

TOWARDS A TAXONOMY OF SPANISH METROPOLITAN AREAS¹

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ABSTRACT

This paper approaches a proposal for categorizing metropolitan areas in Spain as a means of expressing the new scale, nature and functioning of the country's urban geography. As there is no institutional or even statistical recognition of this new spatial reality, the analysis that underpin the proposal for categorization are based on a homogeneous and internationally comparable definition of Spanish metropolitan areas. On the basis of this definition, the elements and variables used to establish the taxonomy therefore refer to the conditions of organization, structure and internal dynamics of these metropolitan spaces and focus on metropolitan areas as urban-territorial processes rather than the more conventional processes of functional hierarchy.

Key words: metropolitan areas, taxonomy, Spain

RESUMEN

El presente artículo aborda una propuesta de categorización de las áreas metropolitanas en España como expresión de la nueva escala, naturaleza y funcionamiento de su geografía urbana. Para ello, al carecer de un reconocimiento institucional e incluso estadístico de esta nueva realidad espacial, los análisis sobre los que se fundamenta la propuesta de categorización se basan en una definición homogénea y comparable internacionalmente de las áreas metropolitanas españolas. A partir de ella, y centrando el foco en las áreas metropolitanas como procesos urbano-territoriales, frente a los más convencionales de jerarquías

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funcionales, los elementos y variables que se utilizan para establecer la categorización se refieren a las condiciones de organización, estructura y dinámicas internas de estos espacios metropolitanos.

Palabras claves: áreas metropolitanas, categorización, España

I. INTRODUCTION

On previous contributions we have established the idea that, as in the rest of the developed countries, the real city in Spain today is the metropolitan city on account of both its function and its territorial scale. This new scale and type of organization redirects us to urban realities unlike the traditional realities, and which have to be appropriately recognized if we are to gain a more accurate understanding of the way that Spanish urban geography is currently configured, which has been an ongoing concern for over almost four decades (Vinuesa, 1975).

Logically, from the start we must have a suitable and consistent definition and delimitation of this new reality before we can approach this task. It is known that Spain has no official delimitation of metropolitan areas either for political and administrative (Toscano, 2010) or purely statistical purposes. To address this need, some public bodies have developed, or are in the process of developing, their own proposals for the delimitation and subsequent analysis of these new urban realities. The efforts of the Ministry of Housing deserve special mention in this respect; to date this Ministry has published three statistical Atlases of Spanish Urban Areas (2000, 2007 and 2013) that include a proposal for delimiting urban areas, a broad database of related statistics, and a set of sectoral analyses of this urban universe. However, the initial problem stems from the fact that the delimitations envisaged are not the result of some homogeneous and consistent criteria being applied in all cases, but of either the proposals of all the Autonomous Communities, which have delimitations according to their own varied criteria, or, alternatively, of the Ministry directly applying variables (population densities, housing stock dynamics, existing transport networks, etc.) where the threshold values used are not made clear (Ministry of Housing, 2007; pp. 31-32). Significantly, the first Atlas' diffuse use of terms to refer to the various delimitations (metropolitan areas, metropolitan region, urban agglomerations, etc.) has been avoided since the second edition of the Atlas, opting for the more neutral phrase of "Urban Areas" instead.

It would therefore seem that an attempt is needed at a proposal for defining and delimiting the Spanish metropolitan reality based on consistent, rigorous and internationally comparable criteria. There are many approaches available for defining, delimiting and explaining this new metropolitan city (Roca, 2003; Feria, 2004), from the simplest based on its demographic size or administrative character, to much more complex alternatives based on functional relationships, and others still that contain a morphological or density element. This is not the place to give a presentation on this wide array of approaches (vid. Champion, 2001; OECD, 2012), but some agreement can be found in the literature that the most identifiable, consistent and powerful line of research is that which uses commuting as the key variable for instrumentalizing the procedure for defining metropolitan areas (Horner, 2004). The fact that

this is available in census information, its materiality (as a physical movement) compared to other types of relationship not subject to the constrictions of distance, its nature as a recurring process and as a linking factor between jobs markets and place of dwelling all justify its relevance and virtuality as a benchmark variable for this task (Feria, *op. cit.*). Since it was first used in the United States Census of 1950 to define Standard Metropolitan Areas, commuting has been the fundamental benchmark used up to the present day for the process of delimiting these new urban-spatial realities. From that date on, the United States Census Bureau has used this as the substantive variable for delimiting statistical metropolitan areas (OMB, 1998). The use of commuting later became widespread with specific variants in a number of countries with widely varying geographical and socio-economic contexts, including, among others, the France (Julien, 2000); Italy (Martinotti, 1991); Canada (Murphy, 2003); Mexico (INEGI, 2004), the GEMACA group for Eastern European countries (Cheshire and Gornostaeva, 2003) and, more recently, by Eurostat for the European Union as a whole (Urban Audit, 2008) and the OECD (*op. cit.*).

The availability of the data for this variable for all Spain in the 2001 census –it was included on the census questionnaire for 1981 but little was done to exploit the information, and in 1991 it was only included for the Autonomous Communities that requested it– means it has been possible to proceed with defining and delimiting the Spanish metropolitan universe according to the aforementioned consistent, rigorous and internationally comparable bases (Feria, 2008). Pending the release of 2011 census data for the commuting variable, the scope of the data and extent to which they have been broken down is still unknown. However, as they will probably not enable such a full and accurate delimitation exercise to be conducted as the data from the 2001 census, the use of the 2001 delimitation will enable us to address the appropriate taxonomy and interpretation of the new Spanish urban reality that is the core objective of this study with a high degree of certainty.

Prior papers have already presented an initial approach to the Spanish metropolitan system (Feria, 2008 *op. cit.*; 2010a) and we refer you to these for greater detail. Here we shall very briefly recap on these to lead into the categorization and description that is the object of this article. The total number of delimited metropolitan areas in Spain is 46. According to data from the 2011 Population Census, this includes a total of 31,745,459 inhabitants, equivalent to 68% of the population of the whole of Spain (see Table 1). This not only shows that the majority of Spanish society is currently concentrated in these areas but that Spain is moving towards a model of urban concentration and organization that is clearly metropolitan in nature. There are two reasons for this: firstly, because the delimited metropolitan areas have grown in the inter-census period at an average 1.45% per year compared to 1.36% for the country as a whole and, more importantly, compared to 0.9% for the rest of the settlement system. Secondly because, as has been stated more than once, territorial references correspond to the 2001 delimitation and in all likelihood the current Spanish metropolitan map is being under-represented, both due to the growth of the existing areas in spatial terms, and the emergence of new metropolitan areas that comply with the established requirements

We shall use four basic vectors to approach this complex universe and address the above-mentioned objective: **size, structure, organization and dynamics**. These are described and explained below. The first, **size**, evidently refers to the quantitative dimension of the urban reality in question, commonly expressed as the volume of population.

Table 1
BASIC DATA OF SPANISH METROPOLITAN AREAS

METROPOLITAN AREA	MUNICIPALITIES	POPULATION2001	POPULATION 2011	ANNUAL AVERAGE GROWTH RATE
Madrid	171	5.623.784	6.751.873	1,82
Barcelona-Sabadell	130	4.340.618	4.971.928	1,36
Valencia	74	1.594.762	1.856.365	1,52
Sevilla	49	1.369.708	1.550.636	1,24
Bilbao	93	1.131.564	1.179.001	0,41
Málaga	19	826.038	1.010.704	2,01
Avilés-Gijón-Oviedo	28	871.859	897.762	0,29
Palmas de Gran Canaria	18	709.191	813.464	1,37
Zaragoza	31	684.490	787.179	1,40
Bahía Cádiz-Jerez	7	602.809	672.833	1,10
Murcia	12	529.467	646.791	2,00
Palma de Mallorca	20	470.000	593.458	2,32
Vigo	28	550.531	589.219	0,68
Granada	47	497.945	580.723	1,54
A Coruña	23	463.339	503.502	0,83
Santa Cruz de Tenerife	13	430.858	501.612	1,52
Alicante	7	381.502	464.137	1,95
Donosti	27	431.696	455.265	0,53
Valladolid	28	395.258	432.082	0,89
Santander	29	388.734	427.460	0,95
Tarragona	29	316.638	418.426	2,77
Castellón	20	305.651	383.062	2,25
Pamplona	25	294.843	355.029	1,85
Córdoba	5	327.788	350.501	0,67
Elche	3	239.335	288.140	1,85
Vitoria	19	238.114	269.045	1,22
Huelva	11	224.645	253.693	1,22
Bahía de Algeciras	6	213.737	249.323	1,54
Marbella	10	174.862	243.324	3,27

Table 1 (continuación)
 BASIC DATA OF SPANISH METROPOLITAN AREAS

METROPOLITAN AREA	MUNICIPALITIES	POPULATION2001	POPULATION 2011	ANNUAL AVERAGE GROWTH RATE
Cartagena	2	199.227	234.722	1,64
Girona	31	172.965	229.309	2,80
Almería	8	190.950	227.509	1,75
León	20	203.400	222.124	0,88
Santiago de Compostela	18	201.332	220.421	0,91
Salamanca	19	194.567	210.357	0,78
Logroño	19	165.327	199.433	1,87
Lleida	23	158.089	199.019	2,29
Burgos	15	175.282	192.809	0,95
Badajoz	10	163.922	183.866	1,15
Albacete	4	156.728	180.926	1,43
Ourense	25	178.732	180.399	0,09
Pontevedra	13	154.010	163.404	0,59
Ferrol	10	163.404	162.806	-0,04
Manresa	17	132.095	159.406	1,87
Benidorm	7	104.884	155.503	3,89
Jaén	3	119.852	126.909	0,57
METROPOLITAN AREAS	1.226	27.464.532	31.745.459	1,45
TOTAL SPAIN	8.116	40.847.371	46.816.010	1,36

Source: Author from 2001 and 2011 Population Census data.

Six categories were established following this analytical framework: metropolitan regions; consolidated metropolitan areas; polynuclear metropolitan areas; standard metropolitan areas; minor metropolitan areas and incipient metropolitan areas. All area characterized in this paper according the above mentioned explanation vectors.

