

**“Residential sprawl as a `local' metropolitan strategy.
Multi-scalar governance processes of the sprawling city in the
metropolitan areas of Barcelona and Milan.”**

Sofia Pagliarin*

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(*) Sofia Pagliarin, Ph.D.

pagliarin.sofia@gmail.com

skype: pagliasofia

mob. (IT) +39 340 52 81 635

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Sofia Pagliarin, PhD
pagliarin.sofia@gmail.com

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Abstract

Urban sprawl is a truly metropolitan phenomenon, as it re-articulates housing functions and demands between the metropolitan center(s) and the adjacent territories. The territorial development dynamics that occurred in the Barcelona and Milan metropolitan areas are comparatively examined in terms of relative variations (1990-2006) in land use categories, and of demographic (1981-2011) and administrative (2011) data. Interviews and document analysis on individual and collective spatial practices are employed to disclose residential behaviour, planning strategies and regulatory systems concerning housing functions. The paper shows how the metropolitan character of urban sprawl originates from local planning practices mainly performed by municipal authorities through land use micro-transformations.

keywords: urban sprawl, governance, housing, metropolitan areas

1 Introduction

As a decentralising process of urban functions through dispersed urban forms, suburbanism re-structures the territorial configuration of urban resources and facilities within poly- and mono centric urban agglomerations. A particular form of urban sprawl is related to the decentralisation of housing functions: residential offer and demand are re-arranged between the metropolitan center(s) and the adjacent territories (López et al., 2010)

Despite economic theorists have already clarified the connections between land rent, house price, commuting cost and producers’ and consumers’ utility functions in preferring a suburban dwellings on the urban fringe (Brueckner et al., 2001), few

attention has been paid so far to the decision-making process, involving both public and private actors, that can influence the emergence of urban sprawl.

In this article, it is assumed that urban sprawl is a complex spatial outcome of multi-scalar and multi-actor governance processes of land use change. Urban sprawl is understood as a land transformation process from open and agricultural land into dispersed residential areas, involving a diversity of public and private actors at different territorial scales, who influence the occurrence of urban sprawl in a certain territory. The metropolitan character of urban sprawl is best appreciated when it is acknowledged that the spatial patterns of residential diffusion extend beyond conventionally defined administrative boundaries.

Because of such metropolitan character of urban sprawl, a territorial perspective is analytically practical to encompass the variety of actors involved in the redistribution of housing functions within metropolitan areas and regions. A territorial, multi-scalar governance approach (Brenner, 2001; Gualini, 2006; Jessop et al., 2008; Smith, 1995) is here employed to clarify both the political and planning factors leading to the emergence of urban sprawl, and also how suburbanism can spatially reconfigure residential functions between urban and metropolitan centers and their surrounding territories.

Through the comparison of two Southern European metropolises, Barcelona and Milan, this article seeks to trace out the recent suburban expansion of urban functions, and of scattered residential areas in particular, in both case studies, and also to propose an explanation of suburban processes in both contexts by looking at the 'soft' variables such as inter-municipal relationships, land use regulatory systems and land use decisions put in place by certain actors.

This task appears to be particularly relevant since, as an increasingly relevant global phenomenon (Keil, 2013), urban sprawl not only challenges the (European) ideal model of the compact city (EEA, 2006), but also aspires to represent a new type of planned city, the (polycentric) urban region with its suburbia (cf. Hayden, 2004).

2 Case studies

Barcelona and Milan have been chosen for comparison for a variety of reasons. First, they are the largest non-capital cities in their countries, and have a pronounced metropolitan character. Second, both Milan and Barcelona are post-industrial cities, having recently shifted their economic functions to the service sector. This change implies a transformation in the social uses of space in the urban environment, for example 'releasing' ex-industrial areas for the tertiary sector. Third, both Barcelona and Milan have been gone through a similar historical process of urban expansion in the XIX century; for instance, the beginning of the demolition of their old city walls is almost contemporary - during 1850-1860 for Barcelona, and during 1850-1950 for Milan.

Barcelona, located in Catalonia (northeast Spain), is particularly renowned among planners and architects for Ildefons Cerdà's plan, approved in 1859, which defined the expansion of the city, after the demolition of its medieval walls, through a regular grid composed by innovative pattern units (the *xamfláns*), structuring what it

is commonly known as the *Eixample* ('expansion'). It is also thanks to this plan that Barcelona is usually still considered to be a model for city compactness. It took 150 years to complete Cerdà's grid plan, and important works are still underway in what Cerdà prospected to become the new city center, Glòries square. Prioritising functionality and density. Cerdà's plan allowed for the coexistence of a complex diversity of uses (residential, industrial and commercial, transport uses, green areas) (Busquets and Corominas, 2010), although since 1990s industrial activities have been delocalised outside the city under the popular *leitmotiv* of 'urban regeneration'¹.

Since the 1850s, with the exception of the Spanish Civil War (1936-1939), Barcelona experienced a great demographic increase, mostly due to internal migration from rural areas in Catalonia. In the twentieth century, since the end of the 1940s and especially since the 1950s, Barcelona was overwhelmed by massive flows of South-North internal migration coming from all over Spain, as migrants were attracted by the incipient industrial development taking place in the city². Demographic growth experienced a halt in the 1970s, and only since the second half of the 1990s did birth rates rapidly grow again for Barcelona, mainly due to the new wave of immigration, especially from Latin America (Degen and García, 2008). In contrast, the main urban centers surrounding Barcelona, such as Sabadell, Terrassa, Mataró or Granollers, consistently grew in demographic terms (and, in absolute terms, more than Barcelona itself), forming the metropolitan area of influence of the city (i.e. *cinturó de ciutats perifèriques*, Carrera Alpuente, 2002).

Milan is the capital of the Lombardy region, located in Northern Italy. From 1859s, Milan began to experience an intense demographic growth. In the recently constituted Italian nation state (1861), Milan was expected to play a prominent role, therefore urban renewal processes started (such as the one in *Piazza del Duomo*) and the implementation of urban plans was needed to modulate urban expansion. In 1889, the expansion plan proposed by Cesare Beruto was approved. It organised Milan's enlargement by extending the historical main roads that radially departed from Milan city center, and that were marked off by gates named after the cities they were headed to (e.g. *Porta Venezia*, *Porta Genova*). Simultaneously, the Spanish walls (called *Bastioni*) were demolished and the canals traversing the city (*Navigli*) covered. Beruto planned Milan expansion along the radial roads from the city center, which would have crossed with concentric rings around the city to improve the mobility network.

