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The effect of Airbnb on the Housing Market

A case study of the city of Amsterdam



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Summary

The global platform Airbnb is continuously growing and its presence in cities is increasing. This has resulted in a contentious debate about the possible impacts of Airbnb. This thesis will focus on the effect of Airbnb on the housing market of Amsterdam. Although Airbnb provides a service for commercial rental for tourists, it uses private property. Proponents of Airbnb believe that income through Airbnb will help hosts to pay their mortgage, where opponents believe prices of houses will rise because of Airbnb. To indicate if any of these claims are true, a quantitative analysis is conducted. This research is limited to the city of Amsterdam, a popular tourist destination as well as a popular place to live. House prices are rising rapidly especially compared to the Netherlands as a whole. Also, a growing number of tourists are visiting Amsterdam. The city of Amsterdam is actively trying to regulate the negative externalities caused by Airbnb and sort like platforms. Besides potential impacts on the housing market, it disturbs the traditional tourist sector and creates problems in neighbourhoods. This thesis analysed the change of Airbnb listings and the change in transaction prices on sold private properties. The main finding is that there is no significant relation between rising transaction prices and Airbnb listings. This thesis faced difficulties concerning limitations of the data sources. Moreover, Airbnb is a very recent phenomenon, and effects are still developing. Therefore, further research on this topic is of great relevance.

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1 Introduction

1.1 Background

After successfully renting out their apartment during a big conference in San Francisco, two recently graduated roommates' felt this concept could become a lucrative business (Guttentag, 2015). Today, this business is known as Airbnb and it has become immensely popular. In less than a decade the online platform served more than sixty million guests (Zervas et al., 2014). The Airbnb platform provides a service that is part of the 'sharing economy'. To be more precise, Airbnb acts as a facilitator where hosts share their space with tourists who are looking for short-term accommodation (Guttentag, 2015). Alongside Airbnb comparable platforms have emerged that also provide services where individuals can rent out their underused assets (Oskam & Boswijk, 2016). The alternative taxi service Uber is for example another major platform contributing to the 'sharing economy'. Where Uber drivers become a big competitor of ordinary taxi drivers, Airbnb is a major rival of the traditional tourist sector.

Airbnb and similar practices are often referred to as a 'disruptive innovation' (Guttentag, 2015). Disruptive innovations will distort the traditional and existing sector and transforming this particular sector (Guttentag, 2015). Thus, Airbnb competes with the established tourist sector, and moreover offers a product competing mostly at the low-end of this market (Zervas et al., 2014; Guttentag, 2015). Concerns are for example that Airbnb will take a 'piece of the pie' (Guttentag, 2015). Besides competing with the traditional accommodation sector Airbnb may be disruptive to other sectors as well. Airbnb provides a new form of accommodation where individuals can compete with the established surrounding hotels by sharing their own home. However, the potential earnings through Airbnb may persuade individuals to not only rent out a spare bed but their entire house while they are away (Gurran & Phibbs, 2017). In fact, homeowners may not even live in their dwelling anymore and use it entirely for Airbnb purposes only. This will potentially disturb another established market, the real estate market. For this reason, this thesis will focus on the presumed effects Airbnb has on the real estate market.

Since Airbnb is growing so incredibly fast, with high concentrations in major cities, the impact of the platform become visible. Municipalities are facing these effects and are trying to work out ways to regulate this phenomenon. For example, the New York State Attorney (2014) states in a report that there is a big societal need for research on the effects on the housing market. This report claims that housing stock is decreasing in popular New York neighbourhoods as many houses are used for Airbnb purposes only (New York State Attorney, 2014). Furthermore, a report from the Residential Landlords Association in London argues that a consequence of short-term rentals through Airbnb has resulted in decreasing housing stock and increasing rents in London (Simcock & Smith, 2016). A report from the Canadian Centre of Policy Alternatives who researched the effect of Airbnb on the housing market in Toronto, shares this concern (Jamasi & Hennessy, 2016).

