Short-term rentals and housing market: Evidence from Portuguese metropolitan areas

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- Over the last few decades, temporary accommodation services and short-term rental platforms, such as Airbnb, have sparked an intense debate in the media, academia and among political agents.

- It is perceived to increase house prices and displace residents, especially in highly touristic areas.

- However, little is yet known about precise the economic mechanisms through which these effects operate.

- The effects on house prices can potentially act through different channels.
    - The development and revamping of buildings to turn into short-term accommodation services increase the overall attractiveness of the neighbourhood and area where they are located.
    - In addition, as mentioned in Garcia-López et al. (2020), it can also make home-owners shift from long-term to short-term rentals, leading to a reduction in the supply of residential properties.

- Previous literature on this topic can be divided into two branches.
    - Effect of placing restrictions on short-term rentals - reduction in house prices as well as in the supply of Airbnb's (Duso et al., 2021; Koster et al., 2021; Peralta et al., 2020).
    - Impact of the growth of the Airbnb platform - positive effect on house prices and asking rents (Garcia-López et al., 2020; Segú, 2018; Horn and Merante, 2017; Franco and Santos, 2021).

Contribution to the literature

- We rely on the rapid variation of the number of short-term rentals based on a policy change in 2014 and employ a novel dataset consisting of comprehensive Portuguese transaction data from the tax authority.

- We perform a comprehensive set of heterogenous exercises - will help us to better understand which areas and types of properties were more affected by the development of temporary accommodation services.

- Use data from the largest real estate online advertisement platform to examine spillovers to the value of commercial properties.

Institutional context

- Portugal introduced changes to local housing laws in 2014, creating the legal concept of temporary accommodation establishments, named in portuguese *alojamento local*.

- It provided a fully online and streamlined procedure for landlords to register their local accommodations.

- Establishments that opened prior to 2014, had to register in compliance with this new procedure within a 30 day period following the approval of the law.
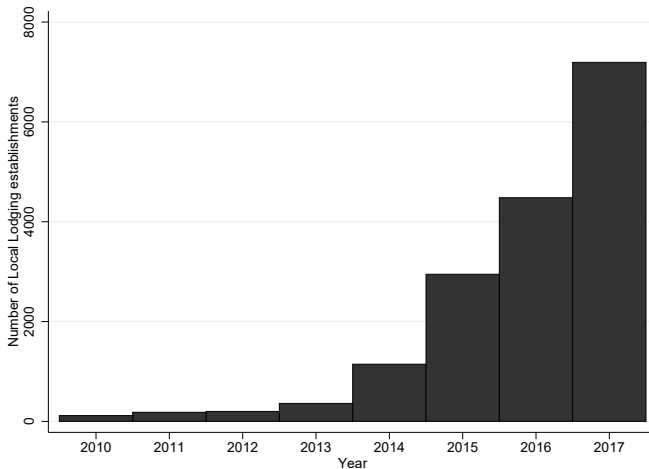
Figure 1. Number of local lodging establishments: 2010-2017

- We construct a novel dataset that combines Portuguese data from four different sources for the period 2010-2017.

- We focus on the metropolitan areas of Lisbon and Porto, the two largest cities in the country.

- Within these metropolitan regions, our geographical unit of analysis are the civil parishes, locally referred to as *freguesia*

Data - Local lodging establishments

- The data for the Local lodging establishments comes from the publicly available National Short-Term Rental Registry (RNAL).

- This dataset provides details on the address, geographical coordinates, date of opening to the public and administrative territorial division to which the establishment belongs.

- Rather than providing a snapshot of a point in time, this dataset gives us the exact moment each short-term rental started to operate.

- For the time period considered, we have a sample of 16,936 establishments, 12,621 in the metropolitan area of Lisbon and 4,315 in the metropolitan area of Porto.
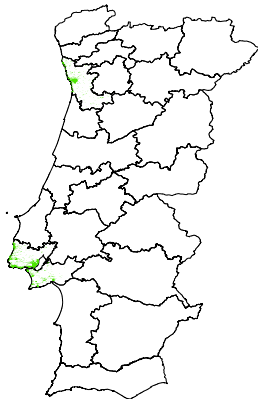
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Figure 2. Geographical location of Local lodging establishments

- Transaction values are obtained through the real estate transfer tax (IMT) records, while the property characteristics were obtained from local property tax (IMI).

