ODISSEI Community Conference

22 October 2019 | Galgenwaard, Utrecht

ODISSEI

Open Data Infrastructure for Social Science and Economic Innovations

Contextual effects at multiple spatial scales for the full population of the Netherlands

Ana Petrović, Delft University of Technology
Prof. Maarten van Ham, Delft University of Technology, University of St Andrews
Prof. David Manley, University of Bristol

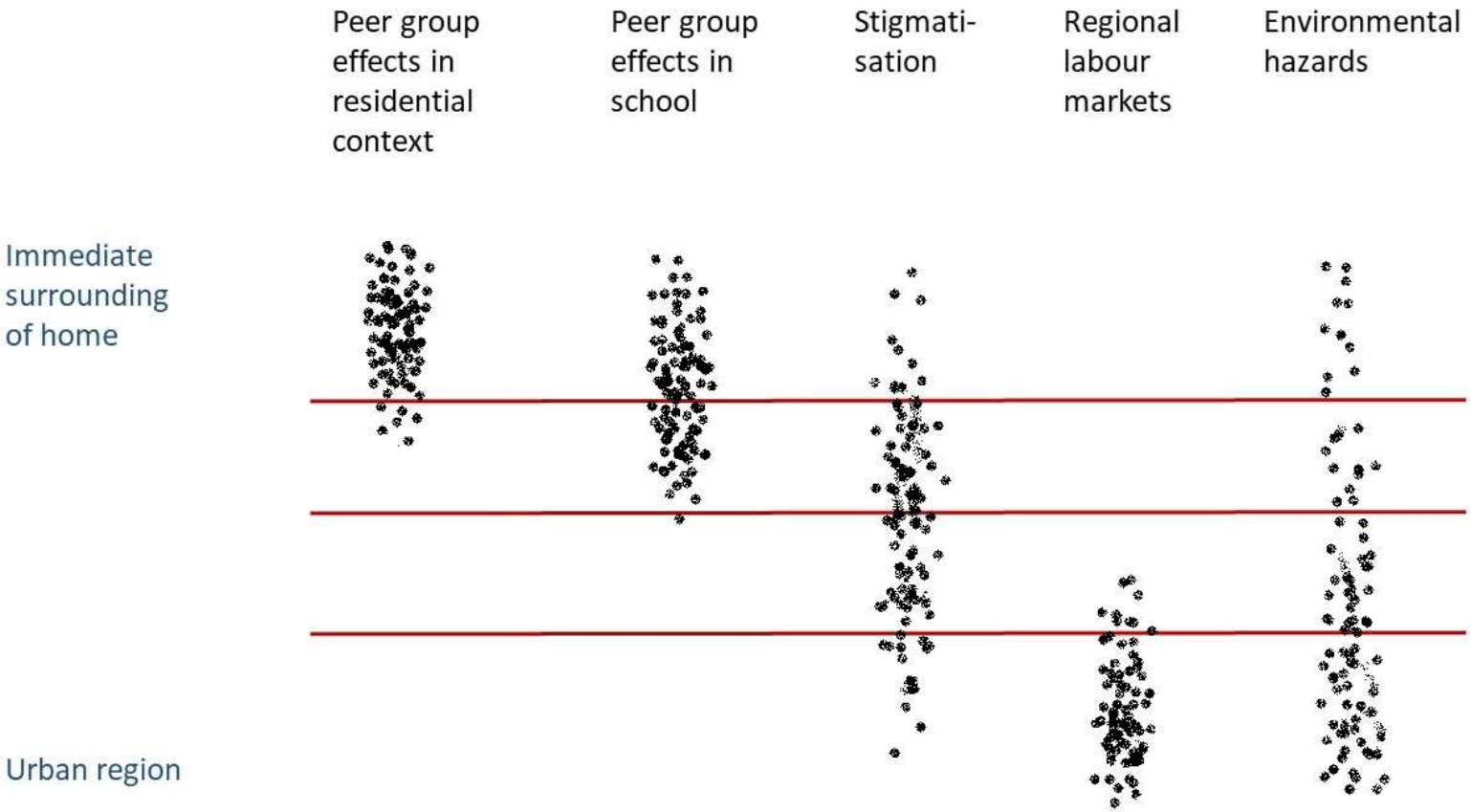
ODISSEI Community Conference
Utrecht, 22 October 2019

https://airfreshener.club/quotes/detroit-michigan-poverty.html

http://www.landlordreferencing.co.uk/blog/them-next-door-vetting-your-tenants-future-neighbours/#

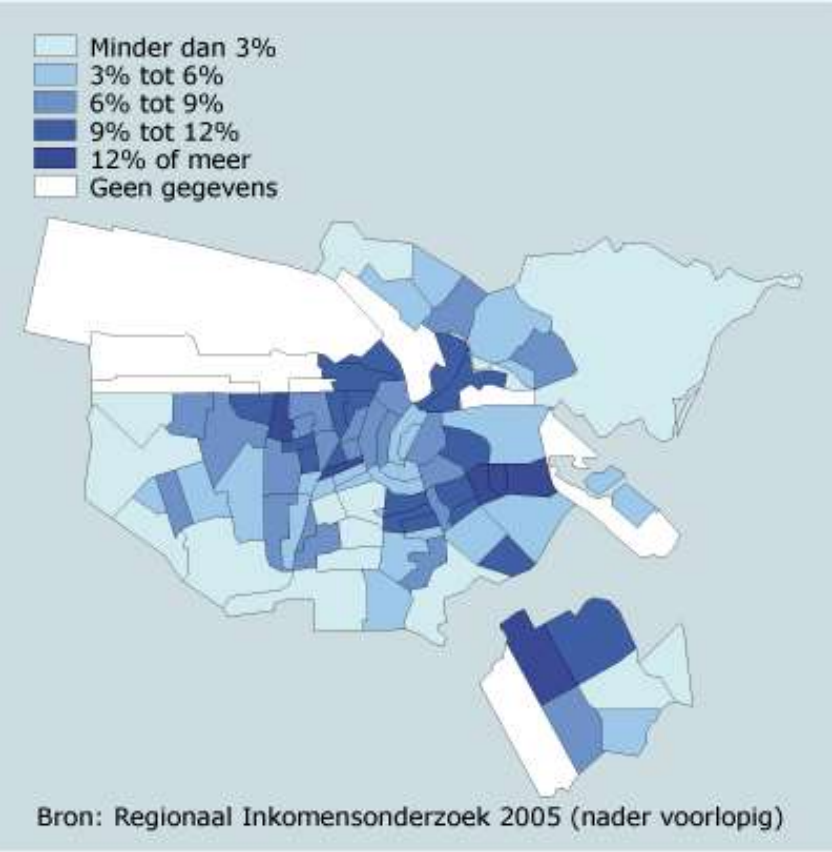
https://www.lovemoney.com/galleries/81646/rich-city-poor-city-where-prosperity-and-poverty-are-neighbours?page=31