Airbnb is becoming a topic of interest in academic literature as well. The literature on Airbnb impacts is especially focussed on case studies of major cities in Western countries (Gurran & Phibbs, 2017). Published articles address mostly regulation and tourist impacts. For example, the article of Zervas, et al. (2014) examines the effect on the establish tourist industry. Furthermore, a few studies cover the regulatory impacts of Airbnb (Edelman & Geradin, 2015; Kaplan & Nadler, 2015). Only very recent studies cover the effects on permanent housing supply in Los Angeles and Sydney (Lee, 2016; Gurran & Phibbs, 2017). Academic literature on European cities is however lacking while impacts in these cities become more noticeable as well. A recent episode of Tegenlicht (2016) covered the negative impacts Airbnb has on the city of Amsterdam. Moreover, it sheds light on the struggle for the municipally to combat illegal practices and regulatory difficulties (Tegenlicht, 2016).

1.2 Research Problem

As it was mentioned, the new platform has caused many discussions in international media and academic literature. Therefore, this thesis will elaborate further on the potential effect Airbnb has on the housing market of a city. As Airbnb rentals are mostly concentrated in urban regions, this thesis will focus on the real estate market of an urban area. The city of Amsterdam will be used as a case study. The main question will be phrased as follows: *What is the effect of Airbnb on the transaction prices of houses in the city of Amsterdam?* In addition to this main question, the following sub question is relevant: *Is there a difference in terms of impact when renting out an entire house, shared room or private room?*

1.3 Structure

In order to answer and elaborate on the research question a statistical analysis will be performed using qualitative data. Beforehand, this thesis will start with a detailed framework on previous research on this subject. For the data analysis a simple linear regression is performed in Stata, a statistical tool. The analysis aims to find causality between house prices in Amsterdam and the number of Airbnb locations. To finish, the results will be interpreted and the research will be concluded and evaluated. A discussion for further research will also be included.

2 Theoretical framework

Airbnb is a digital platform specialized in the supply of short-term rentals to people from all over the world (Zervas et al., 2014). Airbnb describes itself as a people-to-people based platform, where Airbnb facilitates an online market place for hosts and visitors to meet (Airbnb Citizen, 2016). With the world continuously digitalizing Airbnb is only one of the many online platforms that have emerged in the past two decades. Collectively these platforms are known as the 'sharing economy'. A sharing economy distinguishes itself from other economies as goods are not transferred from one to another but are granted access to for a limited period of time (Oskam & Boswijk, 2016). As a facilitator of home sharing, Airbnb has little marginal costs enabling them to grow easily (Zervas et al., 2014).

2.1 Opportunities

With the continuous digitalization of the world, sharing your assets has never been easier. Airbnb is only one of the many online platforms to facilitate this. The efficiency of online platforms may be one of their biggest advantages. Dropping transaction costs due to easy advertisement of homes is one of the benefits (Edelman & Geradin, 2015). Besides, the opportunity to rent out so easily improves the allocation of resources. Airbnb has removed barriers that would otherwise retain someone from renting out property for a short period of time. By removing these barriers short-term rentals become more attractive and therefore the property is used more efficiently (Edelman & Geradin, 2015). Platforms like Airbnb rely heavily on their customers, and this is why they imply an efficient information system that discourages unwanted behaviour from both parties. This is for example achieved through public reviews from both renter and host (Gurran & Phibbs, 2017). For this reason, supporters of Airbnb believe that this form of self-regulation will make government intervention and regulation unnecessary (Guttentag, 2015). The most notable efficiency is the fact that Airbnb and sort-like platforms are able to employ a more attractive price for people who are looking for accommodation. On the supply side, prices are very dynamic and in peak season one can easily adjust them (Edelman & Geradin, 2015).

