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ID 1527 | UNDERSTANDING TERRITORIAL DIFFERENCES AND SCALE EFFECTS WHEN EVALUATING HOUSING CONDITIONS USING CENSUS DATA: THE CASE OF PORTUGAL

Teresa Sá Marques[1]; Miguel Saraiva[1]; Fátima Loureiro de Matos[1]; Diogo Ribeiro[1]; Paula Guerra[2]
[1]Faculty of Arts of the University of Porto, CEGOT Research Centre;
[2]Faculty of Arts of the University of Porto, Institute of Sociology/ CEGOT Research Centre
miguelmsaraiva@gmail.com

1 INTRODUTION – HOUSING PROBLEMS IN EUROPE

The EU development strategy for the next decade (Walsh, 2012) has as a strategic priority the identification of mechanisms for enriching quality of life and reducing social-spatial inequalities. For that, rather than focusing exclusively on economic growth, regions should enhance place resilience and reduce their vulnerability at various scales (Murphy and Scott, 2014). One fundamental scale is that of housing and related services. Indeed, for the past two decades a large array of factors have contributed to increase the housing problems and vulnerabilities of European countries, such as the decline of public investments, the restructuring of social services' systems, the reduction of the consumption capacity, and also the internal disparities and domestic policy decisions that eventually led to the most recent economic crisis (Carballo-Cruz, 2011, Dellepiane Avellaneda and Hardiman, 2010, Eichengreen et al., 2014).

In the countries of Southern Europe in particular (Portugal, Ireland, Italy, Greece and Spain), housing bubbles have burst (notably in Ireland and Spain, see Dellepiane Avellaneda and Hardiman, 2010, Whelan, 2014, Carballo-Cruz, 2011), youth unemployment, dissatisfaction and emigration have dramatically increased (Cairns et al., 2014), and severe austerity measures have been implemented (Murphy and Scott, 2014). These and other factors have led to decreases in levels of happiness, life satisfaction and quality of life (Anderson et al., 2012, Bell and Blanchflower, 2011), have affected employee job satisfaction, commitment, and self-regulation (Markovits et al., 2014), and have had increasing social risks, for vulnerable groups as immigrants, low waged workers or youths (Cairns et al., 2014) and in terms of poverty and social exclusion (Frazer and Marlier, 2011).

The housing market itself, often used as proxy for cost of living and life satisfaction (Garrido-Yserte et al., 2012, Murphy and Scott, 2014), has been more than often associated to financial volatility and social vulnerability (e.g. Loutskina and Strahan, 2015, Martin, 2011, Whitehead et al., 2014, Donald et al., 2014, Priemus and Whitehead, 2014, Whitehead and Williams, 2011). Indeed, the urban economy is very sensitive to housing, and the effect is larger in localities more financially integrated (Loutskina and Strahan, 2015). Thus, falling housing prices and transactions since 2010, mortgage debts and overdue loans, limited credit from banking institution, unemployment in the construction industry and the simple fact that supply far exceeds demand, have all, to a greater or lesser extent, contributed to increase the state of housing problems.

Even so, this is not just a question of economics. More and more, housing is perceived as a freedom right (King, 2003) rather than a socio-economic claim. Housing, and access to housing, is, undoubtedly, the most visible side of the social conditions of populations, and decent housing is essential for maintaining an acceptable standard of living, by providing warmth, security, safety and privacy (Nepal et al., 2010). The recent impact of elements such as the crisis have only exacerbated housing problems that were already long standing, related to social exclusion and social cohesion. Certain groups in deprived areas, for example, like low-income households and young families, face daily the struggle to meet housing expenses in an unaffordable housing market (Somerville, 1998, Frazer and Marlier, 2011, Healy and Hillman, 2008). As well, prolonged home staying of youths at the parents' house has also become a relevant problem (e.g. Cairns et al., 2014), producing a negative impact upon their capacity to enact housing transitions. Non-coincidently, these examples relate exactly to the two main conclusions of the European Report 'The State of Housing in the EU 2015' (Pittini et al., 2015): (i) there are more people without a proper home today in Europe than in 2009 (the high point of the crisis); and (ii) there are not enough affordable homes available in most European countries to meet the increasing demand.

On one hand, the EU regards housing as a major cause of economic and social instability (Whitehead et al., 2014). On the other, decent and affordable housing is regarded as an important tool in addressing social exclusion and maintaining social cohesion (Frazer, 2005, Nepal et al., 2010). Thus, the problems related to housing, and particularly to the socio-economic inclusion of low-income households and other vulnerable social groups, are considered a priority in new European directives, in a sense that stronger policies and regulations need to be established (Matos, 2012, Donald et al., 2014). However, this is still, recognizably, a major challenge (Pittini et al., 2015). Many social housing traditional systems in European countries are declining due to budget cuts and political change (Boelhouwer and Priemus, 2014, CECODHAS, 2012) and there seems to be a lack of a common housing policy in Europe, particularly in terms of a long-term stable framework for the affordable housing sector (Pittini et al., 2015).

First, European housing markets are very heterogeneous (for example Northern and Southern markets are recognizibly different, see Balchin, 2013, Elsinga and Hoekstra, 2005, Allen, 2006, Holdsworth and Irazoqui Solda, 2002, Priemus and Dieleman, 2002) making it very difficult to propose one-size-fits-all policies (Pittini et al., 2015). Second, the economic crisis is still ongoing and essential empirical data of recent years is thus unavailable, or at least incomplete. Consequently, former models that can properly measure and regulate housing problems at the European scale; explain the effects of the socio-economic crisis on the housing sector and housing conditions; interpret the differences in resilience between national housing systems in Europe; and predict the impact of recently adopted measures, are still to be properly developed (CECODHAS, 2012, Priemus and Whitehead, 2014).

This being so, at this stage, authors address the importance of continuing to monitor change, for example by developing indicators that help understand cause-and-consequence effects (Méndez et al., 2015), and formulate hypothesis based on the comparison between different experiences (Priemus and Whitehead, 2014, Méndez et al., 2015). According to Guerra (2011) an essential step may involve taking an holistic approach to address the deteriorated housing conditions that still persist today (derelict buildings, overcrowded dwellings, lack of basic living conditions), as well as the inherent social consequences (debt, eviction, homelessness, growth in waiting lists for social housing). More precisely, models and policies should adapt to the profound changes of the past decades, including (but not limited to) the economic crisis, the austerity measures, the new models of housing intervention and the increasingly complex social realities and lifestyles, which are, more than often, unfairly distributed (Guerra, 2011, Frazer and Marlier, 2011, Méndez et al., 2015).

