



The effect of Airbnb on housing prices

Eduard Juan Noordermeer Montoya

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Department of Economics and Economic History

Tutors:

Dr. Luis Ángel Hierro Recio

Dr. David Patiño Rodríguez

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Abstract

This paper establishes a relationship between housing prices and the influence of Airbnb businesses in both price and quantity. Its sample is the 50 provinces of Spain. It employs an econometric model to set up the influence of its variables in a significant way through Ordinary Least Squares. Studying the price of housing while the average price of Airbnb and its quantity of offers are the main variables to be analyzed, obtained by direct scraping of its website. The main results reflect a positive correlation both in terms of price and supply. As they get higher the average price of housing increases. It has been estimated an approximate effect of an increase in the price per square meter of housing of €1 for every 16 new offers and an increase of €1.3 per square meter for every euro increase in the average price of Airbnb offers. Therefore, it is concluded that housing has gained value in view of the possibility of investing in this short-term rental business.

Key words: Housing price, P2P accommodation, Airbnb

JEL Codes

D16, R31, L83

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1. Introduction

This article is an analysis of the impact of tourism on the price of housing, with tourists being potential users of these for their tourist rental.

During the last decade in Spain, renting housing has become popular as an overnight stay option, occupying a space that has historically been occupied by the hospitality industry, more specifically the hotel sector.

This rental option is offered through platforms that connect landlord and tenant in exchange for a commission. These services are known as “Peer2peer” or “P2P” for short. In Spain, the company that connects landlord and tenant using its own platform that has the highest turnover is Airbnb.

Since a greater profit can be obtained with this rental model than with the classic rental rental, the traditional rental housing stock can be allocated to tourist clients. This could increase the prices of traditional leases, either due to the reduction in supply or the search for an economic return similar to the new model.

To continue the investigation of the matter, it has been analyzed whether the total price of housing has been affected by this phenomenon, as it is an investment object limited in quantity and with a potential benefit in the face of a growing sector.

The objective of this study has been to carry out a price analysis in the real estate market based on an econometric model that explains the current housing prices in the country and its correlation with the Airbnb business.

The geographical scope of this study is the whole of Spain, making a distinction between the 50 provinces of the country. Which will be established throughout the document and in the annex in alphabetical order numbered from 1 to 50. The analysis does not include the autonomous cities of Ceuta and Melilla due to the lack of updated data for some variables, which would distort the analysis.

The study estimates the correlation between housing prices and tourist rental prices. Therefore, the tourism factor is fundamental and those provinces with a greater and lesser number of tourists will be distinguished. In order to carry out a realistic analysis of Spain as a whole and not only of those areas with the greatest Airbnb offering.

Although the analysis could be carried out on a smaller scale, for example, provincially or exclusively for those with the greatest number of offers. The largest number of provinces has been chosen by providing more global data, which increases the effectiveness of the study and will alleviate possible peculiarities that, although they will be taken into account during the analysis, the greater the number of samples, the lower the possibility of specific distortions spoiling the model.

Another important factor is the temporal moment, since the data corresponds to a data panel in which those referring to Airbnb have been taken in the month of February 2022, that is, in the low tourist season.

Regarding the methodology, we have worked under the following hypothesis:

The increase in homes dedicated to short-term rentals on platforms for tourism purposes, together with their economic return, has caused a general increase in housing prices.

To obtain satisfactory conclusions, an econometric study has been carried out with the following variables:

Housing price (Dependent variable), Rental price, Price of Airbnb businesses, Number of Airbnb offers, Available Income, Secondary Housing and mortgage interest rate.

The proposed model is macroeconomic in nature and its coefficients have been obtained through an Ordinary Least Squares regression with robust estimation of heteroscedasticity and collinearity analysis.

The main results are the determination of a positive correlation between the price of housing and the quantity and price of properties intermediated by Airbnb. A greater number of Airbnb offers implies a higher price per square meter. For every increase in 16 Airbnb offers available, the price of housing grows by €1 per square meter. In turn, an increase of one euro in the rental price causes an increase of €1.3 per square meter of residential housing.

The number of offers is especially relevant for the analysis, so, although the impact of the potential price exists, for homeowners available to do business, the business forecast is the most important factor. They tend to choose to offer their home as an Airbnb rental in a scenario of high tourist demand, with the analysis of the price to be received compared to other bidders in their area being a less relevant factor. The hypothesis is satisfactorily fulfilled, especially with respect to quantity, with Airbnb being an influential factor for higher housing prices in Spain as of February 2022.

The work is structured in 6 sections. In addition to this introduction, the second reviews the most notable literature regarding the Airbnb market and its impact on the real estate market. The third section establishes the methodology to be followed and the source of the data used for the study. In addition, the data obtained from each of the variables in the model is compiled with its nature and justification. Once all the data have been established, the fourth section presents the results of the model with a corresponding analysis. The study ends with a fifth reflective section along with the relationship between the results and the literature. All the referred bibliography can be found in a sixth concluding section. The annexes referred to throughout the document are found at the end of it.

2. Literature Review

The real estate market in Spain has been characterized by great volatility in prices in the first decade of the century due to the expansionary situation of the economy and the characteristics of this sector.

The price of housing plummeted with the explosion of the real estate bubble caused by the economic crisis of 2008. It was from 2016 onwards that the price began to recover again, reaching similar levels later (Alves, & Urtasun,2019). At the same time, rental prices have also increased generally throughout the country, and especially in large cities (Lopez & Matea2019).

One of the possible factors that explain this recent growth in prices is the emergence of “Peer to peer” (p2p) rental platforms, the impact of which will be verified in the study. Those that connect landlords and tenants through their platform for short-term rentals. Consumers who travel mainly for leisure or work (Liang et al.,2020). Examples of these would be Airbnb, Booking and Vrbo.

The effect of p2p platforms has had a high impact on the scientific community, with dozens more articles published each year on the matter than the previous one, taking into account perspectives on prices, tastes, gentrification, environment, tourism and economic consequences.(Kuhzady, Seyfi & Béal.2020).