II. METROPOLITAN REGIONS

By **metropolitan regions** we define a category of metropolitan areas whose physical size, functional complexity and internal structure place them on the uppermost rank of organization and spatial deployment of urban-metropolitan processes. The term metropolitan region to refer to Madrid's area of influence was first used by Castells in the early

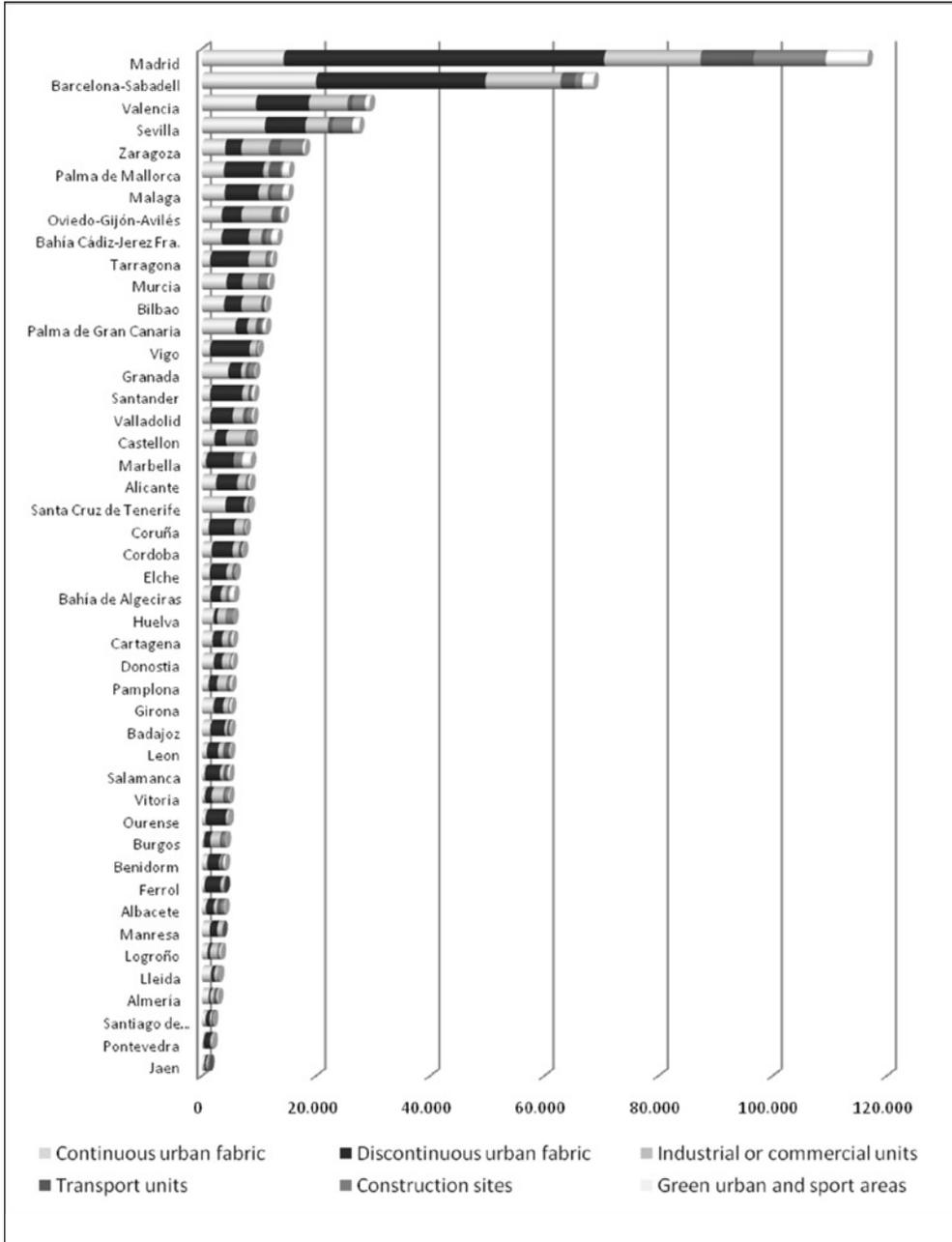
nineteen-nineties (1991). This was defined as “*the direct and day-to-day area of influence of economic processes focused on and organized around a specific territory*” (ibid. p. 20). However, as no criterion or variable was provided for this delimitation and also for reasons of opportunity regarding the availability of statistical information, the metropolitan region was assimilated to the province of Madrid. Curiously, this is what Eurostat did almost two decades later when defining metropolitan regions on the NUTS 3 basis -which in Spain is the province- singly or in combination with others. It cannot be overstressed that subordinating the definition or delimitation of urban or metropolitan areas to administrative circumscriptions is a methodological error which can only lead to severe distortions and misinterpretations of the results, especially when done on a scale such as the European scale (Dijkstra, 2009), where there is such a broad assortment of administrative geography. The term of metropolitan region is used more assiduously and greater “naturalness” in the case of Barcelona, especially for distinguishing it from the “metropolitan area”, which is a more limited area subject historically to institutional cooperation since the mid-twentieth century (Nel-lo, 2011).

In our case, the use of the term “metropolitan region” takes on material content through the various interpretational vectors mentioned above. The first of these, size, is not the result of some prevalent administrative reference, but the application of a consistent and internationally comparable method of delimitation, and offered to us by some very extensive areas which are home to several million inhabitants. Although the Barcelona metropolitan region is more compact in spatial terms, in part due to the geographical configuration of the area, the Madrid metropolitan region extends through more than 170 municipalities in 5 different provinces and three different Autonomous Communities (Solís, 2008), deploying almost 120,000 hectares (approx. 463 sq.mi.) of artificial urban land-cover compared to Barcelona metropolitan region’s 70,000 (270 sq.mi.) (Figure2).

However, the large scale of an urban phenomenon on its own would not be sufficient for it to be categorized as a metropolitan region if it did not also comply with other functional organization requirements. These include zones and centers of functional organization with a high degree of autonomy and functional complexity set up within the area as a whole. Thus, other “metropolitan areas” can be found inside both these metropolitan regions that comply with the established delimitation requirements, for example. These are specifically Sabadell in the Barcelona metropolitan region, and Alcalá de Henares in the Madrid region, which have been incorporated into or, more precisely, subsumed by the expansion of the main area. However, especially, what can be seen along with this is a large number of functional areas that differ widely in the two aspects analyzed: labor markets and housing markets.

With regard to the first of these, an analysis of commuting provides significant evidence. The analysis of the inter-municipal flow matrix enables other sub-areas of metropolitan integration to be distinguished, although these are based on secondary flows. In the case of Madrid, for example, (Moreno y Vinuesa, 2009; García Palomares, 2008) the Henares corridor clearly stands out as the major commuter axis, with other areas emerging in more recent times, one in the south of the province that includes the municipalities of La Sagra, in the province of Toledo, and another to the north that takes in the towns of Alcobendas and Tres Cantos, although the latter specializes more as a place of employment (García P. and Gutiérrez P., 2007).

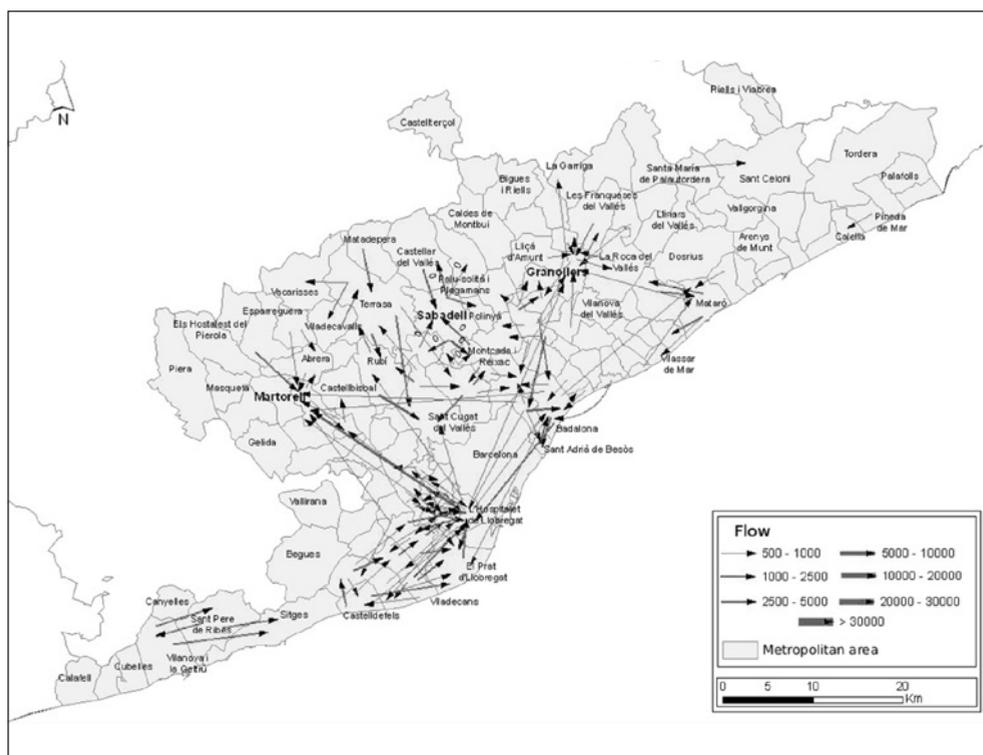
Figure 2
 URBAN LAND USES IN SPANISH METROPOLITAN AREAS (2006).



