Labour Market Areas: The Portuguese case

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Overview

1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS
2 | DEFINING LMA – THE PORTUGUESE EXERCISE
3 | DEFINING LMA – THE EUROPEAN MODEL
4 | ALTERNATIVE SOURCE
1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS
The concept of Region is the result of a representation constructed with specific aims.

**Statistical data**

**The need for meaningful territorial divisions**

- Express political will
- Limits fixed according to government attributions
- Have an historical and cultural dimension

E.g.: NUTS, municipalities, parishes

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**Normative regions**

- Defined according to analytical requirements
- Group together zones using
  - Geographical criteria (e.g. altitude or type of soil)
  - Socio-economic criteria (e.g. homogeneity, complementarities or polarization)

E.g.: functional urban regions, coastal regions, urban/rural typologies
The adequacy between the territorial units and the study of the territorial dynamics is part of a broader discussion:

The implications of the choice of the territorial units in the tabulation of statistical results

**Scale effect**
variation of the results according to different sizes of the territorial units

**Delimitation effect**
variation of the results according to the way the area of study is delimited, using the same scale
1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS

Meaningful territorial divisions *modifiable area unit problem - MAUP*

MAUP – scale effect

**Influence of the zoning on the perception of a phenomena**

Starting from one given spatial distribution, at a given scale (district)

Zoning A:
The aggregation leads to that the observed phenomena has the same intensity in the four cells in the center.

Zoning B:
The aggregation leads to that the observed phenomena appears very intense in two of the four cells in the center.

MAUP – delimitation effect
1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS

The concept of Region as a result of the space of activity

The space of activity “…of something is the spatial network of links and activities, of spatial connections and of locations within which a particular agent operates” (Massey, 1995)

- In the case of a person, it would be, simultaneously:
  - The living spaces of the daily activities
  - The movements established to undertake those activities
  - The remote connections done through communication and information systems

- The space of activity is an important operational concept to:
  - Explore the concept of Functional Regions from the point of view of the daily living space of people and organizations
  - Include the scale discussion into the operationalisation of the Functional Regions based on rhythm/frequency of the use of territories
1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS

FUNCTIONAL REGIONS AND LABOUR MARKET AREAS

- The methodologies for defining functional regions intend to express a vision of the organisation of the territory modulated, at a first level, by relatively close spaces of daily living.

  - The new territorial units should be unique and self-sufficient: the territorial expression of the match between demand and supply.

- The most common concept used for defining a functional region is labour markets areas: functional regions are integrated territories in the sense that labour mobility towards the exterior is low or even non-existent: resident workers have jobs within the region’s limits.
2 | Defining LMA – The Portuguese exercise
Portuguese space occupation (mainland) is strongly centered on the west-coast from Lisbon to Viana do Castelo (up in the North) and also in Algarve in opposition of low density areas in the inland.

On the last decades the evolution of population patterns has shown littoralisation trends stimulated specially by the two metropolitan regions centered in Lisbon and Oporto.
The patterns of interaction show the complexity around the 2 metropolitan areas as well as in Algarve; and also some small and medium-size cities: Aveiro, Viseu, Coimbra and Évora.

The Lisbon metropolitan system is mostly defined by the strong capacity of polarization of the Lisbon municipality; The municipality of Porto plays a weaker role to its metropolitan system.
2 | Defining LMA – The Portuguese exercise

FUNCTIONAL RELATIONS BETWEEN MUNICIPALITIES (LAU1) CENSUS 2011

Self-Containment 1:
Employed resident population working in LAU1 / Jobs

Self-Containment 2: Employed resident population working in LAU1 / Employed resident population (workers)

Opposition between coastal and inland municipalities, specially those from Norte and Centro regions.

lower values in municipalities surrounding medium or big cities

municipalities strongly dependent of other municipalities to employ their residents.
The Portuguese Exercise

Model: Open System (integration and not polarization)

- Source: Census data
- Territorial coverage: Continente (Mainland)
- Building blocks: municipality (LAU1)

Basic variables:
- ✔ Matrix of working commuters
- ✔ Employment (jobs)
- ✔ Employed resident population (workers)
- ✔ Resident population
- ✔ Surface
- ✔ Contiguity (0/1)

Interaction indicator: \( \text{INTERAC}_{ij} \)

\[
\text{INTERAC}_{ij} = \frac{(\text{ERP}_{ij} + \text{ERP}_{ji})}{(\text{ERP}_i + \text{ERP}_j)}
\]

Where:
- \( i \) and \( j \) - municipality or cluster
- \( \text{ERP}_{ij} \) – commuters between \( i \) and \( j \)
- \( \text{ERP}_{ji} \) – commuters between \( j \) and \( i \)
- \( \text{ERP}_i \) - employed resident population in \( i \)
- \( \text{ERP}_j \) - employed resident population in \( j \)