Consequently, the most recent studies on housing problems and housing vulnerability have developed indicators that are multi-criteria and consider both objective/economic indicators and subjective/social indicators, such as Murphy and Scott's (2014) housing vulnerability index, which established a link between household vulnerability and localities that contained oversupply of houses and younger population in rural areas in Ireland; Nuuter et al's (2015) housing sustainability index for ranking European countries; Carmo et al's (2015) logistic regression model for assessing vulnerabilities and inequalities in the access to housing in Lisbon; or Pendall et al's (2012) multivariate regression model to analyse the relationship between potential personal or household vulnerability and potentially precarious housing conditions in metropolitan areas in the United States. As well, other studies have dwelled on how housing conditions cope with climate change, extreme weather conditions or natural disasters (Barbosa et al., 2015, Vincent and Cull, 2010, Van Zandt et al., 2012) or even on how housing itself can be the instrument to reduce the vulnerability to these conditions (Tipple, 2006).

2 PURPOSE AND METHODOLOGY – SCALE MATTERS?

Regardless of how housing and social problems and vulnerabilities are measured and interpreted in recent years in the literature (the debate regarding it is vast and thus out of the range of this paper), it would be unrealistic to assume that they are evenly distributed across social and territorial levels. Consequently, to achieve more cohesive communities, many research projects and policy programs have addressed spatial unevenness, spatial segregation and social mix through the evaluation of housing conditions and housing policies (Cassiers and Kesteloot, 2012). But if on one hand these policies have been criticized for being based on little tested assumptions and showing only limited results (Cassiers and Kesteloot, 2012, Musterd and Andersson, 2005), on the other hand they have, recognizably, been structured only around the problems of specific territorial areas. According to Battaglini and Annunziata (2014) policies seek elements of temporal and territorial stability in everyday life, but this stability has many times been achieved at the expense of disregarding matters of scale.

Since the turn of the millennium, the debate around how 'scale matters' has been continuous in the literature across a wide range of thematic areas, notably, for example, in climate change (see Wilbanks and Kates, 1999, Neil Adger et al., 2005). However, the same degree of attention has not been given when addressing problems related to housing conditions and social vulnerabilities. Precisely for that reason, very recently authors like Cassiers and Kesteloot (2012) or Donald et al (2014) have reinforced the need to address social-spatial inequalities across a wide range of spatial scales, mainly at the subnational and urban levels. 'The State of Housing in the EU 2015' Report also supports this idea, by stating that, because European housing markets are so heterogeneous, "the best way, indeed, to observe the markets is at national and even regional level, since the needs of the metropolitan areas, which become increasingly dense, differ a lot from the ones of the rural areas." (Pittini et al., 2015).

However, there is still a somewhat stiffness of scale in responding to these directives and analysing housing conditions, as studies either regard solely local scales (e.g. Carmo et al., 2015, Murphy and Scott, 2014, Pendall et al., 2012) or national scales (e.g. Nuuter et al., 2015), but not both. In Portugal, for example, João Ferrão (2014) has discussed how public policies only take into account the national level, evaluating various phenomena as if the country were a point. The author states, quite rightly, that although somewhat small when compared to other European countries, Portugal has enormous geographical, housing and social diversity. Thus policies, particularly cohesion and sectorial policies, should not be a-territorial nor should they oversimplify the segmentation between coast and inland; urban and rural; and metropolitan areas and the remaining country. By doing so, they take the risk of concealing the actual magnitude of problems and the location of many problematic areas.

Consequently, stemming from this debate and considering Portugal as a test case, the purpose of this research is to test and evaluate whether scale-of-analysis matters when addressing the issue of housing problems and vulnerabilities. A straightforward methodology is used where four territorial levels are analysed in turn through housing data; the national, the regional, the municipal and the borough levels. The analysis was conducted at two different time frames (2001 and 2011) corresponding to the last two population and housing Census in Portugal, which supplied the data for this research. Based on the most problematic issues identified at national level, three indicators of housing problems and vulnerabilities were selected: (i) the state of decay of buildings (derelict or requiring medium to large repairs); (ii) dwelling overcrowding; and (iii) dwellings lacking basic amenities. These indicators were analysed on the remaining

territorial levels, thus enabling direct comparison, the pinpointing of problematic hotspots and the highlighting of territorial disparities. Then, hypothesis testing, namely t-test for dependent samples (in the comparison of any two scales) and repeated measures ANOVA (in the comparison between the four scales), was applied to look for significant differences between spatial readings at different levels. In the final section, the research question is taken up and debated, in order to understand whether the territory should play a more important role in the integration of public policies for housing.

3 A PORTRAIT OF PORTUGAL'S HOUSING STOCK – NATIONAL AND REGIONAL LEVEL

In the last 30 years, the housing offer in Portugal has significantly increased and comfort levels of dwellings have also considerably improved. Nonetheless relevant housing problems, mostly associated to socially vulnerable groups, have persisted over the decades. Towards the end of the 20th Century, housing problems in Portugal were largely associated to the rapid growth of the Lisbon and Porto metropolitan areas. Several authors identified the causes for these problems (Ferreira, 1987, Ferreira, 1993, Serra, 2002, Guerra, 2011), namely the return of residents from former Portuguese colonies after the 1974 revolution; the intensive rural exodus from the interior to the coastal cities around the same period; the lengthy freeze of rent values (which contributed to the deterioration of the housing stock and overcrowding); the lack of social housing and its poor construction quality (leading to the rapid deterioration of buildings); the concentration of disadvantaged social groups in social housing neighbourhoods (and respective social consequences); and the outbreak of illegal construction and of precarious, run-down dwellings, recently exacerbated by the arrival of many economic immigrants from Africa and Eastern Europe.