There is therefore literature that indicates a relationship between tourist rentals and housing prices, specifically in the price of residential rentals. For example (Rodríguez, Hierro & Patiño.2019)showed an increase in the price of residential rentals of 13.69% on the coasts of Andalusia, pointing out a special impact for sun and beach tourist areas, even in small municipalities, analyzing Airbnb prices. In an analogous way(Etxezarreta et al.2020)established a relationship of 7.3% between intensification and rental prices in San Sebastián, being a tourist area with characteristics different from Mediterranean beach tourism. Another city with a correlation studied with a more urban approach is Barcelona,where it has been estimated responsible for a 4% increase in rental prices (Segú,2019).This phenomenon is not exclusive to Spain, in turn(Horn& Merante.2017) estimated that every 1% increase in Airbnb activity generates a 0.22% increase in the rental income index in Boston.

The use of this rental model has increased over the last decade, especially in large cities of tourist interest. That have increased the number of visitors and have presented situations of gentrification, that is, the population of tourist areas has been displaced to lower-income areas to accommodate families with greater resources or in this case tourists (Wachsmuth & Weisler,2018). In fact, proximity to the urban center is the most decisive objective factor when establishing the rental price. (Tong & Gunter.2020).Being a reason for touristification in the central areas of the cities.(Morales & Nunez2021).The transition from a long-term to short-term rental model is closely linked to the proximity of tourist and historical points, since they are the most profitable. (Shokoohyar, Sobhani & Sobhani.2020)

In general, in Spain a transition has been highlighted in the most gentrified areas in the rental offer from residential to tourist. This reduction in supply together with the price trends in the sector has led to a general increase in prices.(Gonzalez, Checa & Cano,2021). Given this perspective, models have been proposed to limit the arrival of tourists to avoid the corresponding socioeconomic problems (Benítez,2021)

In spaces dedicated to massive sun and beach tourism, income in the sector and the number of homes in this market has increased. The transition to the sector has been especially lucrative, increasing the sector's profits by 350% between 2010 and 2015. While prices have continued to grow, so has its competition, with profitability having declined since then, but still high.. (Yrigoy,2019)

There is an unavoidable factor for the analysis because it has distorted the generalized behavior of the population, which has been the “Orthocoronavirinae” pandemic, popularly known as “Coronavirus” or in its abbreviation “COVID”. Due to local and international movement limitations (Bakar & Rosbi,2020). The COVID crisis has had a distorting impact on the upward trend in prices, with 41% of non-professional reservations having been reduced between April 2020 and January 2021, and the tourist rental price of the properties has also been reduced by 11.3%. homes and 4.7% individual rooms. The impact on the professional hospitality sector was slightly greater, at 13.6% and 9.8% respectively.(Simplicity,2021)

With the covid-19 crisis, the number of articles in 2020 has been reduced due to the circumstances of the impact. The number of articles published was reduced by 55% compared to the previous year, especially market and social impact studies.(Hijrah et al.2021)Therefore, there is room for study related to the effects of COVID.

This situation, however, has not ended the trend. On the contrary, although there has been a relative reduction in the price after the shock, it has continued to grow and has gained share of the hotel sector due to the isolation of the home over the hotel (Fairley, et al.,2021). At the same time.The impact of short-term rentals has forced hotels to improve their quality and consequently their prices.(Casado & Sellers,2020)

(Sanchez,2021)It indicates a perspective of the population towards local tourism or experiences far from urban centers, this can also distort the evolution of prices, although a retraction of the trend is expected with the fall of restrictions.

One of the study factors in this article is the quantity offered of Airbnb from which certain characteristics are expected according to its territorial distribution. For these businesses, complete or partial properties can be used, which function as a main or secondary home. These take the form of complete houses, apartments, farms and even private rooms can be rented where the tenant lives with the usual residents or with other clients (Flamarich & Duro,2014).

The greater the amount of housing per square meter, the more potential supply. Therefore, a greater quantity is expected in cities with a greater number of inhabitants and urban concentration. (Merino, Lago & Serrano,2003)

A greater number of offers are also expected in coastal areas as it is the main tourist destination in Spain (Batista e Silva, et al.2018). This is because there is a direct

correlation between the number of tourists received and the Airbnb offer, so they are variables with a similar behavior, being able to deduce the other from one, since the greater the amount of tourism, the greater the amount of hotel accommodation and Airbnb offers (Adamiak,2018). A final factor to take into account is the proximity of airports to tourist centers, since the closer the accommodation is to this, the greater the demand for Airbnb (Adamiak, et al.,2019).

The relationship between increasing rental prices and the number of Airbnbs (Kassoum et al.,2019) is due to the fact that the number of Airbnb offers increases while the number of traditional rentals decreases, keeping the total number of offers the same. (Barron, Kung & Proserpio,2020)

Although there are numerous studies relating the influence of Airbnb on traditional rental prices, there is a study space for its effect on the total price of housing in Spain.

3. Methodology and data sources

The methodology consists of the estimation of an econometric model that allows elucidating an answer to the hypothesis proposed through the treatment of databases and certified reports. To do this, cross-sectional data is established with the most recent data possible for each of the variables that determine the aforementioned model.

In order to establish these variables, the knowledge provided by studies with similar characteristics and compiled in the “previous literature” of this document will be used as a reference.(Rodríguez, Hierro & Patiño.2019) (Continue,2019). This has been done through three fundamental pillars for obtaining data:

- Data provided by public administrations. Especially the Tax Agency and the INE.
- Reports from private entities regarding the matter. Such as associations or real estate portals.
- Airbnb information to establish a database updated as of February 2022 obtained through the “Scraping” technique. This consists of using software that extracts information directly from websites and applications in real time. In an automated way by interpreting its source code.

