. Cross effect coefficients
    3. Mean indirect utilities from each location

• Second step – Explaining the vector of mean indirect utilities using (instrumented) urban amenities.

• The coefficients from both steps are used to calculate MWTP
Method (III)

• **Instruments**: Price and share of migrants
  • Instrument rise naturally from the mode – set unobserved element to be equal to zero.
  • Price instrument = Price vector that clears the market assuming no unobserved heterogeneity
  • Share of migrants instrument – The counterfactual share of migrants that would prevail if no unobserved amenities exist.
The sorting model – estimation of the steps

\[ V_{i,n} = \sum_{k=1}^{K} \beta_{0,k} X_{k,n} + \xi_n + \sum_{k=1}^{K} \left( \sum_{l=1}^{L} \beta_{k,l} (Z_{i,l} - \bar{Z}_l) \right) X_{k,n} + \varepsilon_{i,n} \]

\[ V_{i,n} = \delta_n + \sum_{k=1}^{K} \left( \sum_{l=1}^{L} \beta_{k,l} (Z_{i,l} - \bar{Z}_l) \right) X_{k,n} + \varepsilon_{i,n} \]

\[ Pr_{i,n} = \frac{e^{V_{i,n}}}{\sum_{n=1}^{N} e^{V_{i,n}}} , \quad \sum_{i=1}^{I} Pr_{i,n} = S_n \]

\[ \delta_n = \sum_{k=1}^{K} \beta_{0,k} X_{k,n} + \xi_n \]
Marginal willingness to pay

\[
\frac{\delta P_n}{\delta X_{k,n}} = \frac{(\beta_{0,k} + \sum_{l=1}^{L} \beta_{k,l}(Z_{i,l} - \bar{Z}_l))}{(\beta_{0,p} + \beta_{p,l}(Z_{i,l} - \bar{Z}_l))} P_n
\]

\[
\frac{\delta P_n}{\delta X_{k,n}} = \frac{\beta_{0,k}}{\beta_{0,p}} P_n \quad , \quad Z_{i,l} = \bar{Z}_l
\]
Choice of urban amenities and household characteristics

- **Urban Amenities:**
  - Housing prices
  - Work related: Number of Jobs, Accessibility, ICT sector LQ
  - Recreation and nature: Nature coverage, Official monuments
  - Social: Share of migrants (positive and negative effects)

- **Household characteristics:** Age, Kids (dummy), Income, Skill level (dummy), Migrant status (dummy).
Data and study area

- **Household location choices and characteristics:** WoON 2012 housing survey (BZK)
- **Urban Amenities:** Dutch CBS

- **Study area:** 71 municipalities in the province of Zuid-Holland (incl. Rotterdam, Den-Haag, Leiden, Delft, Dordrecht and Gouda)
Zuid-Holland - Provision of urban amenities

Accessibility

Legend
Municipalities
Accessibility
- 2786.079000 - 3988.416000
- 3988.416001 - 5124.809000
- 5124.809001 - 6803.313000
- 6803.313001 - 7432.645000
- 7432.645001 - 8192.019000
- 8192.019001 - 9484.890000
- 9484.890001 - 12245.760000
Zuid-Holland - Provision of urban amenities

Legend
Municipalities
Nature coverage
0 - 1.1
1.1 - 2.25
2.25 - 4
4 - 7
7 - 11.7
11.7 - 28
28+
Zuid-Holland - Provision of urban amenities
## Results – first step (I)

Table 8 - First step results (Specification 2)

