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Short-term rentals in Malta: A look at Airbnb listings

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Policy Note

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Abstract

New technologies have affected many traditional industries, with disintermediation and innovation changing the manner in which individuals travel, commute or even purchase day-to-day items like food. While popular, many of the international technological platforms in popular use are hardly regulated. The short-term rental market for tourists has been fundamentally changed by platforms likes Airbnb. This study uses a novel dataset of properties available for rent in Malta during May 2019, and attempts to determine the composition, ownership, utilisation and possible revenue generation potential of these listings. This study finds the number of listings to be similar to other mid-sized population centres in the Mediterranean. It discusses the distribution of the housing stock devoted to short-term rentals and looks at some metrics for pricing, including the pricing of characteristics, and considers the existence of spatially interdependent pricing decisions.

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Keywords: Tourism; Airbnb; housing supply; spatial econometrics; Malta;

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The data in this policy note relate to listings found in May 2019 on Airbnb. The company does not provide data to the public on its operations, making it difficult to quantify the use of this platform in a country. However, across the world, community minded data activists regularly scrape websites like Airbnb, to ensure that data which affects the daily lives of many is in the public domain.

InsideAirbnb, an open-data community, provides an independent, non-commercial set of tools online, with readily available databases which can be used to analyse data from Airbnb. In this regard, the author gratefully acknowledges the work and help of Mr. M. Cox to obtain the data, and sharing it for the purposes of writing this study. The author would also like to thank Mr. N. Rapa for his work on calculating the impact of a shock to the housing variable of a macro-econometric housing market model. Finally, the author would like to thank Mr. S. Attard for sharing some of his analysis, as found in Attard (2018).

This policy note contains no private or confidential information. The data used in this analysis are all publicly displayed on the Airbnb site, and the analysis is anonymised. The note also contains data shared by the Tourism and Education Statistics Unit within the National Statistics Office, as well as data shared by the Malta Tourism Authority.

Contents

1 Executive Summary

Over the past years, Malta has seen a surge in the supply of units for short-term lets, an increase in tourists choosing private accommodation, and a downward trend in the share of collective accommodation. Recent years have also seen efforts by the authorities to require private operators to abide by regulations. Many countries are experiencing particular pressures driven by short-term rentals of properties listed on Airbnb, as the sharing economy takes root. Policymakers have issued limits on the number of days a property may be rented, levying fees and charges on hosts. City administrators across the world have unsuccessfully attempted to obtain data from Airbnb to better inform their policies. These data have to be obtained through web scraping sources. This study focuses on web-scraped Airbnb data. Other websites for short-term lets exist, while property owners - particularly those operating along commercial lines - may have their own website or list their properties on multiple short-term rent websites.

How have tourist accommodation decisions changed in recent years?

Tourist accommodation decisions have changed in recent years, with stays in private accommodation units and short-term tourist rentals increasing substantially. The note also summarises the effects of short-term tourist lets, in particular Airbnb, in other cities and countries around the world.

How are short-term tourist lets distributed in Malta?

The analysis is based on a single snapshot observation for May 2019, which shows 8,761 Airbnb short-term rent listings. The study looks at the distribution of short-term tourist lets in Malta, in particular the geographical spread between regions and localities, availability and ownership structures. The bulk of Airbnb listings in Malta are "whole-dwelling" listings, with most hosts on Airbnb having multiple listings. Listings are distributed widely across Malta and Gozo, although concentrations of rental properties remain around the traditional tourist areas and resort towns. Using self-reported availabilities and accommodation size, properties listed on

Airbnb are able to potentially satisfy almost 8 million night stays, with an estimated occupancy rate of close to 70.0%. Properties appear to be available for most of the year, pointing at listings being run as quasi-commercial operations. This is also confirmed by the ownership structure.

What are the price characteristics of Airbnb listings?

The average price per listing stands at €80.20 per night. The policy note also looks at the price characteristics of Airbnb listings, looking at the marginal prices of desirable features. An extra bedroom increases the final nightly price by around 27.0%, an extra guest by around 6.5%, the availability of a pool increases the nightly price by around 21.0%, while sea-views increase the nightly price by 14.0%. Further spatial regressions are used to confirm the existence of spatial dependency in price-setting behaviour among hosts, as well as testing for statistically significant locality effects.

What are the policy implications of short-term tourist lets?

Different occupancy rate scenarios are assumed to construct a plausible set of revenue for owners. The highest of these scenarios assumes a 70.0% occupancy rate, with possible estimated gross revenues of €111.1 million, and listing owners possibly earning on average around €2400 monthly. The distribution of these earnings, however, is very skewed: The top 10.0% of hosts in terms of revenues earn around 59.9% of revenues. Estimates for the prices of a selected number of characteristics are also calculated on the basis of a set of regressions. Further analysis reveals spatial interaction in price-setting behaviour among listing hosts. Clustering behaviour in localities confirms geographical price differentials across different towns and villages in Malta. Finally, the use of this significant part of the housing stock for short-term rents is estimated to increase long run real house prices by 2.8%.

To properly regulate the short-term rental market, policymakers across the world ought first to decide on a regulatory regime. This is difficult to do without proper data. Accommodation sharing platforms can serve as an economic development tool, particularly in areas not typically devoted to tourism, but the tourist flows they bring ought to be sustainable.

2 How have tourist accommodation decisions changed in recent years?

2.1. Malta's tourist accommodation patterns

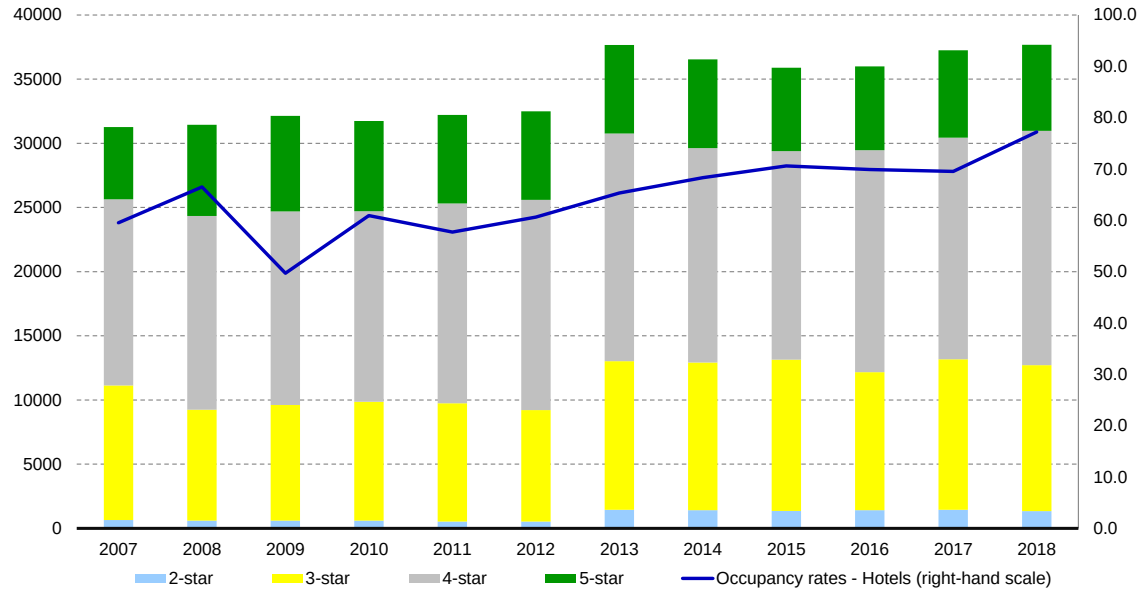
Over the past sixty years, Malta has successfully marketed itself as a Mediterranean tourist destination. Tourism was, and remains, an important tool in the development of the Maltese economy. Malta has known periods of strong changes to its tourist accommodation structure. Between 1959 and 1964, eleven new hotels were opened - almost doubling Malta's existing bed capacity (Lockhart, 1997). The tourist industry expanded considerably from then onward, with tourist arrivals rising from less than 400,000 tourists in 1975 to just below 1,800,000 in 2015. Latest available figures show that almost 2,600,000 tourists visited Malta in 2018, doubling on a decade earlier. This expansion in tourist arrivals was supported by continued private investment in tourist accommodation, in the form of collective establishments[1] and holiday complexes (Micallef and Attard, 2015). Over past decades, the industry thus became a major player in the economy, strongly contributing to economic growth, employment and improving Malta's balance of payments position. An in-depth analysis of the evolution of the Maltese tourist industry is carried out in Attard (2018).

