

Evaluating the Impact of Airbnb on Social Equality

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Abstract. This research paper aims to investigate the development and impact of Airbnb on social, economic, and cultural dimensions, with a focus on its negative impacts on social equality and gentrification. The paper argues that Airbnb gentrifies local communities through the creation of short-term rent gaps, leading to rising housing prices, displacement of long-term users, and social injustice. Using data retrieved from the website of the UK government and Insideairbnb, this study examines the relationship between Airbnb and the well-being of London residents using linear regression. The results show a close correlation between Airbnb and rising housing prices, a fair correlation with decreasing greenery, transportation, and average income levels, and no significant correlation with average life expectancies. The correlation between these variables highlights the negative externalities associated with social justice that have arisen from Airbnb's proliferation. Considering that the growth of Airbnb in London has led to negative consequences for residents' well-being, policymakers should mitigate these impacts while monitoring Airbnb's growth to promote social justice and equitable outcomes for all residents.

Keywords: Airbnb, Gentrification, Sharing economy.

1. Introduction

1.1. Development of Airbnb

Airbnb rapidly grew into one of the world's largest online platforms, with over 4 million Hosts and 1.4 billion visitor arrivals in practically every country worldwide (Airbnb, 2023). It has a significant impact on the world in terms of social, economic, and cultural dimensions.

Airbnb was established in 2007 by Brian Chesky and Joe Gebbia. To afford their own house rent, Brian and Joe came up with the idea of redesigning their house into a hotel which also provides with beds of air mattresses and services breakfast. In order to advertise their space, they created their own website called Airbedandbreakfast, which was the prototype of Airbnb. A completed site is constructed with the assistance of Nathan Blecharczyk, a computer science graduate and Gebbia's former housemate, which allows it to be a platform to promote home-sharing between people online. Later, as investors showed higher interest in this creative concept, the website drew more visitors and grew in global and local influence. Airbnb modified its logo in 2014, replacing the old one with an A symbolizing the mix of people, places, and love, which strengthened the company's identity and led to its continued prosperity.

With over 4 million hosts, 6 million active listings, and 150 million users today across the globe, Airbnb has grown tremendously since the company's founding in 2008 (Wachsmuth, 2018). It revolutionized the lodging industry by enabling travelers to experience local culture at affordable prices in remote places devoid of hotels while also providing convenience for both the rental and the owner. The significance of Airbnb resides in the abundance of short-term rental properties it offers, as well as the variety of unusual lodgings it offers, such as treehouses, beach huts, and igloos. According to analysts at HSBC (Mermet, 2017), Airbnb will be worth between \$160-\$180 by 2025. However, criticism of the gentrification of cities showed that Airbnb has led to a decline in the quality of life of locals, which sparked discussions in contemporary society.

1.2. Impact of Airbnb

Airbnb has grown in popularity across the world since it can benefit both parties. The initial goal of Airbnb is to allow house owners to rent their vacant rooms so as to make extra money and alleviate their financial burden. Airbnb also allows them to meet tourists from around the world, make friends, learn about local cultures, and broaden their horizons. For travelers who prefer to choose luxury accommodation over hotels, they enjoy a homey feeling in Airbnb rooms. For tenants, they can also better integrate into the local culture, and it is also more convenient to go shopping. For the government, Airbnb disperses visitors to various parts of the city instead of concentrating in hotels near scenic spots, which greatly alleviates local traffic congestion issues. For the city, Airbnb will provide visitors with a good experience and choose to stay for a few more days, so their consumption will also increase, driving the economic development of the entire city. In addition, as more people stay behind, it will also create more job opportunities and increase employment rates, making the city more prosperous.

Nevertheless, every coin has two sides. The popularity of Airbnb goes with the rise of surrounding housing prices and rents. When housing prices rise, residents' purchasing pressure will increase, and many people need to bear higher mortgage pressure, which will increase the burden on residents' lives. Moreover, the increase in housing prices will trigger dissatisfaction among the public and cause social unrest. Furthermore, the emergence of Airbnb will make the surrounding environment more noisy and affect the normal daily routines of existing residents.

1.3. Airbnb and Gentrification

Gentrification is one of the primary problems that has resulted from the popularity of Airbnb. The term "gentrification" is first mentioned in 1964 by a British sociologist Ruth Glass, who used the term when describing the process of replacing London's working class by wealthier classes. The process that Glass described was later saw as a significant historical trend of developing towards the economy as today. It is a "process in which wealthier, privileged, typically white individuals move into neighbourhoods largely populated by poor and working-class residents who are frequently and predominantly people of colour, with the newcomers displacing the original residents." (Mkrtychian, 1964).

Afterwards, to clarify the relationship between Airbnb and gentrification, we should focus on the rising housing prices caused by Airbnb, which makes it difficult for the original residents to afford it. At this time, the government may invite or introduce some middle and upper class people to live here in order to maintain the liveliness of the area, in order to match the housing prices and other factors here. As more and more people come, prices will gradually increase (Huebscher, 2023). Originally, residents here find it increasingly difficult to afford the living expenses and will choose to leave the city. So the spread of Airbnb will cause many indigenous people in cities to be replaced by other higher-level people.

1.4. Process of Gentrification

The gentrification increases the value of a neighbourhood and provides more economic possibilities for the community, but results in increased rents, mortgages, and property taxes. Due to the escalating costs of living in that location, original residents are constantly facing threats of survivability, and social relationships become insubstantial whilst under the potential of displacement.

One of the noteworthy socio-economic impacts of gentrification is the undermining social capital owned by the minorities and vulnerable communities. Given the historical context of racist housing policies and blockbusting practices in America following World War II, most poor neighbourhoods targeted for gentrification house coloured communities, making them the primary victims of the negative consequences of this process, which include "forced displacement, the fostering of discriminatory behaviour by people in power, and a focus on spaces that exclude low-income

individuals and people of colour" (Rabiei-Dastjerdi, 2022). As a result, gentrification exacerbates pre-existing social justice and inequality concerns in such communities, emphasizing the significance of addressing gentrification's negative impacts on social justice.