In 1934, the Albertini plan was approved with the aim to reform and re-organise the mobility infrastructures of the city. This plan defined that Milan city center would have functioned as an administrative, political and commercial center, where mostly upper-class inhabitants resided, while it directed the future demographic expansion towards the peripheral areas of the city, which would be connected with the center and to each other through the enhanced mobility system that the plan envisaged.

After the end of the Second World War, 'epochal transformations' occurred (Lanzani, 2012, p.77): mountainous areas and forests were abandoned, while countryside zones were deeply transformed by an incessant, wildfire diffusion of industries, transportation areas and housing. Urbanisation was mainly caused by a massive

internal South-North migration, with migrants attracted by the industrial development boom, dramatically increasing the population of Milan and its adjacent municipalities. This urbanisation process first involved Milan and its surrounding municipalities, and later extended to the rest of the Lombardy region. It has been estimated that, between 1955 and 1970, 17 millions Italians migrated from the South of the country to the North, predominantly to the Milan-Turin-Genoa 'industrial triangle' (De Lucia, 2006, p.73).

Since the 1970s, the city has experienced a demographic decrease, while the first and especially the second metropolitan arch increased in population, extending further the metropolitan boundaries of Milan and the influence it exerts on the surrounding territory.

3 Methods

A variety of data sources has been employed in this research, including both quantitative and qualitative data. First, the Barcelona and Milan metropolitan areas have been defined, and then urban sprawl has been measured within such identified metropolitan delimitations through the use of the Corine Land Cover (CLC) longitudinal surveys. Second, interviews and document analysis have been carried out in order to examine how actors' decisions and land use regulatory systems differently influenced the emergence of suburbanism in both case studies. Third, administrative and demographic data have also been employed, in order to examine demographic decentralisation processes, and to corroborate the need for a qualitative approach to clarify land use transformation processes at the local level.

The European nomenclature for statistical territorial units (NUTS) (Eurostat, 2011a) is a Europe-wide classification of administrative units for statistical purposes, systematising and facilitating territorial analyses and comparisons across Europe. In the absence of a better and more defined definition of metropolitan areas in Europe (cf. Tannier and Thomas, 2013), in this research NUTS3 levels, corresponding to provinces, counties or *arrondissements* according to the European country of reference, have been used as the best available proxy for the metropolitan areas of Barcelona and Milan. Although Larger Urban Zones (LUZ) and Urban Morphological Zones (UMZ) delimitations exist (Eurostat, 2014; Le Gléau et al., 1996), for this research a more 'conservative' choice was taken, employing NUTS3 levels as the most convenient administrative boundary to make reference of when examining, in Europe, metropolitan areas³.

Once metropolitan delimitations were methodologically identified, urban sprawl was operationalised as a land use type and measured as relative variation, by using the longitudinal Corine Land Cover (CLC) datasets for years 1990, 2000 and 2006. The Corine Land Cover (CLC) project is an ambitious initiative which has been aimed at collecting and elaborating land cover data for the entire European territory (EEA, 1994; EEA European Environment Agency, 2007). 1:100,000 topographic maps have been classified according to the Corine Land Cover (CLC)⁴ nomenclature, composed of 44 land cover classes in total, and subdivided into 5 broad categories (artificial surfaces, agricultural areas, forests and semi-natural areas, wetlands and water bodies).

For the purposes of this research, only the first CLC category (artificial surfaces) has been considered. 11 land use classes form the 'artificial surfaces' category, among which there is only one land use class (1.1.2) that clearly distinguishes both land uses *and* intensity of land use: it is the 'discontinuous urban fabric' class, referring to *dispersed residential* areas that are not as compact as the city center (CLC class 1.1.1, residential 'continuous urban fabric'), or as slightly urbanised as agricultural areas (CLC class 2.4.2, 'complex cultivation'). The 'discontinuous urban fabric' land use class has been considered as a suitable proxy for quantifying urban sprawl in Europe.

Nevertheless, the use of this class bears also some drawbacks. According to its definition, the 'discontinuous urban fabric' class includes a large variety of land uses - there are many morphologically diverse urban forms between a 'completely compact' urban fabric and agricultural areas-, hence undermining the theoretical and methodological validity of this class in identifying urban sprawl in Europe. Furthermore, CLC data suffer from a rather coarse level of detail (1:100,000 geographical scale, minimum mapping unit of 25 ha, and 100 meters as minimum width of linear elements), limiting their potential for local analysis and comparison of land use transformations. In addition, some methodological limitations necessarily confine the comparison among the 1990, 2000 and 2006 CLC inventories in the two considered case studies. Technical specificities (e.g. less European coverage, data collection period, open access of data) convert the 1990 CLC survey as less precise and comparable than the 2000 and 2006 CLC inventories, which are more alike (EEA European Environment Agency, 2007).

Nevertheless, the unique availability of longitudinal (and prospectively perfectible) inventories on land covers and use for the European territory should be considered as an opportunity to support and combine quantifiable analyses on spatial phenomena, such as urban sprawl, with more qualitative investigations of those governance processes related to land management, potentially influencing - as it will be shown - the emergence and scope of urban sprawl as re-arrangement of housing functions in metropolitan areas and regions.

A total of 30 in-depth, semi-structured interviews have been carried out to planners, politicians, stakeholders and key informants at different institutional scales (e.g. urban, provincial, metropolitan, regional) to disclose how different actors take decisions over land use allocation and redistribution, and to investigate the possible connections with the appearance of urban sprawl. Interviews have also been combined with documentary analysis on the land use regularity systems in Italy and Spain, with a particular focus on Milan and Lombardy, and Barcelona and Catalonia.

Demographic data (1981-2011) are also employed to examine overall de-centralisation patterns of the population in connection with the emergence of urban sprawl. Administrative (2011) data on both provinces have been employed, to examine the possible connection between the occurrence of urban sprawl and administrative fragmentation (i.e. number of municipalities), however highlighting the need to complement these data with qualitative fieldwork.