The variables used for this analysis are the following:

| <i>Variable name</i> | <i>Description</i> |
|-------------------------------|----------------------------------------------------------------------------|
| <i>Housing prices</i> | Dependent variable |
| <i>Average rental price</i> | Traditional real estate market prices |
| <i>Airbnb Average Price</i> | Airbnb platform prices |
| <i>Airbnb Quantity</i> | Number of accommodation offers available |
| <i>Available rent</i> | Income of the population estimated for free use |
| <i>Consumer price index</i> | Price index with respect to 2016. |
| <i>Mortgage interest rate</i> | Annual mortgage interest rate |
| <i>Secondary home</i> | Total number of secondary housing by province available for commercial use |

Being the model for the study:

$$Precio_i^{\text{housing}} = \beta_0 + \beta_1 \text{Rental price} + \beta_2 \text{Airbnb Price} + \beta_3 \text{Amount of airbnb} + \beta_4 \text{Available income} + \beta_5 \text{Interest} + \beta_6 \text{CPI} + \beta_7 \text{Secondary Housing}$$

The model analyzes a cross-section of the data referred to below. The estimates are made using Ordinary Least Squares [OLS] robust to heteroscedasticity and multicollinearity analysis.

The especially relevant data for the study are those referring to Airbnb, these referring to the month of February 2022, the month in which data was obtained directly from Airbnb. The model presents a cross section instead of a time series due to the static nature over time of Airbnb's price and quantity variables. This is because today there are no time series available that collect quantity and prices referring to Airbnb in an adequate way for the needs of the study.

The scope of study includes the entire Spanish territory. The descriptive variables present data for the 50 provinces and therefore for 50 observations.

The data used for the analysis of each of the variables is found in the [exhibit](#) of the article and its main statistics are compiled in the following table:

Table 2. Descriptive statistics

| Name | N | Half | Typical deviation | Minimum | Maximum |
|-------------------|-----------|----------|-------------------|---------|---------|
| Sale price | 15,442.70 | 637.51 | 759 | 3,351 | |
| Airbnb Price | 111.03 | 45.05 | 44.58 | 279.04 | |
| Airbnb Quantity | 1,307 | 2,491.20 | 30.00 | 14,205 | |
| Rental price | 8.04 | 3.17 | 4.80 | 23.80 | |
| Available rent | 20,659 | 2,340.20 | 17,375 | 29.88 | |
| CPI | 111.88 | 0.83 | 109.7 | 113.81 | |
| Interest | 17 | 0.02 | 0.001 | 0.014 | 0.022 |
| Secondary Housing | 73,619 | 57,161 | 9,791 | 326,705 | |

The established variables are compiled below. For each of them, the method or source through which the data was obtained is specified. The reason for using each of the variables is also explained. In addition, the treatment carried out on these data is specified for its adaptation to the model.

- *House price [Dependent variable]:*

The price of housing in Spain constitutes the dependent variable of our work. Data provided by Idealista will be used for its determination.

Idealista is an online real estate portal that works in Spain, Italy and Portugal. It is the portal with the largest amount of compiled data on homes for both sale and rental and its data publication is monthly and immediate, thus being the data source that best adapted to the characteristics of the study. This portal also compiles reports on sales and rentals in all the territories it participates on a monthly basis. Being able to obtain not only updated data but also its historical evolution since 2007 when it comes to obtaining context about the market in question. Data on the activity of this portal is published in its “Press Room” and can be obtained manually by breaking down the provinces one by one. (Idealistic, 2022)¹. So a direct report from the same entity is suitable for the study.

The data identifies its price as euro per square meter as of February 2022.

- *Average rental price (Traditional)*

Rent is, in the first instance, a variable strongly related to the price of housing. Having a direct relationship with the Airbnb rental variable and connection with the homes, since these can be available for sale or rent. As has been established in previous literature.

For its study, the same reference is used as for the dependent variable, since the Idealista portal also collects rentals and produces reports of exactly the same nature for this data. (Idealistic, 2022). This allows greater precision in the analysis since the database and methodology for obtaining this variable and the dependent variable are the same, avoiding relevant biases. Prices are given as euros per square meter as of February 2022.

- *Airbnb Average Price*

The variable “Airbnb Prices” is defined as the arithmetic mean of the prices for one night in euros for each province under analysis. The variable shows the average price of the offers.

The objective of this variable is to estimate the difference in prices between provinces of peer to peer businesses. So these prices could have been obtained from platforms similar to Airbnb such as Booking, which also has a relevant market share, however, due to the inability to bias the “scrap” for private homes and to avoid duplication of offers with respect to At Airbnb we limit ourselves to the data obtained from the first platform.

The Airbnb platform does not display prices or prepare reports in this regard, so these must be obtained through third-party collection software. There are market analyzes by institutions external to the platform, essentially academic, but they are limited to very specific areas at specific times. To obtain it in this study, web scraping techniques were necessary. The specific tool for this is Apify. It is a scraping portal with computerized software to collect information in bulk for specific websites. To analyze the Airbnb market, the actor programmed by Tin Duong has been used, which collects data from the

¹The scraping method has not been used because the idealista portal has a very effective defense against scraping methods that rejects automated portals or computer executions via Python. Since this portal offers reports with this data on a monthly basis, the data offered by the platform itself is the most appropriate for the study.

Airbnb application itself (Apify,2022). The inputs made have been dedicated to provincial territories due to the limitations of this service. Which, in any case, presents reliable data as it is obtained directly from real-time offers, which gives strong veracity to those used for the study. Finally, the “runs”² on the corresponding cities were carried out between February 18 and 26. Downloaded in Excel format for subsequent data processing and can be requested if necessary.

This information processing has consisted of the following actions in the original files:

1. Purge erroneous entries.

This includes deleting erroneous locations. For example, for the analysis of the province of Guadalajara, offers from Guadalajara – Mexico could have been included. These have had to be purged.

Another common constant is that of duplicate homes, either directly through double entry or by making the same publication with variations in rental requirements unrelated to the price.

2. Data optimization.

A total of 50 satisfactory “scrapings” have been carried out to obtain these prices. Some of these files were very large, with more than 10,000 results and contained repeated or irrelevant information, so columns of repeated or unnecessary data have been eliminated and compiled all into a single working file.

3. Price management.

Finally, it has been necessary to rule out unreasonable prices that have been mistakenly taken during scraping or are set in such a way that they will not be rented, but do not remove the offer from the listing.

