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THE EFFECT OF ANDALUCÍA'S AIRBNB REGISTRATION POLICY

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Master's Degree in Economics of Tourism: Monitoring and Evaluation

(Specialisation: *Monitoring*)

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Abstract

The researcher focuses on two different timestamps in regard to the Decree 28/2016 initiated in 2016 by the Andalusian government aimed at requiring a certain standard for private homeowner to comply with regulation and register their property in the Tourism Register of Andalucía. The researcher focuses on the effect it has on the average listing price of the Apartments and houses listed on Airbnb, the revenue the listings made, the occupation rate of the listings and the overall rating. The researcher applied a Difference-in-Differences analysis over the time span of one year at two different points in time. First, for the shock in May of 2018 where Airbnb communicated that it would enforce the policy by removing all listings not registered with the tourism register until the end of September of 2018 and second, for the shock of Airbnb actually enforcing the legislation. The results obtained show that the shock in May 2018 had a negative impact on prices and revenue, a positive impact on the number of reservations and no impact on overall ratings. For the shock in October 2018, the results show a positive impact for prices, revenue, and the number of reservations while again showing no impact on ratings. Those results are explained with a variety of hypothesis that will require further testing in follow up research for a clear confirmation. However, they allow to evaluate the policy as at least somewhat successful in what it was trying to achieve, although that effect started over two years after the policy was initiated.

As a conclusion, the researcher recommends the government of Andalucía to preferably collaborate with the private sector from the policy design stage onwards to prevent such delays between the initiation of a policy and its time of starting to be effective.

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1 Introduction

The sharing of homes by means of peer-to-peer platforms like Airbnb has enabled many people with an efficient way to rent their houses, apartments or rooms for a short term on the market. Therefore, this platform has evolved to a very successful instrument to match supply and demand in the market, being advantageous for both supplier and consumer.

Since it was launched in 2008, the company and platform Airbnb -the worldwide market leader in regard to private room sharing- has changed the playing field for the sector as nowadays Airbnb's are competing with hotels and hostels (Guttentag, 2013). In the last years, the numbers of listings on Airbnb increased rapidly as this form of private room sharing was new and there were only few guidelines and regulations in place, allowing the company to flourish to a large extent unregulated (Sherwood, 2019).

One of the problems that occurred through this laissez faire regulation approach was an increasing number of listings that would increase house prices slightly for locals and making it unpleasant for them having ever changing neighbours that are often on vacation and not as compliant with local norms, especially when being foreign (Von Briel, D. & Dolnicar, S., 2020), (Ferreri & Sanyal, 2018). It is also associated with encouraging mass tourism as the capacity of some cities has increased significantly, which, in some places like Barcelona, even makes the government consider to entirely prohibit Airbnb from operating (Sanz, 2020).

Another negative effect of the rise of Airbnb is that, with little surveillance, in some regions it became possible to advertise listings that are below a certain standard that the local government would like to maintain in order to provide a positive appearance to national and international tourist and to provide a fair playing field for hotels to be able to compete with the comparably low prices of the Airbnb's.

In an effort to go against the negative effects of the platform, especially the latter ones, in 2016 the government of Andalucía imposed a new regulation that prohibits listing on Airbnb if the property is not registered properly in an effort to reduce the amount of undesired renting homes in the region (Cañas & Sáiz, 2018). After two years of non-action on Airbnb's side, the platform announced in May 2018 that they would delete all listings that are not registered by the end of September 2018. In October they took consequences by deleting approximately 18.000 listings from the website in Andalucía, which amounted to over 30% of total listing at the time (Martinez, 2018).

This report will examine the effect of Andalucía's Airbnb Registration Policy on several indicators, namely the average price of the listings, number of reservation, ratings and revenue. According to general economic theory, prices are expected to rise due to the reduction in supply and a constant demand, and thereafter derive results on the general effectiveness of the policy for the region and its stakeholders.

The objective of this thesis is to explore the impacts of the Andalusian Policy concerned with regulating the rental market and to give a founded evaluation of it.

According to the researcher's thorough research there has not been previous research that has analysed this policy for its effectiveness, which makes this paper an innovative approach towards a yet untouched subject and therefore a valuable contribution to scientific literature in the field of tourism economics.

This report is further divided into four sections. Section 2 provides a literature review where previous research regarding Airbnb, policy evaluation and policies design for Airbnb in different regions will be reviewed for a better understanding of the context of this report. In section 3, the methodology, the data used, and the policy context will be explained and a detailed reasoning behind the selection of the control variable is provided. It also briefly illustrates the Difference-in-Differences technique that is used to analyse the provided data. In section 4 the researcher will present the results of the analysis while providing hypothesis concerning the reasons behind the results. Finally, section 5 presents the conclusion where the final evaluation and opinion of the researcher will be provided. Additionally, it contains founded recommendations for future policy design to the Junta de Andalucía.

2 Literature Review

This section examines and summarizes relevant literature that the researcher deems important to be aware of in respect to the context and objective of this thesis.

The paper named “The What, Where, and Why of Airbnb Price Determinants” from Perez-Sanchez, Serrano-Estrada, Matri and Mora Garcia from the year 2018 deals with the influence that Airbnb attributes have on the prices of the accommodations. Variables that were expected to have an impact on prices were identified by using Spanish Mediterranean city hubs as a case study example, which makes this study a good groundwork for this research as well considering the area of interest (Perez-Sanchez, Serrano-Estrada, Marti & Mora-Garcia, 2018). The main finding concludes that the main driver for an increase in price is the location of the property, i.e., the closer to the coastline, the more expensive a property gets. Also, and contrary to other research, this paper finds that the prices increase as they diverge from historic centres. It provides no solid correlation between the general quality and equipment of a listing, which is interesting to keep in mind when analysing the sample for this research as this is the main variable that is set to increase because of the policy change (Perez-Sanchez, Serrano-Estrada, Marti & Mora-Garcia, 2018)