- The IMT tax records provide information regarding the date of the transaction, civil parish of the property and the value of the transaction.

- The IMI tax records contain data on property attributes such as number of floors, number of bedrooms, total area, age of the building.

- In addition, the link between these two data sources is accomplished through a unique property identifier.

- We employ a novel dataset from *Imovirtual*, one of the largest online real estate platforms in Portugal, which started to operate in 2011.

- The data provided by the website referrers to listings of commercial properties, containing information on the type of property (store, office and storage unit), asking price, geographical location, approximated coordinates, square footage, operation (rental or sale) and exact date the advertisement of the property became online.

- Our datasets contains information on offices and stores, for rent and sale, for the period 2015-2017.

- The identification strategy follows the vast literature on hedonic models and relies on the variation caused by a policy reform and on various location and time fixed effects.

$$\ln(P_{i,t,f}) = \alpha_0 + \alpha_1 LL_{t,f} + \alpha_2 X_{i,t,f} + \gamma^f + \delta^t + \epsilon_{i,f}$$

- In this model, we view the number of short-term rentals in the nearby area as a contributing attribute to the value of a property.

- Our outcome variable is a sum of the value of the same-day transactions.

Table 1. Baseline model

Variables	Log(prices)	Log(prices)	Log(prices)	Log(prices)	Log(prices)
Number of Local Lodging	0.00176***	0.00172***	0.00173***	0.00173***	0.00148***
	(0.00038)	(0.00036)	(0.00038)	(0.00033)	(0.000296)
Number of bedrooms	No	✓	✓	✓	✓
Number of floors	No	✓	✓	✓	✓
Area (square meters)	No	✓	✓	✓	✓
Age of building	No	✓	✓	✓	✓
Coefficients of location and quality	No	✓	✓	✓	✓
Civil parish FE	✓	✓	✓	✓	✓
Quarter FE	✓	✓	✓	✓	✓
Postcode FE	No	No	✓	✓	✓
Municipality FE	No	No	No	✓	✓
Municipality time trends	No	No	No	No	✓
Number of clusters	261	261	261	261	261
Observations	210,445	210,445	210,438	210,438	210,438
R-squared	0.1460	0.3252	0.3285	0.3286	0.3564

Table 2. Outcome variable: number of transactions of new buildings

Variables	Entire sample	Metropolitan area of Lisbon	Metropolitan area of Porto
	Number of Transactions	Number of Transactions	Number of Transactions
Panel A: Quarterly aggregation			
Number of Local Lodging	0.00171*	0.00113	-0.00385***
	(0.000924)	(0.00101)	(0.000686)
Civil parish FE	✓	✓	✓
Quarter FE	✓	✓	✓
Number of clusters	278	135	112
Observations	8,896	2,528	2,037
R-squared	0.124	0.201	0.144
Panel B: Monthly aggregation			
Number of Local Lodging	0.00351	-0.000457	-0.00391***
	(0.00231)	(0.00123)	(0.00128)
Civil Parish FE	✓	✓	✓
Month FE	✓	✓	✓
Number of clusters	278	137	113
Observations	26,688	6,769	4,743
R-squared	0.121	0.241	0.101

- Our results are robust to:
    - Monthly and weekly aggregation - positive and significant effect of 0.0039 and 0.0083, respectively
    - Dropping transactions before 2014.
    - Considering only properties with one transaction.
    - Dropping transactions in the 99th percentile.
    - Dropping observations in the 99th percentile in terms of number of local lodging establishments per quarter and civil parish.
- Placebo test shows no effect for the years before 2014.

Table 3. Heterogenous effects: by metropolitan area

Variables	Lisbon			Porto		
	Metropolitan area Log(prices)	Municipality Log(prices)	Historical centre Log(prices)	Metropolitan area Log(prices)	Municipality Log(prices)	Historical centre Log(prices)
Number of Local Lodging	0.0024**	0.00026	-0.00079	0.0016***	0.00138***	0.0011***
	(0.00082)	(0.00063)	(0.00066)	(0.00011)	(0.00016)	(0.00012)
Number of bedrooms	✓	✓	✓	✓	✓	✓
Number of floors	✓	✓	✓	✓	✓	✓
Area (square meters)	✓	✓	✓	✓	✓	✓
Age of building	✓	✓	✓	✓	✓	✓
Coefficients of location and quality	✓	✓	✓	✓	✓	✓
Civil parish FE	✓	✓	✓	✓	✓	✓
Quarter FE	✓	✓	✓	✓	✓	✓
Number of clusters	144	37	6	117	10	3
Observations	144,461	42,676	10,838	65,984	18,017	8,038
R-squared	0.3482	0.3336	0.3641	0.2723	0.3165	0.3286

