The role of cities for regional development

Regional policy in an increasingly spiky world

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A spiky world indeed

The European urban landscape

The urban landscape of Europe is characterized by a large diversity of small, medium-sized and large cities. Compared to other parts of the world, many urban regions in Europe have a polycentric structure where multiple towns and cities are in close proximity to one another. In other cases, a single large city or a nation's capital dominates its surrounding region, resulting in a more monocentric pattern. In a few regions, a linear urbanization pattern can be discerned, such as in areas bordering the Mediterranean Sea and Italy’s Adriatic coast.

Europe’s urban structure is the result of many underlying factors. Some settlements date back to the Roman Empire, where they functioned as administrative centres. Other towns and cities developed during the Middle Ages, as regional working centres at strategic locations along trade routes, often close to a river or harbour. As a result of political, demographic and economic developments, towns and cities flourished (and therefore expanded) in some periods, whereas other periods were characterized by decline (Benevolo, 1995; Rutte and Abrahamse, 2015). Over the course of the 20th century, cities spilled over into their surrounding regions. Several countries built so-called new towns. Milton Keynes in the United Kingdom, Almere in the Netherlands and Nowa Huta in Poland are examples of these. This injected new and highly planned urban and suburban centres into the historical European urban structure.

Looking back, Europe’s urban landscape is clearly not a static phenomenon. Even today, some towns and cities grow, while others decline. Currently, there are over 800 cities with more than 50,000 inhabitants in the European Union. The majority of these, almost 700, are small and medium-sized cities (between 50,000 and 250,000 inhabitants).
Urbanization as a dominant trend

Most Europeans live in **urban areas**

According to the harmonized definition by Eurostat and the OECD, urban areas — defined as cities, towns and suburbs — provide a home to 72% of the EU-28’s population; 41% live in cities and 31% in towns and suburbs. Over the past 50 years, the urban population has continued to grow. However, the strongest growth took place in towns and suburbs. Many people have settled in the newly developed residential areas surrounding the existing cities. In contrast to the urban growth rates, the rural population showed a steady decline throughout the past decade. The share of people living in rural areas has decreased from 35% in 1960 to 28% in 2010.

**What is the degree of urbanisation?**

The degree of urbanisation is a density-based classification originally introduced in 1991 to distinguish densely populated areas with more than 50,000 inhabitants (cities), intermediate urbanised areas (towns and suburbs) and thinly populated areas (rural areas). In 2011, work carried out by the European Commission, Eurostat and the OECD resulted in a harmonised definition of the degree of urbanization which is based on more precise population data (see appendix).
Taking place all across Europe
Engines of employment growth

Stronger job growth in urban areas

For centuries, people have migrated to cities to find work, and this trend continued into the 21st century. In the first decade of this millennium, European cities, on balance, outperformed rural areas in terms of job growth. The gap between urban and rural areas is widening. The difference in job growth in the 1990-2010 period in both area types across Europe (EU-27) was almost 19% (PBL, 2016).

Monitoring this trend is important in the context of both the European Union’s smart growth and inclusive growth agendas. With these agendas, the EU aims, among other things, to raise Europe’s employment rate (75% employment rate for people aged 25 to 64, by 2020). This requires not only the creation of more jobs, especially for women, young people and older and low-skilled workers, but also a modernisation of labour markets, and investment in education and skills training.

As "engines" of the European economies, cities have a key role to play in translating EU and national smart and inclusive growth policy objectives into concrete actions. In terms of job growth, different European urban areas show different developments. Geography and differences in the structure of national economies matter. In the 1990-2010 period, job growth in rural and urban regions virtually went hand in hand in Ireland, Portugal, Austria and the United Kingdom. At the other end of the spectrum, urban regions in Bulgaria, Romania, Iceland, Slovakia, Hungary and Lithuania performed far better than their rural counterparts over the same time period. Romanian and Lithuanian rural regions, for instance, lost over 20% of their jobs. The Netherlands followed the EU average, albeit somewhat less pronounced in its divergence and at a higher overall growth rate. The only country which seems to defy the trend is Belgium, where rural job growth outperformed that of the cities.

Source: Cambridge Econometrics, adaptation by PBL

ERSA-REGIO Academic Lecture - April 23, 2018

Source: PBL (2016)
But also decline in some places

Growth and decline in metropolitan areas

Changes in the size of the population in cities are the result of natural processes (births and deaths) and migration. In most European metropolitan areas, the population is growing. Cities in Europe are also becoming more naturalistically diverse, as a result of the free movement of citizens within the European Union and the influx of migrant and asylum seekers from non-EU countries. Most EU cities now experience an increase in the share of non-national inhabitants in recent decades.

