INSTITUTO NACIONAL DE ESTATÍSTICA
STATISTICS PORTUGAL

POPULATION ESTIMATES ACCORDING TO URBAN AREAS TYPOLOGY

FROM THE RELEVANCE OF PRODUCTION TO THE DISSEMINATION OF NEW STATISTICAL INFORMATION

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scorus
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RESIDENT POPULATION ESTIMATES

BACKGROUND

Annual resident population estimates have been disseminated since 1940 and by municipality since 1981

Increase demand for new territorial segmentations of annual resident population estimates → Spatial planning purposes by the central and local administration and for regional policy monitoring

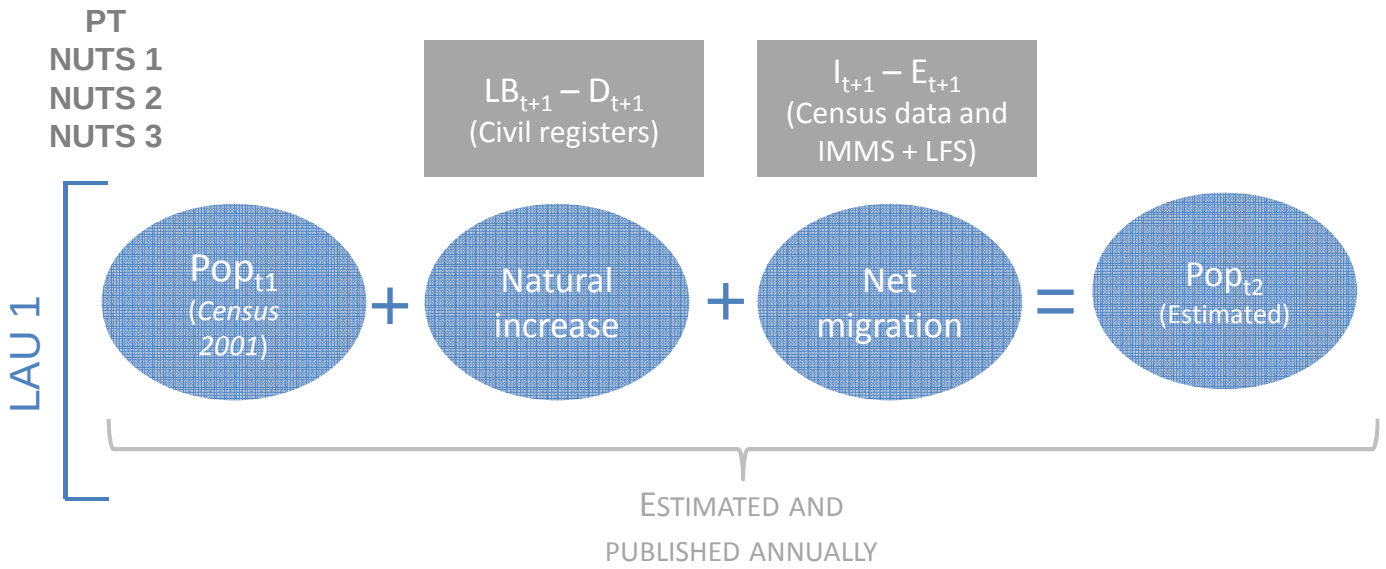
Need for annual resident population data at LAU 2 level to obtain population data for territorial levels, namely by **Urban Areas Typology**

The Urban Areas classifies LAU 2 units according to three levels of urbanisation

Predominantly urban	Medium urban	Predominantly rural

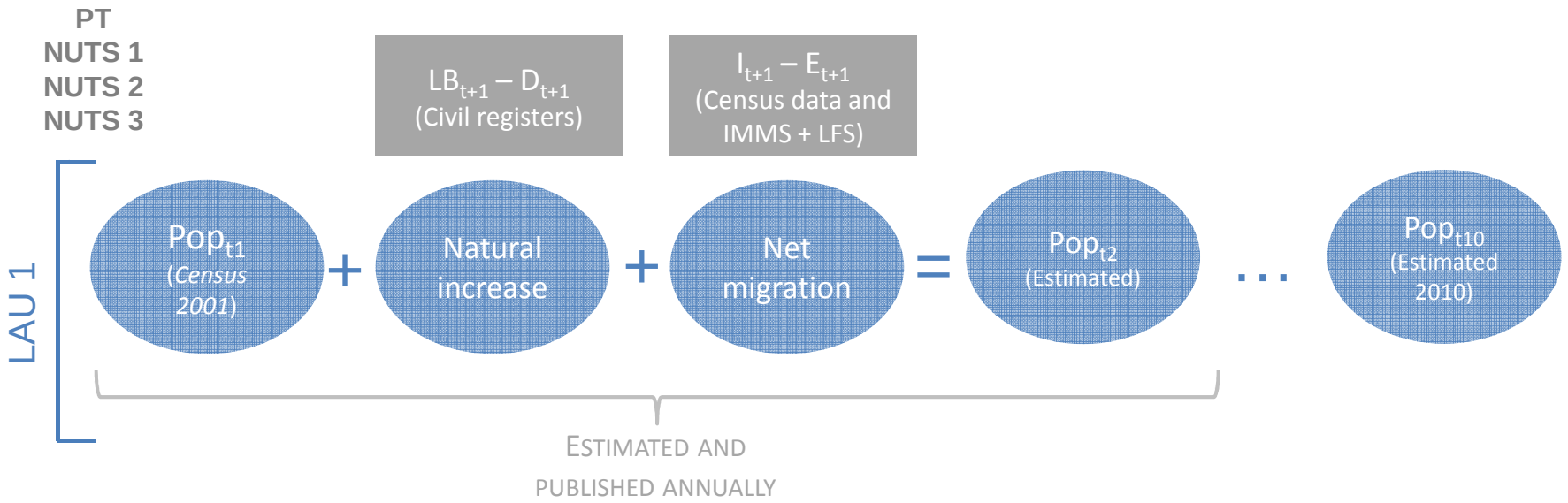
RESIDENT POPULATION ESTIMATES

FRAMEWORK



RESIDENT POPULATION ESTIMATES

FRAMEWORK



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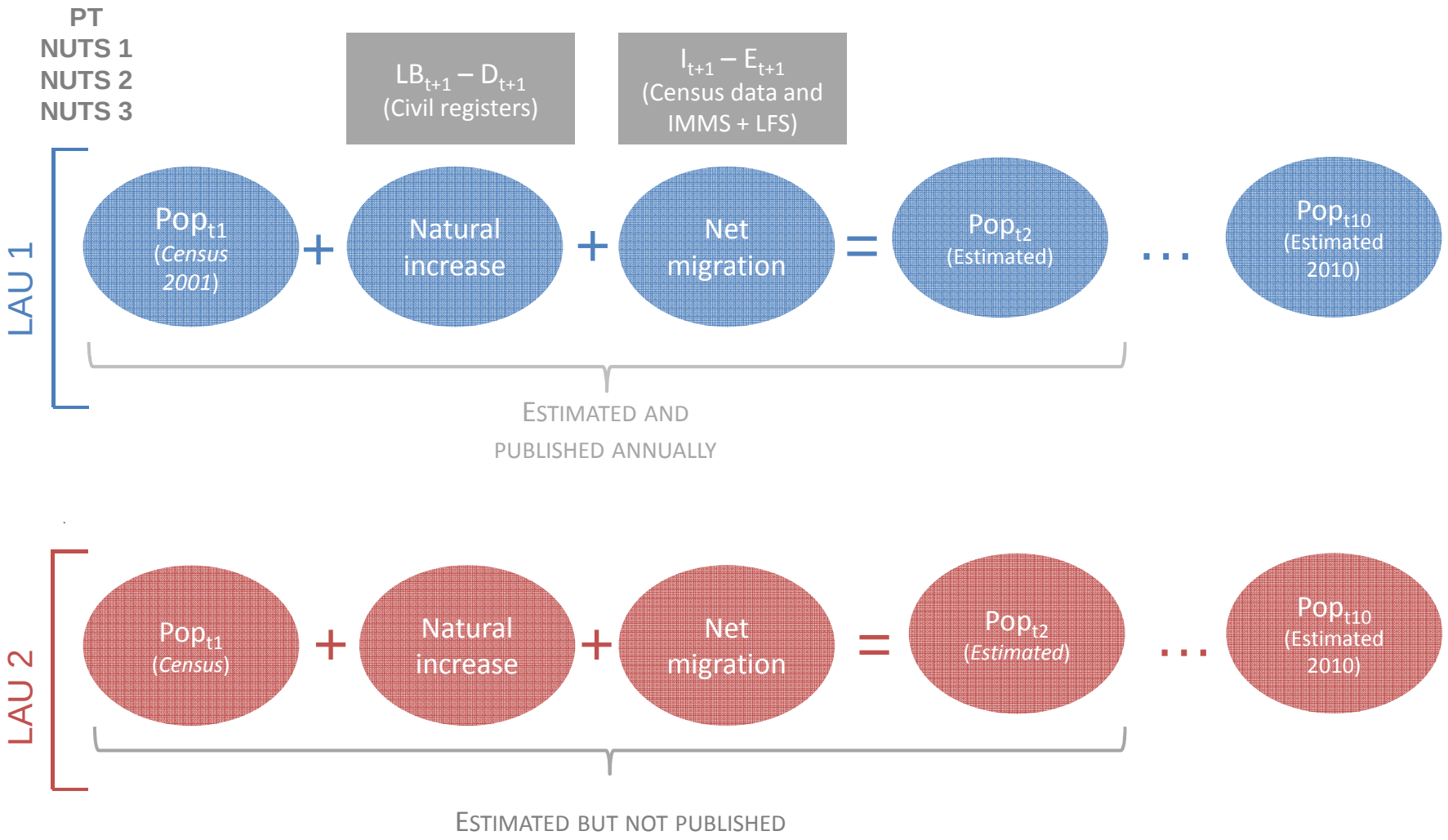
Resident population estimates