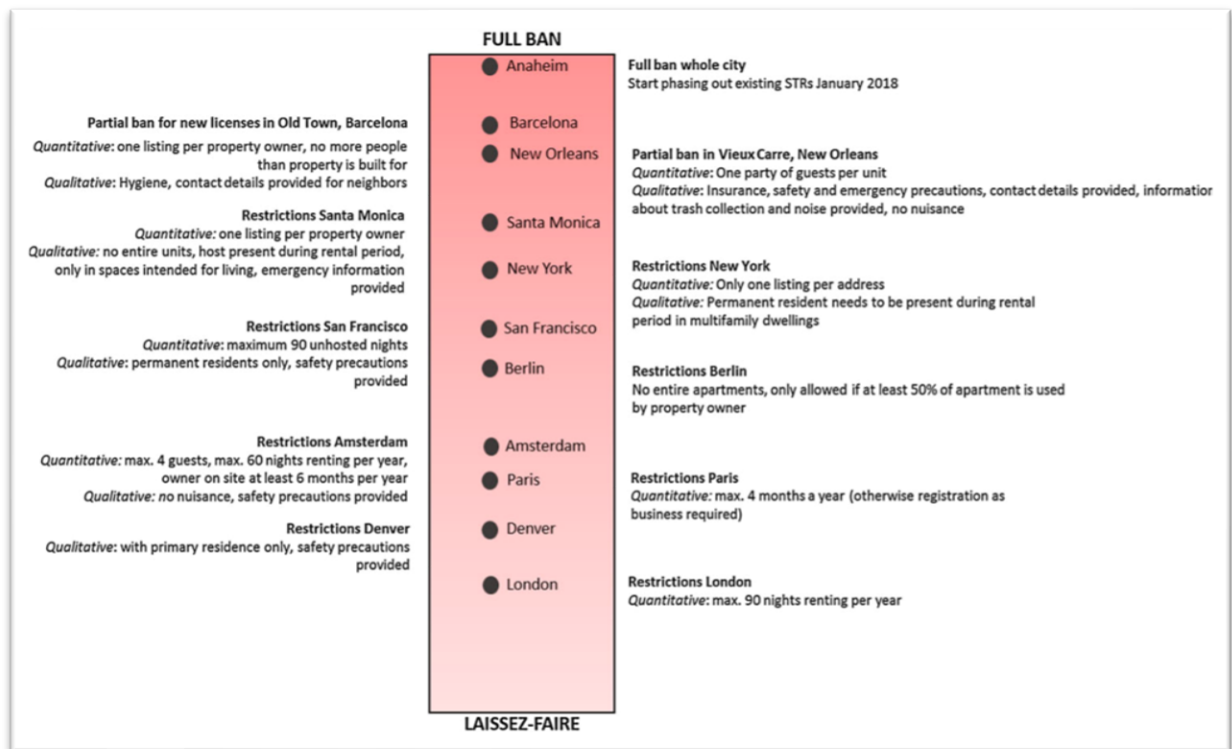
In an attempt to evaluate the effect on Airbnb policy on rental markets in Berlin, Germany Thomaso Duso, Claus Michelsen, Maximilian Schaefer and Kevin Tran focused on one intervention that significantly reduced the number of high-availability Airbnb listings that were being able to book most parts of the year and another one that led to the elimination of occasional, low-availability properties (Duso, Michelsen, Schäfer & Tran, 2021). By analysing the development of prices and availability of listing types over time, the paper shows that Airbnb policies had a clear effect in that city. Though, this is also an interesting and valid approach, the researcher of this thesis considers the Difference-in-Differences the better approach in this specific case in order to be able to clearly exclude omitted variables and fixed effects from the analysis when not only looking at the before and after picture, as this might be influenced by many other factors than just the policy announcement or enforcement (Duso, Michelsen, Schäfer & Tran, 2021).

The paper of Nieuwland and van Melik, called “Regulating Airbnb: how cities deal with perceived negative externalities of short-term rentals” and was published in 2018 focuses on the key challenges that cities face when they have to deal with an increasing short term rental market, and they describe their rationale behind the regulatory approaches they provide. Nieuwland & van Melik (2018) directly relates to the topic of this research as the Andalusian government was in a similar situation when they decided to implement the policy in question. The report finds that the majority of cities are comparably lenient towards short term rentals and the corresponding brokers, which is mainly Airbnb. The main action they take is limiting the number of guests, nights, the number of nights a listing can be booked, require a specific safety standard and the provision of information (Nieuwland & van Melik, 2018). The main reason behind the policy implementation is that they want to mitigate the impacts on the

neighbourhoods and not so much on levelling the playing field for hotels, which is, according to local news, a clear intention of the Andalusian policy. The report further describes that also other cities have severe problems in enforcing their laws effectively, such as Andalucía.

The figure below illustrates how different the approaches on Airbnb regulation can be. They are sorted by the severity of the governmental intervention in the market.

Figure 1: Regulatory approaches in 11 European and American cities



Source: (Nieuwland & van Melik, 2018)

Additionally, the paper “Airbnb in New York City: Law and Policy Challenges” by Andrea Lazarow that was published in 2015 deals with the largest Airbnb market in the United States, New York City. The rental activity is strictly curtailed in regard to short-term rentals (Lazarow, 2015). The report further emphasises that the laws, while strict, were also difficult to enforce and fines were issued inconsistently leading to cases of frustration among their hosts. This paper provides another base for understanding the difficulties that come along with the design and enforcement of an Airbnb policy like the one discussed in this thesis.

With respect to literature concerned with the evaluation of policies, Card and Krueger (1994) use the Difference-in-Differences approach, comparing the development of various attributes of Airbnb listings in the region that was affected by the policy to the development of Airbnb listing attributes in a region that was not affected (Card and Krueger, 1994).

Under some mild assumptions, that enables the researcher to verify a credibly causal estimate of the impact of the announcement of the policy enforcement in May of 2018 as well as the impact of the actual enforcement of the policy by Airbnb via the removal of all listings that have not been registered until the 30th of September 2018 and consequently have been removed the following day (Cañas & Saiz, 2018).

This thesis further expands the scientific field on the subject of policy evaluation by applying it on a local short term rental market and how it has been affected by a specific policy that has previously not been investigated providing new knowledge on that matter. To this aim, the researcher makes use of a highly detailed dataset at the property and month level that permits to obtain empirical evidence and hence to provide solid policy recommendations.

3 Methodology and Data

For the analysis of the impact of the abovementioned policy the researcher is using an elaborate database collected by AirDNA¹ and provided by the University of the Balearic Islands which entails all the Airbnb listings in Spain from the years 2015 until 2020. It further contains additional information for each property such as type of listing, occupancy rate, the number of days where the property was available to rent in a given month, the monthly revenue, the price of the listing, the rating and average response time, just to name a few. The dataset is analysed by using the analytical software STATA which enables the researcher to deal with a huge amount of data and filter the required and necessary information for this research from the rich sample. For this thesis, the researcher selects a subsample of all Airbnb listings in the area of Andalucía and Valencia in the years between 2017 - 2019.

At first, the datasets had to be checked to understand which was of most use as the researcher was presented with a selection of three different datasets. One that did contain the ratings of the properties, one for the monthly numbers and another one for the daily information of each property. The researcher decided to work with the monthly dataset for computational reasons, as it contains enough information for this analysis. The sample includes a time span of one year.

The analysis of the effectiveness of the policy is based on the analytical technique of a Difference-in-Differences analysis. This technique enables the researcher to analyse the impact of a shock in a region, city or company, and comparing it to another region not affected by the shock. Then, the difference is looked upon and if the treated entity develops differently than the control variable an impact can be detected associated with the shock in question (Fradkin, Grewal & Holtz, 2018).

