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Mapping Airbnb supply in European cities

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Airbnb is the largest peer-to-peer platform offering tourist accommodation in private homes. Tourism scholars are increasingly interested in its influence on the tourism industry, tourist behaviour, destinations and urban housing (Dolnicar, 2017; Dredge & Guimóthy, 2017; Guttentag, 2015). Several studies have used spatial analysis to determine the local impacts of peer-to-peer accommodation by examining the distribution of Airbnb supply and demand in urban areas (Gunter & Önder, 2017; Gutiérrez, García- Palomares, Romanillos, & Salas-Olmedo, 2017; Quattrone, Proserpio, Quercia, Capra, & Musolesi, 2016). There are also sparse and selective comparative studies between large cities (Coyle & Yeung, 2017) and between countries (Abdar & Yen, 2017). However, no study to date has comprehensively analysed the distribution and characteristics of Airbnb activity at the European level. Moreover, none have examined middle-sized cities apart from large metropolises. This research note attempts to fill these two gaps by providing a generic spatial description of Airbnb supply across European cities.

Airbnb does not publish statistics on properties available for rent in individual cities. Yet, such information can be gathered from the webpage using web-scrapping techniques. The most advanced system of tracking Airbnb offers and bookings is run by the AirDNA company (AirDNA, 2017). As the only service of this kind, they gather data not only about major cities, but also smaller destinations around the world. This study uses basic data on "Airbnb markets" (cities) acquired from the AirDNA webpage in early December 2017. The study covers European countries according to the UNWTO regionalisation, excluding Siberia and Central Asian states. Three maps present data for 432 cities with at least 100 thousand inhabitants. Data for a further 336 cities of this size (mostly located in Eastern Europe) were unavailable. Generally the units of analysis are cities in municipal borders. Yet, if AirDNA data is only available for larger urban regions (e.g. for some German districts rather than cities), or numerous Airbnb listings are offered in many municipalities of one agglomeration (e.g. in French metropolitan areas), entire urban regions serve as units of analysis. Three successive maps present the following characteristics of Airbnb supply: (1) the number of listings (active rentals) and their number per 1000 inhabitants; (2) relative importance of Airbnb for tourism in a city calculated as the ratio of the number of bed-places in Airbnb offers to the estimated capacity of hotels; and (3) three measures of the level of professionalisation of Airbnb hosts: the percentage of entire properties,

the share of properties owned by users who host more than one property, and the share of properties available for rent for more than six months during a year.

There are 737 thousand active Airbnb rentals in all cities in the analysis. The two largest markets are Paris and London, followed by other European metropolises (Table 1 and Fig. 1). To estimate the relative intensity of Airbnb activity in cities, the numbers of listings in relation to the population (according to latest available data of national statistical offices) were calculated. In the largest Airbnb markets, this value varies between 0.9 and 17.6. The higher values of the ratio are observed in coastal resorts of southern Europe (Batumi, Split, Marbella) and historic tourism destinations (Venice, Florence, Edinburgh). If towns below 100 thousand inhabitants were included in the analysis, then several coastal and mountain resorts would attain even higher values (e.g. 95 in Dubrovnik, over 200 in Chamonix-Mont-Blanc).

The second map (Fig. 2) presents the role that Airbnb plays in providing tourist accommodation in cities. It shows the capacity of Airbnb listings compared to the estimated capacity of hotels. There are no internationally comparable official statistics about hotels on the city level. Hence, the numbers of hotels were derived from the TripAdvisor webpage. TripAdvisor aggregates information on hotel offers from several online travel agents, and its search engine identifies hotels in administrative borders of cities, making the results comparable with AirDNA data. Estimated hotel capacity for each city is a product of the number of hotels listed on TripAdvisor and the higher of the two average hotel size indicators: for a proper NUTS-2 region and for all urban areas in a country, based on Eurostat data. For countries not covered by Eurostat data, the average hotel size for all other countries was used. In all the cities collectively, the number of bed-places in Airbnb listings (3.0 million) was more than half that of the capacity of hotels (5.2 million beds). In many cities, particularly in Southern Europe, Airbnb properties could house more tourists than all hotels. It should be noted that this comparison only represents the maximum capacity, not the number of tourists using it. Airbnb bed-places are surely less intensively utilised than hotels.