Source: Authors, from 2006 Corine Land Cover data

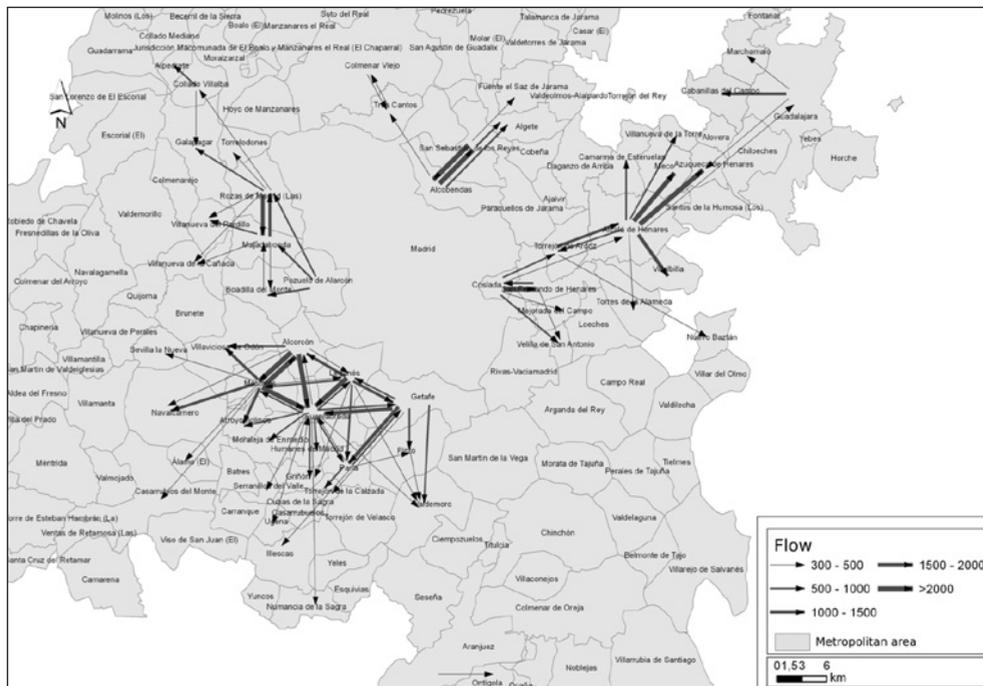
Meanwhile, in Barcelona, the metropolitan region model divided into an assortment of small areas becomes even more evident when visualized through commuting flows (fig 3.). The area's particular geographical configuration, with mountains along the coast separating the urbanized coastal highway strip from the interior, and the existence in the area of historical industrial towns and cities, favors the emergence of these small industrial areas not only around places such as Sabadell, as mentioned above, but also Terrasa, Martorell and Granollers (Nel-lo et alia, 2002; Boix, 2004). The coastal strip acts as a powerful, but linear, interrelationship corridor which becomes less significant the further we move away from the core city and no new secondary linkage points emerge, except perhaps for Mataró. It should be pointed out in this respect that, although also based on the commuting variable, the analyses done by Roca et alia (2009 and 2012) focus on the notion of polycentrism and identify a series of functional sub-centers in both of these metropolitan regions; 12 in the Barcelona region and 8 in the Madrid region. This confirms both the complexity of the two metropolitan formations and, with respect to this variable, the greater relative decentralization in the Barcelona region (Roca, Marmolejo and Moix, 2011).

Figure 3
COMMUTING FLOWS IN THE RING OF THE BARCELONA METROPOLITAN AREA



Source: Author (2010a).

Figure 4
RESIDENTIAL MOBILITY FLOWS IN THE RING OF THE MADRID METROPOLITAN AREA



Source: Author (2010b).

This perspective of functional organization is incomplete if it is not considered jointly with that of residential mobility. In this case, in the Madrid metropolitan region there are four areas that are consolidated powerful housing markets, apart from the market created by the core city. The first of these is once again the Henares corridor. Of the other three, one to the north is still in a fledgling state, and there is a second that is more consolidated in the north western sector of the area; the strongest, however, is situated around the system of towns in the south western sector of the metropolitan ring (Alorcón, Móstoles, Leganés, Fuenlabrada, Getafe and Parla). This is by far the most developed and intense of all, to the extent that it is possible to talk of reticular system of towns/cities in the metropolitan ring itself that is perfectly distinguishable from the processes generated by the core city (fig. 4). In contrast, in the Barcelona metropolitan region, metropolitan residential mobility has less capacity for spatial organization than the Madrid region (Pujadas, 2009; Pujadas and García, 2005), as the area’s traditional sub-centers, such as Sabadell, Mataró, Granollers and Terrasa, which have a strong centralizing capacity in the areas around them as far as commuting is concerned. However, they play a more diffuse role with regard to residential mobility as, while the first three mostly observe a degree of decentralization, Terrasa acts as focal point for receiving residential mobility.

To summarize, these are complexly configured metropolitan areas in which the “mother city” (which is the etymological root of metropolitan) yields part of its functional and territo-

rial role and gives rise to a ring with increasingly extensive and decentralized patterns, which nonetheless adapt to the geographical and production-oriented features of each area, as well as the structure of the settlement system. Precisely, recognizing the intensity and direction of the dynamics that feed these processes, the dynamics of residential mobility, will enable these metropolitan regions to be characterized definitively. In fact, the two metropolitan regions have the highest rates of residential mobility of all metropolitan regions in Spain, and the only ones -with Granada- that broke the 10 moves per every 100 inhabitants barrier during the last decade of the twentieth century (see Table 2). An even greater defining feature is this mobility's composition or spatial type, i.e., the proportional distribution of the various processes of metropolitan dynamics: *(re)centralization* (ring-center) and *intra-ring* or *peripheral* (ring-ring). What characterizes these metropolitan regions compared to the rest of the metropolitan system in Spain is, firstly, the growing importance of peripheral movements, which, in keeping with what has been seen above, present the highest rates in all Spain in relative terms and in the case of Barcelona exceed 10%. Secondly, the ongoing deconcentration processes which, although now less intense than in other smaller areas in relative terms, still represent sizeable flows in absolute values that resulted in a metropolitan residential bottom line of -220,000 people for the core city of Madrid, and -127,000 for Barcelona. Thirdly, the emergence of significant recentralization flows from the first metropolitan ring, whose impact can still not be perceived to any great extent in overall terms, but can be when its absolute flows are mapped individually (see figure 5).

Figure 5
FLOWS OF RESIDENTIAL MOBILITY RING-CENTRAL CITY IN THE METROPOLITAN AREAS
OF BARCELONA AND MADRID

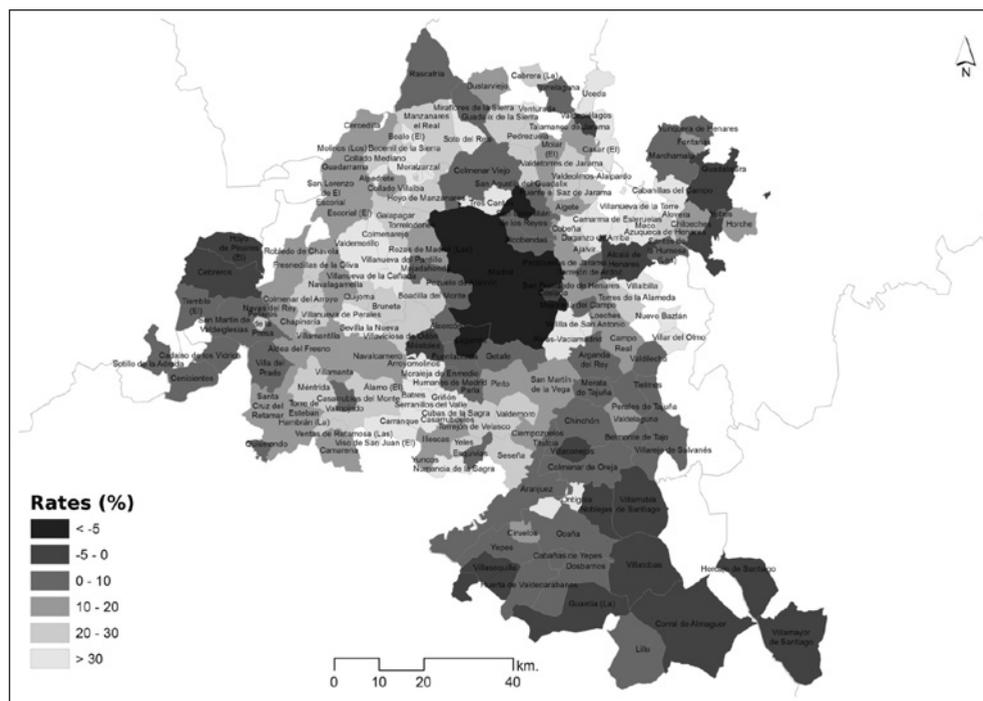


Source: Author (2010b).

All the foregoing shows us very dynamic and complex territories that are evolving along well-known theoretical models, but whose dimensions and specific circumstances need to be appropriately explored and monitored. The data provided in this respect come from the previous Census period and can be used to compare these dynamics with the data for the 2011 Census where available, although with the caveat that they might not be of the same quality or be broken down to the same level as the data for 2001. At this moment in time only gross population data are available, and these show that the overall growth dynamics of these metropolitan regions outstrip the country average and, in the case of Madrid, outstrip the average for

all Spanish metropolitan regions as a whole. Apart from this –and although the interpretation for this is on less firm ground– as this was a decade of extraordinary population growth, the observation of the distribution of municipal growth in both these metropolitan regions shows that the deconcentration processes were sustained, spreading the core city behavior pattern to a section of the first ring, deepening the suburbanization processes and consolidating and probably extending the metropolitan land area, except in the south-eastern offshoot of the Madrid metropolitan region, which shows no signs of demographic dynamism.

Figure 6
MUNICIPAL RESIDENTIAL BALANCE RATES IN MADRID METROPOLITAN AREA



Source: Author (2010b).

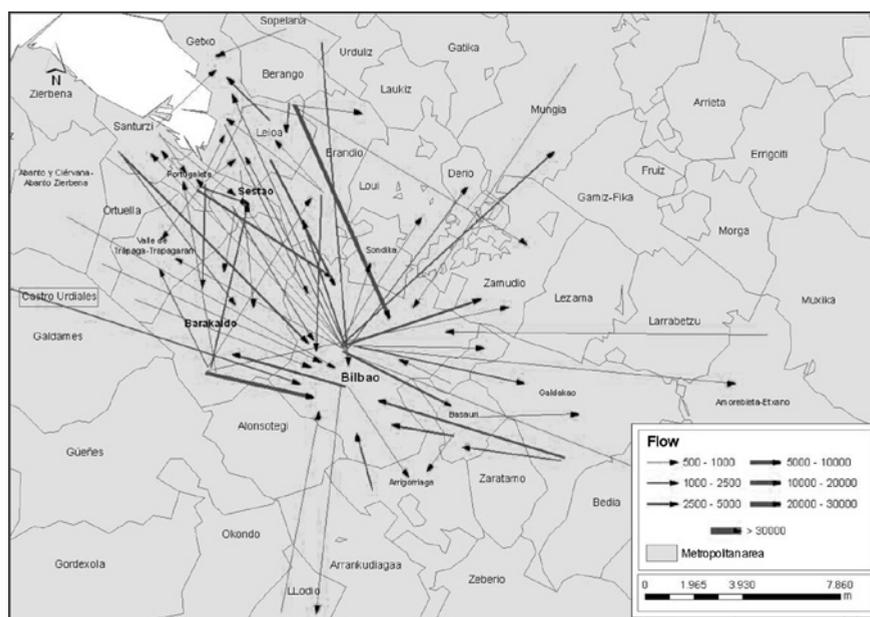
III. CONSOLIDATED METROPOLITAN AREAS

There is a second level in urban hierarchy, below metropolitan regions, when the metropolitan area has a significant size –in Spain this would be around one million inhabitants– and has reached a level of maturity in its evolutionary dynamics. Here we find what is called –in keeping with the terminology coined by the American Census Bureau (OMB, 2000)- **consolidated metropolitan areas**. Although they do not have the same size or complexity as the metropolitan regions, as far as their internal organization is concerned metropolitan areas are similarly characterized by the active role played by the metropolitan ring as a whole. This is not simply a passive receiver of the decentralization that comes from core city, but presents signifi-

cant autonomous spatial organization patterns, thus starting out on the path towards creating a metropolitan city which, as in the case of the traditional town or city, is characterized by all the various territorial components of the metropolitan area being interleaved in the various urban functions and relationships. These above-mentioned characteristics of maturity and structural complexity are clearly visible in the metropolitan areas of Valencia, Seville and Bilbao. These are three metropolitan areas with populations that exceed one million inhabitants and where, moreover, the population of the ring exceeds that of the core city itself. This therefore implies that, on the one hand, the metropolitan residential mobility process has consolidated and, on the other, that there are some very strong commuter links, with dozens of flows of over a thousand workers.

