# The Effects of Airbnb on hotels in Norway

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## Abstract

This paper examines the effects of Airbnb on the Norwegian hotel market. By using correlational design and difference-in-difference statistical method, authors investigated the effects of the rapid expansion of the Airbnb on the hotel industry in Norway. Authors findings show that hotels in the regions of Norway where Airbnb is flourishing have more guests than the regions with less Airbnb activity. In addition, it seems that Airbnb has a positive effect on the hotel market in Norway. However, as the Airbnb expansion continues, and it diversifies into the 'travel business' and the 'luxury accommodation' segment, it will affect the hotel industry. How the hotel industry will respond to this threat remains to be seen; something that will provide a very interesting subject for future research.

**Keywords**: Peer-to-peer, Airbnb, hotel industry, leisure travel, Business travel, Travel Agencies

## Introduction

For many countries, tourism is a major source of employment and national income. According to the World Travel and Tourism Council (WTTC), tourism has contributed $7.6 trillion to the world's GDP and currently employs 292 million people or provides one out of ten jobs worldwide. In addition, globally, tourism with the growth of 3.3%, is the second fastest growing industry after information and communication industry's 4.2% growth. (WTTC, 2017). It is therefore extremely important to understand the underlying factors that affect this industry.

The tourism industry has always been affected by the technology and process innovations, but seldom by innovations that have been originated from within itself. As a matter of fact, various

studies have shown that the tourism industry, for example hotels and restaurants, are not very innovative (Camisón & Monfort-Mir, 2012; Miles, 2008).

Furthermore, innovations that have been affecting tourism industry have mostly been invented to improve existing technologies/processes or to solve problems unrelated to tourism. Hjalager (2015) lists 100 such innovations, from passports (year 1414), and highway (year 1922) to body scanning (year 2007) that were not specifically invented for tourism yet have profoundly affected the tourism industry.

The recent advances and innovations in Information technology, especially the Internet and Web 2.0, along with Geographical Positioning System (GPS) (Korpilo, Virtanen, & Lehvävirta, 2017; Zheng, Huang, & Li, 2017) and mobile phones (B. Brown & Chalmers, 2003; Dickinson et al., 2017; Gunawan & Purnama, 2015) are once again affecting the tourism industry in profound ways.

These technologies have facilitated the creation of a new business model, called platform. According to Paul S. Chaudary (2015, p. Kindle Location 301),  these platforms play two specific roles: "they provide an open, participative, plug-and-play infrastructure for producers and consumers to plug into and interact with each other; and they curate participants on the platform and govern the social and economic interactions that ensue…". Amazon, Apple, Facebook, Google, Airbnb, Lyft and Uber are some of the platforms that are fundamentally changing the way many industries operate.

One of these business models, 'the short-term letting platform', has received considerable attention from the public as well as the municipal and tax authorities. Companies such as Airbnb initially aimed at the lower end of the leisure market, i.e., covering single rooms, or entire units. However, as this platform has become increasingly popular with the public, it is expanding beyond its low-end accommodations for the cheap leisure market. Therefore, as Airbnb continue to expand, it is slowly encroaching into other areas and some see this as a growing threat to the commercial hotels, motels, and bed and breakfast establishments. For example, a recent report by HVS Global Hospitality Services concluded that hotels lose approximately $450 million in direct revenues per year to AirBnb (Mahmood, 2016). Another major study also pointed at the Airbnb's effect on hotel prices, concluding that by 2020, the Airbnb's market share will be high enough to affect the hotel prices, especially those at the lower end hotels and motels (Consigli et al., 2012).

The result of these studies are not of course applicable to all countries since differences in local rules and regulations, attractiveness of locations, customs, etc., influence the expansion of the Airbnb. This why it is necessary to examine the effect of Airbnb on hotels in each country, in this case Norway.

## Literature Review

One of the inherent characteristics of capitalism as stated by Schumpeter (1942) is the concept of the 'creative destruction'. New technologies, processes, or organizational developments result in various 'mutations' that at times result in fundamental restructuring of the economic structure from within, giving birth to new structures, while destroying the old. He argued that this creative destruction is the essential fact about capitalism.