2. Literature Review

2.1. Airbnb-led gentrification

A crucial trend of gentrification led by short-term platforms (STR) such as Airbnb is named 'Airbnbification'. In recent research papers regarding the impacts of STRs such as Airbnb among the aspect of gentrification, the term 'Airbnbification' is mentioned at a high frequency (Amore, 2022). Airbnbification is a significant part of the impacts of the popularization of Airbnb, to understand it adequately, it is necessary to know the term 'gentrification,' which is illustrated previously, the property of Airbnb, as will be demonstrated through this paper, and the relevance between the impact of Airbnb and gentrification.

A bit astonishingly, the impacts of Airbnb fit all the criteria of gentrification. Airbnb firstly causes a surge of demand for housing from extra-local populations; it secondly causes the exploitation of a rent gap; and it secondly causes the subsequent displacement of long-term users. (Anne-Cécile Mermet, 2022) Since the high relativity between Airbnb's impacts on the local housing market and gentrification, the gentrification caused by Airbnb is so then named 'Airbnbification.' Then, in this paper, we will examine the influence of Airbnb on local society and economy through the lens of gentrification, or 'Airbnbification.'

Airbnb gentrifies local communities through the creation of short-term rent gaps. Rent gaps describe "the disparity between the current rental income of a property and the potential achievable rental income" (wikipedia.org), and this increases the incentive for renovation and the redirection of real estate capital. In most cases, the rent gap occurs as the result of a neighbourhood's devalorisation, which causes the capitalised ground rent to depreciate, but Airbnb creates a new mechanism for the production of revenue flow through real estate, heightening the potential rent instead of devaluing the actual rent. This suggests that short-term rentals can potentially create rent gaps in all communities, especially in cities without strict rent control regimes (Wachsmuth and Weisler, 2018). As mentioned above, gentrification is a process in which more affluent newcomers replace old residents in a neighborhood by improving housing, and this occurrence happens when the rent gap in a neighborhood is large enough to ensure the developers a sufficient profit after the costs of new construction. However, rent gaps caused by short-term rentals defeat the need for refurbishments before gentrification, as the only necessity for this is to remove the existing tenant. As a result, more developers would be provoked to rent out their property and earn the additional revenue knowing that there are no further costs, likely causing gentrification in numerous local communities. The impacts of this phenomenon will be investigated below.

2.2. Impact of Airbnb-led gentrification

With the gradual popularity of Airbnb in the world, the gentrification triggered by it has gradually penetrated various regions. But how does gentrification affect society? It can be confirmed that the local people and culture will be affected. When wealthier people come to a community, due to their higher wages and spending power, the surrounding housing prices, prices, etc. will be raised, which will make it difficult for the original residents to afford. Gradually, more and more indigenous people will move out of this community to more remote and underdeveloped areas, as their economic strength no longer matches here. The residents who have moved out are forced to leave a comfortable life, which is a manifestation of social injustice (Robertson, 2022). The wealthy live a comfortable life, while the poorer can only suffer. Furthermore, some people struggle to continue living here, and they will also be ridiculed by those who move in. On the other hand, when a city has experienced Gentrification, it means that the living standard of residents has improved, and the government has

money to build and beautify the infrastructure and environment of the city (Cocola-Gant, 2020). On the premise of improving the happiness index of residents, it will also attract more tourists to visit, which not only drives the economic development of the city but also may attract many entrepreneurs and companies from outside the city to invest.

2.3. Research Question

Even though numerous studies have presented research regarding Airbnb and gentrification, there is still insufficient analysis of the impact Airbnb has on wellbeing and social justice. This research gap restricts our understanding of the full impact Airbnb has on society, and thus we hope to contribute our findings in this study to fill in the blanks on this subject. We will focus our investigation in this project on the correlation between Airbnb and social justice, and statistics from data.london.gov and InsideAirbnb will be utilised to analyse the socio-economic, built environment, and wellbeing factors which define "social justice". Based on our previous research, we hypothesise that the development of Airbnb brings about a decline in social justice as a result of the impacts of Airbnb-led gentrification.

3. Methods

3.1. Study Area

London is the capital and largest city of England and has a current metro area population of over 9.6 million, a 1.12% increase from the previous year (macrotrends 2023). The output growth in the metropolis is also the fastest in the nation, with a gdp of approximately 486.4 billion pounds as of 2021 (statista 2022). Wealth inequality has inevitably existed in the history of London, but numerous sources cite London as the city with the greatest divergence in wealth distribution in Great Britain, with a high percentage of citizens in the top and lowest wealth deciles in the country (trustforlondon). London is also the city with the highest Airbnb listings in the world, making it a compelling subject for this investigation.

According to statistics, there are currently approximately 81792 Airbnb listings in London. From the map, it can be easily seen that most of the housing resources are located in the city center. Moreover, almost all listings are composed of entire home and private room (61.6% and 37.6% respectively). After Airbnb entered the housing market in London, the number of visitors to London increased exponentially, which contributed greatly to the economic development of London. At the same time, however, local residents are complaining that the local housing price is too expensive. According to research, the house rent in London ranks first in the UK and second in the world. One seventh of people spend about 50% of their wages on housing. But the fact is that even before Airbnb appeared in London, there was a problem of high rent, and Airbnb was just an additional contributor. Due to the proliferation of Airbnb, not only have rents increased sharply, but London's economy has also been affected, as there are fewer properties available for long-term residents, which has led to a decrease in the number of permanent residents in London, resulting in population loss. In addition, the rent increase caused by Airbnb has also occurred in major cities around the world, such as Barcelona, Los Angeles, Boston, Ireland, and so on.

Despite that the Airbnb platform having certain influences on London City as mentioned above such as causing an increase on rent price and impacting the economy, another major effect is the gentrification process. Although the gentrification of London is driven by many factors, Airbnb is one of the major contributors which also promoted other causes of London gentrification.

