Abstract

Sharing economy or just utilization of new business models?

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The year 2019 was when the sharing economy and its collaborative consumption was starting to make a bigger impact on Norwegian society and way of life. With international hospitality and mobility services leading the way, also several digital platforms developed domestically saw noticeable growth in its users and revenue. New legislation was put in place to support an orderly transition to an economy that makes better use of idle resources. However, the COVID-19 pandemic caused a major temporary setback to this development.

The sharing economy offers a quick and cheap way of matching supply with demand for goods and services. The main innovation in the business model of the sharing economy lies in the technological platforms such as smartphone apps which

h bring demand and supply together. There are two main types of sharing platforms: peer-to-peer (P2P) and business-to-consumer (B2C). In P2P demand and supply are matched via a digital platform developed and operated by a third entity who usually charges a fee of a fixed percentage of each transactions' payment. Typical examples are platforms such as Airbnb and Uber, two major players in the sharing economy. Due to the growing popularity of the P2P business models, more traditional commercial firms are also adapting their economic model to incorporate this concept of "sharing" into their companys portyfolio. This type of business (B2C) implies direct contact between the commercial provider and their customers via sharing platform apps or by adapiting the providers own app or platform.

The aim of the paper is to define and delineate sharing economy within the P2P and B2C plattforms. We find that although the underlying business model of the sharing economy keeps growing, the consumption within the P2P segment in Norway is still limited, while there is an increase in the B2C segment. Further, based on data from the Norwegian Tax Authority, the paper will demonstrate the limitations and the challenges of estimating a proper price index for accommodation within the sharing economy.

1 Introduction

The sharing economy as a sizable phenomenon is relatively new and due to Norway being a small country with a small market, it may be subject to international companies operating with platforms based on mature technology after testing their set up in other countries first. New legislation was put in place in 2018 to support an orderly transition to an economy that makes better use of idle resources. And 2019 was the year when the sharing economy and collaborative consumption was starting to make a bigger impact on Norwegian society and way of life. With international hospitality and mobility services leading the way, also several digital platforms developed domestically saw noticeable growth in the numbers of users and income. However, the occurance of the COVID-19 pandemic in 2020 dealt a major temporary setback to the development.

The sharing economys business models utilization of technological platforms such as smartphone apps provides an enviroment where demand and supply can meet at "an instance" independent of time zones and geography. The business model is found in a wide range of sectors, although currently most noteworthy within tourist accommodation and personal transport, such as taxi services and sharing of vehicles. Since the term "sharing economy" appeared around 2008 the phenomenon has grown alongside the rise of peoples' omnipresent connection to the web through smartphones, all while the activity within the sharing economy has evolved during the same period of time. In this paper we will describe multiple definitions existing in Norway of what is considered as sharing economy. We also aim to identify which economic activity is covered within the sharing economy platforms in Norway, and that the sharing economy business model is widespread both in the B2C and P2P segments, also showing that the P2P segment for the time being is rather small. We will furthermore demonstrate the limitations and challenges of estimating a proper price index for accommodation within the sharing economy based on data from the Norwegian Tax Authority. As of now it is still preferable to obtain data from Airbnb or other platforms directly. But in the future with sufficient adjustments the Norwegian Tax Authority data may prove useful as a source for price information.

2 Definition of sharing economy

A random search online for the definition of the sharing economy results in "noun: an economic system in which assets or services are shared between private individuals, either free or for a fee, typically by means of the internet". However in Norway other, more specific definitions exist, among them the definition by a Norwegian Official Report (Government.no, 2017:3) which states that the sharing economy is "economic activity enabled or facilitated via digital platforms that coordinate the provision of a service or the exchange of services, skills, assets, property, resources, or capital without transferring ownership and primarily between private individuals."

Next, the sharing economy is defined by The Norwegian Tax Administration as "a business model where private individuals sell services or rent out assets directly or through intermediary companies" (The Norwegian Tax Authorities, 2022). Payment may be returned as services in kind, instead of money.

As a clear distinction between a hobby and a commercial activity is not defined, to identify what category the activity falls within the Tax Administration suggest the following assessment to be carried out in effort to identify whether the activity:

- is carried on at the business's own expense and risk
- has a certain scope
- is likely to generate a surplus over time
- is aimed at having a certain duration

Another definition that is based upon three key features that characterize the sharing economy is provided by Fafo (an independent social science research foundation associated with the largest Norwegian labour union) (Jesnes et al., 2016:7):

- An intermediary in the form of a digital platform.
- Which helps to connect complementary players, which can be considered as providers and customers.
- Who exchange a set of benefits from the provider to the customer. There can be a wide variety of benefits, from services and asset/property sharing to capital, expertise, and labour.

In all the above definition the peer-to-peer (P2P) transaction is a defining characteristic of the sharing economy, however in the last definition by Fafo it is the contact facilitation of the P2P transaction which defines the sharing economy, not the sharing element itself.

3 B2C and P2P

There are two main types of sharing platforms: peer to peer (P2P) and business to consumer (B2C). In P2P demand and supply are matched via a digital platform developed and operated by a third entity who usually charges a fee of a fixed percentage of each transactions payment. Typical examples are platforms such as Airbnb and Uber, two of the best-known examples of sharing economy models[1].