The final map (Fig. 3) illustrates how the structure of Airbnb supply differs across cities. The colours of the circles present the comparison of values of three variables to their median values for all cities. Red and yellow circles indicate a higher than median share of entire properties (against rooms and shared rooms). Red and violet represent a higher than median share of multiple properties (owned by users that host more than one property). Darker colours mark cities with higher than median share of year- round offers (properties available for rent for more

than six months during a year). All three measures indicate the level of professionalisation of Airbnb activity. Low values correspond with higher importance of the sharing-oriented model. High values indicate that Airbnb serves rather as an intermediary in profit-oriented rental. Central and Eastern European, as well as many Mediterranean cities, have more professionalised Airbnb supply, whereas in German cities, it is closest to the sharing economy model. In most countries a combination of these patterns exists. In France, the Netherlands and Nordic countries entire, but individually owned properties predominate. In the largest Mediterranean cities and Britain, rental of individual rooms is relatively popular, but multiple properties predominate. In Eastern Europe, Turkey and Israel, professional, but seasonal renting is most common.

Three basic conclusions can be drawn from the analysis and each of them presents new questions that need to be addressed in further research. First, the number of Airbnb offers is positively related to the size of the city and its importance as a leisure tourism destination. This is in accordance with previous research which indicated that Airbnb serves for leisure, but rarely business travel (Young, Corsun, & Xie, 2017). Further investigations on actual travel behaviour of tourists will demonstrate whether peer-to-peer accommodation platforms lead to the expansion of geographic scope or tourist activity (as Tussyadiah and Pesonen (2016) conclude from the users' declarations) or rather to the increasing concentration of tourism in popular destinations (as Gutiérrez et al. (2017) revealed on the city scale of Barcelona).

Second, the structure of Airbnb supply varies across cities. In relatively non-touristic cities, it mostly consists of rooms rented by residents in private homes. Yet, in major tourist destinations, particularly in coastal and historic cities of the Mediterranean countries, Airbnb offers more second homes and apartments exclusively used for touristic purposes. Hence the platform not only creates a new form of accommodation, but also enables the commercialisation of the use of private second homes and serves as a new distribution channel for existing commercial accommodation. Studies on the impacts of Airbnb on the hospitality industry, apart from recognising the diverse effects on various accommodation businesses (Koh & King, 2017), should also acknowledge the importance of the local composition of Airbnb stock. A promising research avenue is the extension of the use of second homes. Studies should target the areas that recently experienced intensive property developments induced by the demand on second homes and property speculation. In such cases a question should be asked whether the expansion of peer-to-peer platforms promotes further construction or rather enhances more efficient use of existing housing stock.

Third, there are differences in the size and characteristics of Airbnb supply between cities and countries that cannot be attributed to the differences in the sizes of cities and their positions in the hierarchy of tourism destinations. For example, Airbnb plays a particularly important role in countries with fast growing inbound tourism numbers: Iceland, Georgia, and Israel. It supports the claim that Airbnb rentals fill the gap created by underdeveloped tourism infrastructure (Knezevic Cvelbar & Dolnicar, 2017). Relatively low proportions of entire properties and year-round offers in several large cities may prove the efficiency of regulations employed there to avoid negative effects of gentrification and overcrowding (Hajibaba & Dolnicar, 2017). High professionalisation of Airbnb activity in Eastern and Southern European countries can signify that the rent gap between relatively low long-term rental prices shaped by the domestic housing demand and high short-term rental prices established on an international platform-mediated market makes it particularly attractive for homeowners to replace tenants with tourists. Other explanation for differences between Airbnb offers in various countries may be the competition of other peer-to-peer accommodation platforms operating on a national scale. It is, thus, necessary to investigate how cities are transformed by the interplay between global activity of peer-to-peer plat- forms, and national and local contexts of housing and tourism markets and regulations.