Looking at historic patterns for bed-places and occupancy in established hotels during the month of May, it is apparent that availability remained stable over most of the past decade, increasing in 2013 (see Chart 1). Occupancy rates for hotels[2] surged from a low of 49.7% in 2009 to a high of 77.2% in 2018.

Attard (2018) notes how, since the turn of the 21st century, there was a striking shift in preferences from collective accommodation towards stays in private accommodation establishments.[3] The changing trend in tourists' preference to stay in private accommodation is a global phenomenon and not exclusive to Malta, betraying global technological developments - particularly effortless booking of alternative accommodation via online platforms. The study notes how the

[1] As per National Statistics Office (NSO) definition, these include hotels, guesthouses, hostels, tourist villages, holiday complexes, bed & breakfasts, and campsites.
[2] Defined as hotels with 2,3,4 and 5-star ratings.
[3] Private accommodation includes rented accommodation, own private residence, staying with friends and other private accommodations.

Chart 1
Bed-places and occupancy in May
(Number of bed-places; per cent)



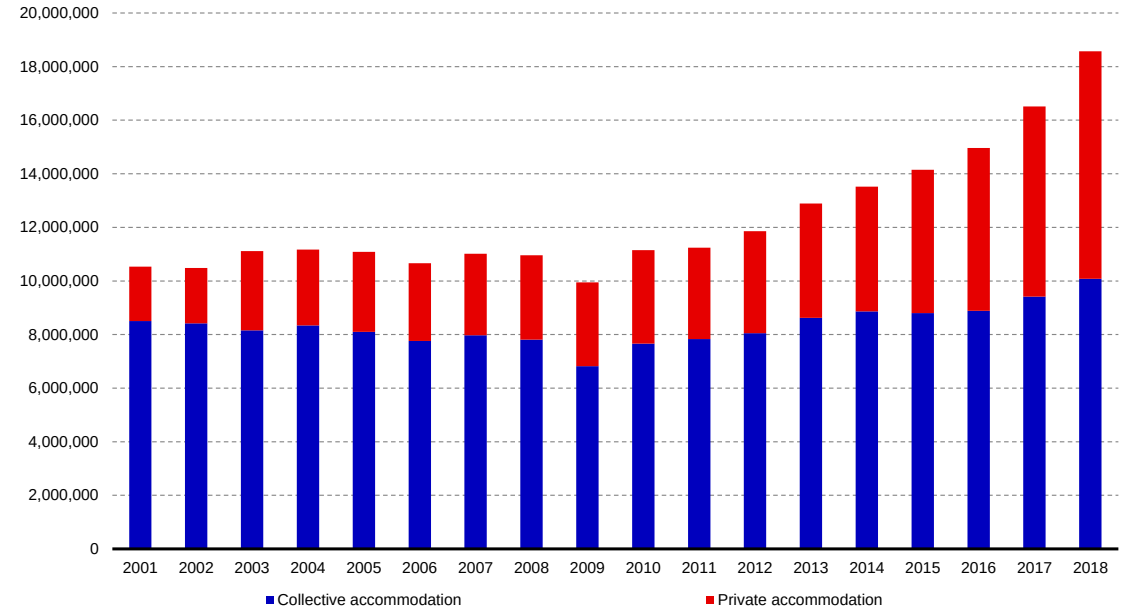
Source: NSO

shift to private accommodation may reflect increasing attention to the concept of value for money, and visitors searching for more experiential tourism and authentic local experiences.

Guests in short-term private accommodation booked online may benefit from the simplicity of use, lower daily rental rates, peer review and user feedback, as well as access to localities not typically used to host tourists. Property owners using online platforms tend to have the advantage of a very wide audience and stable revenues.

Nights stayed in collective accommodation experienced strong growth in the ten years to 2018, rising from 7.8 million nights in 2008 to 10.1 million in 2018 (see Chart 2). Growth in private accommodation was also strong, with nights stayed rising from 3.1 million in 2008 to 8.5 million in 2018. This figure, however, also includes a proportion of tourists who do not stay in rented accommodation while in Malta. This may comprise own accommodation, stays with friends or family, as well as other non-rented private accommodation. It is apparent that while nights stayed in collective accommodation establishments increased in the three years to 2018, nights stayed in private accommodation rose by more. The share of nights stayed in private

Chart 2
Nights stayed in Collective and Private accommodation



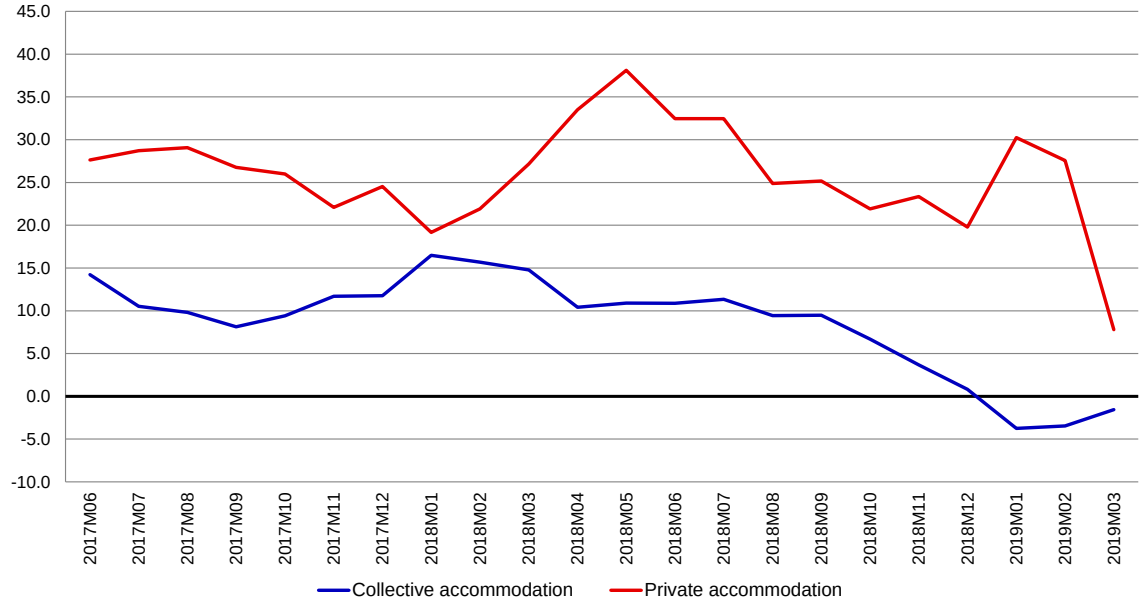
Source: NSO

accommodation rose from 28.7% in 2008 to 45.7% in 2018.[4] In the first quarter of 2019, the share of rented private accommodation in total rented accommodation stood at 31.1%.

In recent years operators have experienced double-digit growth rates in tourist arrivals, buoyed by increased connectivity and the emergence of low-cost airlines. However, in recent months, collective accommodation establishments experienced a slowdown in inbound tourist arrivals (see Chart 3). This development is leading to a pronounced divergence between collective and private accommodation decisions.[5] Annual growth, measured as three month moving averages, slowed down from January 2018 onward, turning negative by January 2019. Growth in private accommodation, however, was strong - accelerating over the summer of 2018 and remaining firmly in double-digit territory. In level terms, in March 2019 around 30,000 tourists, or roughly 20.0%, of inbound tourists who rented accommodation chose not to rent rooms in collective

[4]Includes rented and non-rented private accommodation.
[5]This chart excludes non-rented accommodation, and focuses on rented collective accommodation and rented private accommodation only.

Chart 3
Tourists by accommodation type
(annual percentage rate of change, three month moving averages)



Source: NSO, Author's calculations.

accommodation establishments.[6, 7] The double-digit growth rates in overall tourist arrivals, probably caused by increased connectivity and one-off events such as Valletta 2018, however, largely disappeared by early 2019. Overall inbound tourist arrivals grew by 2.8% in annual terms for the first three months of the year.

