Links between socio-economic and ethnic segregation at different spatial scales: a comparison between The Netherlands and Belgium

Bart Sleutjes[1] & Rafael Costa[2]

[1] Netherlands Interdisciplinary Demographic Institute (NIDI)/KNAW/ University of Groningen

[2] Vrije Universiteit Brussel

Abstract

Socio-economic and ethnic segregation have often been studied separately. Furthermore, comparisons across countries are difficult to make with the common measures of segregation at the neighborhood level. This paper proposes an innovative measure of segregation, by defining neighbourhoods from around individuals instead of being based on administrative borders, ('individualized' neighbourhoods) allowing a direct comparison of segregation levels across cities and countries. Applying this method we compare segregation and the links between socio-economic and ethnic segregation (focusing especially on persons with a non-EU background) in four metropolitan areas in The Netherlands and Belgium. For each country we take both the capital cities (Amsterdam and Brussels) and two main port cities (Rotterdam and Antwerp) because of their differences in terms of socio-economic composition as well as their migrant population and migration histories. In the paper we focus on both the overlap between spatial patterns related to socio-economic segregation and ethnic segregation, as well as differences in segregation levels and patterns across spatial scales. The results show that segregation patterns of non-EU residents closely correspond to those for indicators of low socio-economic status. Also we find that segregation is manifested at very small spatial scales, while segregation patterns change with an increase in scale level.

Introduction and background

Residential segregation, or the physical separation of groups into different neighbourhoods, is assumed to have negative effects on individual outcomes. The literature has reported negative effects e.g. for the labour market position and integration for minority groups in the US. (Lichter et al., 2012). However, empirical evidence on these supposed neighbourhood effects across Europe is mixed (Musterd and Andersson, 2005; Andersson and Malmberg, 2014). At the same time a single accepted standard for measuring segregation across cities and countries is lacking so far. This is mostly due to the fact that geographical areas differ much in size and distribution across and also within countries, which hampers reliable international comparisons.

In this paper, we propose an innovative measure of segregation, where neighbourhoods are defined from around individuals instead of being based on administrative borders. These areas are called 'individualized' or 'egocentric' neighbourhoods. This measure allows for a direct comparison of segregation levels across cities and countries. We use this methodology to compare segregation levels in four metropolitan areas in The Netherlands and Belgium. In both countries, we study the largest -and capital- cities (Amsterdam and Brussels) as well as two large port cities (Rotterdam and Antwerp). By doing so, we focus on the overlap between socio-economic segregation and ethnic segregation: to what extent do these phenomena occur in the same spatial units? We analyze how

residential patterns based on social assistance, employment and tertiary education overlap with the residential patterns of people with non-EU foreign origin.

Also, we are interested in differences in segregation levels and patterns across spatial scales. Segregation is a spatially complex phenomenon, which can occur at different spatial scales, ranging from regions to districts, or even blocks within them. While some studies indicate that effects of the spatial context are strongest at the micro level, others stress that processes at the municipal or regional level may be more relevant, largely depending on the stage in the life cycle (Andersson and Musterd, 2010). Some recent empirical studies presented arguments in favour of multiscalar approaches when studying segregation. Fowler (2015) argued that there is no single 'correct' scale for calculating segregation; rather segregation is continuous across different scale levels. In addition, Clark et al. (2015) argued that multiscalar measures help to better understand neighbourhood dynamics, and also allow for linking changing segregation patterns to experiences of changing population compositions in individuals' residential locations. It is thus important to get a better understanding of the role scale levels play for estimating patterns of residential segregation.

This paper contributes to this discussion by comparing levels and patterns of segregation in areas with low, medium sized and large population counts. The smallest 'individualized neighbourhood' consists of the 200 nearest neighbours, whereas the largest scale level corresponds with a small town (51,000 nearest neighbours). We are especially interested in how levels and patterns of segregation, and the change with an increase in scale level. In light of these theoretical debates the following research questions guide our analyses in this paper:

- *To what extent do levels and patterns of socio-economic and ethnic segregation overlap in the four cities in The Netherlands and Belgium?*
- *How do levels and patterns of socioeconomic and ethnic segregation differ across different scale levels?*
- *How can we explain differences or similarities between the four cities in the two countries?*

Data and methodology

Comparative analyses with existing data are often hampered because the geographical units used in analyses differ in size, function and distribution between regions and over time. This problem, known as the Modifiable Areal Unit Problem or MAUP affects all quantitative analyses making use of geographical delineations. In comparative studies, the problem is aggravated, as spatial units that represent data tend to differ structurally between regions and over time. By calculating 'individualized neighbourhoods', the neighbourhood context of an individual is studied by a predefined number of closest neighbours (200 and larger), irrespective of administrative borders (Malmberg et al., 2011; 2014). These individualized neighbourhoods, particularly the smallest ones, supposedly more closely resemble people's residential environment.