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Table 1. European cities with the highest numbers of Airbnb listings and the highest numbers of Airbnb listings per 1000 inhabitants

Highest number of Airbnb listings				Highest number of Airbnb listings per 1000 inhabitants			
	City	Number of listings (thous.)	Number of listings per 1000 inh.		City	Number of listings (thous.)	Number of listings per 1000 inh.
1	Paris (Métropole)	56.8	8.0	1	Batumi	6.1	40.1
2	London	55.4	6.3	2	Split	6.1	34.2
3	Rome	25.3	8.8	3	Marbella	4.4	31.1
4	Barcelona (Àrea Metropolitana)	21.6	6.7	4	Venice	7.0	26.7
5	Berlin	16.6	4.7	5	Florence	8.9	23.2
6	Madrid (Área Metropolitana)	14.9	2.7	6	Lisbon	12.4	22.8
7	Aix-Marseille-Provence (Métropole)	14.0	7.5	7	Syracuse	2.7	22.4
8	Copenhagen	13.5	17.6	8	Reykjavík	2.8	22.3
9	Istanbul	12.9	0.9	9	Porto	5.8	19.3
10	Amsterdam	12.5	14.7	10	Nice Côte d'Azur (Métropole)	9.9	18.4

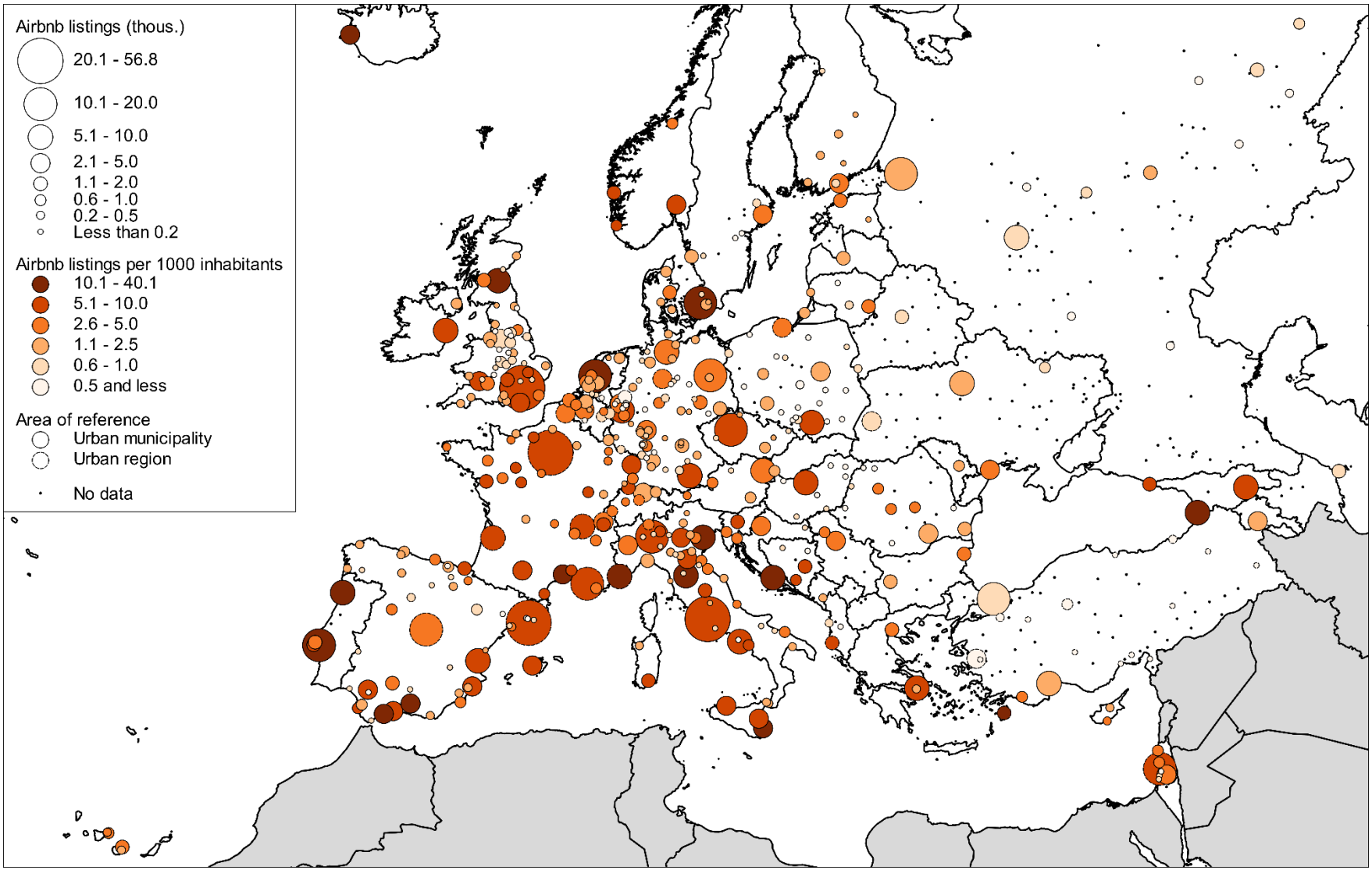

Fig. 1. Number of Airbnb listings and number of Airbnb listings per 1000 inhabitants in European cities