In the 2000-2010 period, the strongest population growth took place in London, Madrid, and Paris. But also Dublin, Toulouse, Oslo and metropolitan areas in Spain gained in population. However, not all metropolitan areas have been growing. In the same period, population numbers in Athens, Tbilisi, Genoa, and a number of cities in Poland and Germany declined.

How are metropolitan areas defined?

The OECD database contains detailed data on 114 metropolitan areas in Europe. According to the OECD definition, metropolitan areas are urban areas with more than 500,000 inhabitants. The OECD, in cooperation with the European Commission and Eurostat, has developed a harmonised definition of urban areas that overcomes previous limitations linked to administrative definitions (OECD, 2012). According to this definition, an urban area is a functional economic unit characterised by densely inhabited 'cities' with more than 10,000 inhabitants and 'commuting zones' whose labour market is highly integrated with nearby cities.
The big policy debates

- People vs place based policies
- Top-sector policy vs smart specialization strategy
- Concerns about segregation and gentrification vs sorting
- The future for Europe(an Cohesion Policy)

- NEED FOR A SOLID EVIDENCE BASE
This presentation

- Agglomeration externalities – some background

- Micro-evidence from wages
  - Aggregate results (for Dutch context)
  - Differentiation according to education level

- From wages to land rents

- Policy implications
A rough sketch of the literature

- Huge theoretical literature on agglomeration economies, focusing on sharing, matching and learning

- Potentially huge policy implications (markets fail)

- Many attempts to identify effects empirically
  - Spatial and temporal variation
  - Aggregation levels
  - Research methods
  - Density and / or more refined measures
Some evidence from meta-analyses

- Melo et al. on density-productivity relationship
  - On average elasticity of about 5%, but huge variation

- De Groot et al. on scale, diversity and competition
  - Builds on literature following Glaeser et al. (1992)
  - Based on more than 300 studies
  - Elimination of irrelevant ones leaves 73 studies (1992–2009)
  - These contain 392 estimated equations with 786 estimates
Evidence from Glaeser literature

- Attempt to address relevance of Jacobs, Marshall-Arrow-Romer (MAR) and Porter externalities

- Overall conclusion: The jury is still out...

- … but some specific results emerge:
  - Initially clear evidence for Jacobs externalities
  - If anything: upward trend
  - Increasing evidence for MAR externalities
  - Heterogeneity according to sector and stage of development
Agglomeration and wage differences

- Based on Dutch micro-data (following Combes et al.)
- Description of spatial wage differences
- Key notion: wages reflect productivity
- Identification of sources
  - Spatial allocation of individuals
  - Agglomeration economies
Questions addressed

- What part of spatial wage disparities is due to differences in labor market composition?
  - Skills, experience
  - Gender, age, ethnic background
  - Type of work

- What part is due to agglomeration forces?
  - Density
  - Specialization
  - Diversity
  - Competition
Data

- Micro data from Statistics Netherlands (CBS)
- Tax records + labor market survey
  - Covers 2000–2005
  - 70,000 observations per year
  - Hourly wage
  - Industry, age, work location (NUTS 3)
  - Extra information on job type and education
- Regional aggregations – NUTS 3 and municipalities
The labour market

<table>
<thead>
<tr>
<th>GSA</th>
<th>Highly educated (%)</th>
<th>Wage</th>
<th>Immigrants</th>
<th>Density</th>
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<tbody>
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<td>The Hague</td>
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<td>Utrecht</td>
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<td>20,6</td>
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<td>19,1</td>
<td>5,6</td>
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<td>Niet-GSA</td>
<td>31,7</td>
<td>17,9</td>
<td>5,4</td>
<td>143</td>
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</tbody>
</table>

Source: De Groot et al. (2015)
Mincerian wage regression – step 1

- Dependent variable: log wage
- Independent variables: education, age, gender, immigrants, part-time, occupation
- The spatial residual is measured by a dummy for each region
- Coefficients are as expected
Spatial residual

Source: De Groot et al. (2015)
What explains the spatial residual?