Some literature states that Airbnb does not increase property values but helps preserving them. Proponents of Airbnb believe that the opportunity to rent out property can help homeowners with their mortgage (Jefferson-Jones, 2015). Also, Airbnb reduces vacancy rates and therefore the negative effects of housing market downturns will be diminished (Jefferson-Jones, 2015; Gurran & Phibbs, 2017). Airbnb itself invests in a lot of research on potential housing market effects. It measures its economic impact and says Airbnb can have significant positive effects on a city (Airbnb Citizen, 2016). To illustrate, in Amsterdam alone 380 million euros extra economic activity is measured. According to Airbnb, Airbnb visitors generally stay longer than traditional tourists and spend more money in the neighbourhood they stay in which results in this high economic impact (Gurran & Phibbs, 2017). Moreover, Airbnb claims that hosts in Amsterdam can earn an average of 3800 euros annually, which helps them pay their mortgages and pursue new projects. The Dutch bank ING (2016) agrees with these statements in a recently

published report. They state that individuals will buy a house more easily with these extra earnings in mind.

2.2 Obstacles

Online platforms such as Airbnb have created situations and developments we are yet unfamiliar with. As a result, local and national governments are having difficulties with the regulation of these online platforms. Moreover, Airbnb can have a negative effect on communities and short-term rentals may change the identity of a neighbourhood. Within communities complaints about nuisance are growing. Tourists travelling with Airbnb are not aware of the rules within that community and cannot be held accountable for their actions (Edelman & Geradin, 2015).

National and local governments are raising concerns about Airbnb regulation. Many questions were raised about whether Airbnb guests should pay hotel room taxes (Kaplan & Nadler, 2015). On this particular topic action was undertaken and in some countries Airbnb now collects hotel room taxes, also in cities like Amsterdam, but as legislation is different for every country, this cannot be implied everywhere (Edelman & Geradin, 2015). Another difficulty cities face is regulation of illegal renting. For example, the city of Amsterdam only allows Airbnb hosts to rent out 60 nights a year. While Airbnb says it is strongly opposed these illegal practices as well, only until recently it did not want to share its user data with municipalities (Kaplan & Nadler, 2015). At the end of 2016 Airbnb and the city of Amsterdam came to an agreement where also Airbnb helps regulating the 60 nights a year rule (Gemeente Amsterdam, 2016). The increasing prevalence of Airbnb guests has an impact on excising communities as well. Many heard complaints are nuisance, poor garbage disposal, and reduced parking space (Gurran & Phibbs, 2017; Edelman & Geradin; 2015). Furthermore, the traditional tourist sector has to live up to protocols concerning the safety of their guests (Gurran & Phibbs, 2017). However, for Airbnb rentals this regulation does not apply.

In addition, critics believe Airbnb is (partly) responsible for a shortage of rental housing in big cities (Edelman & Geradin, 2015). When houses are being removed from the long-term housing supply, prices will rise. As Airbnb uses private physical space for commercial purposes, real estate and regulatory frameworks are under pressure. Lee (2016) calls this process 'conversion', the change from residential housing stock to hotel room stock. This process will continue when property owners can earn more from Airbnb than from long term rent to city residents. There are basically two academic studies addressing housing market impacts of Airbnb. Lee (2016) has examined the impacts through the observation of rental vacancy rates. The declining vacancy rates imply a higher pressure on rental supply. In Los Angeles Lee (2016) found a 3% share of apartments is being removed from the long-term rental market. Gurran and Phibbs (2017) state there is a considerable chance for Airbnb to remove entire homes from the permanent rental supply in Sydney. This will pressure both rents and the highest visited areas in Sydney. In contradiction with Airbnb Citizen (2016) and ING (2016); Gurran and Phibbs (2017) state that aspiring homeowners will not benefit from Airbnb. In their research, the potential 'mortgage

relief' will not be as significant due to rising housing prices. Moreover, they believe that an additional income through Airbnb listing is not a widespread phenomenon. It will only be a true additional income when the host stay in the property and rent out spare beds. However, when looking at Airbnb listings, mostly entire homes are listed.

2.3 Conceptual model

This thesis will analyse the effects of Airbnb listings on the city of Amsterdam. In figure 1 the conceptual model briefly explains what this thesis is about to research. If the number of Airbnb listings would rise, what will happen to transaction prices of homes in Amsterdam? Also, a distinction is made between an entire home, a private- or shared room.