Today, Portugal is living in a well-known scenario of economic and social crisis (succintly described in Cairns et al., 2014). Unemployment has risen from below 7% of the working population in the early 2000s to 14% in 2014 (PORDATA, 2015) with obvious consequences to the investment in housing. Portugal was a country with high transaction rates at the beginning of the century (Whitehead et al., 2014), a consequence of the increasing demand and social relevance of owning individual private housing with specific characteristics (location, materials, architectural design), fuelled by bank mortgages (Guerra, 2011, Matos, 2012). However, there was a massive and consistent fall both of housing transactions and housing prices since 2010 (Whitehead et al., 2014, Matos, 2012), at the same time that average credit valuation for home loans has had a negative variation, representing a greater stiffness in conceding credit, a reduction of housing loans and a drop in housing demand, not accompanied by a decrease in supply. If in the early 2000s companies needed an average time of 7-8 months to sell a house placed on the market, in 2013 that time had increase to 17 months (PORDATA, 2015). This caused huge problems for the mortgage and housing markets and the bankruptcy of many construction companies (Whitehead et al., 2014, Matos, 2012). But it also contributed to worsen living conditions and increase social inequalities, as there has been a significant increase in overdue rent/mortgage payments, in cries for counselling on mortgage and debt management, in the number of houses repossessed by the banks, in the waiting lists and types of profiles applying for social housing, and in the number of families filing for insolvency (PORDATA, 2015). As in Portugal there was (and is) a deep culture of home ownership, many families were forced to relinquish the main destination of most of their savings, and as the budget available for social housing is decreasing, the most vulnerable groups are having no choice but to seek overcrowded poor quality accommodation, and the risk of homelessness increases.

The analysis of the data from the last two population and housing Census in Portugal, 2001 and 2011 (INE, 2001, 2011, see Table 1) helps to trace this evolution in Portugal's housing stock. The increase in the number of dwellings in the country after 1974, by decade, was always greater than 20% (Matos, 2012) representing the massive investment in new housing. And even though the rates eased over time, this increase was never really accompanied by the total number of inhabitants. As Table 1 shows, the housing stock continued to grow significantly between 2001 and 2011 (an increase in 12.2% of buildings intended for housing and in 16.2% of dwellings), whereas the Portuguese population in that period only increased 1.0%. Moreover, 91% of these new inhabitants have come, not from births, but from migration, and the elderly population has increased in almost 20% since 2001 (INE, 2011). Overall, the country only increased in about 200.000 inhabitants, but gained 800.000 more dwellings, i.e. there were four new dwellings for each person.

The housing boom was able to replace older construction thus, theoretically, increasing the quality of dwellings. The number of buildings in the country constructed before 1960 has reduced by a third, and about 30% of the housing stock was built in the last two decades (Table 1). Of the Portuguese regions, the Algarve (at the South of Portugal) and the Madeira Island showed the greatest increases in housing stock from 2001 to 2011 (24% and 23% respectively – see Table 2), a growth that can mainly be attributed to the considerable rise in tourism. These are, naturally, the regions also possessing the youngest housing stocks. The lowest increases were observed at the North of Portugal and in the Alentejo region (around 10%). The inland regions as well as the greater metropolitan areas of Lisbon and Porto contain older housing stocks. Yet it is to be noted that the regions around Greater Lisbon and Greater Porto contain younger housing stocks – intense suburban construction in the last decade and good conditions of access to housing credit are the cause.

	2001	%	2011	%	Variation (%) 2001-11
Population	**10356117**	**100.0**	**10562178**	**100.0**	**1.0**
Elderly population (+65)	1693493	16.4	2010064	19.0	18.7
Total number of buildings	**3160043**	**100.0**	**3544389**	**100.0**	**12.2**
Buildings constructed before 1960	955858	30.2	624279	17.6	-34.7
Buildings constructed between 1991 and 2001	606644	19.2	558471	15.8	-7.9
Buildings constructed after 2001	-	-	510005	14.4	-
Derelict buildings (medium to very large repair needs)	584985	18.5	400615	11.3	-31.5
Total number of conventional dwellings	**5046744**	**100.0**	**5866152**	**100.0**	**16.2**
Total number of conventional dwellings of usual residence	3551229	70.4	3991112	68.0	12.4
Ratio 'Conventional dwellings / buildings'	1,59	-	1,66	-	-
Total number of conventional dwellings of usual residence	**3551229**	**100.00**	**3991112**	**100.00**	**12.4**
Overcrowded dwellings	568886	16.1	450729	11.3	-20.8
Dwellings without water supply	54396	1.5	23579	0.6	-56.7
Dwellings without bathtub or shower	223916	6.3	76924	1.9	-65.6
Dwellings without any amenity	3753	0.1	5637	0.1	50.2
Non-conventional family dwellings	27319	0.5	6612	0.1	-75.8

Table 1 –General features of the housing stock in Portugal for 2001 and 2011 Variation 2001 % 2011 % (%) 2001-11 Population 10356117 100.0 10562178 100.0 1.0 - Source: INE, 2001, 2011

	Building increase from 2001 to 2011 (%)	Conventional dwelling increase from 2001 to 2011 (%)	% of buildings constructed since 2001	Year	% of very derelict buildings or with medium to large repair needs	% of overcrowded dwellings	% of dwellings without bathtub or shower
North	9,96	11,64	14,60	2001	21,05	18,56	8,28
				2011	12,12	11,69	2,50
Center	12,06	7,98	13,88	2001	17,57	10,29	7,02
				2011	11,49	7,20	2,13
Lisbon	13,80	16,17	13,46	2001	17,37	16,99	2,21
				2011	10,62	12,91	0,85
Alentejo	9,69	4,50	12,45	2001	16,85	13,72	9,71
				2011	11,00	9,11	2,71
Algarve	23,91	23,98	18,40	2001	15,20	16,65	6,92
				2011	8,81	14,29	2,23
Azores	12,83	16,32	18,16	2001	16,65	21,48	5,67
				2011	7,39	16,11	1,34
Madeira	22,94	28,76	17,73	2001	16,71	29,69	6,80
				2011	12,52	22,52	1,92

Table 2 – Housing stock data, by regions, for 2001 and 2011
Source: INE, 2001, 2011

The number of dwellings per building has also increased from 1.6 in 2001 to 1.7 in 2011. This indicator is larger in the greatest metropolitan areas in the country, Lisbon (3.3), Setúbal (just South of Lisbon; 2.5) and Porto (2.3), whilst the remaining regions have primarily single family homes (averages ranging from 1.1 to 1.3 dwellings per building) (INE, 2011). The Azores display the lowest figures (around 1.1).