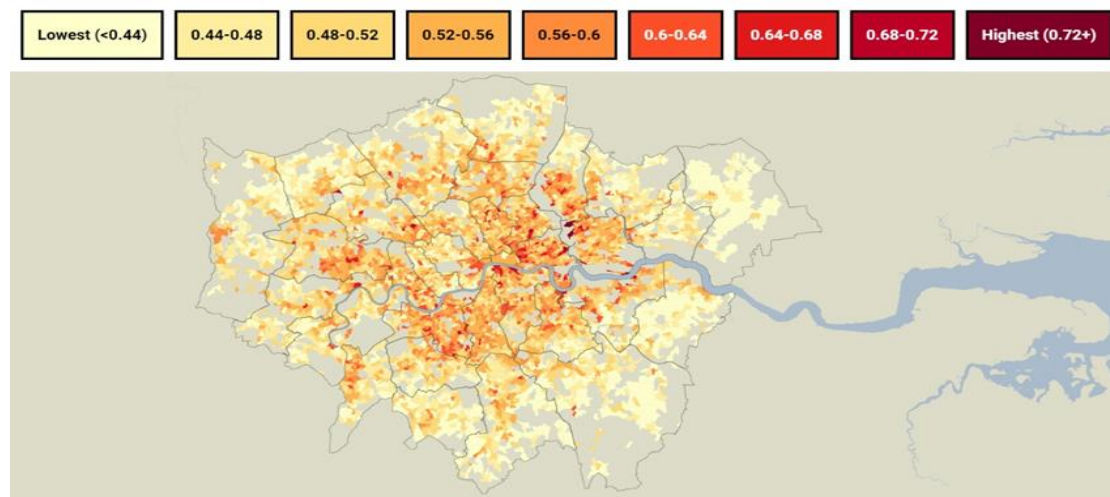


Figure 1. Map of gentrification index for small areas in London from 2010-2016

As shown by a map of gentrification index for small areas in London from 2010-2016 by the website Trust for London, a trend is exhibited that as the proximity to city center increases, high levels of gentrification could occur. One factor of this is the high value and convenience of residence which is closer to city center, since it is in average easier and quicker to reach other positions in the city. This trend would be seen the wealthier outsiders, and they would be promoted to move their residence in the city center, replacing the original ones. However, Airbnb plays a crucial role of informing and advertising to the outsiders of these residence and the values within. By using Airbnb, outsiders could have a before-view of the conditions of the city and its culture, which would let foundation for later gentrification of the city.

3.2. Data Source

A paper based only on theories is nothing, therefore, pieces of evidence and data are found in order to substantiate the claim. Data regarding certain aspects relating to gentrification and Airbnb in London are traced and utilized on websites <https://data.london.gov.uk/> and <http://insideairbnb.com/get-the-data/>. By using the data downloaded from these two websites, a table is created containing all required information. The variables for the first column identify the names of the areas, such as streets and roads, in London, and the second and third columns show the basic information about each area: the GSS code and which borough it is in. The fourth to sixth columns exhibit the relationship between Airbnb and the housing market: the fourth column is the number of Airbnbs in the area, the fifth column shows the average price of them in US dollars, and the sixth is the average house price among those areas. The seventh column reveals the average income level of the population in the area for reference. The eighth column estimates how many people are highly educated, meaning had gone to university. The ninth to thirteenth columns measure the health level of the population. The fourteenth to eighteenth columns evaluate the standard of living in these areas from five angles: life expectancy, the unemployment rate, the crime rate, public transport accessibility (convenience), and the subjective well-being score (how well people live). The last two columns demonstrate the environmental protection level for these areas by determining the extent of green area in hectares and the percentage of green space in the area. However, empty blocks in the table mean that no data was found.

4. Results

4.1. Airbnb and Local House Price

Airbnb can be roughly divided into two parts - quantity and price. From figure 2 and Figure 4, it can be seen that for local housing prices, both the increase in the number of Airbnb and the increase

in prices will lead to an increase in local housing prices. But in comparison, the price of Airbnb has a greater impact on local housing prices. And the coefficients of these two figures are 0.2227 and 0.5957 respectively (coefficient table of figure 3 and coefficient table of figure 5). The reason is when the number of Airbnb listings in a region increases, it means that the area gradually becomes prosperous, the local environment, infrastructure, and other aspects have improved, and people's living standards have greatly improved, which can attract more tourists to come and play. In this way, tourists' demand for Airbnb will increase. As the saying goes, there is demand, there is supply, and the number of Airbnb will also increase. Gradually, the economy of this city has developed, and all prices, including housing prices, will rise because the local wage level has also increased. Similarly, as a region attracts more and more tourists, Airbnb's housing supply will be in short supply, and whoever pays the most will be able to stay. Therefore, Airbnb's prices will gradually rise, and local housing prices will also rise accordingly. Overall, the number and price of Airbnb are positively correlated with local housing prices.

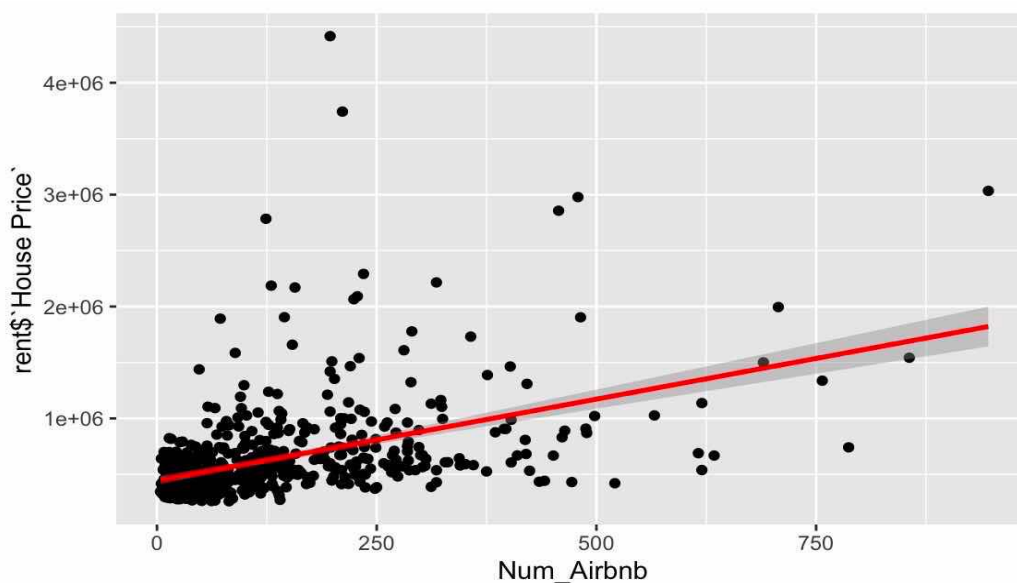


Figure 2. Relationship between number of Airbnb and house price

```
Residuals:
    Min       1Q   Median       3Q      Max
-848482 -164177  -75277    67558 3685429

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  444535.7    19808.2   22.44  <2e-16 ***
Num_Airbnb    1455.3      108.6   13.40  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 367800 on 627 degrees of freedom
(25 observations deleted due to missingness)
Multiple R-squared:  0.2227,    Adjusted R-squared:  0.2215
F-statistic: 179.6 on 1 and 627 DF,  p-value: < 2.2e-16
```