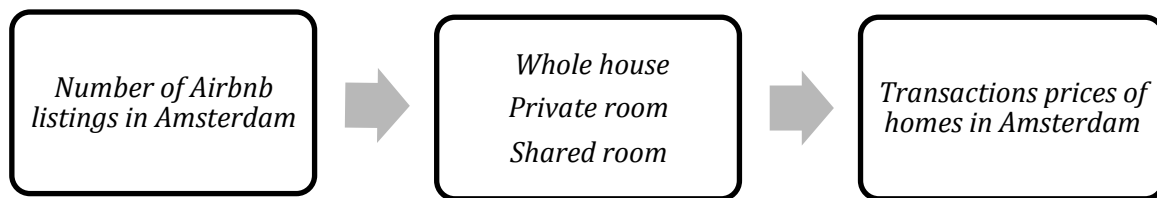


Figure 1: *Conceptual model (source: author's own work)*

3 Methodology

In order to address the research questions a secondary data analysis will be carried out. The data analysis will use data from Inside Airbnb (InsideAirbnb.com) and the Dutch association of realtors (NVM). The data from the NVM has been given access to by M, Hofman on November 15 2016.

3.1 Case: Amsterdam

The empirical analysis of the research questions is limited to the city of Amsterdam. The capital of the Netherlands is home to an estimate of 820 thousand people (CBSa, 2016). Amsterdam is a very popular tourist destination with around 7 million visitors annually (CBSb, 2016). Nearly 575,000 guests have stayed with Airbnb during their visit to Amsterdam in the year 2015 alone (Action Airbnb, 2016). Besides Amsterdam being a beloved destination for tourists, it is also a popular place to live. In 2015 the average transaction price of houses was €300,000 in the city of Amsterdam. In comparison, the average transaction price in the Netherlands was approximately of €70,000 less. Moreover, in the period from 2014 to 2015 in the Netherlands as a whole, house prices increased by 2.8%, where in Amsterdam this was almost 10% (CBS, 2016). According to the Dutch real estate association NVM between 2015 and 2016 prices in Amsterdam have risen by 12.3% (NVM, 2016).

3.2 Data

The data on Airbnb listings was retrieved from an independent data collector named Inside Airbnb. Inside Airbnb is a non-commercial website which makes visual interpretations of Airbnb data and share this data publicly. In the city of Amsterdam they have collected data on Airbnb listings randomly spread from April 2015 until July 2016, which can be referred as point-in-time information. A limitation to this data is the potential for out-of-date listings to be included in the analysis. However, Zervas et al. (2014) state that data from Airbnb listings are always imperfect, as many Airbnb hosts do not update their listing when they for example do not rent out their property anymore. This will result in an effect were 21 to 32 per cent of guest requests will be rejected. Despite this effect the data will still be of substantial quality for this research. This thesis will also examine the effect of different Airbnb listings in terms of property types.

The data retrieved from Inside Airbnb shows all Airbnb listings that are specified by their location and property type. Property types listed on Airbnb are an entire home, a private room or a shared room. Data on Airbnb listings where retrieved from the following points in time: April 2015, August 2015, September 2015, January 2016 and July 2016. A monthly estimation was made in order to calculate the absolute change between the months. Also, transformed into monthly data it could be used in combination with NVM data. For the analysis these listings are being subdivided by postcodes to increase the number of observations.

Table 1 shows the increasing presence of Airbnb in the city of Amsterdam. The total amount of listings is shown from all 5 recordings that were conducted from Inside Airbnb. A distinction

between room types is made as well. From this table, one can conclude that Airbnb listings have almost doubled in only 15 months time. Percentages on the share of property types were added as well. One can easily see that most listings on Airbnb are entire houses, implying that hosts will not be at home when renting out their home. Less than 20% of Airbnb listings consist of shared- or private rooms.

	Apr. 2015	Aug. 2015	Sept. 2015	Jan. 2016	July 2016
Entire House	3791 (81.56%)	4525 (80.44%)	4916 (81.86%)	5777 (80.38%)	7194 (81.27%)
Shared Room	33 (0,71%)	44 (0.78%)	41 (0.68%)	40 (0.56%)	45 (0.51%)
Private Room	824 (17,7%)	1056 (18.77%)	1048 (17.45%)	1370 (19.06%)	1613 (18.22%)
Total	4648 (100%)	5625 (100%)	6005 (100%)	7187 (100%)	8852 (100%)

Table 1: Total Airbnb listings in Amsterdam (source: InsideAirbnb.com)

The data on Amsterdam's housing market has been retrieved from the NVM. This thesis will use data from 2015 and 2016 only. The data provided by NVM shows quarterly data on the median transaction prices on sold private properties in Amsterdam.