- The highest value of the Interaction indicator determines the aggregation of the first pair of municipalities (contiguous) which will form a new territorial unit (cluster)
- Agglomeration of new territorial units through an hierarchical aggregation process
2 | Defining LMA – The Portuguese exercise

### The Portuguese exercise

- **Aggregate evaluation indicators**
  - **a)** Self-containment indicators (SC1; SC2)
    
    Level of territorial integration that provides the necessary economic activities to the resident workers in order to prevent its movement to other territorial units

    \[
    SC1 = \frac{TRP}{Jobs} \times 100 \\
    SC2 = \frac{TRP}{Workers} \times 100
    \]

    Where: TRP – Employed resident population working in the cluster

    Aggregation accepted if SC1 OR SC2 > 85% in the cluster

- **b)** Additional exogenous criterion: closing rule of the clusters

  Territorial approach:
  
  **setting the maximum surface of each cluster:**
  
  6 000 Km\(^2\) (→ area of a circumference with a radius of 45 Km)

  Exception: aggregation of isolated municipalities

### Other tests:

- Maximum surface of 3500 Km\(^2\) (→ the average size of European NUTS 3 regions)
- Labour market dimension – setting the maximum value of employed resident population of each cluster
- Population dimension – setting the maximum value of population of each cluster

**Very heterogeneous cluster dimension**
## Defining LMA – The Portuguese exercise

### The Portuguese Exercise - Results

<table>
<thead>
<tr>
<th>Nr. of territorial units (t.u.)</th>
<th>Municipalities</th>
<th>NUTS 3 (2013)</th>
<th>LMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV (%)</td>
<td>278</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>Surface (Km²)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV (%)</td>
<td>89</td>
<td>51</td>
<td>38</td>
</tr>
<tr>
<td>Average</td>
<td>320</td>
<td>3 873</td>
<td>4 454</td>
</tr>
<tr>
<td>Median</td>
<td>229</td>
<td>3 344</td>
<td>4 992</td>
</tr>
<tr>
<td>Max</td>
<td>1 721</td>
<td>8 543</td>
<td>6 120</td>
</tr>
<tr>
<td>Min</td>
<td>8</td>
<td>1 246</td>
<td>447</td>
</tr>
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<td>229</td>
<td>3 344</td>
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</tr>
<tr>
<td>Min</td>
<td>8</td>
<td>1 246</td>
<td>447</td>
</tr>
<tr>
<td>Resident population (hab.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV (%)</td>
<td>161</td>
<td>142</td>
<td>170</td>
</tr>
<tr>
<td>Average</td>
<td>36 143</td>
<td>436 853</td>
<td>502 381</td>
</tr>
<tr>
<td>Median</td>
<td>15 700</td>
<td>247 453</td>
<td>144 481</td>
</tr>
<tr>
<td>Max</td>
<td>547 733</td>
<td>2 821 876</td>
<td>2 927 076</td>
</tr>
<tr>
<td>Min</td>
<td>1 834</td>
<td>89 063</td>
<td>4 497</td>
</tr>
<tr>
<td>Resident employed population (workers)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV (%)</td>
<td>170</td>
<td>150</td>
<td>178</td>
</tr>
<tr>
<td>Average</td>
<td>14 293</td>
<td>172 756</td>
<td>198 670</td>
</tr>
<tr>
<td>Median</td>
<td>5 433</td>
<td>94 806</td>
<td>51 677</td>
</tr>
<tr>
<td>Max</td>
<td>222 202</td>
<td>1 186 472</td>
<td>1 251 428</td>
</tr>
<tr>
<td>Min</td>
<td>607</td>
<td>28 226</td>
<td>1 428</td>
</tr>
<tr>
<td>Employment (jobs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV (%)</td>
<td>250</td>
<td>154</td>
<td>177</td>
</tr>
<tr>
<td>Average</td>
<td>14 293</td>
<td>172 756</td>
<td>198 670</td>
</tr>
<tr>
<td>Median</td>
<td>4 834</td>
<td>90 849</td>
<td>51 486</td>
</tr>
<tr>
<td>Max</td>
<td>509 123</td>
<td>1 211 733</td>
<td>1 230 250</td>
</tr>
<tr>
<td>Min</td>
<td>635</td>
<td>28 208</td>
<td>1 401</td>
</tr>
<tr>
<td>SC1: Employed resident population working in the t.u./Jobs in the t.u.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV (%)</td>
<td>13</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Average</td>
<td>78</td>
<td>79</td>
<td>93</td>
</tr>
<tr>
<td>Median</td>
<td>80</td>
<td>80</td>
<td>93</td>
</tr>
<tr>
<td>Max</td>
<td>94</td>
<td>90</td>
<td>99</td>
</tr>
<tr>
<td>Min</td>
<td>35</td>
<td>52</td>
<td>86</td>
</tr>
<tr>
<td>SC2: Employed resident population working in the t.u./workers of t.u.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV (%)</td>
<td>18</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Average</td>
<td>74</td>
<td>78</td>
<td>93</td>
</tr>
<tr>
<td>Median</td>
<td>77</td>
<td>79</td>
<td>94</td>
</tr>
<tr>
<td>Max</td>
<td>95</td>
<td>90</td>
<td>99</td>
</tr>
<tr>
<td>Min</td>
<td>34</td>
<td>53</td>
<td>80</td>
</tr>
</tbody>
</table>
3 | Defining LMA – The European model
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THE EUROPEAN MODEL (TRAVEL TO WORK AREAS METHOD)

