

RECENT CHANGES IN THE SOCIO-DEMOGRAPHIC SPATIAL STRUCTURE OF THE VALENCIA METROPOLITAN AREA (2001-2011)¹

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I. INTRODUCTION – INEQUALITY AND SPATIAL SEGREGATION IN URBAN AREAS

The study of social inequalities in metropolitan areas and how these are reflected in spatial terms has been a recurring theme in urban geography research. The aim of early work was to describe the internal structure of urban areas based on environmental criteria, and used descriptive rather than explanatory approaches to the factorial ecology of urban areas. Since then, such approaches have been enriched and become more complex as a result of ideas arising from the effects of globalisation and post-fordism on intra-metropolitan social inequality. Recent economic changes have increased social polarisation in cities, particularly those where tertiarisation has been most marked. In addition, increasing international migration has given rise to new social tensions and problems linked to ethnic and cultural diversity within cities such as those in Spain, which had not had much experience of such issues previously. In Spain's case, the economic crisis is an additional factor since the deteriorating labour market and cuts to social services have seriously affected the working and middle classes and created a growing group: the “newly poor”. As a result of this process, inequality has risen continuously since the beginning of the property and financial crisis in 2007. Increasing social vulnerability has been reflected within cities, giving rise to “local geographies of the crisis”, which deepen the already existing social fragmentation between different sectors of the city.

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In recent years, numerous studies have examined urban segregation in Spanish cities using a variety of methodologies. However, there is no research comparing the effects of the most recent economic and social changes on the internal socio-demographic structure of metropolitan areas, probably due to a lack of available data. This article examines this issue using information from the 2001 and 2011 housing and population censuses (*Censos de Población y Vivienda*) and from the 2002 and 2012 municipal registers (*Padrón de Habitantes*) of Valencia Metropolitan Area (VMA), a mid-sized Spanish metropolitan area defined on the basis of functional criteria (commuting patterns). The period studied consists of an initial phase with strong economic and population growth (2001-2007) followed by a second phase of economic and social crisis (2008-2011).

Like other Spanish metropolitan areas, the metropolitan area of Valencia has its origins in the structural transformation that arose out of the industrialisation process from the 1960s onwards. From then until 1975, population and economic growth linked to industrialisation were concentrated in the central municipality and in the municipalities to the southwest. From 1975 until around 1980, development took place in the north west, as a result of the industrial, residential and tertiary sector growth encouraged by improvements to transport and communications infrastructure. A third phase began in the mid-eighties characterised by accelerating residential and economic decentralisation. This gave rise to marked differences in land use structure between the central municipality, where the tertiary sector was dominant, and the metropolitan ring, where industry still predominated despite growing residential and tertiary sector use.

During the first decade of this century, the Valencia metropolitan area underwent several key territorial processes. Firstly, there was a significant increase in urban development on the periphery, particularly in the second metropolitan ring. A second key process was the huge increase in immigrants, particularly from non-EU countries. Initially, this group settled in the poorer neighbourhoods in the old centre of the city but, at the beginning of this century, they began to settle in most parts of the metropolitan area with spatial segregation being lower than Spanish and European averages. The third major territorial change was the effect of the economic crisis, which was particularly significant across the economy from 2008 onwards. The territorial effects of the crisis have been superimposed on the age-old trends towards relocation and decentralisation of economic activity and residential areas resulting in the changes to the metropolitan structure described below.

II. SOURCES AND METHODOLOGY

This article analyses the current internal structure of the VMA from the point of view of the socio-economic and demographic characteristics of the residents and recent developments therein. The principal components analysis and cluster analysis techniques are applied using information on socio-economic, demographic and residential aspects of the territorial units that make up the area for two key dates: 2001 and 2011. The aim is to compare the results obtained and analyse the changes that have taken place over the course of the period in question.

