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Labour Market Areas: The Portuguese case

Elsa Soares

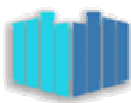
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SCORUS
Standing Committee in Regional and Urban Statistics



Conference 2016


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 **OECD**
BETTER POLICIES FOR BETTER LIVES

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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**





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1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS



1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS



Statistical
data



The need for
**meaningful
territorial
divisions**

The concept of Region is the result of a representation constructed with specific aims

Normative regions



- express political will
- limits fixed according to government attributions
- have an historical and cultural dimension

E.g.: NUTS, municipalities, parishes

Analytical regions

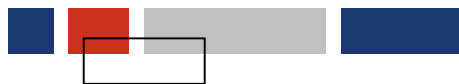


- defined according to analytical requirements
- group together zones using
 - ✓ geographical criteria (e.g. altitude or type of soil)
 - ✓ socio-economic criteria (e.g. homogeneity, complementarities or polarization)

E.g.: functional urban regions, coastal regions, urban/rural typologies



1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS



Meaningful territorial divisions *modifiable area unit problem - MAUP*

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

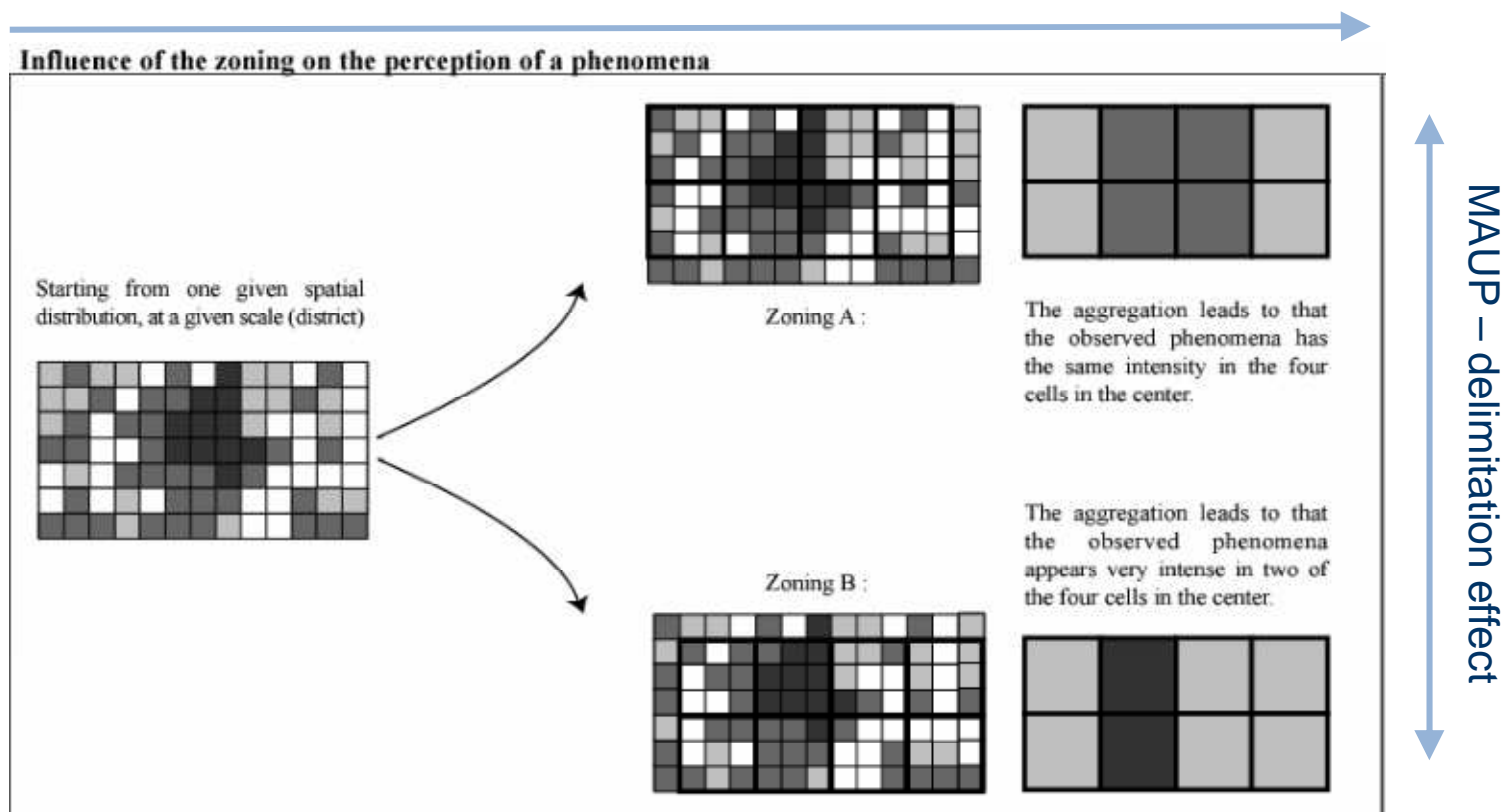


1 | THE IMPORTANCE OF DEFINING FUNCTIONAL REGIONS

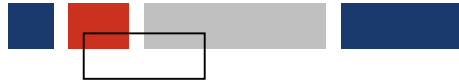


Meaningful territorial divisions *modifiable area unit problem - MAUP*

MAUP – scale effect



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

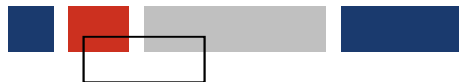
- The methodologies for defining **functional regions** intend to express a vision of the organisation of the territory modulated, at a first level, by relatively close spaces of daily living
→ The new territorial units should be unique and self-sufficient: the territorial expression of the match between 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





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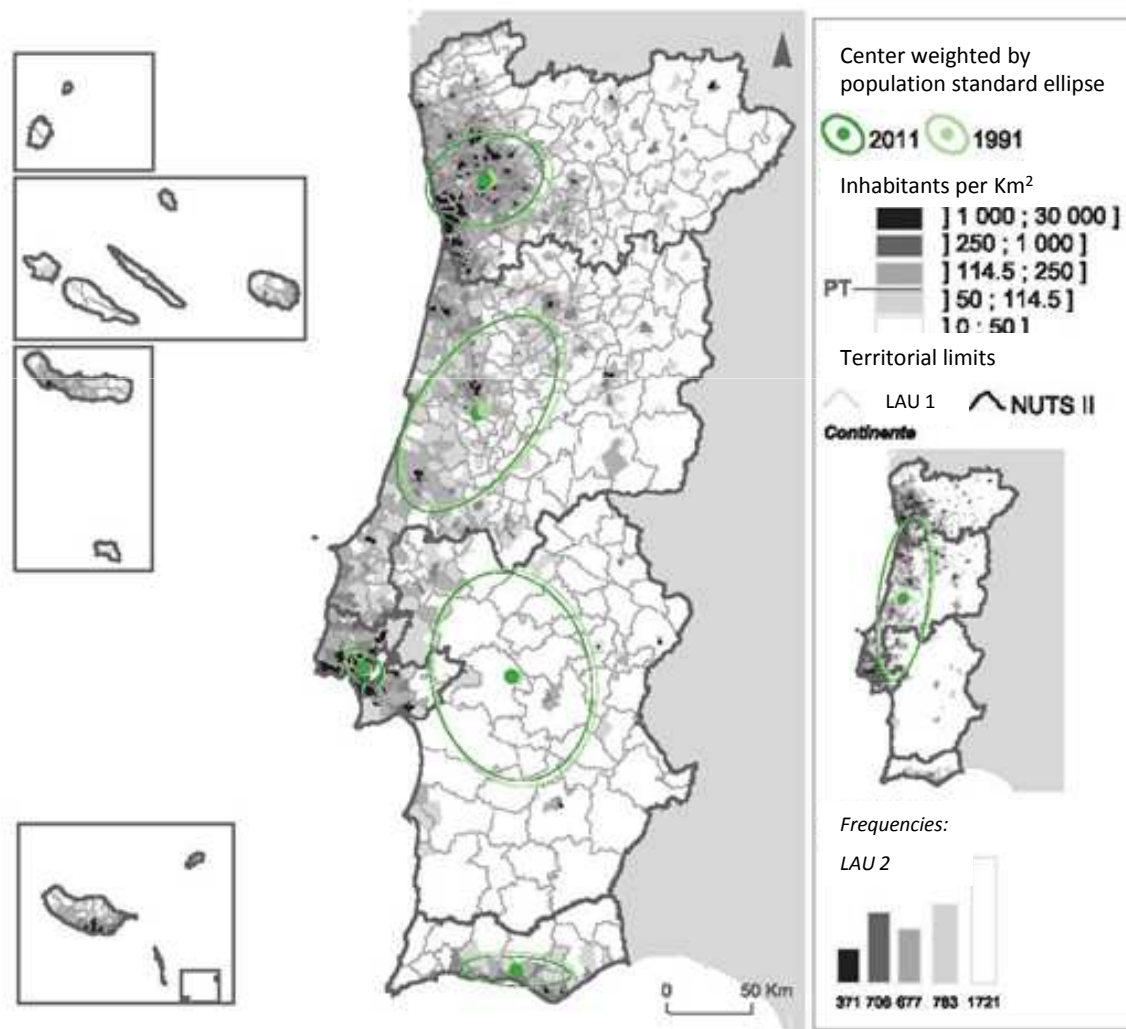
2 | Defining LMA – The Portuguese exercise