Although this last fact is in itself significant, what is relevant for characterizing these metropolitan areas is the spatial organization of the commuting pattern. This is no longer confined to conventional bidirectional ring-center mobility, but also affects sectors and spaces in the ring itself. In Valencia, apart from the consolidated employment area around Sagunto, which historically has enjoyed a degree of autonomy due to its peripherality, other more adjacent areas have emerged in the north eastern sector of the first ring, and another to the south (Salom et alia, 1997). Other intra-metropolitan areas have more recently been established both towards the north east and the south east with the Ribera Alta municipalities (Salom and Casado, 2007). Although there is less activity now than in the nineteen-sixties and seventies, the Baracaldo, Sestao, Portugalete, Getxo industrial corridor outside the central city is still able to attract mobility from Bilbao itself and from other municipalities in the surrounds (Juaristi, 2011) (figure 7).

Figure 7
COMMUTING FLOWS IN BILBAO METROPOLITAN AREA

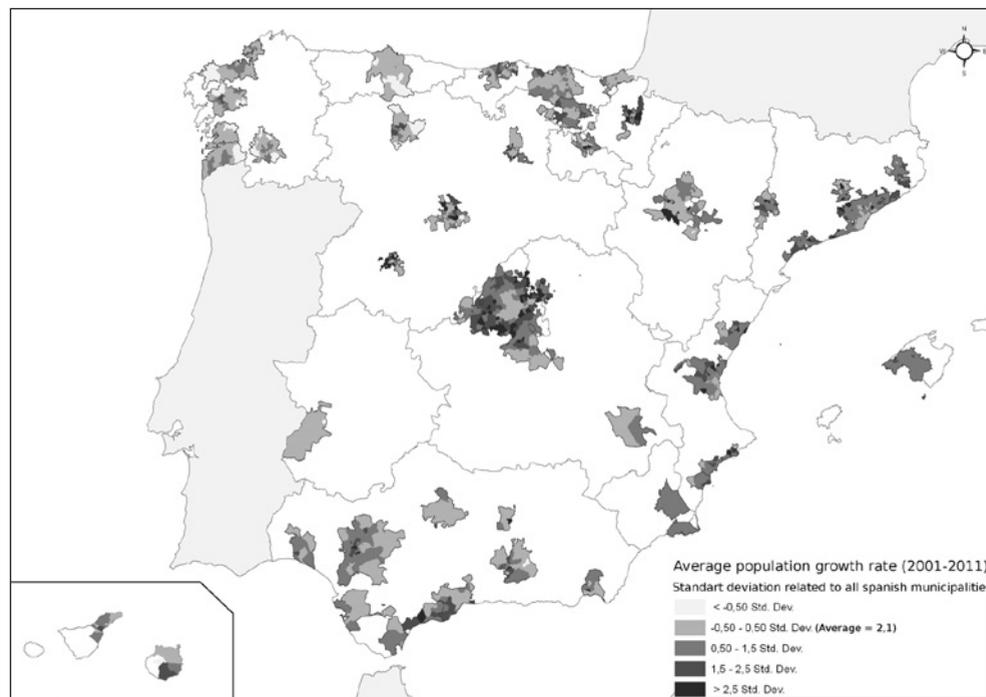


Source: Author (2010a).

Finally, the decentralization process is not as strong in Seville, where the core city continues to be the focal point; of the 27 flows in excess of one thousand, 26 have the municipality of Seville as their point of origin or destination. However, two sectors in the first metropolitan ring appear to be consolidated as decentralized employment areas. One of these corresponds to some municipalities on the eastern side of the Aljarafe plateau. Although this was originally an almost exclusively residential area, commercial and service activities have subsequently become established there. The other sector is the Los Alcores corridor, basically with Alcalá de Guadaíra and Dos Hermanas being a second focus of activity in the metropolitan area. This function has existed ever since the metropolitan area was first configured, as the Development Pole extended through these municipalities, but there is now an ongoing process of intensification and diversification.

In short, these are fully consolidated metropolitan spaces in which the core city is gradually relinquishing its lead role to the metropolitan rings. These, meanwhile, are becoming increasingly autonomous areas of functional organization and spaces with their own identity which, with the passage of time, will be configured as substantial parts of the new metropolitan city with all its attributes, not just containers of specialized functions, be they residential or productive.

Figure 8
POPULATION GROWTH RATES OF SPANISH METROPOLITAN MUNICIPALITIES



Source: Author from Population Censuses 2001 and 2011 data.

The different behavior of the dynamics of the Valencia and Seville metropolitan areas from Bilbao during the last decade should be mentioned. These first two areas have grown at about the average rate, although slightly higher in the case of Valencia, while Bilbao has only grown at a third of their rate. The dynamics of the Bilbao metropolitan area cannot be justified by the city's position in the urban hierarchy, but must be placed in a vector that is more territorial in nature and linked to the demographic behavior of the Galician-Cantabrian coast –and thus of its metropolitan areas– which is the least demographic dynamic area in all Spain (See fig 8). Irrespective of these differences in their overall dynamics, the data on municipal growth in these three areas point firstly to the municipalities in the first ring assimilating the behavior of the core city, and then, and more especially, to the full consolidation and probable overflow to outside areas of the suburbanization processes, as many of the municipalities with greater growth are those in the respective outer rings, which all goes to show a tendency towards them forming increasingly extensive and complex metropolitan areas.

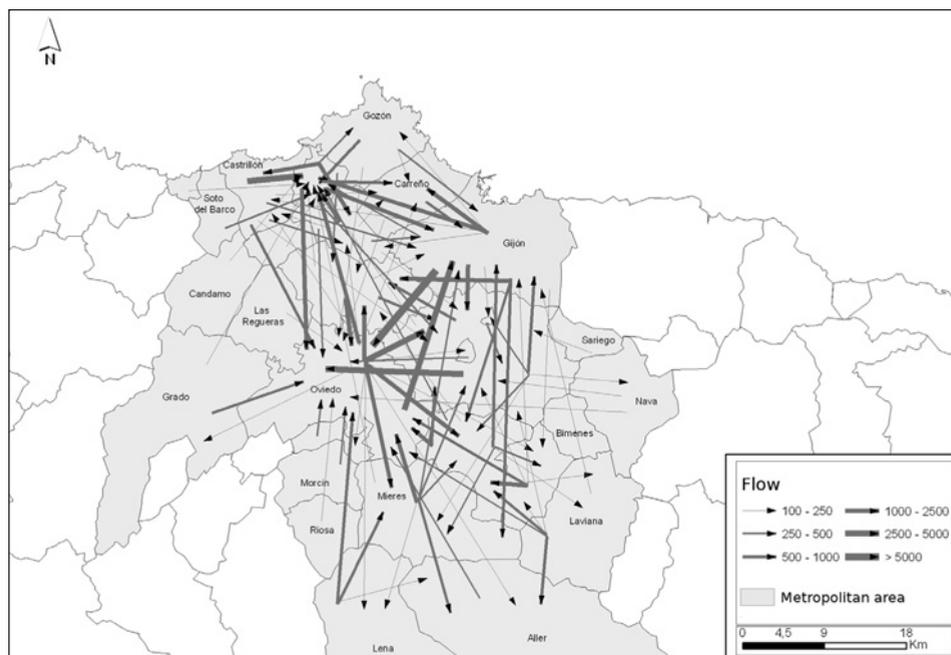
IV. POLYNUCLEAR METROPOLITAN AREAS

The hierarchical reading that we have made so far of the taxonomy of Spanish metropolitan areas must be disrupted to enable a category to be included whose main defining features are not those of spatial organization connected with the size and dimension of the metropolitan phenomenon in question, but those that result from the particular conditions of the territorial structure of the original settlements. This introduces benchmarking elements that contribute to producing organization models other than the conventionally described monocentric models, where the whole structure is built up around a single core city that expands over its adjacent territory. However, when a number of towns or cities that are in relatively close proximity to each other are capable of developing metropolitan processes, different types of organization may occur; we shall refer to these as **polynuclear**. They are not easily identified by the conventional commuting-based area delimitation methods used in this study. In fact, only three of all the Spanish metropolitan areas will be included in this category, and two of these (Oviedo-Gijón-Avilés and Bay of Cadiz-Jerez) can be delimited using conventional criteria, whereas the third (Malaga-Marbella) has arisen due to the inclusion of two jointly ascribed municipalities situated between them (Mijas and Fuengirola). There are other possible polynuclear structures in Spain, such as Alicante-Elche-Benidorm and Vigo-Pontevedra, but according to 2001 data these two areas did not comply with the basic requirements for being considered as a single metropolitan area at that time.