Model: Open System

• Basic variables:
  - ✓ Matrix of working commuters
  - ✓ Employment (jobs)
  - ✓ Employed resident population (workers)

• Aggregate evaluation indicators
  a) **Number of persons employed**
  b) **2 Self-containment indicators:**
     - **SS-SC: Supply side** Self-containment
       (Employed resident population working in the cluster/Workers)
     - **DS-SC: Demand side** Self-containment
       (Employed resident population working in the cluster/Jobs)
  c) **Cohesion measure: interaction indicator**
3 | Defining LMA – The European model

The European Model (Travel To Work Areas Method) – First LMA Results

Census 2011 – LAU1 Building Blocks

<table>
<thead>
<tr>
<th>LMA 23</th>
<th>Parameter / Indicator</th>
<th>LMA 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.80</td>
<td>Min SC</td>
<td>0.85</td>
</tr>
<tr>
<td>0.85</td>
<td>Tar SC</td>
<td>0.90</td>
</tr>
<tr>
<td>50 000</td>
<td>Min SZ</td>
<td>50 000</td>
</tr>
<tr>
<td>100 000</td>
<td>Tar SZ</td>
<td>100 000</td>
</tr>
<tr>
<td>20</td>
<td>Number of LMA</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>Min LAU by LMA</td>
<td>9</td>
</tr>
<tr>
<td>38</td>
<td>Max LAU by LMA</td>
<td>38</td>
</tr>
<tr>
<td>198 670</td>
<td>Mean EMP</td>
<td>248 337</td>
</tr>
<tr>
<td>186 225</td>
<td>Mean EMP_LIVE_WORK</td>
<td>235 453</td>
</tr>
<tr>
<td>0.93</td>
<td>Mean SC_DEMAND_SIDE</td>
<td>0.94</td>
</tr>
<tr>
<td>0.92</td>
<td>Mean SC_SUPPLY_SIDE</td>
<td>0.93</td>
</tr>
<tr>
<td>794</td>
<td>Min Area LMA (KM²)</td>
<td>1 628</td>
</tr>
<tr>
<td>13 852</td>
<td>Max Area LMA (KM²)</td>
<td>13 852</td>
</tr>
</tbody>
</table>
4 | Alternative source
Testing other national sources is a necessity that arises from the fact that the lowest territorial level for which **Census** commuting data are available, only allows to consider **LAU 1** as the building block for **LMA**:

- the place of residence is available as far as census tracks
- **but** the place of work is only available at LAU 1 level

**Alternative source** to Census, based on administrative data (LAU 2) → **Lists of Personnel**, from the Ministry of Labour, Solidarity and Social Security (“**Quadros de Pessoal**”)
The statistical project “Lists of Personnel” provides statistical data resulting from an administrative procedure.

The obligation to deliver “List of Personnel” respects to all entities with employees, with the exception of:

- central, regional and local government and public institutions
- employers of domestic service workers

Information concerning “List of personnel” integrates Annex A of the “Single Report”, which consists of an annual report on the information on the social activity of the company, delivered via an electronic form.

**Cadastre of Social Security**
Convergence between the two universes: the number of employees registered in the Lists of Personnel accounts for more than 90% of the comparable Census data.
4 Alternative source

There is a strong association between the main indicators used in this exercise (Census vs. Lists of Personnel) 

But 

There are differences in level. Example: data from Lists of Personnel underestimates the workers who live and work in the same LAU 1
FINAL REMARKS

1) DIFFICULTIES OF THE OPERATIONALISATION OF LMA IN PORTUGAL
   - Settlement asymmetries: littoral vs. inland and North vs. South
   - Disparities in the levels of functional integration of the municipalities: metropolitan territories vs. non-metropolitan territories
   - Unbalanced urban system

2) IMPORTANCE OF THIS EXERCISE FOR THE NATIONAL STATISTICAL SYSTEM
   - Test different approaches to define LMA
   - Opportunity to explore the potentialities of administrative sources
     • more detailed building blocks allows the definition of different objectives and returns different outputs
     • Higher periodicity: data availability between Census years

3) RELEVANCE FOR THE PUBLIC POLICIES
   - The importance of clarifying the purpose of the LMA when defining the methodology and the parameters: regional vs. intra-metropolitan perspectives
   - The new spatial units must be useful for local, regional and central authorities
Thank you for your attention

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