Figure 3. Coefficient table

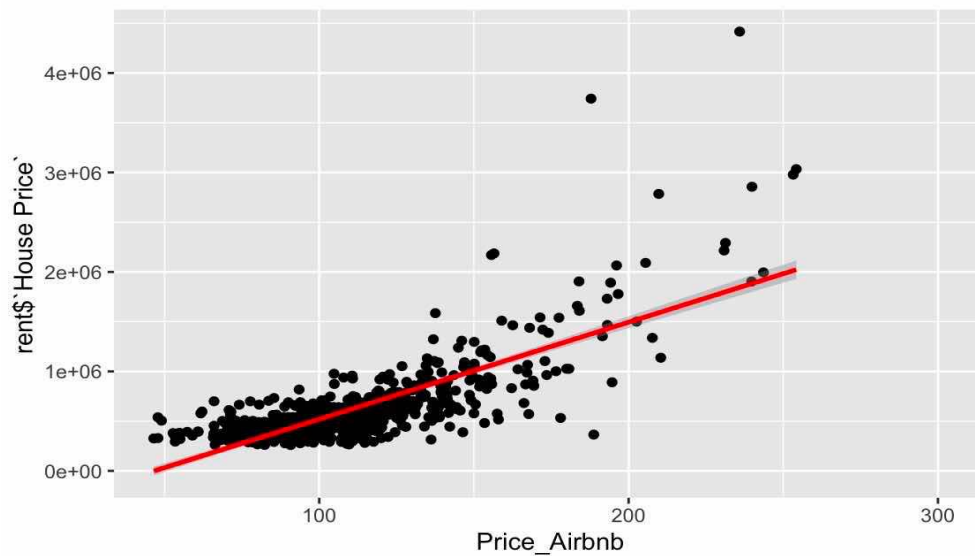


Figure 4. Relationship between price of Airbnb and house price

```

Residuals:
    Min       1Q   Median       3Q      Max
-1020003  -133703   -16365    100385   2572105

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -455065.7    37013.5  -12.29  <2e-16 ***
Price_Airbnb   9748.3     320.7    30.39  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 265300 on 627 degrees of freedom
(25 observations deleted due to missingness)
Multiple R-squared:  0.5957,    Adjusted R-squared:  0.595
F-statistic: 923.8 on 1 and 627 DF,  p-value: < 2.2e-16
    
```

Figure 5. Coefficient table

4.2. Airbnb and Green Space

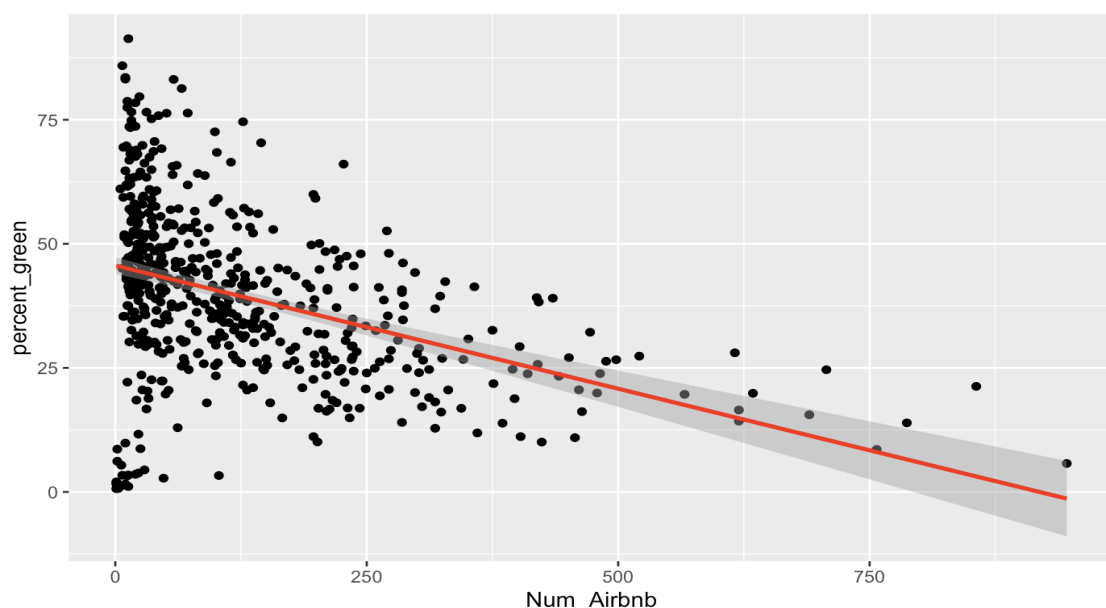


Figure 6. Relationship between the number of airbnbs and percentage of greenery in an area

```

Residuals:
    Min       1Q   Median       3Q      Max
-44.926  -8.298  -0.220   8.671  46.350

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  45.632865   0.864061   52.81  <2e-16 ***
Num_Airbnb   -0.049657   0.004643  -10.69  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 15.27 on 564 degrees of freedom
(88 observations deleted due to missingness)
Multiple R-squared:  0.1686,    Adjusted R-squared:  0.1671
F-statistic: 114.4 on 1 and 564 DF,  p-value: < 2.2e-16