TU Delft



(Petrović, Manley, & van Ham, 2019)

Share of low-income people in Amsterdam neighbourhoods



TU Delft

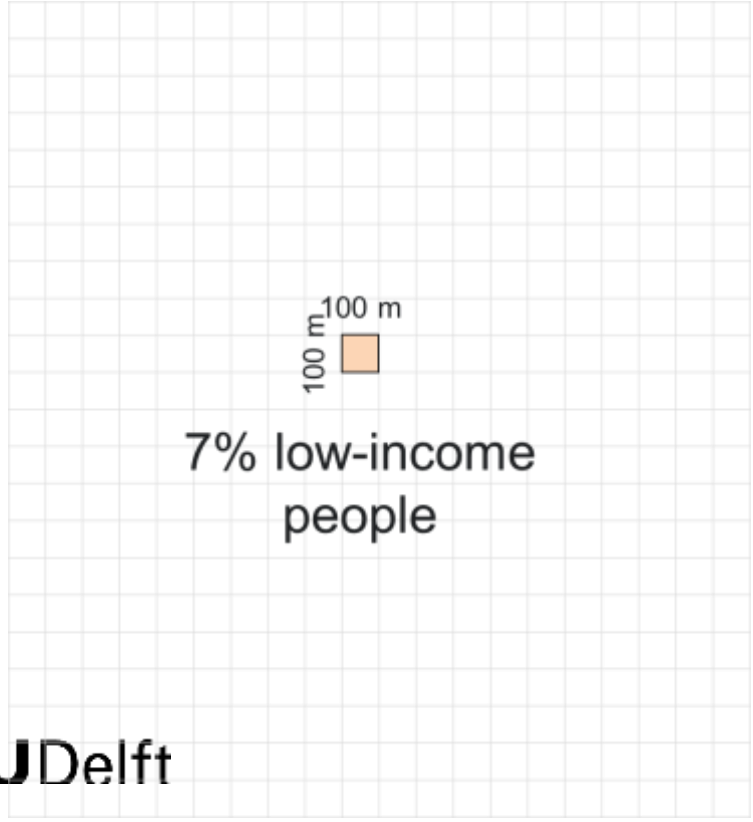
Aim of our research

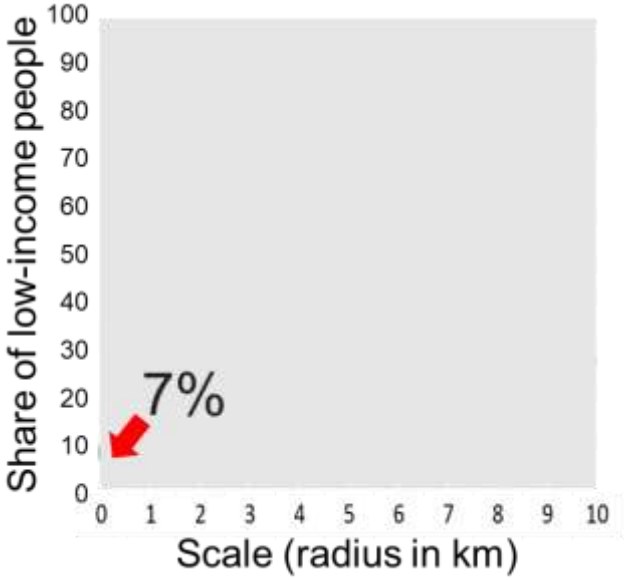
To better understand the effect of spatial inequality on individual socioeconomic status

- To operationalise residential context at multiple spatial scales (from 100m by 100m grid cells up to areas with 10km radius)

- To follow people over multiple years and model the effect of residential context on individual income

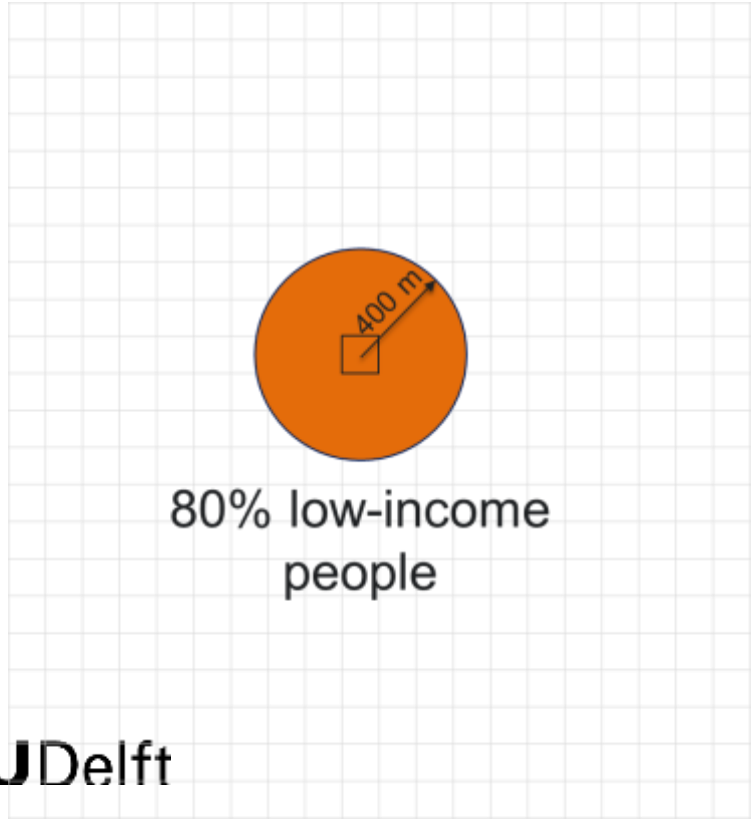
Exposure to spatial context at 101 scales