Finally, a terminological note: in this paper, the terms 'urban', 'provincial' or 'regional' are employed as they are understood in the governmental administrative systems of both countries. 'Urban' refers to the local administrative tier ('the city'),

'provinces' refer to what it is commonly understood as 'counties' (UK), 'regions' (Belgium), 'Kreise' (Germany) or simply 'districts', while 'regions' include different provinces, and can be compared to the Spanish 'Comunidades Autónomas', to the German 'Regierungsbezirk' or, to confuse even more, to 'provinces' in Belgium or The Netherlands.

4 Measurement of urban sprawl

Tables 1 and 2 compare land use transformations in the Barcelona and Milan provinces, both in absolute values and relative variations, between 1990 and 2006⁵. In this timespan, discontinuous residential areas have increased in the Barcelona province by +11.2%. In 2006, the built-up areas of the Barcelona province present a substantial amount of discontinuous residential areas (40.7%), outpacing continuous residential areas, which occupy almost 30% of the total built-up areas. However, discontinuous residential areas increased by +21.2% in the Milan province. Here, discontinuous residential areas are the characterising land use type of artificial areas, taking up 63.9% of all built-up areas; although continuous residential areas have also increased in the Milan province (+17.2%), they nevertheless remain around 6% of the total urbanised areas.

Absolute values and proportions of artificial areas of industrial and commercial areas are similar (around 16.000 hectares in 2006), however the Barcelona province shows a higher increase in industrial and commercial areas (+58.5%) than the Milan province (+39.2%) within the considered timeframe (1990-2006). Transport areas (roads and railways, ports and airports) have substantially increased in the Barcelona province, and absolute values (in hectares) are much higher in the Barcelona province than in the Milan province. As an illustration, in 2006 the sum of all transport areas amounts to 3.135 hectares in Barcelona, while it reaches only 1.415 hectares in Milan (roughly half). Furthermore, by considering transport areas all together (roads and railways, ports and airports), in 2006 the Barcelona province could count on a total of 3.135 hectares of transport facilities, composed of 36.8% of port areas, 43.3% of airport areas and 19.8% of roads and railways. In contrast, in the Milan province there are in total 1.415 hectares of transport infrastructures, subdivided into 41,9% of airport facilities (so roughly the same as in the case of the Barcelona province), and 58.1% of roads and railways. The great increase of roads and railways in the Barcelona province (+630.6%) should nevertheless be considered in comparison to the Milan case: in absolute terms, in 2006 the Barcelona province has 621 hectares of roads and railways compared to 822 hectares in the Milan province.

Construction sites have also greatly increased both in the Barcelona province (+407.1%) and in the Milan province (+876.8%), however absolute values are substantially different (1,714ha of construction sites in the Barcelona province, and 547ha in the Milan province), as well as proportions to the total of urbanised surfaces (in 2006, 2.0% in the Barcelona province compared to 0.7% in the Milan province).

Between 1990 and 2006, total built-up areas similarly increased in both provinces, growing by +20.8% in the Barcelona province and +26.1% in the Milan province.

By comparing years 2000 and 2006, open and agricultural areas have similarly decreased in both provinces. However, the proportion of artificial surfaces to the total area reaches 37% in the Milan province, while it attains only 11% in the Barcelona province. Although the Barcelona province is almost four times larger than the Milan province (774,569 hectares compared to 198,700 hectares), in absolute values (in 2006) the total artificial surfaces are roughly similar, amounting to 85,090 hectares in the Barcelona province and 73,482 in the Milan province. Hence, comparatively, the Barcelona province is much less urbanised than the Milan province. The 37% value reached by the Milan province expressing the proportion between artificial and open areas should however be considered an alarming threshold as urbanised areas are dangerously approaching to the 45% threshold, which is deemed to put into risk the capacity of soil regeneration (Centro Studi PIM, 2009, p.12).

Table 3 shows detailed information on the new artificial surface produced between 1990 and 2006 in the Barcelona and Milan province by land use type. In absolute terms, Barcelona and Milan province expanded in a similar way (14,635 hectares and 15,227 hectares, respectively), however, it is possible to note that, in the Milan province, 53.9% of the newly built-up areas have been taken up by discontinuous residential areas, this figure attaining 23.9% in the Barcelona province. Table 3 also clearly displays that 40.2% of the built-up areas in the Barcelona province between 1990 and 2006 is occupied by industrial and commercial areas, and 11.5% by transport areas (roads and railways, ports and airports), while in the Milan province, such figures reach 29.1% and 0.4%, respectively. In the Barcelona province, construction sites are also a consistent proportion of the newly built-up areas (9.4%), sport and leisure facilities being almost equal in percent and absolute values in both provinces.

Considering tables 1, 2 and 3, the Milan province can be considered, in relative terms, more dispersed: both the absolute values and proportions of both continuous and discontinuous areas show that urban sprawl is more consistently found in the Milan case. In addition, it seems that transport infrastructures in the Barcelona province are more industry- and service-oriented than urban sprawl-related, as in the case of the Milan province, suggesting that transport infrastructures are a necessary but not sufficient condition to urban sprawl.

Demographic data also support the less dispersed character of Barcelona in comparison to Milan. Table 4 shows the absolute values and proportions, for the 1981-2011 period, of demographic variations and 'weights' in both the Barcelona and Milan municipality and province, including also regional figures for both Catalonia and Lombardy. As the Barcelona municipality registered a demographic decrease over the period (-8.1%), its province shows a population growth (+19.5%), concentrating a considerable 73.4% of the entire Catalan population. While demographic proportions show as well a negative trend (-8.0% and -4.2%), it is still possible to conclude that the majority of Catalans continue to locate within the Barcelona area, strengthening its role and influence as a city and as a regional capital. However, the presented figures simultaneously corroborate the demographic de-concentration processes: the Barcelona province functions as a 'residential basins' of the population pivoting around Barcelona (cf. Miralles-Guasch and Pujol, 2012; Pujadas i Rúbies, 2009; Serra, 2003).

Table 1: Corine Land Cover classes (1990-2006) for Barcelona province (NUTS3 area). Source: EEA. Author’s elaboration.