- Two stage method
  - Estimate spatial residuals for each industry–year combination using the Mincer equation (explains about 60% of variation)
  - Regress the residuals on
    - Log employment density
    - Log area
    - Log industry share
    - Diversity (Shannon’s entropy)
    - Sector and year fixed effects
    - This explains about 30% of the variation
## Results from second step

<table>
<thead>
<tr>
<th></th>
<th>NUTS-3 regions</th>
<th>Municipalities</th>
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</thead>
<tbody>
<tr>
<td>Density</td>
<td>0.038</td>
<td>0.021</td>
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<tr>
<td></td>
<td>(13.6)</td>
<td>(14.9)</td>
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<tr>
<td>Specialisation (industry share)</td>
<td>0.024</td>
<td>0.023</td>
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<td></td>
<td>(8.2)</td>
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<td>Diversity (Shannon’s entropy)</td>
<td>−0.078</td>
<td>−0.042</td>
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<td></td>
<td>(2.9)</td>
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<td>Competition (1–HHI)</td>
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<td>(4.5)</td>
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<tr>
<td>Log(area)</td>
<td>0.013</td>
<td>0.011</td>
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<td></td>
<td>(3.7)</td>
<td>(5.9)</td>
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<tr>
<td>Industry dummies</td>
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<td>yes</td>
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<td>Year dummies</td>
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<tr>
<td>$R^2$</td>
<td>0.32</td>
<td>0.19</td>
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<td>Number of observations</td>
<td>7,747</td>
<td>28,048</td>
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Assessing the economic significance

<table>
<thead>
<tr>
<th>Agglomeration</th>
<th>Expected Wage</th>
<th>Actual wage</th>
<th>Decomposition of expected average wage in different components</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gender</td>
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<tr>
<td>Amsterdam</td>
<td>10.99</td>
<td>19.52</td>
<td>0.76</td>
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<td>'s-Gravenhage</td>
<td>11.08</td>
<td>19.22</td>
<td>0.47</td>
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<tr>
<td>Utrecht</td>
<td>9.95</td>
<td>14.10</td>
<td>0.53</td>
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<tr>
<td>Nijmegen</td>
<td>9.39</td>
<td>12.99</td>
<td>-0.11</td>
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<tr>
<td>Amersfoort</td>
<td>8.26</td>
<td>9.88</td>
<td>0.16</td>
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<td>5.18</td>
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<td>8.57</td>
<td>0.54</td>
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<td>Groningen</td>
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<td>7.02</td>
<td>0.13</td>
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<td>Arnhem</td>
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<td>6.61</td>
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<td>Apeldoorn</td>
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<td>Maastricht</td>
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<td>Tilburg</td>
<td>2.21</td>
<td>0.81</td>
<td>0.08</td>
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<tr>
<td>Zwolle</td>
<td>3.50</td>
<td>0.63</td>
<td>0.02</td>
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<td>Dordrecht</td>
<td>1.11</td>
<td>0.63</td>
<td>0.14</td>
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<td>3.55</td>
<td>0.11</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

Source: De Groot et al. (2015)
Summary

- Density-wage elasticity is about 3.8%:
  - Smaller than the 5% that is generally found (Melo et al., 2009)
  - Consistent with Combes et al. (2009)

- Specialisation results in higher productivity:
  - Doubling share of an industry results in a 2.4% wage increase

- Negative diversity and competition effect
Next step

- Bias according to education level?
- Social returns to clustering of high skilled?
- Better education data
- Longer time span

- Expanding on Moretti (2004); Canton (2009)
Data

- CBS Microdata, 2000–2010
  - 11.5 million observations, 2.12 million employees
  - Fiscal data: wage slips (wage and hours worked)
  - GBA: age, gender, place of residence
  - ABR: sector and location of firms
  - Gemeente standplaats: place of work

- Selection
  - Per year and employee job with highest income
  - Job duration at least one month, and at least 12 hrs/week
  - At least minimum wage
  - Age 18–65
Local labour market

- No administrative units
- Distance decay estimated on basis of commutes

Source: Groot and De Groot (2014)
Agglomeration

Legenda
- Minder dan 100.000
- 100.000 tot 200.000
- 200.000 tot 300.000
- 300.000 tot 400.000
- 400.000 tot 500.000
- 500.000 tot 600.000
- 600.000 tot 700.000
- 700.000 of meer

Jobs local labour market

Jobs per municipality

Source: Groot and De Groot (2014)
Agglomeration and wages

# jobs local labour market

Average hourly wage

Source: Groot and De Groot (2014)
Agglomeration and highly educated

# jobs local labour market

% highly educated local labour market

Legenda
Minder dan 100.000
100.000 tot 200.000
200.000 tot 300.000
300.000 tot 400.000
400.000 tot 500.000
500.000 tot 600.000
600.000 tot 700.000
700.000 of meer

Legenda
Minder dan 30
30 tot 32
32 tot 34
34 tot 36
36 tot 38
38 tot 40
40 tot 42
42 tot 44
44 of meer