With the renewal of the housing stock, the comfort and the state of conservation of buildings/dwellings has also improved, both at a national and a regional scale. The percentage of derelict buildings having medium

to large repair needs has decreased in the order of -30% nationwide from 2001 to 2011 (Table 1). Over two thirds of buildings in the country were deemed in good state of conservation and hence do not need repairs. Madeira Island has the highest percentage of derelict buildings with medium to large repair needs (12.5%) and the Azores the lowest (7.4%) (Table 2). The most significant improvement was witnessed precisely in the Azores, with the percentage decreasing from 16.7% in 2001 to 7.4% in 2011, and in the North region, with values decreasing from 21.1% to 12.1% in the same ten year period. The percentages related to dwelling problems have also decreased from 2001 to 2011. The number of overcrowded dwellings has decreased to 11% nationwide (Table 1), with the archipelagos of Madeira and Azores displaying the highest percentages (23% and 16% respectively – see Table 2). This value has also decreased to below 10% in 2011 for the Center and Alentejo regions. The fact that the size of households is dropping dramatically in Portugal may also contribute to reduce the problem of overcrowded dwellings.

Non-conventional family dwellings, namely tents, rudimentary wooden homes, mobile homes, improvised buildings or others also decreased considerably (-76%) since 2001. This success is partly attributed to the Special Rehousing Program, introduced in 1993 (Decree-law 163/93, of 7th May, amended by Decree-law 271/2003, of 28th October). This decree's major goal was to eradicate non-conventional housing mainly from the two largest metropolitan areas of Lisbon and Porto. It allowed local authorities and other agents to use government funds for building social housing in order to rehouse those families that were living in precarious accommodations. Significant reductions were also achieved in the number of dwellings without basic amenities as piped water supply or shower facilities (reductions of around 60% - Table 1). As of 2011, no region in Portugal displayed a number of dwellings without bathtub or shower above 3% (see Table 2). However, the number of dwellings of usual residence without any amenity constitutes the only national indicator which has increased between 2001 and 2011. This may signify that derelict dwellings that were previously unoccupied/abandoned have become occupied in the last ten years, causing further social and health problems. Further strain is also caused by the fact that 60% of the elderly population is living either alone or in exclusive company of other elderly people (an increase of 28% since 2001), often in unsuitable conditions.

4 SPATIAL DIMENSION OF HOUSING PROBLEMS – MUNICIPAL LEVEL

When looking at national statistics, there is no question that housing conditions have, overall, significantly improved in the last decade, both as a result of public and private initiatives. If this has been heralded as a significant achievement, it stems nonetheless, as Ferrão (2014) points out, from an a-territorial perspective of analysis that can be concealing the actual magnitude of existing problems and the location of many specific problematic areas. Actually, as discussed in the previous section, several authors (Guerra, 2011, Matos, 2012, Whitehead et al., 2014) have shown evidence of smaller scale housing problems in Portugal that elude, to some extent, the national/regional overview. At this scale, it can be established that some regions are obviously more problematic than others, but even regions which overall have displayed positive improvements from 2001 to 2011 may still contain areas at risk. Therefore, such a wide and vague glance may not suffice at a time when the debate and proposal of place-specific territorial policies is on the political agenda, not only of Portugal, but of the European Union.

Consequently, two additional levels have been added to this analysis: the municipal and the borough level (next section). Through the analysis of the national and the regional level (previous section), a decision was made to select three main representative indicators of housing problems in Portugal; (i) the state of decay of buildings (derelict or requiring medium to large repairs), that represent over one tenth of the total housing stock in the country; (ii) dwelling overcrowding, occurring in one in every ten dwellings; and (iii) dwellings lacking bathtub or shower, whose number dropped by more than half from 2001 to 2011 but still represents one of the most problematic issues concerning housing salubrity conditions (see Table 1). Each of these problems was mapped at the municipal level for the years of 2001 and 2011 (Figures 1 to 3). The percentage values obtained consider each municipality as a separate entity; for example, the percentage of derelict buildings is obtained by dividing the number of derelict buildings in a given municipality by the total number of buildings in that municipality. The figures illustrate first the overall major improvements in housing conditions that Portugal witnessed from 2001 to 2011, but second they confirm how misguiding a national/regional analysis can be, as many problems still persist in vulnerable localities.

Figure 1 represents the number of derelict buildings, by municipality, in 2001 and 2011. The images illustrate well how the national average has significantly decreased in the ten year period, with the dilution

of many hotspot areas, but also point out to how this phenomenon is clearly territorialized, thus constituting an important source of information for national public policies concerning the rehabilitation of the built environment. Derelict buildings are still a problem especially in urban areas of the Center and Northern regions of Portugal that, with the exception of Madeira, also appeared as the most problematic areas in the national/regional analysis (Tables 1 and 2). The southern region of Alentejo, on the other hand, has had a significant improvement at municipal level from 2001 to 2011, although such improvement is less perceptible at regional level. As it can be seen on Figure 1, the Alentejo municipalities closer to Spain have had a decrease of 10 percentage points, or more, in the ten year period, whereas those closer to the Atlantic Ocean have had a much smaller decrease of the problem.

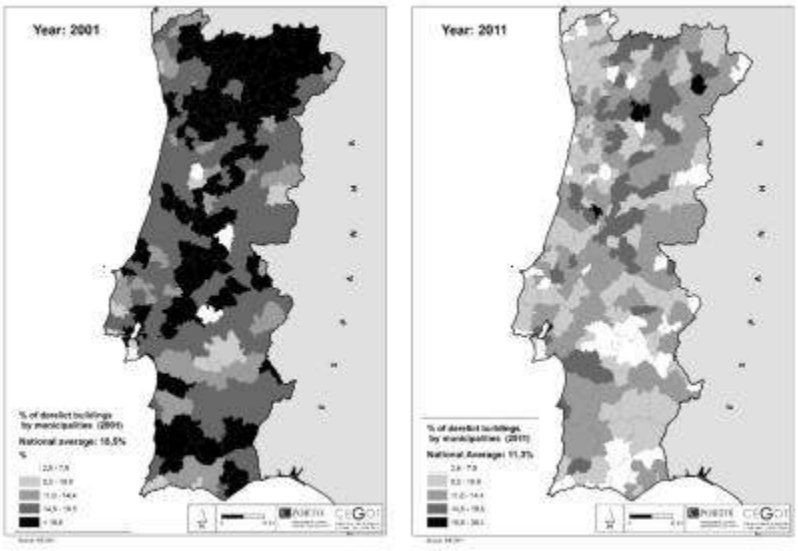

Figure 1 -Derelict buildings by municipality, in 2001 and 2011 (data source: INE, 2001, 2011)