Following the strong growth of P2P business models, two trends have occured. Some suppliers expand operations to investing in more rental units, thereby transcending from a P2P supplier to becoming an owner of several units and operating as a B2C supplier within the same platform. Simultaneously, the traditional commercial firms adapt their economic model to incorporate similar concepts of "sharing". This type of B2C business implies direct contact between the commercial provider and their customers either via the providers own platform or through an established sharing economy platform. According to the definition from FAFO, these activities are not included in the definition of the sharing economy as these business models are relatively similar to those of traditional traders. Contact through well-established web sites such as booking.com between hotels and guests are easily defined as B2C,however when booking.com also include listings of lodging by private owners the distinction between the two segments becomes less clear as the web sites trancends into also providing stays P2P.

Given the connection between the National Accounts (NA) the Consumer Price Index (CPI)[2] a collaboration between the price and the NA communities is preferable to ensure progress and consistency in both statistics. Digitalisation leads to a shift in the production boundary with more activities taking place within the household. The traditional assumption in NA is that firms create value added as producers, while households/individuals are consumers only. Due to the limited role of households as producers, their value added is recorded in the informal economy (IMF Committee on Balance of Payment, 2020). We now face an increasing number of individuals who participate directly as "producers" in activities related to the sharing economy. For instance, we see a growing trend of trading second-hand goods like clothing, furniture, electronics, books, etc. This trend is facilitated by the simplicity brought to the second-hand market by P2P sharing platforms. The practice of P2P in general not being measured in NA applies for every area of the economy with one exception;

[1] Consumers are also using digital networks to lend office space, parking spots, boats, bicycles, cameras and more.

[2] Throughout the paper CPI also refers to the Harmonised Index of Consumer Prices HICP)

for accommodation services where a correction is performed to the housing service by owner occupiers of houses which otherwise is registered as production in the NA.

4 Accommodation

Arguably among the most well-known sharing economy models are Airbnb, which has been said to have disrupted the industry of accommodation when entering the market as a competitor operating under rules differing from the ones existing in the established market. Airbnbs P2P offered accommodation service may feel different from stays provided through traditional accommodation. Differences are present through the accomodations physical attributes and its less visible ones such as different requirement, such as for instance building risk assessment and other similar national regulations mandatory to the existing accomodation service while not required in the regular housing market. Hence, the two service options should be seen as different products in price statistics. As the market share of Airbnb and the likes differs between countries, the inclusion of these services in the CPI sample must be determined individually by each country. In Norway short-term rental services like Airbnb are still rather small. Based on figures from 2017, NA currently estimates the household expenditure share to be below 0.1 per cent of total household consumption, but there are indications that the share is steadily growing and is expected to grow in the years to come. The question about whether rentals through Airbnb are to be considered B2C or P2P remains to be answered.

Traditional accommodation services such as hotels, motels, inns, and their likes operate within a legal context supporting the supplier and consumers in the existing markets. However, the existing legislation did not fully cover the activity made possible by sharing platforms which enabled peers to easily offer lodging under the safeguarding of the platforms terms and condition all while connecting the host to the "whole world" in an instance. As platforms such as Airbnb offer user profiles at no fee, the barrier was lowered substantially for peers to put an offer out for lodging while at the same time increasing the awareness of these possibilities for potential hosts.

The economic efficiency from the sharing economy model, which make it easier to rent out underused assets, is in general welcomed by the Norwegian government who appointed a Sharing Economy Committee in March 2016. The committee was asked to evaluate opportunities and challenges presented by the emerging market phenomenon (Government.no, 2017). Among other things, the Committee was tasked with identifying and assessing regulatory provisions challenged by the sharing economy, identifying the consequences of the sharing economy on the labour market and finally, the Committee was requested to consider consumer protection rules and the objective of consumer safety.

In the wake of the committee's findings the government took legislative action. In effect from 2 April 2019 a new short-term rental law was effectuated allowing apartments in housing cooperatives to be rented out for a total of 90 days per year, while previously these types of short rentals were not allowed at all. Furthermore, the law made it illegal to own more than one unit in each housing cooperative. The intention of the new law is to balance the interests of those who wish offer lodging in their home and their neighbouring residents. The new rules state that for rentals where the length of stay is less than 30 days for each individual letting, the revenue is taxable under the standard method i.e.: that revenue from rental up to NOK 10,000 (around 850 € April 2023) is tax-free, while 85 percent of the remaining surplus revenue is considered taxable income. Rental revenue equals the total fee paid by the renter to the host including all additional cost related to the individual letting (The Norwegian Tax authorities, 2021).

5 Transport services

Among the most well-known and highest profile companies within the sharing economy are the ridesharing companies Uber and Lyft. However, Norway has chosen a legislation which acts counter-current to many other countries in the transportation field within the sharing economy.

5.1 Taxi services

As of November 2020 a new taxi market reform took effect in Norway, postponed from July 2020 due to the pandemic (www.government.no, 2021). The main elements in this reform was linked to shifting rights and responcebilities from the taxi license holders to the taxi drivers, in addition to deregulationg the numerical restriction on number of licences.

