

# **URBAN POPULATION NEW SPATIAL PATTERNS UNDER A CRISIS CONTEXT: AGEING AND HOUSEHOLD CHANGES IN BARCELONA AND MADRID**

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## **Summary**

### **Background**

As previously shown by these authors, during the economically and demographically expansive period lasting from the mid-1990s to 2007, internal and external migrations were the main factor shaping Spain's urban demographic structures and their spatial patterns. This led to a metropolitan population redistribution based on life cycle and socio-demographic features. Despite prevailing ageing trends, young students or people starting their career, together with newly arrived foreign migrants were attracted by core cities. On the other side, young families with children tended to move away from these central areas towards peripheries –in search of improved environmental conditions and better value for money, higher quality and more spacious housing in suburban municipalities. Hence, this new distribution did not only have demographic consequences but household typology ones, as it affected core city and periphery dominant household types. On the contrary, the economic crisis and its impact on the housing market drastically reduced suburbanisation flows and increased centripetal trends, as urban cores raised the amount of affordable rented housing, while the number of new constructions in peripheries plummeted.

### **Main hypothesis and aims**

From a sociodemographic perspective, this implies assuming the hypothesis that migratory dynamics have partly lost relevance in reconfiguring space, while demographic behaviour and urban population structure in itself have gained it. This would lead –and this is our initial hypothesis for this crisis period which begun in 2008– to a greater metropolitan population homogenisation. In other words, it would mean that there would presently be fewer differences between core cities and their own peripheries regarding demographic structures.

Here, our aim is to analyse how this spatial reconfiguration has affected Barcelona and Madrid urban demographic structures, focusing on ageing and dominant household types. Therefore, 2001 and 2011 aggregated census section data will be our main data source, permitting us to study the main ageing and household structure spatial changes during these ten years.

### **Data and methodology**

Spatial statistical analysis techniques will be used to underline geographical differences and statistically significant spatial patterns. To this aim, we will use quantitative methodology where the spatial dimension will be essential, as space is the main dimension in which residential inequalities appear. At the same time, only territory allows to empirically characterise how these inequalities are composed. In other words, only space permits to measure the impact of factors determining their structure. Therefore, these phenomena must be analysed at the smallest possible local level, so 2001 and 2011 Spanish census microdata will be our basic source.

These data entail certain challenges involving the following problems and possible solutions:

- 1) The absence of detailed common administrative stable delimitations enabling adequate comparisons, as census sections have partially been modified. This problem will be overcome by classifying sections into homogenous 20 000 inhabitant groups permitting to analyse variable changes (including segregation) between 2001 and 2011 censuses.
- 2) On the other hand, the 2011 census has its own specific problems, as it is not exhaustive but survey based. Together with statistical confidentiality, it is one of the major problems found when working with census sections. It is overcome by either constructing larger spatial units, adding several neighbouring census sections or alternatively by grouping several categories of the same variable. However, the optimal solution combines two scales. A first one using units around 5 000 inhabitants, which forces to reduce the number of variables and categories, though allowing to obtain great and crucial spatial details –to study, for example, micro segregation processes. And a second one containing units over 20 000 inhabitants, permitting to work with all the richness that census microdata variables provide –essential to identify causal factors.

This information enables us to calculate municipal and inframunicipal classical segregation rates, identifying which dimensions and what characteristics lead to the widest spatial separations. Typology construction techniques and spatial groupings such as factor ecology or spatial autocorrelation will be applied. Factor analysis and cluster analysis as well as local autocorrelation indicators will permit to obtain statistically significant socio-territorial typologies and point to the factors producing and conditioning them. Therefore, multivariate statistical analysis techniques will be applied to quantify the degree to which diverse factors have contributed to variables analysed.

Mapping these results will be considered a particularly relevant task, as we believe that cartography is not only highly descriptive but also allows researchers to generate new hypothesis on possible explanations to analysed phenomena. Spatial inequality analysis –an essential geographic aim– therefore becomes a great added value research strategy, as it permits to relate apparently unconnected processes, making metropolitan change comprehension easier. Thus, specialised spatial statistical applications such as GeoDa or SaTScan will be used. The former enables us both to implement exploratory spatial data analysis (esda) so that the way in which the distribution of diverse variables is spatially related can be studied, and to calculate and map Moran's *I* and local Moran (Local indicator of spatial association, LISA), showing statistically significant spatial correlations. It also permits to do spatial regressions allowing understanding spatial relationships between two or more variables. On the other hand, SaTScan compares expected and observed values of any spatially distributed variable and uses Scan-statistic to study whether there are any significant space and/or time clusters.

We hope that, taken as an example of what might be occurring in other European urban areas, Barcelona and Madrid results can show us whether pre-crisis trends –older and smaller households in urban cores than in peripheries– still exist or, on the contrary, have been reverted. In other words, if we are presently living in a new phase in which core cities and their peripheries' demographic structures are more homogenous.

**Key words:** urban spatial changes, age structure, ageing, spatial statistics, censuses, Barcelona, Madrid.