As early as 2010, the hotel industry had recognised this phenomenon - with spokespersons observing that unregulated short-term lets alter the level playing field with hotels, giving "non-regulated people an unfair advantage, since regulation carries costs."[8] Moreover, stakeholders also comment on how "the proliferation of non-licensed accommodation [...] results in a substantial loss of revenue through fees and taxation for the State." Hoteliers have tended to couch their arguments towards short-term tourist rentals in terms of ensuring these abide by the same rules as established operators, in particular with respect to safety standards and tax-

[6]Unfortunately a break in series between April and May 2018 does not allow for comparisons between collective and private accommodation, due to the inclusion of Non-rented accommodation in recent NSO releases.
[7]It could be argued that with the increase in foreign workers living in Malta, some temporary tourist visitors to Malta may be residing with family, partners or friends working here. This may be inflating the proportion of tourist visitors in private accommodation.
[8]Cooke, P., (2013). "Unlicensed room letting risks penalty of €23,000," Times of Malta, October 13, 2013.

ation. Beyond the views of the hoteliers' lobby, the effects of tourist visitors on neighbourhood cohesion and on permanent residents, and their pressure on property prices, ought not to be understated.[9]

On the other hand, hosts listing their properties for short-term lets in 2015 described how bureaucracy and administrative costs may be challenging, particularly if they started out providing accommodation recently and were unsure on whether their venture will be successful. Back in 2013, tax considerations and the inability to benefit from a reduced flat rate of 15% on short-term rental incomes were also reported as stumbling blocks.[10]

While there are other players on the market for short-term rentals, Airbnb has emerged as a major global player in linking property owners with prospective visitors since its establishment in 2008. This is primarily a short-let platform for more than six million spaces worldwide, currently available in 81,000 cities and 191 countries.[11] Airbnb states it is economically empowering millions of people around the world, unlocking and monetising their spaces, passions and talents to become hospitality entrepreneurs. These views are broadly echoed by Maltese nationals. A property owner leasing space in Sliema styled Airbnb's impact as "revolutionary," allowing him "to turn unused spaces within [his] house into profit-making assets."[12] Properties may be listed in different ways, from individual rooms to whole dwellings.

The monetary incentives for owners to provide lodging to tourists in Malta may be quite large, with Airbnb being reported to have had 813 properties listed for rent in 2013, over 1,000 in 2015,[13] and around 6,800 by 2018.[14] This surge in the supply of rental space attracted the attention of the authorities, with both the tourism regulator - the Malta Tourism Authority

[9]Cocks, P., (2018), "Malta feels the pain of its tourism boom: residents speak out," Malta Today, September 28, 2018.
[10]Grech, H., (2015), "Why are short-let rental home owners choosing not to get licensed?," The Malta Independent, May 4, 2016.
[11]See: Airbnb Press Room, `https://press.airbnb.com/about-us/`
[12]Cooke, P., (2013). "Unlicensed room letting risks penalty of €23,000," Times of Malta, October 13, 2013.
[13]Leone Ganado, P., (2015), "Hoteliers, users at odds over Airbnb regulation," Times of Malta, October 25, 2015.
[14]Grech, D., (2019), "Over 1,500 register to offer AirBnB accommodation following MTA clampdown," Times of Malta, March 16, 2019.

(MTA) - and the Ministry for Tourism looking at regulating the market.

In its consultations with the public following the publication of proposed changes to the laws governing tourism, the authorities noted how the tourism regulator's role was "to ensure that any accommodation provided by any online agency, like Airbnb, is licensed and regulated. To provide the wider spectrum of accommodation types, the new regulations are now offering licensed accommodation in the form of hotels, guest houses, serviced apartments, tourist villages, host families for students, B&B Residences, holiday homes in five different categories. The choice is wide but the playing field has to be kept particularly in terms of regulation and monitoring," (Ministry for Tourism, 2016). In fact, following a clampdown by the MTA, more than 1,500 private accommodation providers registered with the authorities.[14]

Taken together, the data all indicate a surge in the supply of units for short-term lets in recent years,[15] an increase in tourists choosing private accommodation, and a downward trend in the share of collective accommodation, despite considerable investment by operators in this area. Occupancy rates in collective accommodation establishments, however, appear to be stable. Recent years have seen efforts by the authorities to require private operators to abide by regulations. This rebalancing between accommodation types is also paired with lower growth in overall tourist arrivals in the first part of 2019, following double-digit growth rates in the three years to 2018.

[15]The self-reported bed supply from the Airbnb dataset stands at 36,222.

2.2. The effect of short-term tourist lets in other countries and cities

The effects of short-term lets for tourist purposes in large cities, such as those booked via Airbnb, are well documented. Airbnb is present across major global metropolises, like New York and London, as well as closer tourist destinations like Rome, Barcelona and Athens. The latter cities are also Mediterranean venues, sharing similar holiday destination characteristics with Malta. Growth in some of these markets has been exceptional. In Athens during 2017, there were 5,127 listings receiving reservations at least once on Airbnb, up by 6.8% from the previous year (4,801 listings), and a very strong increase of 56.5% from 2015 (3,275 listings).[16] The same story is paralleled in many cities across the world, with a number of grassroots movements, city administrators and governments clamping down on this phenomenon.[17]

The effects of Airbnb on cities can be rather strong. Analysts discuss how the short-term rental phenomenon results in a loss in long-term housing units, as increasingly more units are devoted for tourist purposes. In New York City, for example, 13,500 units of housing were lost from the long-term rental market by August 2017, including 12,200 listings for 'entire-home' listings, advertised for rent for 120 days or more. Of these, 5,600 were listed for rent for 240 days or more. In turn, this led to an estimated increase of around $380 in long-term rent rates, due to the drop in house supply. In some areas, the increase was more than $700, (Wachsmuth et al., 2018). In many of these cities, issues with sub-letting of properties and penalties are regularly discussed.

Another observation relates to "ghost hotels."[18] These are listings that operate like hotels, with many rooms available for short-term rent in a single unit. They represent a marketing tactic by commercial Airbnb operators, usually to avoid regulators. Such professional hosts are often found in touristic cities like Barcelona and Athens, where commercial operators tend to control multiple listings or large property portfolios. These operators tend to be a small proportion of overall listings, but their revenues are proportionately significantly higher than the share of

[16]Sideris, S., (2018), "Mapping the dominance of Airbnb on Athens," medium.com, August 23, 2018.
[17]The Economist, (2018), "Charlemagne: the backlash against Airbnb," July 19, 2018.
[18]A term coined by Fairbnb grassroots activists in Toronto, Canada.

properties they control.

Moreover, the distribution of revenues from Airbnb across hosts is described to be very unequal,[19] with the top 10% of hosts estimated to earn significantly more than the bottom 80% in multiple cities. In terms of earnings, many analysts report how the median host of frequently occupied short-term listings earned significantly more than median long-term rents. This disparity is seen to drive housing stock loss, and pushes gentrification. In order to tone down the negative effects on neighbourhoods, some cities - notably Paris and Los Angeles - have set a maximum annual limit of 120 days in which property owners are allowed to rent out properties using Airbnb. In order to be allowed to rent out properties for 120 days a year, owners are asked to register with local authorities and pay an administrative fee.

Of course, the lack of published data by Airbnb suggests that such analyses ought to be undertaken with caution. Analysts have to make assumptions on crucial variables such as, for example, implied occupancy rates and estimated revenues in order to understand trends and developments in this market. These variables have to be carefully constructed using Airbnb data, and the assumptions made to generate the data should be transparent, and provide robustness checks.

[19]For example, in New York City, the top 10% of hosts earned 48% of all revenues in 2016, while the bottom 80% of hosts earned just 32%, (Wachsmuth et al., 2018).