Land use classes	Barcelona province (NUTS3 area)						% 1990–2006 Variation
	1990 (ha)	%	2000 (ha)	%	2006 (ha)	%	
Continuous residential areas	24 717.0	35.1	24 720.0	30.7	24 894.0	29.3	0.7
Discontinuous residential areas	31 154.0	44.2	34 032.0	42.3	34 649.0	40.7	11.2
Industrial and commercial areas	10 048.0	14.3	14 287.0	17.8	15 930.0	18.7	58.5
Roads and railways	85.0	0.1	614.0	0.8	621.0	0.7	630.6
Ports	854.0	1.2	1140.0	1.4	1155.0	1.4	35.2
Airports	518.0	0.7	626.0	0.8	1359.0	1.6	162.4
Mineral extraction sites	1703.0	2.4	2168.0	2.7	2300.0	2.7	35.1
Dump sites	187.0	0.3	311.0	0.4	351.0	0.4	87.7
Construction sites	338.0	0.5	754.0	0.9	1714.0	2.0	407.1
Green urban areas	277.0	0.4	312.0	0.4	335.0	0.4	20.9
Sport and leisure facilities	574.0	0.8	1428.0	1.8	1782.0	2.1	210.5
Total urbanised areas	70 455.0	100.0	80 392.0	100.0	85 090.0	100.0	
Total urbanised areas	70 455.0	9.1	80 392.0	10.4	85 090.0	11.0	20.8
Agricultural areas	252 499.0	32.6	243 715.0	31.5	239 867.0	31.0	
Forests, semi-natural lands and water bodies	439 598.0	56.8	450 462.0	58.2	449 612.0	58.0	
Total area	774 569.0	98.4	774 569.0	100.0	774 569.0	100.0	
Total urbanised area to total area		9.1		10.4		11.0	

Table 2: Corine Land Cover classes (1990-2006) for Milan province (NUTS3 area). Source: Corine Land Cover data, EEA. Author’s elaboration.

Land use classes	Milan province (NUTS3 area)						% 1990–2006 Variation
	1990 (ha)	%	2000 (ha)	%	2006 (ha)	%	
Continuous residential areas	3966.0	6.8	4650.0	6.5	4650.0	6.3	17.2
Discontinuous residential areas	38 719.0	66.5	46 101.0	64.5	46 929.0	63.9	21.2
Industrial and commercial areas	11 306.0	19.4	14 824.0	20.7	15 738.0	21.4	39.2
Roads and railways	768.0	1.3	792.0	1.1	822.0	1.1	7.0
Ports	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airports	593.0	1.0	593.0	0.8	593.0	0.8	0.0
Mineral extraction sites	669.0	1.1	854.0	1.2	753.0	1.0	12.6
Dump sites	233.0	0.4	114.0	0.2	114.0	0.2	–51.1
Construction sites	56.0	0.1	124.0	0.2	547.0	0.7	876.8
Green urban areas	1417.0	2.4	1671.0	2.3	1591.0	2.2	12.3
Sport and leisure facilities	528.0	0.9	1745.0	2.4	1745.0	2.4	230.5
Total urbanised areas	58 255.0	100.0	71 468.0	100.0	73 482.0	100.0	
Total urbanised areas	58 255.0	29.3	71 468.0	36.0	73 482.0	37.0	26.1
Agricultural areas	99 064.0	9.9	117 051.0	58.9	115 048.0	57.9	
Forests, semi-natural lands and water bodies	6870.0	3.5	10 181.0	5.1	10 170.0	5.1	
Total area	198 700.0	82.6	198 700.0	100.0	198 700.0	100.0	
Total urbanised area to total area		29.3		36.0		37.0	

Table 3: Newly built areas relative to Corine Land Cover classes as proportions to the total 1990-2006 variation of built-up areas. Source: Corine Land Cover data, EEA. Author’s elaboration.

Land uses	Barcelona	%	Milan	%
Newly built residential continuous areas (CLC class 1.1.1)	177.0	1.2	684.0	4.5
Newly built discontinuous residential areas (CLC class 1.1.2)	3495.0	23.9	8210.0	53.9
Newly built industrial and commercial areas (CLC class 1.2.1)	5882.0	40.2	4432.0	29.1
Newly built roads and railways (CLC class 1.2.2)	536.0	3.7	54.0	0.4
Newly built ports (CLC class 1.2.3)	301.0	2.1	0.0	0.0
Newly built airport areas (CLC class 1.2.4)	841.0	5.7	0.0	0.0
Newly opened mineral extraction sites (CLC class 1.3.1)	597.0	4.1	84.0	0.6
Newly opened dump sites (CLC class 1.3.2)	164.0	1.1	–119.0	–0.8
New construction sites (CLC class 1.3.3)	1376.0	9.4	491.0	3.2
Newly built green urban areas (CLC class 1.4.1)	58.0	0.4	174.0	1.1
Newly built sport areas and facilities (CLC class 1.4.2)	1208.0	8.3	1217.0	8.0
Total hectares of <i>newly</i> built areas	14 635.0	100.0	15 227.0	100.0

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Table 4: Total number of inhabitants, population change and demographic proportions by municipality and province for Barcelona and Milan, 1981-2011. Source: (IDESCAT Catalan Institute of Statistics, 2011), (ISTAT Italian National Institute for Statistics, 2011). Author’s elaboration.