Framework



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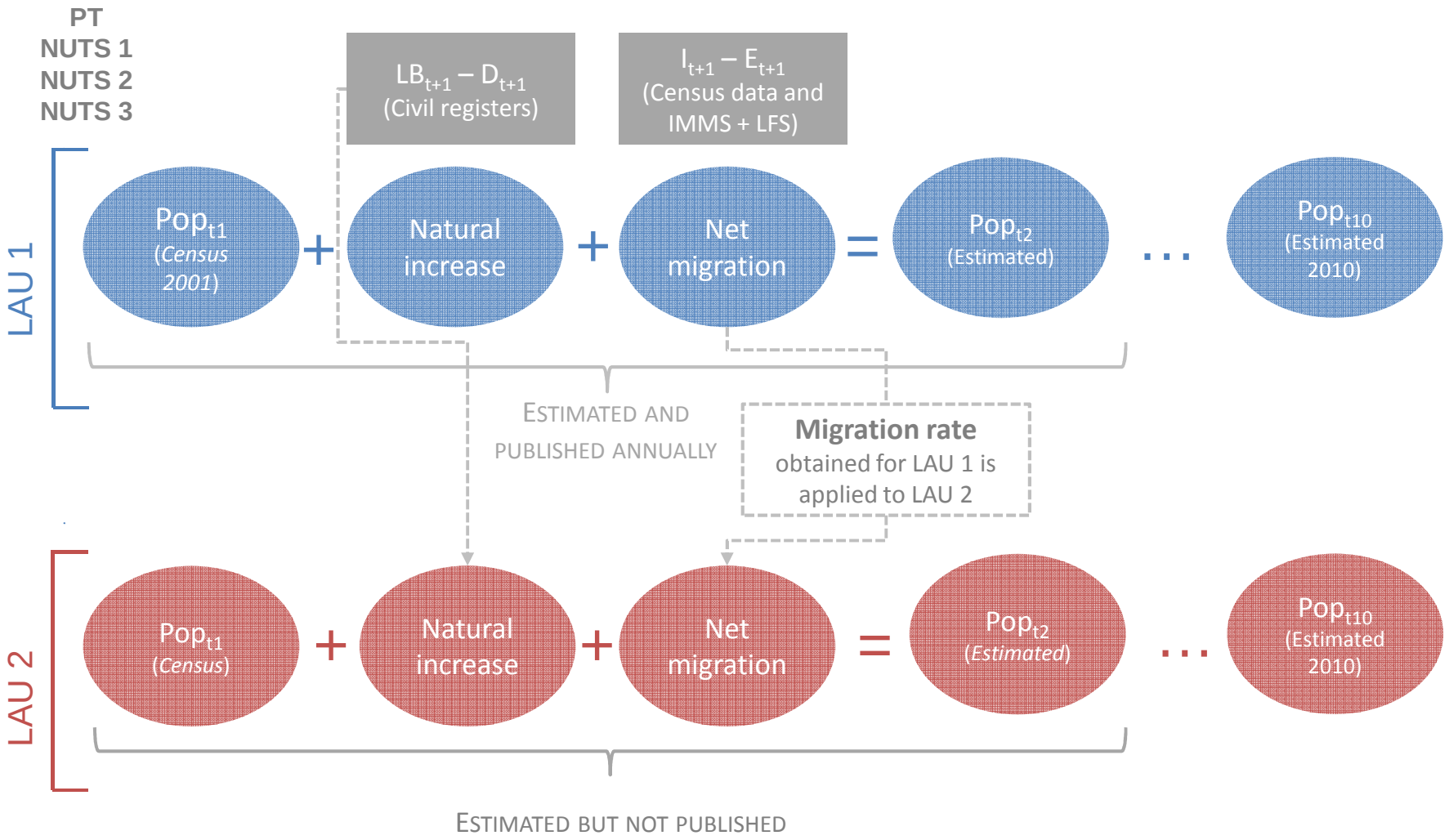
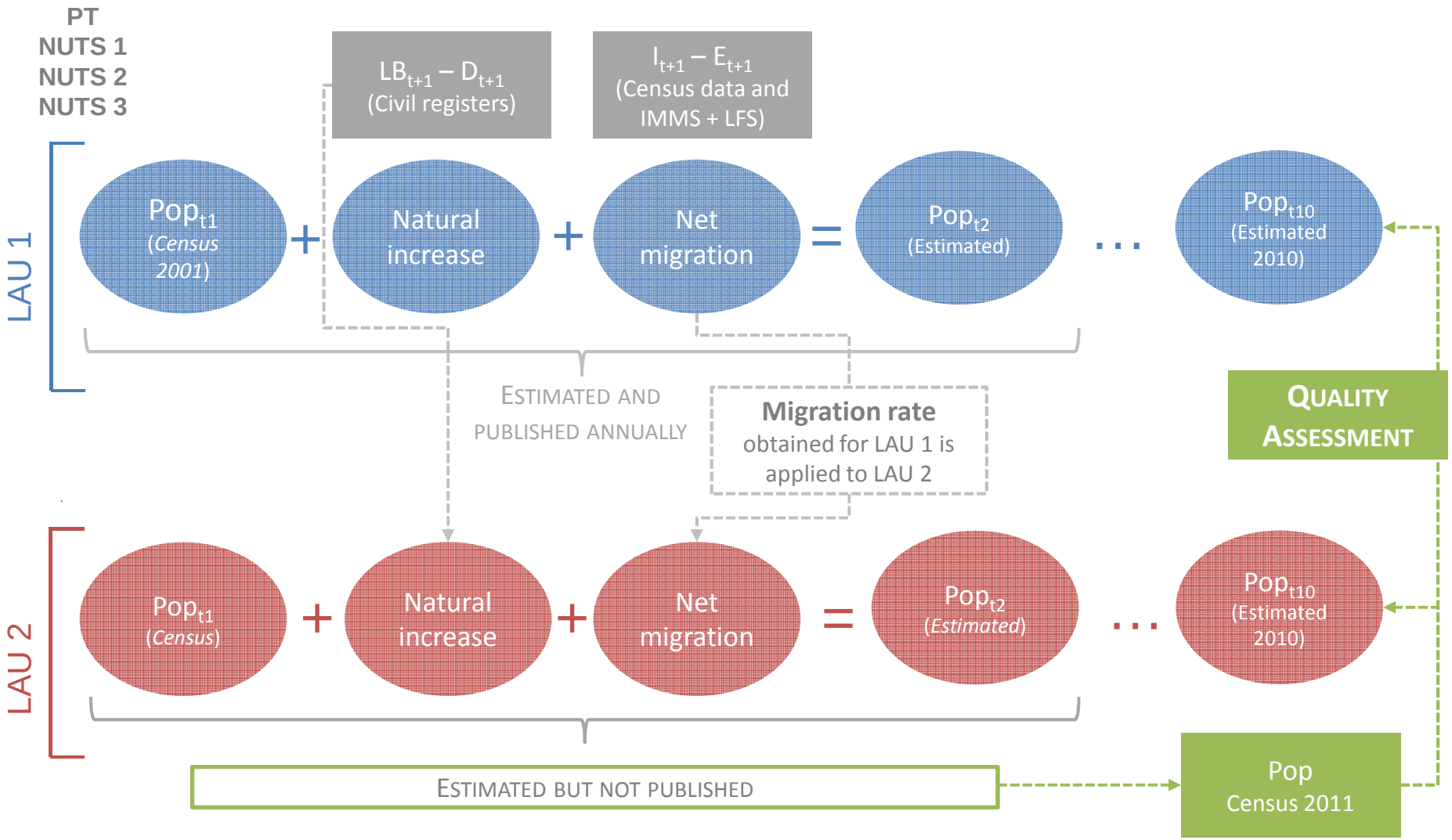
Resident population estimates