3 How are short-term tourist lets distributed in Malta?

In a web scraping carried out in May 2019, Malta had 8,761 listings available for short-term lets advertised on Airbnb. This is significantly higher than the 6,800 listings quoted in the media. Comparatively, the neighbouring island of Sicily had just under 50,000 listings on Airbnb in February 2019. If one were to compare with Sicilian cities, the province of Palermo had around 5,400 listings, Catania about 3,100 listings and Siracusa around 2,300 Airbnb listings. This places Malta very close to mid-sized municipalities in the Mediterranean, such as Athens with 9,122 Airbnb listings and Naples with 7,169 listings, although it still falls short of competing destinations like Crete and Barcelona.[20] This study focuses on data obtained from Airbnb only, and there may be other available properties for short-term lets.[21] It is assumed that the data scraped in May 2019 are representative of the total listings available for short-term rent in Malta. A further major caveat of this dataset is that it represents a single observation, such that there may be other factors such as seasonal availability and pricing at play. Moreover, properties with no availabilities in the near future in the calendar during web scraping exercises may be excluded from the dataset. These limitations have to be kept in mind when analysing the distribution of dwellings listed for short-term rent.

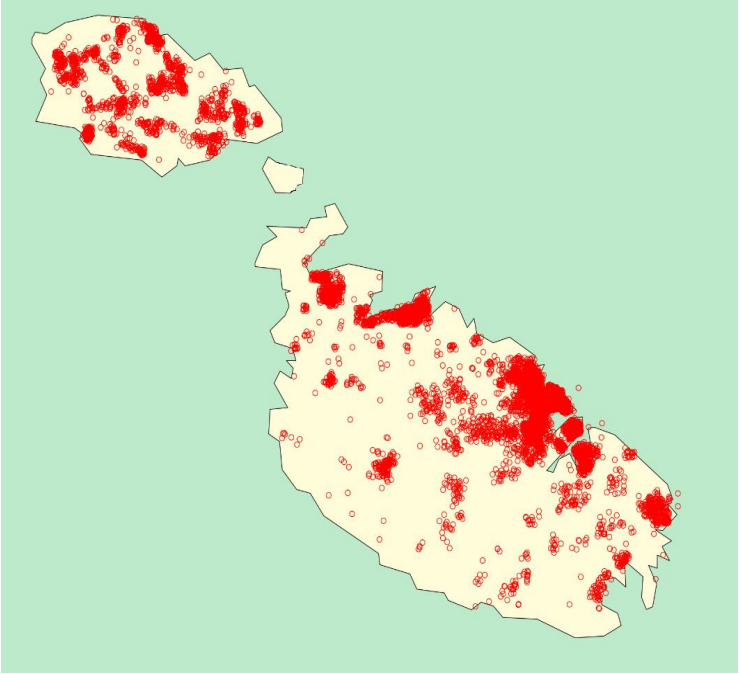
Owners listing their properties on Airbnb may list an entire dwelling or parts of it for short-term lets, with private or shared rooms. Of the 8,761 Airbnb listings in Malta, 5,532 (63.1%) are entire dwelling listings. Private rooms stand at 2,905 listings (33.2%), while there are 324 shared room listings. The vast majority of whole property listings relate to apartments (63.5%), followed by houses and townhouses (15.8%), and villas (4.6%). These properties may be listed with other holiday accommodation search engines, and are not assumed to be exclusive to Airbnb. In terms of amenities, internet Wi-Fi availability is the most common reported listing characteristic. Turning to tourist satisfaction, 6,513 listings had reviews, which had a mean score of 92.0. Reviews in other cities are also skewed to the high side.

[20] Data for Sicily, Athens, Naples, Crete and Barcelona obtained from InsideAirbnb.

[21] Other websites for short-term lets exist, while property owners - particularly commercial ones - may have their own website or list their properties on multiple short-term rent websites.

3.1. Localities

Chart 4
Location of Airbnb listings



Source: Author's calculations.

The top ten localities with listings in May 2019 are Sliema (12.0%), San Pawl il-Bahar (11.3%), San Giljan (8.9%), Mellieha (5.1%), Valletta (5.0%), Gzira (4.9%), Msida (4.1%), Swieqi (3.9%), Iz-Zebbug (Gozo)[22] (3.7%) and Marsascala (3.1%). The spread of listings among localities, however, is wide (see Chart 4 and Table 1).[23] The distribution confirms the predominance of established resort towns, and may indicate the conversion of holiday homes owned by Maltese into rental properties, as well as the economic usage intensity of the Northern Harbour region.[24]

A further remarkable finding is the availability of properties in more historic cities and villages

[22] Iz-Zebbug (Gozo) also includes properties in the bay of Marsalforn.

[23] Geographical coordinates are self-reported. Moreover, Airbnb randomises the exact location of properties to a set number of metres, to protect privacy. In a number of cases, this means certain properties may be listed as being in the sea. These may be 'placed back' on-shore on the basis of Bayesian inference methods, however such manipulations are deemed to be beyond the scope of this study. Furthermore, in the dataset there are around 60 boats listed for short-term rent.

[24] This may partly confirm the approach in Ellul, Darmanin and Borg (2019) who designate the area around Marsamxett Harbour as the geographic 'zero-point' upon which to base a *geographic distance from centre* variable.

Table 1: Number of listings per locality

Locality	No.	Locality	No.
Attard	38	Mtarfa	7
Balzan	25	Munxar	176
Birgu	87	Nadur	128
Birkirkara	126	Naxxar	95
Birzebbugia	54	Paola	16
Bormla	106	Pembroke	91
Dingli	1	Pieta	88
Fgura	17	Qala	147
Floriana	115	Qormi	30
Fontana	20	Qrendi	7
Ghajnsielem	102	Rabat (Malta)	101
Gharb	152	Rabat (Victoria)	103
Gharghur	6	Safi	10
Ghasri	74	San Giljan	781
Ghaxaq	7	San Gwann	133
Gudja	14	San Lawrenz	56
Gzira	433	San Pawl il-Bahar	994
Hamrun	54	Sannat	61
Iklin	18	Santa Lucija	6
Isla	79	Santa Venera	29
Kalkara	31	Siggiewi	26
Kercem	57	Sliema	1053
Kirkop	6	Swieqi	340
Lija	13	Ta' Xbiex	54
Luqa	13	Tarxien	28
Marsa	6	Valletta	434
Marsascala	275	Xaghra	270
Marsaxlokk	49	Xewkija	71
Mdina	22	Xghajra	19
Mellieha	448	Zabbar	27
Mgarr	63	Zebbug (Ghawdex)	327
Mosta	85	Zebbug (Malta)	41
Mqabba	4	Zejtun	32
Msida	355	Zurrieq	25

Source: Author's calculations.

Table 2: Number of operators per NSO region

Locality	Collective accomodation establishments Aug. 2017	Airbnb May 2019	Collective accomodation establishments %	Airbnb %
Southern harbour	17	984	9.0	11.2
Northern harbour	77	3567	40.7	40.7
South eastern	11	483	5.8	5.5
Western	5	292	2.6	3.3
Northern	52	1691	27.5	19.3
Malta	162	7017	85.7	80.1
Gozo and Comino	27	1744	14.3	19.9
Maltese islands	**189**	**8761**	**100.0**	**100.0**

Source: NSO, Author's calculations

such as in the Cottonera area, Rabat and other rural areas of Malta and Gozo which are typically less used to accommodate tourists. At first glance Airbnb listings cover a greater part of Malta, including suburban areas.

A look at the shares of hotel and Airbnb operators shows how in most areas the distribution is very close, in particular those in the Northern Harbour region (see Table 2). However, there are more Airbnb operators in Gozo, the Southern Harbour and, to a lesser extent, the Western regions than the share of collective accommodation establishments would suggest. This may indicate the inability of the larger collective accommodation operators to find suitable locations for large scale hotels in these areas, or the comparatively higher availability of characteristics properties, such as townhouses, villas, farmhouses and palazzos.

In terms of operators, the distribution figures may be seen to be too close for meaningful analysis. However, the distribution of bed-places returns an even stronger divergence across regions (see Table 3). Looking at the shares, it is apparent that geographically, Gozo has a significantly higher proportion of Airbnb bed-places available than that implied by its share of collective accommodation establishments. This may reflect different types of tourism targeted by Gozitan operators of short-term lets, such as internal tourism, or a markedly different type of tourist visitors than those who tend to choose collective accommodation establishments.