The deregulation of the market due to the taxi reform has led to a huge increase in the number of taxi licenses by 45% on a national basis and as much as 69% only in Oslo. New companies, like Yango, Bolt and Uber, providing taxi services have entered the market since the reform took place. These new companies in the market are all foreign, which limits the Norwegian Statistics Act legal force to to oblige data delivery to Statistics Norway. Due to the taxi reform the taxi companies are not required to be connected to a dispatcher. This makes it difficult to obtain data for taxi rides, probably even for the regular taxi rides in the future, as comprehensive data ideally should be obtained from each taxi driver.

Uber provided their services prior to the reform, but had to abandon their operation in Norway after a damaging court case in 2017. There are reasons to believe that the increase in the number of taxi licenses is connected to the establishment of these new platform companies. However, since the taximeter requirement is not yet removed, none of the new companies can operate entirely within the P2P business model, as one is required to holding a professional taxi licence[3] as well as registering the vehicle as a taxi. The latter requirement includes a yearly EU periodic roadworthiness check, as opposed to a biannual check of roadworthiness required for a car purposed for private usage. Regular taxi drivers have also started driving for the new companies in addition to dispatching central. Yango and Bolt have registered as transport companies and not as taxi operation as given in NACE, probably to avoid some of the rules that a taxi driver/taxi company is subject to, among others the requirement of a taximeter.

According to the Tax Authorities, if you decide to make driving your main source of income, you must follow the general tax and reporting rules that apply to businesses. The general rule will then be that the income from the driving is taxable from the first NOK, and the expenses associated with the driving are deductible.

As the current regulation does not allow a taxi service purely through the P2P segment, the platforms are not able to fully make use of the P2P business models. In the future, if the taximeter requirement are replaced by digital platforms, P2P offered transportation services may reach significant market shares.

The question of whether or not taxi fares from the regular taxi companies work as a proxy for prices in the P2P segment still remains unanswered. Most likely, to gain market share in the Norwegian market the price level for taxi rides by the new companies will not surpass the fares in the existing taxi market. However, we do not have any information whether the price development differ from the regular taxi rides.

[3] The fee for getting a taxi license issued is at present NOK 3400 (around 300 € April 2023)

Following the changes in the market brought to us by the new reform, some political parties are now advocating a reversion of the reform due to complaints about too many licenses in the market, leaving drivers without enough clients to reach decent wages. According to economic theory prices should drop in the face of supply overbidding demand, and the digitalisation within the taxi market has opened for more differeansiated prices (Aftenposten, 2023).

5.2 Vehicle sharing

Several companies in Norway are offering vehicle sharing within the B2C segment. The companies are a mix of Norwegian and foreign.

As an alternative to private car ownership, organised carsharing is a system that offers people to rent cars locally available at any time and for any duration. Carsharing has existed in Norway for over two decades, however the number of users is still limited. The first carsharing providers in Norway were member-owned cooperatives in Norways three largest cities: Oslo, Bergen, and Trondheim. The carsharing stations were almost always located in central areas with a high enough residential or business density to sustain a viable customer base. Currently, seven carsharing providers within the B2C segment operate in Norway. It is estimated that around half of the members are passive members. One platform offers carsharing within the P2P segment, with about 10 000 cars in their registry (figures from 2021).

Carsharing users generally tend to be more urban, wealthy, educated and younger than the general population (link.springer.com, 2023). A typical user is between 30-40 years old, has higher education and fewer cars in the household. The biggest motivations for memberships are related to convenience, the financial aspect and the environment. Carsharing is primarily used for holiday and leisure trips as well as for shopping heavy goods, and rarely used for everyday travel such as commute. As more of the following generations grow up in families who do not own a car the phenomenon of carsharing may increase.

Allthough the station based cooperative model is the most established model, newer types of platforms, both in terms of organizational model and operational model, have entered the market since 2015. What remains to be seen is who will be the dominant players and what the dominant platforms will be in the future.

According to the Tax Authorities you do not have to pay tax on renting out your car if your rental income is up to NOK 10,000 (around 850 € April 2023) per year. It makes no difference whether you rent out the vehicle yourself privately or through an agent.

Smaller vehicles such as e-scooters was legalized in Norway in 2018, and since then several e-scooter sharing companies have established themselves in Norwegian cities offering around 20 000 vehicles. In Oslo, and elsewhere, unregulated e-scooter markets create challenges with respect to traffic safety and littering of excess vehicles resulting in an introduction of a new regulation in 2021 which limmit the number of companies in Oslo to three and the number of vehicles reduced to 8000, down from previously 23 000. All companies that operate in Norway are within the B2C segment, as the vehicles are owned by commercial companies. The same is the case for bicycles, both regular and electric,which also operate commercially.

Table 1. Types of sharing economy and share of total private consumption

Type of service	Expenditure share, CPI (%)	P2P's share of expenditure	Comment
Accommodation	0.8	Not significant*	Both B2P and P2P at play, legislation adapted to both business models
Taxi services	0.3	Not significant*	P2P business models not fully utilized yet as the requirement are like regular taxies
Carsharing (rental car)	0.1**	Not significant*	One companies offering P2P services. Several B2C companies are established in the market

*Less than 0.1 % of total private consumption according to NA
**The expenditure share is for rental cars

6 The Covid-19 pandemic and the sharing economy

The rapid development of the sharing economy in Norway was dealt a major setback due to the COVID-19 pandemic of 2020 (Halvorsen, 2021). In 2023 it is still not fully clear what of the pandemics impacts remain permanent, and whether the rapid changes experienced pre-pandemic may soon return when the COVID-19 pandemic converges towards an endemic stage.