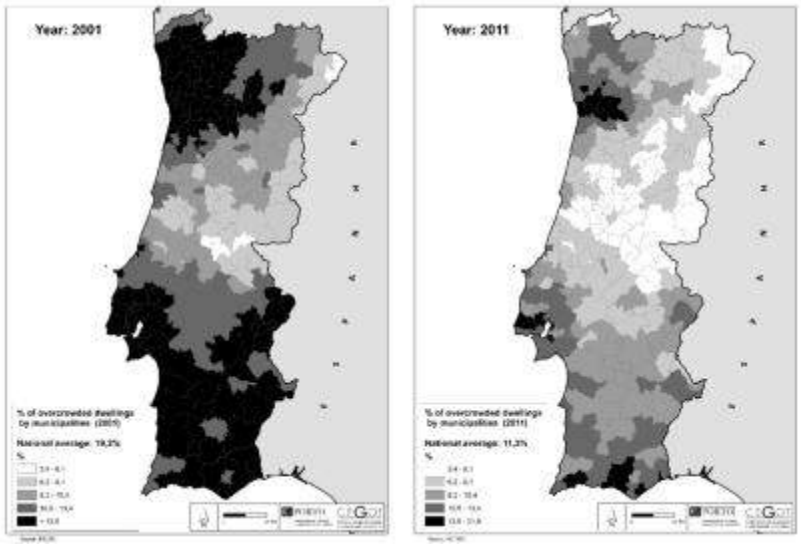

Figure 2 -Overcrowded dwellings by municipality, in 2001 and 2011 (data source: INE, 2001, 2011)

Dwelling overcrowding (Figure 2) is another problem that has seen a relevant reduction at municipal level from 2001 to 2011. In 2001 (Figure 2, left) problematic areas are unequivocally identified as being the northwest region of Portugal, the metropolitan area of Lisbon, and the greater extent of the south of the country. In 2011, this problem has been significantly reduced to specific areas, notably the extended outer rim of the metropolitan areas of Lisbon (municipalities of Sintra, Amadora, Odivelas and Loures) and East of Porto (Cinfães, Marco de Canavezes), as well as some municipalities in the southern Algarve and Alentejo regions (Figure 2, right). Identified problems in the areas around Porto, Lisbon and the Algarve somewhat coincide with those found in the regional analysis, albeit with less definition, but again, the evidence of problematic hotspots in the Alentejo region is exclusive of the municipal analysis.

Comparatively, the municipalities of the interior and the centre of the country have very few overcrowded dwellings, particularly in 2011.

Finally, Figure 3 displays the number of dwellings lacking bath or shower, by municipality, in 2001 and 2011. If in 2001 most of the country, with the exception of the Lisbon metropolitan area and other by-the-sea municipalities, had comparatively medium to high problems of this nature, in 2011 they have mainly remained inland. Whereas most municipalities of the West of the country have practically solved this problem, hotspots still remain in some municipalities in the north (Baião, Cinfães, Resende) and in municipalities closer to the Spanish border, something which was not really perceived through the regional analysis. However, both the municipal and the regional analysis coincide in revealing that the borderline between the Algarve and Alentejo is the most problematic area in the country regarding dwellings lacking bath or shower.

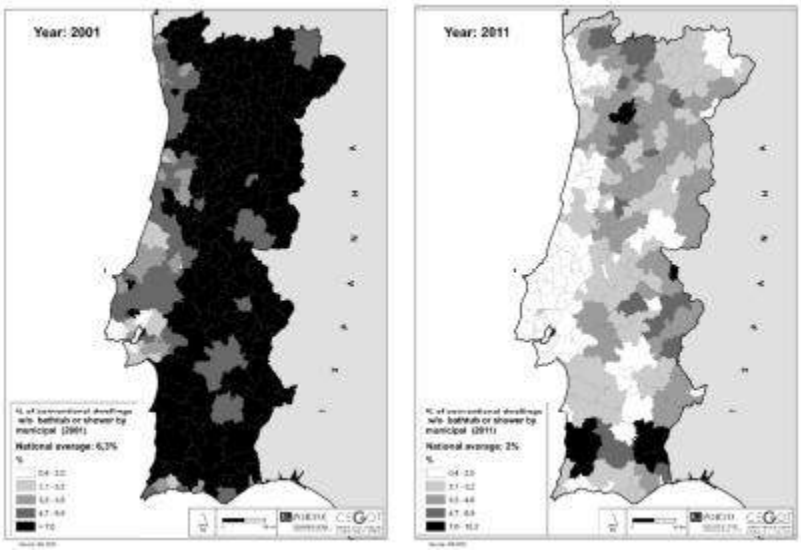

Figure 3 – Dwellings lacking bath or shower by municipality, in 2001 and 2011 (data source: INE, 2001, 2011)

5 ZOOMING IN ON HOUSING PROBLEMS – BOROUGH LEVEL

The fourth, and last, scale of analysis selected in this research was the borough level. As in the previous section, color maps were produced representing the geographical distribution, at this scale, of the same three variables: derelict buildings, dwelling overcrowding, and dwellings lacking bathtub or shower, both for 2001 and 2011 (Figures 4 to 6).

As seen above, new housing stock does not necessarily mean that the problem of building deterioration is solved, because of the poor construction quality of the last thirty years and the lack of funds from public and private quarters to carry out maintenance. Even so, obviously, physical deterioration affects older buildings the most and, therefore, the most problematic areas identified were those in traditional areas of older construction, i.e. historical centers, particularly of Lisbon and Porto, and many other urban centers in the country both in the Ccenter and interior northern regions (Figure 4). In this case, this is, overall, very similar to the outcomes of both the regional and municipal analysis.