Bed-places in the Northern and Northern Harbour regions are lower in the Airbnb dataset

Table 3: Number of bed-places per NSO region

Locality	Collective accomodation establishments Aug. 2017	Airbnb May 2019	Collective accomodation establishments %	Airbnb %
Southern harbour	1549	3348	3.6	9.2
Northern harbour	17416	13498	40.6	37.3
South eastern	548	2212	1.3	6.1
Western	766	1025	1.8	2.8
Northern	20483	7682	47.7	21.2
Malta	40762	27765	95.0	76.7
Gozo and Comino	2165	8457	5.0	23.3
Maltese islands	**42927**	**36222**	**100.0**	**100.0**

Source: NSO, Author's calculations

than for collective establishments, while all other regions have a higher share of bed-places available in the Airbnb dataset than in terms of collective establishments. This serves to confirm underlying supply differences in terms of regional characteristics between what Airbnb operators are providing, when compared with hotels. In turn, these may reflect travellers' choices related to accommodation, budget or holidaying preferences.

Some caveats to this analysis are based on the availability of a property when the web-scraping exercise was carried out, as well as an issue related to listing a whole property on the one hand, and private or shared rooms on the other. The former would exclude properties from the Airbnb dataset if these were unavailable when the web-scraping exercise was undertaken.

According to NSO figures, in 2018 there were 614,480 tourists who chose to stay in "other rented" accommodation (non-hotel establishments), or 27.1% of all rented accommodation. In total, this amounted to 5,429,361 nights spent in Malta by tourists or 35.0% of all nights spent in rented accommodation.

The properties included in the dataset have a theoretical bed supply of 36,222. If one multiplies the accommodation potential of houses, by the daily availabilities of the properties, the properties listed on Airbnb have the potential to satisfy 7,960,487 nights stayed. Using the figures quoted in the NSO release, this would mean that the theoretical occupancy rate in terms of night stayed stands at around 68.2%. This occupancy figure is based on self-reported

accommodation possibilities and annual availabilities.

A more conservative estimate for occupancy, based only on the number of reviews made for each listing, would indicate that Airbnb properties have an occupancy rate of 29.7%. However, this figure is based on very conservative assumptions - as not all those who stay in a property leave reviews. By relaxing these assumptions, one would arrive at an occupancy figure which is closer to 70.0%. The range of between 30.0% and 70.0% will be used in the analysis carried out in this study, and serves as a robustness check to the analysis on estimated revenues.

3.2. Availability

Of the properties listed on Airbnb, more than 6,700 properties are available for more than 120 days a year - that is, 76.6% of listings. More than 7,800 properties are listed for more than 60 days a year, or 89.8% of listings. Of the 5,532 "whole dwelling" properties listed on Airbnb, 4,370 (79.0%) are available for short-term lets for more than 120 days a year and 5,052 (91.3%) for more than 60 days. Furthermore, of the 2,905 private room properties 2,037 (70.1%) are available for more than 120 days a year and 2,503 (86.2%) are available for more than 60 days. Taken together, this implies that the bulk of the properties listed on Airbnb are available for most of the year. Listed properties are available for short-term rent persistently, rather than on an occasional basis. This may indicate that these are run as quasi-commercial operations.

3.3. Ownership

Concerns about excessive commercialisation of residential areas and the emergence of "ghost hotels" are a primary argument of organised groups resisting the spread of short-term lets. These arguments usually focus on multiple listing ownership by the same individuals or companies. Of the 8,761 listings in the dataset, 2,472 (28.2%) are owned by individuals or companies that have only one property listing, 1,198 (13.7%) are owned by individuals or companies with two listings, and 5,091 (58.1%) are advertised by owners with three or more listings. This distribution points at a high proportion of commercial rather than occasional short-term rental operators. The total number of individual hosts in the Airbnb dataset is 3,856.

The top four hosts with the highest number of properties appear to be commercial operators, together amounting to 3.4% of the total number of listings. The single host with the highest number of listings has 110 individual property listings, the second most has 80 listings, and the third and fourth have 61 and 51 listings respectively. Some of these listings appear to be property management companies, who operate listings owned by third-parties.[25] This ownership structure will have a strong impact on the distribution of estimated revenues, which can be expected to be rather unequal. While the image that Airbnb serves as a secondary source of income for some families or owners may be true for around a third of the listings, there is strong evidence that listings on Airbnb are run by semi-professional individuals, or fully professional commercial operators.

[25]Property management companies may not necessarily own the rented properties, but there could be individuals owning one property listing their property with such companies rather than directly with Airbnb. Unfortunately, no information regarding how many of these properties are owned by third parties is available. Hence, revenue earned from such rentals may ultimately benefit a wider segment of individuals, such that revenue distribution may be significantly less unequal than suggested by this analysis.

4 What are the price characteristics of Airbnb listings?

The average price per listing stands at €80.20 per night.[26] There is a wide divergence between different localities and type. The most expensive locality in terms of average nightly rates is Gharghur,[27] while the cheapest is Santa Lucija (see Table 4). This result may be affected by the distribution of high-end properties listed for short-term rents. In particular localities, this phenomenon may be gauged by looking at the discrepancy between the average and the median prices per night.

In order to confirm price trends per type, one can look more closely at 15 major types of properties found in the data (see Table 5).[28] The highest average nightly price is charged for short-term lets on boats,[29] followed by bungalows and villas. The cheapest average prices can be found in hostels. After looking at the geographical and price distribution of Airbnb listings in Malta, one should also look at the factors correlated with price (see Table 6). Strong correlation is seen between bedrooms and number of people hosted in accommodation, due to the closeness in the definitions.

Prices are positively correlated with most attributes, except for the number of reviews and reviews per month. When looking more closely at the amenities described in the property listings, the most common amenities in the priciest properties are beach views, private hot tubs and private pools.

[26] The US exchange rate against the euro for May 20, 2019 was obtained from the European Central Bank website, and it was applied to the US dollar prices as found on Airbnb. This may differ from the exchange rates used by InsideAirbnb.

[27] The locality of Ghargur has a very low count in terms of property listings (see Table 1), and these are comparatively higher priced, leading to this result

[28] Kindly note that these property types are self-reported and that the category "Bed and breakfast" (5.0%) may include other types of properties.

[29] This type of property rental can easily be considered to be a particular outlier.

Table 4 : Airbnb nightly rates by locality

Locality	Average € / night	Median € / night	Locality	Average € / night	Median € / night
Attard	49.1	31.3	Mtarfa	29.4	31.3
Balzan	41.0	34.9	Munxar	58.1	49.3
Birgu	147.9	61.8	Nadur	81.0	49.3
Birkirkara	38.8	27.8	Naxxar	78.7	53.7
Birzebbugia	60.4	47.9	Paola	42.3	40.3
Bormla	76.6	67.2	Pembroke	43.6	31.3
Dingli	76.1	76.1	Pieta	119.4	34.5
Fgura	29.6	22.4	Qala	79.5	62.7
Floriana	85.4	58.2	Qormi	38.5	22.4
Fontana	69.7	53.7	Qrendi	74.2	49.3
Ghajnsielem	75.7	63.6	Rabat (Malta)	62.6	44.8
Gharb	109.9	89.5	Rabat (Victoria)	68.1	53.7
Gharghur	169.4	115.5	Safi	29.6	26.9
Ghasri	119.7	107.5	San Giljan	93.8	64.5
Ghaxaq	39.0	30.4	San Gwann	42.9	31.3
Gudja	54.2	47.5	San Lawrenz	134.0	109.7
Gzira	71.3	55.5	San Pawl il-Bahar	67.3	53.7
Hamrun	40.7	34.0	Sannat	109.9	89.5
Iklin	97.4	33.6	Santa Lucija	18.1	15.2
Isla	69.7	58.2	Santa Venera	35.7	22.4
Kalkara	99.3	67.2	Siggiewi	67.7	45.7
Kercem	120.2	89.5	Sliema	90.9	71.6
Kirkop	44.0	33.6	Swieqi	66.9	35.8
Lija	43.9	22.4	Ta' Xbiex	166.6	53.7
Luqa	54.4	53.7	Tarxien	68.1	56.0
Marsa	31.0	26.9	Valletta	104.5	85.1
Marsascala	72.7	53.7	Xaghra	94.9	71.6
Marsaxlokk	95.5	60.0	Xewkija	93.1	71.6
Mdina	130.1	89.5	Xghajra	75.0	76.1
Mellieha	106.4	71.6	Zabbar	73.5	56.4
Mgarr	71.0	46.6	Zebbug (Ghawdex)	57.7	44.8
Mosta	45.4	31.3	Zebbug (Malta)	86.4	44.8
Mqabba	57.3	38.1	Zejtun	67.2	44.8
Msida	47.4	33.1	Zurrieq	108.4	44.8

Source: Author's calculations.