Figures from Statistics Norway's accommodation statistics show a sharp decline in guest nights at commercial accommodation establishments in 2020. Norwegian guest nights declined by 17 per cent, while foreign guest nights declined by 69 per cent. Increased guest nights by Norwegians in the summer, especially at camping sites and holiday dwellings and youth hostels, did not compensate for the absence of foreigners. As restrictions were loosened and the willingness to travel domestically rose, the number of guest nights increased by 14 per cent from 2020 to 2021. In 2022, when most restrictions were liftet worldwide, the total number of guest nights rose to almost 3 per cent above the pre pandemic level in the year of 2019.

Similar data for Airbnb lodging in Norway is not public, but figures for Airbnb nights & bookings worldwide (FourWeekMBA, 2023) describe a substantial rise from 2017 to 2019, while figures dropped to reach the 2017 level in 2020, before once again climbing steeply through 2021 to reach an all-time number of bookings in 2022. Although the rules and regulations differed between countries throughout the pandemic, some similarities were present; rules and regulations which serve to limit the contact between people and reduce the likelihood of spreading the virus. It is likely that the decline observed in commercial accommodation in Norway corresponds to a decrease in the activity facilitated by Airbnb worldwide.

Also the transportation services were hit hard by the Covid-19 pandemic. The level of restrictions induced a reduction in demand, with activity increasing during the summer months of 2020, although variations between different segments were observed; the street segment was hit hardest, while the contract market segment[4] seems to have performed better.

[4] The taxi service industry can be divided into two segments, the single trip segment, and the contract segment, e.g. contract driving for public authorities or companies who negotiate fares for multiple trips. In the single trip segment customers either order a taxi through a dispatching service companies or hail a taxi from a taxi rank or from the street.

For taxi owners and employed drivers, the reduced demand in the early phase of the pandemic led to many temporary lay-offs and parked cars. Many taxi owners applied for compensation, with those who own multiple cars having a much higher chance of getting their claim for compensation accepted. Some of the temporarily laid-off drivers likely received an equal or larger sum in unemployment benefits than they would have been paid in wages if they were to continue to work in a market with severely reduced demand. Combined with the deregulation of the taxi market in November 2020, the pandemic made many taxi owners and employed drivers leave the industry.

While sales of new cars in Norway faced new records in 2021 and the government instructed people to avoid the use of crowded public transport as an attempt to stop the spread of the Covid-19 culminating in historic low passenger demand for public transport use especially in the capital of Oslo, there are reasons to believe that private driving increased during the pandemic, and therefore also the use of carsharing in 2020 and 2021.

No data are found for city-bicycles during the pandemic period in Norway, however dealerships of new electrical bicycles reportet new sales records during this period.

7 Taxable income data, - a possible data source?

Legislative action was introduced in 2018 to address short-term rentals (defined as rental periods of 30 days or less) resulting in a softening of the regulation of the housing market. The deregulation opened up for subletting apartments in housing cooperatives for 90 days per year, as opposed to earlier restriction which forbid renting out these types of self-owned apartments.

Income from the sharing economy is liable to taxes, and as of February 2021 all platforms providing connection and facilitating payment between parties involved in renting lodging services in Norway, both Norwegian and foreign, are obliged to report information about each unique rental, regardless of the duration of the stay. Statistics Norway was granted full access to these data from the year 2020 through an agreement with the Norwegian Tax Authorities.

In its most severe form travel bans due to the Covid19 pandemic, effectuated in the spring of 2020, restricted inhabitants to stay within their registered municipality. Hence the figures derived from the Norwegian Tax Authority data for 2020 must be viewed as highly affected by the rules and regulations imposed on international travel and national movement in the period the data covers. In comparison several hotels shut down during the early stages of the pandemic. Most likely the following year is also affected by the pandemic as restrictions were imposed with variable strength and strictness in Norway and the rest of world throughout 2021 . This hypothesis is supported by figures for number of nights conveyed through Airbnb throughout the last six years, where the number of nights in 2021 accumulated to less than the most recent pre-pandemic year of 2019. Analysis on the year of 2021 will be released by Statistics Norway later in 2023, henceforth this paper will only describe figures from the first pandemic year of 2020.

In total slightly more than 400 000 unique rentals[5] were registered in the Tax Authorities data for the year 2020 with about 90 per cent of them related to short-term rentals for up to 90 consecutive days. The numbers do not include information about rentals where the platform only arrange for the connection between the provider and the buyer of lodging services as verifiable transaction prices related to them registered in their system, as these platforms are relieved from the duty to report.

[5] Unique rentals are equivalent to each transaction between the one that rents out and the ones renting. Every transaction is considered unique. The data does not identify the renter leaving no option for Statistics Norway to identify renters that repeats their rental on several occasions.

Since then COVID-19 hit, Airbnb launched its "Live Anywhere theme" in 2020, and said: As a result of the pandemic, millions of people can now live anywhere. They're using Airbnb to travel to thousands of towns and cities, staying for weeks, months, or even entire seasons at a time. We want to design for this new world by making it even easier for guests to live on Airbnb. We believe that living somewhere enables deeper connections to local communities and the people who live there. In Q4 2022 stays of at least 28 nights accounted for 22% of gross nights booked, while 47 per cent of gross nights booked were from stays of at leas 7 nights (rentalscaleup, 2022).