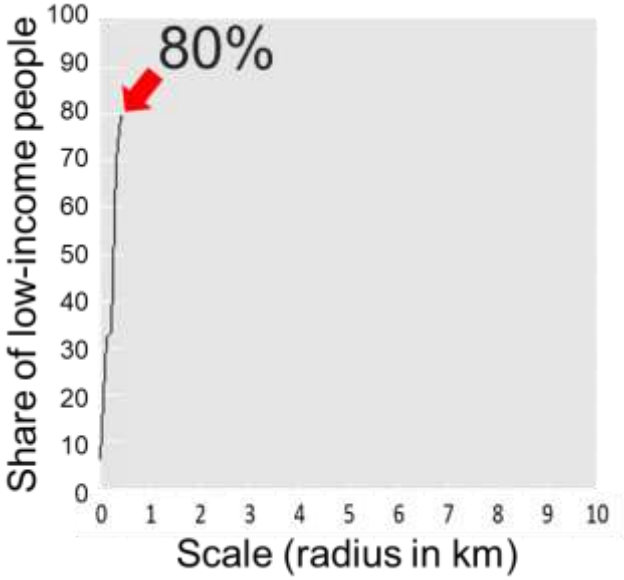




(see Petrović, van Ham, & Manley, 2018)

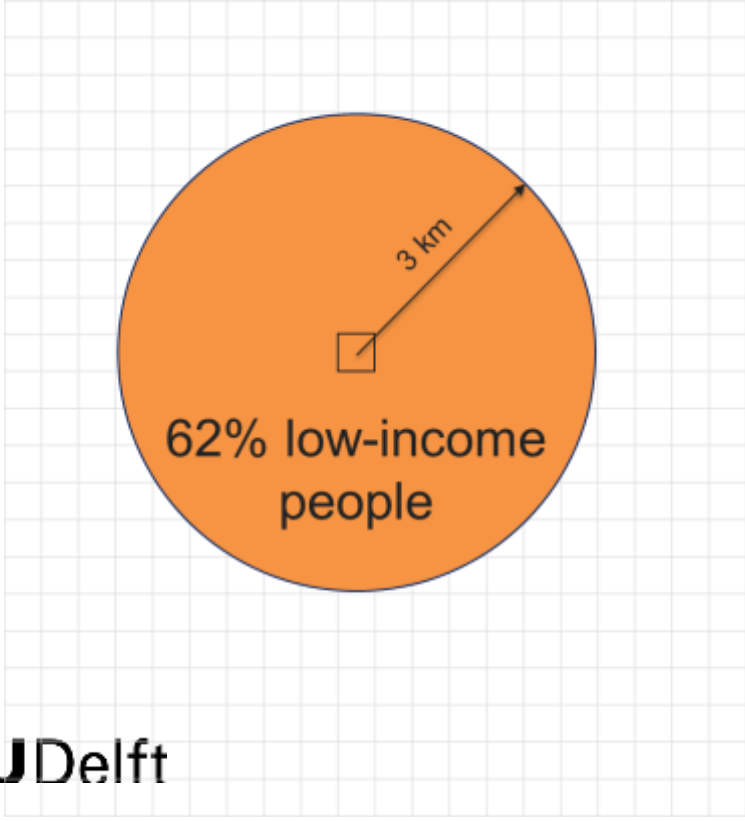
Exposure to spatial context at 101 scales

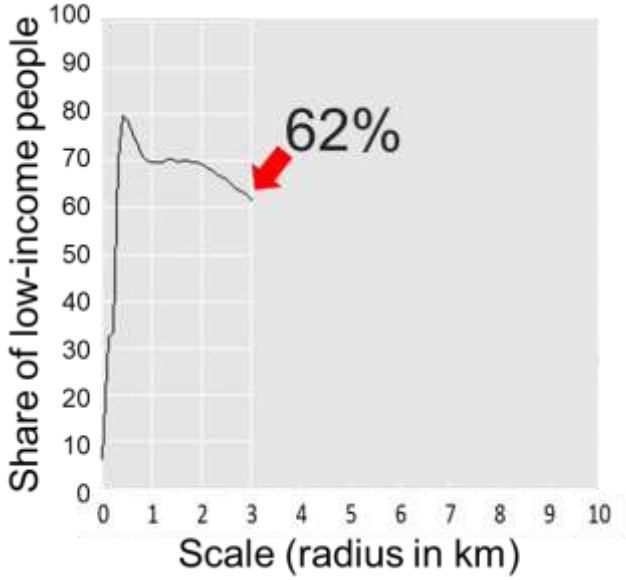




(see Petrović, van Ham, & Manley, 2018)