Source: Groot and De Groot (2014)
Hourly wage according to skill

Low

Medium

High

Source: Groot and De Groot (2014)
Methodology

- Wage regression per skill level
- No agriculture and public sector
- Dependent: log hourly wage
- Controls: education (3 levels), age, age^2, origin, part-time, year, sector, plus
  - (Log) Employment Density (density 1830 as instrument)
  - (Log) Share high skilled (# graduates HBO and university as instrument)
  - (Log) Share people with SAME education level
### Results – OLS

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
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<td># Observations</td>
<td>3.750.960</td>
<td>3.219.920</td>
<td>4.507.189</td>
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<tr>
<td># Employees</td>
<td>736.573</td>
<td>584.981</td>
<td>799.423</td>
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<tr>
<td>Female</td>
<td>-0,180</td>
<td>-0,172</td>
<td>-0,111</td>
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<td></td>
<td>(573)</td>
<td>(426)</td>
<td>(321)</td>
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<tr>
<td>Age</td>
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<td>0,070</td>
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<td>(463)</td>
<td>(573)</td>
<td>(858)</td>
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<td>-0,0007</td>
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<td>(362)</td>
<td>(439)</td>
<td>(674)</td>
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<td>Part-time</td>
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<td>(190)</td>
<td>(290)</td>
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<tr>
<td>Foreign (OECD)</td>
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<td>Year- and sector dummies</td>
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<td>Goodness of fit</td>
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<tr>
<td>Goodness of fit</td>
<td>0.38</td>
<td>0.44</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Source: Groot and De Groot (2014)
# Observations 3.750.960 3.219.920 4.507.189
# Employees 736.573 584.981 799.423
Female 0,180 0,172 0,111
(569) (425) (318)
Age 0,037 0,070 0,113
(463) (572) (856)
Age² −0,0004 −0,0007 −0,0011
(362) (439) (674)
Part-time 0,035 0,083 0,117
(108) (187) (288)
Foreign (OECD) −0,024 −0,032 −0,076
(25,5) (24,5) (72,7)
Foreign (non-OECD) −0,082 −0,112 −0,195
(182) (127) (235)
Ln(employment density) 0,029 0,090 0,097
(14,7) (37,5) (49,4)
Ln SHARE HIGHLY EDUCATED 0,051 −0,083 −0,208
(3,5) (4,7) (14,4)
Year- and sector dummies Ja Ja Ja
Goodness of fit 0,38 0,44 0,49

Source: Groot and De Groot (2014)
Methodology – III (worker FE)

- Unobserved heterogeneity may lead to upward bias if high-density areas attract people according to unobserved (good) characteristics.

- ‘Solution’: Worker FE
  - Identification exclusively on workers that change region
  - Workers that do not change excluded
  - But: sensitive for selection bias: People that gain are more likely to accept job.
# Results – FE per worker

<table>
<thead>
<tr>
<th></th>
<th>Laag</th>
<th>Middelbaar</th>
<th>Hoog</th>
</tr>
</thead>
<tbody>
<tr>
<td># Observations</td>
<td>1.584.236</td>
<td>1.874.901</td>
<td>2.553.011</td>
</tr>
<tr>
<td># Employees</td>
<td>193.380</td>
<td>268.999</td>
<td>304.792</td>
</tr>
<tr>
<td>Age</td>
<td>0.046</td>
<td>0.087</td>
<td>0.150</td>
</tr>
<tr>
<td></td>
<td>(164)</td>
<td>(327)</td>
<td>(605)</td>
</tr>
<tr>
<td>Age(^2)</td>
<td>-0.0004</td>
<td>-0.0008</td>
<td>-0.0014</td>
</tr>
<tr>
<td></td>
<td>(220)</td>
<td>(340)</td>
<td>(559)</td>
</tr>
<tr>
<td>Part-time</td>
<td>-0.035</td>
<td>0.003</td>
<td>-0.018</td>
</tr>
<tr>
<td></td>
<td>(93)</td>
<td>(6.8)</td>
<td>(53.6)</td>
</tr>
<tr>
<td>Ln(employment density)</td>
<td>0.027</td>
<td>0.047</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>(11.4)</td>
<td>(22.5)</td>
<td>(28.5)</td>
</tr>
<tr>
<td>Ln(share highly educated)</td>
<td>-0.098</td>
<td>-0.207</td>
<td>-0.207</td>
</tr>
<tr>
<td></td>
<td>(5.7)</td>
<td>(13.8)</td>
<td>(16.7)</td>
</tr>
<tr>
<td>Year- and sector dummies</td>
<td>Ja</td>
<td>Ja</td>
<td>Ja</td>
</tr>
<tr>
<td>Goodness of fit</td>
<td>0.11</td>
<td>0.29</td>
<td>0.51</td>
</tr>
</tbody>
</table>