Framework



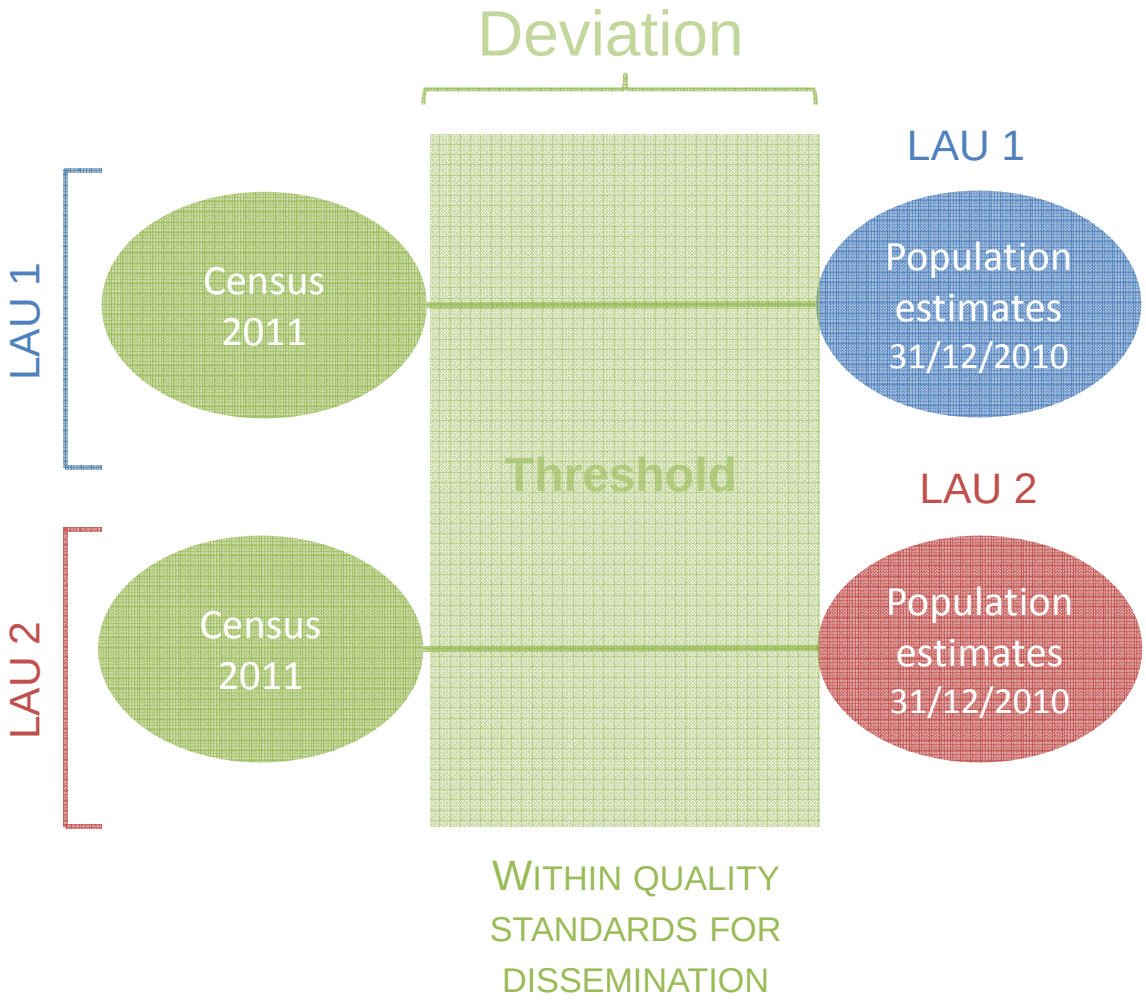
RESIDENT POPULATION ESTIMATES

FRAMEWORK



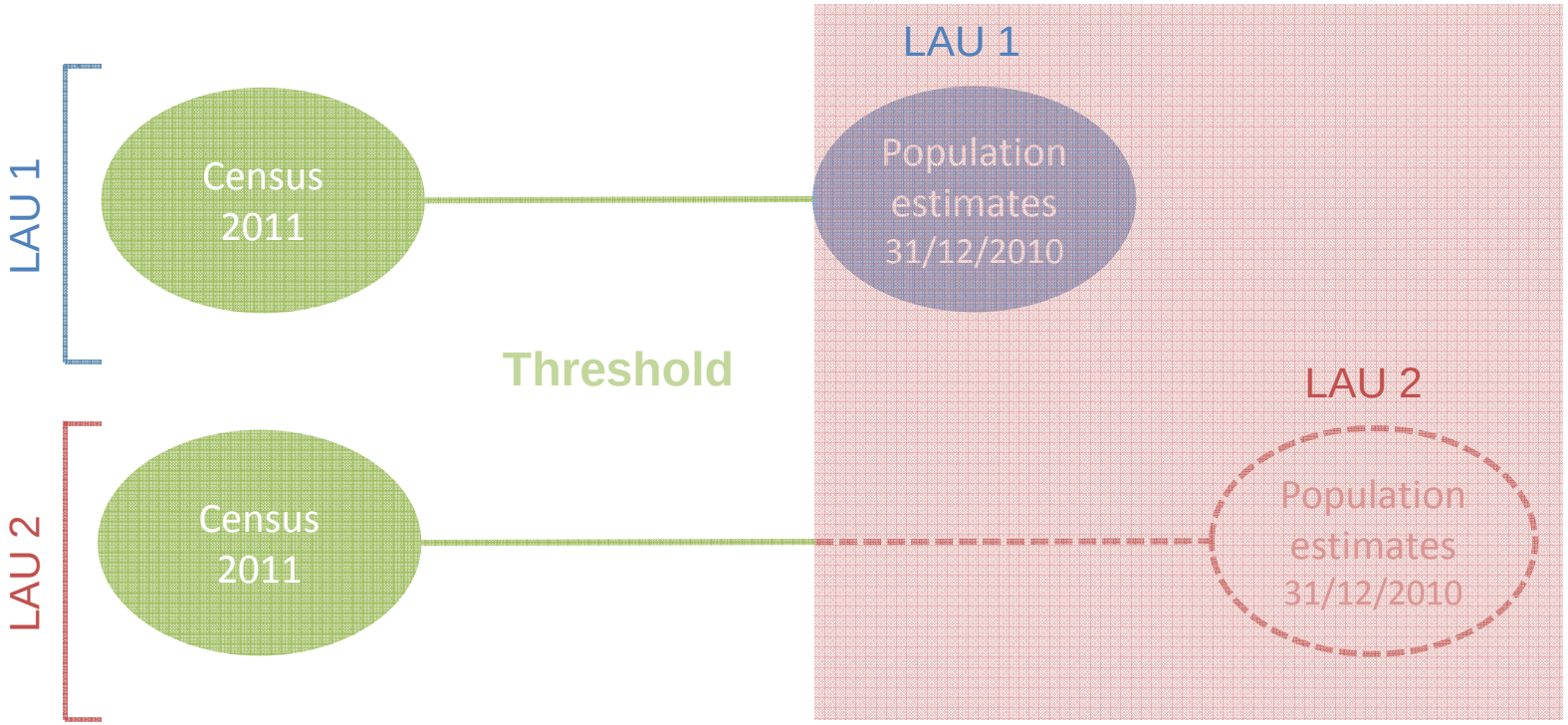
RESIDENT POPULATION ESTIMATES

QUALITY ASSESSMENT



RESIDENT POPULATION ESTIMATES

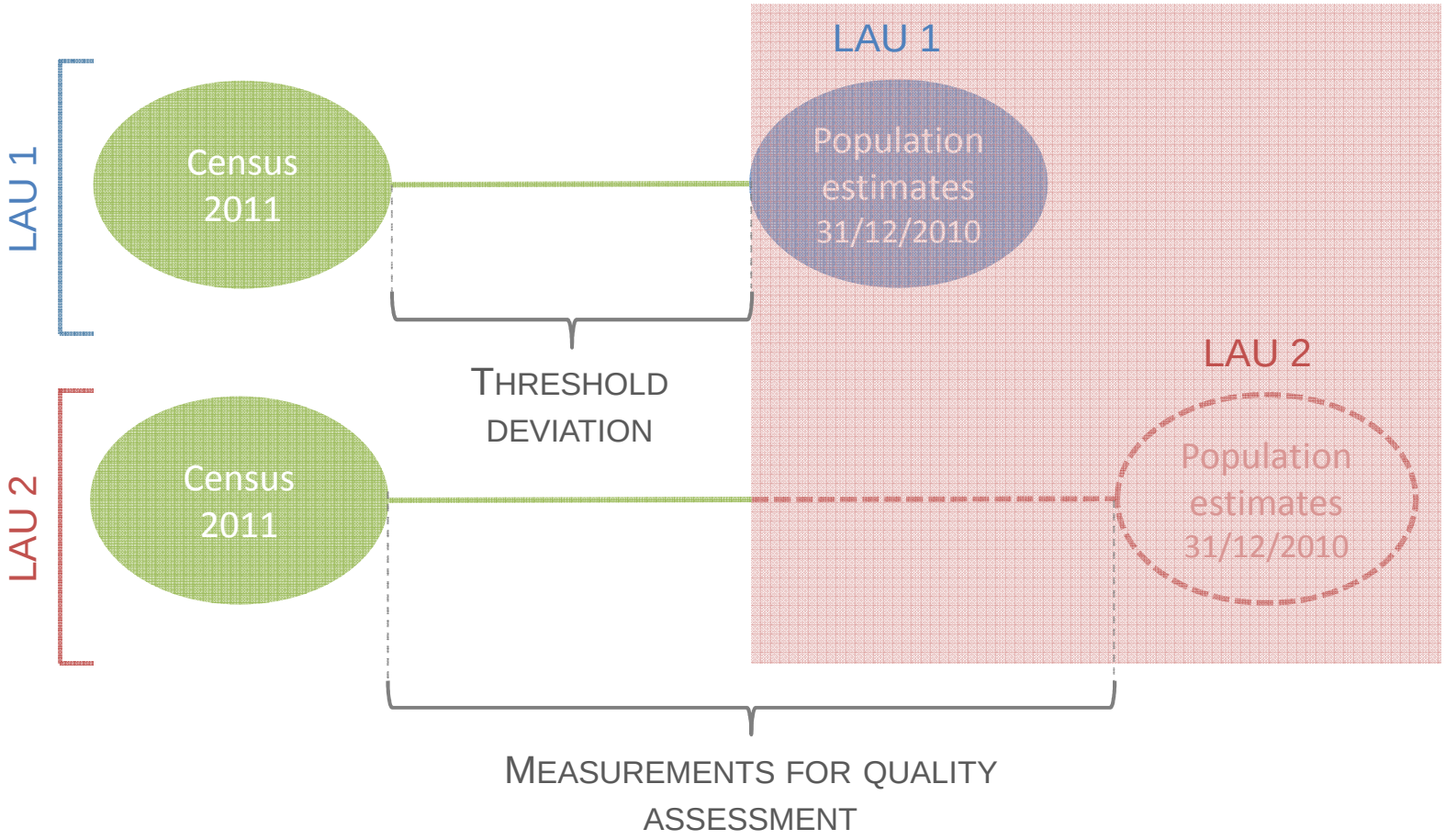
QUALITY ASSESSMENT



OUT OF QUALITY STANDARDS FOR DISSEMINATION

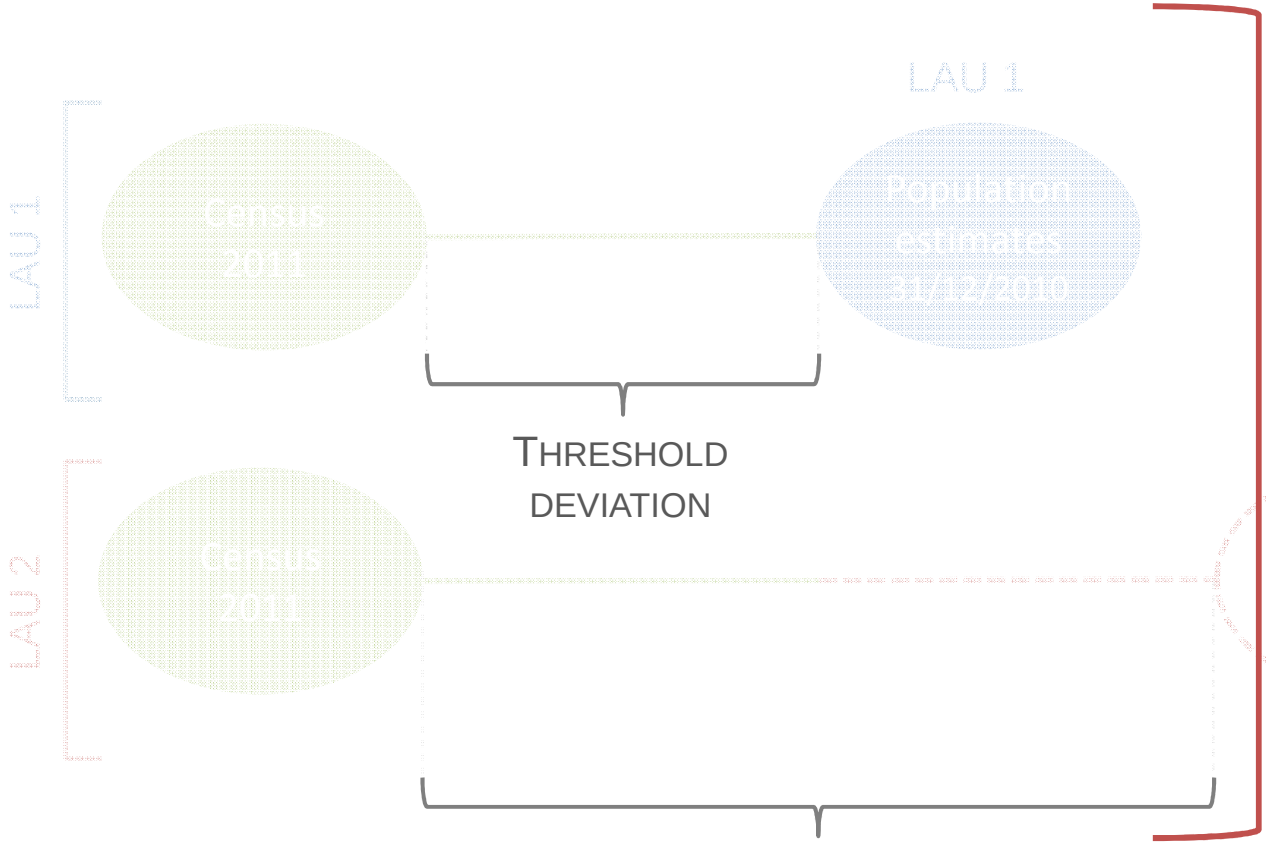
RESIDENT POPULATION ESTIMATES

QUALITY ASSESSMENT



RESIDENT POPULATION ESTIMATES

QUALITY ASSESSMENT



COMPARISON BETWEEN THRESHOLD DEVIATION (ESTIMATES FOR LAU 1 UNITS COMPARED TO CENSUS POPULATION) AND DEVIATION OBTAINED FOR LAU 2 ESTIMATES

DECISION:

POPULATION ESTIMATES FOR LAU 2 ARE PUBLISHABLE? IF NOT, FIND THE LAU 2 AGGREGATIONS SUIT FOR PUBLISHING

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POPULATION ESTIMATES BY LAU 2