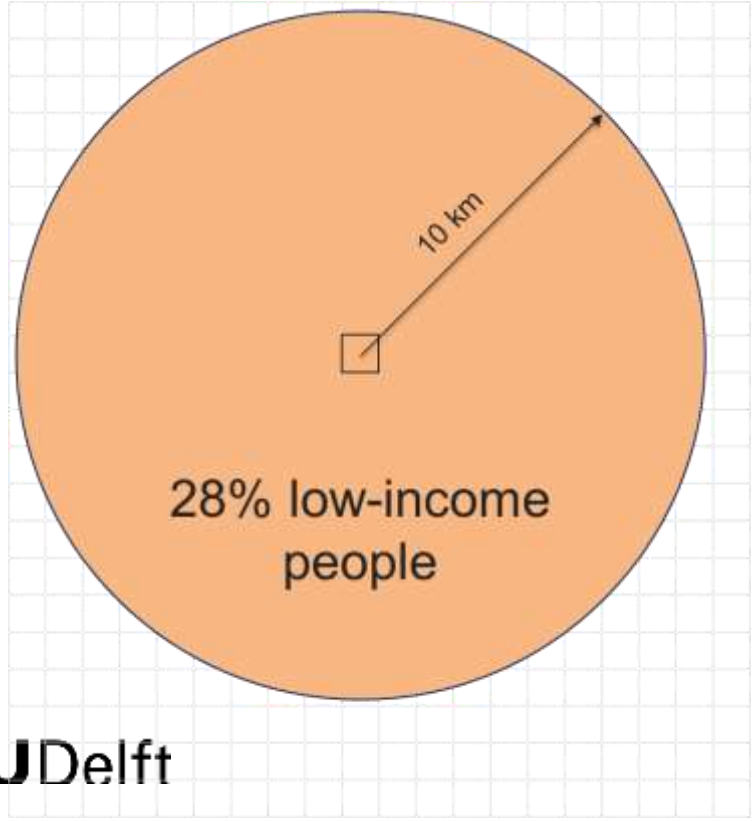
Exposure to spatial context at 101 scales

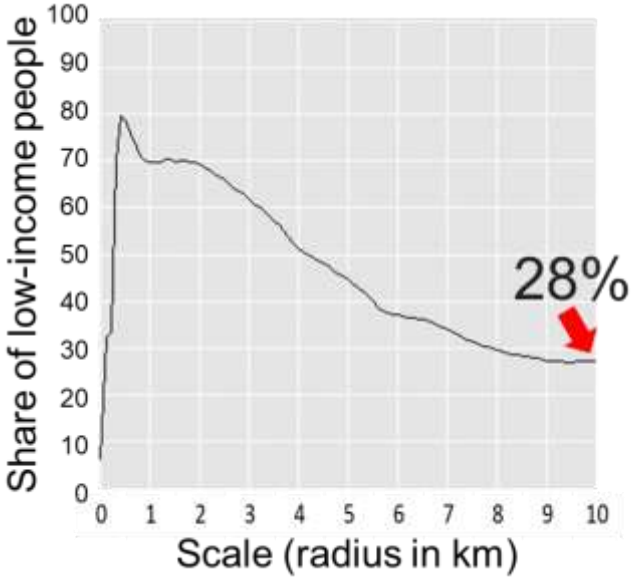




(see Petrović, van Ham, & Manley, 2018)

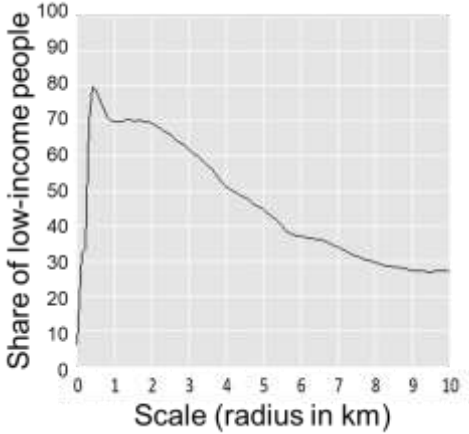
Exposure to spatial context at 101 scales

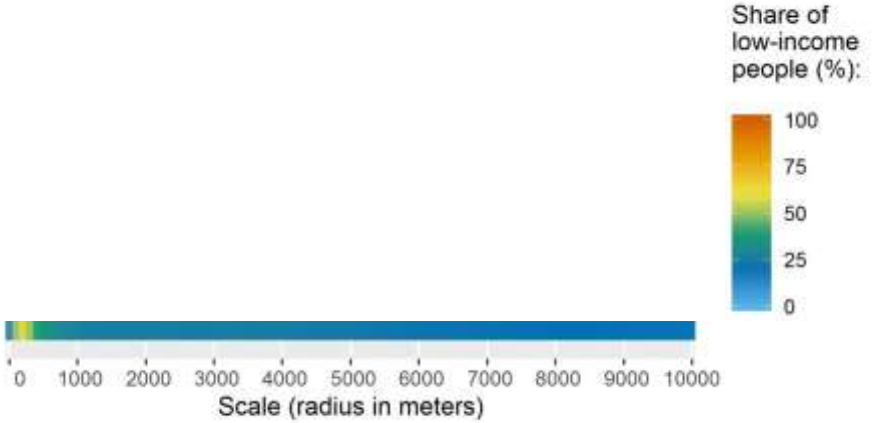




(see Petrović, van Ham, & Manley, 2018)

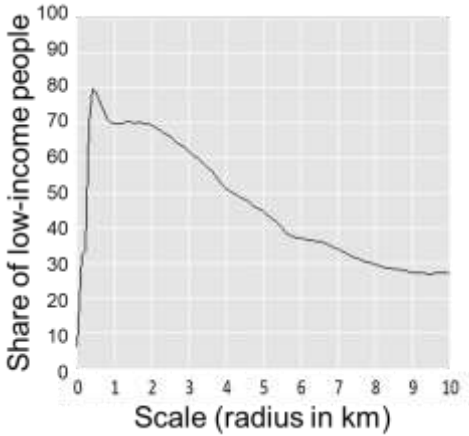
Share of low-income people in one residential location, measured at 101 scales