2 | Defining LMA – The Portuguese exercise

SPATIAL OCCUPATION OF THE PORTUGUESE TERRITORY

- 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.



2 | Defining LMA – The Portuguese exercise



FUNCTIONAL RELATIONS BETWEEN MUNICIPALITIES (LAU1) CENSUS 2011

Interaction indicator: flows of commuters ($i_j + j_i$) / employed resident population (workers) ($i + j$)

Interaction rate:
between each municipality and all the others

Interaction flows:
between each pair of municipalities (>1,25%)

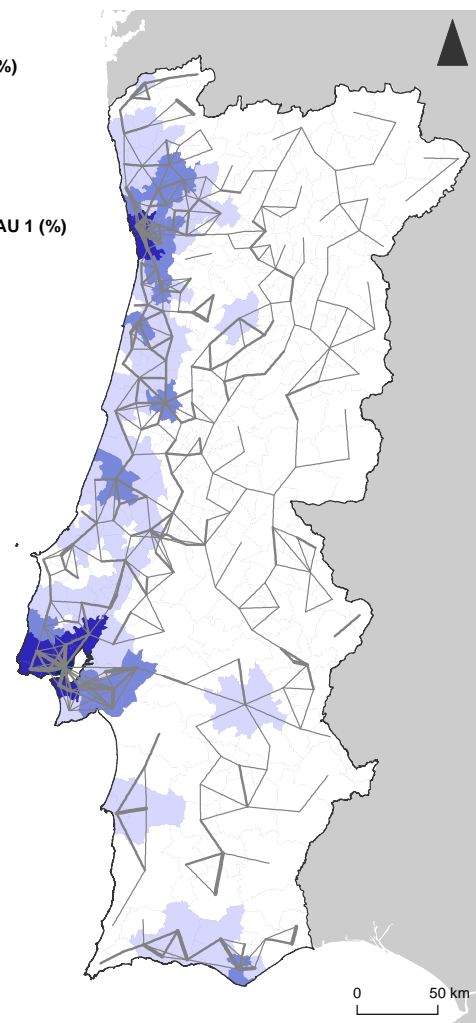
Interaction rate LAU 1 (%)

- Dark blue:] 1,5 ; 11]
- Blue:] 0,5 ; 1,5]
- Light blue:] 0,3 ; 0,5]
- Very light blue:] 0,13 ; 0,3]
- White:] 0 ; 0,13]

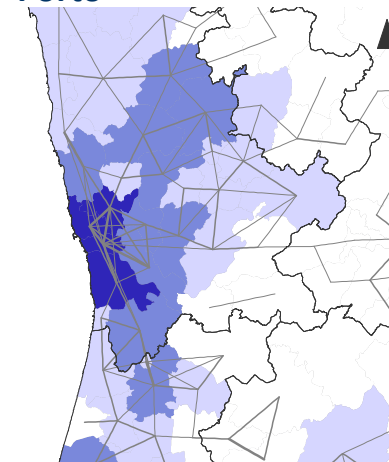
Interactions between LAU 1 (%)