MEASUREMENTS FOR QUALITY ASSESSMENT

Percent Error for region *i*

$$PE_i = \left(\frac{e_i - c_i}{c_i}\right) \times 100$$

Absolute Percent Error for region *i*

$$APE_i = \left|\frac{e_i - c_i}{c_i}\right| \times 100$$

Mean Algebraic Percent Error for region *i*

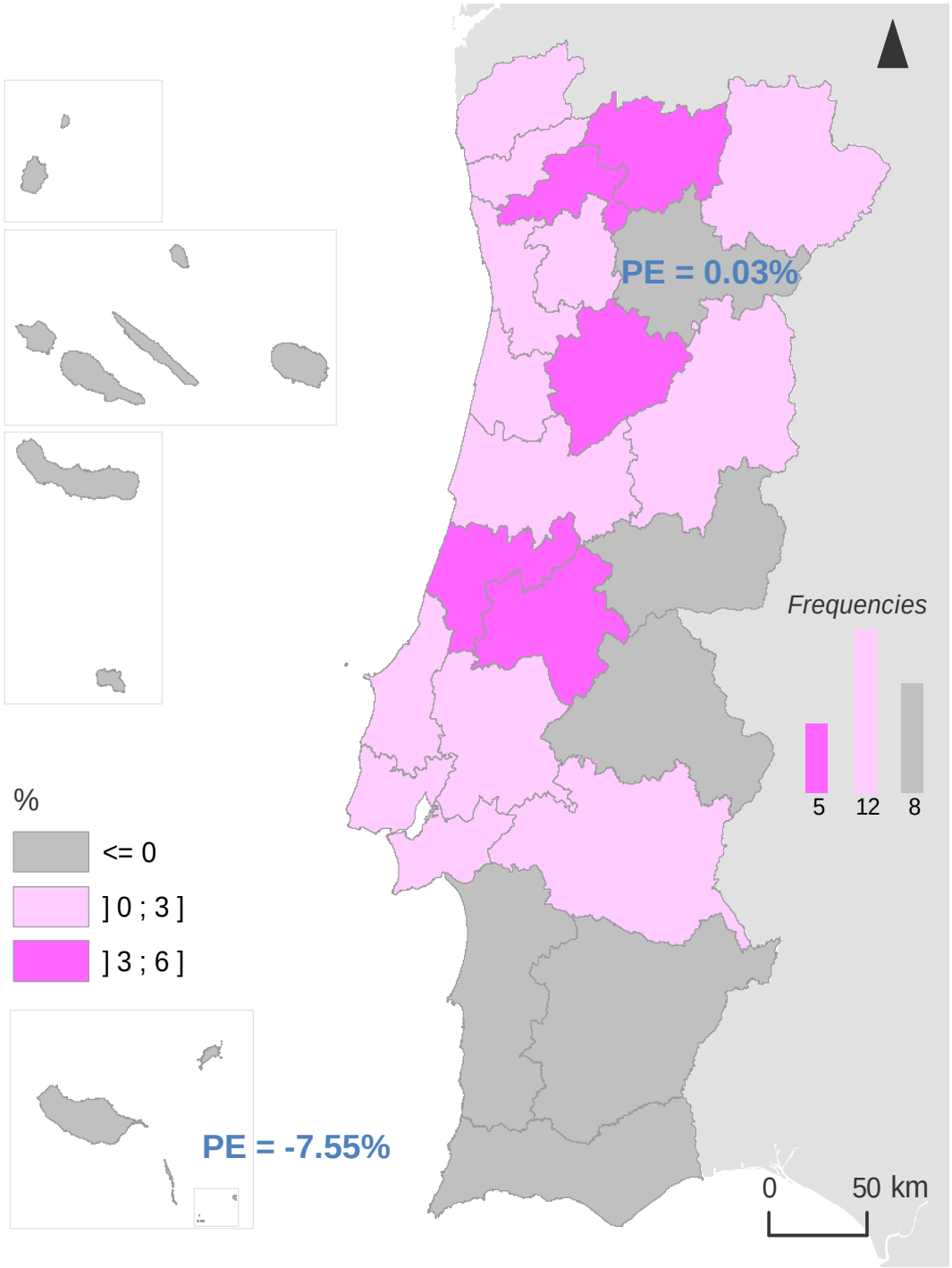
$$MALPE = \frac{\sum_{i=1}^{n}\left(\frac{e_i - c_i}{c_i}\right)}{n} \times 100$$

Mean Absolute Percent Error for region *i*

$$MAPE = \frac{\sum_{i=1}^{n}\left|\frac{e_i - c_i}{c_i}\right|}{n} \times 100$$

e_i - Estimated population for region *i*; c_i - Census population for region *i*

Bryan, 1999; Coleman and Swanson, 2007; Swanson *et al*, 2000



TERRITORIAL LEVELS OF POPULATION ESTIMATES PUBLISHED

NUTS III

PT ABSOLUTE DEVIATION FROM CENSUS 2011: **0.71**%

(PE = 0.71% → OVERESTIMATION)