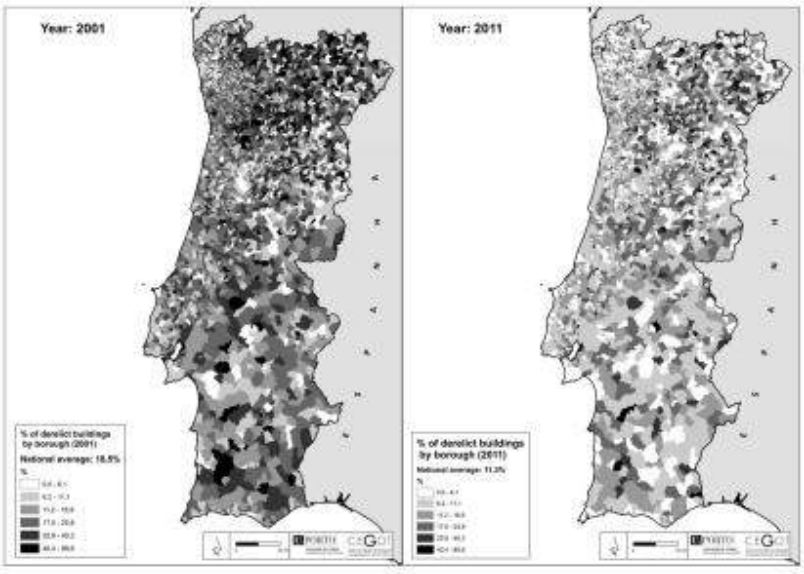

Figure 4 – Derelict buildings by borough, in 2001 and 2011 (data source: INE, 2001, 2011)

Overcrowded dwellings (Figure 5) have seen considerable reductions since 2001 in the littoral north, Lisbon and southern regions of Portugal. Nonetheless, there are still some severe hotspots, primarily located in densely populated areas, where inhabitants possess low school qualifications and scarce economic resources, namely in the north and in the Archipelagos of Madeira and Azores. Although the identified problems in the areas around Porto, Lisbon and the Algarve coincide, generally, with those found in the municipal and regional analysis, a closer attention should be given to the northern region. In the regional analysis, this region displays a percentage of overcrowded dwellings inferior to that of Lisbon and the Algarve, and the municipal analysis (Figure 2) shows three concentrated hotspots corresponding to each of these regions. Only in the borough analysis (Figure 5) it can be seen that the extent of the problems covers a much larger geographical area in the north.

Lastly, Figure 6 shows how the number of dwellings lacking bath or shower has had a significant improvement at the borough level from 2001 to 2011, particularly in the interior and the north of the country. At this level the worse situations are still found in the rural areas in the north, the inland centre and especially in the mountainous regions of Algarve, at the south of the country. This is in line with the regional and the municipal analysis that, overall, revealed the most problematic area to be between Alentejo and Algarve.

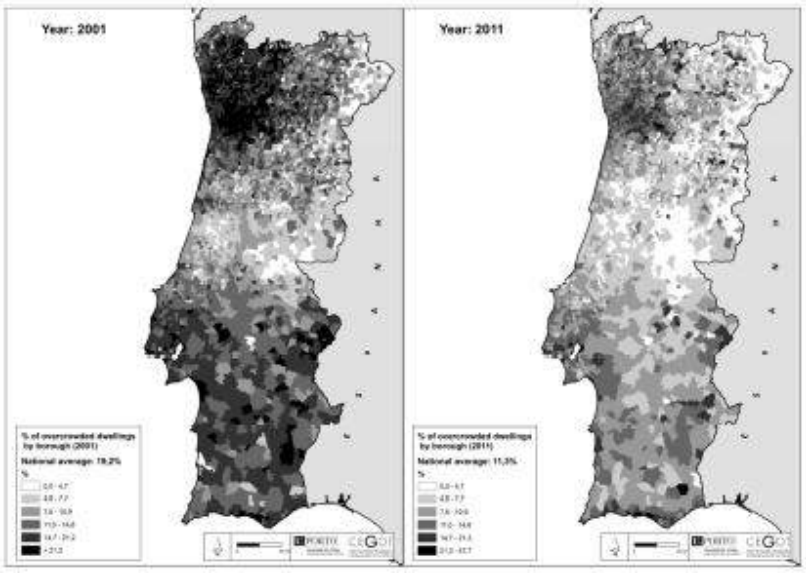

Figure 5 – Overcrowded dwellings by borough, in 2001 and 2011 (data source: INE, 2001, 2011)

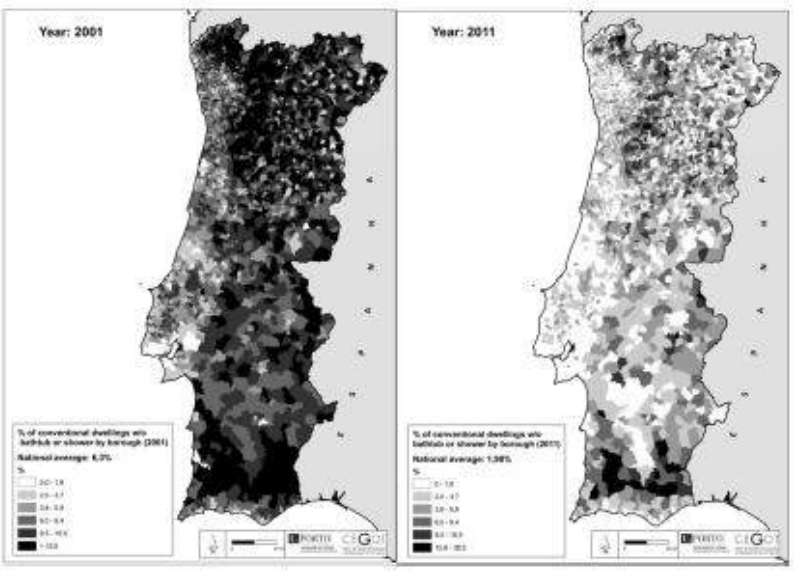

Figure 6 – Dwellings lacking bath or shower by borough, in 2001 and 2011 (data source: INE, 2001, 2011)

6 STATISTICAL COMPARISON OF THE FOUR SCALES OF ANALYSIS

In the previous sections it has been discussed that there are some perceptible differences between the problematic areas identified at different territorial scales. To further understand if these differences between scales are, statistically speaking, significant, parametric hypothesis tests were applied to the universe of the

4.241 (in 2001) and 4.260 (in 2011) boroughs of Portugal. Considering the three variables that have been analyzed in greater detail in the previous sections (% of derelict buildings; % of overcrowded dwellings; % of homes lacking bath or shower), each borough was characterized by four different values; i) the respective value at borough level (Figures 4 to 6); ii) the value of the municipality in which the borough is in (Figures 1 to 3); iii) the value of the region the borough is in (Table 2), and iv) the value for the country (Table 1). This last value is, obviously, the same for all boroughs.

