**Introduction**

The development of the peer-to-peer (P2P) economy in the last decades economic happened because of the technological and sociological changes. Peer to peer economy relate to an individual who rent their unused product for those who temporarily need it for a certain fee (Gupta et al 2019). Some researchers use the term sharing economy; however, this is not an accurate term as the product is not really “shared” (Dolnicar, 2021). The P2P economy spreads from accommodation to cars, fashion (Choi & He, (2019) and even electricity (Schneiders et al., 2022) and now has the potential to totally alter the economy. The most common example of the P2P economy is the example of P2P accommodation specifically, Airbnb (Gansky, 2010; Sundararajan, 2013). Airbnb links people who have vacant housing available with people who look for provisional accommodations (such as tourists) using digital markets (Botsman & Rogers, 2011; Zervas et al., 2017). Brian Chesky and Joe Gebbia founded Airbnb in 2008 by, and by 2021 had 12.7 million listings in 100,000 cities (Airbnb, n.d). Airbnb now leases more rooms than the world’s three largest hotel companies combined. The company has a market value of 113 billion (Airbnb, n.d).

Airbnb might pose a serious threat to the hospitality industry because it offers significantly cheaper accommodations and larger diversity in comparison to hotels (Dolnicar, 2019). Some researchers claim that Airbnb is a substitute to hotels. For example, Guttentag, & Smith, (2017) found that over 60 percent of the American uses Airbnb as a substitute to hotels. Similarly, Yang et al. (2021) found the two to be substitute. They analyzed 466 estimates from 33 studies on the effect of Airbnb on hotel performance and found that the effect was negative, but small. Dogru1 et al. (2020) researched 10 major hotel markets in the US between 2002 and 2018 and reported that ‏ the increase in Airbnb supply between 2008 and 2017 had a negative effect on hotel revenues, average prices and occupancy rates. In London, Paris, Sydney, and Tokyo Dogru2 et al. (2020) found that an increase of 1 % in Airbnb listings decreased hotel revenue between 0.016% to 0.031%. Blal et al. (2018) found that in San Francisco overall hotel revenue per room was unrelated to the availability of Airbnb facilities. In certain segments, however, it was affected by the average price of Airbnb accommodations. On the other hand, other researchers claimed Airbnb is a complementary product for example, Varmaet et al. (2016) who researched hotel employees and found that Airbnb and hotel address different types of guests. likewise, Sainaghi & Baggio (2020) indicated that during the week hotels usually serve business guests, whereas Airbnb houses leisure guests.

Besides the immediate effect Airbnb has on the hospitality industry, for example it leads to a rise tourists’ numbers (Gutiérrez et al., 2017)‏, it has wider effect on the economy (Levendis & Dicle, 2016; Negi & Tripathi, 2022). One example is it effects rental prices and housing prices (Benitez-Aurioles & Tussyadiah, 2020, Barron et al., 2021). It was found that Airbnb increases crime (Ke et al., 2021) as well as lead to neighborhood gentrification and overcrowding (van Holm, 2020; Gyodi, 2019). In the Balearic Islands it was found that Airbnb creates environmental degradation (Martin et al., 2018). On the other hand, Airbnb has a positive effect on the employment market in hotels and restaurant (Dogru3et al., 2020; Mao et al., 2018) and on the revues of local community and authorities (Belarmino et al., 2021; Mao et al., 2018; Farmaki & Kaniadakis, 2020).

The positive effects of Airbnb on economic activities and local income, along with its negative effects, such as disturbances in the local community and a decrease in hospitality income, have caused local municipalities and governments to consider how they should treat Airbnb. Therefore, it is crucial to learn more on the Airbnb effect on the markets. This study uses the stock market to test the effect of Airbnb announcements on the hotel stock values. The uniqueness of this study is that it does not focus on a specific area as most of the others research that deal with Airbnb does (Dann et al., 2019).

**Literature review**

The efficient market theory (EMH) claims that share prices reflect all information known to the market. Investors in the stock market who are looking for ways to gain profit look for information that can predict the stock prices. Therefore, Extensive research was performed about on how different information published in varies channels and in various modes effect the stock prices. One of the common ways to study news effect on the stock market is to use the event study methodology. This method has been widely used in many areas including marketing (Sorescuet et al., 2017).‏ economics (Lee and Mas 2012), accounting (Jiang et al. 2015), health (Maneenop & Kotcharin, 2020) and tourism (Papakyriakou et al., 2019).

In the hospitality industry the event study approached was used by many researchers. For example, Che Ahmat et al. (2023) utilized it to test the impact of a minimum wage in the hospitality industry on the stock prices of hotel companies in Malaysia, finding that introducing minimum wage and increasing it led to a decline in the stock values. Bloom & Jackson (2016) found that there was a negative effect before and after CEO change in hotel companies. Likewise, Dorgou (2017) found that acquisition had a positive effect, it size depends on the financial constraint and organizational structure. Kim (2021) found that announcements regarding hotel mergers tend to have different effect on the offer bidder and the target.

Focusing specifically on Airbnb, Garcia-López et al. (2020) used several models including the event study model to test the effect of Airbnb in Barcelona on the city housing and rental prices. They found that since 2014 when Airbnb became important player in Barcelona, housing and rental prices increased in neighborhoods where Airbnb was present compared to neighborhoods it was not. This was also the results of Bibler et al (2021) in Chicago and Sn Francisco, however, they also found that growth in Airbnb listing help individual economic situation. Similarly, Gonçalves (2020) focused the ban of Airbnb in Lisboan. He found that there was a pick in registry between the time the ban was announced and it implementation and that buyers liked the option of being able to participate in the Airbnb market.