Unique new population register data that are available from cooperation with Statistics Netherlands and Statistics Belgium, are used for the analyses. These data include information on different demographic (e.g. age, country of birth, migrant origin) and socioeconomic (e.g., income, employment, welfare dependency and education) indicators, for the year 2011. In this paper we will

focus on the concentration patterns of persons with a non-EU foreign origin (and sub-groups within this category), and compare their residential patterns to the spatial patterns according to welfare dependency, employment and tertiary education.

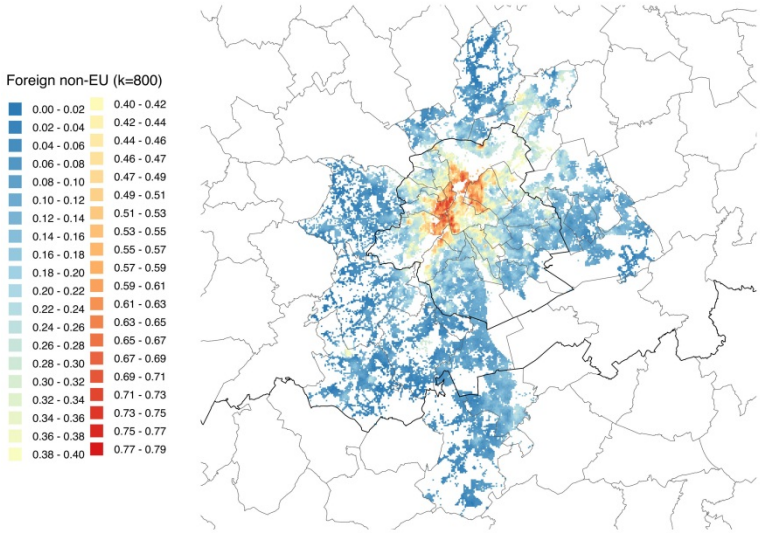
Residential patterns are subsequently mapped using GIS-tools. Showing maps of different scale levels gives a clear impression of how segregation patterns change with an increase or decrease of scale levels.

First results and preliminary conclusions

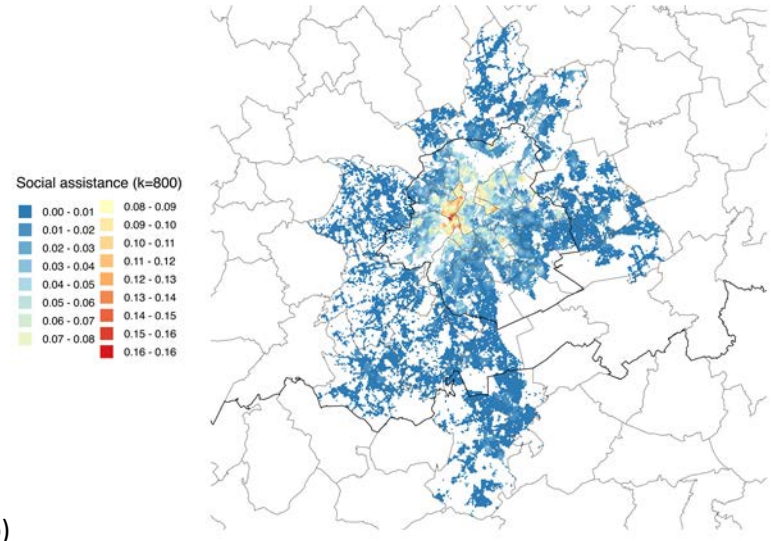
The overlap between levels and patterns of socio-economic and ethnic segregation

First results for the two countries indicate that patterns of socioeconomic and ethnic segregation are indeed related to a large extent. Figure 1 shows that in the Brussels metropolitan area, based on individualized neighbourhoods of 800 nearest neighbours, the spatial patterns of persons with a non-EU foreign origin (map a) overlap largely with those of persons depending on welfare benefits (map b). Generally, areas with the highest shares of non-EU residents also have the highest shares of welfare benefits. These districts are located north and east of the inner-city. The lowest shares of both non-EU migrants and welfare dependents are found in the southeastern part of the Brussels-Capital Region, and in the suburban areas just outside this region.