```

Figure 7. Coefficient table

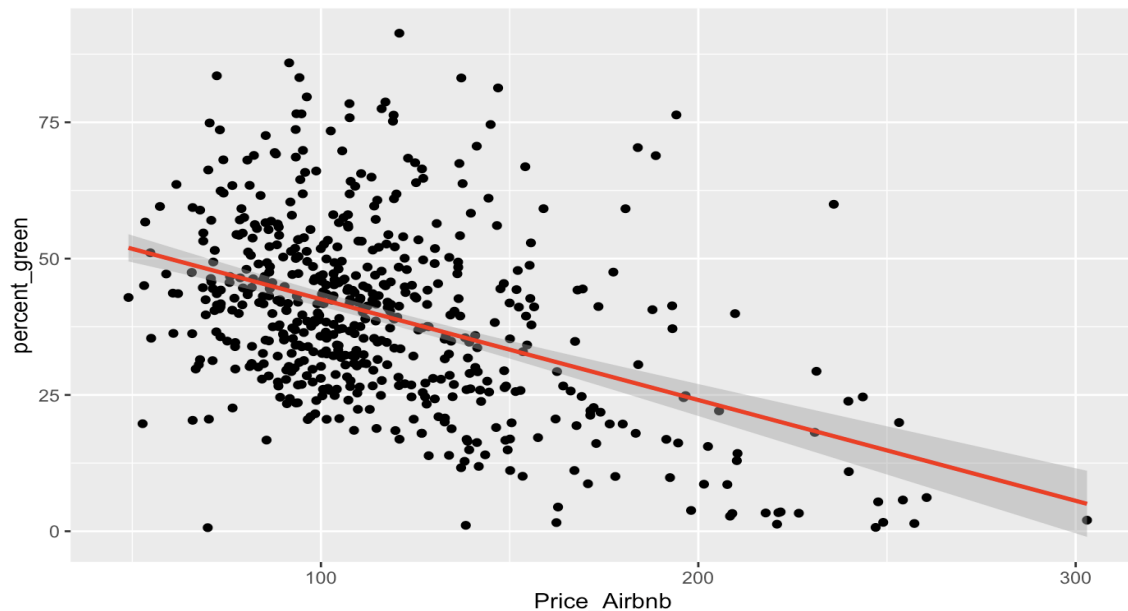


Figure 8. Relationship between the price of Airbnbs and the percentage of greenery in an area

```

Residuals:
    Min       1Q   Median       3Q      Max
-47.440 -10.206  -1.815   8.236  52.625

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  61.03447   1.99717   30.56  <2e-16 ***
Price_Airbnb -0.18483   0.01621  -11.40  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 15.1 on 564 degrees of freedom
(88 observations deleted due to missingness)
Multiple R-squared:  0.1873,    Adjusted R-squared:  0.1858
F-statistic: 130 on 1 and 564 DF,  p-value: < 2.2e-16

```

Figure 9. Coefficient table

The two figures depict the relationship between the quantity or price of Airbnbs and the percentage of greenery in a district. The first graph shows a negative association between these variables, with a correlation coefficient of -0.049. This means that as the number of Airbnb rentals increases, the percentage of greenery in a neighbourhood typically decreases, and only 5% of the points are aligned with the trend line. However, the low slope indicates that this decline is gradual, and the strength of the correlation is low, meaning that the percentage of greenery only slightly declines as the amount of Airbnb rises. The data points are also scattered out around the trend line, showing a moderate relationship, meaning that the number of Airbnb does not impact the percentage of greenery too much. In addition, the scattered data points around the trend line signify only a moderate relationship, indicating that the number of Airbnb rentals does not significantly affect the percentage of greenery in a district. The second scatter plot also demonstrates a negative relationship between the price of Airbnbs and the percentage of greenery in a district and has a weak correlation of -0.18. While the gentle slope indicates a slight decline in the percentage of greenery as the price of Airbnbs increases, this dataset has limitations. These limitations arise because the pricier Airbnbs are generally located in downtown areas, where there is less greenery naturally. Despite these limitations, the overall trend still suggests that the proliferation of Airbnb contributes to a decline in greenery within the surrounding area.

4.3. Airbnb and Transportation

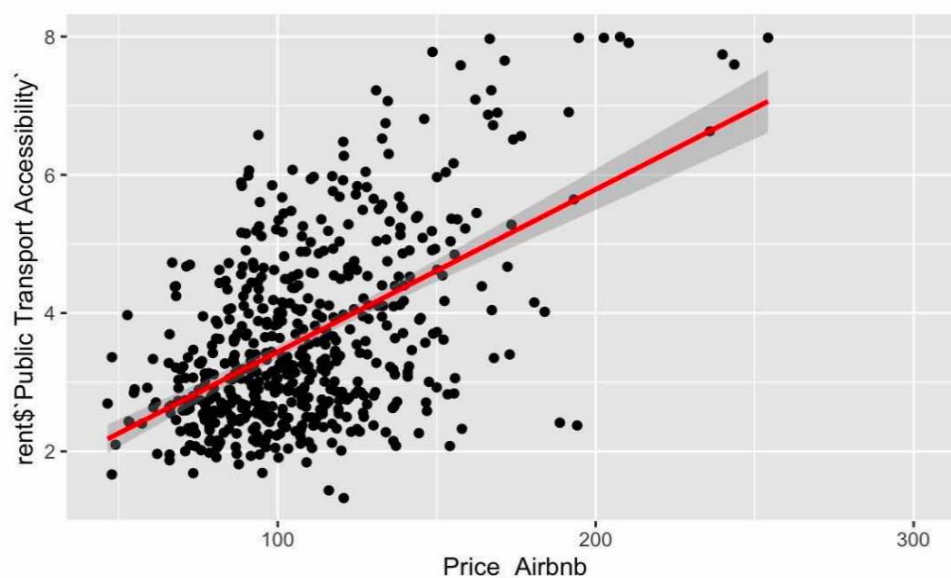


Figure 10. Relationship between price of Airbnb and public transportation accessibility

```
Residuals:
    Min       1Q   Median       3Q      Max
-3.2772 -0.7544 -0.1482  0.6461  3.2821

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.08611    0.17361   6.256 7.78e-10 ***
Price_Airbnb   0.02351    0.00155  15.173 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.122 on 568 degrees of freedom
(84 observations deleted due to missingness)
Multiple R-squared:  0.2884,    Adjusted R-squared:  0.2872
F-statistic: 230.2 on 1 and 568 DF,  p-value: < 2.2e-16
```