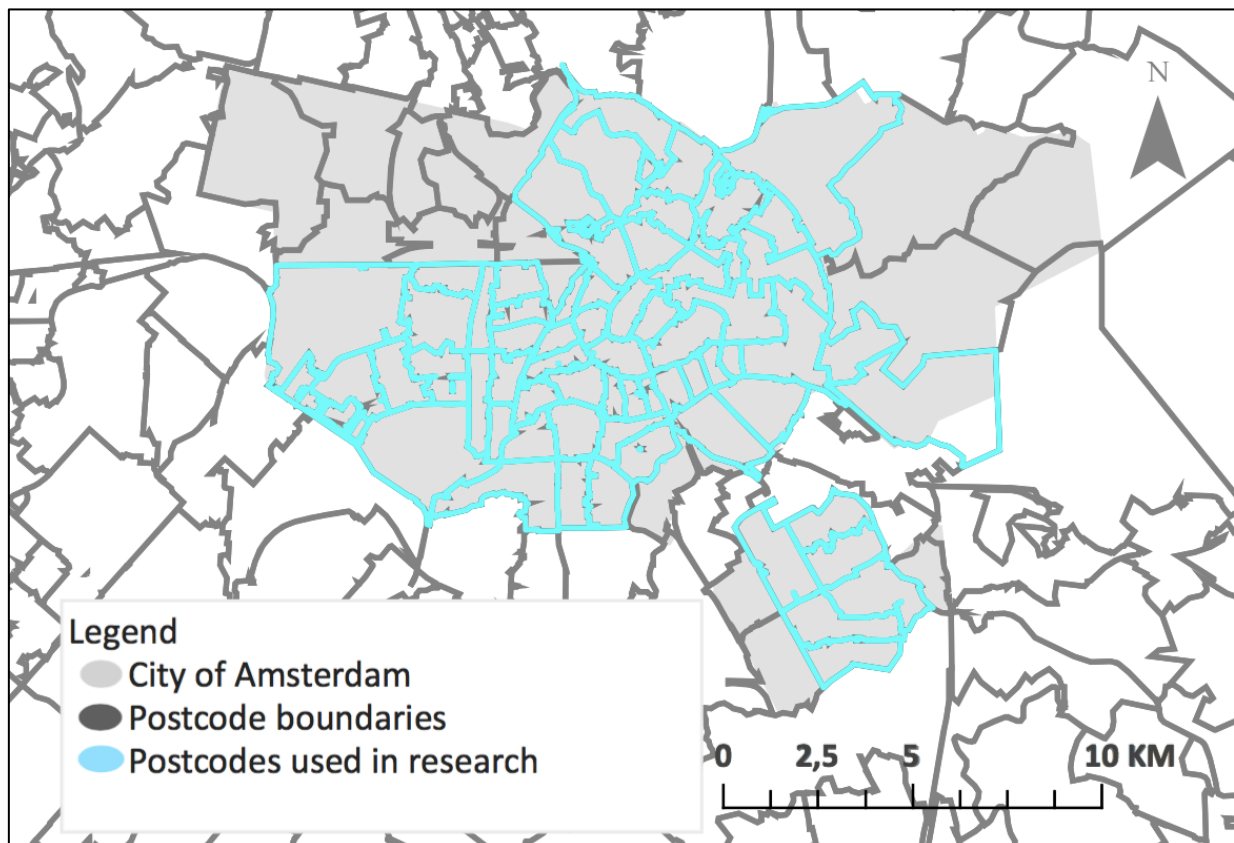


Figure 2: Postcode boundaries in Amsterdam (source: Esri Nederland)

This research will use the transaction prices per m² in order to correct for the difference in size. This data was converted into monthly data through estimation as well. This way the data from NVM could be used in combination with data from Inside Airbnb. The data provided by the NVM listed 76 postcodes in

The city of Amsterdam. However, some postcodes lacked data from both Airbnb data and NVM data and therefore, it was decided to leave these out of the analysis. For the data analysis a total of 63 postcodes were used. The most prominent reason for this data to lack is the fact that in these areas no private property is present. For example, postcode 1105 consists almost entirely of the AMC hospital. Figure 2 shows which area is represented in the research.