The defining element of this category is, logically, the existence of two or more core cities that both comply individually with the requirements of size and functional integration for having their own areas but are also integrated with each other. In this case, unlike with metropolitan regions, where the existence of areas of internal organization can come from the growth dynamics of the metropolitan ring or through small metropolitan areas being absorbed, what exists in polynuclear organizations is a fusion of areas with functional and/or territorial complementarities, giving rise to complex and highly diverse forms of organization, as we shall be able to see in the following. Due to the way that they are configured these

are, in any case, metropolitan areas of significant size, both in terms of urban development –between 13,000 and 23,000 has. (approx. 50-89 sq.mi.) (Figure 2), covering an area greater than the Bilbao consolidated metropolitan area- and demographically, ranking sixth, seventh and tenth in the metropolitan hierarchy for this dimension. They are, therefore, significant components of the Spanish urban system.

Figure 9
COMMUTING FLOWS IN OVIEDO-GIJÓN-AVILÉS METROPOLITAN AREA



Source: Author (2010a).

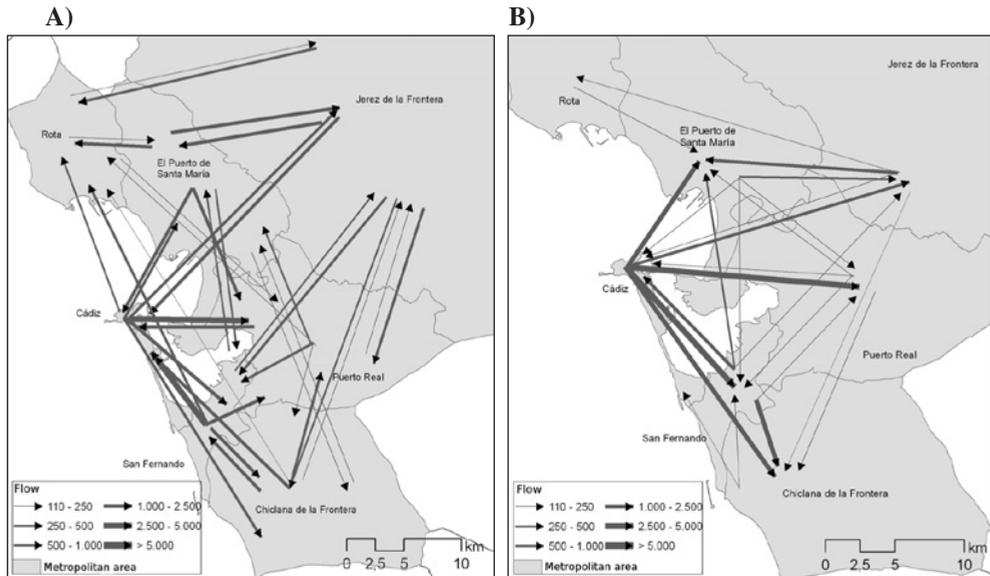
There are important differences between the three Spanish polynuclear areas due precisely to their nature, which is in large part product out of the characteristics of the reference territorial system. The area with the most distinct organization is the so-called Asturian ‘Y’ (Oviedo-Gijón Avilés), with three heavily interrelated metropolitan areas (Rodriguez et alia, 2009). Despite the somewhat differing demographic size of Gijón and Oviedo on the one hand, with a joint population of over 200,000 inhabitants, and Avilés on the other, with fewer than 90,000, Avilés’ high level of specialization as a place of industrial employment determines its condition as a metropolitan center. The strong relationships between the three centers and the dual and even triple links with the rings help to consolidate the sharply-defined polynuclear organization of this central Asturian area.

The residential mobility pattern in this area is exceptional in relative terms, beginning with the fact that unlike virtually all metropolitan areas, the majority of the municipalities here have negative metropolitan residential balances. What can be observed in the context of

weak residential movement, therefore, is not so much a decentralization process as the territorial deconcentration of the population, in which, as we have already stated, the majority present negative outcomes to the benefit of the north eastern sector of the agglomeration. As such, we find one core city with a positive residential outcome (Gijón), which is an infrequent occurrence in metropolitan processes, and two other core cities with very low negative outcomes, lower in relative terms than those of many of the municipalities in their respective rings (Figure 9).

Meanwhile, the polynuclear organization of the Malaga-western Costa del Sol area is rather singular. It has two large focal points (Malaga and Marbella) linked by the central Benalmádena-Fuengirola-Mijas ‘hinge’ –with some 120,000 inhabitants– which is indiscriminately connected with the two metropolitan areas. Continual coastal urban development in the whole area, mainly connected to its tourism function, and Marbella’s strong attraction as a place of employment contribute to an intense and complex interrelationship pattern in the entire area, where the major singularities are, on the one hand, Malaga’s commuting deficit, as the exit links are basically in the direction of the western Costa del Sol, and, on the other hand, the complex spatial organization of the residential mobility pattern, which is far removed from the conventional decentralization model.

Figure 10
FLOWS OF COMMUTING (A) AND RESIDENTIAL MOBILITY (B) IN THE METROPOLITAN AREA OF BAHÍA DE CÁDIZ- JEREZ.



Source: Author (2010a).

Although in the case of the Bay of Cadiz-Jerez the starting point is two conventional metropolitan areas, what we find is an exceptional model due in part to the uniqueness of the historical settlement system in the area, with two cities of more than 100,000 inhabitants,

another three between 100,000 and 50,000 and a further two between 25,000 and 50,000. This a reticular structure model that have been described by Dematteis (1992), among others, for the case of some areas in central Italy and which are based, as the name indicates, on some patterns of interrelationship in the form of a network. There are no centralizing hierarchical structures but rather horizontal and multi-directional linkages between the elements that make up the settlement system (Figure 10). For this reason one condition required for this type of network organization to originate is the existence of a settlement system made up of a relatively small number of towns or villages with similar demographic or functional levels, as is found in this area. A quite complex relationship structure is built upon this system. In terms of commuting, a central nucleus is configured around the Bay to which an external ring is linked, comprising Chiclana, Jerez and Rota, each with a distinct role. With respect to residential mobility, however, the spatial organization solution approximates more to the

Figure 11
RESIDENTIAL METROPOLITAN BALANCES OF CENTRAL CITIES

Population	Balance	Rate (per 10 hab.)
Granada (240.661)	-27.079	-11,25
Barcelona (1.503.884)	-126.964	-8,44
Cádiz (133.363)	-10.235	-7,67
Madrid (2.938.723)	-212.229	-7,22
A Coruña (236.379)	-15.640	-6,62
León (130.916)	-8.451	-6,46
Pamplona (183.964)	-11.485	-6,24
Santiago de Compostela (90.188)	-5.207	-5,77
Sevilla (684.633)	-36.697	-5,36
Santander (180.717)	-9.682	-5,36
Valencia (738.441)	-38.267	-5,18
Salamanca (156.368)	-7.833	-5,01
Valladolid (316.580)	-15.690	-4,96
Palma de Mallorca (333.801)	-13.371	-4,01
Tarragona (113.129)	-4.486	-3,97
Almería (166.328)	-6.483	-3,90
Palmas de Gran Canaria (Las) (354.863)	-13.801	-3,89
Málaga (524.414)	-19.833	-3,78
Alicante (284.580)	-10.451	-3,67
Santa Cruz de Tenerife (188.477)	-6.912	-3,67
Manresa (63.981)	-2.060	-3,22
Benidorm (51.873)	-1.654	-3,19
Bilbao (349.972)	-11.157	-3,19
Girona (74.879)	-2.344	-3,13
Huelva (142.284)	-4.257	-2,99
Ourense (107.510)	-3.047	-2,83
Lleida (112.199)	-2.853	-2,54
Vigo (280.186)	-6.379	-2,28
Castellón de la Plana (147.667)	-3.344	-2,26
Avilés (83.185)	-1.806	-2,17
Ferrol (77.950)	-1.480	-1,90
Burgos (166.187)	-2.182	-1,31
Vitoria-Gasteiz (216.842)	-2.512	-1,16
Zaragoza (614.905)	-6.775	-1,10
Logroño (133.058)	-1.209	-0,91
Pontevedra (74.942)	-685	-0,85
Murcia (370.745)	-3.074	-0,83
Algeciras (101.468)	-651	-0,64
Oviedo (201.154)	-1.161	-0,58
Marbella (100.036)	-419	-0,42
Jaén (112.590)	-389	-0,35
Elche (194.767)	-628	-0,32
Córdoba (308.072)	-305	-0,10
Cartagena (184.686)	-75	-0,04
Albacete (148.934)	102	0,07
Donostia-San Sebastián (178.377)	165	0,09
Badajoz (133.519)	159	0,12
Gijón (266.419)	5.864	2,20

Source: Feria and Susino (2012).

centralized residential mobility model, with one municipality, Cadiz, feeding most of the exit flows and presenting negative balances with all the municipalities in the area. However, the other large municipality in the area, Jerez, to all intents and purposes has a zero balance, which results from its positive balance with Cadiz and negative balance with all the other municipalities.

The prevalent trends in dynamics cannot be described for this category, as it does not follow the conventional core-ring arrangement-based metropolitan organization model, and even more so as the types of organization in all three areas are significantly different from one another. The sole common denominator is some relatively low residential mobility rates compared to other areas of a similar size, but which are determined by different dominant patterns in each case: suburbanization in the Bay of Cadiz-Jerez, peripheral in Malaga-Marbella and recentralizing in the case of the Asturian metropolitan area. This means, for example, that Gijón is the only metropolitan core city with significant positive residential outcomes while, to the contrary, Cadiz has the highest negative rates in all Spain (Figure 11).

Recent evolution has shown that these differences persist, confirming the prevalence of the above-described structural patterns in each, but with the inclusion of a new factor: the previously-mentioned sluggish demographics in the Cantabrian metropolitan areas compared to the tourism activity-linked demographics on the Mediterranean coast.

V. STANDARD METROPOLITAN AREAS

We shall refer to the fourth category of metropolitan areas to take into consideration as **standard**. The reason for the use of this term is twofold. Firstly, because this category includes the greatest number of areas and, secondly, and above all, because this is the category with the organization and structure pattern that best adapts to the conventional metropolitan model, i.e., a core city which is also the place of employment for a relatively large hinterland and is the source from which population suburbanization processes emanate. Fifteen Spanish metropolitan areas would be included in this category with current populations of between 800,000 and 350,000 inhabitants and between 13,000 and 5,000 has. (19.3 sq.mi.) of urbanizedland (Las Palmas de Gran Canaria, Zaragoza, Murcia, Palma de Mallorca, Vigo, Granada, A Coruña, Santa Cruz de Tenerife, Alicante, Donosti, Valladolid, Santander, Taragona, Castellón and Pamplona).