Figure 11. Coefficient table of figure

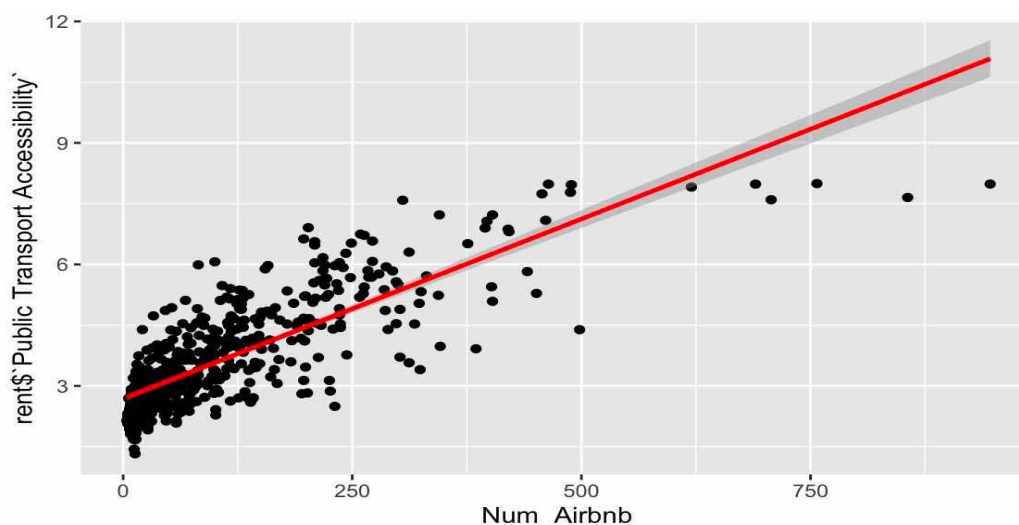


Figure 12. Relationship between number of Airbnb and public transportation accessibility

```

Residuals:
    Min       1Q   Median       3Q      Max
-3.09332 -0.49102 -0.07991  0.47897  2.57626

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.6857830   0.0439012   61.18  <2e-16 ***
Num_Airbnb   0.0088702   0.0002741   32.37  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.7885 on 568 degrees of freedom
(84 observations deleted due to missingness)
Multiple R-squared:  0.6484,    Adjusted R-squared:  0.6478
F-statistic: 1048 on 1 and 568 DF,  p-value: < 2.2e-16

```

Figure 13. Coefficient table

These two figures show the impact of Airbnb's price and quantity on local transportation accessibility. Firstly, Figure 10 shows the positive correlation between Airbnb's price and transportation, with a coefficient of 0.2884 (coefficient table of Figure 11). Compared to the previous figure, Figure 12 shows a stronger positive correlation between the number of Airbnb and transportation, and the distance between the black dots and the slope is also closer, with a coefficient of 0.6484 (coefficient table of figure 13). Both the increase in price and quantity of Airbnb are manifestations of its development, indicating that the region may have attracted more tourists for various reasons, greatly increasing the demand for Airbnb among tourists and driving local economic development. As is well known, the purpose of travelling is to keep oneself free from stress and relax, so one does not want to travel in places with crowded and inconvenient transportation, as it can affect one's mood. So to attract more tourists, make the city prosperous, and create a virtuous cycle, the government will spend a lot of energy on developing transportation, such as widening roads and reducing traffic congestion; Alternatively, developing more subway and bus routes can not only make travel more convenient but also provide more choices. Overall, the development of Airbnb can improve the level of transportation.

4.4. Airbnb and Income

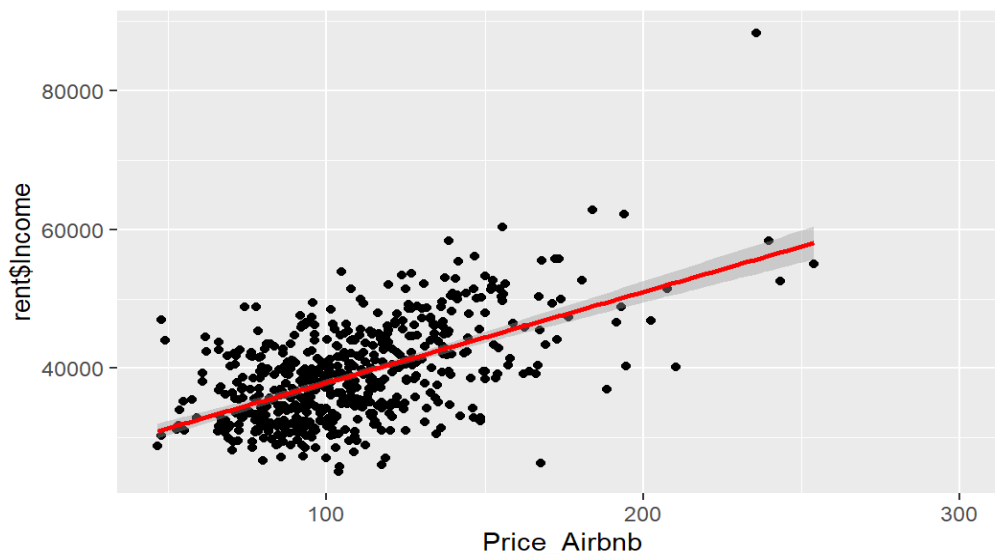


Figure 14. Relationship between average income and price of Airbnb

```
Call:
lm(formula = rent$Income ~ Price_Airbnb, data
= rent)

Residuals:
    Min       1Q   Median       3Q      Max
-20484  -4132   -638    3829   32647

Coefficients:
            Estimate Std. Error t value
(Intercept)  24855.24    904.15   27.49
Price_Airbnb   130.68     8.07   16.19
            Pr(>|t|)
(Intercept)  <2e-16 ***
Price_Airbnb  <2e-16 ***
---
Signif. codes:
  0 '***' 0.001 '**' 0.01 '*' 0.05 '.'
  0.1 ' ' 1

Residual standard error: 5842 on 568 degrees
of freedom

Multiple R-squared:  0.3158,    Adjusted R-
squared:  0.3146
F-statistic: 262.2 on 1 and 568 DF, p-value:
< 2.2e-16
```