<table>
<thead>
<tr>
<th>Alternative characteristics</th>
<th>Individual characteristics</th>
<th>ln Price</th>
<th>Kids</th>
<th>ln(Income)</th>
<th>migrant</th>
<th>skilled</th>
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<tbody>
<tr>
<td>Age</td>
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<td>0.562**</td>
<td>-0.0778</td>
<td>-0.342</td>
<td>1.753***</td>
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<td>(0.00652)</td>
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<td>(0.178)</td>
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<td>(0.238)</td>
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<tr>
<td>P.mig</td>
<td>6.30e-05</td>
<td>-0.0455***</td>
<td>-0.00307</td>
<td>0.132***</td>
<td>0.0713***</td>
<td></td>
</tr>
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<td>(0.000406)</td>
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<tr>
<td>P.mig^2</td>
<td>5.25e-06</td>
<td>0.00124***</td>
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<td>-0.00197***</td>
<td>-0.000583</td>
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</tr>
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<td>(1.11e-05)</td>
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<td>Monuments</td>
<td>-1.48e-05***</td>
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<td>-0.0187***</td>
<td>0.00732**</td>
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<td>(0.00358)</td>
<td>(0.00613)</td>
<td>(0.00556)</td>
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</tbody>
</table>
Results – first step (mean ind. Utility)
# Results – first step (Cross effects)

Table 8 - First step results (Specification 2)

<table>
<thead>
<tr>
<th>Individual characteristics</th>
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<td>(0.000306)</td>
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<td>Monuments</td>
<td>-1.48e-05***</td>
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<td>-0.000308***</td>
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<td>-0.0159***</td>
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<td>(0.000132)</td>
<td>(0.00479)</td>
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## Results – Second step

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<tr>
<td>Perc. Mig(sqr)</td>
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<tr>
<td>Constant</td>
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<tr>
<td>Perc. Migrants inst.</td>
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<tr>
<td>R-squared</td>
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</table>

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
Results - Marginal willingness to pay (III)

- **MWTP for nature and historical amenities**

  ![Bar chart](chart.png)

  **Monuments (+)**
  - Natives:
    - Low skilled: 20.57 EUR
    - High skilled: 56.82 EUR
  - Migrants:
    - Low skilled: 11.79 EUR
    - High skilled: 42.01 EUR

  **Nature (+km^2)**
  - Natives:
    - Low skilled: 2440 EUR
    - High skilled: 2440 EUR
  - Migrants:
    - Low skilled: 2937 EUR
    - High skilled: 3126 EUR

- **MWTP for monuments appears to be education based, but with large gaps**
- **MWTP for natural amenities appears to be origin based.**
Results - Marginal willingness to pay (II)

- **MWTP for work-related amenities**

![Bar chart showing MWTP for work-related amenities](chart)

- **Valuation of work related amenities appears to be skill based.**
### Results - Marginal willingness to pay (I)

- **MWTP for Share of migrants**

<table>
<thead>
<tr>
<th>MWTP (EUR)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of migrants</td>
<td>Mean</td>
<td>Natives</td>
<td>Migrants</td>
<td>Low skilled</td>
<td>High Skilled</td>
</tr>
<tr>
<td>0%</td>
<td>6625</td>
<td>3861</td>
<td>9953</td>
<td>9245</td>
<td>16934</td>
</tr>
<tr>
<td>5%</td>
<td>3774</td>
<td>1495</td>
<td>6248</td>
<td>6172</td>
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<tr>
<td>10%</td>
<td>923</td>
<td>-870</td>
<td>2542</td>
<td>3098</td>
<td>7766</td>
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<tr>
<td>15%</td>
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<td>-3235</td>
<td>-1163</td>
<td>24</td>
<td>3182</td>
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<tr>
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</table>

- **MWTP for Share of migrants varies between levels of share of migrants**
- **Valuation pattern appears to be origin based (in low shares).**
MWTP for an additional share of migrants in ZH municipalities (by groups of skill and origin)
Discussion and conclusion

• Consumer amenities are important for locations’ attractiveness.
• Preferences of skilled migrants are similar to those of skilled natives.
• Share of migrants – decreasing MWTP
• Policy implications
To be included in the research

- Dutch CBS data to replace WoON survey
  - better identification of households’ characteristics
  - Larger study area
- Spatial extensions
- Counterfactual simulations
Questions
Bibliography and citations