The territorial unit used for this analysis was the municipality, except in the case of the city of Valencia, where we chose to process information by census district. The final number of territorial units studied was, therefore, 89, covering 70 municipalities and 19 Valencia

city districts. The information used comes from the 2001 and 2011 housing and population censuses (*Censos de Población y Vivienda*) and from the 2002 and 2012 municipal registers (*Padrón de Habitantes*). The use of these two complementary sources meant that we were able to obtain more detailed information as regards demographic features and the birthplace of the resident population. The data were obtained from the online database of Spain's National Statistics Institute (www.ine.es).

The main problem with these sources is the change in methodology for conducting the surveys which took place between 2001 (traditional census) and 2011 (sample survey). This meant that a laborious selection and standardisation process had to be carried out on the available information to create a database with comparable information for the two dates concerned. The 2011 survey was also of limited use for the analysis of spatial units with low absolute population figures due to significant sampling errors that were made as a result of the data-gathering procedure used. This imposed significant restrictions regarding the selection of the original information. Some of the variables that could have been included in the analysis had to be abandoned because they were not available at municipal level or below for the 2011 survey. The final selection of 26 variables cover the following:

- Population structure and socio-economic situation (occupation by sector, unemployment rate)
- Educational level of the population
- Age structure and size of family
- Nationality of the resident population
- Kind of housing (tenure type, surface area, age, facilities).

All the variables used are indicative of a relevant aspect of urban processes and they show significant correlations at a level of significance of 0.05 (two-tailed) with at least 11 other variables for 2001 and at least six for 2011. The statistics were processed using IBM SPSS Statistics version 22©. The analysis returned statistically significant results according to the Bartlett test (significance below 0.001 in both the analyses carried out) and the Kaiser-Meyer-Olkin index (KMO equal to 0.717 for 2001 and 0.694 in 2011). The PCA was based on the correlation matrix and the matrix was rotated using the VARIMAX method to facilitate interpretation of the results.

For the cluster analysis, the first four main components for the first reference date (2001-2002) and the first six for the second (2011-2012) were used. These components represented 70.6% and 76.2% respectively of the total variance of the initial figures. Squared Euclidean distance was used as the index of dissimilarity and clustering was done using complete linkage hierarchical agglomerative clustering.

III. RESULTS

A comparison of the results for the two reference dates shows two important changes: changes to the number and significance of the main components explaining spatial segregation in the VMA, and changes to the territorial model taken on by the socio-demographic typology of the space under examination.

III.1. The components of urban inequality (2001-2011)

As regards the first of these two aspects, our analysis leads us to the conclusion that a change in the number and significance of the main explanations for spatial segregation in the VMA took place during the period we examined. At the beginning of this century, internal socio-demographic differences could basically be explained by reference to four main components which accounted for 70.58% of the total variance from the initial figures. On the basis of the table of factorial saturations or weightings, these four components have been defined as indicators of the following: *centrality* (specialisation in the service sector and presence of population who are higher on the socio-economic scale), *lower socio-economic status* (higher unemployment rates, large proportion of non-EU immigrants, presence of young people and illiteracy, high proportion of small, poorly equipped housing), *consolidated city* (associated with variables characterising town centres such as older housing, the predominance of adult population and large numbers of single-person households), and *new neighbourhoods-growing population* (post-sixties growth neighbourhoods with a large younger population and larger households).

Generally speaking, these results are in line with the results of similar studies as regards the importance of socio-economic, demographic and life-cycle-related components of urban structures. However, the use of a wider territorial scope determined by functional criteria rather than the usual morphological variables meant that aspects like centrality and urban consolidation levels were given greater weight than traditional criteria related to socio-economic status, family type and ethnicity of the population in the results, although the latter criteria were also reflected in the outcome.

However, the results of the same analysis for the 2011-2012 period show fairly significant differences. A first important point to note is that, for this later period, analysis of the scree test shows it is appropriate to keep a higher number of components (up to six) for correct interpretation of the metropolitan structure. Together, the six components give a level of explanation which is only slightly higher than that of the four significant factors for the year 2001 (76.2% as opposed to 70.6%), which points to the underlying processes organising the metropolitan structure being more complex, or at least to more divergent behaviour of the variables in question. The six main components, which are listed below, overlap only partially with the results from ten years earlier: *low socio-economic status* (24.4% of the variance explained); *consolidated city* (23.1% of the variance explained), *non-EU immigrant population* (11% variance); *Percentage of foreign population* (7.47% of the variance explained); *growing population* (5.67% of the variance), and *new neighbourhoods* (4.51% of the variance).