Figure 15. Coefficient table

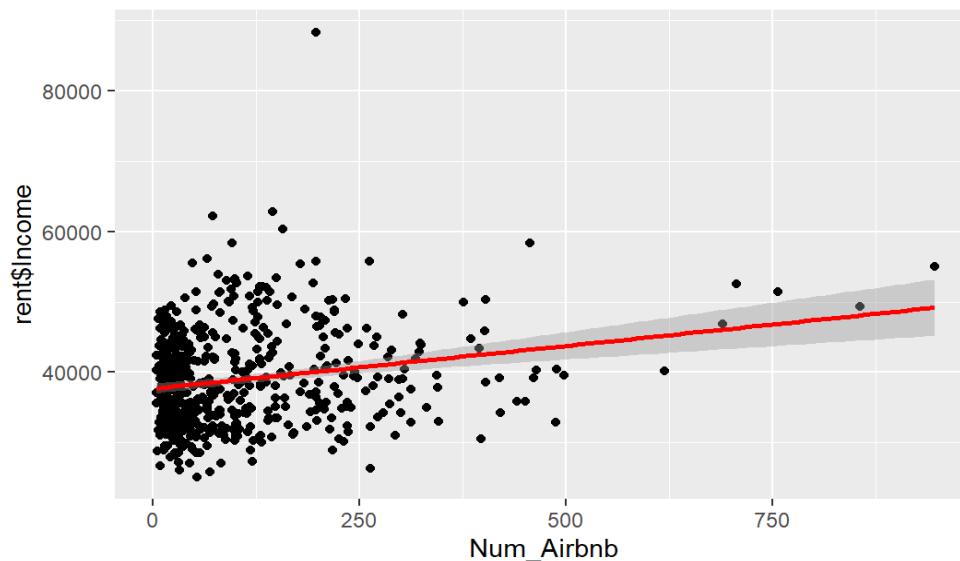


Figure 16. Relationship between average income and number of Airbnb

```
Call:
lm(formula = rent$Income ~ Num_Airbnb, data =
rent)

Residuals:
    Min       1Q   Median       3Q      Max
-14576  -5296   -872    4293   48267

Coefficients:
              Estimate Std. Error t value
(Intercept) 37665.246    384.647   97.922
Num_Airbnb    12.171      2.401    5.069
              Pr(>|t|)
(Intercept) < 2e-16 ***
Num_Airbnb  5.43e-07 ***
---
Signif. codes:
  0 '***' 0.001 '**' 0.01 '*' 0.05 '.'
  0.1 ' ' 1

Residual standard error: 6908 on 568 degrees
of freedom

Multiple R-squared:  0.04328,    Adjusted R-
squared:  0.04159
F-statistic: 25.69 on 1 and 568 DF,  p-value:
5.425e-07
```

Figure 17. Coefficient Table

These two figures are showing the relationship between Airbnb and the average income levels in certain small areas in London. Both figures use income level as the y-axis. For the x-axis, figure 14 uses the average price of Airbnb, and Figure 16 uses the total number of Airbnb used in the selected area. The coefficients of these figures are 130.68 for Figure 14 and 12.171 for Figure 16, and the multiple R-squared values for each figure are 0.3158 and 0.04328. On figure 14, the black dots, which each symbolize the data for one small area, is more dispersed compared to the other. This is because the price of Airbnb could be more fluctuated in different areas but for most areas, there are only less than 100 Airbnb housings. Figure 14 identifies a positive relationship trend between Airbnb house pricing and the average income level in London. The trend indicates an inclination that as income level increases, more people are affordable higher prices of Airbnb housing, and the trend also informs another possible explanation that higher prices of Airbnb could increase the average income

level by a certain level. The slight positive relationship trend depicted in Figure 16 could also prove that Airbnb could cause local income levels to increase by a little amount.

4.5. Airbnb and Health

Figure 5.1: the relationship between the number of Airbnb and life expectancy

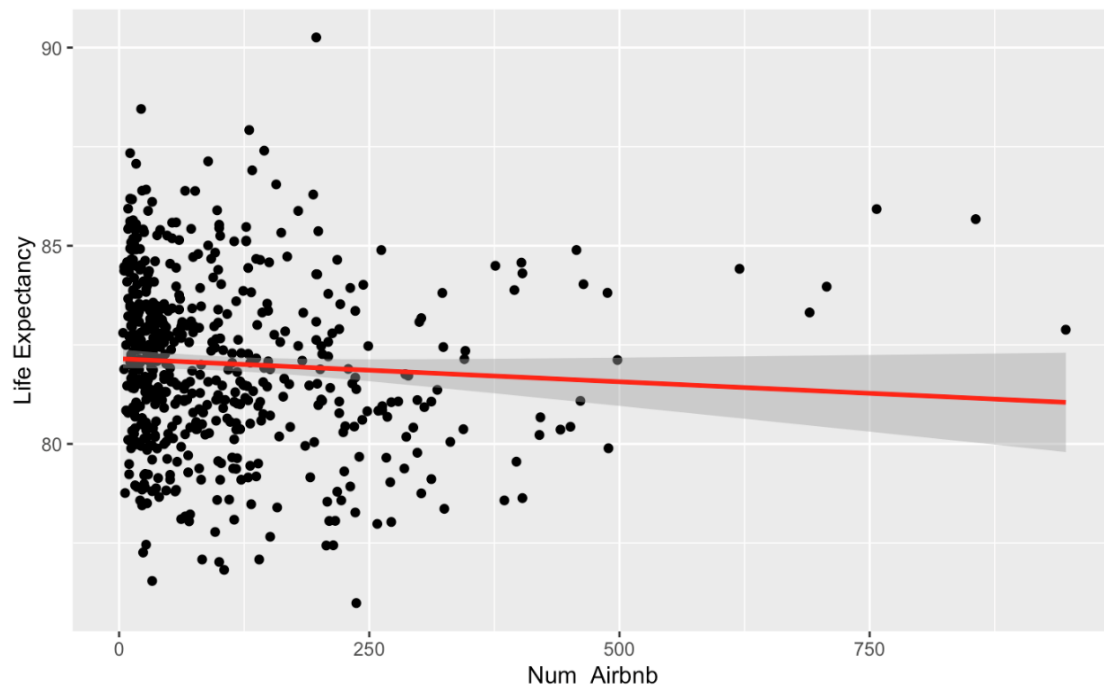


Figure 18. Coefficient table

Residuals:

Min	1Q	Median	3Q	Max
-5.890	-1.440	-0.053	1.355	8.335

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	82.1500119	0.1202439	683.195	<2e-16 ***
Num_Airbnb	-0.0011639	0.0007506	-1.551	0.122

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.16 on 568 degrees of freedom

(84 observations deleted due to missingness)