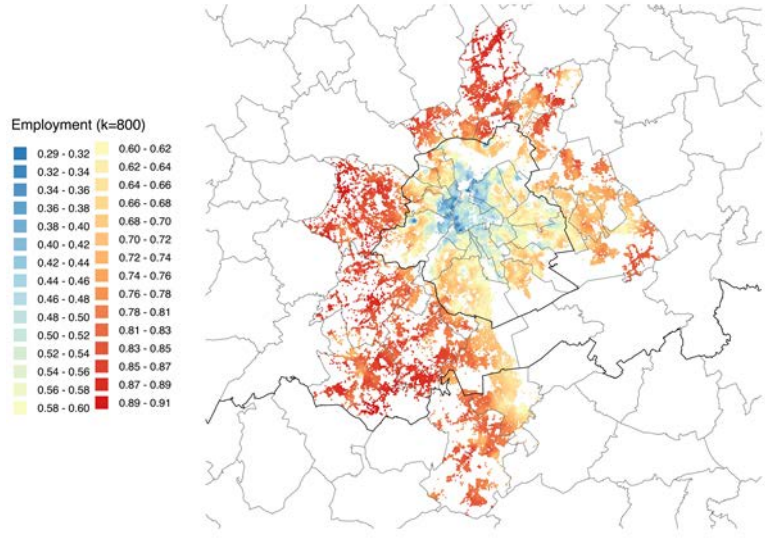
Conversely, the districts where the shares of non-EU residents are highest generally have the lowest scores with respect to employment (map c) and tertiary education (map d). The areas just outside the Brussels-Capital Region have the highest shares of employed persons, whereas the lowest scores are found in the central districts. The strongest concentrations of persons with tertiary education are found in the eastern and southeastern parts of the Brussels-Capital Region and in the adjacent suburban areas. The areas surrounding the canal, both inside and outside the Brussels-Capital Region, are the least popular residential locations for the higher-educated.



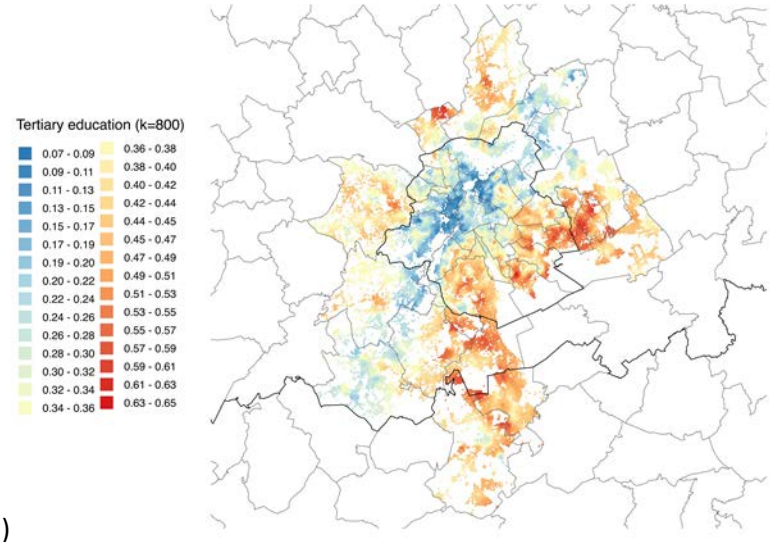
a)



b)



c)



d)

Figure 1: concentration patterns of persons according to a) non-EU foreign origin, b) social assistance, c) employment status, and d) tertiary education. Based on individualized neighbourhoods consisting of the 800 nearest neighbours (k=800)

Also in the Amsterdam region, we found a strong overlap between ethnic and socio-economic indicators of segregation, but the exact patterns are different than those in Brussels. Whereas non-EU migrants in the Brussels region are found especially in some central districts, in the Amsterdam region they are concentrated most strongly in the outskirts of the core city. In particular, the A 10 ring road, surrounding the central parts of the city, and the River IJ create a strong divide within the city. Non-Western migrants are found especially in the areas west and southeast of this ring road and in some areas north of the river. These are also the areas with the lowest shares of persons with tertiary education; the higher educated are found especially in the districts within the ring road and south of the river, and also in the southern suburbs.