A new wave of creative destruction is currently underway, made possible by advancements in Information and Telecommunication Technologies (ITC), Geographic Positioning Systems (GPS), and new payment solutions. Of special interest is the rise of new business models, based on what is called the platform. At its most basic form, a platform creates value by facilitating exchanges between consumers and producers.

Access Economy, Peer Economy, On Demand Economy, Collaborative Economy, Gig Economy, People Economy, Enabling Economy, Empowering Economy and sharing Economy are some of the synonyms used for these platform based business models. These business models increase the market efficiency by reducing the search and payment transaction costs. This reduction in costs has enabled the providers, for example of rental units or various consumer goods, to reduce the lending time from months to weeks or in some cases even hours. For example, it used to take days to search and find customers or suppliers, conduct negotiations, and check reliability (establishing trust). All these activities are now performed on these platforms within a few minutes and at a fraction of the cost.

These platforms are disrupting / transforming many industries. The disruption of industries' cost structures along with evading of established regulations have created much debate about the effects, and legality of these new businesses. There are those (Agyeman, McLaren, & Schaefer-Borrego, 2013; H. S. Brown & Vergragt, 2015; Heinrichs, 2013) that see these Platforms Business Models (PBMs) as the solution to the prevailing consumerism, while others such as (Martin, Upham, & Budd, 2015; Mohler, 2015; Morozov, 2013) who see it as the continuation of the neoliberal capitalism. Similarly Slee (Slee, 2016, p. location 102)(2016, p. Kindle edition, location 102) sees these business models as a movement for deregulations. There are still others that focus mainly on the legal and financial perspective (Kassan & Orsi, 2012; Zervas, Proserpio, & Byers, 2015a). However, regardless of the perspective one adopts, the fact remains that 'sharing economy' or platform based

companies are disrupting the traditional industries. None has apparently received more name recognition than the sharing economy's poster child, the Airbnb.

Airbnb was started by two friends, Brian Chesky and Joe Gebbia in 2007. Facing difficulty in making the monthly rent payment on their San Francisco small apartment, they decided to turn their living room into a bed and breakfast, accommodating three guests on airbeds and providing homemade breakfast. In 2010, they received capital venture money and so began the meteoric rise of this small company.  Today, Airbnb is present in 191 countries and covers 34000 cities worldwide with highest growth being in the traditional tourist destinations such as Paris, London, New York, Rome, and the like. The majority of the listings in these places is for entire place, rather than a room in an apartment or a house (figure 1).

Figure 1. Percent of entire units listed on Airbnb
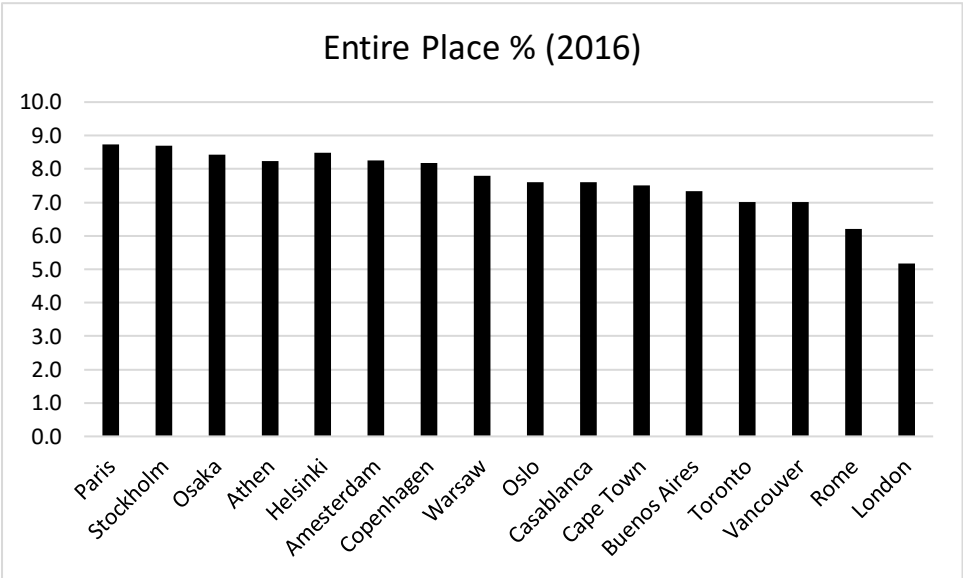


Source: Airdnb.com (2016)

Airbnb currently boast 3,000,000 listings across the globe, making it by far the largest provider of short-term rental accommodations in the world, surpassing Marriot International, the largest hotel chain in the world (Table 1).