Multiple R-squared: 0.004215, Adjusted R-squared: 0.002462

F-statistic: 2.404 on 1 and 568 DF, p-value: 0.1216

Figure 19. Relationship between the number of Airbnb and life expectancy

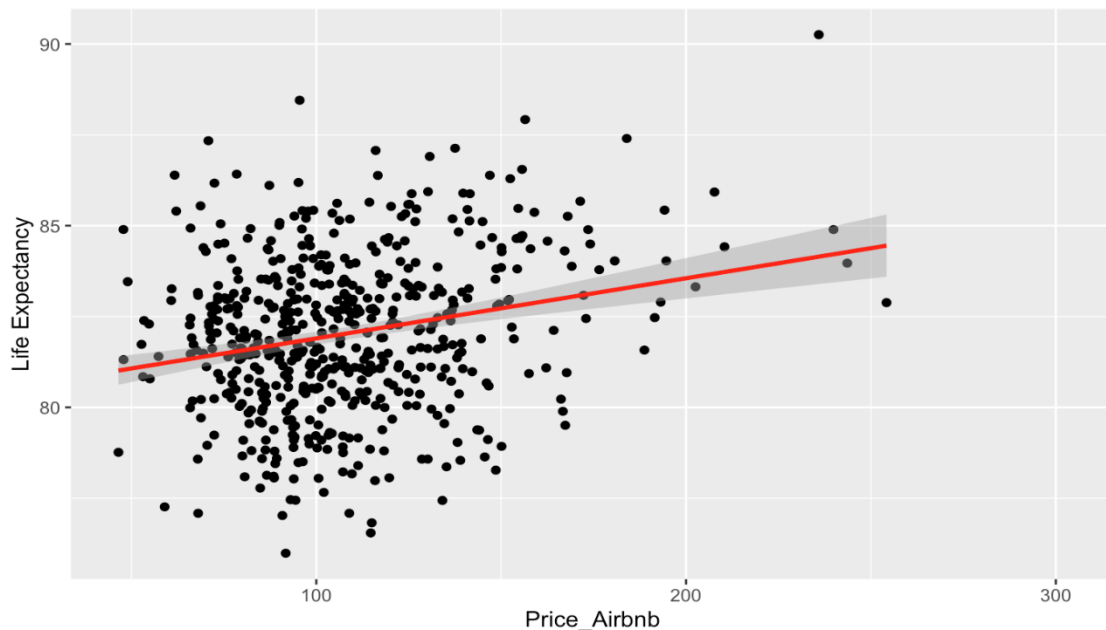


Figure 20. Coefficient table

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Residuals:
    Min       1Q   Median       3Q      Max
-5.7762 -1.3910  0.0863  1.3992  6.6278

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  80.242462   0.325788   246.30 < 2e-16 ***
Price_Airbnb  0.016548   0.002908    5.69 2.03e-08 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.105 on 568 degrees of freedom
(84 observations deleted due to missingness)
Multiple R-squared:  0.05394,    Adjusted R-squared:  0.05227
F-statistic: 32.38 on 1 and 568 DF,  p-value: 2.031e-08

```

Figure 21. Relationship between the price of Airbnb and life expectancy

The last two figures represent how the number and price of Airbnb in an area impact the average life expectancy in that area. The first plot depicts a slightly negative and weak correlation between these two variables. However, as the slope of the trend line is nearly zero, it can be concluded that the overall life expectancy of an area does not change based on the number of Airbnbs it has. The weak correlation coefficient of -0.001 denotes no meaningful relationship between the number of Airbnbs and life expectancy, signifying no apparent correlation between life expectancy and the number of airbnbs in an area. The second figure illustrates a weak, positive correlation between the price of Airbnbs and the average life expectancy of residents in the surrounding area and has a coefficient of 0.017. However, this correlation may not be a causal relationship between these variables as the expensive Airbnbs are situated in better-off neighborhoods, where the quality of life of residents tends to be high. Therefore, it is extremely likely that the positive trend line in the plot is driven by the overall affluence of the neighborhood, rather than the price of Airbnbs itself. Moreover, there is no logical explanation as to why the price of Airbnbs would directly impact the health of nearby residents, so the development of Airbnb does not impact the health of the residents in an area.

5. Disucssion

5.1. Conclusion

This study has examined the relationship between Airbnb and the well-being of residents in London through the usage of linear regression. Through our analysis, we have found a close correlation between Airbnb and rising housing prices, a fair correlation with decreasing greenery, transportation, and average income levels, and no significant correlation with average life expectancies. The correlation between these variables highlights the negative externalities associated with social justice which have arisen ensuing from Airbnb's proliferation. These externalities would disproportionately affect lower-income individuals and communities of color, worsening the already existent income gap in London. Thus, based on our research findings, it is evident that the growth of Airbnb in London has led to negative consequences affecting the wellbeing of residents. To ensure social justice and promote equitable outcomes for all residents, London's policymakers should make an effort to mitigate the adverse impacts resulting from Airbnb while continuing to surveil its growth.

5.2. Novelty

Compared to other articles on Airbnb, this paper links Airbnb to some less frequently discussed topics. Firstly, there is the issue of transportation. Most articles focus on the relationship between Airbnb and local economic development, or the rise in housing prices. However, it is rarely considered that when Airbnb develops in a region, it will also improve the local transportation environment. Airbnb will attract more tourists to the city, making it prosperous, and the government has the money to develop transportation, such as widening roads, increasing and improving public transportation. In addition, the happiness index of residents is also related to Airbnb. Because the development of Airbnb has driven the city's economy and improved the living standards of residents, the government will also put in effort to improve the local environment and infrastructure after having money. On the one hand, it can make residents feel happy, and on the other hand, it can also attract more tourists, which is a win-win situation.

5.3. Limitation

However, our paper is imperfect to demonstrate the impacts of Airbnb adequately, since that several defects are present on it, such as the data we found are not solid enough to substantiate our points. The data we found are upon the social side of a city and merely on the economic and cultural sides, and the only economic aspect from these data is the 'House Price' section, since that although sections 'Unemployment Rate' and 'Public Transport Accessibility' are regarding economy, they are poorly related to Airbnb's influences. In order to completely illustrate Airbnb's effects on all aspects of global society, more data on angles like economy and culture should be included to consummate the paper.

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