Area	Barcelona				%1981-2011 Variation
	1981	1991	2001	2011	
Barcelona municipality	1 752 627	1 643 542	1 503 884	1 611 013	-8.1
<i>Demographic proportion to Catalonia</i>	29.4	27.1	23.7	21.4	-8.0
Barcelona province	4 623 204	4 654 407	4 805 927	5 522 566	19.5
<i>Demographic proportion to Catalonia</i>	77.6	76.8	75.8	73.4	-4.2
Catalonia	5 956 414	6 059 494	6 343 110	7 519 842	26.2
	Milan				
Milan municipality	1 604 773	1 369 231	1 256 211	1 242 123	-22.6
<i>Demographic proportion to Lombardy</i>	18.0	15.5	13.9	12.8	-5.2
Milan province	4 018 108	3 922 710	3 707 210	3 038 420	-24.4
<i>Demographic proportion to Lombardy</i>	45.2	44.3	41.0	31.3	-13.9
Lombardy	8 891 652	8 855 216	9 032 554	9 704 151	9.1

In the case of Milan, both its municipality and province decreased in population during 1981 and 2011 (-22.6% and -24.4%⁶), and proportions show a limited capacity of the Milan municipality and province to concentrate the Lombardian population within their boundaries (12.8% and 31.3%, respectively), if compared to the Barcelona case. Such figures demonstrate a reduction over time of the ‘demographic weight’ of the Milan municipality and province in the considered period, suggesting that the ‘residential basin’ for Milan municipality extends far beyond the Milan province, as the population re-distribute to the nearby provinces (Monza, Bergamo, Brescia, Como, Lecco and Varese), as supported by other studies (cf. Balducci, 2003).

Plausibly, in the Barcelona case, the increase of discontinuous residential areas during the considered periods can be related to the demographic dispersion of the population from Barcelona municipality to the surrounding areas. However, despite such an increase, in the Barcelona case the discontinuous residential areas take up a proportion of the built-up areas which is considerably less than in the Milan case. In the latter, the high proportion of discontinuous areas within artificial areas is related to the ‘spreading out’ of the population in scatters residential areas outside Milan’s administrative boundaries.

At this level of analysis, it can be suggested that, in the Barcelona case, built-up forms appear to be less dispersed (-) than those of Milan in terms of residential areas, and population more concentrated (+); conversely, discontinuous residential areas within the Milan built-up forms are more diffused (+), and the population is less concentrated (-). There seems to be a connection between a less territorially dispersed pattern of residential areas with demographic concentration in the Barcelona case, and between a more territorial dispersed pattern of residential areas with demographic dispersion in the Milan case⁷.

5 Analysis and findings

How can the less dispersed character of the Barcelona’s built-up forms be explained? Why, despite similar demographic deconcentration trends, the Barcelona case presents relatively less urban sprawl than the Milan case?

Some authors (Chin, 2002; Couch et al., 2007, p.18) mention how municipal fragmentation can be related to the occurrence of urban sprawl, as independent, medium and small size local governments try to attract investment to the detriment of other municipalities (i.e. interurban competition).

Almost 33% of the 947 Catalan municipalities lie within the Barcelona province, while only 8.7% (134) of the 1,544 municipalities comprising the Lombardy region belong to the Milan province. Both Barcelona and Milan provinces present a rather high number of municipalities per province, if compared to data at the European level. According to Eurostat data (2011b), by considering the 1,247 NUTS 3 levels (provinces) in Europe, the Local Administrative Units (LAUs), which correspond to municipalities, the European mean is 81.12 LAUs (municipalities) per NUTS3 level (province), with the median being 41.

Municipal fragmentation between Barcelona and Milan provinces is here operationalised in number of municipalities subdivided by demographic size, and are shown in table 5. Both provinces are composed of mostly small and medium size towns and villages: 57.6% of the municipalities within the Barcelona province have less than 5,000 inhabitants, while such figure reaches 27.6% in the Milan province. Furthermore, by considering municipalities with less than 10,000 inhabitants, the cumulative frequency reaches 74.0% in the Barcelona province and 56.0% in the Milan province. Hence, at first glance, table 5 shows that the Barcelona province is more fragmented than the Milan province in terms of number and size of municipalities.

Table 5: Municipal sizes in Barcelona and Milan provinces (2011). Source: IDESCAT 2011, ISTAT 2011. Authors elaboration.

Municipal size (no. of inhabitants)	Barcelona			Milan		
	Freq.	%	% Cum.	Freq.	%	% Cum.
less than 1,000	94	30.2	30.2	1	0.8	0.8
less than 5,000	85	27.3	57.6	36	26.9	27.6
less than 10,000	51	16.4	74.0	38	28.4	56.0
less than 25,000	43	13.8	87.8	38	28.4	84.3
less than 50,000	19	6.1	93.9	16	11.9	96.3
less than 100,000	12	3.9	97.8	4	3.0	99.3
less than 250,000	5	1.6	99.4	0	0.0	0.0
less than 500,000	1	0.3	99.7	0	0.0	0.0
more than 500,000	1	0.3	100.0	1	0.8	100.0
Total	311	100.0		134	100.0	

However, the Barcelona province is almost four times larger than the Milan province (7,745 square kilometers compared to 1,987 square kilometers)⁸, and the former is subdivided into twice over the number of municipalities than that of the Milan province (311 compared to 134 municipalities). If the Milan province were to extend as much as the Barcelona province, the current number of municipalities would be more than 500. This means that, because of the surface area of the two provinces, and despite the fact the Barcelona province contains more municipalities,

the Milan province can still be considered more fragmented.

This conclusion can be further supported by considering the average municipal surface in both provinces: the average municipal surface in the Barcelona province is 24.9 square kilometers, while the average municipal surface in the Milan province is 14.8 square kilometers. Hence, the Milan province is, comparatively, more fragmented as municipalities are smaller in surface.

Therefore, it can be put forward that the less territorially dispersed pattern of residential areas can be related with a more contained municipal fragmentation, regardless of the municipal size, registered in the Barcelona case as compared to the Milan case. It can thus be concluded that, upon the two considered case studies, the lesser the municipal fragmentation, the lesser the interurban competition, and hence to a lesser extent will the patterns of residential areas be dispersed.

However, what is it about a more contained municipal fragmentation that can (comparatively) hamper urban sprawl? What are the dynamics through which a lesser municipal fragmentation can inhibit land management strategies towards discontinuous residential areas? By employing a territorial, multi-scalar perspective, an analysis of plans and planning regulations at the national, regional and municipal level will be carried out in order to show how the interconnectedness of institutional actors can cumulatively influence the material emergence (or containment) of a spatial phenomenon such as urban sprawl.

5.1 *Barcelona*

According to the Spanish national 1953 and 1975 laws in planning, local governments are the public actors who occupy the most prominent role for land use allocation. Having competence over land management within their boundaries, municipalities can autonomously bargain over land. Interviewees highlighted the role that the connection between urban development and local taxation has for municipalities, as stressed by one of the interviewees, working on the Barcelona Metropolitan Area (AMB):

planning fees are the best way for local governments to ensure revenues, together with the state grants for municipalities to provide services according to the number of inhabitants (...) [all this] allows municipalities to keep afloat.