8 Analysing the data from the Norwegian Tax Autorities

8.1 Number of stays and revenue

In economic figures revenues from lodging reported to the Norwegian Tax Authorities was 1.7 billion NOK for 2020, while the corresponding total revenue for hotel accommodation from official statistics was 9.4 billion NOK. On average the price for lodging was 1100 NOK per night stay, while the average price per night in a hotel room in 2020 was 979 NOK (Statistics Norway, 2021). Be aware that these figures do not say anything about the size and location of the rental, not the number of people staying in the unique rental object; all factors that may influence the observed prices.

Further drilling in to the length of stay dimension in the Tax Authority data show that most rentals are substantially shorter than 90 days[6]. This corresponds to the general right of vacation days granted within the EU being 4 weeks, some member states and EFTA members, like Norway, operate with more vacation days, while the US and Canada have considerable weaker standard rights to paid vacation days (EurDev, 2021). The observed data showed a boost in the length of stay at exactly one-week rentals, while the numbers consistently decreased for each more added night of stay. By selecting only stays consisting of one-week rentals or less we are left with about 84 per cent of the original data material.

Table 2. Share of stays by lenght

Night(s) stay	Percent	Cumulative Percent
1	27,3	27,4
2	23,3	50,7
3	14,3	64,9
4	7,6	72,6
5	3,9	76,5
6	1,9	78,4
7	5,8	84,3
8	0,7	85,0
9	0,6	85,6

All platforms providing rental agreement in Norway are represented in the Tax Authority data. In this analysis we aim to identify the ones represented by platforms as defined by the sharing economy phenomenon. As defined above an important aspect of these exchanges is the distinction of transaction made "primarily between private individuals".

[6] The Norwegian Tax Authority's definition of short-term rental (less than 90 days per stay) is adapted to the purpose of tax liability.

The better part of the data were rentals arranged via Airbnb. Booking.com were well represented in the data too. However, booking.com operate also in the segment were rentals made through them are targeted at established brands and entrepreneurs of all sizes (Booking.com, 2022).

8.2 Rental object number

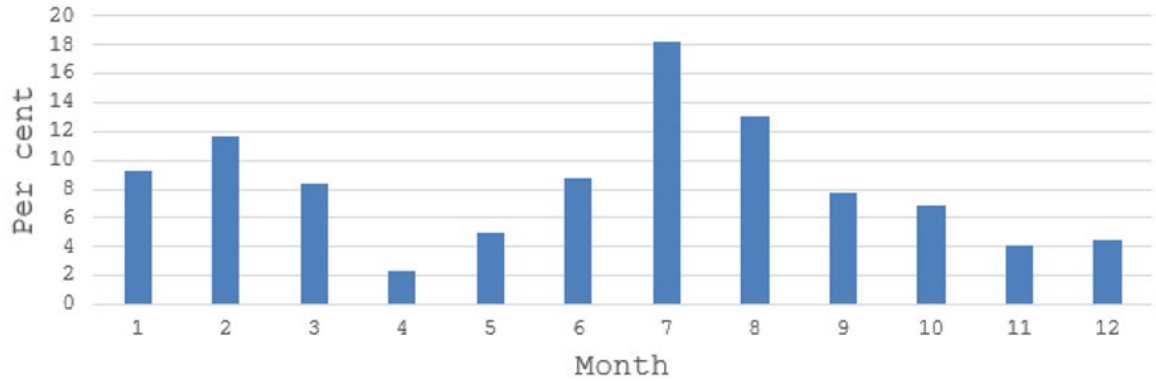
The data included information about rental object number. To secure the aspect of transactions "primarily between private individuals" we assume that private individuals most likely do not operate with several rental objects and decided to include only rental object numbers of one or two. The higher rental object numbers from 3 and up covered about 10 per cent of the original data material, leaving almost 90 per cent for further analysis.

By selecting only rentals with a length of stay of a week or less, only Airbnb and securing the number of objects rented out by each host to be no more than 2 we believe we are left with a subset of data that is well within the definition of sharing economy where transactions are made "primarily between private individuals" as well as it represents lodging acquired by private households in Norway through this channel. The subset of data after this selection is done accounts for more than 180 000 unique rentals, equivalent to about 45 per cent of the original dataset. The number of nights of stay in the subset of data were about 500 000, about 1/3 of the original data material, totalling up to 500 million, about 30 per cent of the total revenue in the full data set.

In compiling a price index the first step was to derive a unit price per night per unique rental. As the same rental object may have been rented out several times within one period (month) the unit price was aggregated to a monthly unit price before a timeline per unique rental object was constructed.

Rental numbers vary throughout 2020. About 60 000 unique rental subjects have a monthly unit price registered which are unequally distributed throughout the months of 2020.

Table 3. Monthly overview of rentals, per cent.



Action taken by the government during the spring of 2020 to restrict the spread of COVID-19 is visible through the low activity seen in the spring months of March, April and May. Followed by a summer where the mobility within Norway was unrestricted and numbers again rose, the lodging numbers declined as COVID-19 numbers rose through the fall and the government once again enforced strict regulationsto reduce the spread of the virus to a maintainable scale as the year moved towards Christmas celebration. Most likely also non-pandemic figures would vary throughout the year, with high numbers associated / coinciding with national holidays and summer vacation in Norway mid-June to mid-August, and the following summer holiday season for southern Europe lasting through August.