NUTS III MAX. ABSOLUTE DEVIATION FROM CENSUS 2011: **7.55**%

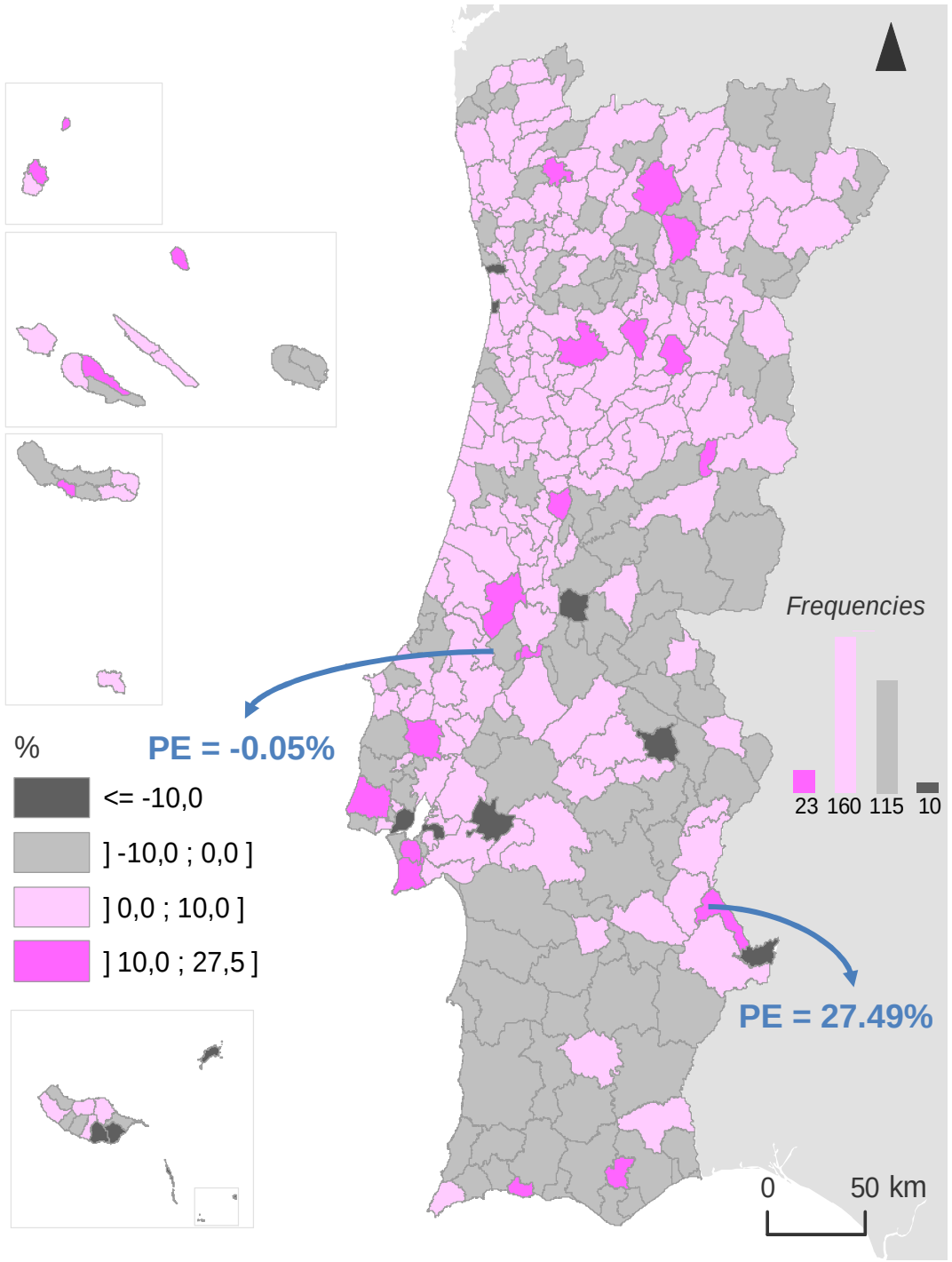
(PE = -7.55% → UNDERESTIMATION; REGION: RAM)

NUTS III MIN. ABSOLUTE DEVIATION FROM CENSUS 2011: **0.03**%

(PE = 0.03 → OVERESTIMATION; REGION: DOURO)

TERRITORIAL LEVELS OF POPULATION ESTIMATES PUBLISHED

LAU 1

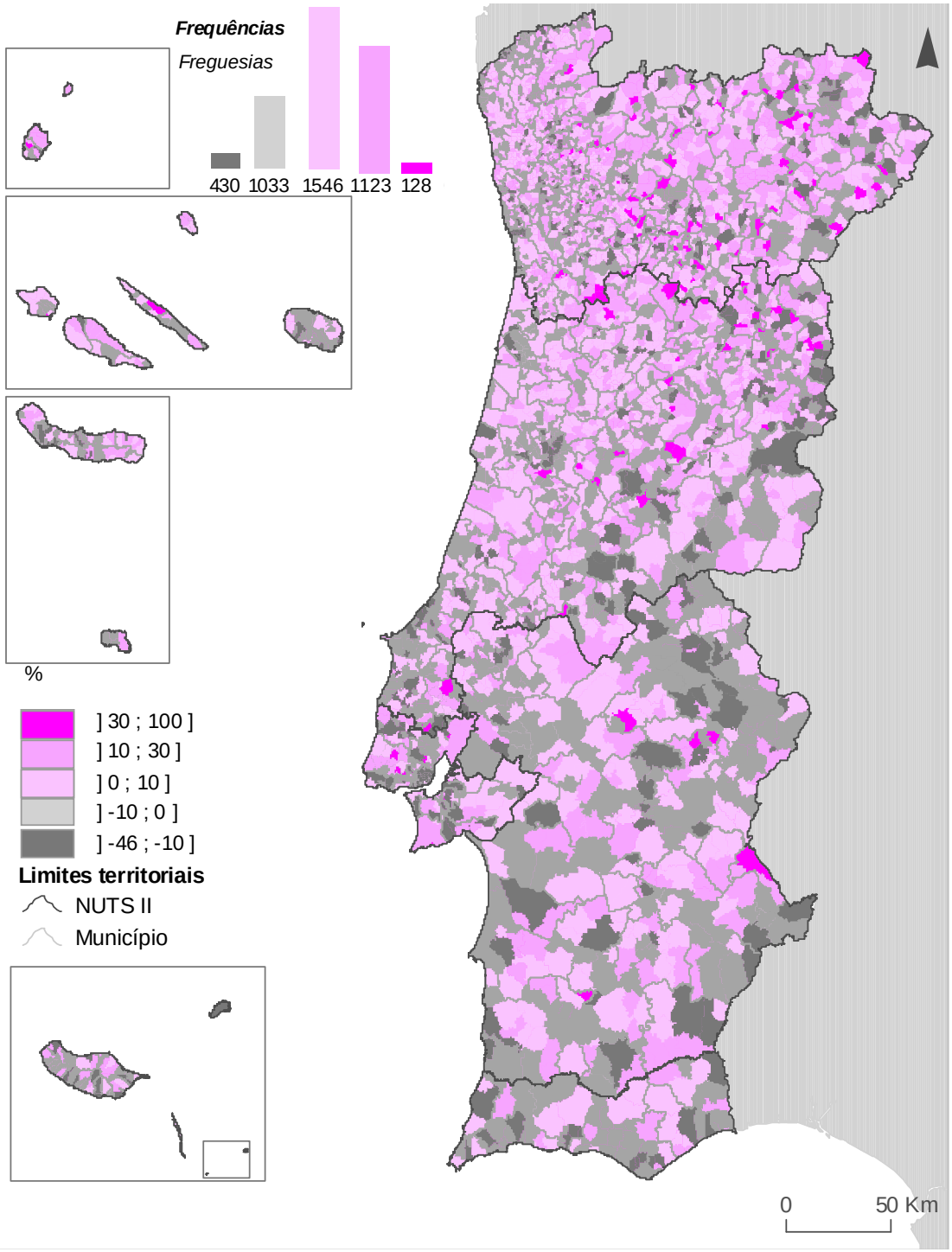


LAU 1 MAX. ABSOLUTE DEVIATION FROM CENSUS 2011: **27.49%**

(PE = 27.49% → OVERESTIMATION; MUNICIPALITY: MOURÃO)

LAU 1 MIN. ABSOLUTE DEVIATION FROM CENSUS 2011: **0.05%**

(PE = -0.05 → UNDERESTIMATION; MUNICIPALITY: TORRES NOVAS)



TERRITORIAL LEVELS OF POPULATION ESTIMATES EVALUATED FOR PUBLISHING

LAU 2

LAU 2 MAX. ABSOLUTE DEVIATION FROM CENSUS 2011: **76.54%**

(PE = 76,54% → OVERESTIMATION)

LAU 2 MIN. ABSOLUTE DEVIATION FROM CENSUS 2011: **0%**

(IN 18 PARISHES, POPULATION ESTIMATES WERE EXACTLY THE SAME AS CENSUS POPULATION)

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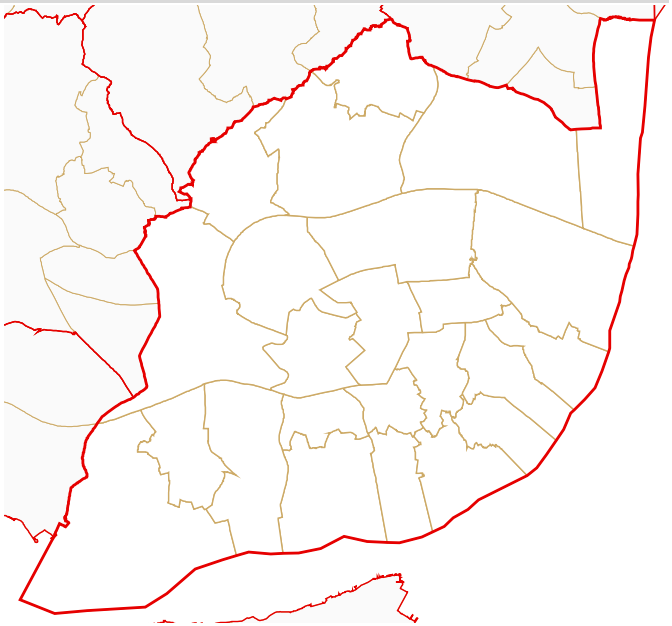
POPULATION ESTIMATES BY LAU 2

QUALITY ASSESSMENT

LAU 1 LISBOA



COMPARISON BETWEEN LAU 2 AREAS AND LAU 1 AREAS WAS MADE USING THE MAPE AND APE MEASURES.