Therefore, after purchasing the average, median and mode prices, those with a value of less than €10 per night and more than €5,000 per night have been eliminated. This, in addition to as a method to avoid anomalous data, is because, due to the way Airbnb works, many establishments stipulate minimum prices with rentals not available, or put absurd numbers at market prices such as a single room without services for €9,999. the night with the same objective. They want to avoid canceling their ads at times when they do not provide the service or do not have availability, something marginal but existing, especially in February (low tourist season) and the time of data collection.

To obtain lists of scrapes from previous times it is necessary to resort to private databases. (AirDNA,2022). These are an inconvenience for two reasons:

The first is that there are few on the market and all of them make the data available at very high prices, without also having guarantees that the data collection methodology coincides for the different territories.

²The “runs” are each of the data collection processes carried out. These cannot be obtained in a single search due to the immense amount of data to be processed by the software, so independent collections must be made for each territory.

The second is that these data are not global or broad. They correspond to specific cities in very specific time spaces, limiting the territorial and temporal scope of the analysis.

Although there are popular platforms in related studies such as “Inside Airbnb”,⁽²⁰²²⁾ which provides a quarterly compilation for the last year. The months of March, June, September and December 2021 are available. The cities included in this database are: Barcelona, Madrid, Malaga, Seville. Mallorca, Menorca, Girona, Valencia, Euskadi (Bilbao/San Sebastián/Vitoria Complex). This implies that they are insufficient for the scope of the study, and they cover a very specific time frame that may be especially distorted by the COVID-19 pandemic situation.

For these reasons, the model used in this study with availability of all provinces, despite its limitation in time, is the most appropriate.

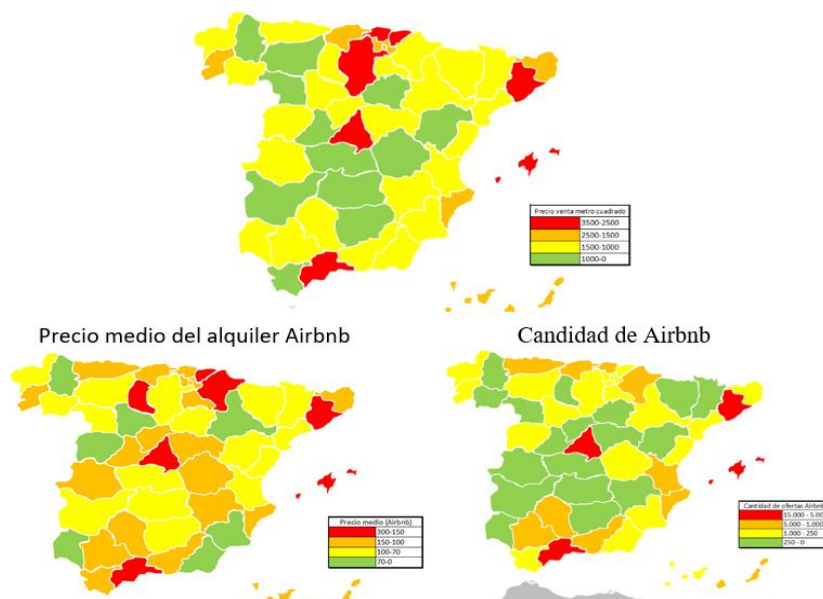
- *Number of properties offered on Airbnb*

The Airbnb quantity variable compiles the number of available Airbnb offers in each province as of February 2022. These offers have been collected using the Apify scrap tool. Being the same methodology that has been used to define the variable “Average Airbnb price”.^(Apify,2022). The data has revealed a greater number in those provinces with a greater number of tourists received. ^(INE2021). That is, tourist centers have a greater number of offers, as other studies have also pointed out in previous literature.

During the study, the Airbnb quantity variable has demonstrated strong collinearity with overnight tourism carried out in each of the provinces by both national and international tourists. So, even if we omit the variable in the model, we know that tourism will behave in a similar way.

The following figure shows the relationship that exists between the three variables described, which constitute the key variables of the study. Similarities can be deduced at a glance that will be studied in subsequent calculations.

Figure 1 – Visual comparison between house prices and Airbnb price/quantity. February 2022.
Precio de venta por metro cuadrado



Source: Own elaboration based on idealista ⁽²⁰²²⁾, Apify ⁽²⁰²²⁾

- *Available rent*

Disposable Income shows the purchasing power of the population according to its territory. This variable is also indicative of the economic capacity of the provinces with discretion of the CPI of each one. This can be consulted at the national level (Spanish Tax Agency,2019) except for communities in the Foral Regime. In the case of the Basque Country, it is compiled by the Basque Institute of Statistics (Eustat,2019) and for Navarra by the Department of Economy and Finance (Hacienda Navarra,2019).

- *Consumer Price Index (CPI)*

The variable “CPI”, consumer price index, seeks to determine an inflationary environment in the corresponding province. A general increase in prices can affect the population's consumption basket, so the price of housing can increase, either following the natural trend of prices, or in order to maintain a real value over time. The data provided comes from the National Statistics Institute. Establishing the Consumer Price Indices based on 2016, being a general index distributed by provinces. (INE,2021).

- *Mortgage interest rate*

The interest rate is a fundamental variable as the loan is a basic tool to obtain housing, whether for own use or for investment.

The specific interest rate for the analysis is the mortgage interest rate compiled by the Statistical Process Center of the College of Property, Movable and Commercial Registrars of Spain. The latest data available in this regard was released in February 2022 with the interannual data for 2021, these data corresponding to each Autonomous Community. (Registrars,2022).

Each of the provinces has assigned the average mortgage interest rate of each of its Autonomous Communities.

- *Secondary home*

The number of secondary homes is compiled by the National Statistics Institute. They are those homes that are used only during specific times of the year, either periodically or sporadically, and that are not in any case residential housing for daily use and, therefore, those that have the potential to be dedicated to rental either short or long term.