	Q1 2015	Q2 2015	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Q3 2016
Number of sold properties	2029	2579	2401	2626	1910	2346	2181
Average transaction price per m²	€ 98.36	€ 81.30	€ 89.63	€ 86.42	€ 120.24	€ 95.89	€ 113.52
Change compared to previous quarter	-	-17.35%	10.25%	-3.58%	39.14%	-20.25%	18.39%
Change compared to base year (Q1 2015 = 100)	100.00	82.65	91.12	87.86	122.24	97.49	115.41

Table 2: Quarterly data on transaction prices in the city of Amsterdam (source: NVM)

Table 2 shows the change in transaction prices per m² for the total of Amsterdam. This is a very general depiction of the changes between the first quarter of 2015 and the third quarter of 2016. Since the first quarter in 2015, transaction prices rose by 15.41%. When looking at the intermediate quarters price changes are fluctuating.

3.3 Data Analysis

To address the research question a linear regression is conducted. The dependent variable will be the change in transaction prices in Amsterdam expressed as a percentage and this percentage change in transaction costs will be calculated for one month to the other. The independent variable will be the absolute change in Airbnb listings for total, entire homes, shared rooms and private rooms listings. Also, two dummy variables are included that represent the year and postcodes. For the independent variable this implies the change in number of Airbnb listings from one month to the other.

The following time periods will be used in the research:

Δ July 2015 – August 2015

Δ August 2015 – September 2015

Δ December 2015 – January 2016

Δ June 2016 – July 2016

As it was mentioned before, the data that was retrieved had to be reorganised for the sake of the data analysis. To start the Airbnb Inside data was ordered based on the numbers of listings per postcode. For all for periods these listings were added so the total number of listings per postcode could be used for the analysis. A second step in adjusting the data was a calculation to estimate the monthly change per postcode. First, the difference between April 2015, August 2015, September 2015, January 2016 and July 2016 was calculated. Second, this change was equally divided between months. The third step was calculating the change for the time periods mentioned above. Furthermore, the same had to be done with the data from NVM. This quarterly data had to be changed into monthly data as well using the same steps as the data from Inside Airbnb.

The dependent variable will be the change of transaction prices per m² per postcode expressed in percentages. The independent variable will be the change of Airbnb locations per postcode. Furthermore, this research will also look at the effect of renting out an entire room, shared room and private room. The variables for this are change of Airbnb locations per postcode for entire home, shared- and private room. So, in total, 4 regressions will be performed. Like it was said before, 63 postcodes will be used in this analysis. For the regression the following functional form is used:

$$\Delta \text{ transaction price per m}^2_{zt} = \alpha + \beta_1 \Delta \text{ Airbnb Listings}_{zt} + \beta_2 \text{ Dummy Postcode} + \beta_3 \text{ Dummy Year} + \text{error}$$

The dependent variable is change in the transaction price per m² expressed in euro's based on the time periods mentioned above (t) and postcode (z). The independent variable is the change of Airbnb listings for the same time periods (t) and postcodes (z). Furthermore, two dummy variables, for postcodes and years (2015/2016) are used.

4 Results

Before this thesis will elaborate on the results, the data will be described in table 3. The summary statistics show a total of 252 observations for the dependent variable, change in transaction prices. The independent variables, on Airbnb listings, show fewer observations; as for some postcode areas no Airbnb listings are present. The mean can be interpreted as the centre of the data. In this case, the mean is the mean change for the variables. The independent variable has a mean statistic 0,4429365, which tells us in general what the monthly change on transaction prices will be. For the independent variables almost all means show a positive number, which can be interpreted as a positive change in Airbnb listings. Only shared rooms show a negative mean. A large number of standard deviation (SD) suggests a great diversion of observation, making the mean a less reliable criterion to indicate the centre of the data. The summary statistics show a high number of SD for all variables considering the minimum and maximum observations. For the dependent variable a minimum of minus 100 is observed. This can be interpreted as a change from 1 sold house to 0 sold houses in a specific postcode area.