Source: Groot and De Groot (2014)
Conclusion

- Illustration of usefulness of micro-data

- Return to agglomeration higher for medium and high skilled
  - Agglomeration elasticity low: 2.7 – 2.9 %
  - Agglomeration elasticity medium: 4.7 – 9.0 %
  - Agglomeration elasticity high: 4.9 – 9.7 %

- More need for research into spatial scope of several externalities, link with housing market / land rents, role of commuting
From wages to land rents

- Ongoing effort building on Ricardo’s capitalization result
  - Outgrowth of project at CPB Netherlands Bureau for Economic Policy Analysis
  - Joint with Gerard Marlet, Coen Teulings and Wouter Vermeulen

- Attempt to derive land rents
  - Empirically the big unknown

- And subsequently explain variation
Basic idea

- Step 1 – Use hedonic pricing techniques to derive land rent based on information on lot sizes

- Step 2 – Explain variation in land rents as a function of labour market variables, urban amenities and urban disamenities

- Natural starting point for evidence based policy evaluation (ex ante and ex post)
Data

- Unique data from Dutch Association of Brokers
  - 1985-2007
  - 1.1 million transactions (excluding appartments, etc.)
  - Detailed information on houses (# rooms, year of construction, garage, lot size, etc.)

- Analysis done at 4-digit ZIP-code level

- Elasticities for lot size allowed to vary over space
Land rents

- Hedonic pricing exercise
- Huge variation
- Focus on 21 ‘Metropolitan Areas’ in NL

Source: De Groot et al. (2015)
Land rents and population density

Source: De Groot et al. (2015)
- Average annual growth

Source: De Groot et al. (2015)
Wages and land rents confronted

<table>
<thead>
<tr>
<th>GSA</th>
<th>Wage surplus</th>
<th>Differential land rent</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amsterdam</td>
<td>16,7</td>
<td>45,4</td>
<td>2,7</td>
</tr>
<tr>
<td>The Hague</td>
<td>8,0</td>
<td>17,7</td>
<td>2,2</td>
</tr>
<tr>
<td>Utrecht</td>
<td>6,6</td>
<td>7,5</td>
<td>1,1</td>
</tr>
<tr>
<td>Nijmegen</td>
<td>1,7</td>
<td>1,5</td>
<td>0,9</td>
</tr>
<tr>
<td>Amersfoort</td>
<td>1,2</td>
<td>2,2</td>
<td>1,8</td>
</tr>
<tr>
<td>Rotterdam</td>
<td>11,0</td>
<td>11,9</td>
<td>1,1</td>
</tr>
<tr>
<td>Leiden</td>
<td>1,2</td>
<td>7,8</td>
<td>6,2</td>
</tr>
<tr>
<td>Eindhoven</td>
<td>3,3</td>
<td>3,7</td>
<td>1,1</td>
</tr>
<tr>
<td>Haarlem</td>
<td>1,2</td>
<td>7,8</td>
<td>6,5</td>
</tr>
</tbody>
</table>

Source: De Groot et al. (2015)
Next steps

- Explain variation in land rents
  - Labour market – wages and accessibility (35%)
  - Urban amenities (27%)
  - Natural amenities (10%)
  - Disamenities (5%)
Wages and land rents

- Higher wages partly reflected in land rents
- But also clear role for other factors (old city centre, cultural activities, accessibility)
- Which are patterns that we also saw back in the dynamics of land rents
- Evidence for the consumer city
Policy dimensions

- Place / history / context matter: policy versus luck
- Specialization versus diversity (people and sectors)
- Scale versus density (borrowed size debate / transport)
- Equity versus efficiency
The big policy debates

- People vs place based policies
- Decentralization / increasing role of regions
- Top-sector policy vs smart specialization strategy
- An urban future for Europe (an Cohesion Policy)
- Concerns about segregation and gentrification vs sorting
Spatial equity-efficiency trade-offs

- Bear in mind (cf. Glaeser, 2011, p. 250): ‘… throwing resources at troubled cities is usually a terribly inefficient means of taking care of troubled people. Helping poor people if an appropriate task for government, but helping poor places is not.’

- Key question in many countries: which government are we talking about? A question of governance and organizing solidarity!
Knowing more?

- Contact me at h.l.f.de.groot@vu.nl
- Meta-analysis on externalities (Journal of Economic Surveys)
- Cities and the Urban Land Premium (Edward Elgar, 2015)
- Groei en Krimp (Growth and Decline: in Dutch)
- And much more…