Studying the effect on funding on Airbnb and hotels at different stages Biancoa et al. (2022) found that startup of traditional hotels had a declining effect on the stock market, while Airbnb at a similar stage had a positive effect on the stock market. Looking at the connection between Airbnb and hotel companies Biancob et al. (2022) used a sample of publicly traded hotel management companies and hotel real estate investment trusts in the US before and after Airbnb was recognized as a competitor (2013-2014). Using the event study methodology, they found that after 2014 new products or services offered by Airbnb had a negative effect on the stock market. Focusing on this connection but expending it to Airbnb around the world, Teitler-Regev & Tavor (2022) tested how announcements on Airbnb website effected the value of the stocks of hotel companies finding a negative connection. In addition, they found that positive Airbnb announcements led to a decline in the stock values, and that announcements regarding families had a longer effect.

Based on those papers (Biancob et al. 2022; Kim, 2021; Teitler-Regev & Tavor, 2022) and several other papers that showed that negative events have a negative effect on the stock market. Examples include dealing with the Cyber-attacks (Arcuri, 2020), Terrorist attacks (Markoulis & Neofytou, 2019), Political uncertainties (Das et al., 2020), and COVID-19 (Clark et al., 2021; Sharma & Nicolau, 2020; Shin et al., 2021). Our hypothesis is:

Hypothesis 1:

Airbnb announcements will have a negative effect on the hotel stock prices.

In addition, mentioning the location of the announcement might also affect differently the stock prices of hotels. For example, Viljoen (2016) studied the effect of news announcements on stocks with dual listings. The study determined that the announcements affected not only the stocks in the specific location, but also had a spillover effect on the general market.

Based on this paper our hypothesis is:

Hypothesis 2:

Airbnb announcements with exact location will have different effect on the hotel stock prices than announcements with general location.

This paper builds on the paper by Teitler-Regev & Tavor (2022) and uses more advanced statistical models in order to increase the robustness of the tests of the effect of Airbnb announcement on hotel stock prices.

Data and Empirical Strategy

Data

Studies have shown that the existence of Airbnb affect the hotel companies in those area. Therefore, to test the effect of Airbnb on the stocks of the hotel companies we collected data regarding the stock of the hotel companies and the stock exchange’s main index in 10 different countries around the world that had announcements on Airbnb. (USA, France, Australia, India, Japan, UK, China, Germany, Thailand and Spain). For each Airbnb announcement with exact location, we collected data on the hotel’s companies that might be affected for the announcement day. For announcements that did not have an exact location we considered all the companies in the sample. The data included forty-eight announcements related to 145 stocks with an exact location, and 132 announcements related to 969 stocks without exact location The data in this study is based on announcements posted on Airbnb site from 2017 to 2019. The data regarding the stock prices were collected form Yahoofinance.com and Investing.com. Appendix A includes the list of countries names according to the indexes of the different countries.

Empirical strategy

The even study approach was developed as a statistical way to measure how an economic event effects the stock market by using the abnormal returns (AR) (Luoma, 2011), and specifically to test the Efficient Market Theory (EMH) developed by FAMA (1970) (Dashdondog, 2021).  The first research published on event study was carried out by Dolley in the beginning of the 1030 (Dolley 1933). In the late1960s the research made by Ball & Brown (1968), and Fama, et al. (1969) introduced the method that is still in use today in many research in economic and finance. However, several changes have been made to the method. Specifically using daily data instead on monthly data and using more sophisticated methods to estimate the abnormal returns (Brown & Warner 1980,1985 Campbell et al., 1997).

The conventional event study approach to measure abnormal return around a specific day is widely used, however there might be several problems in this method including the fact that stock prices are not necessarily normally distributed (Kolari, & Pynnönen, 2010), there might be bias in the OLS estimations when non-synchronous trading is present (Dutta 2014) , or that increase in the variance might lead to misspecification of the model (Brown and Warner 1980,1985). Therefore, several researchers offered ways to deal with some of the problems and several other tests were developed to increase the accuracy and robustness. For example, Boehmer, Musumeci, and Poulsen (BMP) (1991) claimed that the event-period returns needs to be standardized by the estimation-period standard deviation, and that the cross-sectional mean of the standardized returns has to be divided by the cross-sectional standard deviation in order to get the test statistic. They assume that the event induced variance is identical for all the stocks used. Brown and Warner (1980, 1985) claimed that when the event day is the same for several industries the use of the market model reduces the inter-correlation of the abnormal return close to zero. However, this is not the case when the stocks are from the same industry and over-rejection of the null hypothesis can be created. To handle that problem Kolari and Pynnönen (2010) offered a variation of the PATELL statistics. Patell uses standardize t- test and assumes independence in the cross section and control the impact of large standard aberrations and even conscious changes in the variance id the returns (Hussain 2020). Boehmer et al (1991) used the cross-sectional variance and ignored the estimation-period residual variance. Using the Maximum likelihood estimation (MLE) on stock return data Ball and Torous (1988) simultaneously estimated event- period returns, the variance of these returns, and the probability of the event’s occurrence for any given day in the event window. The results suggest that MLE method rejects the null hypothesis more often than the traditional Brown and Warner method, however the null hypothesis is not rejected loo often when it is true. The standardized residual test assumes that the residuals are not correlated and that the event induced variance is insignificant. In this method used by Brown and Warner (1985) and Boehmer et al (1991) the event period residual are divided by the standard deviation of the estimation-period residuals, therefore, adjusted to reflect the forecast error.