	Variables	Obs.	Mean	SD	Min.	Max.
Dependent variable	Change in transaction prices (%)	252	.4429365	7.786396	-100	20.29
Independent variable (Airbnb listings)	Entire house	240	3.951042	6.317963	-3	51
	Shared Room	120	-.0758333	.4699805	-2	2
	Private Room	248	.5826613	2.409319	-28	7.5
	Total	251	4.370319	6.796872	-30	55

Table 3: Summary statistics (source: InsideAirbnb.com; NVM)

The null hypothesis (H_0) in this analysis will be that Airbnb has no impact on transaction prices in Amsterdam. The alternative hypothesis (H_A) indicates there is an effect of Airbnb on the transaction prices in the city of Amsterdam. The Pearson correlation matrix will indicate whether the variables correlate with each other, with 0 meaning no correlation and (-/+ 1 meaning very correlated. The correlation for this analysis can be found in table 4. The interpretation of this correlation matrix is that there is a very weak correlation, in other words, a very weak linear relation. All results are close to zero, where entire homes show the strongest linear relation with change in transaction prices per m².

Table 5 shows the result from the linear regressions. The regressions were conducted four times, for total Airbnb listings, entire homes listings, shared room listings and private room listings. The regressions will indicate if there is a linear coherence between transaction prices and Airbnb listings. No significant relation ($P < .05$) is found between on the one side the independent variable and the dependent variables, controlled by the dummies, on the other side. The p values are respectively .988, .982, .864, .964 $> .05$ for the independent variables total,

entire home, shared room and private room. As a result, the alternative hypothesis cannot be accepted. When looking at the first regression with the independent variable change in the total Airbnb listings, the coefficient shows a negative impact of Airbnb listings on the transaction prices in Amsterdam. Besides being insignificant the coefficient is also very small. The interpretation of the coefficient is as follows; a change of 1 Airbnb listings will result in a -0.0012754% change in transaction prices per m^2 . The main research question, whether the increasing presence of Airbnb has an impact on the housing market of Amsterdam, can therefore not be answered.

	Change in transaction price m^2	Airbnb listings total	Airbnb listings entire home	Airbnb listings shared room	Airbnb listings private room
Change in transaction price m^2	1,0000				
Airbnb listings total	0.0363	1,0000			
Airbnb listings entire home	0.0451	0.9252	1,0000		
Airbnb listings shared room	-0.0218	-0.0795	-0.1106	1,0000	
Airbnb listings private room	-0.0103	0.4272	0.0560	0.0178	1,0000

Table 4: Results Pearson's correlation ((source: InsideAirbnb.com; NVM))

		Change in Airbnb Listings			
		Total	Entire Home	Shared Room	Private Room
Change in transaction price m^2	Coefficient	-0.0012754	-0.0011234	-0.0615874	.0096895
	Standard Error	.0839458	.0496748	.356827	.2134128
	t	-.02	-.02	-.17	-.05
	P> t 	.988	.982	.864	.964
Control Year		Yes	Yes	Yes	Yes
Control Postcode		Yes	Yes	Yes	Yes

Table 5: Results linear regression (source: InsideAirbnb.com; NVM)

As none of the distinguished property types show a significant coefficient, little can be said about the difference in impact per property type. Shared rooms and private rooms show the highest standard error in comparison with the total and entire home variables. This can be explained by the fact that for these two variables there were far less observations. The higher the standard

error the less accurate the regression is. The only positive coefficient, although really small, is found for the variable change in private room listings. The interpretation for this finding is that for a change of 1 private room will result in a change of .0096895% in transaction price per m². However, as all the regressions are insignificant, interpretations about the results cannot be used. The sub question, whether certain property types cause more impact than others on the housing market in Amsterdam, cannot be answered.