- Thick line:] 8 ; 18]
- Medium line:] 3 ; 8]
- Thin line:] 1,25 ; 3]

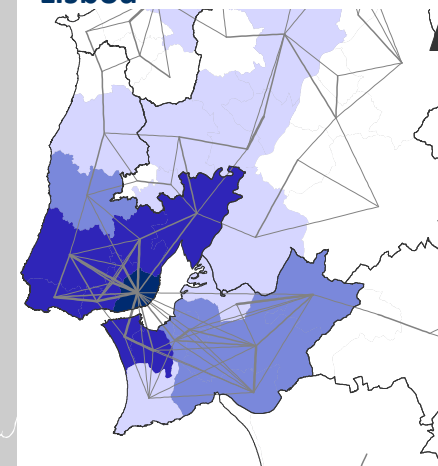
Territorial Limits
NUTS I



Porto



Lisboa



- 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.

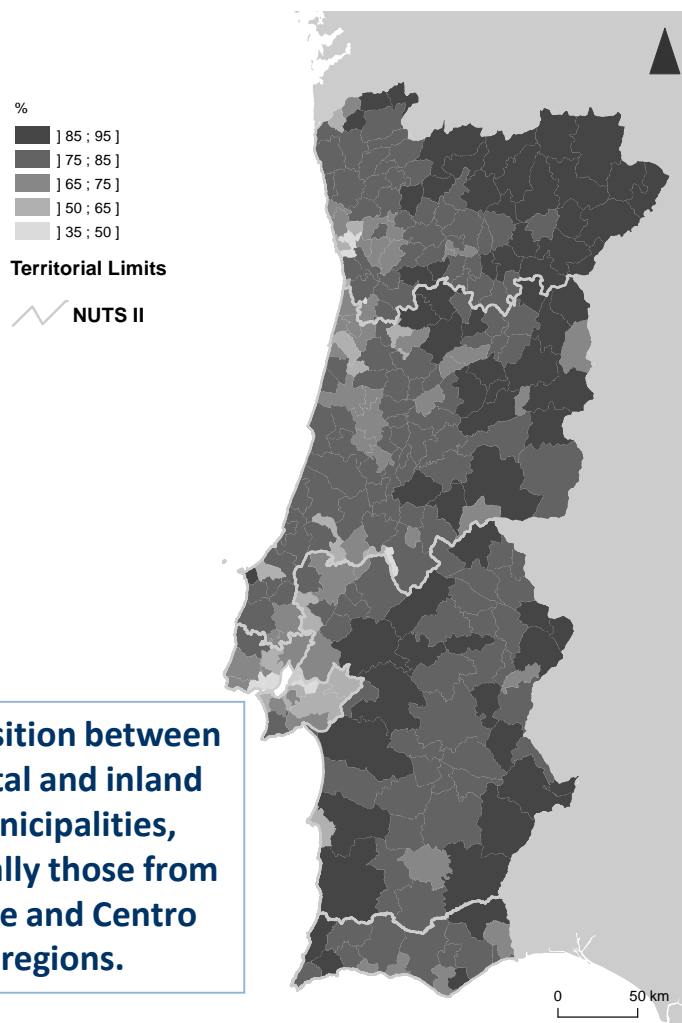
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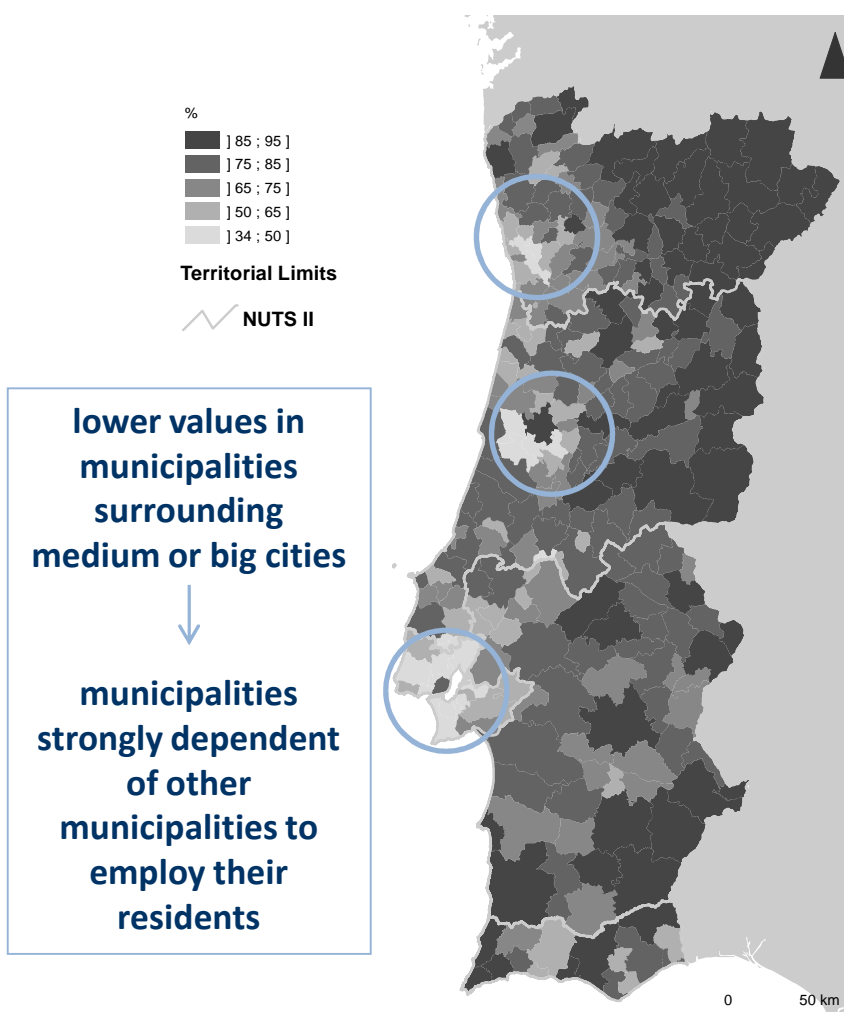
FUNCTIONAL RELATIONS BETWEEN MUNICIPALITIES (LAU1) CENSUS 2011