Table 1. STR Rankings: The Largest Hotel Companies as Of 2016 plus Airbnb

| Ranking | Hotel | Properties | Nr. of Rooms |
|---|---|---|---|
| 1 | Marriot International | 5929 | 1,158,107 |
| 2 | Hilton Inc. | 4856 | 790,659 |

| | | | |
|---|---|---|---|
| **3** | InterContinental Hotels Group | 5034 | 727,82 |
| **4** | Wyndham | 7699 | 675,036 |
| **5** | AccorHotels Group | 3897 | 528,369 |
| | **Airbnb** | | **3,000,000** |

Source: BusNow.com and Airbnb.com (2016)

## Airbnb's Popularity

Clearly, Airbnb and other short-term letting platforms have proved extremely popular with the public. This popularity can be attributed to the effects of what Vargo and Lush (2004) call the Service-Dominant Logic (SDL), where instead of traditional focus on production and sales of goods separate from the consumer, the focus is on concepts such as intangibles, competences, dynamics, exchange processes and relationships. In SDL the customer is seen as "an operant resource (co-producer) rather than operand resource ("target") and can be involved in the entire value and service chain in acting on operand resources" (2004, p. 11). Coproduction is one of the main points of the SDL. Indeed, Shaw et al. (2011, p. 13) argue that "S-D Logic emphasizes that the role of consumers in the co-production process is critical to understanding competitiveness". Mathis et al. (2016) also mention the importance of the co-creation. Their findings "indicate that satisfaction with co-creation of an experience (i.e., tourists collaborating with a travel professional to provide their own ideas, and express their needs and desires to ensure that the trip is tailored to them personally) can contribute to satisfaction with the vacation" (2016, p. 72).

The short-term letting platforms such as Airbnb, provide an excellent tool for customization of the accommodation (location, type, services, etc.), as well as providing the users with the means of not only evaluating their service providers, but also to engage in story-telling; something that can result in the enhancement of the consumer's experience. Pera (2017, p. 337) argues that "the data show that online reviews published by travelers regarding a tourism experience tell stories to enact an account of themselves, and compelling storytelling results in traveler's delight, enhancing the experiential customer value phenomena".

Perhaps this story telling is one of the main reasons why the ratings on Airbnb seems to be much more positive than other rating systems such as for example 'TripAdvisor'. Another reason for these positive responses maybe the result of the effect of the 'socially induced reciprocity', which occur

when sellers and buyers interact socially. This often result in reviewers omitting negative comments or information from reviews (Fradkin, Grewal, Holtz, & Pearson, 2014). Regardless of the reasons, the studies (Nosko & Tadelis, 2015; Pallais, 2014) show that positive ratings from the users increase a platform's chances of success.

## Competition: difficulties faced by hotels

The increasing popularity and growth of short-term letting platforms is ringing bells at the major hotel chains' headquarters. These chains face a major threat to their bottom-line. Platforms such as Airbnb have a near zero-marginal cost structure, which translates into a huge advantage over the traditional hotel companies. Adding an extra 1000 rooms to the Airbnb's portfolio, will cost a fraction of what it will cost a hotel chain to add the similar 1000 rooms to its existing inventory. The removal costs are similarly very small for Airbnb. This near zero-marginal cost allows the Airbnb and other platforms to scale their supply at a very low cost to meet demand.  Hotels face tremendous scaling problems. To scale-up they have to either construct new hotels or buy existing ones. Constructing new hotels costs both money and time. Construction costs and furnishing are given. Finding the right place and complying with local zoning regulations is another problem that has to be addressed. In addition, staffing is difficult and incurs additional costs. More over, safety regulations, obligatory reporting and other red tape is a larger challenge for hotels then for the entrants of somewhat loosely regulated sharing economy.  When a hotel chain decides on scaling-up, it has to consider at a minimum a multi-year, if not a multi-decade return on investment period.  Similarly, scaling down present its own difficulties. Selling carry its own transaction costs, including costs of laying-off hotel staff.