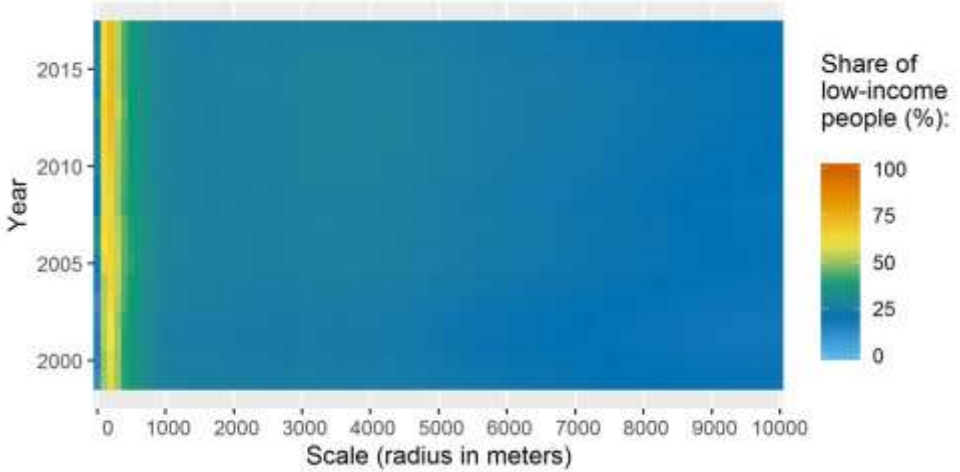


TU Delft

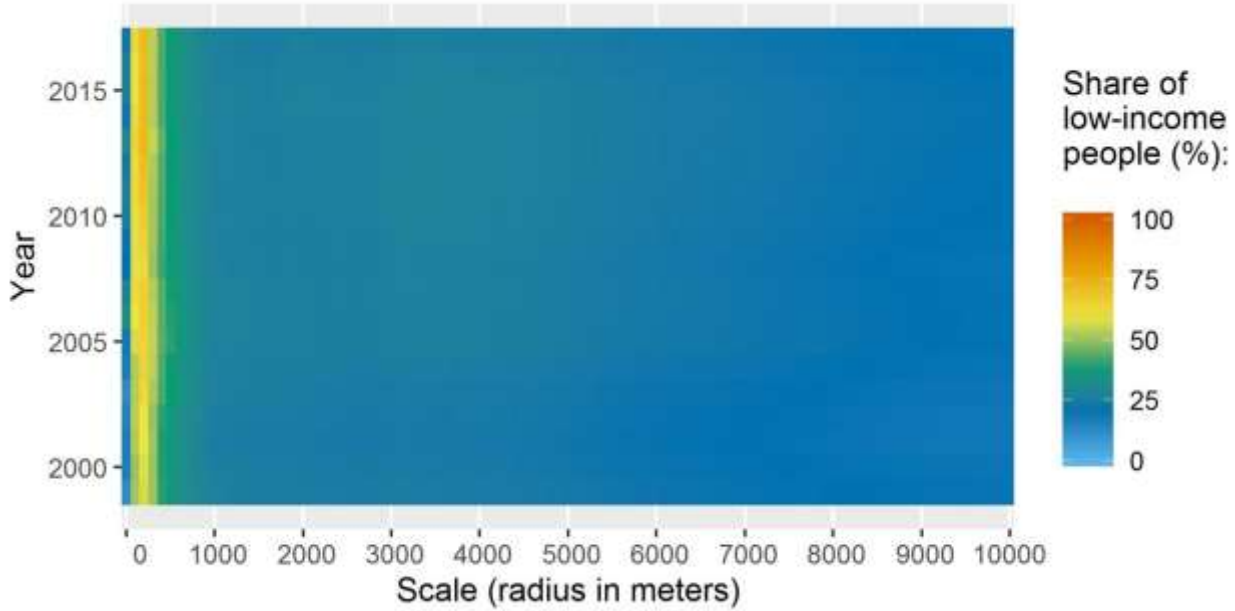
Share of low-income people in one residential location, measured at 101 scales in 19 years



× 19 =

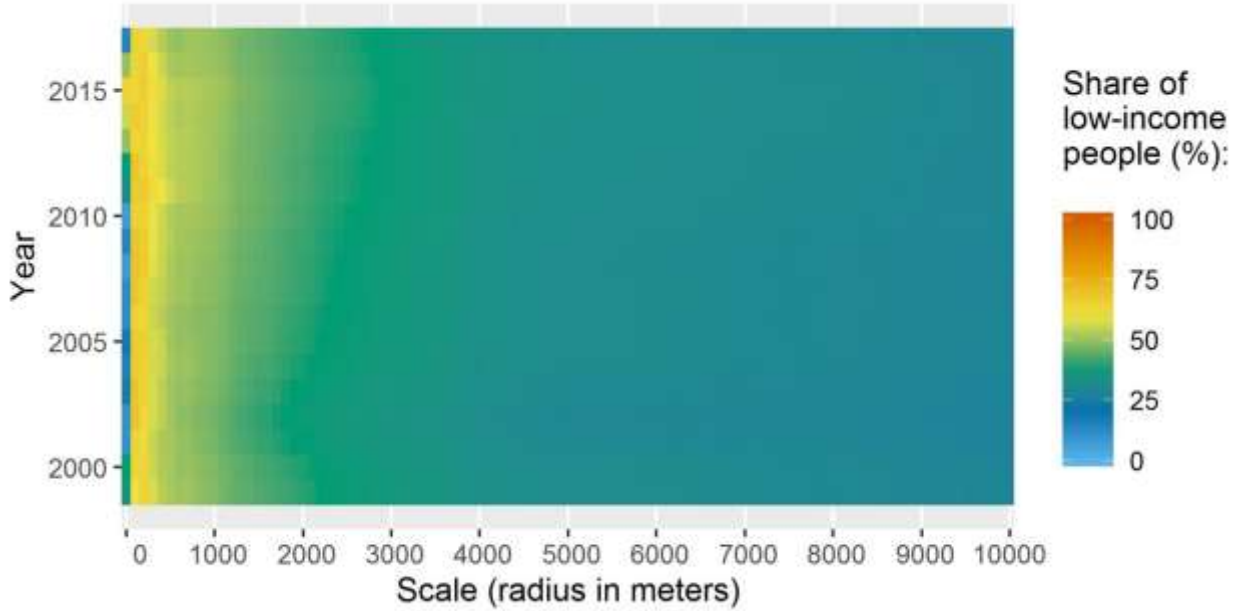


Share of low-income people in one residential location, measured at 101 scales in 19 years