However, when housing needs are directly managed by the municipalities (e.g. the development of a suburban residential area as a particular land management strategy), the expectation to get higher revenues can clash with the crude reality of the financial difficulties the city councils will later have to face. A key informant of the Polytechnic University of Catalonia stated that:

(...) local municipalities have the authority to classify land and to make their municipality expand their built-up areas, therefore (...) the municipality facilitates in any possible means the provision of houses to the population that is arriving, concluding that the more houses we produce, the more inhabitants we will attract, and so we will have more resources (...) when in reality it was found out that, the larger the population, the more the needs, therefore the more the deficit.

In the Barcelona case, local municipalities are the tier of government mainly responsible for the urban and housing development occurring within their boundaries. The suburban qualities of the built environment become an asset for those municipalities that chose to develop land to meet the housing needs of and thus attract (a certain type of) metropolitan areas' inhabitants and real estate investors (cf. Carreras Quilis, 2002, p.34, Nello, 2002, p.110). There is always a political choice behind land use management and planning, therefore housing provision is heavily influenced by the specific decisions made by local authorities. The availability of 'affordable' or 'unaffordable' houses in a certain municipality is related to such choices and to the certain market population segment that local authorities attempt to attract.

Concurrently, in Catalonia the regional government (Generalitat) performed a significant role concerning territorial and spatial planning. This is not only due to an advanced national legislation on land use planning and management (national 1953 and 1975 laws, despite having been issued during the dictatorship), but also because of a more diffuse local culture on land management. With the re-establishment of democracy, and the institution of regional governments in 1978 (*Comunidades Autónomas*), the illegal and low density occupation of the Catalan territory, given the previous poor enforcement of existing plans, came to a halt by means of the 1976 Barcelona metropolitan plan and the commitment by the regional government to endorse Catalonia with a proper territorial legislation, resulting in the 1983 and 1987 regional laws, sponsored by the right-wing political party (CiU *Convergència i Unió*) leading for over 20 years. There has been a sort of a cultural reaction to the senseless land management during 1950s and 1970s, giving the regional government political room for action in working with the municipalities to reduce land consumption and to enforce urban development plans.

Regional plans did not solely suppose a top-down approach, but the Department of territorial planning at the Generalitat sought for the direct cooperation with (and not 'only' the participation of) municipalities, stakeholders, and civil society. In particular, land and competences bargaining often goes through the interaction between the planning director of the Generalitat and the municipalities. One of the interviewees, who is a reference person for Catalan planners with extensive experience in plans and political responsibilities, described such interaction by stating that:

the local government proposes the urban plan, and discusses it with its inhabitants, and then it delivers it to the regional authority, which controls it in certain commissions, where there are competent people, who are anyway connected with the political basis of the regional government, which are the municipalities. Hence the urban plans are discussed in such commissions, however the last word is for the director of the Generalitat territorial planning department [*director de urbanismo*]. The commission can make some comments, it is obvious that then the urban plan will be approved, however it is the director's final choice to approve the plan. Hence, the director of the Generalitat's territorial planning department muddles through a very complex situation, because politically a local government can have quite an influence in the party, and in the party that is ruling the Generalitat [e.g. the right-wing CiU]... Therefore, the decisions that the director wants to make

can be short-circuited. Obviously, the director of the Generalitat territorial planning department receives certain instructions, in order to accommodate municipalities' expectations on urban plans and projects. At the end of the day, this is quite normal. (...) That is why being the Generalitat's planning director is the most difficult political post in Catalonia. (...) All municipalities have something to debate with him, and he has to give answers in a complex political setting.

However, the same interviewee stated that the director of the Generalitat's territorial planning department, and especially Juan Antoni Solans as one of the most influential directors, could equally 'advise' the city officials of local governments that urban plans should have been 'acceptable and conform with certain requirements', avoiding unrealistic expectations for urban development growth, or the land use transformation of consistent amounts of open and agricultural land.

5.2 Milan

At the national level, national law no. 1150 on planning (*Legge urbanistica statale*), promulgated in 1942 during Fascist rule and the Second World War, which was later modified in the subsequent decades, is still valid. The 1942 law anticipated the expansion and urban development that would have been necessary to fulfill the reconstruction demands of the country after the world conflict. According to the 1942 law, housing provision retains priority over mobility infrastructures and planning of industrial areas, and no general planning directives were defined to orient the planning decisions made by local municipalities (Campos Venuti, 1990, p.59ff).

Although the 1942 law was an advanced spatial planning tool, the real problem was that it was not applied in practice (De Lucia, 2006), leaving the housing boom of the post-war period to local municipalities. Still today, local governments do the lion's share with regard to land management. Proposing and self-approving their urban plans, municipalities act solipsistically with regard to land management strategies, and the decision-making process over land cannot easily be tackled by higher governmental institutional scales.

As in the case of Barcelona, urban political choices regarding the type of houses to be built within the municipality can define the residents profile, under the rationale to achieve a competitive asset relative to other municipalities. The connections between public and private actors for housing provision have been effectively described by one of the interviewed employees of the Milan Building Constructors Association (ANCE):

the mayor comes here [to the Building Constructors Association] and says: sirs, I want to build. In Milan, it happened like that: sirs, I [the mayor] have found out that in Milan houses are expensive. Hence I want to provide houses for all, also to the people that can not pay 5,000 euros per square meter. (...) So, we, the stakeholders, reply to him: we can not provide houses for less than 5,000 euros per square meter, we have to pay the workers, we have to buy the land, the building materials. (...) Hence the mayor tells us: good, as land is a municipal property, I will give it to you for free, so you don't have this cost,

but you have to promise that then you will provide affordable houses. So we make a deal, a real written contract.

However, there is no control on whether the stakeholders, such as the builders or the real estate agencies, will finally sell houses for the 'agreed' price.