Non-parametric tests are well-specified and good in detecting false null hypothesis of no abnormal return. Researchers like Corrado (1989), and Corrado and Zivney (1992), Cowan (1992), Campbell and Wasley (1993, 1996), and Corrado and Truong (2008) used nonparametric sign and rank tests showing that those tests produce better specification and power than parametric tests. Zivney and Thompson (1989) adjusted the sign test to deal with skewness, and risk adjusted. To handle the problem of event induced variance Corrado (1989) offered a non-parametric rank test, which relaxes the assumption of normality and give robustness results. This test applies for a one day of abnormal return, but Corrado claims that it can be used for multiple day event if the estimation period is divided by interval according to the number of days in the CARs. However, when the time period is longer the number of the observation becomes very small, so it weakens the model estimation. On the other hand, to avoid the same problem Cowan (1992) and Campbell and Wasley (1993) used the accumulative abnormal returns on Corrado's rank. The shortcoming of this method is losing the power in detecting abnormal returns, specifically when the event windows are long. To avoid this problem, Kolari and Pynnönen (2011) developed a generalized rank test that uses the generalized standardized abnormal returns for testing both single abnormal returns and cumulative abnormal returns. The test they offer is robust to abnormal return serial correlation, event-induced volatility and cross-sectional correlation of abnormal returns. One of the shortcomings of the sign test is the loss of information due to use of positive or negative signs. The Wilcoxon's signed ranks test reflex this limitation as it tests not only observed values relative to the median but consider the relative sizes as well (Zoungrana et al. 2021)

The day of the event, in our research regards to the day the announcements about Airbnb were posted, is defined as t=0. If the event occur on a day were there is no trade in the stock exchange, the event day will be the first business day after the event. t=T0+1,T0+2,…,T1 are the days of the estimates related to the event day. During that period, we calculated the statistics values that are the bases for testing the event. Finally, t=T1+1, T1+2,…,0,…,T2 are the days of event window related to the event day.

In the event study methodology, there is no uniform rule regarding the length of the event and estimation windows. During the years of using the event study approach, researchers changed the length of the estimation and events according to the research needs(Alkhatib, & Harasheh, 2018; Ball & Brown, 1968; Brown & Warner, 1985; Fama, Fisher, Jensen, & Roll, 1969; Palatnik et al., 2019; Teitler‐Regev & Tavor, 2022). The event window is calculated during the days t ∈[-330,-31] and the event window is defined as t ∈[-30, +30].

We used the abnormal return (AR) and the cumulative abnormal return (CAR) to analyze the responses of the stock returns of the hotel companies to the Airbnb announcements. We built a market model (MM) to describe the correlation between the stock returns of the hotel companies for event i on day t, (*Rit*) to the market return on that day (*Rmt*) on normal circumstances, that is in a situation when no unpredictable events happened. The market rerun is represented by the return of the index of the stock that is tested.

1. *, t* [-330,-31], *i* = 1, 2, …., N

The return (*Rit*) is weak white noise random variables with E[*Rit*] = μi for all t, Var[*Rit*] = for all t and Cov[*Rit, Rih*] = 0 for all t ≠ h.

The normal return, *E(Rit|It)*, for information I on day t is based on the ordinary least square regression with the estimators and **.**

1. ,  *t* [-30,+30], *i* = 1, 2, …., N

Then, the abnormal return, *ARit,* was calculated representing the difference between the actual return and the normal return for event i on day t.

1. , *t* [-30,+30], *i* = 1, 2, …., N

Standardized abnormal return (*SAR*) is defined as

where*S(ARi*) is the standard deviation of the regression errors in forecasting the abnormal returns (see Campbell et al., 1997).

The cumulative abnormal return for event i on day t (*CARit*) tests the cumulative influence of an event on a period of time *t* [t1, t2] by summarizing the abnormal returns during the time of the event.

1. , *t* [t1, t2]

The standardized cumulative abnormal return (*SCAR*) is defined as:

where is the cumulative standard deviation of the regression errors in forecasting the abnormal returns.

In addition, we calculated the cumulative average abnormal return in the event window as follow:



In order to test the significance of the event window we used three parametric tests and three non-parametric tests.

The first parametric test is the well-known ordinary t-test (ORDIN) (see Brown & Warner, 1985; Campbell et al., 1997) as follows:

This test has been widely used, for example: Teitler‐Regev & Tavor (2022), Luoma (2011) and Maneenop & Kotcharin (2020)

The second parametric test is Patell test that can overcome the weakness of the standard t-test for the fluctuation caused by event, by standardize the abnormal returns of the event window (see Patell, 1976).

where is the average of the standard deviations of the *CAR* and L1 represents the number of days in the estimation window.

This test was used by Luoma (2011), Drechsler et al. (2019) and Buigut & Kapar (2020).

The third parametric test is Standardized Cross-Sectional Approach which is also known as the Boehmer, Mucumeci and Poulsen (BMP) test (see Boehmer et al., 1991).

where is the cross section of the standard deviation for *SCAR*.

This test was used by researchers like Luoma (2011), Tahir et al. (2020) and Allen (2021).

The first test for the non-parametric test is the Rank Test. In order to implement the rank tests, we have to change the abnormal returns of each firm in rank (K) through the integrated time period that include both the estimation and the event window (T). The test compares the ranks during the event period for each firm, with the expected rank () (Corrado, 1989).

where is the average rank in the event window, L2 is the number of days in theevent window that is tested and represent the ranked standard deviation for the estimation period and the event period.