3.1 Consideration of Regions for Comparison

In order to be able to conduct a proper Difference-in-Differences analysis it is important that the treated group is compared against a group that did not experience the same shock as the treated one or some other shock that is out of the ordinary and could therefore make the result noisy (Abadie, 2005). In this specific case, as the researcher focuses on an autonomous region in Spain, it makes sense to compare it against another autonomous region located within the country that is as similar as possible to Andalucía, but with no shocks nor any unusual economic, social or natural developments. The researcher therefore decided upon a selection of indicators that have to be fulfilled by an autonomous region as good as possible in order to be considered suitable for the Difference-in-Differences analysis.

3.2 The Autonomous Region of Andalucía

First, the researcher looks at the region of Andalucía and its attributes to have a clear idea what the comparing region should look like to be acceptable for this analysis.

The region of Andalucía is the southernmost autonomous region within the Spanish peninsula. It is the largest autonomous region in regard to the number of inhabitants (8.4 million) and second largest in regard to land size (Eurostat, 2021). It is divided into eight provinces, namely Almería, Cádiz, Córdoba, Granada, Huelva, Jaén, Málaga and Seville with the last one being the largest and its capital. The GDP per capita was around 20.000€ in the year 2019 (Countryeconomy, 2021). Traditionally the main source of income has been the agricultural sector due to its warm climate and many rural areas but has now changed, as it is common in many industrialized regions around the world, to the service sector, with the sector of tourism being the most important one.

Figure 2: Location of Andalucía in Spain



Source: (Wikipedia, 2021)

3.3 Control Group Selection Process

The first indicator that was deemed important and used to exclude a wide variety of autonomous regions is the location within Spain. The non-treated region should be roughly in the same area, which also entails a similar climate and of similar accessibility for tourists. Applying these criteria already lets the researcher exclude the communities of the various islands, namely the autonomous community of the Balearic Islands as well as the community of the Canary Islands and both the autonomous cities located on the African continent, Ceuta and Melilla.

Furthermore, the researcher decided to exclude every autonomous region from the list of potential regions to compare against that are landlocked as the Andalusian community contains a large coastline and attracts a lot of sun and sand tourism with over 75% of the tourism bookings in Andalucía taking place in coastal municipalities. Though that might not be the only reason for people to spend their holidays there, this gives the researcher nevertheless enough reason to exclude the regions that do not possess a coastline. Therefore, the Community of Madrid, Extremadura, Castilla y Leon, the autonomous region of La Rioja and the one of Castilla–La Mancha will not be considered for the Difference-in-Differences analysis.

Another important criterium to be considered is the GDP per capita, as it gives a rough idea about the economic situation and the level of prices within a region. The GDP per capita should be similar to the one of the autonomous regions of Andalucía which is set around 20.000€ annually in 2019. By applying that criterium we can exclude the autonomous region of Catalunya as it has a much higher gross domestic product amounting to over 31.000€ in 2019 (Countryeconomy, 2021). It is for the same reason that we can exclude the autonomous regions of Navarra with a GDP of 32.000€ and the region of the Basque Country that has a GDP per capita of 34.000€ annually from the list.

Moreover, due to the different and colder climate and the generally lower dependency on tourism, the researcher decided to exclude the rest of the autonomous regions located along the northern coast of the country, namely Asturias, Cantabria and Aragon.

One possible candidate to compare the region against, the autonomous community of Murcia, is similar in location and GDP but is less than half as depended on tourism as the autonomous region of Andalucía (Countryeconomy, 2021). Also being almost twenty times smaller in number of inhabitants makes it not the ideal region to compare against.

By applying all these criteria, the researcher has eliminated 15 out of the 16 available autonomous communities of Spain for not being similarly enough to the autonomous region of Andalucía in at least one of the six criteria that have been deemed suitable for this selection process. The remaining one, and the one that will be chosen for the Difference-in-Differences analysis is the autonomous community of Valencia.

3.4 The Region of Valencia

The autonomous region of Valencia is located on the east coast of the Spanish peninsula and is the fourth most populated autonomous region with just over five million inhabitants, which is sufficiently close to the amount of inhabitants of the region of Andalucía (Eurostat, 2021).

The autonomous region consists of three provinces, namely Castellon, Valencia, and Alicante with the homonymous city of Valencia being the largest city and the capital of the autonomous community. The

GDP per capita amounted to about 23.000€ in the year of 2019 which is also very similar to the around 20.000€ annual GDP per capita of Andalucía (Countryeconomy, 2021).

Furthermore, the community of Valencia shows a similar dependency on tourism with around 6% less tourist arrivals than Andalucía. However, when taking into account the larger size of Andalucía, it is observed that the dependency of tourism is actually slightly higher in Valencia than in the community of Andalucía, though still in close range and not heavily dependent like the autonomous regions of the Balearic or the Canary Islands (Countryeconomy, 2021). As a last measure, the region has been investigated for any unusual economic, social or environmental developments for the time span this report is investigating and nothing that was out of the usual has been detected. Further, it has been checked for the last legislative action in regard to home renting and the last action that has been taken only included minor adjustments that happened within the Decree 75/2015, published in May 2015, and could therefore not have caused a shock in the time span under analysis in this thesis (Spanish Property Insight, 2020), (DECRETO 75/2015, de 15 de mayo, del Consell, regulador de los establecimientos hoteleros de la Comunitat Valenciana, 2015).

Figure 3: Location of Valencia in Spain



Source: (Wikipedia, 2021)

The following table shows a summary of all the criteria collected of all the autonomous regions in Spain and illustrates in what criteria a region was similar to the community of Andalucía and where not.

Table 1: Summary of Selection Process

	Similar GDP	Similar Tourism dependency	Similar population	Part of the Peninsula	Similar Climate	Coastal Region
Andalucía	X	X	X	X	X	X
Catalonia		X	X	X	X	X
Community of Madrid			X	X	X	
Valencian Community	X	X	X	X	X	X
Galicia				X		X
Castile and Leon	X			X		
Basque Country				X		X
Castilla-La Mancha	X			X		X
Canary Islands	X				X	X
Murcia	X			X	X	X
Aragon				X	X	X
Extremadura	X			X	X	X
Navarre				X		X
La Rioja				X		
Cantabria	X			X		X
Balearic Islands					X	X

Source: Own Creation

3.5 Policy Definition and its Intentions

In May 2018 the peer-to-peer private room rental company Airbnb announced, as the first of all platforms of similar nature, that they would require their customers that wanted to rent out a flat or their home to register to the Tourism register of Andalucía in order to comply with the requirements set within the Decree of the Andalusian government from 2016. They also provided the possibility to register via online application, which was not possible before and therefore heavily facilitated the compliance with the policy. Within the same announcement they also gave a deadline until which everyone had to hand in their registration, which was set on the 30th of September of the same year. Noncompliance with this would result in the removal of their listing from the platform (Airbnb, 2018).

The Airbnb ultimatum caused a significant increase in registration of homes and apartments. According to the Junta de Andalucía, the registrations have risen from 35,000 homes registered in May to 41,616 at the end of October (Ávila, 2018). As announced by Airbnb in May, they kept their word and on the 1st of October 2018 they removed all the listings from the platform in Andalucía that were not registered. In total they removed 18,000 listings from the platform, which amounted to over 30% of the listings that were advertised on the platform at the time. One of the reasons for that significant drop is that some places could not fulfil the requirements that the new legislation requires to be fulfilled, and people were not willing or could not afford to adapt their houses to those standards (Ávila, 2018).

