Source: Newman & Kenworthy, 2015

What data for measurement? What about future densities? Will densification help?
High densities often considered beneficial

*Economy* - Productivity assumed to rise with density

*Sustainability* – "a 1% increase in the share of land covered by artificial land needs to be supplemented by a 2.2% increase in the share of green infrastructure" (Maes et al, 2015)

*Socially* – Dense enough neighbourhoods a requirement for mechanisms of selfcontrol (Jacobs, 1962; Jacobs-Crisioni et al, 2014)
Available data

DG REGIO municipal population counts 1961 - 2011

EUROSTAT census 1x1 km grid, 2011

Soon: JRC maps, estimated daytime and nighttime population (24 1x1 km grids)
What about future densities?

**EUROSTAT projections:** national, downscaled to regional levels

**LUISA model:** creates future 100m population and land-use maps by combining regional expectations and bottom-up dynamics

**Context of the knowledge centre for territorial policies**
From regional expectations to local activity distributions

Expectations

GDP, population, ...

Land use changes

Population distribution

Accessibility

- Lowest
- Medium
- Highest

100 m
NEW: population change per age class
Population weighted density expectations

Year

National population weighted densities

2015 2020 2025 2030

BE BG CZ DE EL ES FR HU IT LU NL PL PT RO SE
Many more indicators available through urban.jrc.ec.europa.eu

People exposed to annual mean concentrations of NO2 superior to 40 µg/m3 of air

Population weighted density expectations
Will densification help? A spatial interaction perspective

Are densities advantageous to agglomeration benefits, transport energy consumption, neighbourhood self control because of increased local interaction opportunity?

\[ D_i = \frac{P_i}{\text{area}_i} \text{ vs } A_i = \sum_{j=1} P_j / d_{ij} \]
On the one hand, yes

For spatial interaction within a city....

... it may be expected that in denser cities:

- travelled distances go down
- opportunities for walking, cycling go up

Stepniak & Jacobs-Crisioni, 2017, Reducing the uncertainty induced by spatial aggregation in accessibility and spatial interaction applications. JTrG 61: 17-29
A spatial interaction perspective

Straightforward origin-constrained SIM 1x1km

Destinations <45 min

Uniform behaviour, no elasticities
"cities are no islands"

Potential accessibility 2.18** (26.41)
Pop-weighted density -2.86** (-26.04)
Constant 8.57** (61.28)
N 663
R2 0.62

* p<0.05, ** p<0.01

Source: EC-JRC, H98, LUISA
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Thanks! Questions?

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