IN OTHER WORDS, FROM THE AVERAGE OF DEVIATIONS FOR LAU 2 ESTIMATES WE SUBTRACTED THE DEVIATION MEASUREMENT OBTAINED FOR LAU 1.

E.G., FOR LAU 1 LISBOA:

MAPE = 14.70%

APE = 14.28%

$$APE_{min} = 2{,}22\%$$

$$APE_{max} = 46.20\%$$

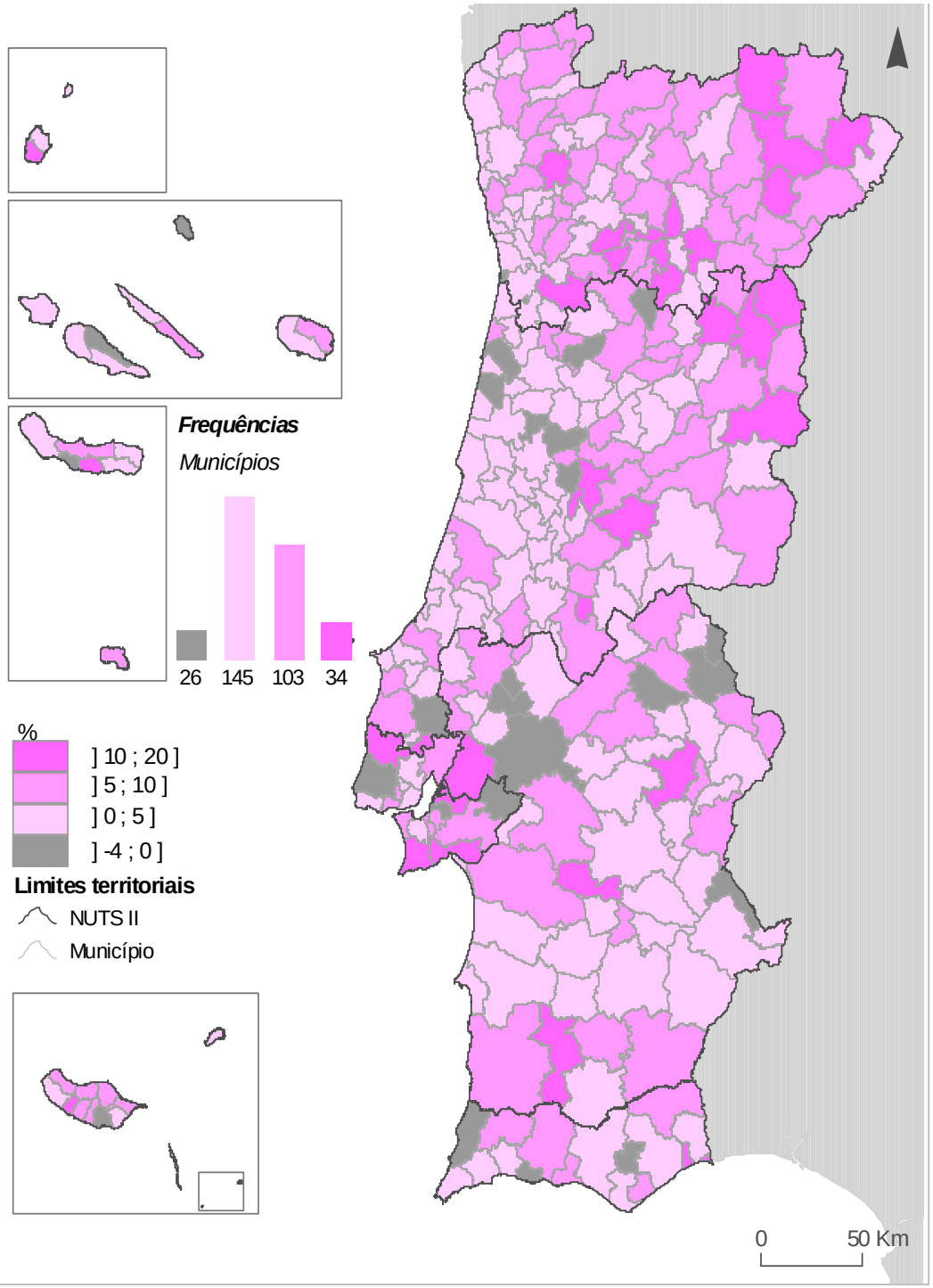
$$APE_i = \left|\frac{e_i - c_i}{c_i}\right| \times 100$$

$$MAPE = \frac{\sum_{i=1}^{n} \left|\frac{e_i - c_i}{c_i}\right|}{n} \times 100$$

THE DIFFERENCE

MAPE – APE = 0.42

THIS MEANS THAT ESTIMATES FOR LAU 2 UNITS HAVE A HIGHER MEASUREMENT ERROR THAN THE ESTIMATION OBTAINED FOR THE LAU 1 UNIT.



MAPE – APE > 0

↓

ESTIMATES FOR LAU 2 UNITS HAVE A HIGHER MEASUREMENT ERROR THAN THE ESTIMATION OBTAINED FOR THE LAU 1 UNIT.

MAPE – APE < 0

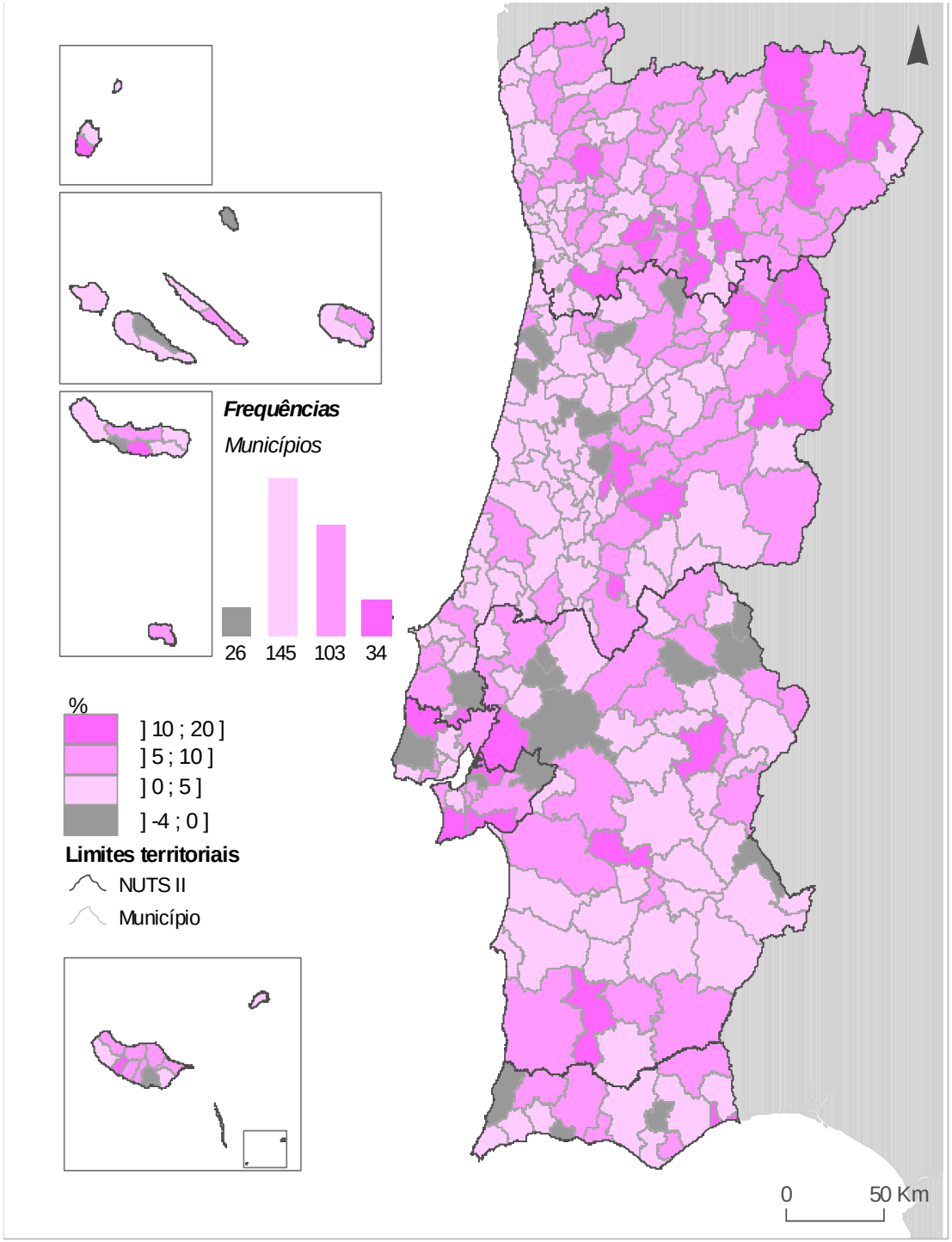
↓

ESTIMATES FOR LAU 2 UNITS HAVE A LOWER MEASUREMENT ERROR THAN THE ESTIMATION OBTAINED FOR THE LAU 1 UNIT.