Hotels are at a clear disadvantage and the industry is being disrupted. The question that remains is how the industry is effected and what should be done. Oskam and Boswijk (2016) present a dilemma for the authorities. They argue that banning the phenomenon will mean a disincentive to innovation while policies that are more receptive may result in harmful commercialization in attractive destinations. In addition they may increase the number of illegal Airbnb units (Guttentag, 2015), making the situation even worse for the hotels. Hotels are also concerned about the direction that Airbnb is taking. While previously, Airbnb was not openly challenging hotels, it is assumedly beginning to capture an increasing share of the hotel market, by offering a hybrid hotel-Airbnb package. For example:  "recently, Airbnb has been testing hotel-style packaging and amenities – such as local treats, wines, and upgraded bath products - in a select number of highly rated listings in Sonoma, California, to broaden its appeal to travelers who prefer more of a blend of a traditional hotel stay and that of an Airbnb: the comforts of a hotel stay like special amenities and treats as well

as instant booking, combined with the more personalized, peer-to-peer, local experience that the Airbnb platform facilitates. Such efforts indicate Airbnb's intention to turn itself into a full-blown hospitality brand, one that delivers a seamless end-to-end experience when its customers travel. While the company initially disrupted the hospitality business by serving as a provider of alternative accommodation, it is now trying to take this disruption to the next level by competing along the lines of the guest  experience." (Wilson et al., 2016, p. 4).

## The effect on Hotels

For most of the year, many hotels operate at break-even point and sometimes at a loss. During holidays and special events and occasions, the increase in demand presses the prices higher, leading to the major part of that year's profit. Airbnb, increases the supply and thereby eats into that profit. For example, according to Zervas et al. (2015b) Airbnb expansion in Austin, Texas, has resulted in a 13% reduction in hotel revenues.  For Texas in general, they estimated a 0.35% decrease in monthly revenue for every 10% increase in Airbnb listings.

A recent report by HVS , a Hotel Valuations & Appraisals  consultancy  "estimated that hotels lose approximately $450 million in direct revenues per year to AirBnb. Between September 2014 and August 2015, 480,000 hotel room nights were reserved while over 2.8 million room nights were booked on Airbnb. By 2018, HVS estimates that Airbnb room nights will reach 5 million per year. Clearly, the vacation rental site has diminished the demand for traditional hotel rooms" (Mahmood, 2016).

Merril Lynch analysts also mention the impact. Huston (2015) citing these analysts writes that by 2020, Airbnb listings could make up 3.6% to 4.3% of the room inventory, forcing the hotels to lower their prices.  This will of course affect the lower end hotels and motels most (Consigli et al., 2012; Jordan, 2015), since these providers lack the business facilities of the larger hotels.

## Situation in Norway

There have been too few studies done on the effect of Airbnb on hotels in Norway, especially studies that have been peer reviewed.  A Google Scholar search for the words "Airbnb + Norge" produced only 105 hits with only four relevant studies. Of these, there were one Bachelor thesis (Duggmo, Smedsland, & Andersson, 2016) and three Master theses (J. M. Furuholmen, 2016; Jordet & Lehne, 2016; Ytreberg, 2016).  A search for "Airbnb+Norway+Hotel" gave 300 hits, and a search for "Airbnb + Norway" gave 560 hits. Again, there were very few studies about effect of Airbnb on hotels in Norway, and most were, as mentioned above, Master Theses. There was, however, one peer

reviewed article by Neeser et al. (2015) in which he concludes that Airbnb had no significant effect on Hotels' average revenue per available room in Norway, Sweden, and Finland.

The results from the Master theses are rather different. All three theses (J. M. Furuholmen, 2016; Jordet & Lehne, 2016; Ytreberg, 2016) report the negative effect of Airbnb on Hotels in Norway. Jordet and Lehne (2016) report a 0.4% decrees in hotels' revenue for every 10% increase in Airbnb's listings in the area, while Ytreberg (2016) reported a 0.3% decrease in hotel revenues. As is evident, there are few peer-reviewed articles published on this subject and of those, very few are focused on Norway. It is therefore the aim of this paper to contribute to the general knowledge in this area by investigating the effect of Airbnb on Norwegian hotel industry.