This tests was used by researchers like Luoma (2011), Hussain et al 2011 and Pandey & Kumari (2021)

The second test for the non-parametric test is the GRANK-Z test. we define the Generalized Standardized Abnormal Return (GSAR) as Kolari & Pynnonen (2011):

The demeaned standardized abnormal ranks of the GSARit are:

and the GRANK-Z test is:

Where is the average demeaned standardized abnormal ranks of the *GSARit* in the event window and is the standard deviation of the average *Uit* in the estimate window for event i on day t. This test was used by researchers like Dashdondog (2021) and Fotaki, Kourtis & Markellos (2021).

The third test for the non-parametric test is Wilcoxon Signed-Ranks Test (WSRT). This test considers that both the power of the abnormal returns and the sign are important (see Gibbons & Chakraborti, 2014; Wilcoxon, 1945) as follows:

where is the positive rank of the absolute value of the cumulative abnormal real exchange rate return.

This test was recently used by Kirana & Sembel (2019), Zoungrana et al. (2021) and Isynuwardhana & Putri (2021).

**Empirical results**

***Descriptive statistics***

***Descriptive statistics***

Table 1 presents the descriptive statistics of the 10 countries that were tested in this research, as well as the world index

**Table 1**

Descriptive statistics of the market indices

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Country | Index | N | Mean | Std. Dev. | Min | Median | Max |
| USA | S&P 500 | 798 | 0.052 | 0.799 | -4.100 | 0.050 | 4.960 |
| France | CAC 40 | 812 | 0.030 | 0.948 | -8.040 | 0.010 | 4.140 |
| Australia | S&P/ASX 200 | 803 | 0.030 | 0.721 | -3.200 | 0.070 | 3.340 |
| India | BSE Sensex 30 | 570 | 0.067 | 0.686 | -2.580 | 0.080 | 2.210 |
| Japan | Nikkei 225 | 807 | 0.033 | 1.202 | -7.920 | 0.050 | 7.160 |
| UK | FTSE 100 | 803 | 0.028 | 0.796 | -3.150 | 0.050 | 3.580 |
| China | Shanghai SE 50 | 771 | 0.056 | 1.115 | -5.330 | 0.050 | 6.280 |
| Germany | DAX | 803 | 0.028 | 0.987 | -6.820 | 0.060 | 3.510 |
| Thailand | SET 100 | 777 | 0.038 | 0.767 | -3.280 | 0.070 | 4.420 |
| Spain | IBEX 35 | 812 | 0.014 | 1.103 | -12.350 | 0.030 | 3.760 |
| World | MSCI World | 827 | 0.040 | 0.665 | -4.900 | 0.050 | 3.090 |

Note: The values of the mean, standard deviation, minimum, median and maximum are presented in the table as percentages. The collected country indices are the leading indices in each country.

As can be seen from the table the country with the daily highest average yield is India and it is equal 0.067%. The country with the lowest average daily yield is Spain where it is equal 0.014%. The country with the most fluctuate index is Japan with 1.202%, while India has the most solid yield of 0.6868%. Moreover, it can be seen the yield of the world income is in the middle 0.04% and it has the lowest volatility 0.665%.

***Effect of the announcement with a general location vs. an exact location on the share prices of the hotel companies***

In this section we use MM to estimate the effect of announcements on Airbnb on the return of the stocks of hotel companies for two type of announcements: 48 announcements with exact location relating to 145 event of the hotel companies in the area, and 132 announcements with general location including 969 events of the hotel companies in the area. Figure 1 describes the behavior of CAAe-30,+30 during the 61 event window around the day of the event for the two types of announcements from day (-30) before the announcements to day (30) after the announcements. Panel A in table 2 presents the results of the cumulative abnormal return for announcements with general location, and Panel B presents the results of the cumulative abnormal return for announcements with exact location.

The results appear in two types of windows. In the first type of window 4 windows are presented around the day of the event: [-1,+1], [-3,+1][[1]](#footnote-1), [-5,+5] and [-10,+10]. In the second type of window, we investigated three pre-event windows [-3,0], [-2,0] and [-1,0], the event day window [0,0] and three post-event windows [0,1], [0,2] and [0,3]. In column two we present the results of the for each window, in columns 3-5 the results of the three parametric tests (ORDIN, PATELL and BMP) and in columns 6-8 the results of the three non-parametric tests (RANK, GRANK-Z and WSRT).

**Table 2**

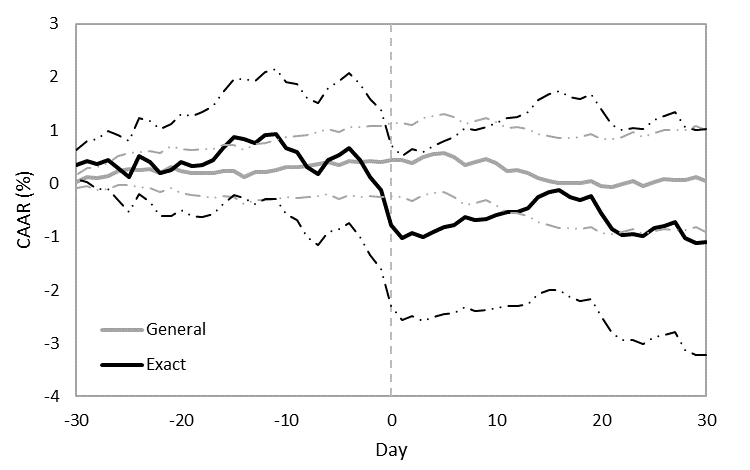
The behavior of the cumulative abnormal return (CAR) for the general location and exact location