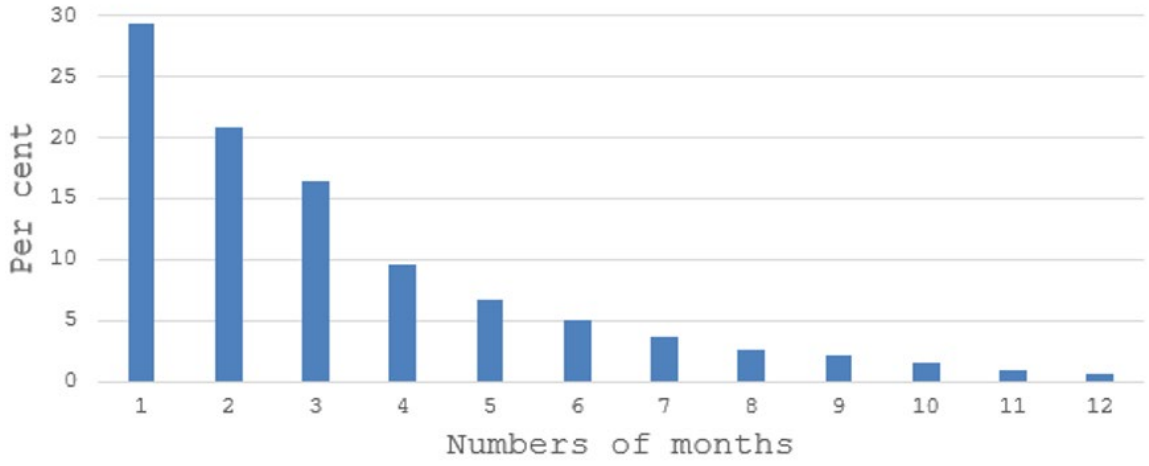
When measuring hotel prices, the services followed are consistent over time with regards to location, interior and amnesties included. It is to be assumed that the same rooms are either rented out or

offered for rent. This is opposite to the sharing economy lodging which offers non-commercial accommodation by private households at the time when the rental object is available for the hosts to offer the public. Whereas it is possible to measure the same service over time offered by traditional accommodation services at hotels or other established facilities, the very idea of sharing economy imposes challenges through its diversity in object offered or actually rented out which may differ greatly between periods.

8.3 Matching unique rental objects

Aggregating the about 60 000 unit price observation per night per unique rental to an annual time series leaves us with shortly less than 20 000 unique hosted lodgings during the year. Among these slightly 30 per cent of the unique lodgings were present during only one of the months in the year of 2020. To measure prices over time the lodging object must at least be present in two consecutive periods (months) or more. The data shows that only very few object (less than 1 per cent) were rented out throughout every month of 2020, with an increasing percentage of lodging objects appearing when moving from occurring in twelve months during the year towards only twice.

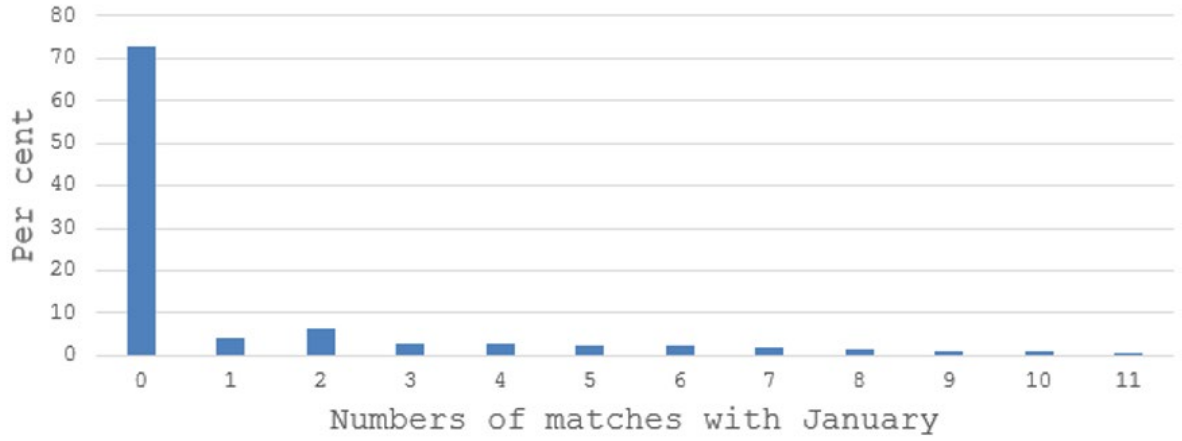
Table 4. Unique rentals per month, per cent.



As a large proportion of the data are only present in one month of 2020 only a small share are available for a match with a previous period. The figures illustrate the increase in matches when shifting from matches towards a fixed base period to matches between two consecutive months.