Table 2
RESIDENTIAL MOBILITY RATES OF SPANISH AREAS

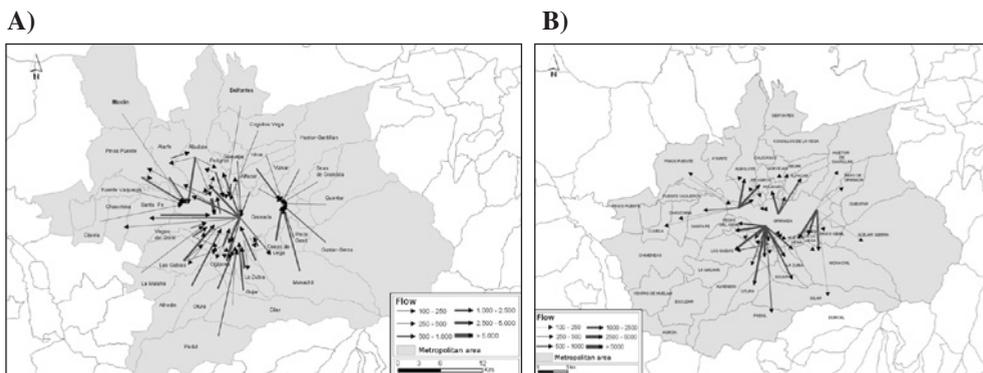
Metropolitan area	Number of Movements	Rate (per 100 habs.)	Core to ring	Ring to core	Ring to ring
A Coruña	31.047	7,9	8,82	2,00	4,83
Albacete	531	0,4	0,17	4,49	0,25
Algeciras	4.230	2,4	1,83	0,96	1,99
Alicante	15.472	5,1	5,07	2,40	2,96
Almería	8.312	4,5	5,06	1,43	1,30

Metropolitan area	Number of Movements	Rate (per 100 habs.)	Core to ring	Ring to core	Ring to ring
Avilés-Gijón-Oviedo	35.727	4,6	2,56	5,18	2,84
Badajoz	1.084	0,8	0,33	2,00	0,87
Barcelona- Sabadell	422.942	11,5	10,85	1,81	10,09
Benidorm	3.208	4,2	5,43	1,25	1,74
Bilbao	82.597	8,2	6,58	1,45	7,51
Burgos	2.705	1,9	1,73	4,72	0,60
Cádiz- Jerez	18.350	3,6	4,28	0,82	1,95
Cartagena	1.057	0,6	0,37	4,13	0,00
Castellón	10.070	4,1	4,44	1,62	2,18
Córdoba	1.104	0,4	0,27	2,40	0,08
Donosti	22.488	6,0	3,72	2,63	4,95
Elche	1.397	0,7	0,61	1,09	0,04
Ferrol	8.204	5,7	4,90	2,64	3,89
Girona	12.000	8,8	8,09	3,30	5,99
Granada	41.410	10,3	13,29	1,52	4,97
Huelva	7.337	3,9	4,28	1,63	1,60
Jaén	461	0,5	0,46	0,64	0,00
L.P. de Gran Canaria	35.615	6,0	5,87	1,61	4,54
León	13.788	8,2	8,82	3,77	2,94
Lleida	5.349	4,1	3,88	2,38	2,21
Logroño	3.873	2,9	2,24	4,76	1,18
Madrid-Alcalá de Henares	502.562	10,9	10,05	3,62	8,57
Málaga	37.210	5,6	5,17	1,85	4,82
Manresa	7.271	6,7	6,65	2,99	3,68
Marbella	2.494	2,0	1,75	1,56	0,68
Murcia	11.267	2,6	1,94	2,21	2,13
Ourense	7.027	4,6	4,99	2,72	1,39
Palma de Mallorca	23.000	6,3	6,34	4,25	1,86
Pamplona	23.407	9,9	9,49	5,15	5,56
Pontevedra	4.076	3,1	3,25	2,11	0,89

Metropolitan area	Number of Movements	Rate (per 100 habs.)	Core to ring	Ring to core	Ring to ring
Salamanca	10.196	6,5	6,39	4,41	3,10
Santa Cruz de Tenerife	24.512	6,9	7,31	2,65	3,82
Santander	28.184	8,5	7,71	1,77	7,42
Santiago	10.238	6,1	8,01	1,43	2,95
Sevilla	73.342	6,4	7,20	1,44	4,01
Tarragona	17.281	6,9	6,50	1,24	5,90
Valencia	109.513	8,1	7,76	1,93	6,45
Valladolid	19.913	6,0	6,05	3,29	2,26
Vigo	20.451	4,3	3,90	1,41	3,36
Vitoria	4.464	2,2	1,84	6,03	1,00
Zaragoza	11.156	1,9	1,66	3,69	1,20

Source: Feria and Susino (2012).

Figure 12
 FLOWS OF COMMUTING (A) AND RESIDENTIAL MOBILITY (B) IN THE METROPOLITAN AREA OF GRANADA



Source: Author (2010a)

The majority of the metropolitan areas in this category correspond to this model, although not so obviously or with such great intensity. However, logically there are situations or specific cases that break the rule. The two most significant are the metropolitan areas of Zaragoza and Murcia, which rank second and third in this category by size of population, but where very low residential mobility rates are dominated by the centripetal movements (ring-core) that are usually found in the initial phases of metropolitan processes. The explanation for this behavior lies in the sprawling city limits of the core cities, which means that most of

the metropolitan suburbanization processes can still be concentrated inside them. While the core municipalities are home to three-quarters of the population in both these metropolitan areas, it is distributed not only in the core city but across a number of secondary towns and villages, especially in the case of Murcia, where a larger part of the population lives in the 54 towns and villages (*pedanías*, or municipal districts) than the core city itself (Andrés, 2011).

Apart from these variants caused by the settlement structure and the associated territorial- administrative framework, the most significant differences between standard metropolitan areas come from recent dynamics, which are positive in all cases as far as population growth is concerned, but with a notable “gap” between the majority with high growth rates and another group with quite weak demographic dynamics. In fact the annual rates of population growth are higher than the average growth for Spanish metropolitan areas and some (all located on the Mediterranean coast) have values of over 2%, which is higher than those for the metropolitan areas in higher-ranking groups in the hierarchy. And yet the Cantabrian metropolitan areas (Donosti, Santander, Vigo and A Coruña), and also Valladolid, have much lower growth rates that have not reached 1% annually. This, together with the peripheral movements, are as, or even more significant (Donosti) than the suburbanization processes, which could be an indication of the situation of some relatively mature metropolitan areas within their population stability. Compared to this, most standard metropolitan areas, pulled along by more active dynamics, still seem to have quite a way to go before they become more complex organizations, with a greater and more active role played by metropolitan rings that will, foreseeably, spread further in spatial terms.

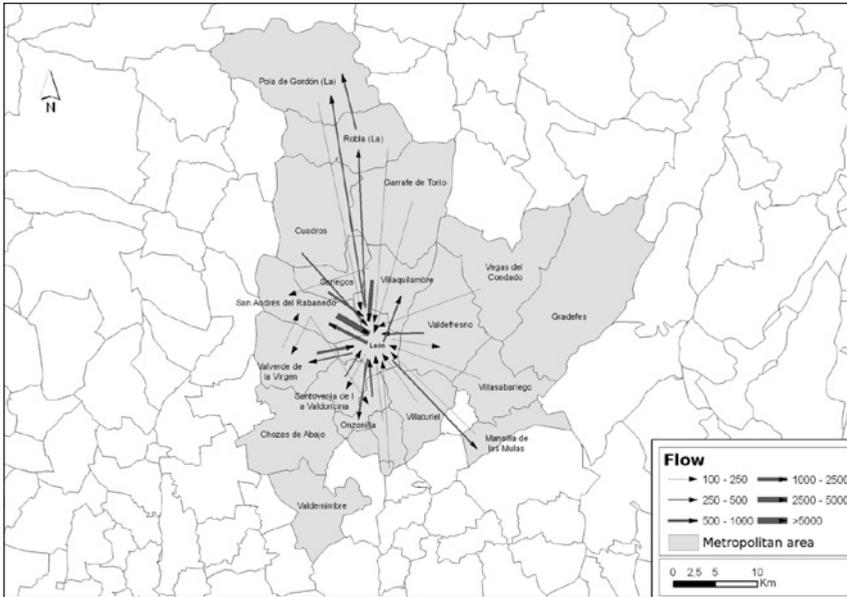
VI. MINOR METROPOLITAN AREAS

A group of nine Spanish areas that are fully compliant with the established commuting criteria requirements for their definition as metropolitan have been categorized as **minor metropolitan areas** on the basis of their size as urban phenomena. This inescapably determines some structural features of their metropolitan status, to the point that none of them are usually linked with the term in academic or institutional nomenclature. The nine areas (Algeciras, Almería, Girona, Huelva, León, Lleida, Logroño, Ourense, Salamanca and Santiago de Compostela) have populations that range between the bottom and top thresholds of 180,000 and 255,000 inhabitants, and core cities that in none of the cases reach the lower threshold figure, which, in short, implies a lesser capacity for generating far-reaching urban-metropolitan processes.

What distinguishes this category is that despite their different characteristics and configurations, there is a substantial amount of commuting –with flows exceeding a thousand workers- but that this contrasts significantly with weak residential mobility.

The most widespread configuration in this category can be found in areas such as Huelva and León –Figure 13–, which are good examples of smaller or just-forming metropolitan areas. They have a core city of between 100,000 and 180,000 inhabitants (the two already mentioned, plus Almería, Lleida, Logroño, Ourense and Salamanca), which always comprises over three-quarters of the whole population in the area. These core cities also have relatively distinct metropolitan rings, but their occasional linkages with adjacent municipalities, such as Palos in Huelva, and San Andrés de Rabanedo in León, are still

Figure 13
COMMUTING FLOWS IN LEÓN METROPOLITAN AREA



Source: Author (2010a).

not intense and these municipalities act more as continuations of the core city than new corridors of urban development. Along with this basic model, the other three metropolitan areas are characterized by much smaller core cities (two of these –Girona and Santiago de Compostela– have still not reached the threshold of 100,000 inhabitants), which means that in all three cases they contain less than half the population of the area, but with a large capacity for generating metropolitan processes.