Figure 4: Stages of the Policy



Source: Own Elaboration

Other brokers for home sharing however, like the Spanish Association of Temporary Rental Digital Platforms which groups Rentalia, Niumba, Homeaway and Spain Holiday that have a total of 60.000 listings on their websites advertised have not taken action like Airbnb at the time. Furthermore, according to thorough research, these companies have failed to do so until this day therefore inevitably providing the opportunities for illegal listings to advertise themselves (Ávila, 2018).

Social movements have criticised the increase in illegal housings arguing that it would take a “good number of homes from the rental market and would contribute to an excessive increase in prices” (Ávila, 2018). However, the initial intention of the policy launched in 2016 by the Susana Díaz administration was designed to regulate the booming tourist sector, which, according to critics caused a rise of rentals

in historic centre in the main capitals of the community and encouraged the development of an underground economy (Cañas & Saiz, 2018).

Traditionally platforms like Airbnb have left the compliance with local regulations and the management of taxes to their hosts, the people that rent out and advertise their places via the platform. However, in this case, they have decided to take action themselves with the enforcement of the legislation, as the platform places the corresponding registration number on all of their listings allowing the government for a better way to check for compliance with regulations and tax laws (Ávila, 2018).

According to *elDiario*, the Tourism Ministry has tried to convince Airbnb since the release of the Decree in 2016 for help to enforce the law and collaborate to prevent the existence of illegal content on the platform as the website did not see itself responsible for making sure that hosts comply with the new law and the legal position on whether they could force them to comply was in a grey area, so no legal action was pursued by the government (Ávila, 2018). After two years, the website finally agreed to help the government with the enforcement of the law.

According to the delegate of Security, Mobility and Major Festivities in Sevilla, Juan Carlos Cabrera (PSOE), the irregular activity was not in line with the image of the city they want to project, since in most cases it was detrimental to their own users by failing to comply with a series of requirements and often cause inconvenience to neighbours who live in the same building.

The fines of noncompliance with the policy range between 600€ and 30.000€ based on the severity of the policy infringement (Ávila, 2018). Some associations, like the association of Hotels of Seville and Province applauded the measures as they consider the tourist housing a totally unfair competition. They acknowledge that it is something that is here to stay, but also urge that they have to comply with a minimum of security, tax and other requirements that were previously only required for the hotel sector (Cañas & Saiz, 2018).

According to a platform against touristization of Seville such as CACTUS, the regulation is needed to prevent various undesirable developments such as the ecological effect, the job insecurity that sector brings, the loss and degradation of certain public spaces and the impact on the housing market.

In any case, the Andalusian Tourist Housing Association believes that the mandatory registration in the official registry can be seen as an important step needed to regulate this sector properly and demonstrates that there is a clear intention of the sector to comply with the norm and avoid the prosecution of the industry and the negative effects that Andalucía could have as a destination (Cañas & Saiz, 2018).

Appendix 1 details the new requirements for houses and apartments included in the Decree.

3.6 Econometric model

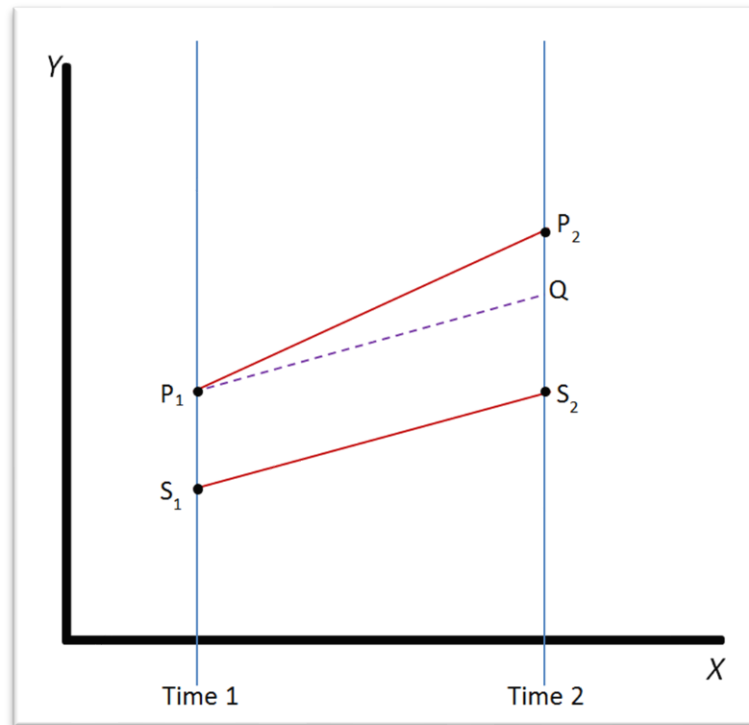
Following literature concerned with the evaluation of policies like Card and Krueger (1994), the author uses a Difference-in-Differences approach, in which the researcher compares the development of various attributes of Airbnb listings in the region that was affected by the policy to the development of Airbnb listing attributes in a region that was not affected (Card and Krueger, 1994).

Under some mild assumptions, this enables the researcher to verify a credibly causal estimate of the impact of the announcement of the policy enforcement in May of 2018 as well as the impact of the actual enforcement of the policy by Airbnb via the removal of all listings that have not been registered until the 30th of September 2018 and consequently have been removed the following day (Cañas & Saiz, 2018).

The listings in the region of Valencia have been identified as a good control group due to its similarities to the community of Andalucía in many attributes which minimizes the chances of omitted variables affecting the result of the analysis. Furthermore, the region did not experience any policy change in regard to its rental market at the time and also did not, according to thorough research, experienced any other shock that could have affected some development within the rental market or a significant change in listings advertised on the Airbnb platform. It is therefore very unlikely that the Valencian community has been affected, neither directly nor indirectly.

The distinguishing theory in any Difference-in-Differences analysis is that the dependent variable would have pursued a comparable trend in both the control and the treatment group if the shock caused by the policy had not have happened (Aguilar, Claussen & Peukert, 2018).

Figure 5: Difference-in-Differences Technique visualized



Source: (Abadie, 2005)

By making use of the long-time dimension of the available data, the researcher provides some statistical comprehensions which are backing that assumption. This way the researcher addresses the possibility that the changes in the dependent variable would have struck regardless of whether the policy shock would have occurred or not (Fradkin, Grewal & Holtz, 2018).