The data is collected through “Housing according to size of the municipality by type of housing (by autonomous communities and provinces)” belonging to the 2011 Census. Published in the INE and being the most updated date of this statistic collected by the institution. (INE,2011)

4. Results

Both the average price and the number of Airbnb offers show a positive correlation with the price of the home. An increase in any of the two variables implies an increase in the price per square meter of residential homes.

The number of offers is shown as a very representative variable, however, the average Airbnb price, although it presents a positive correlation, its significance is not high, so we cannot ensure its explanatory effect. This may be due to two fundamental factors.

The first is the seasonality of the study. The data collected does not show a time series, but rather presents data referring to February 2022. These may present a certain seasonal bias as they are reduced prices compared to the rest of the year due to the lack of festivities. And it shows higher relative values in winter tourism areas compared to sun and beach tourism areas. When, according to specific data from previous years, these coastal areas are placed far above those of these areas mentioned during vacation times with the arrival of foreign tourists.

The second is that, although the collinearity is not high enough to decide to eliminate a variable from the model, those with higher values and relationship between them are the average rental price and the average Airbnb price. This may have reduced the relative significance of the second variable as the first is the most explanatory of the model and has a certain relationship.

The estimates present the following quantified results shown below:

Relationship between the price of residential housing and the Airbnb business according to supply and price in the 50 provinces of Spain

Dependent variable: Price of residential housing in € per square meter

| | Coefficient |
|-----------------------------|---------------------------------------|
| <i>Constant</i> | 8435.64** (0.299) |
| <i>Rental price</i> | 104,521*** (0.0009) |
| <i>Airbnb Price</i> | 1.35399 (0.4357) |
| <i>Airbnb Quantity</i> | 0.0638378*** (0.0010) |
| <i>Available rent</i> | 0.0338652* (0.0630) |
| <i>Interest</i> | -78836.8** (0.0312) |
| <i>Consumer Price Index</i> | -64.6151** (0.0430) |
| <i>Secondary Housing</i> | 0.000596270(0.4983) |
| *** Significance at 0.01 | R-Square: 0.876324 |
| ** Significance at 0.05 | R- Corrected square 0.855712 |
| * Significance at 0.10 | Sum squared of the residuals: 2462938 |
| | p value (of F): 1.65e-18 |

Source: Own elaboration from: idealist (2022), Apify (2022), ATE (2019), Eustat (2019), Hacienda Navarra (2019), INE (2011) (2021), Registrars (2022)

For every increase in Airbnb's supply of an available unit, the price of housing grows by 6.38 cents per square meter. Similarly, an increase of one euro in the average Airbnb price would imply an increase of €1.35 in the price per square meter of housing.

The Airbnb quantity variable is statistically significant at the 1% level. This result can be interpreted as meaning that this variable is highly explanatory of housing prices. The rental price constitutes another very explanatory variable as it represents the possible benefit of that home as a long-term investment for residential rental or similar.

The heteroskedasticity correction presents a stable and representative model that, after performing the White test for heteroscedasticity, confirms its non-existence at least at a 95% level of significance. The collinearity analysis also shows acceptable values, with the variance inflation factors (VIF) presenting values less than 10, above which collinearity problems would arise.

The rental price is the most representative variable for housing, and conversely, if the variable explained in this model were rent, the most explanatory variable would be housing. This implies that an alteration in the rental price affects the price of the home. Therefore, the impact on rental prices influences housing prices, and Airbnb is impacting both.

6. Conclusion and discussion

This study has shown a positive correlation between the price of residential housing, the number of Airbnbs offered on the market and their price. In the context of the 50 provinces of Spain in February 2022.

The results obtained partially confirm the hypothesis. An increase in the number of Airbnb businesses and an average increase in their prices causes an increase in home prices. Exactly for each offer presented by Airbnb, the price of housing increases by 6.38 cents per square meter. Approximately every 16 new ads the price per square meter increases by €1. And an increase of one euro in the average Airbnb price in the province would cause a €1.35 increase in the price per square meter of housing.

However, the price effect is not very significant. Due to its relationship with the average rental price and the summer nature of the studio. Therefore, it is recommended in future literature to carry out this analysis on a date that is radically opposite in seasonal characteristics, such as the middle of the summer tourist season, in order to be able to compare the effect of prices with respect to this model.

With the data obtained in this study we can affirm that homeowners consider the expected demand for this service, due to the arrival of tourists and the perception of the territory, as a most relevant factor when putting their home up for sale with Airbnb, which the prices offered by their neighbors.

Another relevant conclusion is the relationship between the price of housing and the price of rent. Having found a correlation between the supply of Airbnb and the price of residential rentals, this study can ratify these numerous conclusions in addition to its own contribution.

Although as this study and the excellent literature have shown, there is a relationship between the growth of Airbnb and the price of rent and housing, as these real estate assets become an investment asset with greater potential. It would be interesting to collect data in this regard over time to carry out a temporal analysis, since it could provide more clarifying and concrete data.

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Exhibit:

Table A1. Sale Price in square meter by province

| <i>N</i> | Province | €/M2 | <i>N</i> | Province | €/M2 | <i>N</i> | Province | €/M2 |
|----------------|-----------|------|-------------------|-------------|------|-----------------------|--------------------|------|
| <i>1</i> | To | 1268 | <i>18</i> | Basin | 791 | <i>35</i> | Ourense | 1171 |
| <i>2</i> | Coruña | | | | | | | |
| <i>3</i> | Alava | 2169 | <i>19</i> | Girona | 2109 | <i>36</i> | Palencia | 1119 |
| <i>4</i> | Albacete | 1023 | <i>twenty</i> | Grenade | 1369 | <i>37</i> | Pontevedra | 1568 |
| | Alicante | 1713 | <i>twenty-one</i> | Guadalajara | 1081 | <i>38</i> | Salamanca | 1312 |
| <i>5</i> | Almeria | 1077 | <i>22</i> | Gipuzkoa | 3186 | <i>39</i> | Segovia | 1131 |
| <i>6</i> | Asturias | 1347 | <i>23</i> | Huelva | 1242 | <i>40</i> | Seville | 1396 |
| <i>7</i> | Avila | 836 | <i>24</i> | Huesca | 1393 | <i>41</i> | Soria | 978 |
| <i>8</i> | Badajoz | 939 | <i>25</i> | Jaen | 828 | <i>42</i> | Tarragona | 1388 |
| <i>9</i> | Balearics | 3351 | <i>26</i> | The Rioja | 1279 | <i>43</i> | Sta.C. Tenerife | 1955 |
| <i>10</i> | Barcelona | 2686 | <i>27</i> | The Palms | 1964 | <i>44</i> | Teruel | 864 |
| <i>eleven</i> | Burgos | 1182 | <i>28</i> | Lion | 999 | <i>Four. Five</i> | Toledo | 813 |
| <i>12</i> | Caceres | 919 | <i>29</i> | Lleida | 1235 | <i>46</i> | Valencia | 1219 |
| <i>13</i> | Cadiz | 1538 | <i>30</i> | lugo | 973 | <i>47</i> | Valladolid | 1302 |
| <i>14</i> | Cantabria | 1475 | <i>31</i> | Madrid | 2983 | <i>48</i> | Biscay | 2661 |
| <i>fifteen</i> | Castellon | 1080 | <i>32</i> | Malaga | 2481 | <i>49</i> | Zamora | 961 |
| <i>16</i> | Real city | 759 | <i>33</i> | Murcia | 1068 | <i>fifty</i> | Saragossa | 1329 |
| <i>17</i> | Cordova | 1185 | <i>3. 4</i> | Navarre | 1442 | | | |

Own elaboration based on idealista (2022)

Table A2. Traditional rental price in square meter by province

| <i>N</i> | Province | €/M2 | <i>N</i> | Province | €/M2 | <i>N</i> | Province | €/M2 |
|----------|-----------|------|------------|-------------|------|---------------|------------------|------|
| 1 | To | 7.1 | 18 | Basin | 5.2 | 35 | Ourense | 5.5 |
| | Coruña | | | | | | | |
| 2 | Alava | 9.7 | 19 | Girona | 10.5 | 36 | Palencia | 6.2 |
| 3 | Albacete | 6.2 | twenty | Grenade | 7.7 | 37 | Pontevedra | 9 |
| 4 | Alicante | 7.6 | twenty-one | Guadalajara | 6.8 | 38 | Salamanca | 7.5 |
| 5 | Almeria | 6.7 | 22 | Gipuzkoa | 23.8 | 39 | Segovia | 7.3 |
| 6 | Asturias | 7.6 | 23 | Huelva | 7.4 | 40 | Seville | 9.1 |
| 7 | Avila | 5.4 | 24 | Huesca | 7.8 | 41 | Soria | 6.4 |
| 8 | Badajoz | 5.6 | 25 | Jaen | 4.8 | 42 | Tarragona | 7.6 |
| 9 | Balearics | 12.2 | 26 | The Rioja | 7 | 43 | Sta. C. Tenerife | 9.4 |
| 10 | Barcelona | 14.6 | 27 | The Palms | 11.1 | 44 | Teruel | 5.4 |
| eleven | Burgos | 7.1 | 28 | Lion | 6 | Four. Five | Toledo | 6.1 |
| 12 | Caceres | 5.3 | 29 | Lleida | 7.8 | 46 | Valencia | 8.5 |
| 13 | Cadiz | 8.1 | 30 | lugo | 5.5 | 47 | Valladolid | 6.9 |
| 14 | Cantabria | 8.5 | 31 | Madrid | 13.9 | 48 | Biscay | 11.9 |
| fifteen | Castellon | 6.5 | 32 | Malaga | 10.2 | 49 | Zamora | 5.3 |
| 16 | Real city | 5.3 | 33 | Murcia | 6.6 | fifty | Saragossa | 8.2 |
| 17 | Cordova | 7.1 | 3. 4 | Navarre | 9.1 | | | |

Own elaboration based on idealista (2022)

Table A3. Average Airbnb price by province

| <i>N</i> | Province | Half price | <i>N</i> | Province | Half price | <i>N</i> | Province | Half price |
|----------------|-----------|------------|-------------------|-------------|------------|-------------------|------------------------|------------|
| <i>1</i> | To | 75.47 | <i>18</i> | Basin | 117.62 | <i>35</i> | Ourense | 80.28 |
| <i>2</i> | Coruña | | <i>19</i> | Girona | 101.24 | <i>36</i> | Palencia | 164.48 |
| <i>3</i> | Alava | 103.6 | <i>twenty</i> | Grenade | 144.86 | <i>37</i> | Pontevedra | 109.23 |
| <i>4</i> | Albacete | 130.36 | <i>twenty-one</i> | Guadalajara | 134.78 | <i>38</i> | Salamanca | 53.88 |
| <i>5</i> | Alicante | 104.74 | <i>22</i> | Gipuzkoa | 279.04 | <i>39</i> | Segovia | 114.66 |
| <i>6</i> | Almeria | 64.95 | <i>23</i> | Huelva | 58.27 | <i>40</i> | Seville | 139.02 |
| <i>7</i> | Asturias | 113.05 | <i>24</i> | Huesca | 87.67 | <i>41</i> | Soria | 75.24 |
| <i>8</i> | Avila | 103.28 | <i>25</i> | Jaen | 91.49 | <i>42</i> | Tarragona | 71.62 |
| <i>9</i> | Badajoz | 78.06 | <i>26</i> | The Rioja | 140.65 | <i>43</i> | Santa Cruz of Tenerife | 146.92 |
| <i>10</i> | Balearics | 257.00 | <i>27</i> | The Palms | 115.13 | <i>44</i> | Teruel | 99.31 |
| <i>eleven</i> | Barcelona | 152.17 | <i>28</i> | Lion | 79.63 | <i>Four. Five</i> | Toledo | 88.59 |
| <i>12</i> | Burgos | 98.56 | <i>29</i> | Lleida | 90.14 | <i>46</i> | Valencia | 96.13 |
| <i>13</i> | Caceres | 127.39 | <i>30</i> | Iugo | 65.48 | <i>47</i> | Valladolid | 66.45 |
| <i>14</i> | Cadiz | 137.09 | <i>31</i> | Madrid | 157.20 | <i>48</i> | Biscay | 121.33 |
| <i>fifteen</i> | Cantabria | 132.77 | <i>32</i> | Malaga | 165.42 | <i>49</i> | Zamora | 78.82 |
| <i>16</i> | Castellon | 82.15 | <i>33</i> | Murcia | 44.58 | <i>fifty</i> | Saragossa | 55.03 |
| <i>17</i> | Real city | 87.38 | <i>3. 4</i> | Navarre | 151.74 | | | |
| | Cordova | 117.62 | | | | | | |