5 Conclusion

In this thesis, the impact of Airbnb on the housing market of Amsterdam is examined, focussing primarily on the change in transaction prices of private property. Airbnb has grown immensely since the platform started in 2008. Whilst the presence of Airbnb in Amsterdam became visible some years after, already the potential impact it has on the city had been widely discussed in popular media. The flexibility of Airbnb has enabled its growth to be very fast. Because Airbnb uses private properties for commercial purposes concerns are raised what the effect on these properties might be. The aim of this thesis was to provide an answer to the research questions: 'Whether an increase of Airbnb listings in the city of Amsterdam will have an effect on the transaction prices in Amsterdam and moreover which form of Airbnb accommodation contributes the most to this effect.'

The findings of this research did not show any significant results. The effects of Airbnb on the transaction prices in Amsterdam can therefore not be statistically supported. Consequently, the analysis cannot be assigned to any of the specific accommodation types, entire home, shared rooms and private rooms. Beforehand, the effects of shared- and private rooms were expected to be smaller than entire homes. The main argument for this claim is the fact that the share of private- and shared rooms is much smaller compared to entire homes.

The analysis, although insignificant, shows predominantly negative effects, suggesting that the presence of Airbnb will have a negative impact on transaction prices. This is an impact, which was not indicated by the theories on Airbnb, who stated that Airbnb converts of private property to commercial property would withdraw houses from the housing market. This would have resulted in higher transaction prices. The data analysis did not show a significant relation between on one side the independent variable change in transaction prices per m² and on the other side the number of Airbnb listings (total, entire home, shared room, private room). The rise in transaction prices of houses in Amsterdam can therefore not be accounted on Airbnb based on the results from this research. However, literature that studied Airbnb impacts on the grounds of vacancy rates and rental market did find a considerable potential for Airbnb to impacts the real estate market.

Even though the analysis does not show any significant results, this does not immediately exclude a possible relation between the dependent variable and the independent variables. Limitations to the data may have caused this insignificant result. The collected data for the statistical analysis included data on Airbnb listings and transaction prices in the city of Amsterdam. Data on Airbnb Listings is difficult to find, as Airbnb.com does not provide data for public use. Fortunately, Inside Airbnb collects point-in-time data on Airbnb listings. Nevertheless, as these datasets randomly spread throughout the years 2015 and 2016, analyses in combination with other sources are difficult. Furthermore, data on Airbnb for the city of Amsterdam is limited to the years 2015 and 2016. As a result, trends on the real estate market and trends of Airbnb are difficult to analyse. Besides, due to lack of availability in Airbnb listings

there are fewer observations. As a result, limited data on Airbnb listings forced data on transaction prices was to be limited as well. Another constraint to the analysis is the fact that both data sources had to be reorganized. These adjustments will have an effect on the analysis. Both data sources are partly based on an estimation making the results less accurate.

When evaluating this thesis, the quality the data shows some critical limitations that have probably affect the usefulness of the data analysis. Although aware of the limitations of data on Airbnb listings, it was decided to conduct a statistical research anyway. When looking backwards, it would have been useful to gather more qualitative data, in the form of interviews, to support the analysis. Furthermore, this research predominantly looks at the effects on the housing market through transaction prices in the city of Amsterdam. In literature however, vacancy rates and increasing rents are used to indicate any effects on the housing market. These criteria could have been of more fit when looking at impact of Airbnb on the housing market of Amsterdam. Nevertheless, this thesis succeeded to provide an empirical analysis for the city of Amsterdam, where there is not yet any supporting academic literature present.

This thesis will finish with recommendations for future research. More insight on impacts of Airbnb on the housing market will make ways for regulation easier. Therefore more empirical analysis on the impact of Airbnb on the city of Amsterdam will be of relevance. Based on the conclusions from this research, an analysis with data on vacancy rates and the rental market of Amsterdam will construct a better depiction of the housing market. Furthermore, in the future, data that will not be based on estimation would immediately increase the validity of the research. This way, one can fully understand the impacts of Airbnb on a city like Amsterdam.

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