The baseline specification for the Difference-in-Differences model can be expressed as follows:

$$Y_{pt} = \alpha + \delta_1 \text{Andalucía}_p + \delta_2 \text{After}_t + \delta_3 (\text{After}_t \times \text{Andalucía}_p) + \beta_1 X_{pt} + \mu_s + \mu_l + \mu_m + \mu_t + \varepsilon_{pt}$$

Within this formula, the Y_{pt} describes each of the dependent variables that are analysed, i.e., the revenue, the number of reservations, the ratings and the prices at the month and the property level. δ_1 is the treatment group specific effect, δ_2 is the time trend, common to control and treatment group, and δ_3 is the coefficient for the main variable of interest that indicates the development after the shock for both the May 2018 and October 2018 scenario. The variable X_{pt} contains a set of controls at the property and month level. The coefficients $\mu_s, \mu_l, \mu_m, \mu_t$ are alternative sets of fixed effects at the state, listing type and month level, which captures all potential unobserved heterogeneity associated to each specific aspect. Finally, ε_{pt} is the error term.

3.7 Expected Results

Mainly based on basic economic theory, the researcher can make some assumptions about what results are expected to occur when conducting the analysis. For the first shock under analysis, the May 2018 announcement, the researcher expects an increase in prices due to the prospect of less supply and therefore the opportunity to charge higher prices without fearing to lose out on customers. Consequently, the researcher also expects the effect on revenue to be positive. There is no expected impact on number of reservations and only a slight positive effect on overall rating.

For the second shock, the actual enforcement of the policy by Airbnb in October 2018, the researcher again expects a positive impact on price and revenue due to decreased supply while assuming constant demand. The number of reservations is again expected to be unaffected, and the overall rating is expected to be positively affected due to the increased average quality of the properties.

3.8 Limitations

The dataset does not include perfect information on which are the properties affected. Additional information could help to obtain a more precise estimation. In addition, the data is aggregated at the monthly level due to computational constraints. However, there could be some variation also at the daily that the researcher does not capture in this report.

Another limitation of the research were the time constraints, caused by the set deadline of the thesis which had to be completed in just over a month. More time to explore and analyse the dataset could result in further discoveries.

An additional limitation is that the available sample does not provide sufficient information on the overall ratings, which does not allow for a reliable result and interpretation of the results obtained in the analysis.

Furthermore, there is no qualitative data collection in this research, which would have been of interest in order to be able to better interpret and explain the results obtained by performing the Difference-in-Difference's analysis.

4 Results

In the following section the researcher presents and discusses the results acquired through the analysis performed with the analytical software STATA on the available dataset of Airbnb listings in the area of Andalucía and Valencia in the years between 2017 - 2019.

4.1 Presentation of used Variables

Table 2: Summary of Variables used

VARIABLES	mean	sd	min	max	N
Revenue (USD)	781.9	1,918	0	168,693	2,116,252
Prices (ADR, USD)	135.5	153.1	0	11,096	2,116,252
Number of Reservations	1.520	2.641	0	31	2,116,252
Ratings (20 – 100)	90.103	12.58	20	100	4,064
Andalucía	0.564	0.496	0	1	2,116,252
Valencia	0.4359	0.496	0	1	2,116,252
Bedrooms	2.258	1.371	0	52	2,116,252
Occupancy Rate	0.227	0.337	0	1	2,116,252

Source: Own Elaboration

All variables, with the exception of "Ratings" are derived from a sample of over 2.1 million observations. This high sample size results out of the fact that the researcher analyses both the regions of Andalucía and Valencia, which combined have over 250.000 active listings. Regarding the one variable that does contain way fewer observations, the Rating, this is the case because the data does not contain this information to a large extent, which, as previously mentioned, is a serious limitation on this part of the analysis and research possibility. The minimum and maximum values of that variable are located between 20 and 100 as Airbnb uses a star system as their rating system where you can rate your stay overall and minor aspects of it with 1(worst) up to 5(best) stars. Translated in numbers from (0 – 100) that gives every star a value of 20. As it is not possible to evaluate something with less than one star the lowest rating a listing can contain is 20. The mean of 90,1 therefore translates to an average overall rating in the star system to 4,5 stars.

The variable Average daily rate (ADR) measures the average amount of how much all the listings earned for an occupied day. The average of 135.5 USD per occupied day is likely influenced by outliers on the high-priced site so the median and mode would be considerably lower than the mean on this variable in the regions of interest.

The mean for the variable of Andalucía and Valencia provides the researcher with the information of how much percent each region contributes to the total sample. This means that the sample contains slightly more observations from Andalucía (56,5%) than from the community of Valencia (43,5%).

The Number of reservations indicate the number of occupied days in a given month, therefore 31 is the maximum and the listings are, on average, occupied for 1,5 days a month. In contrast to this variable, the variable of occupancy rate shows to what extent the listings have been booked, not measured on all days of the month, but only on the days the proprietor was offering their listing to be booked. This number is therefore much higher than the percentage of “number of reservations” is where 4,8% of the days of the month are occupied versus 22,7% of days are occupied when looking at the mean of the occupancy rate.

Lastly, and somewhat self-explanatory the revenue variable indicates the revenue per month and the bedroom variable the number of bedrooms.

4.2 Analysis of the shock of the Announcement of Legislation Enforcement (May 2018)

In the first subsection of this section, the researcher focuses on the initial policy shock that was initiated by the Airbnb announcement over their intention to enforce the policy by deleting all listings not complying with the law. The Difference-in-Differences analysis contains, as is common practice, a time span of one year, including the six months prior and the six months after the announcement in May 2018.

a. Policy Impact on Prices

Table 3: Policy Impact on Prices (May 2018)

Dependent variable:	(1) Log ADR	(2) Log ADR	(3) Log ADR	(4) Log ADR
Andalucía	0.139*** (0.002)			
After	0.058*** (0.002)	0.058*** (0.002)	0.058*** (0.002)	
After x Andalucía	-0.010*** (0.002)	-0.013*** (0.002)	-0.032*** (0.002)	-0.024*** (0.002)
Bedrooms	0.320*** (0.000)	0.316*** (0.001)	0.274*** (0.001)	0.270*** (0.001)
Occupancy Rate	-0.041*** (0.001)	-0.062*** (0.001)	-0.089*** (0.001)	-0.183*** (0.001)
Constant	3.822*** (0.002)	3.925*** (0.002)	4.043*** (0.002)	4.147*** (0.002)
State FE	NO	YES	YES	YES
Listing type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	2,095,754	2,095,754	2,095,754	2,095,754
R-squared	0.360	0.380	0.472	0.497

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

ADR stands for Average Daily Rate, which is the variable for price

Source: Own Elaboration

The first table presents the impact of the policy on prices. The dependent variable is introduced in logarithms to avoid reduce the skewness of the original data and avoid potential outliers. In column (1), no fixed effects are included, in order to observe the raw effect of the policy. Then, in subsequent columns, additional fixed effects are included, and column (4) shows the preferred specification. This procedure will be applied to all remaining tables in the analysis, except to tables in the Appendix.