Table 5 : Airbnb nightly rates by type

Property type	Average € / night	Median € / night
Aparthotel	64.3	62.7
Apartment	71.1	53.7
Bed and breakfast	59.7	49.3
Boat	342.6	89.5
Boutique hotel	104.4	89.1
Bungalow	181.0	141.0
Guest suite	58.2	53.7
Guesthouse	76.0	76.1
Hostel	43.9	25.1
Hotel	156.1	179.1
House	89.0	51.9
Serviced apartment	104.0	71.6
Townhouse	66.6	44.8
Villa	174.2	125.4

Source: Author's calculations.

Table 6 : Correlation matrix across attributes

	Host listings count	Number of people in accomodation	Bathrooms	Bedrooms	Beds	Price	Number of reviews	Review scores rating	Reviews per month
Host listings count	1.00								
Number of people in accomodation	0.10	1.00							
Bathrooms	0.10	0.63	1.00						
Bedrooms	0.08	0.80	0.69	1.00					
Beds	0.07	0.82	0.64	0.75	1.00				
Price	0.19	0.54	0.44	0.52	0.41	1.00			
Number of reviews	-0.12	-0.06	-0.10	-0.10	-0.08	-0.12	1.00		
Review scores rating	-0.18	-0.02	0.00	0.01	-0.06	0.05	0.05	1.00	
Reviews per month	-0.17	-0.12	-0.15	-0.14	-0.16	-0.17	0.52	0.13	1.00

Source: Author's calculations.

4.1. Price-characteristics patterns in the dataset

Sets of regressions are estimated using the data.[30] At first, a simple regression compares the logarithm of prices for short-term rentals with the number of bedrooms, the number of guests the property can accommodate,[31] the availability of sea-views and the availability of a pool. An extra bedroom increases the final nightly price by around 27.0%, an extra guest by around 6.5%, the availability of a pool increases the nightly price by around 21.0%, while sea-views increase the nightly price by 14.0%.

Using a more complex method which accounts for spatial dependence in pricing behaviour does not change the results significantly for the variables describing the property characteristics.[32] However, this method's estimate for the spatial lag of prices is statistically significant. This confirms that there is a process of spatial interaction between property owners when setting prices for short-term rentals.

This clustering behaviour is confirmed in a further regression, which finds statistically significant differences in prices for properties listed in a number of localities. The village of Attard is assumed to be the benchmark, as it is mostly residential in nature. Statistical differences are found in localities which are popular with tourists for their historic nature (for example, Birgu, Bormla, Mdina, Valletta), their central locations (for example, Gzira, Sliema and San Giljan), or for their amenities (for example beaches in Mellieha, selected localities in Gozo, and the seaside fishermen's village of Marsaxlokk). These geographical price differentials confirm the analysis carried out in Ellul, Darmanin and Borg (2019) on house price differences across regions in Malta.[33]

[30] These are included in the Appendix to this study.

[31] The difference between the number of bedrooms variable and the maximum number of guests the property can accommodate relates to how easily other rooms may be converted into bed spaces, and how 'dense' in terms of occupants a property may be.

[32] A generalised method of moments model with spatially lagged endogenous regressors, based on the geographical longitude and latitude of the properties listed on Airbnb.

[33] For reference to this regression, see Table 10 in the Appendix to this study.

5 What are the policy implications of short-term tourist lets?

There appears to be a vibrant market for short-term tourist lets in Malta, which is dominated by commercial operators with multiple listings. In order to assess the policy implications of short term-rents, this study looks at some possible estimates on revenues based on a number of assumptions linked with occupancy. Moreover, using a macro-econometric model of the housing market, this study also estimates the direct impact of short-rents of whole properties on long-term house price inflation. In other countries, there is evidence that Airbnb contributes to rent price inflation, however data limitations does not allow a similar analysis to be carried out for Malta.

5.1. Revenues

An estimate for possible revenues is calculated on the basis of the calendar availabilities of the listing and an occupancy rate. This exercise is carried out on the basis of the self-reported figures of maximum number of beds available for accommodation purposes. In that sense, this estimate is not to be looked at as revenues generated by Airbnb listings only, but as revenues generated by properties available for short-term rental irrespective of which website or search engine they are listed.

To calculate the estimated revenues, the self-reported availabilities - in terms of days per year - are multiplied by the quoted prices, and then an assumption is made on the occupancy rates, which are assumed to be 30.0%, 50.0% and 70.0%. The estimated revenues in the three scenarios are €47.6 million, €79.4 million and €111.1 million, respectively.[34] As NSO data appears to suggest an occupancy rate which is very close to 70.0%, the latter scenario is considered to be a likely estimate. Moreover, this occupancy rate is broadly in line with that in collective accommodation establishments.

A more conservative estimate of listing occupancy, however, was also calculated based on the

[34]These figures exclude charges on short-term rentals for additional cleaning expenses, utilities, and other services.

number of reviews per property, returning annual estimated gross revenues of €33.1 million.

As a comparison, in the three years to 2016 the revenues generated from long-term rentals to private individuals, such as - for example - foreign workers living in Malta, stood at €30.6 million, €47.5 million and €92.0 million, generated on the basis of 4,062, 4,945 and 7,249 registered contracts respectively.[35] It is apparent that the revenue estimates for short-term rentals are broadly in line with developments in other parts of the housing market.

5.1.1. Revenues by listing ownership

As discussed above, property listing ownership in Malta appears to be strongly skewed towards multiple listings by the same hosts. In the dataset, there are a total of 3,856 hosts. Using the estimates calculated above, it is possible to calculate the distribution of estimated revenues among hosts, and to comment on hosts with multiple listings. Using the conservative estimate for occupancy, hosts earn - on average - a monthly income of around €716.

In the three more reasonable occupancy scenarios discussed above (30.0%-50.0%-70.0%), the estimated monthly earnings for the hosts stand at €1029, €1715 and €2401 respectively.[36] These are comparable with market rates for long-term rentals of large properties in highly-demanded areas. However, as these figures are also based on conservative assumptions which exclude fees charged for 'extras' such as cleaning services and utilities, the income generated by listing owners may be much higher. This would make short-term lets significantly more lucrative than long-term rental alternatives.

The top 10.0% of hosts in terms of revenues earn around 59.9% of all revenues generated in the three different occupancy scenarios.[37] In the conservative occupancy scenario, which adjusts

[35] Parliamentary Question 4824 - Leg. XIII - Sitting 98.

[36] These figures represent the summation of the nightly rates charged by owners for their listings, multiplied by the number of nights per year these properties are available, and further multiplied by the fraction of occupancy rates discussed above. Moreover, the author - following an analysis of Airbnb terms and conditions - assumes that Airbnb charges fees for its services as a mark-up on the revenues earned by the owner. If, however, one were to assume that (i) Airbnb charges a margin on the revenues and (ii) this margin stands at, on average, 16.5%, then the average revenues for owners under each scenario would stand at €859, €1432 and €2005, respectively.

[37] The scenarios are linear in nature, such that the distribution is identical across the range.

for occupancy based on reviews, the distribution is such that the top 10.0% of hosts in terms of revenues earn 55.8% of total revenues. This is further indication of highly commercialised operations on the short-term rental market.