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Panel A: General location | | | | | | | |
| Daily time | CAR(%) | ORDIN | PATELL | BMP | RANK | GRANK-Z | WSRT |
| Event window surrounding the event day | | | | | | | |
| CAR[-1,+1] | 0.019 | 0.174 | -0.999 | -0.913 | 0.427 | 0.565 | 0.461 |
| CAR[-3,+1] | 0.026 | 0.183 | -1.140 | -0.954 | 1.880\* | 1.078 | -1.247 |
| CAR[-5,+5] | 0.160 | 0.771 | -0.360 | -0.306 | -0.723 | 0.803 | 0.383 |
| CAR[-10,+10] | 0.116 | 0.405 | -1.855\* | -1.637 | 4.387\*\*\* | 1.974\* | 1.956\* |
| Pre-event and post-event window | | | | | | | |
| CAR[-3,0] | 0.029 | 0.231 | -0.774 | -0.646 | 1.277 | 0.841 | 0.950 |
| CAR[-2,0] | 0.043 | 0.393 | -0.386 | -0.318 | 0.756 | 0.718 | 0.762 |
| CAR[-1,0] | 0.022 | 0.249 | -0.516 | -0.473 | 0.538 | 0.520 | 0.325 |
| CAR[0,0] | 0.033 | 0.524 | 0.365 | 0.372 | -0.270 | -0.275 | -0.896 |
| CAR[0,+1] | 0.030 | 0.334 | -0.450 | -0.436 | -0.361 | -0.038 | -0.518 |
| CAR[0,+2] | -0.030 | -0.268 | -1.471 | -1.414 | 0.343 | 0.442 | 0.231 |
| CAR[0,+3] | 0.094 | 0.747 | 0.404 | 0.372 | -2.369\*\* | -0.318 | -1.214 |
| Panel B: Exact location | | | | | | | |
| Daily time | CAR(%) | ORDIN | PATELL | BMP | RANK | GRANK-Z | WSRT |
| Event window surrounding the event day | | | | | | | |
| CAR[-1,+1] | -1.149 | -4.785\*\*\* | -8.905\*\*\* | -2.325\*\* | 6.002\*\*\* | 2.222\*\* | 3.527\*\*\* |
| CAR[-3,+1] | -1.683 | -5.431\*\*\* | -10.156\*\*\* | -3.082\*\*\* | 8.519\*\*\* | 2.705\*\*\* | 4.067\*\*\* |
| CAR[-5,+5] | -1.268 | -2.759\*\*\* | -5.242\*\*\* | -2.223\*\* | 6.527\*\*\* | 1.849\* | 2.716\*\*\* |
| CAR[-10,+10] | -1.525 | -2.401\*\* | -4.482\*\*\* | -2.410\*\* | 7.724\*\*\* | 1.854\* | 2.797\*\*\* |
| Pre-event and post-event window | | | | | | | |
| CAR[-3,0] | -1.449 | -5.227\*\*\* | -10.060\*\*\* | -3.051\*\*\* | 6.527\*\*\* | 2.530\*\* | 3.691\*\*\* |
| CAR[-2,0] | -1.219 | -5.079\*\*\* | -9.539\*\*\* | -2.786\*\*\* | 4.511\*\*\* | 2.306\*\* | 3.470\*\*\* |
| CAR[-1,0] | -0.915 | -4.666\*\*\* | -9.075\*\*\* | -2.259\*\* | 3.265\*\*\* | 2.019\*\* | 3.186\*\*\* |
| CAR[0,0] | -0.671 | -4.841\*\*\* | -8.068\*\*\* | -5.178\*\*\* | 3.838\*\*\* | 3.314\*\*\* | 4.781\*\*\* |
| CAR[0,+1] | -0.905 | -4.618\*\*\* | -7.536\*\*\* | -3.228\*\*\* | 3.845\*\*\* | 2.006\*\* | 2.929\*\*\* |
| CAR[0,+2] | -0.807 | -3.362\*\*\* | -5.636\*\*\* | -2.907\*\*\* | 3.629\*\*\* | 1.759\* | 2.533\*\* |
| CAR[0,+3] | -0.884 | -3.189\*\*\* | -5.333\*\*\* | -3.188\*\*\* | 4.239\*\*\* | 1.808\* | 2.590\*\*\* |

Note: Panel A and panel B represents the cumulative abnormal return of general location and exact location respectively. The parametric tests in columns 3-5 include the t-statistics (displayed as ORDIN), the Patell test (displayed as PATELL) and the Standardized Cross-Sectional Approach (displayed as BMP). The non-parametric tests in columns 6-8 include the Corrado rank test (displayed as RANK), the Generalized Standardized Abnormal Return (displayed as GRANK-Z) and the Wilcoxon signed-rank test (displayed as WSRT). p-value. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% levels, respectively.

**Figure 1**

The cumulative average abnormal return (CAAR) behavior during the 61-day event window surrounding the event day for the general location and exact location



Note: The horizontal axis shows the days relative to the event day t = 0. The dashed lines denote the 95% confidence intervals. The lines in black shades indicate the CAAR-30,+30 for exact location, and the lines in gray shades indicate the CAAR-30,+30 for general location.

Panel A in table 2 and figure 1 shows that generally announcements published on Airbnb site that has general location does not effect on the stock prices of hotel companies except the [-10,+10] window that shows an increase of CAR-10,+10 = 0.116. This window is significant for all the nonparametric tests and the PATELL parametric tests. In addition, there is a significant according to the RANK tests in the [-3,+1] and [0,+3] window. It can be assumed that investors that sees general announcements without an exact location does not change their investment strategy, therefore the prices of hotel’s stock do not change significantly.