However, as stated, the little importance of all these areas as far as the size of their populations is concerned means that residential mobility does not play a significant role in the creation of the metropolitan area. This is even truer when the suburbanization rates are not especially high, with the exception of, precisely, the two with smaller core cities, Girona and Santiago, where the relative intensity of the decentralization processes is counterbalanced by the small size of the absolute volumes.

In short, the generally not very substantial flows, the dominant direction of commuting in the direction of the core city, and the small size and growth-rate of the rings, which indicate some albeit minimum metropolitan residential developments, are the most significant characteristics of these smaller metropolitan areas. And on the other hand this shows that, along with the following group, and in Spain at least, the initial metropolitanization processes are marked by linkages with jobs markets much sooner than with unitary housing markets. Whether these regions become established as standard metropolitan areas will therefore depend on an appreciable increase in their size as urban phenomena, either through their own internal dynamics, which are quite significant in some cases, or also through absorbing or

merging with other adjacent urban areas, as might happen with Almería, Girona and Huelva and neighboring coastal systems.

VII. INCIPIENT METROPOLITAN AREAS

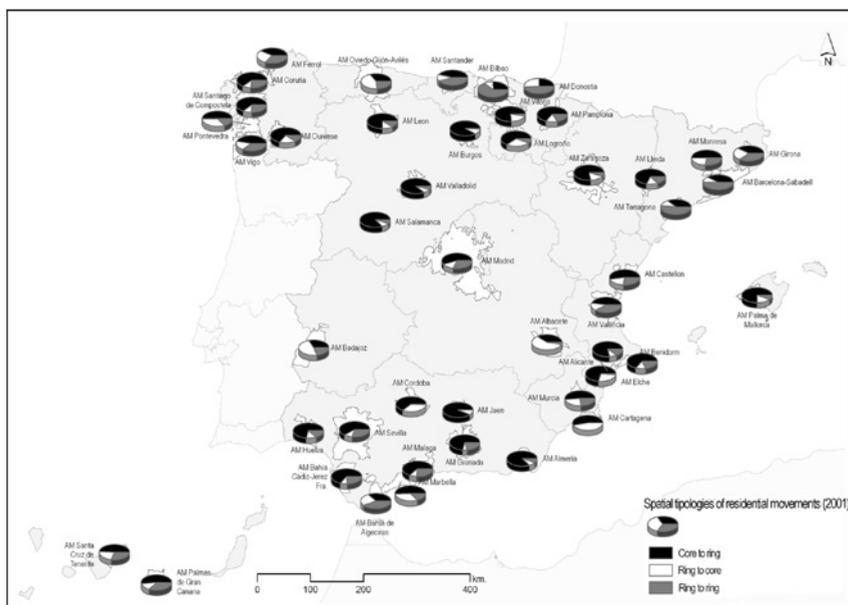
The metropolitan areas in the last category are termed **incipient metropolitan areas** due to the fact that the metropolitan functional organization processes and the way that the territory has developed in urban terms are barely perceptible. This category includes a relatively large number of twelve areas with two different profiles. One of these consists of a small group of delimited areas which, while having the same features as described in the previous group, are even more restricted in size of population and functional scope, meaning that they have extraordinarily low levels of intensity of functional organization and development of metropolitan urbanization processes. It includes four areas whose common characteristic is that the core city has a population of under 100,000 inhabitants, but which nonetheless assemble a small metropolitan area on the basis of commuting, basically because of they are the most important places of employment; industrial in the case of Manresa and El Ferrol, administrative in Pontevedra and tourism-related in Benidorm. However, as far as residential mobility is concerned, although the figures are not low in relative terms and suburbanization movements predominate, the small volumes of population in the areas as a whole means that these metropolitan areas are only nascent housing markets (although the development of residential tourism in the Benidorm area is another issue) and have not resulted in significant urbanization processes.

However, the most common incipient metropolitan area model is that of a core city with a certain population size and, almost always, a large municipal territory, while the metropolitan ring is limited to a small part of the whole, and represents less than 10% of the entire population of area in most of these cases and never exceeds 20%. Such is the case of Cordoba, Elche, Vitoria Cartagena, Burgos, Badajoz, Albacete and Jaén. These all have a large municipal territory, which means that the main part of the metropolitan growth and residential suburbanization processes are located inside the boundaries of the city. The most extreme example is Cordoba. With a municipal area that exceeds 1,200 Km² and a population of over 325,000 inhabitants, 91% of the population of the area is concentrated in Cordoba and it consequently has noticeably weak links with the metropolitan ring in commuting terms –with only one link of over 500 workers– both for incoming flows and, especially, outgoing flows.

However, it is in residential mobility that the very limited presence of supra-municipal metropolitan processes can be perceived. This is confirmed by two significant facts: some derisory residential mobility rates of under 1% in most cases, and, what is even more telling, a preponderance of centralization movements over suburbanization movements, which is an unequivocal sign that the state of evolution of the metropolitan phenomenon is not in its initial phases, but rather, its pre-emergence phases (Figure 14).

Logically, all this makes it very difficult to perceive whether the metropolitan condition of the areas in this category corresponds to one organizational model or the other. For this reason, only in the cases of the areas with cities of a greater size (Cordoba, Vitoria and Elche) or, in the case of cities of a smaller size, through the process of merging with larger cities (Benidorm with Alicante; Pontevedra with Vigo, for example) can possible urban evolu-

Figure 14
PROPORTION OF THE THREE SPATIAL TYPES OF METROPOLITAN RESIDENTIAL MOVEMENTS



Source: Feria and Susino (2012).

tions be foreseen that would enable them to make the step up from their current condition of incipient metropolitan areas to fully-fledged models of metropolitan organization.

VIII. CONCLUDING REMARKS

For people who live in today's Spanish cities it is rather banal to state that these new urban spaces are metropolitan in nature, even if they themselves do not use this term to describe them. The fact that this term is barely recognized in the cities' territorial-administrative configuration and even in Spanish public statistics does not detract from the importance of to advance into the knowledge of the definition, nature and functioning of this urban reality from a scientific point-of-view.

It is also necessary to dig deeper into the very different nature and functioning that is hidden beneath the umbrella definition of 'metropolitan area', because it is in this diversity that some of the keys can be found for understanding the organization, structure and dynamics of urban processes in Spain.

This article has sought to address this task by identifying categories in Spanish metropolitan areas as a whole that go beyond the simplistic basis of population size. Our categories take distinguishing circumstances into account regarding both the nature of the metropolitan areas and their functioning, and may represent a first step towards a more accurate understanding and recognition of the metropolitan phenomenon in Spain, from its global cities to its incipient, and often, unnoticed metropolitan spaces.

Table 3
COMPONENTS, DIMENSIONS AND VARIABLES OF METROPOLITAN CATEGORIES

	COMPRISED OF	SIZE	ORGANIZATION	STRUCTURE	DYNAMICS
METROPOLITAN REGIONS	Madrid Barcelona	Range between 4-6 million inhabitants and 70,000-120,000 has. (approx. 270-463 sq.mi.) of artificial urban land (AUL)	Complex organization throughout the whole area, with cores and areas of internal metropolitan organization.	More confined in spatial terms and with a polycentric structure in Barcelona. More scattered structures in Madrid, with reticular and linear systems	Population growth and, to a lesser extent, spatial expansion. Beginning to complete evolutionary cycle with recentralization processes
CONSOLIDATED METROPOLITAN AREAS	Valencia, Seville and Bilbao	Range between 1-2 million inhabs. and 20,000-30,000 has. (approx. 77-116 sq.mi.) AUL	Fully consolidated metropolitan organization with housing and jobs submarkets around the ring	Proportional weight of core and ring in Valencia and Seville; more diffuse and decentralized structure in Bilbao	Population growth and, to a lesser extent, spatial expansion in Valencia and Seville; stability in Bilbao. Suburbanization accompanied by redistribution in the ring
POLYNUCLEAR METROPOLITAN AREAS	Oviedo-Gijón-Avilés; Bay of Cadiz-Jerez and Malaga-Marbella	Range between 0.5-1 million inhabs. and 15,000-25,000 has. (approx. 58-97 sq.mi.) AUL	Merging of clearly individualizable areas of metropolitan organization	Polycentric structure in Austrian 'Y', reticular structure in Bay of Cadiz-Jerez and loosely-distributed in Malaga- Marbella	Tendency towards consolidation of a single metropolitan space. Positive demographic dynamics in both Andalusian areas; stability in Asturian area
STANDARD METROPOLITAN AREAS	Las Palmas GC; Zaragoza; Murcia; Palma de M.; Vigo; Granada; A Coruña; Santa Cruz de Tenerife; Alicante; Donosti; Valladolid; Santander; Tarragona; Castellón and Pamplona	Range between 300,000-800,000 inhabs. and 5,000-15,000 has. (approx. 19-58 sq.mi.) AUL	Fully consolidated areas as unitary housing and jobs submarkets with significant presence of suburbanization processes, but with limited diversification of activities in metropolitan rings	Standard core city- based structure model with suburbanization in surrounding municipalities, partially diluted in the cases of Murcia and Zaragoza due to their large size and the core municipality's settlement structure	General tendency towards spatial expansion and a degree of functional diversification in the ring with positive demographic trends. Those in the north eastern third of the country are more stable in demographic terms and have greater functional balance of activities

	COMPRISED OF	SIZE	ORGANIZATION	STRUCTURE	DYNAMICS
MINOR METROPOLITAN AREAS	Algeciras; Almería; Girona; Huelva; Ourense; Logroño; Lleida; Salamanca, León; and Santiago de Compostela.	Range between 200,000-300,000 inhabitants and 2,000-5,000 has. (approx. 8-19 sq.mi.) AUL	Areas that are very highly organized as jobs markets but limited in residential aspect ,	The core city has the greatest impact on the configuration of the area except for Girona and Santiago, which have metropolitan structures based around a relatively small core city	Except in Ourense and, to a lesser extent, León and Santiago, above-average demographic dynamics. Few indications of suburbanization processes emerging except in Girona
INCIPIENT METROPOLITAN AREAS	Cordoba, Elche, Vitoria, Cartagena, Burgos, Badajoz, Albacete and Jaén Manresa; El Ferrol; Benidorm and Pontevedra	Range between 100,000-350.000 inhabs. and 1,000-6,000 has. (approx. 4-23 sq.mi.) AUL	Local labor markets but not housing markets. Prevail concentration processes	Mostly structures based on large municipalities with quite large populations which absorb most of the existing suburbanization processes internally. The other model is one of a smaller municipality which has great capacity as a center of employment	Although positive demographic dynamics are found in the majority, no noticeable signs of metropolitan processes, except in the possible melding or merging with nearby areas in the cases of Pontevedra, Ferrol and Benidorm.