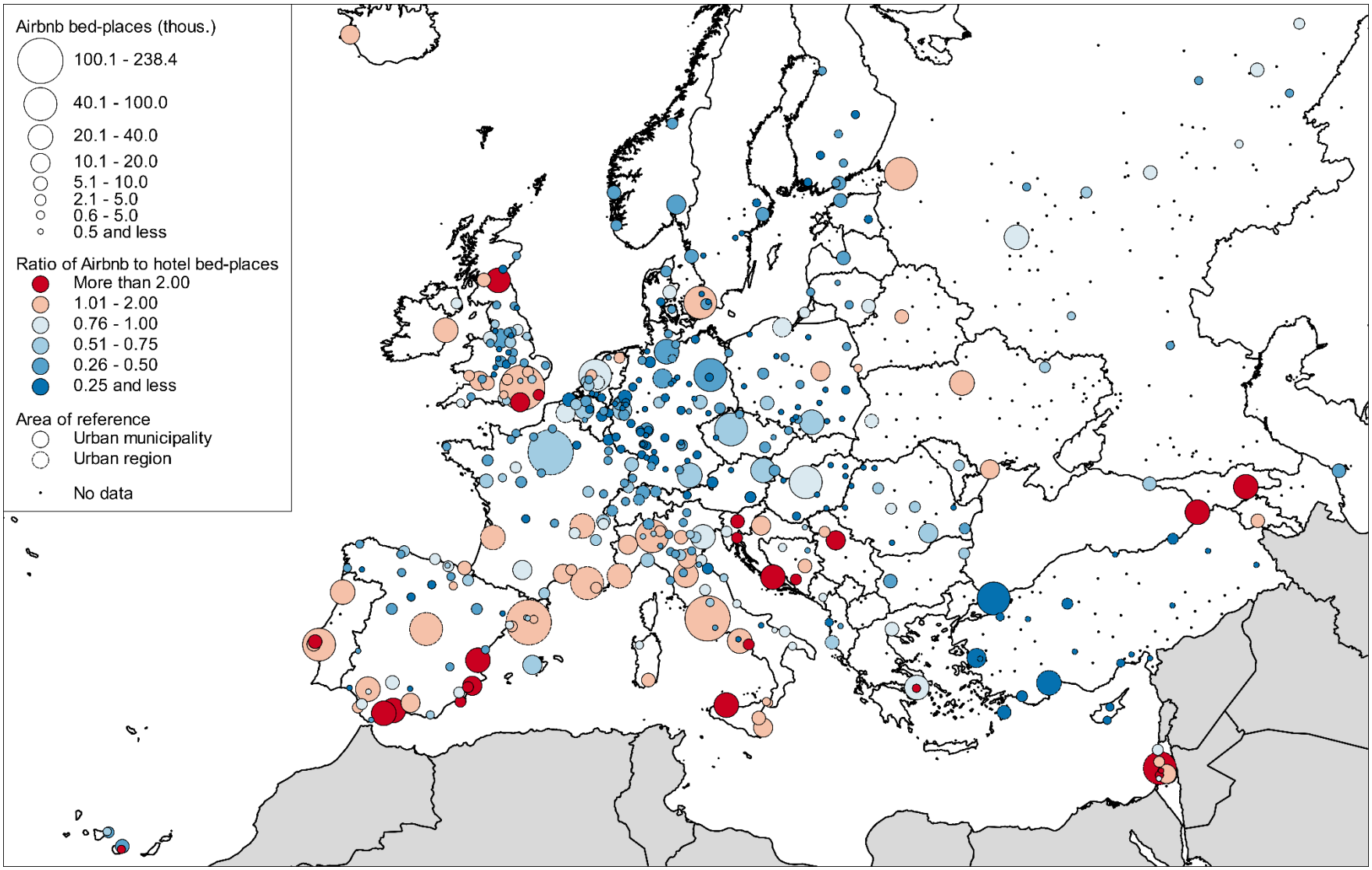

Fig. 2. Estimated number of bed-places in Airbnb listings and ratio of Airbnb to hotel estimated capacity