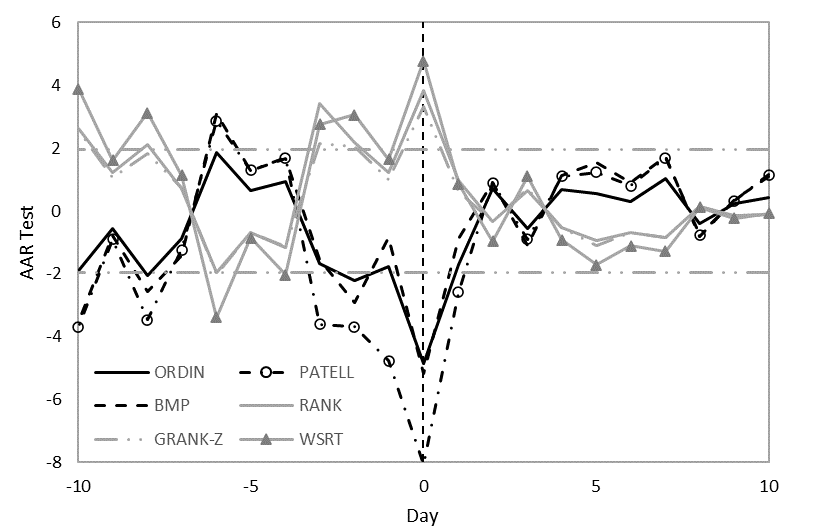
The results presented in panel B present a different picture, where announcements with exact location negatively affect the hotel’s stock prices in the area of the announcement and the is negative for all types of windows tested. Analyzing the statistic tests shows that the most significant results is in the PATELL parametric tests and the RANK non-parametric tests. The most significant results occur in the window [-3,+1] when the CAR-3,+1=-1.683% and the Mean Absolute Value Test (MAVT) equal to 5.660. The pre-event and post-event window analyses reveal that the most significant results occur in the window [-3,0] when CAR-3,0 = -1.449% (MAVT = 5.181), in the window [0,0] when CAR0,0 = -0.671% (MAVT = 5.003), and in the window [0,+1] when CAR0,+1 = -0.905% (MAVT = 4.027).

This result shows that most of the influence of announcements with exact location occur during the 5 days around the event window [-3,+1[. That is, investors with inside information can use this information and short sell the stocks of hotel companies three days before the announcements and close this position one day after the announcement and gain an excess profit of 1.683%.

To strengthen the significant received for announcements with exact location we present two additional figures: figure 2 and figure 3. Figure 2 presents the results of the parametric and non-parametric tests during the 21 days around the event day, beginning from the 10th day before the announcement was published, ending 10 days after the announcement was published. In the figure the dashed horizontal lines denote statistical significance at the 5% level. The lines in black shades indicate the results of the parametric tests and the lines in gray shades indicate the results of the non-parametric tests.

**Figure 2**

The results of the parametric and non-parametric tests during 231 days around the event



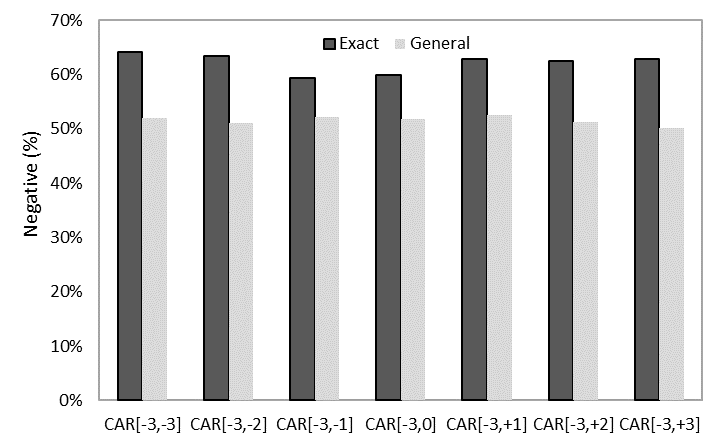
Note: The horizontal axis shows the days relative to the event day t = 0. The dashed horizontal lines denote statistical significance at the 5% level. The lines in black shades indicate the results of the parametric tests and the lines in gray shades indicate the results of the non-parametric tests.

Analyzing the figure, it can be seen that the trend in the parametric tests is usually opposite to the trend in the non-parametric tests. The most volatility tests are PATELL in the parametric tests and WSRT in the non-parametric tests. In addition, it can be seen that there are five days were most of the tests are statistically significant at 5% level: t = -10, -8, -6, -2 and 0. However, calculating the strongest effect of the event according to and significant statistics shows the effect in the [-3,+1] window.

Figure 3 (below) describes the cumulative percentage of announcements with negative during the seven days around the event day beginning three days before the announcement and ending three days after it for announcements with general location (marked in grey) and announcements with exact location (marked in black). It can be seen in the figure that on average 51.5% of the announcements with general location has a negative during the test period and on average 62.1% of the announcements with exact location has negative during that period. The result support the statistically significant received from the in announcements with exact location in all the event windows, compare to the lack of change received in announcements with general location in most of the event windows.

**Figure 3**

The cumulative percentage of announcements with a negative cumulative abnormal return (CAR) during the 7-day event window surrounding the event day for the general location and exact location



Note: The columns in black shades indicate announcements with a negative cumulative abnormal return for exact location, and the columns in gray shades indicate announcements with a negative cumulative abnormal return for general location.