Own creation from Apify ([2022](#))

Table A4. Number of Airbnb offers by province

| <i>N</i> | Province | Amount | <i>N</i> | Province | Amount | <i>N</i> | Province | Amount |
|----------------|-----------|---------|-------------------|-------------|--------|-------------------|------------|--------|
| <i>1</i> | To | 341 | <i>18</i> | Basin | 221 | <i>35</i> | Ourense | 181 |
| | Coruña | | | | | | | |
| <i>2</i> | Alava | 357 | <i>19</i> | Girona | 253 | <i>36</i> | Palencia | 43 |
| <i>3</i> | Albacete | 186 | <i>twenty</i> | Grenade | 1544 | <i>37</i> | Pontevedra | 373 |
| <i>4</i> | Alicante | 2013 | <i>twenty-one</i> | Guadalajara | 88 | <i>38</i> | Salamanca | 239 |
| | | | | | | | | |
| <i>5</i> | Almeria | 289 | <i>22</i> | Gipuzkoa | 876 | <i>39</i> | Segovia | 127 |
| <i>6</i> | Asturias | 3136 | <i>23</i> | Huelva | 102 | <i>40</i> | Seville | 3936 |
| <i>7</i> | Avila | 107 | <i>24</i> | Huesca | 30 | <i>41</i> | Soria | 94 |
| <i>8</i> | Badajoz | 33 | <i>25</i> | Jaen | 92 | <i>42</i> | Tarragona | 207 |
| <i>9</i> | Balearics | 7125 | <i>26</i> | The Rioja | 835 | <i>43</i> | StaC. Have | 882 |
| <i>10</i> | Barcelona | 6638 | <i>27</i> | The Palms | 1358 | <i>44</i> | Teruel | 111 |
| <i>eleven</i> | Burgos | 2. 3. 4 | <i>28</i> | Lion | 287 | <i>Four. Five</i> | Toledo | 191 |
| | | | | | | | | |
| <i>12</i> | Caceres | 188 | <i>29</i> | Lleida | 51 | <i>46</i> | Valencia | 3638 |
| <i>13</i> | Cadiz | 980 | <i>30</i> | lugo | 137 | <i>47</i> | Valladolid | 308 |
| <i>14</i> | Cantabria | 2686 | <i>31</i> | Madrid | 5219 | <i>48</i> | Biscay | 1714 |
| <i>fifteen</i> | Castellon | 229 | <i>32</i> | Malaga | 14205 | <i>49</i> | Zamora | 114 |
| | | | | | | | | |
| <i>16</i> | Real city | 53 | <i>33</i> | Murcia | 254 | <i>fifty</i> | Saragossa | 256 |
| <i>17</i> | Cordova | 1057 | <i>3. 4</i> | Navarre | 1730 | | | |

Own creation from Apify (2022)

Table A5. Average disposable income by province

| <i>N</i> | Province | Income Disp. | <i>N</i> | Province | Income Disp. | <i>N</i> | Province | Available rent |
|----------------|-----------|-----------------|-------------------|-------------|-----------------|-----------------------|---------------------|-------------------|
| <i>1</i> | To | 20592 | <i>18</i> | Basin | 18179 | <i>35</i> | Ourense | 19028 |
| | Coruña | | | | | | | |
| <i>2</i> | Alava | 18323 | <i>19</i> | Girona | 23532 | <i>36</i> | Palencia | 20592 |
| <i>3</i> | Albacete | 19534 | <i>twenty</i> | Grenade | 19737 | <i>37</i> | Pontevedra | 20796 |
| <i>4</i> | Alicante | 19470 | <i>twenty-one</i> | Guadalajara | 22211 | <i>38</i> | Salamanca | 20612 |
| | | | | | | | | |
| <i>5</i> | Almeria | 18062 | <i>22</i> | Gipuzkoa | 19751 | <i>39</i> | Segovia | 20591 |
| <i>6</i> | Asturias | 22674 | <i>23</i> | Huelva | 17717 | <i>40</i> | Seville | 20932 |
| <i>7</i> | Avila | 18759 | <i>24</i> | Huesca | 21188 | <i>41</i> | Soria | 20444 |
| <i>8</i> | Badajoz | 17769 | <i>25</i> | Jaen | 17375 | <i>42</i> | Tarragona | 22546 |
| <i>9</i> | Balearics | 24182 | <i>26</i> | The Rioja | 22113 | <i>43</i> | Sta. C. Tenerife | 20484 |
| <i>10</i> | Barcelona | 27048 | <i>27</i> | The Palms | 21344 | <i>44</i> | Teruel | 19551 |
| <i>eleven</i> | Burgos | 22295 | <i>28</i> | Lion | 20609 | <i>Four. Five</i> | Toledo | 19494 |
| | | | | | | | | |
| <i>12</i> | Caceres | 17788 | <i>29</i> | Lleida | 21920 | <i>46</i> | Valencia | 22135 |
| <i>13</i> | Cadiz | 20538 | <i>30</i> | lugo | 18774 | <i>47</i> | Valladolid | 23061 |
| <i>14</i> | Cantabria | 22361 | <i>31</i> | Madrid | 29882 | <i>48</i> | Biscay | 18387 |
| <i>fifteen</i> | Castellon | 20761 | <i>32</i> | Malaga | 20602 | <i>49</i> | Zamora | 18295 |
| <i>16</i> | Real city | 19329 | <i>33</i> | Murcia | 20345 | <i>fifty</i> | Saragossa | 22773 |
| <i>17</i> | Cordova | 18432 | <i>3. 4</i> | Navarre | 20035 | | | |