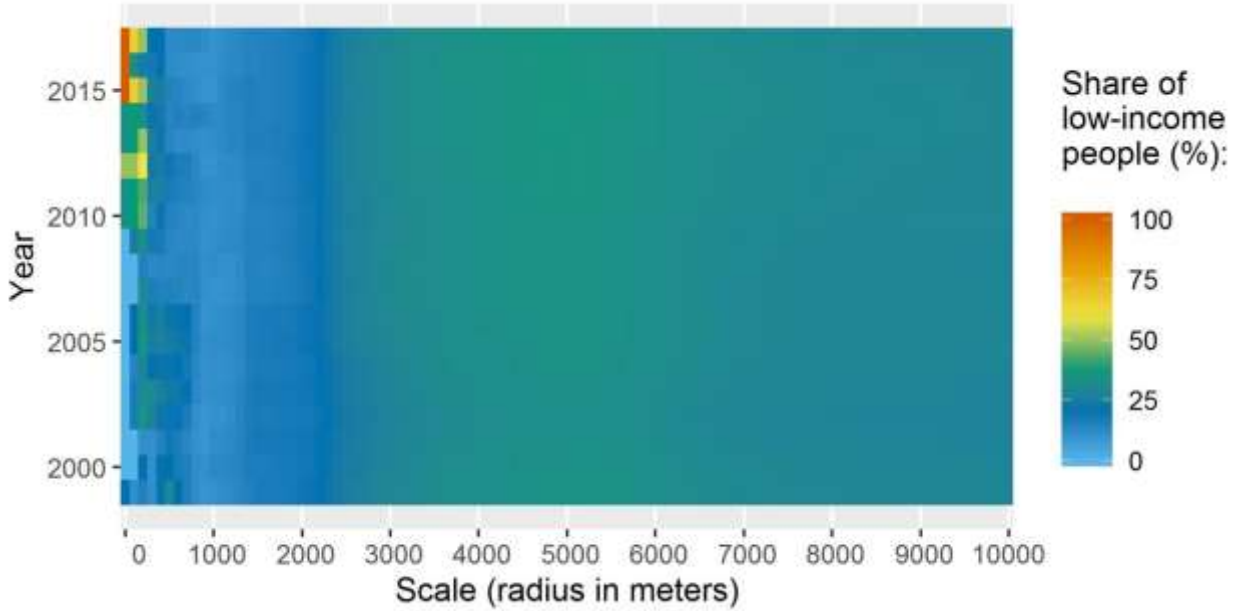
TU Delft

Share of low-income people in one residential location, measured at 101 scales in 19 years



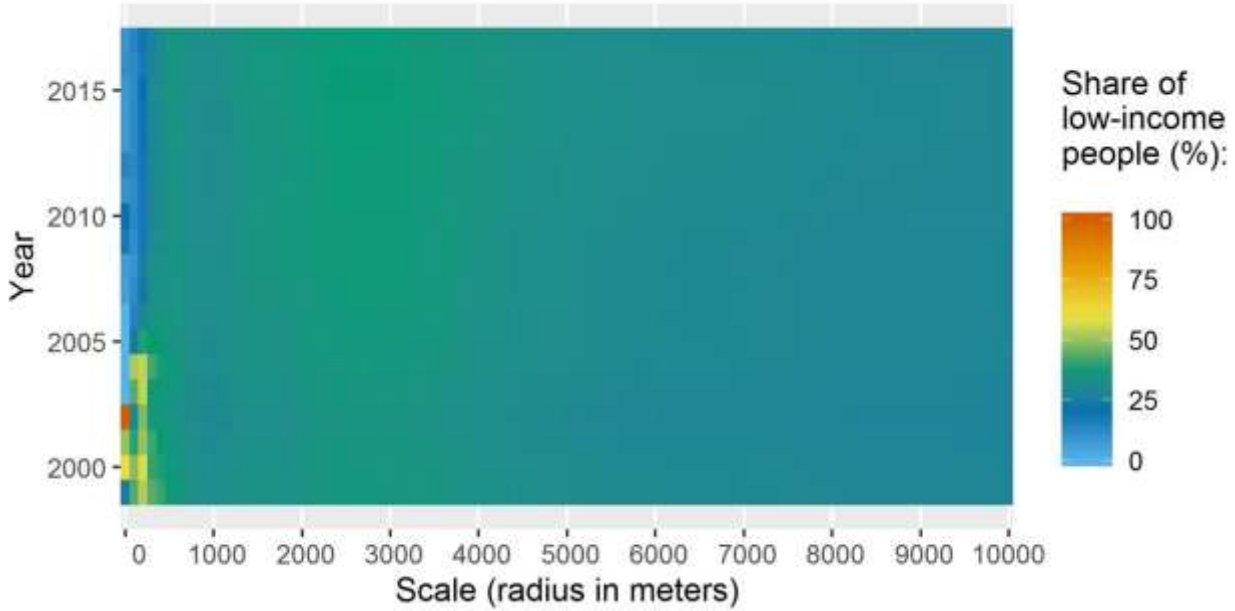
TU Delft

Share of low-income people in one residential location, measured at 101 scales in 19 years