A preliminary conclusion based on Brussels and Amsterdam is therefore that spatial patterns of ethnic segregation seem to correspond closely with those of indicators of low socio-economic status. The paper will be extended with more in-depth analyses including also the two port cities.

Differences in levels and patterns of socioeconomic and ethnic segregation across different scale levels

The individualized neighbourhoods approach gives a clear insight in the exact scale levels at which segregation is manifested, and allows for a better comparison of segregation. Figure 2 shows the example of the concentration patterns of Surinamese migrants in the Amsterdam Metropolitan Region, while comparing individualized neighbourhoods of two sizes. A first conclusion is that the Surinamese community is strongly concentrated in the southeastern part of the City of Amsterdam, and much less in other parts of the city and metropolitan area. Looking at the smallest spatial scale, consisting of the 200 nearest neighbours (k=200; map a), we found that the segregation levels of Surinamese migrants are different even within administrative neighbourhoods. The strongest concentrations are found in specific blocks or apartment buildings, while concentrations are much weaker only a few blocks away. If we scale up to the 6400 nearest neighbours (k=6400; map b), still differences can be found at the microscale level. There is a clear dark blue area on the border of the two administrative districts that make up the Bijlmermeer neighbourhood, while concentrations become weaker further away from this area.

a)

b)

Figure 2: concentration patterns of persons with Surinamese origin. Based on individualized neighbourhoods consisting of a) the 200 nearest neighbours (k=200) and b) the 6400 nearest neighbours (k=6400).

Following the recent studies by Fowler (2015) and Clark et al. (2015), we conclude that segregation is indeed a multiscalar phenomenon, and its patterns clearly change with an increase in scale. In general, we find that patterns of segregation become a bit more blurry with each increase in spatial scale. Although the larger k-levels indicate which parts of a metropolitan region have the highest concentrations of certain groups, especially the smaller k-levels (up to 800 nearest neighbours) show evidence that segregation is manifested most strongly at the micro-level.

In the paper we will expand in the first analyses presented here and study in detail how socio-economic and ethnic segregation are linked for different groups, scale levels and background characteristics of the four cities in the two countries.

References

Andersson E and Malmberg B (2014) Contextual effects on educational attainment in individualised, scalable neighbourhoods: Differences across gender and social class. *Urban Studies* Published online July 16, 2014, DOI: 10.1177/0042098014542487.

Andersson R and Musterd S (2010) What scale matters? Exploring the relationships between individuals' social position, neighbourhood context and the scale of neighbourhood. *Geografiska Annaler: Series B, Human Geography* 92(1): 23-43.

Clark WAV, Anderson E, Östh J and Malmber, B (2015) A MultiscalarAnalysis of Neighborhood Composition in Los Angeles, 2000-2010: A Location-Based Approach to Segregation and Diversity. *Annals of the Association of American Geographers*, DOI: 10.1080/00045608.2015.1072790.

Fowler C (2015) Segregation as a multiscalar phenomenon and its implications for neighborhood-scale research: the case of South Seattle 1990-2010. Urban Geography, DOI: 10.1080/02723638.2015.1043775.

Lichter DT, Parisi D and Taquino MC (2012) The Geography of Exclusion: Race, Segregation, and Concentrated Poverty. *Social Problems* 59(3): 364-388.

Malmberg B, Andersson E and Östh J (2011) How does segregation vary between different urban areas? Using a k-nearest neighbor approach to segregation measurement. In: 23rd Enhr Conference, Toulouse, France, 5-8 July 2011, Toulouse, 16p.

Malmberg B, Andersson EK and Bergsten Z (2014) Composite Geographical Context and School Choice Attitudes in Sweden: A Study Based on Individually Defined, Scalable Neighborhoods. *Annals of the Association of American Geographers* 104(4): 869-888.

Musterd S and Andersson R (2005) Housing mix, social mix, and social opportunities. *Urban Affairs Review* 40(6): 761-790.