MAPE – APE = 0

↓

SIMILAR MEASUREMENT ERRORS FOR LAU 1 UNITS AND THE CORRESPONDING LAU 2 UNITS.



IN 34 LAU 1 UNITS THE AVERAGE ERROR FOR THE RESPECTIVE LAU 2 UNITS IS CONSIDERABLY WIDER THAN THE DEVIATION OBTAINED FOR THE LAU 1

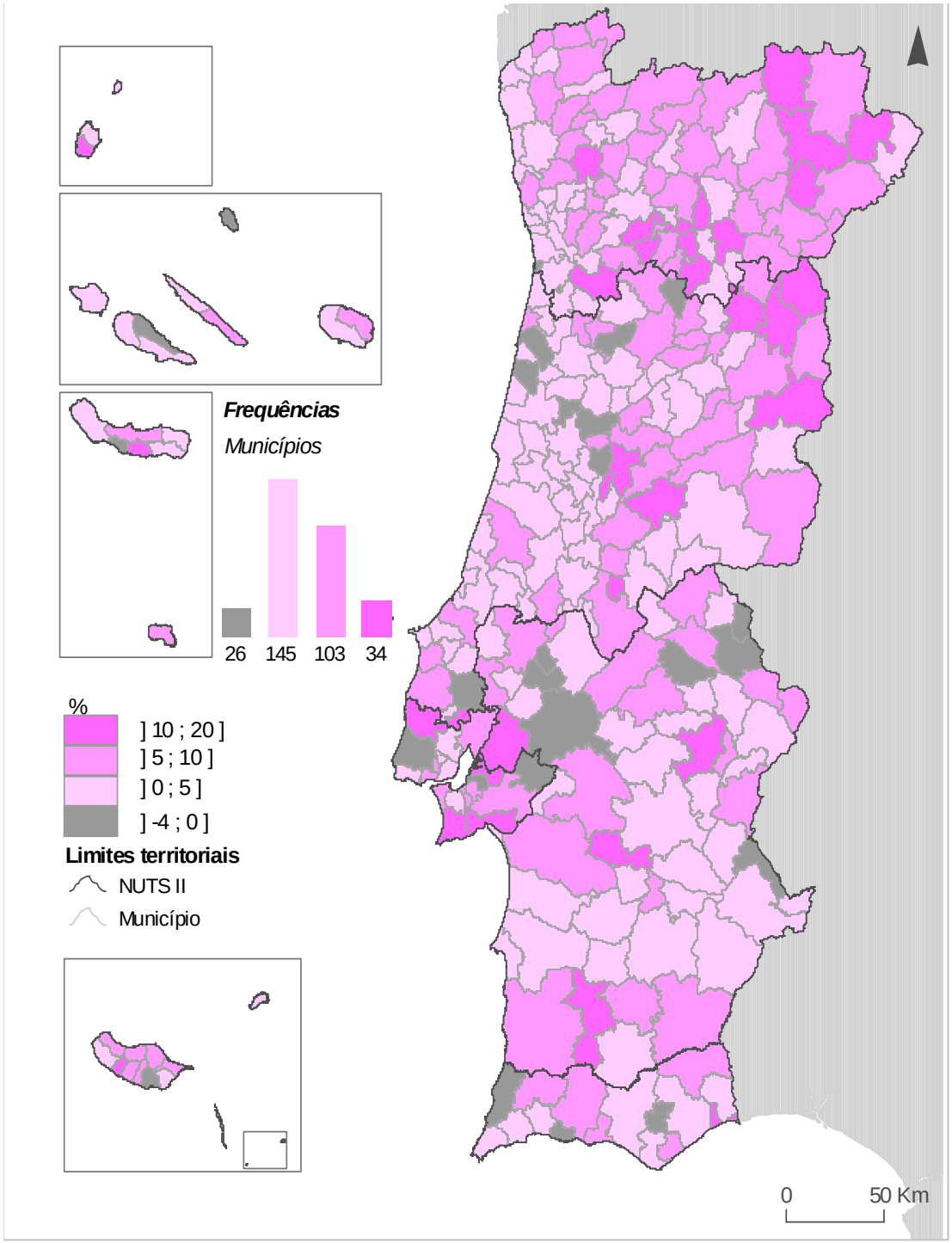
MAX DIF.

MAPE – APE = **19.53%**

MAPE = 26.32%

APE = 6.79%

THESE RESULTS INDICATE A DISCREPANCY BETWEEN LAU 2 AND LAU 1 MEASUREMENT ERRORS

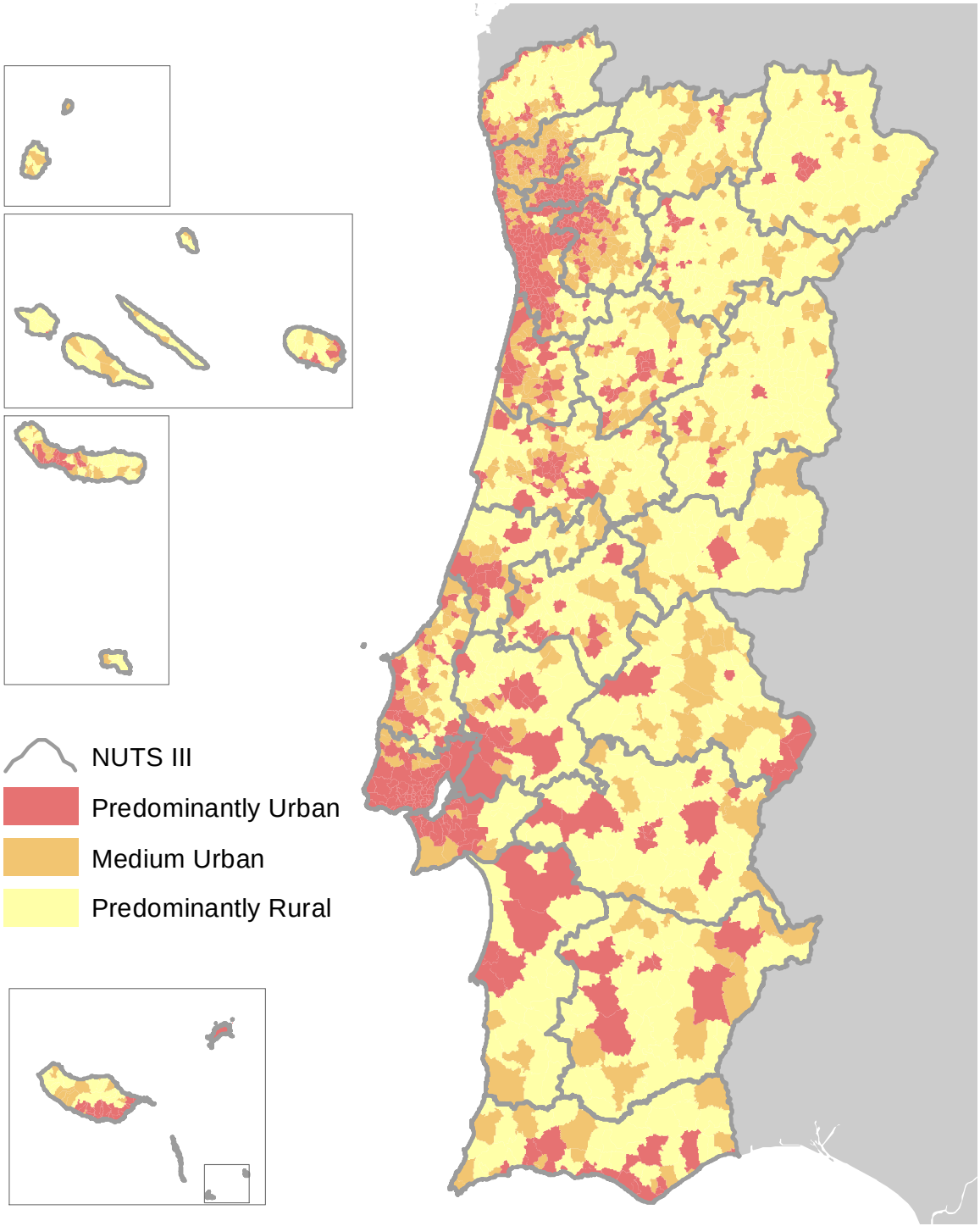


QUALITY OF LAU 2 ESTIMATES ARE NOT ADEQUATE FOR PUBLISHING

NEXT STEP: LAU 2 AGGREGATIONS BY

URBAN AREAS TYPOLOGY

LAU 2 AGGREGATIONS BY NUTS III REGIONS



Urban Areas Typology

Deviation measurements were calculated for aggregations of LAU 2 level units by urban area typology in each NUTS III region