TU Delft

Share of low-income people in one residential location, measured at 101 scales in 19 years



TU Delft

Billions of data points

585,000 populated cells
× 101 scales × 2 variables
× 15 years = 1.8 billion
data points

→ 4 months continuous
calculations

Reduced computing time on ODISSEI Secure Supercomputer

585,000 populated cells
× 101 scales × 2 variables
× 15 years = 1.8 billion
data points

→ 4 months continuous calculations

585,000 populated cells
× 101 scales × 3 variables
× 19 years = 3.4 billion
data points

→ 1 week on 24 nodes

TU Delft

Reduced computing time on ODISSEI Secure Supercomputer

585,000 populated cells
× 101 scales × 2 variables
× 15 years = 1.8 billion
data points

→ 4 months continuous calculations

585,000 populated cells
× 101 scales × 3 variables
× 19 years = 3.4 billion
data points

→ 1 week on 24 nodes

Parallel Stata jobs

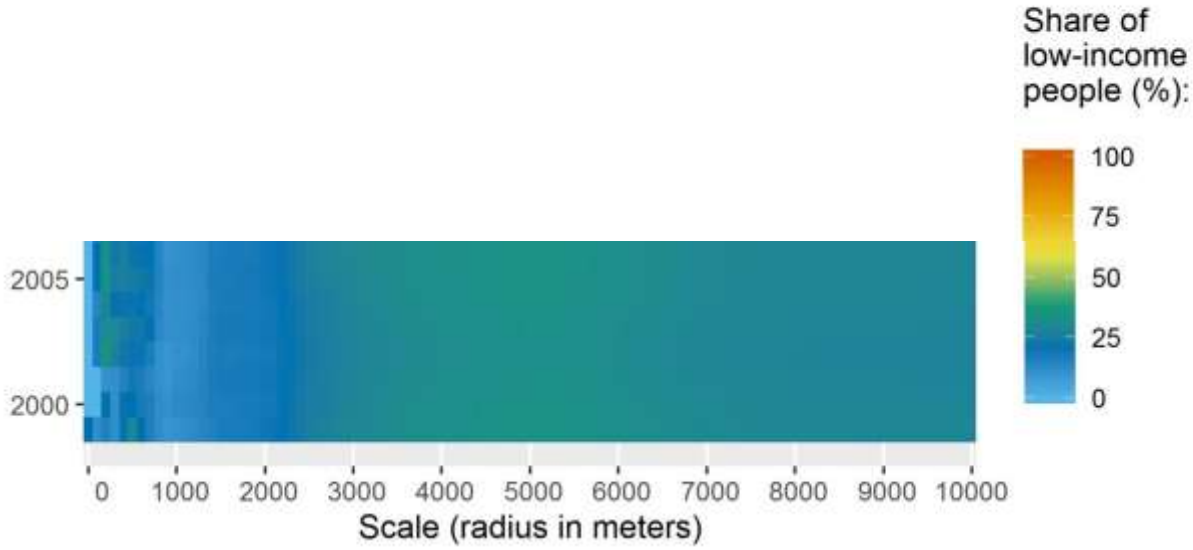
TU Delft

Back to understanding contextual effects

- Interest in individual outcomes over time
- Spatial context characteristics
  - Multiple scales
  - Multiple years

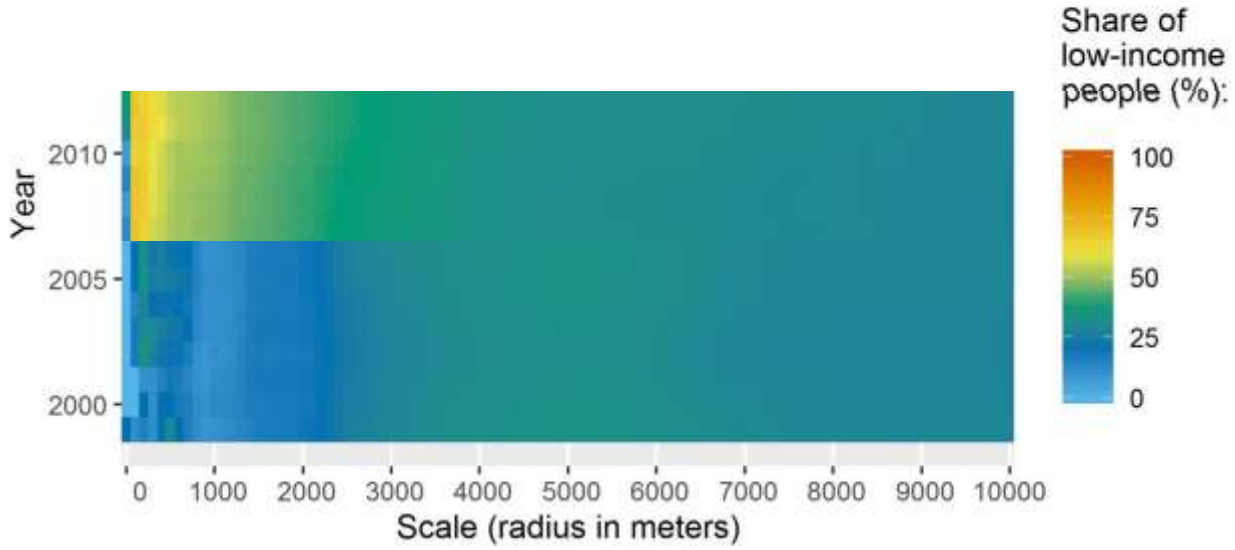
- Next step: Individual life course
  - People move between neighbourhoods
  - Neighbourhoods change over time