There are two most direct ways in which the AirBnb may affect the hotel industry. First, the increasing number of available AirBnb listings may lead to potential hotel guests to switch to AirBnb. Customer loyality to hotles and migration of clients to Airbnb has not been previously studied empirically. The following hypothesis is in line with what was suggested in other contexts (Mahmood, 2016, Wilson et al., 2016, p. 4):

H1. The growth in the occupancy rate of the hotels is negatively associated with AirBnb activity in the region.

Second, increasing supply of Airbnb listings may lead to imbalance between supply and demand on the accommodation market. Since the supply of hotel accommodations is not perfectly elastic, the new equilibrium state is only possible when the hotel prices decline in the short/medium run. In addition, since Airbnb prices are generally lower than hotels', it increases the pressure on the hotels to reduce their prices. Thus, we expect that price reduction and guest migration will result in lower income for the hotels.

H2. The hotel income is negatively associated with Airbnb activity in the region.

## Methodology

The research design is divided into two categories, qualitative and quantitative. Rovai, Baker, and Ponton (2013) citing Gall, Gall & Borg (2007) categorize Quantitative research design into two major types, namely Experimental and Non-experimental. Non-experimental design in turn is divided into three major types: Descriptive/observational, Causal Comparative/ex-post-facto and Correlational design. In this study, we rely on secondary data to examine the possible effects of Airbnb on Hotel

industry in Norway. As such, we look into possible relationships among various variables. This lend itself to the **Correlational design**.

The correlational design, as the name implies, "produces studies that examine relationships (i.e., correlation, association, co-variation) between two or more existing, non-manipulated variables drawing from a single group of research participants." (Rovai et al., 2013, p. 81).

In addition, we have used causal comparative or 'ex post facto' approach as well. In this approach we attempt to determine the cause or consequences of differences that exists between or among groups of individuals, here we use the before and after division between the same group. To that end we used the **Difference-in-Differences (DD)** statistical method. Difference in differences (DD) is usually used to estimate treatment effects comparing the pre- and post-treatment differences in the outcome of a treatment and a control group. In this study the same group (before Airbnb) is used as the control group and the same group after Airbnb is considered as the treated group.

In addition, the results of the DD analyses are cross-checked when the relevant variables are entered stepwise into regression. When control variables are entered in the first step and then the variable measuring Airbnb activity is added, stepwise regression method allows to check if the last variable entered leads to any significant improvement of the regression model (significant increase in adjusted R square is expected).

**Data on AirBnb**

Data on AirBnb accomodations in Norway was supplied by AirDNA – an organisation tracking the performance of AirBnb listings around the globe. The dataset includes information on number of reservations for each active AirBnb listing in Norway for period 2014 – 2017. The original dataset included 26 031 active listings. It was possible to identify the exact location for 25 493 listings. These listings were attributed to 89 regions in Norway that correspond to the regions used by Norwegian Central Statistics Bureau for accommodation statistics.

**Hotel data**

Hotel statistics for period 2014-2016 were acquired from Norwegian Central Statistics Bureau. Due to anonymity restrictions, the Bureau supplies data where the smallest administrative units with less than 3 hotels available are merged into larger regions.

The following data on hotels at the regional level were avalible: Hotel income from accommodations, Hotel income per available room, Number of rooms sold, Number of room nights sold, Time spent at average room, Time spent at hotels (Norwegians), Time spent at hotels (Foreigners), Income per room night sold, and Income per room sold.

**Population and unemployment statistics**

Regional data on population size and unemployment per 31.12.2016 comes from Norwegian Central Statistics Bureau.

**Measures**

Comparing AirBnb development to hotel market development on the regional level presented us with several challenges. First, the absolute number of AirBnb reservations is closely associated with the region's location and population size. In the context of this study the population size influences strongly the number of hotel accommodations as well, making it difficult to use absolute numbers to detect the effect of AirBnb on the hotel industry. Second, while it is easy to calculate the growth rate for the hotels in most of the regions, the growth pattern of AirBnb is more complicated. Only 10 of 89 regions in Norway had any AirBnb reservations in 2013. The respective numbers were 13 in 2015 and 85 in 2016. This means most regions had undefined growth in 2016 compared to 2014 and 2015. Third, the vast differences in growth rates for the hotel industry in different regions suggests that local factors play important role, leading to the conclusion that the local trends should be accounted for.