Table 3 shows that there is a negative coefficient which is significant at the 1 per cent level regardless of whether all, some or none of the fixed effects are included in the analysis. However, this result is somewhat counterintuitive as someone, based on basic economic theory, would assume that a reduction in supply, assuming all other factors in the economy are constant, would lead to an increase in prices. An explanation for this negative correlation could be that, within the six months after the announcement, the number of listings that got registered in the tourism register of Andalucía has significantly risen by almost 19% from 35.000 registered homes and apartments at the beginning of May 2018 to 41.616 at the end of October. The researcher therefore makes the assumption, that this increase in registration might have led to an increase in perceived supply and therefore caused a decrease in prices at this point in time.

However, this can only be considered an indirect effect of the policy as the policy and the requirement to register was already publicized in February of 2016. The price decrease likely was a combination of the fact that Airbnb announced that noncompliance would result in the elimination from the platform and that Airbnb eased the registration process significantly, as prior to the announcement the registration had to be submitted in person or per mail. Airbnb allowing its hosts to apply for the registration online is assumed to have had a great effect on the increase in registrations and subsequent decrease in listing prices.

b. Policy Impact on Revenue

Table 4: Policy Impact on Revenue (May 2018)

Dependent variable:	(1) Log Revenue	(2) Log Revenue	(3) Log Revenue	(4) Log Revenue
Andalucía	0.200*** (0.003)			
After	0.011*** (0.003)	0.012*** (0.003)	0.012*** (0.003)	
After x Andalucía	0.005 (0.003)	0.004 (0.003)	-0.015*** (0.003)	-0.009*** (0.003)
Bedrooms	0.315*** (0.000)	0.313*** (0.001)	0.269*** (0.001)	0.264*** (0.001)
Occupancy Rate	2.413*** (0.002)	2.392*** (0.002)	2.365*** (0.002)	2.244*** (0.002)
Constant	4.790*** (0.003)	4.924*** (0.002)	5.045*** (0.002)	5.128*** (0.003)
State FE	NO	YES	YES	YES
Listing type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	2,115,085	2,115,085	2,115,085	2,115,085
R-squared	0.504	0.510	0.545	0.564

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.

The second table focuses on the effect on the revenue of the hosts in Andalucía and one can see that again, an effect is recognized when increasing the robustness and including fixed effects for the listing type and state as well as when including all three fixed effects. This effect is expected to be associated with the effect observed in the first table. This is because the drop in prices was not sufficiently significant to cause an increase in demand which could have kept the revenue constant or even increase it. However, in this specific case it seems that the demand stayed constant regardless of the decrease in price, triggering also a decrease in revenue.

c. Policy Impact on Reservations

Table 5: Policy Impact on Reservations (May 2018)

Dependent variable:	(1) Log Nr Reservation	(2) Log Nr Reservations	(3) Log Nr Reservation	(4) Log Nr Reservations
Andalucía	0.171*** (0.003)			
After	0.091*** (0.002)	0.096*** (0.002)	0.096*** (0.002)	
After x Andalucía	0.001 (0.003)	0.016*** (0.003)	0.018*** (0.003)	0.013*** (0.003)
Bedrooms	-0.050*** (0.000)	-0.041*** (0.000)	-0.037*** (0.000)	-0.036*** (0.000)
Occupancy Rate	1.112*** (0.001)	1.106*** (0.001)	1.108*** (0.001)	1.116*** (0.002)
Constant	0.300*** (0.002)	0.373*** (0.001)	0.361*** (0.001)	0.440*** (0.002)
State FE	NO	YES	YES	YES
Listng Type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	2,112,770	2,112,770	2,112,770	2,112,770
R-squared	0.237	0.276	0.277	0.295

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.

The third table focuses on the effect of the policy announcement on the number of reservations. As it can be seen, there is a positive impact of the policy announcement on the number of bookings. Here it becomes especially important to control for fixed effects as the number of bookings is heavily affected by the month of the year as people book way more rooms in the region of Valencia and Andalucía in the spring and summer months. According to the results obtained in the analysis, the announcement led to a slight increase in reservations, which could also be correlated with the decrease in prices shown in the first table of this subsection. However, when keeping the results of table two in mind, the reservation numbers did not increase sufficiently in order for the host to maintain their income.

Interestingly this variable correlates negatively with bedrooms in contrast to the first two variables, which indicates that the more bedrooms a house or apartment has, the lesser it is desired and consequently booked by customers.

d. Policy impact on Ratings

Table 6: Policy Impact on Ratings (May 2018)

Dependent variable:	(1) Rating	(2) Rating	(3) Rating	(4) Rating
Andalucía	0.929 (1.423)			
After	-0.943 (1.280)	-0.830 (1.479)	-0.832 (1.456)	
After x Andalucía	1.847 (1.528)	1.736 (1.708)	1.690 (1.684)	1.425 (1.723)
Bedrooms	0.079 (0.165)	0.080 (0.181)	0.256 (0.200)	0.246 (0.198)
Occupancy Rate	1.870*** (0.620)	1.884*** (0.571)	1.892*** (0.569)	2.547*** (0.609)
Constant	88.281*** (1.236)	89.023*** (0.845)	88.716*** (0.853)	88.056*** (1.401)
State FE	NO	YES	YES	YES
Listing Type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	4,064	4,064	4,064	4,064
R-squared	0.008	0.013	0.016	0.028

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.

In this fourth table, the researcher focuses on the effect of the policy announcement on the overall ratings. As it can be seen, there is no effect of the announcement on the ratings. Before conducting the analysis there was the slight expectation that it would be logical for the effect to be positive on the ratings as the standard of the listings might have increased due to the hosts of those listings improving their property in order to comply with the policy and giving them the ability to register.

This table also shows, for the first time in the analysis, that one of the control variables (Bedrooms) is not significant at no level of standard errors. However, this is not an issue of concern as one cannot expect this variable to be correlated with the average rating as with the number of bedrooms also the expectations might rise.

Nevertheless, those results should be taken with caution since the database only contained a very limited number of observations. In order to reliably test the effect of the announcement on the ratings one would need a richer sample with much more observations in order to be able to come to a definite result and conclusion.

4.3 Analysis of the Shock of the Enforcement of the Legislation (October 2018)

The second part of the result section of the thesis deals with the policy shock that was initiated by Airbnb removing over 30% of the listings in the Andalusian region from their platform in an effort to help the Andalusian government to enforce their policy from February 2016. Again, the Difference-in-Differences analysis will, as usual, contain a time span of one year, including the six months prior and the six months after the enforcement of the policy and subsequent elimination of the listings in the beginning of October 2018.

a. Policy Impact on Prices

Table 7: Policy Impact on Prices (October 2018)

Dependent variable:	(1) Log ADR	(2) Log ADR	(3) Log ADR	(4) Log ADR
Andalucía	0.107*** (0.002)			
After	-0.232*** (0.002)	-0.216*** (0.002)	-0.208*** (0.002)	
After x Andalucía	0.076*** (0.002)	0.062*** (0.002)	0.039*** (0.002)	0.032*** (0.002)
Bedrooms	0.320*** (0.000)	0.317*** (0.001)	0.272*** (0.001)	0.270*** (0.001)
Occupancy Rate	-0.074*** (0.002)	-0.093*** (0.002)	-0.121*** (0.002)	-0.176*** (0.002)
Constant	3.961*** (0.002)	4.039*** (0.003)	4.155*** (0.002)	4.107*** (0.002)
State FE	NO	YES	YES	YES
Listing type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	988,630	988,630	988,630	988,630
R-squared	0.376	0.395	0.494	0.511

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

ADR stands for Average Daily Rate, which is the variable for price

Source: Own Elaboration.