In order to achieve such a 'competitive edge' through land bargaining, land management strategies at the local level imply an instrumental use of land, where suburban residential areas are particularly functional in attracting private investments and residents, besides being an attempt to increase the local tax base. One of the interviewees at the regional level stated that:

in no way the land rent produced by agricultural uses rival the land rent coming from land use transformation. Land rent is one of the relevant mechanisms to understand the processes of land consumption. Since in Italy we equal land property with building rights, if I have a land plot and then the local administration decides, or I make the local administration decide, to allocate that land plot for urban uses, this allows me to get a considerable land rent, without any effort on my part. Only by virtue of the fact that my land plot will be transformed, I exploit the legal right to get a surplus from my property. (...) This is a great pressure exerted over local authorities. (...) Land rent has produced in Italy a surplus of land use transformations which is independent from basic needs and demands.

Additionally, municipalities can convert land (at the beginning only on paper) to put balance sheets on an even keel, allocating land for development as a strategy. Following a common practice, the wrecked local municipal coffers can be artificially recovered by classifying agricultural soil as developable, and by assigning to it a market value, which will then be included in the municipal balance sheets (cash inflows), thus keeping the administration afloat. Land use transformation is thus the most effective way for local authorities to make economic resources available in a limited amount of time. As described by Balducci (2003, p.68), the 'complex issue of support for local economic development' is then dealt with, 'at the local level, by the simple allocation of land for use'.

In Italy, although the 1948 Italian Constitution already defined the establishment of regional governments, it was not until 1970 that regions were formally constituted. Until 2001, the regional government received the urban plans issued by the local authorities and controlled, with the cooperation of provincial governments, their compliance to national and regional environment and landscape protection laws (being urban development exclusive competencies of local authorities, as in the case of Barcelona). However, in 2001 a Constitutional reform took place. While the reform ideally aimed at reinforcing regionalism, in reality it implied a complete deregulation of state control over land management (and not only), with environmental protection being transferred to regions, municipalities keeping the greater control over land allocation.

After this reform, Italian regions and provinces were compelled to be endowed with proper territorial strategies and plans. In compliance with the 2001 constitutional reform, the Lombardy region promulgated the 2005 law no. 12 on territorial management, initiating a process of enforcement of the territorial regional (PTCR), provincial (PTCP) and local plans (PGT).

Nevertheless, such an effort did not tackle one of the core problems of Italian planning tools: the predominance of the local scale on land management. Hence, it seems that names have changed and new (and much needed) plans have been issued and updated, however land management dynamics remain almost unchanged. The regional and the provincial governments having competences on environment and landscape protection, they cannot orient the urban development choices of local authorities, sheltered under the 1942 law.

In Italy, the premises for reconstruction introduced by the 1942 law established a 'municipality regime', where it is very difficult to limit, change and regulate local governments' decisions over land. Localised decisions over planning make urban transformations proliferate, leading to a 'self-forming' and uncontrolled urban expansion, sheltered by a permissive national legislation on land use planning conceived to promote post-war recovery. One of the most striking results of the limited state control over land management, and a legislation prioritising municipal governments for land allocation, has been the three building amnesties (*condono edilizio*) in 1985, 1995 and 2003. The approval of urban plans, the establishment of the regional governments (1970s), the late approval of territorial regional and provincial plans after the 2001 constitutional reform, could only *a posteriori* act on a territorially dispersed built-up form in the country, especially with regard to housing areas.

Regional plans are incapable of tackling the municipal bargaining over land given the competences over urban planning that the local scale holds. One of the interviewed regional officials stated that:

planning power, planning implementation, is still in the hands of local governments. With instructions, but just instructions, coming from the territorial regional and provincial plans (...) we try to limit the power of municipalities. (...) The municipality's rationale is related to the idea that they are the center of the universe. (...) hence they try to adopt territorial marketing strategies. (...) They see their municipal areas as a bargaining opportunity for territorial marketing. (...) At best the Lombardy region tries to orient development with guidelines, protection laws, development regulations, and at best the provinces increase the level of detail of these guidelines, and at best the municipalities become aware that they are not an entity on their own, but that for certain topics they need a dialogue with the surrounding municipalities.

6 Discussion

The findings have shown that, with suburbanisation and demographic deconcentration patterns occurring in both the Barcelona and Milan case, the former presents relatively less dispersed residential areas than the latter.

If a plausible connection has been found between municipal fragmentation and the occurrence of urban sprawl, as the less administrative fragmentation is a sufficient condition to observe a lesser spatially dispersed pattern of residential areas in the two considered case studies, a territorial, multi-scalar governance approach helped reveal the political and planning mechanisms that can substantially explain the different occurrence of urban sprawl in the two considered case studies.

In both Barcelona and Milan, local governments behave similarly, and constitute a sort of 'baseline'. The local scale (municipalities), being entitled to local urban planning, takes localised planning decisions over urban development, hence producing a scattered, almost 'self-forming', territory, as highlighted also by other researchers (Christiansen and Loftsgarden, 2011; Mann, 2009; Settis, 2010). Evidence has proven that municipal governments bear the most prominent responsibility for urban sprawl, which consistently appears through the 'welding' and proximity of scattered and low-density residential areas. Urban sprawl consists of land use micro-transformations carried out to obtain a competitive edge with regard to the other municipalities located within the metropolitan boundaries.

The differential factor that can explain the less dispersed character of residential areas in the Barcelona case than in that of Milan is the role that higher institutional levels play. The adopted theoretical framework proved to be particularly valid in distinguishing the role that actors at different governance scales play with regard to land regulations and land management, thus potentially influencing the occurrence of urban sprawl.

Although, overall, it is the local scale that owns the greater amount of authority regarding land management strategies, deciding on how to bargain land for development, and attracting a certain type of inhabitant in order to find their 'competitive niche' within interurban competition dynamics with other surrounding municipalities, it is the broader, institutional context, where these localised decisions on planning are taken, to be distinctive. The more incisive role that the regional government plays in the Barcelona case, issuing legally binding approvals of municipal plans, mediates, and mitigates, land management strategies put into place by local governments.