An individual residential history in 19 years at 101 scales



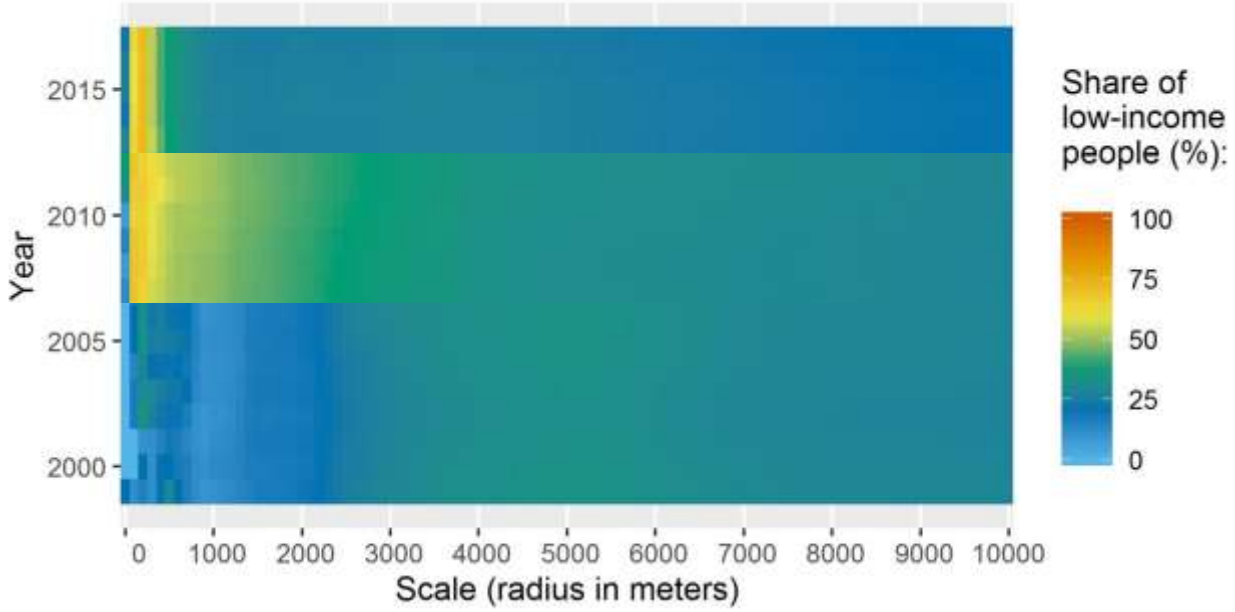
TU Delft

An individual residential history in 19 years at 101 scales



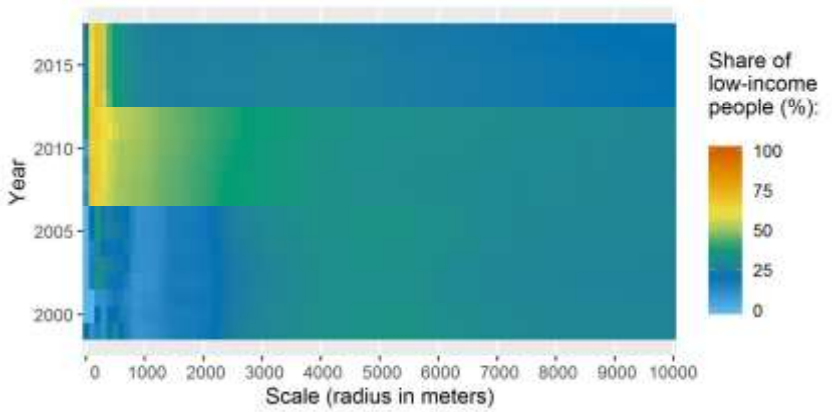
TU Delft

An individual residential history in 19 years at 101 scales

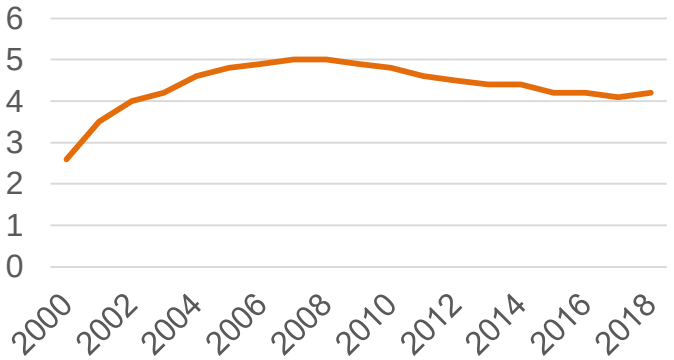


TU Delft

An individual residential history in 19 years at 101 scales



Individual income in 19 years



Thank you!

Ana Petrović, Delft University of Technology (a.petrovic@tudelft.nl)

Recent publications:

Petrović, A., Manley, D., & van Ham, M. (2019). Freedom from the Tyranny of Neighbourhood: Rethinking Socio-Spatial Context Effects. *Progress in Human Geography*, Published online 28 August 2019 (open access).

Petrović, A., van Ham, M., & Manley, D. (2018). Multiscale Measures of Population: Within- and between-City Variation in Exposure to the Sociospatial Context. *Annals of the American Association of Geographers*, *108*(4), 1057-1074 (open access).

DEPRIVEDHOODS
ERC project

The research leading to these results has received funding from the European Research Council under the European Union's Seventh Framework Programme (FP/2007-2013) / ERC Grant Agreement n. 615159 (ERC Consolidator Grant DEPRIVEDHOODS, Socio-spatial inequality, deprived neighbourhoods, and neighbourhood effects) and from the Marie Curie programme under the European Union's Seventh Framework Programme (FP/2007-2013) / Career Integration Grant n. PCIG10-GA-2011-303728 (CIG Grant NBHCHOICE, Neighbourhood choice, neighbourhood sorting, and neighbourhood effects).

ODISSEI Community Conference

22 October 2019 | Galgenwaard, Utrecht

ODISSEI

Open Data Infrastructure for Social Science and Economic Innovations