Heterogeneous effects

- The effects are larger for properties with 4 bedrooms
- Considerably large positive and significant effect on properties owned by citizens from outside the European Union, despite the much lower number of observations.
- The effect on properties singularly owned are in line with our baseline model, while being slightly larger for co-owned properties.
- Positive effect on areas with high unemployment, which could represent a further decrease in welfare.
- Estimates are larger for non-coastal areas.

- Up to this point, our results seem to suggest that the impact of local lodging establishments is not homogeneous across properties.

- Absence of effects in the municipality of Lisbon puzzling - in odds with Franco and Santos (2021)

- We further explore this heterogeneity in our effects through quantile regressions.

- We follow the estimator proposed in Machado and Santos Silva (2019), which makes it possible to perform quantile regressions with panel data and fixed effects. We focus on the 0.10,0.20,0.5,0.75 and 0.90 quantiles.
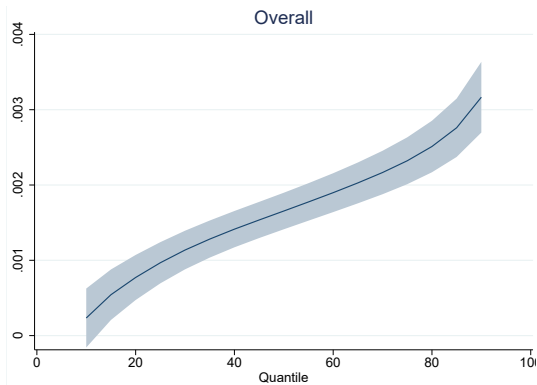
Figure 3. Quantile analysis - entire sample
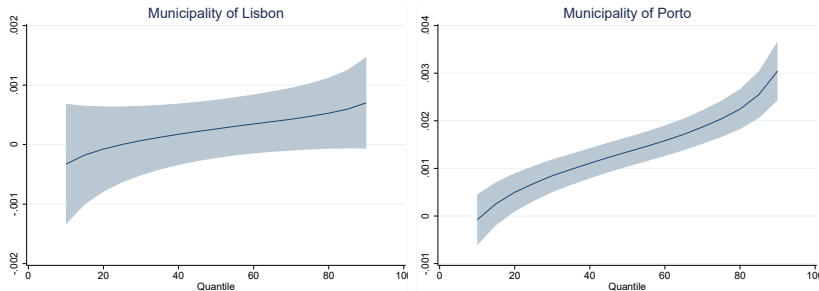
Figure 4. Quantile analysis - Municipalities

Spillover effects: Commercial properties

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Table 4. Spillover effects: price of commercial properties

	Offices for rent	Offices for sale	Stores for rent	Stores for sale
Panel A: Overall sample				
Variables				
Number of Local Lodging	0.0000773	-0.000190	0.00052***	-0.00033
	(0.000326)	(0.000341)	(0.000179)	(0.000258)
Number of clusters	133	144	208	221
Observations	5,609	6,172	9,674	23,164
R^2	0.366	0.403	0.434	0.255
Panel B: Municipality of Lisbon				
Variables				
Number of Local Lodging	-0.000312	-0.000119	0.00256**	0.000439
	(0.00212)	(0.00121)	(0.00115)	(0.00142)
Number of clusters	23	23	23	23
Observations	2,194	1,417	1,658	4,012
R^2	0.191	0.239	0.499	0.295
Panel C: Municipality of Porto				
Variables				
Number of Local Lodging	0.00135***	0.0000544	0.000574**	-0.0000439
	(0.000246)	(0.000241)	(0.000171)	(0.000457)
Number of clusters	7	7	7	7
Observations	1,063	1,158	1,027	2,844
R^2	0.434	0.250	0.204	0.105

- The estimates from our baseline model show that an increment in the number of these venues leads to a significant increase of around 0.17% in the value of transactions.

- When considering solely the municipalities and their historical centres, we find stronger effects for Porto.

- In general, there is a positive and significant effect across our distribution, with the effects being larger at the upper quantiles.

- Positive impact on the value of commercial properties, particularly for rent.