5.2. Short-term rents' impact on long-run real house prices

In recent years discussions on housing affordability and analyses on rental and house prices have increased somewhat. The increase in inward migration, coupled with strong growth in tourist arrivals, has placed significant pressure on Malta's housing stock. In other countries and cities, the discussion on Airbnb's impact on housing availability and affordability is couched in terms of entire dwelling listings. If these are to be rented out often enough to short-term tourists along the year, they can no longer serve as housing for long-term tenants. Listings of private rooms may not have as strong an effect on affordability as they tend to have limited impact on the housing market. This assumption, however, is valid if such short-term renters do not displace long-term tenants.

This policy note also attempts to measure the impact of Airbnb on real house price developments in Malta. The model discussed in Gatt, Rapa and Micallef (2018), shows how a 1.0% increase in per capita housing stock will lead to a 1.3% decrease in real house prices in the long-run. The model looks at per capita housing stock, which is non-linear in the number of houses in Malta. In order to asses in simple terms the impact of the properties devoted to Airbnb on the property prices, this study will assume the sudden return to availability on the property market of some of those "entire dwellings" devoted to short-term lets. Specifically, the study focuses on apartments, as these are probably the type of properties easily purchased by Maltese residents, particularly as their first residential property. Of course, this is a very simplistic scenario as it excludes a number of factors and second-round effects, such as the effects of such a shift on residential investment, tourism and the rest of the economy. The attempt is to estimate what would happen if the "whole dwelling" listings found on Airbnb were to suddenly become available as occupied housing stock.

In order to do this, occupied housing stock in the model is shocked by 10.0%.[38] The results obtained in the above step are then rescaled with the proportion of the 4,037 apartments in the occupied housing stock. Other property types, such as villas and farmhouses are excluded. While their sudden availability for sale may be expected to affect overall house prices, these particular types of dwellings are excluded as their nature as large, luxury units with characteristics beyond those found in typical homes would distort the results of this simple scenario. The apartments in the Airbnb dataset would account for roughly 2.5% of estimated occupied housing stock in the model. Using this method, the sudden availability of these apartments as occupied housing stock for residential purposes would lead to a decrease in long-run real house prices by 2.8% by the fourth year (see Table 7). All estimated shocks stabilise by the tenth year of the model scenario.

Table 7 : Estimated impact of shifting "whole dwelling" apartment listings to occupied housing stock

	Y0	Y1	Y2	Y3	Y4
Housing Block					
Real House Prices	0.0	-1.1	-2.1	-2.6	-2.8
Real Dwelling Investment	0.0	0.0	-0.5	-0.9	-1.2
Gross Housing Stock	0.0	0.0	0.0	0.0	0.0
Occupied Housing Stock	2.5	2.5	2.5	2.5	2.5

Source: Author's calculations, based on work by Mr. N. Rapa.

This assumption operates as an exogenous shock to the supply side, and it excludes demand side effects arising from the re-conversion of apartments from rentals to occupied year-round housing.[39] This serves to further depress real dwelling investment growth, which is negative due to the mechanical effect of higher house occupancy dampening demand for houses. It also excludes the impact of such a shift in the utilisation purpose of housing stock on the rest of the economy, in particular on the tourist industry and its occupation rates.

[38] The author would like to thank Mr. N. Rapa for his help and willingness to carry out the necessary work in order to arrive to suitable estimates for a shock to housing stock.

[39] One of the main shortcomings of this housing market model is its inability to explicitly consider the rental market, due to lack of data.

5.3. Policy implications of short-term rent listings in Malta

This analysis discusses how Airbnb listings are distributed, and where and how estimates for revenues may be distributed. It is apparent that a number of operators are capturing a substantial share of the total revenues generated by Airbnb listings in Malta. The proportion of hosts with single listings shows that there is a minority of individuals or families with extra space for rental, but that in the majority of cases, multiple properties are listed by the same hosts.

Some of these appear to be running properties on a commercial basis. While, in theory, policymakers regulate the emergence of Airbnb using evidence-based policy making, in practice, some cities do not impose any regulation, while others ban it altogether. That is because there is no official data upon which to design policies. Ultimately, to properly regulate the short-term rental market, policymakers ought first to decide how, where, when, and what to regulate (Quattrone et al., 2016).

Airbnb guests spend a significant proportion of their expenditures as tourists in the local community (Edelman and Geradin, 2015). In that sense, accommodation sharing platforms can serve as an economic development tool, particularly in areas not typically devoted to tourism. However, the tourism flows they bring ought to be sustainable. Tourists tend to congregate in central areas, or in areas with specific amenities.

This study shows how Airbnb listings are spread further across Malta and Gozo than the more traditional hotel industry. Nevertheless, short-term rental concentrations ought to be avoided - as the long term effects on communities and residents may affect the character, ambience and ability of communities to persist over time. This is especially the case if, as indicated by the proportion of multiple listings with the same hosts, these short-term rentals are being run along commercial lines.

Short-term rentals affect communities' quality of life, as well as neighbourhood residential prices and availability of housing. Policymakers ought to assess and study the implications and

benefits of this industry. Such studies ought to assess if these short-term rental revenues are being taxed, how they ought to be taxed, both for income and for eco-contribution purposes, as well as whether the revenues generated from such taxation is devolved towards authorities tasked with addressing the pressures generated by such rentals, or towards the communities and local councils most affected by the short-term rental phenomenon.

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7 Appendix

A simple ordinary least squares regression is carried out on the data, regressing the natural logarithm of prices against a number of variables (see Table 8). These are the number of listings a host has, the number of bedrooms, the maximum number of guests a listing can accommodate, whether the listing has a pool and whether it has a sea-view. The results are strongly significant and return the expected coefficient sign.

This simple regression compares the logarithm of prices for short-term rentals with the number of bedrooms, the number of guests the property can accommodate, the availability of sea-views and the availability of a pool. An extra bedroom increases the final nightly price by around 27.0%, an extra guest by around 6.5%, the availability of a pool increases the nightly price by around 21.0%, while sea-views increase the nightly price by 14.0%.

Table 8 : Ordinary least squares regression

Source	**SS**	**df**	**MS**	Number of obs	8758.0
Model	1490.6	5	298.1	F(5, 8752)	677.74
Residual	3849.7	8752	0.4	Prob > F	0.0000
Total	**5340.3**	**8757**	**0.6**	R-squared	0.2791
				Adj R-squared	0.2787
				Root MSE	0.6632

ln_price	**Coef**	**Std. Err.**	**t**	**P>|t|**	**[95% Conf.**	**Interval]**
host_listings_count	0.00098	0.00	5.59	0.000	0.00	0.00
bedrooms	0.26705	0.01	36.90	0.000	0.25	0.28
guests_included	0.06517	0.00	13.28	0.000	0.06	0.07
pool	0.21404	0.02	10.55	0.000	0.17	0.25
seaviews	0.14042	0.02	6.05	0.000	0.09	0.19
_cons	3.38558	0.01	250.20	0.000	3.36	3.41

Source: Author's calculations.

7.1. Spatial econometrics

The main concept behind spatial econometrics focuses on spatial lags. This is similar in nature to time lags in time series analysis. Spatial econometrics assumes that localities and geographical areas are not independent from each other, but interdependent. Spatial econometrics, hence, focuses on the measurement of impacts deriving from some spatially dependent structure based on spatially lagged variables.

These are constructed on the basis of spatial weight matrices.[40] Usually, spatially lagged variables are used for characteristics which may affect the price of a property in a given location. For example, sea-views may represent a visual amenity. If that is the case, then listings surrounded by other properties with sea-views may, ceteris paribus, have higher prices.

The model assumes "joint decisions", that is, instead of listing hosts setting their prices first, with subsequent effect on other properties, the approach models an interdependent process by which each owner sets prices by taking into account the prices that will be set in neighbouring locations. A generalised method of moments framework is used in this analysis, with a lagged price variable showing statistically significant effects (see Table 9). The statistical significance of the lagged price variable confirms that there is a process of spatial interaction between property owners when they set prices for short-term rentals.

[40] In this analysis, spatial weight matrices and spatially lagged variables are calculated using the spgen package in STATA.