**Robustness Check**

This section presents twoRobustness Check to provide evidence to the empirical results presented in the previous section. The first Robustness test is presented in table 3 and mirror the attention of the investors in the short term compared to the first test that checked the influence in the medium term. Panel A of the table present the results for window [-10,+10] and panel B the results for window [-3,+1].

**Table 3**

The behavior of the cumulative abnormal return (CAR) for the general location and exact location in the short term

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Panel A: Event window [-10,+10] | | | | |  | Panel B: Event window [-3,+1] | | | | |
|  | General location | |  | Exact location | |  | General location | |  | Exact location | |
| Daily time | CAR(%) | ORDIN |  | CAR(%) | ORDIN |  | CAR(%) | ORDIN |  | CAR(%) | ORDIN |
| Event window surrounding the event day | | | | | | | | | | | |
| CAR[-1,+1] | 0.012 | 0.112 |  | -1.143\*\*\* | -4.705 |  | 0.012 | 0.110 |  | -1.135\*\*\* | -4.626 |
| CAR[-3,+1] | 0.015 | 0.110 |  | -1.682\*\*\* | -5.363 |  | 0.015 | 0.107 |  | -1.674\*\*\* | -5.283 |
| CAR[-5,+5] | 0.132 | 0.641 |  | -1.288\*\*\* | -2.768 |  |  |  |  |  |  |
| CAR[-10,+10] | 0.058 | 0.203 |  | -1.579\*\* | -2.457 |  |  |  |  |  |  |
| Pre-event and post-event window | | | | | | | | | | | |
| CAR[-3,0] | 0.018 | 0.142 |  | -1.450\*\*\* | -5.167 |  | 0.016 | 0.129 |  | -1.443\*\*\* | -5.092 |
| CAR[-2,0] | 0.035 | 0.323 |  | -1.218\*\*\* | -5.012 |  | 0.034 | 0.315 |  | -1.208\*\*\* | -4.924 |
| CAR[-1,0] | 0.014 | 0.164 |  | -0.911\*\*\* | -4.592 |  | 0.013 | 0.149 |  | -0.905\*\*\* | -4.514 |
| CAR[0,0] | 0.026 | 0.418 |  | -0.673\*\*\* | -4.795 |  | 0.025 | 0.402 |  | -0.670\*\*\* | -4.727 |
| CAR[0,+1] | 0.024 | 0.269 |  | -0.905\*\*\* | -4.561 |  | 0.024 | 0.270 |  | -0.901\*\*\* | -4.495 |
| CAR[0,+2] | -0.037 | -0.346 |  | -0.812\*\*\* | -3.342 |  |  |  |  |  |  |
| CAR[0,+3] | 0.079 | 0.638 |  | -0.897\*\*\* | -3.197 |  |  |  |  |  |  |

Note: Panel A and panel B represents the cumulative abnormal return in the [-10,+10] and [-3,+1] windows respectively. In each panel, the first two columns refer to CAR and t-statistics (displayed as ORDIN) of announcements with general location, and the last two columns refer to CAR and t-statistics (displayed as ORDIN) of announcements with exact location. p-value. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% levels, respectively.

It can be seen from the results of the table in general that announcements with a general location published on Airbnb does not affect the hotel stock prices, but announcements with direct location influence the results of the stock prices in all window types. The robustness test also shows that the window with the highest significance is [-3,+1] when the CAR-3,+1=-1.682% (ORDIN = -5.363) and CAR-3,+1=-1.674% (ORDIN = -5.283) in the [-10,+10] and [-3,+1] windows respectively.

The second robustness test presented in table 4 tests the effect of announcements published on Airbnb on the hotel stock prices using two accepted models for calculating normal return: Index Model (IM) which is present in panel A and Mean Adjusted Returns (MAR) which is present in panel B.

**Table 4**

The behavior of the cumulative abnormal return (CAR) according to the IM and MAR models for general locations and an exact location

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Panel A: Index Model (IM) | | | | |  | Panel B: Mean Adjusted Returns (MAR) | | | | |
|  | General location | |  | Exact location | |  | General location | |  | Exact location | |
| Daily time | CAR(%) | ORDIN |  | CAR(%) | ORDIN |  | CAR(%) | ORDIN |  | CAR(%) | ORDIN |
| Event window surrounding the event day | | | | | | | | | | | |
| CAR[-1,+1] | 0.033 | 0.302 |  | -1.233\*\*\* | -5.047 |  | -0.049 | -0.329 |  | -0.770\*\* | -2.290 |
| CAR[-3,+1] | 0.041 | 0.293 |  | -1.746\*\*\* | -5.537 |  | -0.074 | -0.386 |  | -1.238\*\*\* | -2.853 |
| CAR[-5,+5] | 0.167 | 0.805 |  | -1.407\*\*\* | -3.007 |  | -0.075 | -0.263 |  | -0.577 | -0.896 |
| CAR[-10,+10] | 0.076 | 0.265 |  | -1.774\*\*\* | -2.745 |  | -0.068 | -0.174 |  | -0.543 | -0.611 |
| Pre-event and post-event window | | | | | | | | | | | |
| CAR[-3,0] | 0.043 | 0.348 |  | -1.430\*\*\* | -5.069 |  | -0.112 | -0.650 |  | -1.138\*\*\* | -2.931 |
| CAR[-2,0] | 0.057 | 0.530 |  | -1.201\*\*\* | -4.915 |  | -0.056 | -0.377 |  | -0.968\*\*\* | -2.880 |
| CAR[-1,0] | 0.035 | 0.398 |  | -0.917\*\*\* | -4.596 |  | -0.086 | -0.710 |  | -0.670\*\* | -2.440 |
| CAR[0,0] | 0.047 | 0.753 |  | -0.681\*\*\* | -4.827 |  | -0.090 | -1.043 |  | -0.472\*\* | -2.432 |
| CAR[0,+1] | 0.045 | 0.504 |  | -0.997\*\*\* | -4.998 |  | -0.052 | -0.430 |  | -0.572\*\* | -2.085 |
| CAR[0,+2] | -0.003 | -0.032 |  | -0.965\*\*\* | -3.952 |  | -0.164 | -1.101 |  | -0.417 | -1.239 |
| CAR[0,+3] | 0.109 | 0.873 |  | -1.069\*\*\* | -3.790 |  | -0.090 | -0.522 |  | -0.350 | -0.900 |