In this way, 24 values were attributed to each borough: four for each scale, for each of the three variables, for each of the two years in analysis (2001 and 2011). Consequently, parametric tests for related samples were used to identify differences of means between scales. T-test for dependent samples were used for the comparison of two scales, and repeated measures ANOVA tests were used for comparisons between more than two scales. The confidence level used was 95%, therefore for p-values above 0.05 we could accept the null hypothesis (H0), i.e. that there are no significant differences between scales of analysis. The tests were applied at national level and by regions. P-value results are displayed in Table 3.

Looking at the universe of around 4.260 boroughs in Portugal it can be seen that there is indeed a significant difference between the four scales of analysis for each of the three variables and in both years (p-value = 0.000). Looking at every two different scales in turn, the same conclusion can be drawn, and the p-value is always rounded to 0.000 with the exception of the comparison between the municipal and the borough scale for the variable '% of overcrowded dwellings' in 2011 (p-value = 0.038, see Table 3). This means that, considering a higher level of confidence (e.g. 97%) the null hypothesis would be rejected and thus it could be argued that no significant differences between these two scales actually existed when reading this variable. Basically, this would mean that the analysis of hotspots and the definition of specific territorial policies could be addressed, in this case, at municipal level, instead of the borough level.

Because the results for the entire universe of boroughs in the country were more than likely to reveal significant differences between all scales and across all variables, as it was the case, the tests were repeated for each region in turn. In this case, for each borough, the value for the country and for the region is the same and hence no National-Regional analysis can be performed.

The analysis by regions shows perceptible differences across variables and across regions. Comparing the four scales of analysis simultaneously, the archipelagos of Portugal (Madeira and Azores) are the only ones that show no significant differences between scales of analysis, namely when the variable '% of derelict buildings' is considered. In Azores this happened only in 2001 (hence the scales now display, overall, different values), yet in Madeira this happens for both years. This lack of difference between scales for these regions and this variable is completely confirmed by the t-tests for each pair, with a few exceptions (e.g. a rejected test for the National-Municipal comparison in the Azores in 2001).

Test	Repeated measures ANOVA		t-test for dependent samples											
Scale	All scales		National-Regional		National-Municipal		National-Borough		Regional-Municipal		Regional-Borough		Municipal-Borough	
Census Year	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Nationwide														
Derelict buildings	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Overcrowded dwellings	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,038
Dwellings lacking bath or shower	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
By regions														
Alentejo														
Derelict buildings	0,001	0,016			0,000	0,128*	0,589*	0,059*	0,476*	0,446*	0,008	0,010	0,009	0,013
Overcrowded dwellings	0,000	0,000			0,000	0,000	0,000	0,000	0,297*	0,007	0,072*	0,111*	0,005	1,000*
Dwellings lacking bath or shower	0,000	0,000			0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Algarve														
Derelict buildings	0,002	0,001			0,000	0,000	0,117*	0,068*	0,799*	0,736*	0,109*	0,115*	0,111*	0,111*
Overcrowded dwellings	0,025	0,000			0,429*	0,000	0,158*	0,037	0,005	0,002	0,009	0,000	0,313*	0,051*
Dwellings lacking bath or shower	0,000	0,000			0,000	0,000	0,000	0,000	0,002	0,001	0,000	0,000	0,006	0,001
Center														
Derelict buildings	0,003	0,000			0,000	0,000	0,822*	0,000	0,003	0,000	0,006	0,000	0,070*	0,007
Overcrowded dwellings	0,000	0,000			0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,262*	0,847*
Dwellings lacking bath or shower	0,000	0,000			0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Lisbon														
Derelict buildings	0,000	0,000			0,003	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,003	0,007
Overcrowded dwellings	0,001	0,000			0,000	0,000	0,000	0,000	0,322*	0,021	0,535*	0,417*	0,211*	0,694*
Dwellings lacking bath or shower	0,000	0,000			0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
North														
Derelict buildings	0,000	0,000			0,000	0,000	0,000	0,000	0,006	0,004	0,000	0,000	0,002	0,000
Overcrowded dwellings	0,000	0,000			0,000	0,000	0,000	0,000	0,000	0,004	0,000	0,000	0,000	0,001
Dwellings lacking bath or shower	0,000	0,000			0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Madeira														
Derelict buildings	0,263*	0,234*			0,046	0,872*	0,524*	0,989*	0,779*	0,042	0,483*	0,185*	0,504*	0,900*
Overcrowded dwellings	0,000	0,000			0,000	0,000	0,000	0,000	0,002	0,000	0,002	0,000	0,649*	0,238*
Dwellings lacking bath or shower	0,000	0,010			0,000	0,010	0,000	0,017	0,000	0,003	0,001	0,009	0,282*	0,189*
Azores														
Derelict buildings	0,107*	0,000			0,020	0,000	0,727*	0,000	0,062*	0,027	0,139*	0,026	0,455*	0,233*
Overcrowded dwellings	0,000	0,000			0,000	0,000	0,000	0,000	0,473*	0,032	0,718*	0,108*	0,255*	0,988*
Dwellings lacking bath or shower	0,008	0,000			0,085*	0,000	0,194*	0,001	0,082*	0,683*	0,003	0,015	0,013	0,010

*p-value greater than the significance value, i.e. H_0 accepted

Table 3 – P-value results of the parametric hypothesis tests for 2001 and 2011

Actually, it is precisely this variable, '% of derelict buildings', that presents less significant differences across territorial scales, particularly in the Islands and in the southern regions of Alentejo and Algarve. In Alentejo the similarities occur between the National-Borough and Regional-Municipal scales, whereas in the other three regions they are mostly transversal between all pair comparisons in both years, with the exception of the National-Municipal comparison. The Lisbon and northern regions always present significant differences between scales for this variable in both years, and the same occurs in the Centre region, for 2011. The variable '% of overcrowded dwellings' follows a similar, yet less perceptible, tendency, displaying less differences between some scale comparisons in the Azores, Alentejo, the Algarve and, notoriously, Lisbon, where no significant differences are found between the regional, the municipal and the borough scale.