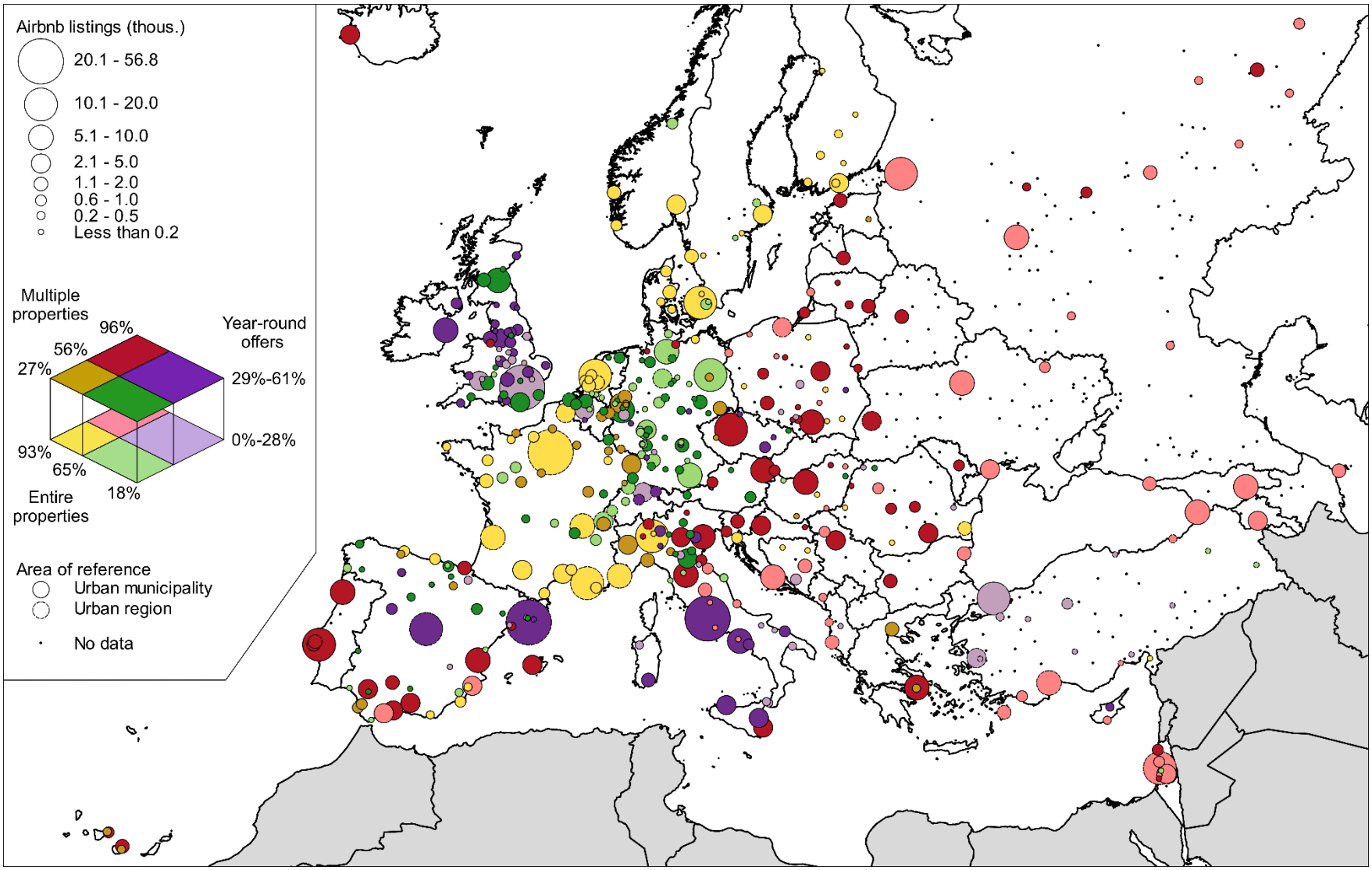

Fig. 3. Professionalization of Airbnb activity