Firstly, the component linked to poor socio-economic status now becomes the main factor explaining the territorial structure of the area since it accounted for 24.4% of the explained variance, as opposed to only 19.6% in 2001. Its territorial pattern has also changed: a comparison of the geographical distribution of this component in 2001 and 2011 indicates that territorial differences have increased due to the geographical concentration of both positive and negative values, with a significant relative improvement in the centre and north west of the outer metropolitan ring contrasting with the relative worsening of the peripheral municipalities and those to the south-south west of the city of Valencia.

Secondly, factors linked to immigration have gained in importance compared to those linked to population growth and urban development. Immigration-related variables which were

linked to indicators for urban poverty in 2001 (unemployment rate, small, poorly equipped housing) have become a separate aspect in 2011 so that immigration, wherever it is from, is no longer directly linked to the poorest neighbourhoods and municipalities. Similarly, geographical segregation by country of origin (EU versus non-EU immigration, in particular immigration from the Americas) now becomes an important component for the organisation of urban areas.

Finally, over the last ten years, variables linked to the life-cycle of the resident population and those linked to urban development have become disassociated from one another. In 2001, these variables were part of the same component whilst in 2011 they formed part of two separate variables. This means that recent economic growth has not necessarily reflected population growth. This phenomenon can be linked to the existence of very localised town planning projects related to factors other than local population growth.

III.2. Changes to the socio-demographic typology of the VMA (2001-2011)

The cluster analyses carried out on the main components mentioned above allowed us to draw up a typology of territorial units for each of the dates referred to. An examination of the dendrograms and the fusion coefficient graphs gave us a final breakdown into eight groups for 2001 and nine for 2011. Both the geographical location and their main features are different for the two dates concerned.

In 2001, the general pattern formed by the groups identified was concentric circles centred on the old centre of Valencia. Three rings could be distinguished as follows: the metropolitan centre, which had the highest values for centrality; the first metropolitan ring, which had low levels of centrality, poor socio-economic status, strong population and building growth; and a second ring, which showed uneven integration with metropolitan processes but the entirety of which registered higher levels of socio-economic status than the municipalities that made up the first ring. This second ring included both the more residential municipalities which tend to be located in the north west and south west of the metropolitan area, and the peripheral municipalities which had not been affected by immigration or residential decentralisation processes and were less urban with an older population.

If we compare this typology with the typology that emerges from the analysis of the 2011 data, an increase in the complexity of the territorial model can be observed. The concentric ring model has been replaced by a pattern of strongly differentiated radial sectors linked by the main transport routes. Although this model was already beginning to emerge in 2001, particularly in the north-western part of the second metropolitan ring, in 2011 its structure was very clear. An analysis of the groups and their development over time indicates there has been an improvement for territorial units located within the municipality of Valencia and the north west of the second metropolitan ring whilst the rest of the area has undergone a process of impoverishment.

IV. CONCLUSION

Firstly, as regards methodology, we conclude that an analysis of the principal components followed by a cluster analysis, which is a traditional technique for the study of socio-demographic structures in urban residential areas, proved useful in studying the internal structure

and recent development of an urban area defined using functional criteria. Despite the limitations arising from the lack of information relating to smaller territorial units in the 2011 population and household survey, we were able to identify the socio-demographic typology of the metropolitan residential areas and the underlying explanatory factors.

In addition, although it is difficult to isolate the effects of each of the various processes that the Valencia Metropolitan Area has undergone over the course of the period under study (increase in functional integration, arrival of new flows of migrants and the economic crisis), the overall territorial result has been an increase in geographical polarisation and a sharpening of internal socio-demographic differences. We can therefore conclude that the increasing inequality created by the economic crisis has, at least in the case examined here, been reflected in spatial terms within the city, which will no doubt have significant social implications in the medium and long term.