Own elaboration from ATE (2019), Eustat (2019), Hacienda Navarra (2019)

Table A6. Consumer price index referenced to 2016 by province

| N | Province | index | N | Province | index | N | Province | Index |
|---------|-----------|---------|------------|-------------|---------|------------|------------------|---------|
| 1 | To | 111,771 | 18 | Basin | 112.85 | 35 | Ourense | 111,682 |
| | Coruña | | | | | | | |
| 2 | Alava | 111,742 | 19 | Girona | 112,059 | 36 | Palencia | 111,631 |
| 3 | Albacete | 112.14 | twenty | Grenade | 111,369 | 37 | Pontevedra | 112,689 |
| 4 | Alicante | 111,703 | twenty-one | Guadalajara | 111.59 | 38 | Salamanca | 112,537 |
| 5 | Almeria | 111,465 | 22 | Gipuzkoa | 111,705 | 39 | Segovia | 112,757 |
| 6 | Asturias | 110,534 | 23 | Huelva | 111,563 | 40 | Seville | 110,934 |
| 7 | Avila | 113,361 | 24 | Huesca | 112,211 | 41 | Soria | 113,287 |
| 8 | Badajoz | 111,607 | 25 | Jaen | 111,806 | 42 | Tarragona | 111,606 |
| 9 | Balearics | 111,325 | 26 | The Rioja | 111,961 | 43 | Sta. C. Tenerife | 111,255 |
| 10 | Barcelona | 111,347 | 27 | The Palms | 110,043 | 44 | Teruel | 111,611 |
| eleven | Burgos | 112,189 | 28 | Lion | 113,809 | Four. Five | Toledo | 113,629 |
| 12 | Caceres | 111,536 | 29 | Lleida | 113,308 | 46 | Valencia | 111,404 |
| 13 | Cadiz | 109,704 | 30 | lugo | 111,726 | 47 | Valladolid | 111,989 |
| 14 | Cantabria | 112,046 | 31 | Madrid | 110,973 | 48 | Biscay | 111,914 |
| fifteen | Castellon | 112,271 | 32 | Malaga | 112,619 | 49 | Zamora | 111,804 |
| 16 | Real city | 112,386 | 33 | Murcia | 110,377 | fifty | Saragossa | 111,804 |
| 17 | Cordova | 112,601 | 3. 4 | Navarre | 111,755 | | | |

Own elaboration from INE (2021)

Table A7 Mortgage interest rate

| | | | |
|-------------------------|------|---------------------|------|
| Andalusia | 2.03 | Valencian Community | 2.06 |
| Aragon | 2.06 | Extremadura | 2.22 |
| Asturias (Principality) | 2.08 | Galicia | 1.98 |
| Balearic Islands | 2.03 | Madrid (Community) | 1.87 |
| Canary Islands | 2.15 | Murcia (Region) | 2.09 |

| | | | |
|---------------------------|------|----------------------------|------|
| <i>Cantabria</i> | 1.88 | <i>Navarre (Community)</i> | 1.89 |
| <i>Castilla la Mancha</i> | 2.19 | <i>Basque Country</i> | 1.47 |
| <i>Castile and León</i> | 1.98 | <i>The Rioja</i> | 1.97 |
| <i>Catalonia</i> | 2.06 | <i>National Average</i> | 1.99 |

Own elaboration from Registrars (2022)

Table A8. Number of secondary homes by province

| N | Province | Number | N | Province | Number | N | Province | Number |
|-----|-----------|---------|--------|-------------|---------|-----|------------------|---------|
| 1 | To | 86,193 | 18 | Basin | 50,739 | 35 | Ourense | 56,049 |
| 2 | Coruña | | 19 | Girona | 141,700 | 36 | Palencia | 26,299 |
| 3 | Alava | 68,536 | twenty | Grenade | 88,804 | 37 | Pontevedra | 61,691 |
| 4 | Albacete | 30,244 | | | | | | |
| | Alicante | 326,705 | twenty | Guadalajara | 53,334 | 38 | Salamanca | 59,369 |
| | | | one | | | | | |
| 5 | Almeria | 72,486 | 22 | Gipuzkoa | 14,985 | 39 | Segovia | 40,865 |
| 6 | Asturias | 73,250 | 23 | Huelva | 64,917 | 40 | Seville | 56,774 |
| 7 | Avila | 68,536 | 24 | Huesca | 45,605 | 41 | Soria | 25,967 |
| 8 | Badajoz | 49,441 | 25 | Jaen | 37,002 | 42 | Tarragona | 140,549 |
| 9 | Balearics | 85,717 | 26 | The Rioja | 32,940 | 43 | Sta. C. Tenerife | 66,901 |
| 10 | Barcelona | 151,335 | 27 | The Palms | 45,829 | 44 | Teruel | 40,672 |
| el | Burgos | 65,684 | 28 | Lion | 60,235 | Fo | Toledo | 78,928 |
| ev | | | | | | ur. | | |
| en | | | | | | Fi | | |
| | | | | | | ve | | |
| 12 | Caceres | 68,756 | 29 | Lleida | 36,496 | 46 | Valencia | 223,885 |
| 13 | Cadiz | 94,562 | 30 | lugo | 42,919 | 47 | Valladolid | 35,794 |
| 14 | Cantabria | 74,697 | 31 | Madrid | 162,022 | 48 | Biscay | 22,883 |
| fif | Castellon | 104,547 | 32 | Malaga | 170,438 | 49 | Zamora | 39,587 |
| te | | | | | | | | |
| en | | | | | | | | |
| 16 | Real city | 41,522 | 33 | Murcia | 132,216 | fif | Saragossa | 52,832 |
| | | | | | | ty | | |
| 17 | Cordova | 43,721 | 3.4 | Navarre | 24,540 | | | |

Own elaboration from INE (2011)