Predominantly urban areas

Max. deviation: **14.19%**

Min. Deviation : **0.05%**

Medium urban areas

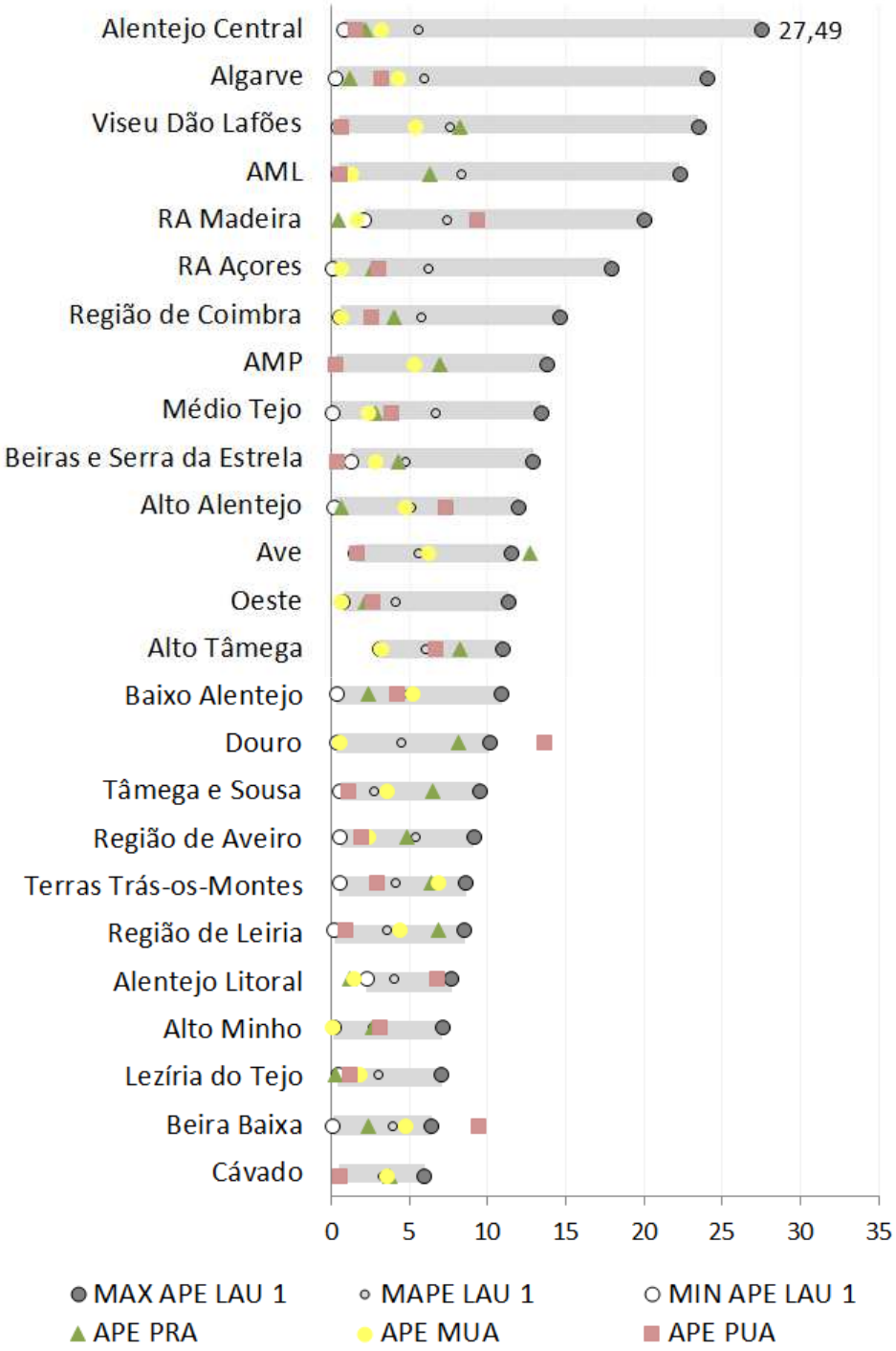
Max. deviation: **9.04%**

Min. Deviation: **0.12%**

Predominantly rural areas

Max. deviation: **11.34%**

Min. Deviation: **0.24%**



URBAN AREAS TYPOLOGY BY NUTS III

QUALITY ASSESSMENT

MOST APE VALUES OBTAINED FOR THE THREE URBAN AREAS (PREDOMINANTLY URBAN, MEDIUM URBAN AND PREDOMINANTLY RURAL AREAS) IN EACH NUTS III REGION ARE SMALLER THAN THE MAXIMUM LAU 1 APE VALUE.

FURTHERMORE, ALL DEVIATIONS FOR URBAN AREAS **ARE SMALLER THAN THE MAXIMUM LAU 1 APE** (27.49%)

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New Statistical Indicators

NUTS III by Urban Typology

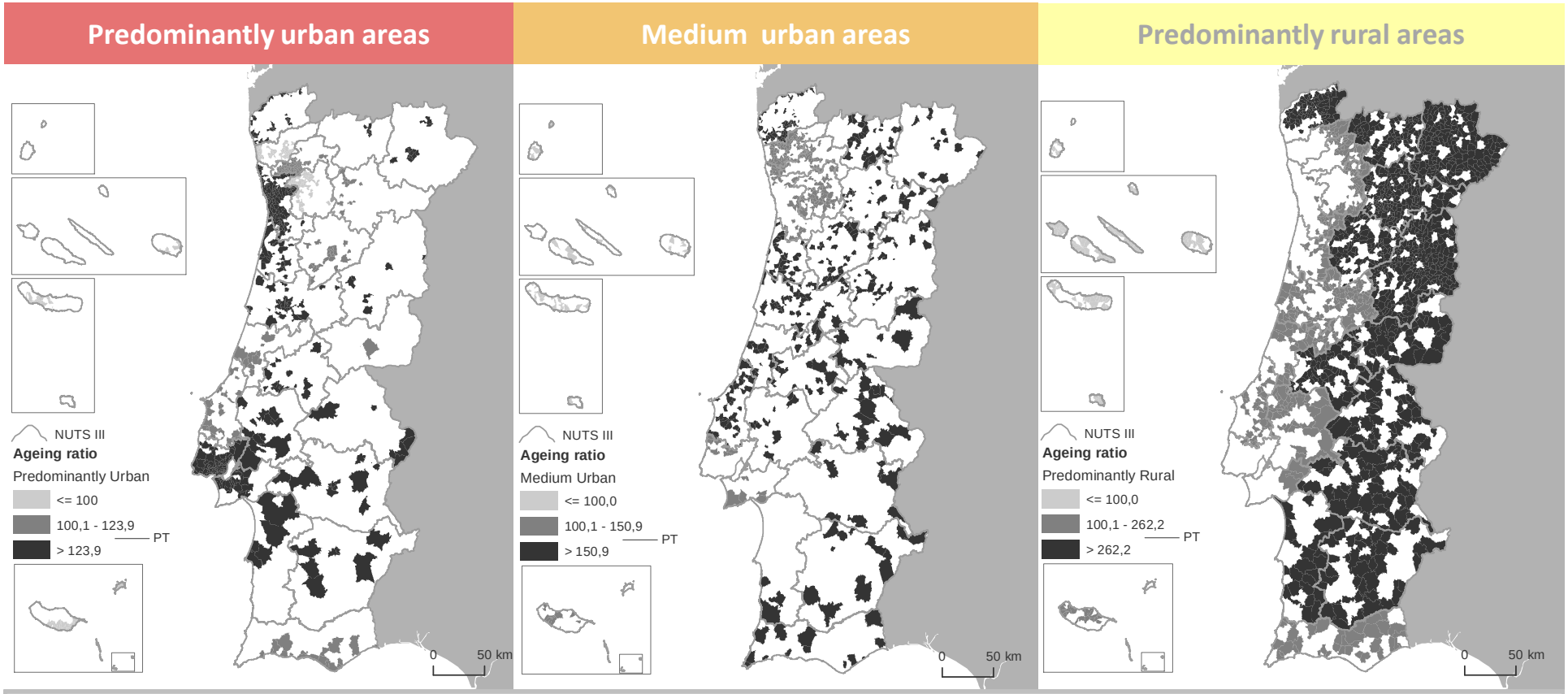
Ten additional statistical demographic indicators by Urban Areas Typology have been disseminated according to the new NUTS version (NUTS 2013)

2011 data series: 2011-2014

- **Resident population by sex** (No.)
- **Resident population by age groups – life cycles** (No.)
- **Population density** (No./ km^2)
- **Crude birth rate** (‰)
- **Crude death rate** (‰)
- **Ageing ratio** (No.)
- **Sex ratio** (No.)
- **Proportion of resident population with 14 years old or under** (%)
- **Proportion of resident population aged between 15 and 64 years** (%)
- **Proportion of resident population with 65 or more years old** (%)

AGEING RATIO

NUMBER OF ELDERLY PERSONS (65 AND OVER) BY THE NUMBER OF YOUNG PERSONS (0-14 YEARS) - 2014



NOTE: IN EACH TYPOLOGY, UNITS BELONGING TO THE SAME NUTS III REGION ASSUME THE SAME VALUE

THERE IS A CLEAR HIGHER AGING RATIO IN INTERIOR REGIONS.

ALL TYPOLOGIES SHOW A PREDOMINANCE OF OLDER PEOPLE.

Resident Population Estimates By NUTS III and Urban Areas Typology

An additional set of statistical demographic indicators by new territorial segmentation is now published

They constitute new statistical information to assess territorial differences and disparities, as well as important assets for spatial planning and regional policy monitoring

There is now the possibility of using the indicators on resident population (number) to derive per capita indicators and other indicators that require the population as a denominator

Resident Population Estimates By NUTS III and Urban Areas Typology

A parallel line of work has been developed → strengthening the estimation model in the internal migration component, using administrative data → restrictions of access to data sources has limited the development of alternative model to estimate migration

Next steps

Assess the possibility of strengthening the estimation model in the internal migration component, using administrative fiscal data (cadastre)

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