In this paper, the observed number of AirBnb reservation days in 2016 was compared to the differences between the observed and the expected growth in hotel guest nights in 2016.

To estimate the expected growth in hotel guest nights in 2016, the average growth in hotel guest nights in each region in period 2009-2013 was calculated. This period was chosen as preceding the appearance of the AirBnb listings in most of the Norwegian regions. Considering the exponential growth rate for AirBnb services, the absolute number of AirBnb guests was insignificantly small before 2013. The average annual growth in hotel guest nights varied between -17 to +50 % (mean=0.5%, Std. deviation=8.8%). Then, the expected number of hotel guest nights in 2016 was estimated as the result of multiplication of the regional number of hotel guest nights in 2013 by the

cube of the average growth rate for the region. Finally, the expected number of hotel guest nights in 2016 was subtracted from the observed number and divided by the number hotel guest nights in 2013:

$$\Delta N_{2016} = \frac{N_{2016} - N_{2013} * \overline{G_{2009-13}}^3}{N_{2013}}$$

Where $\Delta N\_2016$ – relative deviation of the observed hotel guest nights in 2016 from the expected from the 2009-2013 trend; $N_x$ – observed number of hotel guest nights in year x; $\overline{G_{2009-13}}$ - average growth in the observed hotel guest nights in period 2009 – 2013.

Another dependent variable used is hotel income per occupied room in 2016.  It varied from NOK 510 to NOK 996 across the regions.

Concentration of AirBnb services was calculated as number of reservation days per capita. AirBnb's market share in each region was calculated as a number of AirBnb reservations divided by the hotel guest nights.

## Results

**Correlational analysis**

The total number of guest nights spent in Norway in 2016 was 16 525 400 ranging from over 465 000 in Oslo to less 36 000 in some smaller regions. The same year Airbnb listings were reserved for 694 224 nights. Over half of these nights (52 %) were spent in Oslo. Average number of Airbnb reservations per hotel guest night was 0,017. Since we do not know the number of Airbnb guests, this number is a minimum estimation for Airbnb marked share (1.7 %). This number varied from 0.1 % in some regions to over 7 % (in two of the largest cities in Norway (Oslo and Bergen)).

The number of guest nights was strongly positively correlated with both the number of Airbnb reservations and concentration of Airbnb reservations per person living in a particular region. However, this association is mostly explained by the fact that the both number of hotel accomodations and AirBnb listings is dependent on the region's population. *When the measure independent from region population was applied, no significant correlation was found between Airbnb reservations (measured in absolute numbers and related to region population and hotel guest nights) and the relative growth in hotel guest nights (as compared to the numbers predicted by the previous trends).* Thus, hypothesis H1 is not supported.

No significant correlation was observed between hotel income per occupied room and any of the variables in this analysis.

Table *2. Descriptive statistics and Pearson correlations (N=86).*

| | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Hotel guest nights | 270 908 | 644 995 | 1 | | | | | |
| 2. AirBnb reservations | 8 072 | 41 530 | 0.966** | 1 | | | | |
| 3. Region population | 33 848 | 80 560 | 0.959*** | 0.955** | 1 | | | |
| 4. AirBnb reservation per hotel guest night | 0.017 | 0.017 | 0.597** | 0.649** | 0.676** | 1 | | |
| 5. AirBnb reservations per capita | 0.110 | 0.113 | 0.587** | 0.566** | 0.481** | 0.605** | 1 | |
| 6. Hotel guest night deviation from trend | 0.056 | 0.414 | 0.018 | 0.028 | -0.012 | 0.024 | 0.147 | 1 |
| 7. Hotel income per occupied room | 835.11 | 99.626 | 0.273 | 0.232 | 0.257 | 0.208 | 0.271 | -0.049 |

*$p≤0.05$ (2-tailed); **$p≤0.01$ (2-tailed)

Further, Difference-in-Difference analysis was applied.