On the opposite side, the variable 'Dwellings lacking bath or shower' always reveals that the values are significantly different between any two scales, with the exception, again, of the Islands, yet mostly for 2001. In fact, this is a common tendency of the analysis. With the exception of the Municipal-Borough comparison, where the values for 2001 and 2011 are mostly similar, in the other pair comparisons, in most places where no significant differences were found for 2001, they occurred in 2011. This happens, for example, in the analysis of the '% of derelict building' both for the Center and the Azores, of the '% of overcrowded dwellings' for the Algarve, or of the '% of dwellings lacking bath or shower' for the Azores, at various scales. The opposite hardly occurs in the analysis; e.g. the readings for the National-Municipal

comparison of the '% of derelict buildings' in Alentejo and Madeira. This is a significant find as it reinforces the idea that territorial policies for the Horizon2020 period need to be devised at a more focused scale than before, to take into account the significant differences between spatial readings that have appeared from 2001 to 2011.

This should be particularly more pressing at municipal level. Indeed, it is highly perceptible that the Municipal-Borough scale is the one presenting the less amount of differences, particularly in the variable '% of overcrowded dwelling', whose test was accepted for every region except the North, and '% of derelict buildings' in Algarve, Madeira and Azores. It is noticeable how in Madeira there are no differences between the reading of these two scales for every variable and both years. When planning by regions, the municipal scale should then be considered enough to address the specificities of the territory.

As seen before, National-Borough, National-Municipal and Regional-Municipal similarities are scarcer, occurring mostly for the variable '% of derelict buildings' in Alentejo, Algarve and the Islands. Furthermore, every region except the North and the Center display some particular instance where there are no significant differences between the values measured either at the borough or municipal scale and the regional scale. The North region, however, is the only one which always displays asymmetries between scales, and hence should be the one subject to a more careful regional and local planning agenda concerning housing problems.

7 DISCUSSION AND CONCLUSIONS

This paper intended to answer the question of whether scale-of-analysis mattered when evaluating housing conditions and consequently when designing public policies intent on reducing housing problems and vulnerabilities. According to Battaglini and Annunziata (2014) territorial policies "have to be place-based, site specific and embedded into the territorial complexity that is changeable and evolves over-time". This is even more pressing in a post-crisis scenario, where profound socio-economic changes have occurred which have affected the housing market and housing conditions (Guerra, 2011), particularly because these changes can be different across spatial scales (Cassiers and Kesteloot, 2012, Donald et al., 2014). As there are evident territorial disparities between countries but also between regions within the same country, many authors have urged for better tailored regulations and policies (Donald et al., 2014, Matos, 2012, Whitehead et al., 2014). However, planning practices have not yet systematically taken into account multi-scalar territorial perspectives, or rather, studies have focused either on wider, national scales (e.g. Nuuter et al., 2015), considering countries as points-on-a-map (Ferrão, 2014) or have been more place specific in evaluating housing conditions, focusing on local scales (e.g. Carmo et al., 2015, Murphy and Scott, 2014, Pendall et al., 2012). By not considering that places may have several geographies at different scales, the 'scale matters' debate, so prominent in other fields, has mostly been absent from studies on housing problems, and hence this research presents an original first step towards that debate.

The same three variables (% of derelict buildings; % of overcrowded dwellings and % of homes lacking bath or shower) were calculated at national level, by regions, by municipalities and by boroughs, and the value of the four scales has been associated to each borough for comparison. Geographical disparities in all indicators have been found, and several local hotspots at municipal and borough level have been highlighted that eluded national and regional views. In the last section, through statistical comparison, it was possible to prove that different regions require different territorial approaches to policy design, depending on the problem to address.

The variable '% of derelict buildings', for example, displays little significant differences across territorial scales in several regions of Portugal, implying that it could be well catered at a higher territorial level. On the contrary, the variable '% dwellings lacking bath or shower' displays significant differences across most territorial scales, meaning that the smaller the scale when addressing this problem the better, as its geographical dispersion is very precise. However, the municipal scale may be enough when evaluating these problems, as many similarities, across all variables, were found between the municipal and the borough scale. In the smaller insular regions of Portugal; the Madeira and Azores islands located in the Atlantic Ocean, as well as in the Algarve, this phenomena is always most prominent. The North region, on the other hand, displays the greatest differences between scales. It could be argued that these differences are also dependent on the way regions are structured, but there appears to be a sufficiently identifiable

pattern on this analysis of indicators and scales to support the proposed construct. Further comparative studies, with a greater amount of variables, should be pursued to further prove this point, but the fact remains that the scale of analysis may indeed be a determining factor on the design of effective territorial-based housing policies. This is more relevant when it is determined that from 2001 to 2011 similarities between higher and lower order scales of analysis have dissipated, thus corroborating the urges of Battaglini and Annunziata (2014) and of the 'The State of Housing in the EU 2015 Report' (Pittini et al., 2015) for more local, place specific approaches in the Horizon2020 period.

More than two decades ago Rémy and Voyé (1992) argued that dwellings had increasingly become the space of identification for the family, and the basis for the organization of everyday life. To have proper home is a freedom right (King, 2003), and citizens have transformed their homes into an extension of themselves and their existence, and this is truer in the countries of Southern Europe where a culture of home ownership and a home-for-life exists. In the last decades, with the aid of European Structural Funds and through rehabilitation and social housing programs, Portugal has significantly improved its housing conditions, but the numbers can be deceiving. First because a downturn, spurred by the economic crisis, the shortage of public and private resources and the reduction of credit from banking institutions, has led to a decline of the purchasing power of families, causing indebtment and insolvency, and to a cut in social housing benefits, something which may force vulnerable groups into poor quality accommodation or even homelessness. And second because the data may be read at the improper scale, concealing the actual magnitude of housing problems by neglecting specific local hotspots.

Therefore, after nearly thirty years of public policies promoting real estate investment, they now need to address issues of building rehabilitation, comfort and overall housing quality to overcome social-spatial inequalities in terms of housing conditions and access to housing, as preconized by European guidelines. To do so, it should be considered that the territory plays a central role in the integration of public policies for housing, and that scale does matter. At the same time, however, it would be a highly unfruitful waste of resources to develop specific strategies for every borough or every municipality and, true enough, in some cases the differences in readings between these scales and higher order ones are inexistent. It thus appears crucial, at this point, first to recognize that multi-scaler territorial approaches are needed to evaluate to what extent policy design should take into account the specificities of countries and regions; but second that policies should be flexible, avoiding unrealistic one-size-fits-all solutions in order to adapt to the size and characteristics, not only of the territorial scales they are focusing on, but of the specific problems themselves. To think policies at different scales and from different perspectives is a complex process, not common in planning practices, but it is one we should build towards, in order to produce a proper territorialized housing policy, responding to the European common goals but at the same time adequate to the different realities of our countries and regions.

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