In addition, the normative framework seems to be more advanced in the Spanish case than in the Italian one, where a more modern and up-to-date national legislation, and a more consolidated regional territorial planning, facilitated land protection and control over land use change. In particular, since the 1980s the Catalan regional government has made efforts to reform territorial organisation and planning, for instance by defining territorial *àmbits* that would have been endorsed with a territorial plan. In contrast, the Italian normative framework on land use appears to be insufficient and inadequate to face the challenge posed by the post-war and current urban development. Because of a diverse institutional framework, the Lombardy region has been less able than Catalonia to provide a sound and strict normative framework to bind local governments' urban choices over land use planning. Private actors will therefore have more room for action when the regional government has a limited capacity to bind local municipal choices on urban development to plans and regulations.

Such conclusion should be taken into account specifically for the two considered case studies or, potentially, for other Southern European countries. A larger pool of case studies, including other regional governments in Italy and Spain, would have improved the comparative power of the research. In addition, the findings are related with the focus on planning tools and plans, which have been considered as the key instruments through which the institutional actors typically put into place their choices over land management. However, other documents, data and devices may

have been considered, during a sufficiently broad period of time, such as the number of building permits, the number and type of newly built houses, homeownership rates, the territorial distribution of household incomes or average housing prices, opening up other and various insights.

Furthermore, the observed evidence that the built-up form in the Barcelona case is less characterised by dispersed residential areas than in the Milan case does not have to lead to the easy conclusion that the Barcelona case is more virtuous than Milan. The current (2007-present day) economic crisis related to the housing market has had a negative effect on the Catalan economy as well. Although data availability limited this research to the pre-financial crisis period, hence not including the 'Spanish real estate bubble' (*burbuja inmobiliaria*), in 2003 Spanish scholars were already very aware of the critical situation concerning the housing market in Spain. In particular, analyses on the Catalan housing market highlighted the emergence of a paradoxical situation (Esteban Noguera and Tarroja, 2004, p. 34-39; 188-194): the excessive (and seen for the first time in Catalonian history) pace of the construction sector (cf. also Serra, 2003, p.64) poured into the market a great amount of new dwellings, whose prices however kept growing (for example, between 1997 and 2003 housing prices in Barcelona doubled), while, at the same time, the purchasing power of people gradually decreased. Hence, paradoxically, the more the number of houses, the more expensive. Therefore citizens, especially young and old people, or low-income residents, could hardly access such good and were thus under risk of exclusion, despite the ease with which the credit system allowed people to sign for mortgages. These critical analyses are relevant as far as evidence has shown how most of the dwellings built in 1990s and 2000s had a suburban character (Muñoz, 2007), as shown also in table 3.

In addition, the dichotomy between Catalonia and the Spanish central state, dramatically escalated as a consequence of the experience of the Francoist regime, which resulted in Catalans elaborating as many beneficial strategies as possible for 'their people'. Having being the establishment of regional planning during the 1980s an accomplishment of a consolidated right-wing political party (CiU), which rule for over two decades, there may also have been a 'revanchist' (and conservatorist) political strategy to show how 'Catalans do it better' in terms of territorial management.

Finally, it must be remembered that governance dynamics are only one type of driving factor influencing land management. The housing market and the macro-economic situation, globalisation and international competition, local taxation and the financial market are further conditions that have an impact on such decisions. This paper highlighted how more (comparative) studies are needed on local fiscal policies, as the reduction of state grants for local authorities, following neo-liberal dictates, has worsened their ability to withhold from the pressure coming from builders, developers and real estate agents, debilitating the distinctive character of the 'protected' European local authorities as compared to the US case (Vicari Haddock, 2004, p. 101-102).. However, the aim of this research has been to dig into political and planning factors as conditions towards urban sprawl, not to identify (if indeed this is possible) the ultimate driving factor(s) leading to suburbanism.

7 Conclusions

The paper has shown how a territorial, governance perspective can clarify the contextual emergence of a spatial phenomenon with a metropolitan character such as suburbanism. Through the use of land use data and demographic figures, it has been elucidated how urban sprawl reconfigures urban functions, in particular housing functions, between the metropolitan centers and the surrounding municipalities. More importantly, qualitative data have been key to reveal how governance dynamics work in local contexts, disclosing the political mechanisms and planning factors leading towards land consumption or containment.

The paper demonstrates how the metropolitan character of urban sprawl originates from local planning practices mainly performed by municipal authorities through land use micro-transformations, and arguably how the authority of regional governments can incisively influence city council's localised planning decisions, having an overall impact on the occurrence of urban sprawl.

City-regions relationships are thus reconfigured through suburban housing functions, and more specifically through the governance dynamics existing between municipalities and regional governments.

Notes

¹For a critical review on these processes, see Capel, 2005 and Martí-Costa and Pradel, 2012.

²Slum areas appeared in the city, a phenomenon called *barraquisme* (from *barraques*, shanty houses), such as in the case of the Somorostro neighborhood, a slum area located on the beach where currently the fancy maritime tourist area of the city is found.

³The recent classification of the 307 metropolitan areas in Europe has been indeed elaborated on NUTS3 levels; cf. Eurostat, 2012.

⁴From now on, CLC.

⁵It is important to consider that 1990 data are technically different than the 2000 and 2006 surveys. Such discrepancies are apparent in tables 1 and 2, where the sum of the total urbanised areas, agricultural areas, forests, semi-natural lands and water bodies is inferior to the total area surveyed in 2000, which is taken as reference for all CLC inventories. For this reason, the relative variation between 1990 and 2006 of agricultural areas and forests, semi-natural lands and water bodies has not been calculated, while the relative variation of artificial areas should be considered as indicative, as it seems that this discrepancy problem affects less artificial areas than other Corine Land Cover (CLC) land categories.

⁶Such figures should nevertheless be examined in light of the establishment, in 2004, of the Monza e della Brianza province, whose inhabitants have been mostly 'administratively stolen' from the Milan province.

⁷Such conclusion is also corroborated by the calculation of the Gini index, by province, for the number and cumulative distribution of the population with regard to the number of municipalities: for 2011, the Gini index in the Barcelona province is 0.82, while it reaches 0.68 for the Milan province. Such values indicate that in the Barcelona province the population is more concentrated, as the Gini index approximates to 1, while in the Milan province the population is more dispersed, as the Gini index approaches 0.50.

⁸This may also explain why the Milan province can not accommodate as many inhabitants as the Barcelona province, as shown in table 4.

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