**Difference-in-Differences (DD) analysis**

The following regression model was applied to different dependent variables:

$$H_{rct} = \beta_0 + \beta_1 Airbnb_{rt} + \beta_2 Controls_{rt} + \beta_3 HSupply_c + \beta_4 ERate_t + \beta_5 X_{ct} + \varepsilon_{rct}$$

Where:

$H_{rct}$ is one of the dependent variables describing ***hotels' income, occupancy and price-level each year in every region***. The following dependent variables were tested:

1) **Hotel income:**

- Hotel income from accommodations

- Hotel income per available room

2) **Visits:**

- Number of rooms sold

- Number of room nights sold

- Time spent at average room

- Time spent at hotels (Norwegians)

- Time spent at hotels (Foreigners)

3) **Price indicators:**

- Income per room night sold

- Income per room sold

$Airbnb_{rt}$ is a ***number of Airbnb reservations at any given year at each region***. We have also tested a dichotomic variable (1=Airbnb presented in the region and 0 =Airbnb is not presented), but this less precise measurement resulted in no significant regression coefficients.

$Controls_{rt}$ is **control variables (population and unemployment rate in each region for each year**). Population is used as a proxy for demographic change and unemployment is used as a proxy for economic activity in a region.

$HSupply_c$ is a **total number of hotels in each county-region** (19 Norwegian counties were aggregated into 5 county-regions). This county-fixed variable takes into account the total supply of hotel rooms in a county-region controlling for the effects of new hotels built and old hotels taken out of service. Such changes influence all the hotels in a certain area.

$\beta_4 ERate_t$ is **an exchange rate of Norwegian krone to EUR**. The reason we include this time-fixed variable is that the total attractiveness of Norway for foreign tourists is influenced by the exchange rate. Both USD and EUR were checked and the effects were strongest for EUR. Since Norway attracts many more tourists from European countries then from USA, the EUR/NOK exchange rate was used in the analysis.

$X_{ct}$ is a term **accounting for interaction between county-fixed and time-fixed effects**.

The results of regression analysis are summarized in the table below:

Table *3. DD analysis results (N=86).*

| Dependent variable | Std. $\beta$ | | | | | | Adjusted R Square |
|---|---|---|---|---|---|---|---|
| | Airbnb | Population | Unemployment | County Hotel Supply | Exchange rate | | |
| **Total hotel income:** | | | | | | | |
| Hotel income from accommodations | 0,121*** | 0,888*** | -0,089*** | 0,048 | -0,008 | -0,043 | 0,923 |
| Hotel income per available room | -0,145 | 0,493*** | -0,015 | -1,17 | -0,105 | 1,104 | 0,143 |
| **Visits:** | | | | | | | |
| Number of rooms sold | 0,111*** | 0,894*** | -0,087*** | 0,075 | 0,002 | -0,072 | 0,918 |
| Number of room nights sold | 0,133*** | 0,875*** | -0,098*** | 0,096 | 0,007 | -0,088 | 0,913 |
| Time spent at average room | -0,059 | 0,155 | -0,023 | -0,036 | -0,027 | 0,020 | -.009 |
| Time spent at hotels (Norwegians) | -0,076 | 0,180* | -0,073 | 0,031 | 0,001 | -0,070 | -.004 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Time spent at hotels (Foreigners) | -0,017 | 0,050 | 0,041 | -0,328 | -0,082 | 0,257 | -.011 |
| **Prices:** | | | | | | | |
| Income per room night sold | -0,143 | 0,301** | 0,152* | -1,553 | -0,233 | 1,381 | .118 |
| Income per room sold | -0,084 | 0,222* | 0,063 | -1,203 | -0,172 | 1,100 | .035 |

*** significant at .0001 level. ** significant at .001 level. * significant at .05 level.

Among control variables population is positively related to hotel income from accommodation, hotel income per available room, number of rooms sold, number of room nights sold and income per room/night sold. Thus, hotels in larger (in terms of population) regions sell more rooms at higher prices.

Unemployment is negatively related to hotel income and number of rooms and room nights sold suggesting that higher unemployment rate (as a proxy for business activity in the region) leads to weaker demand for hotels. Business activity does not look to have any immediate effect on hotel prices.

The results of the regression analysis indicate that hotel income from accommodation is positively related to Airbnb activity in the region. Stepwise regression additionally confirmed that adding Airbnb activity to the control variables leads to increased adjusted R square indicating that Airbnb has an independent significant effect on hotel income. Thus, hypothesis 1 is not supported.

To decompose this effect, we look further at the effects of Airbnb on number of hotel guests and price level.