Note: Panel A and panel B represents the cumulative abnormal return according to Index Model (IM) and Mean Adjusted Returns (MAR) respectively. In each panel, the first two columns refer to CAR and t-statistics (displayed as ORDIN) of announcements with general location, and the last two columns refer to CAR and t-statistics (displayed as ORDIN) of announcements with exact location. P-value. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% levels, respectively.

This table as well lead to the conclusion that generally, announcements with general location posted in Airbnb site does not affect the hotel stock prices. On announcements with exact location there is effect on the stock prices for all type of windows by IM model that considers the market return as a basis for calculation the normal return like in the MM model. In the MAR model, most windows show affect, but not all of them. A possible explanation is that this model does not include the market return in calculating the normal return only the average of historical returns of each stock. The second robustness tests also shows that the window with the highest significant is [-3,+1] for announcements with exact location: when the CAR-3,+1=-1746% (ORDIN = -5.537) and CAR-3,+1=-1.238% (ORDIN = -2.853) according to IM and MAR respectively.

In summary, it can be seen that both robustness tests show similar results to the main test. That is, announcements with general location published on Airbnb site does not affect the hotel stock prices, while announcements with exact location have a negative effect on hotel stock prices. This leads to two major conclusions. The first is that investors with inside information that are exposed to announcements with exact location on Airbnb site can short sell the hotel stocks in the area the announcements address three days before the announcements is posted and close the position one day after the announcements and make an excess profit. The second conclusion is that Airbnb provide a substitution to the hotel services.

**Conclusion and Policy Implications**

The event study method is used in order to shoe that news and company’s announcements have an effect on the stock market. This paper uses the event study approach to measure the effect of announcements published on Airbnb site on the hotel stock prices). This research uses several parametric and non- parametric tests to increase the robustness of the results. The results of the different tests indicate that for announcement with general location there is no affect the stock prices, however when the announcement has an exact location it negatively affects the stock prices. These results hold in the parametric and non- parametric tests and in the robustness tests. The results can help the investors to develop an investment strategy, and strength the claim that Airbnb is a substitute to hotels. In addition, governments and local municipalities that consider whether to restrict Airbnb need to consider its negative effect on the hotels in the area.

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Appendix A

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Location | | | | | |
| America |  | Europe | | | |
| USA |  | France | UK | Germany | Spain |
| Company | | | | | |
| Braemar Hotels & Resorts Inc. | | Accor Sa | Accor Sa | Accor Sa | Melia Hotels International Sa |
| Choice Hotels International, Inc. | | Pierre Et Vacances Sa | Intercontinental Hotels Group Plc | Hilton Worldwide Holdings Inc. | Nh Hotel Group Sa |
| City Holding Company | | | Intercontinental Hotels Group Plc | Orascom Development Holding Ltd | |
| Hyatt Hotels Corporation | | | Malin Corporation Plc | Intercontinental Hotels Group Plc | |
| Intercontinental Hotels Group Plc | | | Melia Hotels International Sa | Pierre Et Vacances Sa | |
| Summit Hotel Properties, Inc. | | | Mid Wynd International Investment Trust PLC | | |
| Marriott International, Inc. | | |  |  |  |
| Pebblebrook Hotel Trust | | |  |  |  |
| Sunstone Hotel Investors, Inc. | | |  |  |  |
| Sotherly Hotels Inc. | | |  |  |  |
| Starwood Property Trust, Inc. | | |  |  |  |
| Xenia Hotels & Resorts, Inc. | | |  |  |  |
| Advisorshares Vice | | |  |  |  |
| Wynd Hotel & Banquet | | |  |  |  |
| Location | | | | | |
| Australia |  | Asia | | | |
| Australia |  | India | Japan | China | Thailand |
| Company | | | | | |
| Hotel Property investment | | Brigade Enterprises Limited | Fujita Kanko Inc. | Great Eagle Holdings Limited | MBK Hotel & Tourism (MBK PLC) |
|  |  | Eih Limited | Imperial Hotel, Ltd. | Huangshan Tourism Development | |
|  |  | Indian Hotel Company Ltd | Resorttrust,Inc. | Shangri-La Asia Limited | |
|  |  | Taj Gvk Hotels and Resorts Limited | Royal Holdings Co., Ltd. | |  |
|  |  | BSE Sensex 30 | [Agora Hospitality Group](https://www.dorsett.com/en/agora-hospitality-group.html) | |  |
|  |  |  | MBK Hotel & Tourism (MBK PLC) | |  |

1. The event window with the strongest impact of posting announcements on Airbnb. [↑](#footnote-ref-1)