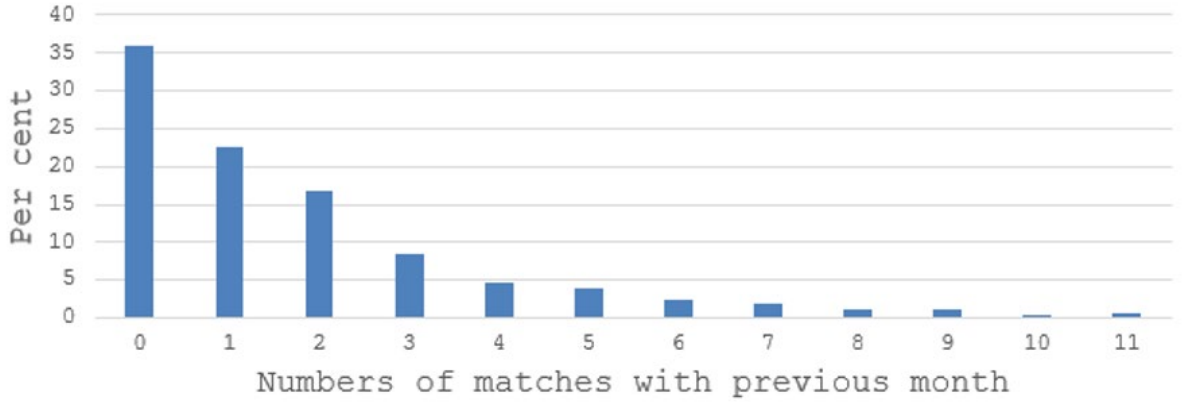
Numbers of matches during a full year can at maximum reach 11 for one unique lodging object. More than 70 percent of the lodging object does not match with a fixed base period of January. While the range differs between a good 6 per cent for a match between January and two other months during the year of 2020 and below 1 per cent for a match between a unique lodging object in January and the following eleven months.

Table 5. Overview of unique rental objects rented per month and in January



The numbers of matches increase for unique lodging object when matches are made for two consecutive months. Almost 36 per cent are unique lodging object rented out only during one of the months in 2020, while about 23 per cent are found to have been rented out for two consecutive months and almost 17 per cent were rented out for two consecutive months twice[7]. The numbers evenly decrease for each added possible match with only 0,2 per cent of the unique lodging object being rented out for 11 of the all years twelve months, and a slight rise to 0,7 per cent of all **unique** lodgings accounted for were rented out at least once in every month of 2020.

Table 6. Overview of unique rental objects rented in a particular month and the month before, per cent.



Having price observations for the same service is one step along the way to compiling a price index. We also need to make sure the services we measure prices for in the whole universe of services offered and consumed are representative services consumed by private households, both with regards to location, length of stay, size of lodging and the standard of the service provided. When we have access to data which accounts for all activity which fall under the Norwegian Tax Authority terms of sharing economy for lodging, covering the geographical boundaries of Norway and channelled both through nationally and abroad owned platforms, the challenge moves from traditional sample issues towards more limitations in the data source. Other P2P rentals are probably prevalent throughout the year, but

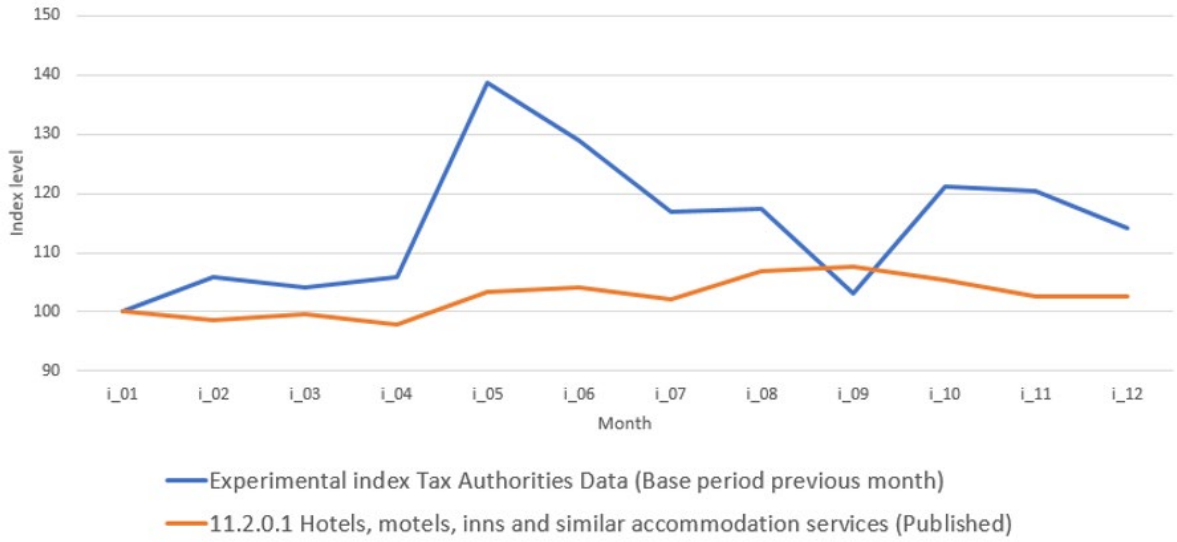
[7] This can either be 3 consecutive months or two consecutive months twice.

rentals which are channelled via a sharing app or website are most likely registered in these data unless the platform operates under illicit terms. Hence, the Tax Authority data provides a complete overview over the accommodation activity in Norway under the terms of sharing economy apps and websites.