Table 7 shows that there is, like it was the case with the policy announcement in May, an effect on prices. However, the signs have changed, and one can now see that the effect of the enforcement on price is positive, contrary to the relationship of the announcement and the price in the May analysis, which was negative. This effect can easily be explained by basic economic theory as a drop in supply, which happened at that time by Airbnb enforcing the policy and deleting unregistered listings, results in an increase in price when assuming the demand stays constant.

Another explanation for the price increase can be that the majority of the listings that were deleted in October of 2018 likely were those that offered especially low prices for apartments that were not fulfilling

basic standards set by the Andalusian government. Removing those evidently would raise the average price of all listings up, which is likely what one can see here.

Nevertheless, a potential beneficiary of that effect are the hotels, which were heavily advocating an enforcement of the policy since its initiation in February of 2016. Through a rising price level, they are more competitive with the listings on Airbnb, and at the same time the Airbnb hosts might be able to profit also from them being able to demand higher prices without facing a drop in demand.

b. Policy Impact on Revenue

Table 8: Policy Impact on Revenue (October 2018)

Dependent Variable:	(1) Log Revenue	(2) Log Revenue	(3) Log Revenue	(4) Log Revenue
Andalucía	0.138*** (0.002)			
After	-0.398*** (0.003)	-0.386*** (0.003)	-0.378*** (0.003)	
After x Andalucía	0.173*** (0.004)	0.156*** (0.004)	0.132*** (0.004)	0.128*** (0.004)
Bedrooms	0.312*** (0.001)	0.311*** (0.001)	0.264*** (0.001)	0.261*** (0.001)
Occupancy Rate	2.351*** (0.003)	2.331*** (0.003)	2.304*** (0.003)	2.243*** (0.003)
Constant	4.999*** (0.003)	5.095*** (0.003)	5.216*** (0.003)	5.103*** (0.003)
State FE	NO	YES	YES	YES
Listing type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	999,157	999,157	999,157	999,157
R-squared	0.511	0.517	0.555	0.568

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.

Table 8 illustrates the effect of the policy enforcement on the revenue, and it is shown that there is a positive impact of the enforcement on the revenue, which confirms the assumption made in the analysis of the previous table, that the hosts of Airbnb were able to raise their prices while likely maintaining demand.

This result is very positive for the hotel industry and the government of Andalucía that was trying to support the hotels to some extent with the implementation of the policy. Though hotels are almost not

present on Airbnb in the region in question, it can be said that the rise in revenue is an indication that people are willing to pay a higher price that are closer to the level of hotel prices and therefore providing the hotels with a better position in the marketplace.

c. Policy Impact on Reservations

Table 9: Policy Impact on Reservations (October 2018)

Dependent variable:	(1) Log Nr Reservations	(2) Log Nr Reservations	(3) Log Nr Reservations	(4) Log Nr Reservations
Andalucía	0.152*** (0.002)			
After	0.071*** (0.002)	0.045*** (0.002)	0.045*** (0.002)	
After x Andalucía	0.040*** (0.003)	0.027*** (0.003)	0.029*** (0.003)	0.035*** (0.003)
Bedrooms	-0.059*** (0.001)	-0.049*** (0.001)	-0.045*** (0.001)	-0.045*** (0.001)
Occupancy Rate	1.133*** (0.002)	1.120*** (0.002)	1.122*** (0.002)	1.139*** (0.002)
Constant	0.307*** (0.002)	0.397*** (0.002)	0.386*** (0.002)	0.393*** (0.002)
State FE	NO	YES	YES	YES
Listing type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	1,003,172	1,003,172	1,003,172	1,003,172
R-squared	0.245	0.288	0.288	0.293

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.

The third table, illustrating the effect of the policy enforcement on the number of reservations shows a positive impact on the number of reservations, meaning that the policy enforcement has increased the number of reservations. This is an unexpected result as one would assume that the increase in prices, which was detected in the first table of this section would drop the number of reservations or, at best, would have no effect and the reservations would stay constant regardless of the policy enforcement. However, a potential explanation for this is that the requirements from the Junta de Andalucía improved the average quality of the listings and hence the demand for those properties increased. Still, this explanation makes the assumption that the policy was very publicized and communicated nationally and internationally and that this would be a determining factor to come and visit the region of Andalucía. In order to confirm or reject this hypothesis additional research would be required containing more qualitative data and specified questionnaires.

d. Policy impact on Ratings

Table 10: Policy Impact on Ratings (October 2018)

Dependent variable:	(1) Rating	(2) Rating	(3) Rating	(4) Rating
Andalucía	4.452*** (0.851)			
After	2.538** (1.182)	2.408 (1.480)	2.395 (1.475)	
After x Andalucía	-1.266 (1.502)	-1.149 (1.683)	-0.926 (1.683)	0.282 (1.733)
Bedrooms	0.051 (0.183)	0.047 (0.201)	0.250 (0.216)	0.258 (0.216)
Occupancy Rate	2.137*** (0.696)	2.206*** (0.632)	2.185*** (0.630)	2.763*** (0.668)
Constant	85.556*** (0.922)	89.430*** (0.462)	89.028*** (0.484)	89.127*** (0.490)
State FE	NO	YES	YES	YES
Listing type FE	NO	NO	YES	YES
Month FE	NO	NO	NO	YES
Observations	3,426	3,426	3,426	3,426
R-squared	0.012	0.016	0.019	0.028

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.

The fourth and last table of this section illustrates the impact the policy enforcement in October 2018 had on the overall rating of the listings. As was the case with the initial shock in May 2018, one cannot detect an impact of the shock on the variable in question. Once again this is not a fully reliable result because of AirDNA not providing a very elaborate sample size for the listings in the region of the community of Valencia and Andalucía.

4.4 Additional Results

Finally, as a way to check the robustness of the analysis, the researcher explored the impact of the policy using different time windows, i.e., extending or shortening the sample that has been analysed. The results remain qualitatively unchanged and are mostly consistent, therefore not worthy of further in-depth analysis. The results of that analysis can be obtained via request to the researcher.

5 Conclusion

Concluding the report, the researcher finds that the policy affected the prices and revenue negatively in May of 2018 while positively affecting the number of reservations. The hypothetical explanation for the effect on price is that the facilitation of the registration process led to a perceived increase in supply, which consequently dropped the price. The drop in revenue is also associated with the drop in price. The positive in reservations is also believed to be correlated with the price increase.