The Table included in these conclusions recaps on the elements and variables that help to establish these categories and assign the metropolitan areas identified to them. It should be noted that although there is obviously an element of hierarchical order, the principle behind the categorization adheres more to the conditions of organization, structure and internal dynamics of the metropolitan areas rather than the conventional principle of position in the functional hierarchy in urban systems, as these are the variables that enable us to obtain greater knowledge of metropolitan areas as urban-territorial processes. Nevertheless, both the approach taken and the characterization and elements and choice of variables –some of the many possible– are given in this article as an open contribution and submitted for your indispensable discussion and improvement in order for advances to be made in the adequate understanding and explanation of the current Spanish urban geography.

REFERENCES

ALONSO, P. ET ALIA (2010): «Mercados locales de trabajo en Aragón: Dinámicas de movilidad en la aglomeración de Zaragoza» en *La ciudad metropolitana en España. Procesos urbanos en los inicios del siglo XX* (Feria y Albertos coords.). Pamplona. Thomson Reuters, 321-353

- ANDRES, J.L. (2011): *El neopaisaje de la huerta de Murcia*. Murcia. Junta de Hacendados de Huerta de Murcia
- BOIX, R. (2004): «Policentrismo y redes de ciudades en la región metropolitana de Barcelona» en *Redes, territorios y gobierno* (Subirats, J., coord.). Barcelona. Diputació de Barcelona. 223-246
- CASADO, J.M. (2000): *Trabajo y territorio. Los mercados laborales locales en la Comunidad Valenciana*. Alicante. Universidad de Alicante.
- CASTELLS, M. (1991): «Estrategias de desarrollo metropolitano en las grandes ciudades españolas: la articulación entre crecimiento económico y calidad de vida» en *Las grandes ciudades en la década de los noventa*, (Borja, J. et alia, eds.). Madrid. Edit. Sistema, 17-64.
- CHAMPION A.G. (2001): «Urbanization, Suburbanization, Counterurbanization and Reurbanization» en *Handbook of Urban Studies*. (R. Padisson dir.). Londres, SAGE 143-161.
- CHESIRE, P. and GORNOSTAEVA, G. (2002): «Cities and regions: comparable measures requires comparable territories ». *Cahiers de L'Aurif*, nº 135, 13-21.
- DEMATTEIS, G. (Ed.)(1992) : *Il fenomeno urbano in Italia : Interpretazioni, prospettive, politiche*. Milán. Franco Angeli.
- DIJKSTRA, L. (2009): Metropolitan regions in EU. http://ec.europa.eu/regional_policy/sources/docgener/focus/2009_01_metropolitan.pdf
- FERIA, J.M. (2004): «Problemas de definición de las áreas metropolitanas en España». *Boletín de la AGE* 38, 85-99.
- FERIA, J.M. (2008): «Un ensayo metodológico de definición de las áreas metropolitanas españolas a partir de la variable residencia-trabajo». *Investigaciones Geográficas*, nº 46, 49-68.
- FERIA, J.M. (2010a): «La delimitación y organización espacial de las áreas metropolitanas españolas: Una perspectiva desde la movilidad residencia-trabajo». *Ciudad y Territorio. Estudios Territoriales*, nº 164, 189-210.
- FERIA, J.M. (2010b): «La movilidad residencial y los procesos de urbanización metropolitanos en España» en *La ciudad metropolitana en España. Procesos urbanos en los inicios del siglo XX* (Feria y Albertos coords.). Pamplona. Thomson Reuters, 23-47
- FERIA, J.M. and ALBERTOS, J.M. (coords.)(2010): *La ciudad metropolitana en España. Procesos urbanos en los inicios del siglo XX*. Pamplona. Thomson Reuters.
- FERIA, J. and SUSINO, J. (2012): «Movilidad residencial y configuración urbana en España» en *La Población en clave territorial. Actas del XIII Congreso de la Población Española*, (Reques, P. and De Cos, O. eds.) 60-71 (CD). Santander, Universidad de Cantabria y Fundación Botín.
- GARCIA, J.C. and GUTIÉRREZ, J. (2007): «Pautas de la movilidad en el área metropolitana de Madrid». *Cuadernos de Geografía de la Universidad de Valencia*, nº 81-82, 7-29.
- GARCIA PALOMARES, J.M. (2008): *Los Desplazamientos al Trabajo en la Comunidad de Madrid*. Madrid. Fundación Sindical de Estudios, Ediciones GPS
- HORNER, M.W. (2004): «Spatial Dimensions of Urban Commuting: A Review of Major Issues and Their Implications for Future Geographic Research». *The Professional Geographer*, nº 56.2, 160-173.

- INSTITUTO NACIONAL DE ESTADÍSTICA, GEOGRAFÍA E INFORMÁTICA (INEGI) (2004): *Delimitación de las zonas metropolitanas de México*. Secretaría de Desarrollo Social, México
- JUARISTI, J. (2011): «Movimientos residencia-trabajo y estructura metropolitana. Cambios en el área metropolitana de Bilbao: 1980-2001». *Anales de Geografía de la UCM*; nº 31 (1), 30-60.
- JULIEN, P. (2000): «Mesurer un universe urbain en expansion». *Economie et Statistique*, nº 336, 3-33.
- MARTINOTTI, G. (1991): «La población de la nueva morfología social metropolitana» en *Las Grandes ciudades en la década de los noventa* (Borja, J. et alia, ed.) 65-141. Madrid. Sistema.
- MINISTERIO DE FOMENTO (2000): *Atlas estadístico de las áreas urbanas en España*. Madrid. Centro de Publicaciones del Ministerio de Fomento
- MINISTERIO DE FOMENTO (2013): *Áreas urbanas+50. Información estadístico de las Grandes Áreas Urbanas españolas*. Madrid. Centro de Publicaciones del Ministerio de Fomento
- MINISTERIO DE VIVIENDA (2007): *Atlas estadístico de las áreas urbanas de España. 2006*. Madrid. Centro de Publicaciones del Ministerio de Vivienda
- MORENO, A. y VINUESA, J. (2009): «Desequilibrios y reequilibrios intrametropolitanos: principios de evaluación». *Ciudad y Territorio. Estudios Territoriales*, nº 160, 233-262.
- MURPHY, P. (2003): «Preliminary 2006 Census Metropolitan Area and Census Agglomeration Definition». *Statistic Canada, Geography Working Paper Series*; 2003-02
- NEL-LO, O. (2011): «La ordenación de las dinámicas metropolitanas. El Plan territorial Metropolitano de Barcelona». *Scripta Nova*, XV, nº 362, mayo 2011
- NEL-LO, O., LÓPEZ, J.; PIQUÉ, J.M. (2002): «Las redes emergentes de articulación del territorio en la región de Barcelona: un análisis de la movilidad obligada, 1986-1996», en *Redes, territorios y gobierno*, (Subirats, J. coord.). Barcelona. Diputació de Barcelona, 201-221
- OFFICE OF THE MANAGEMENT AND BUDGET (1998): «Alternatives approaches to Defining Metropolitan and Nonmetropolitan Areas». *Federal Register*, Vol. 63, nº 244; 70526-70561.
- OFFICE OF THE MANAGEMENT AND BUDGET (2000): «Standards for Defining Metropolitan and Micropolitan Statistical Areas». *Federal Register*, Vol. 65, nº 249; 82228-82238.
- OECD (2012): *Redefining "Urban". A new Way to Measure Metropolitan Areas*. OCDE Publishing
- PUJADAS, I. (2009): «Movilidad residencial y expansión urbana en la Región Metropolitana de Barcelona, 1982-2005». *Scripta Nova*; vol. XIII, nº 290.
- PUJADAS, I. and GARCÍA, A. (2005): «Movilidad residencial y polarización social: la diferenciación social de los nuevos espacios residenciales en la Región Metropolitana de Barcelona» [CD-rom], *Espacios públicos, Espacios privados. Un debate sobre el territorio*. XIX Congreso de Geógrafos Españoles, Santander.
- ROCA, J. (2003): «La delimitación de la ciudad: ¿una cuestión imposible? ». *Ciudad y Territorio. Estudios Territoriales*, nº 135, 17-36.

- ROCA, J.; MARMOLEJO, C. and MOIX, M. (2009): «Urban Structure and Polycentrism: towards a redefinition of the sub-centre concept». *Urban Studies*, nº 46 (13) 2841-2868.
- ROCA, J. et ALIA (2011): «Estructura urbana, policentrismo y sprawl: los ejemplos de Madrid y Barcelona». *Ciudad y Territorio. Estudios Territoriales*, nº 168, 299-231.
- ROCA, J. MOIX, M. and ARELLANO, B. (2012): «El sistema urbano en España». *Scripta Nova*, nº 395.
- RODRÍGUEZ, F., MENÉNDEZ, R., and BLANCO, J. (2009): *El área metropolitana de Asturias. Ciudad Astur: el nacimiento de una estrella urbana en Europa*. Gijón. Trea.
- SALOM, J.; ALBERTOS, J.M.; DELIOS, E. and PITARCH, M.D. (1997): «Los mercados de trabajo local en la Comunidad Valenciana: Una propuesta de delimitación». *Ciudad y Territorio. Estudios Territoriales*, nº 112, 335-356.
- SALOM, J. and CASADO, J.M. (2007): «“Movilidad cotidiana y Mercados Locales de Trabajo en la Comunidad Valenciana. 1991-2001”». *Boletín de la AGE*, nº 44, 5-28.
- SOLÍS, E (2008): «El horizonte urbano madrileño: Más allá de la región política-administrativa. *Anales de Geografía de la UCM*; nº 26, 133-162
- SUSINO, J. (2003): *Movilidad residencial. Procesos demográficos, estrategias familiares y estructura social*. Granada (Tesis Doctoral inédita).
- TOSCANO, F. (2010): *El fenómeno metropolitano y sus soluciones jurídicas*. Madrid. Edit. Iustel.
- URBAN AUDIT (2008): www.urbanaudit.org
- VINUESA, J. (1975): «Sobre el concepto de área metropolitana». *Estudios Geográficos*, nº 140-141, 13-28.