Lacking in the data is information on the purpose of the stay, if it is to be considered business or recreational purpose. The lack of such information is well known when measuring prices with the intention to include in a price index. As long as there is no discrimination between the two consumer purposes, leaving one of the two with a different price development then the prices measured are accurate enough. However, if the rental objects are strongly related to the purpose of business, which does not fall the scope of the CPI, then a bias towards including non-relevant rental objects may be introduced when the corresponding prices are not properly identified and excluded from the price material that enters the index. For instance, when booking at Airbnb.com there is an option to mark an Airbnb reservation as a business trip resulting in Airbnb providing an receipt for expenses while also providing Airbnb with valuable information about the purpose of the stay. This information is not conveyed to the Norwegian Tax Authority. In the fall of 2018 Airbnb launched a work program aiming for an increase from 15 per cent of total bookings stemming from business travel to a 30 per cent share in 2020 (curbed.com, 2018). For the period of the Tax Authority data which we analyse in this paper, it is safe to assume that if the business segment it present, then it is limited as the rules and restriction for work forced typical travel activity to become digital. However, in a situation with no pandemic restriction these are issues that should be addressed.

The most basic form of an unweighted monthly chained price index for the year 2020 shows a more volatility and a higher index level throughout the year of 2020 compared with the published series for 11201 Hotels, motels, inns and similar accommodation services.

Chart 1. Price index lodging by Airbnb 2020. January 2020=100.



The experimental index is a monthly chained index for the year 2020. The published index is a weighted Laspeyre, with December the previous year as the price reference month. For comparability the published index is re-referenced to January 2020=100 from the official 2015=100.

As described above the experimental index is tainted by several challenges, while the published index series for some of the months are affected by the pandemic directly through how we treated consumption which fell close to zero in the period.

First and foremost, the number of prices entering the experimental index varies strongly between the periods. In general, missing observations in the published index series are imputed in line with rules according to the principle of nearest neighbour imputation; starting with the most detailed level within the region the missing price is observed, then drilling upward in the hierarchy . In the experimental index no such imputation is performed, and prices enter where they exist. Additionally, the published index is affected by imputation of the overall index of the CPI consisting of the remaining consumption based on real price observations for the (pandemic) period (Statistics Norway, 2020). With regards to homogeneity, in the published series homogeneity are ensured as the respondents are asked to price a representative service of a specified standard, equally stated to all respondents who provide these services. In the Airbnb data the aspects of the rental object beyond regionality is not registered. The variation of unique rental object whose prices enter the index may vary substantially both within a month and over time time. Not performing imputation of the missing basic data in the experimental index forfeit the possibility to follow the unique rental object over time as missing price observation in one period introduces a breach to the timeline.

9 Further work

The sharing economy within the P2P platforms is for the time being rather small in Norway. Most of what is described as sharing economy is within the B2C plattforms, just indicating that traditional business are utilizing the new business models. Worldwide, we find accommodation and transport services as major services within the P2P plattforms. Through NA we are able to identify an expenditure share for Airbnb, which is still less than 0.1 per cent of total private consumption. No data is available to identify a significant expenditure share for taxi services from the platforms operating within the P2P segment. However, restrictions in the taxi market, making it not so easy to use your own car, indicates an almost non-existing market share of the total taxi market. The experimental work on the Norwegian Tax Authority data shows the new possibilities that occur when access to a new data source appears. Although several challenges remain unanswered, the data available from the Norwegian Tax Authorities are detailed enough to compile a simple version of a price index retrospectively.

Data for the following year are yet to be analysed, however we are already aware of more granulated details introduced in the data for 2021. Utilizing the added level of detail in the data source are expected to enable further improvements in the processing and delineation of the data, maybe even increasing the subset of data potentially entering a price index as the added granularity of detail may prove usefull to subtract the P2P arranged stays from the B2P segment for platforms such as booking.com which currently are catgorized as fully operating withing the B2P segment in lack of information to categorize a stay differently.

The primary challenge with the Norwegian Tax Authority data stems from timeliness, as these data are a one-time extraction for the whole year of 2020, this does not satisfy the timeliness needed in a price index which should register the prices in the period the service commences.

If or when this data source may be of the right timeliness and quality to be used as a source of price information to produce the CPI is too early to conclude on. However, these data will be a much-needed new source of information for NA in their calculation of the production level for Airbnb-related activities in Norway. And the data in its current set up does shed light on aspects regarding traditional sampling issues such as specifying the population and selecting a sample with regards to regionality.

Even though the aggregated expenditure shares for the variety of services provided though the P2P measured by the NA are yet less than of 0.1 per cent of total consumption, we anticipate a future need to measure these prices as the sharing economy activity in Norway most likely will become more prevalent.

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Appendix

Examples of sharing economy in Norway

Following is a list of some of the sharing apps in the Norwegian market which ranges from singular focused sharing apps to the all-consumer area apps:

Lodging services: www.airbnb.com

Child care services: www.sitly.no

Transportation by car: www.uber.com

Cleaning services: www.weclean.no

FINN online market (almost everything): https://finn.no

Book market (used and new): https://bookis.com (skal brukt være med?)

Carsharing: https://nabobil.no/en

Services provided by neighbours: www.obos.no/Nabohjelp

Clothes, decoration and furniture (used and redesign): https://tiseit.com

Sharing goods: https://www.hygglo.no/