Table 9 : Generalised methods of moments with spatially lagged endogenous regressors

		Number of obs	8756.0
		Wald chi2(6)	677.74
		Prob > chi2	0.0000
		R-squared	0.3016
GMM weight matrix: Robust		Root MSE	0.6525

ln_price	Coef	Std. Err.	z	P>|z|	[95% Conf.	Interval]
ln_price_w_lag	0.06961	0.03	2.55	0.0110	0.02	0.12
bedrooms	0.31364	0.01	25.74	0.0000	0.29	0.34
guests_included	0.04801	0.01	8.24	0.0000	0.04	0.06
pool	0.20185	0.02	10.16	0.0000	0.16	0.24
seaviews	0.11499	0.02	5.28	0.0000	0.07	0.16
host_listings_count	0.00097	0.00	3.16	0.0020	0.00	0.00
_cons	3.06505	0.11	27.45	0.0000	2.85	3.28

Instrumented: ln_price_w_lag
Instruments: bedrooms guests_included pool seaviews host_listings_count
w_lag_bedrooms w_lag_guests_included w_lag_pool
w_lag_seaviews w_lag_host_listings_count

Source: Author's calculations.

Table 10 : Ordinary least squares regression with localities

Source	SS	df	MS	Number of obs	8758.0
Model	2073.1	72	28.8	F(72, 8685)	76.54
Residual	3267.2	8685	0.4	Prob > F	0.0000
Total	**5340.3**	**8757**	**0.6**	R-squared	0.3882
				Adj R-squared	0.3831
				Root MSE	0.6133

ln_price	Coef	Std. Err.	t	P>|t|	[95% Conf.	Interval]
host_listings_count	0.00078	0.00	4.75	0.0000	0.00	0.00
bedrooms	0.28198	0.01	40.98	0.0000	0.27	0.30
guests_included	0.05385	0.00	11.76	0.0000	0.04	0.06
pool	0.25256	0.02	11.70	0.0000	0.21	0.29
seaviews	0.10489	0.02	4.79	0.0000	0.06	0.15
_cons	3.09282	0.10	30.97	0.0000	2.90	3.29
localities						
Attard (Benchmark)						
Balzan	-0.03755	0.16	-0.24	0.8120	-0.35	0.27
Birgu	**0.56699**	**0.12**	**4.75**	**0.0000**	**0.33**	**0.80**
Birkirkara	-0.14890	0.11	-1.31	0.1900	-0.37	0.07
Birzebbugia	0.22533	0.13	1.73	0.0830	-0.03	0.48
Bormla	**0.60317**	**0.12**	**5.20**	**0.0000**	**0.38**	**0.83**
Dingli	0.62010	0.62	1.00	0.3180	-0.60	1.84
Fgura	-0.27281	0.18	-1.52	0.1270	-0.62	0.08
Floriana	**0.59279**	**0.11**	**5.16**	**0.0000**	**0.37**	**0.82**
Fontana	**0.37103**	**0.17**	**2.19**	**0.0290**	**0.04**	**0.70**
Ghajnsielem	**0.31851**	**0.12**	**2.73**	**0.0060**	**0.09**	**0.55**
Gharb	**0.38146**	**0.11**	**3.40**	**0.0010**	**0.16**	**0.60**
Gharghur	**0.82738**	**0.27**	**3.07**	**0.0020**	**0.30**	**1.36**
Ghasri	**0.39722**	**0.12**	**3.22**	**0.0010**	**0.16**	**0.64**
Ghaxaq	-0.14248	0.25	-0.56	0.5720	-0.64	0.35
Gudja	0.22343	0.19	1.17	0.2440	-0.15	0.60
Gzira	**0.34718**	**0.10**	**3.34**	**0.0010**	**0.14**	**0.55**
Hamrun	-0.01957	0.13	-0.15	0.8800	-0.27	0.24
Iklin	0.10102	0.18	0.58	0.5650	-0.24	0.45
Isla	**0.43157**	**0.12**	**3.56**	**0.0000**	**0.19**	**0.67**
Kalkara	**0.61333**	**0.15**	**4.13**	**0.0000**	**0.32**	**0.90**
Kercem	0.16538	0.13	1.28	0.2010	-0.09	0.42
Kirkop	0.11460	0.27	0.43	0.6710	-0.41	0.64
Lija	-0.20172	0.20	-1.02	0.3060	-0.59	0.18
Luqa	0.25023	0.20	1.27	0.2040	-0.14	0.64
Marsa	-0.13957	0.27	-0.52	0.6040	-0.67	0.39
Marsascala	0.16279	0.11	1.53	0.1260	-0.05	0.37
Marsaxlokk	**0.52911**	**0.13**	**3.99**	**0.0000**	**0.27**	**0.79**
Mdina	**0.96803**	**0.16**	**5.89**	**0.0000**	**0.65**	**1.29**
Mellieha	**0.38626**	**0.10**	**3.71**	**0.0000**	**0.18**	**0.59**
Mgarr	0.24448	0.13	1.94	0.0520	0.00	0.49
Mosta	-0.09348	0.12	-0.78	0.4350	-0.33	0.14
Mqabba	0.24551	0.32	0.76	0.4460	-0.39	0.88
Msida	-0.10551	0.10	-1.01	0.3140	-0.31	0.10
Mtarfa	-0.34393	0.25	-1.36	0.1730	-0.84	0.15
Munxar	0.15691	0.11	1.43	0.1530	-0.06	0.37
Nadur	0.17076	0.11	1.50	0.1340	-0.05	0.39
Naxxar	0.16930	0.12	1.43	0.1510	-0.06	0.40
Paola	0.06230	0.18	0.34	0.7330	-0.30	0.42
Pembroke	-0.19767	0.12	-1.67	0.0960	-0.43	0.03
Pieta	0.02195	0.12	0.18	0.8540	-0.21	0.26
Qala	**0.27508**	**0.11**	**2.45**	**0.0140**	**0.05**	**0.50**
Qormi	-0.23054	0.15	-1.54	0.1240	-0.52	0.06
Qrendi	0.22696	0.25	0.90	0.3680	-0.27	0.72
Rabat (Malta)	**0.29510**	**0.12**	**2.53**	**0.0110**	**0.07**	**0.52**
Rabat (Victoria)	**0.27828**	**0.12**	**2.39**	**0.0170**	**0.05**	**0.51**
Safi	-0.34411	0.22	-1.58	0.1150	-0.77	0.08
San Giljan	**0.49589**	**0.10**	**4.86**	**0.0000**	**0.30**	**0.70**
San Gwann	-0.09104	0.11	-0.81	0.4200	-0.31	0.13
San Lawrenz	0.13088	0.13	1.00	0.3160	-0.12	0.39
San Pawl il-Bahar	0.19303	0.10	1.90	0.0570	-0.01	0.39
Sannat	**0.47870**	**0.13**	**3.76**	**0.0000**	**0.23**	**0.73**
Santa Lucija	**-0.57492**	**0.27**	**-2.13**	**0.0330**	**-1.10**	**-0.05**
Santa Venera	-0.18678	0.15	-1.23	0.2170	-0.48	0.11
Siggiewi	0.28594	0.16	1.83	0.0670	-0.02	0.59
Sliema	**0.48815**	**0.10**	**4.82**	**0.0000**	**0.29**	**0.69**
Swieqi	-0.01194	0.10	-0.11	0.9090	-0.22	0.19
Ta' Xbiex	**0.45003**	**0.13**	**3.46**	**0.0010**	**0.20**	**0.70**
Tarxien	**0.39443**	**0.15**	**2.58**	**0.0100**	**0.09**	**0.69**
Valletta	**0.93036**	**0.10**	**8.96**	**0.0000**	**0.73**	**1.13**
Xaghra	0.17773	0.11	1.66	0.0970	-0.03	0.39
Xewkija	**0.28950**	**0.12**	**2.33**	**0.0200**	**0.05**	**0.53**
Xghajra	0.25335	0.17	1.47	0.1420	-0.08	0.59
Zabbar	0.08515	0.15	0.55	0.5810	-0.22	0.39
Zebbug (Ghawdex)	0.00013	0.11	0.00	0.9990	-0.21	0.21
Zebbug (Malta)	0.23991	0.14	1.74	0.0830	-0.03	0.51
Zejtun	0.02338	0.15	0.16	0.8740	-0.27	0.31
Zurrieq	0.28116	0.16	1.78	0.0750	-0.03	0.59

Source: Author's calculations.