Self-Containment 1:

Employed resident population working in LAU1 / Jobs



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



2 | Defining LMA – The Portuguese exercise



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: **INTERAC_{ij}**

$$\text{INTERAC}_{ij} = (\text{ERP}_{ij} + \text{ERP}_{ji}) / (\text{ERP}_i + \text{ERP}_j)$$

Where:

- **i and j** - municipality or cluster
- **ERP_{ij}** – commuters between i and j
- **ERP_{ji}** – commuters between j and i
- **ERP_i** - employed resident population in i
- **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

$$\text{SC1} = \text{TRP} / \text{Jobs} \times 100 \quad \text{SC2} = \text{TRP} / \text{Workers} \times 100$$

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 Km² (→ area of a circumference with a radius of 45 Km)

Exception: aggregation of isolated municipalities

Other tests :

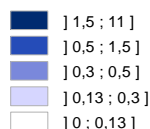
- Maximum surface of 3500 Km² (→ the average size of European NUTS 3 regions)
- Labour market dimension – setting the maximum value of employed resident population of each cluster
- Population dimension – setting the maximum value of population of each cluster

*Very heterogeneous
cluster dimension*

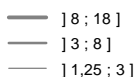
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THE PORTUGUESE EXERCISE - RESULTS

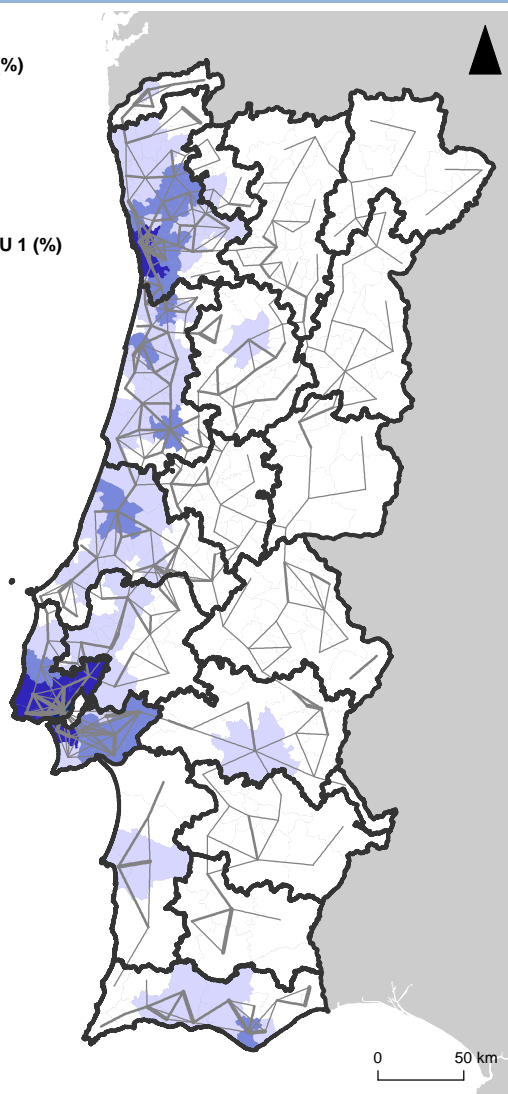
Interaction rate LAU 1 (%)



Interaction between LAU 1 (%)



Territorial Limits

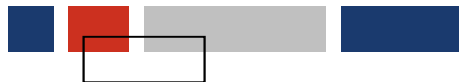


		Municipalities	NUTS 3 (2013)	LMA
Nr. of territorial units (t.u.)		278	23	20
Surface (Km ²)	CV (%)	89	51	38
	Average	320	3 873	4 454
	Median	229	3 344	4 992
	Max	1 721	8 543	6 120
	Min	8	1 246	447
Resident population (hab.)	CV (%)	161	142	170
	Average	36 143	436 853	502 381
	Median	15 700	247 453	144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



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3 | Defining LMA – The European model



3 | Defining LMA – The European model



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**

Parametrization of
minimum
acceptable values and
target values for the
number of persons
employed in the cluster
and for the Self-
containment indicators