The policy enforcement that happened in October of 2018 had a positive impact on three variables that have been tested. The increase in price and revenue are results that were previously expected and can be explained by basic economic theory, though the increase in reservations cannot be reliably explained and needs further investigation. The variable of ratings showed no effect though this would need to be investigated further as the sample size of the available data was very low.

With respect to the evaluation of the policy, one can say that the policy did its part in levelling the playing field for hotels and private home sharing agents, which was one of the intended outcomes of the policy. Furthermore, the positive impact on revenue after the elimination of non-registered properties also shines a positive light on the policy as it increased the revenue for the properties that comply with a certain standard of their apartment, which in return also improves the region of Andalucía as a tourist destination when a certain quality standard is the norm and can be undoubtedly expected from tourist visiting the region which was also an intention of the legislature.

One important discovery of this thesis is that the policy, which became law in February of 2016 had a very miniscule effect for over two years because Airbnb was not legally required to enforce it onto their hosts. Even though until May 2018 around 35.000 properties have been registered within the community of Andalucía, this did not exclude the unwanted, the properties that did not fulfil a certain standard, from the marketplace as there was no punishment for not registering and therefore ignoring the policy. The 35.000 listings already registered were likely hotels and other properties that were already fulfilling the requirements and playing it safe by registering.

However, at the end, the enforcement of the law was only possible by something that is always emphasized as being crucial for an effective tourism policy, the strict collaboration of the private and the public sector.

When this policy was initially designed, it must have been clear from the start that the main source of properties that would not comply with the requirements are the peer-to-peer property sharing platforms, with Airbnb being by far the largest and therefore the most important one. Even though that must have been evident there was no initial contact and over the next two years after the legislation was published the Tourism Ministry wrote several letters to Airbnb requesting collaboration and help for the enforcement of the policy, which finally was granted by Airbnb but could have been done from the start to ensure clarity for hosts and consumers without a period of two years where the policy effectively was as effective as if it had not existed.

It is for that reason, that I would recommend the Junta de Andalucía for future policy design and implementation to collaborate with the affected private entities from the very beginning, the policy design process on, in order to allow for an adequate, effective and enforceable policy for future tourism legislation. Additionally, it would be advisable for the government to take into account all stakeholders in the market. In this case, the burden of the policy was completely on the customers' side, whereas the owners were able to pass-through the additional costs via the increase in the price. A potential beneficiary of this policy are the hotels, which although there is no proof for that might have used their power and lobbied towards the government for the implementation of such a policy, that would improve their position on the marketplace.

In regard to follow up research, it would be interesting to investigate the effect of the policy on the overall ratings in Airbnb by making use of a richer and more sophisticated sample. Due to the low sample size in the database that was available to the researcher, that impact could not be properly investigated in this report. Additionally, it would also be worth taking a deeper look into the mechanisms underlying the effects that have been identified in this report. This thesis already provided a series of explanation attempts and hypothesis associated with the impacts, but additional research is required to properly test these hypothesis and check for their reliability and validity.

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7 Appendices

7.1 Appendix 1 | New requirements for houses and apartments included in the Decree

- a. Possession of an occupation license, and having to comply at all times with the technical and quality requirements of the homes.
- b. The rooms must have direct ventilation to the outside or to patios and some darkening system of the Windows. This requirement will not be required when the home or building in which it is integrated is catalogued as an Asset of Cultural Interest and the level of protection prevents carrying out some type of modification or intervention that is necessary to meet the requirement.
- c. Be sufficiently furnished and equipped with the necessary appliances and equipment for its immediate use and appropriate for the number of places available.
- d. Air conditioning or other type of refrigeration by fixed elements in the rooms and lounges, when the period of operation includes the months of May to September, both inclusive. If the operating period includes the months of October to April, both inclusive, it must have heating. This requirement will not be enforceable when the home or building in which it is integrated is classified as an Asset of Cultural Interest and the level of protection prevents carrying out any type of work, modification or intervention that is necessary to comply with the requirement.
- e. First aid kit.
- f. Have tourist information, in physical or electronic format, of the area, leisure areas, restaurants and cafeterias, shops and food stores, the car parks closest to the home, medical services existing in the area, means of urban transport, map of the town and show guide.
- g. All homes need to have complaints and claims sheets available to users, and a poster advertising them in a visible place inside the house.
- h. Cleaning of the house at the entrance and exit of new clients.
- i. Bedding, lingerie, household items in general, depending on the occupation of the home and a replacement game.
- j. Provide users with a telephone number to attend and resolve immediately, any query or incident related to the home.
- k. Have information and operating instructions available to users for electrical appliances or other devices that require it for their correct use.
- l. Inform users of the internal regulations regarding the use of the facilities, housing units and equipment, as well as the admission and existence of pets in the house, restrictions for smokers as well as restricted use areas.

(Boletín Oficial de la Junta de Andalucía, 2016)

7.2 Appendix 2 | Policy effect on all variables in May 2018 (Hotel Control)

In this section, we analysed our data doing again a Difference-in-Differences analysis but using an unaffected listing type instead of an unaffected region. During the research and as already mentioned in the literature review the hotels of the region were very much in favour of the policy enforcement as it made the private room and house sharing.

Table 11: Policy effect on all variables in May 2018 (Hotel Control)

Dependent variable:	(1) Log ADR	(2) Log Revenue	(3) Log Nr Reservations	(4) Rating
After x Andalucía	0.051*** (0.019)	0.045* (0.025)	0.051** (0.022)	
Bedrooms	0.269*** (0.001)	0.265*** (0.001)	-0.039*** (0.000)	0.237 (0.206)
Occupancy Rate	-0.170*** (0.002)	2.264*** (0.003)	1.229*** (0.002)	2.510*** (0.637)
Constant	4.136*** (0.016)	5.154*** (0.021)	0.424*** (0.018)	89.630*** (0.458)
State FE	YES	YES	YES	YES
Listing type FE	YES	YES	YES	YES
Month FE	YES	YES	YES	YES
Observations	1,263,884	1,272,693	1,272,798	3,346
R-squared	0.492	0.564	0.323	0.019

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.

7.3 Appendix 3 | Policy effect on all variables in October 2018 (Hotel Control)

Table 12: Policy effect on all variables in October 2018 (Hotel Control)

Dependent variable:	(1) Log ADR	(2) Log Revenue	(3) Log Nr Reservations	(4) Rating
After x Andalucía	-0.050** (0.020)	-0.113*** (0.025)	0.079*** (0.022)	
Bedrooms	0.268*** (0.001)	0.261*** (0.001)	-0.048*** (0.001)	0.247 (0.218)
Occupancy Rate	-0.166*** (0.002)	2.265*** (0.004)	1.253*** (0.003)	2.522*** (0.679)
State FE	YES	YES	YES	YES
Listing type FE	YES	YES	YES	YES
Month FE	YES	YES	YES	YES
Constant	4.183*** (0.009)	5.245*** (0.011)	0.391*** (0.009)	89.648*** (0.480)
Observations	597,697	602,498	605,034	2,978
R-squared	0.503	0.566	0.320	0.015

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Own Elaboration.