In the regions with larger number of Airbnb guests, hotels sell more accommodations to larger number of guests than in the regions where Airbnb is less popular. *Stepwise regression additionally confirmed that Airbnb has an independent positive effect on number of rooms and room nights sold. This result contradicts to H2.*

Income per room and room night sold are independent of Airbnb activity. It may indicate that hotels are not pressed to reduce prices in the regions with high Airbnb activity.

## Discussion and Future Work

The results of these analyses indicate that at the regional level the growth rate of hotel guest nights is independent of the development of AirBnb listings. On average, the hotels in the regions where AirBnb is flourishing do not demonstrate lower growth rate compared to the regions where AirBnb is absent or the number of AirBnb guests is relatively small. Moreover, we did not detect any negative relationship between Airbnb activities in the regions and hotel prices. To the contrary, the regression analysis confirmed that Airbnb has an independent positive effect on number of rooms and room nights sold. It is plausible that Airbnb guest, that would not otherwise visit the region, may spent some night at the hotels, leading to increased demand also in this sector. It is also possible, that larger penetration of Airbnb helps spreading information about the destination and signals to potential tourist that a particular region is a well-developed tourism destination. At this time at least, the increasing presence of Airbnb may increase the visibility of the region for tourism and contribute to the increasing tourist traffic into the region, hence positively contribute to the number of rooms and room nights sold.

However, overall, these findings suggest that AirBnb customers are different from the traditional hotel guest, i.e., they possibly would not have visited the place had the prices were not suitable. For example, the cost of a European vacation for an extended family of over 5 people can be prohibitive when one thinks of the hotel costs and food. A villa with 4 to 5 bedrooms through Airbnb, would reduce the costs by half, making it possible for this family to take that vacation. In other words, the availability of the Airbnb can bring in tourists that otherwise would not have visited the place. It is also possible that Airbnb guests value additional social benefits in form of communicating to hosts and untraditional accommodations not available through the ordinary hotel market (boats, cabins, mobile homes etc.).

As can be seen, at some level, Airbnb and hotels, to a certain degree (*currently*), do not compete for the same customers. However, this ambiguity about the effect of the Airbnb maybe short-lived. As Airbnb starts to expand in other areas, such as making special unit focusing on 'business travelers'.

'Airbnb for business', as it is called, focuses exclusively on business travel managers and the general business travelers. Its 'one-click expensing', that can charge directly to the companies, along with 24-hour premium support tries to emulate the services offered by the normal hotels. This service, when fully implemented (at the end of 2017) can become a serious threat to the existing hotel chains (Zaleski, 2017). In long run, an increase in total number of available hotel rooms, regardless of segment, may increase supply and alters the supply/demand/price curve. Even if it is not observable

in the short run, the market is elastic for both supply and demand. This will, as sharing platforms continue developing, at the very least put a ceiling on the hotels' prices and hence their profits, and in the worst case lead to their bankruptcy. The hotels specializing in luxury rooms and suites are not immune either, as Airbnb is said to be planning new tier for luxury vacation rentals (Gurman & Zaleski, 2017). However, these effects will vary dramatically between different countries and regions.

The results of this study contradict to some previous studies finding no or negative effect of Airbnb on hotel industry. One of the explanation is that most of the studies are focusing on larger cities and metropolitan areas, while the current study looks at the variety of the regions. While it is argued in this study that Airbnb has generally positive effect for hotels, it is possible that in few particular regions the negative effect may be still found.

The study has a number of implications for practitioners. First, the proponents of the restrictive regulations for Airbnb and other short-term letting platforms should not overemphasize the negative consequences for the hotel industry. Since the share of Airbnb listings on the accommodation market varies dramatically between regions, it is likely that eventual regulations/restrictions should be introduced on the regional, local and even neighborhood levels while most of the regions continue benefiting from the increasing number of Airbnb visitors.

Although this study showed that currently the hotel industry in Norway is safe from Airbnb but the industry is facing tremendous challenges in a very near future. The next step in the future research is to map the response of hotels to these challenges. Additional research on consumer preferences and behavior are needed to understand to what extent the platforms are taking clients from the hotels, and what they value most. It may also be interesting to investigate if the clients that use Airbnb in one location actually use hotels in another location on their journey. This kind of additional research may help the accommodation industry in general and hotels in particular not only survive in competition with peer-to-peer letting platforms, but also benefit from the growth of the novel technologies and business models.

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