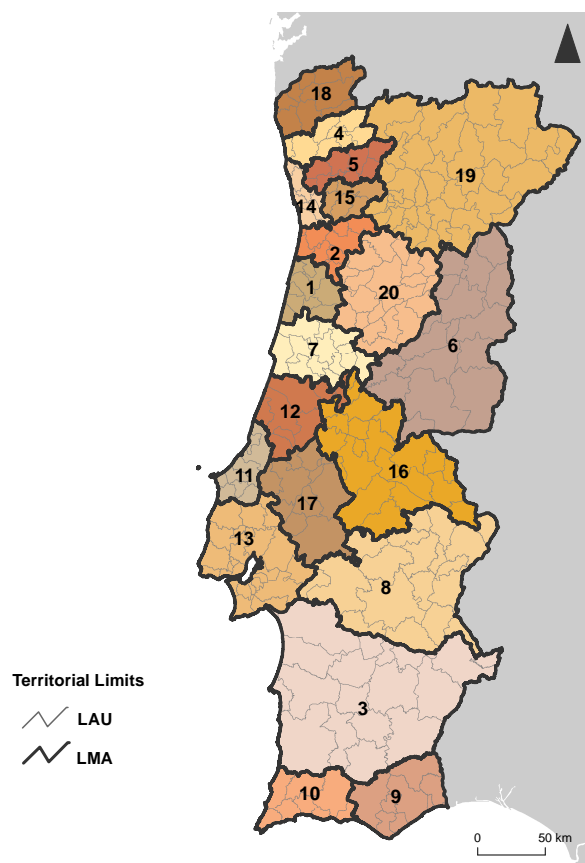
Inexistence of a
contiguity
condition



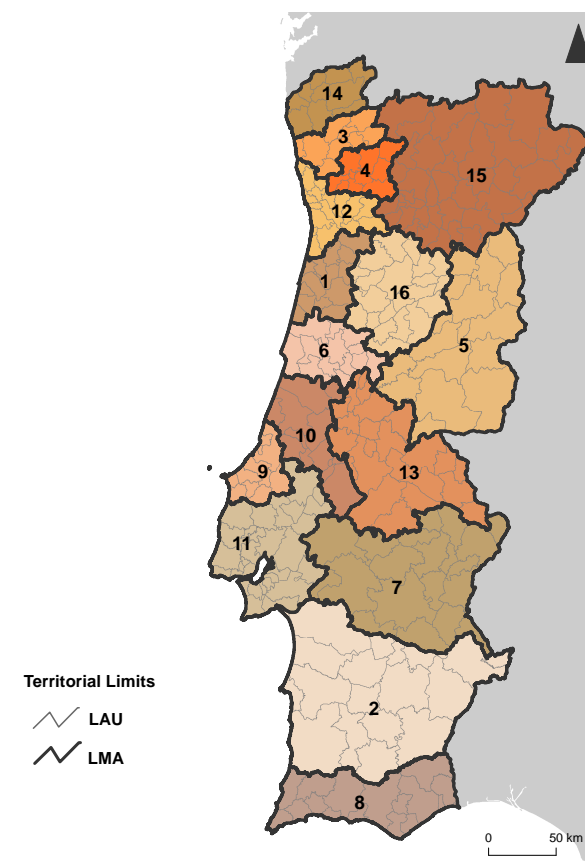
3| Defining LMA – The European model

THE EUROPEAN MODEL (TRAVEL TO WORK AREAS METHOD) – FIRST LMA RESULTS

CENSUS 2011 – LAU1 BUILDING BLOCKS



LMA 23	PARAMETER / INDICATOR	LMA 24
0.80	Min SC	0.85
0.85	Tar SC	0.90
50 000	Min SZ	50 000
100 000	Tar SZ	100 000
20	Number of LMA	16
6	Min LAU by LMA	9
38	Max LAU by LMA	38
198 670	Mean EMP	248 337
186 225	Mean EMP_LIVE_WORK	235 453
0.93	Mean SC_DEMAND_SIDE	0.94
0.92	Mean SC_SUPPLY_SIDE	0.93
794	Min Area LMA (KM ²)	1 628
13 852	Max Area LMA (KM ²)	13 852



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4 | Alternative source



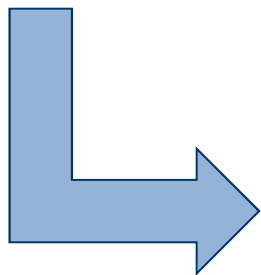
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4 | Alternative source

❖ 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*”)

4 | Alternative source

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.



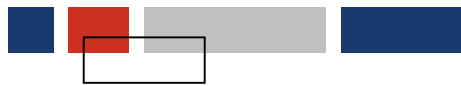
Place of work



Place of residence

Cadastre of Social Security





4 | Alternative source

CENSUS

- ✓ Employees
- ✓ Self Employed
- ✓ All economic activities

LISTS OF PERSONNEL

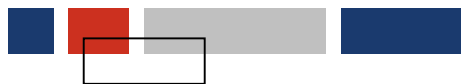
- ✓ Employees
- ~~✓ Self Employed~~
- ✓ All economic activities

Except:

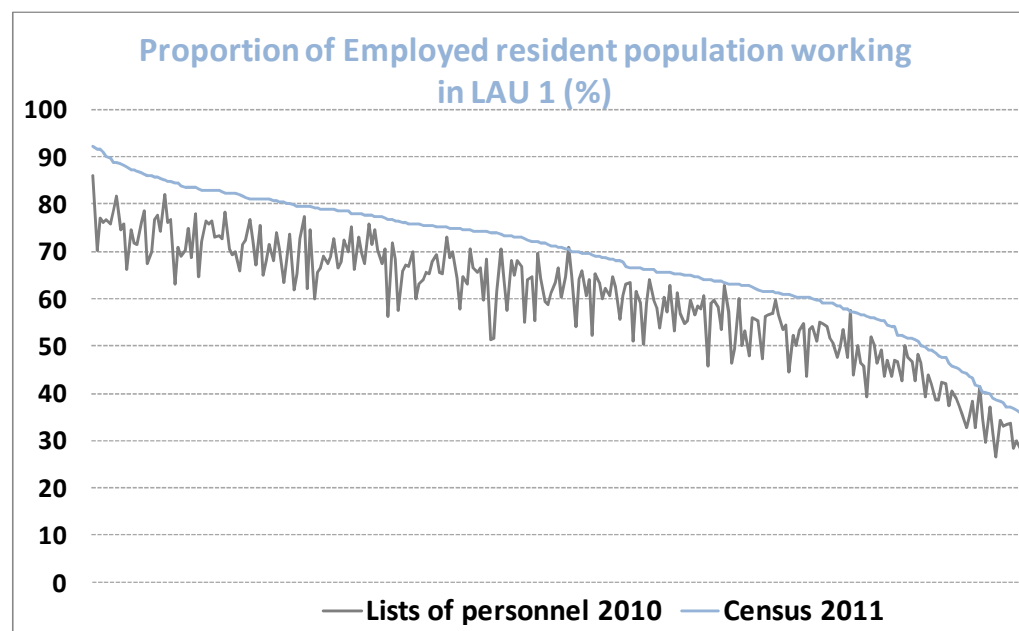
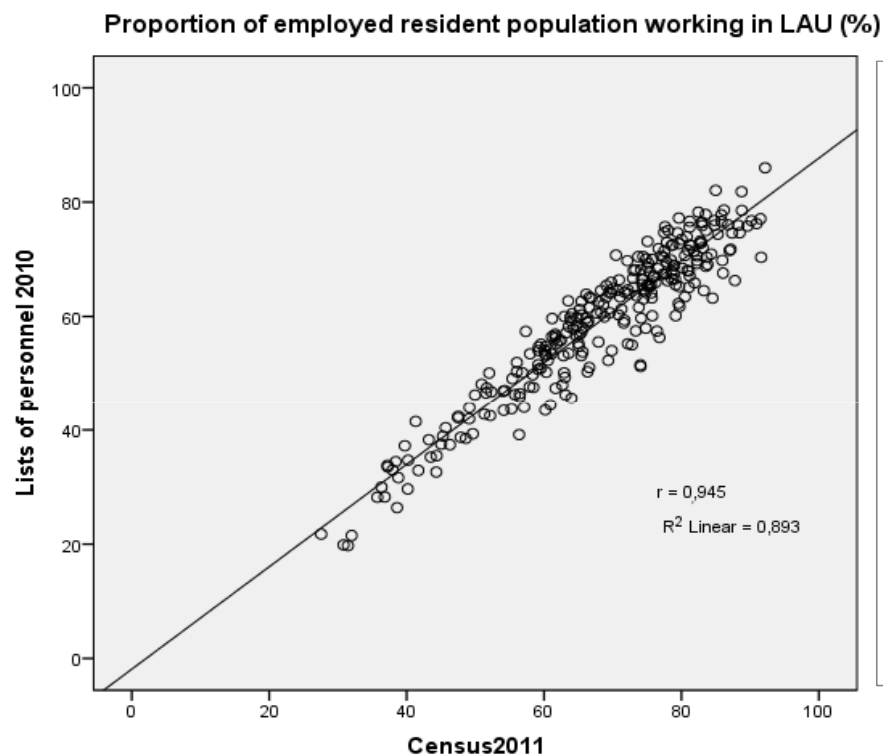
central, regional and local government
and public institutions;
employers of domestic service

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

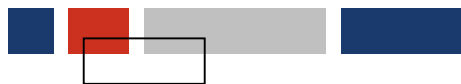


There is a strong association between the main indicators used in this exercise (Census vs. Lists of Personnel)

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

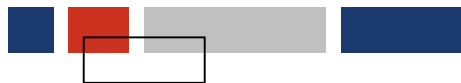
2) IMPORTANCE OF THIS EXERCISE FOR THE NATIONAL STATISTICAL SYSTEM

- 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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