

# Residential Evictions in New York City - Report

July 1, 2020

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[1]: from IPython.display import Image
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## 1 Introduction

New York is the largest city in the United States and arguably the financial capital of the world. It has a very high cost of living, to the point where Economist Intelligence Unit's 2020 Worldwide Cost of Living Survey puts it in the fourth place in the world. Singapore, Osaka and Hong Kong tied for the first place. It also has one of the most competitive and expensive real estate in the country. As to be expected, a large portion of the businesses and homes are leased properties. This study focuses on such residential properties and their renters. High population density, lack of space for horizontal growth and extensive vertical growth make evictions an unfortunate reality for residents of the city. I looked into residents' household income, their level of education and prevalence of certain types of crime in the neighborhood and how the distribution of such factors relate to distribution of evictions per capita.

Most of the data is categorized by neighborhood, except for arrest data. I could only find arrest data by precinct. Thus the study is largely exploratory.

## 2 Data

Data used in this study, their purpose and their sources are discussed below:

- 1. Evictions:** The study focuses on evictions in New York City neighborhoods, which makes this data central to the work. The rest of the project is built on top of findings from the dataset on evictions. (Data Source: New York City Government through NYC Open Data; beginning of 2017 to March 13, 2020)
- 2. Geographical Coordinates:** The coordinates were necessary to plot evictions data on the map. (Data Source: OpenStreetMap Nominatim package)
- 3. Population data for cities and neighborhoods:** Some neighborhoods have larger population than others. Expressing number of evictions per capita (per thousand) helps normalize this factor. (Data Source: Wikipedia)
- 4. Income data by cities and neighborhoods:** Lower income leaves one without a safety net, increasing financial uncertainties in their life. It is one of the measures I compared with eviction rates. (Data Source: Census Bureau American Community Survey Economic Profile; 2012 to 2016)
- 5. Education level by cities and neighborhoods:** Higher educational level generally indicates higher degree of familiarity with principles of money management. Since jobs requiring higher levels of education often pay better, it is correlated to income to an extent. (Data Source: Census Bureau American Community Survey Social Profile; 2012 to 2016)
- 6. Criminal activity in cities and neighborhoods:** Higher crime rates are associated with lower income and less education. (Data Source: FBI Uniform Crime Report; 2012 to 2016)

**neighborhoods:** Criminal activities in an area generate fear in its residents. The perception of lack of safety make properties less desirable which push prices down. In the long run this dynamic leads such places to lower income and poverty. I compared the distribution of higher crime areas to eviction rates as part of the study. (Data Source: NYPD Arrests Data through NYC Open Data; Beginning of 2006 to end of 2019)

### 3 Methodology

When we think of people getting evicted from their home we think of economically depressed areas. The features of such a place include lower income, lower levels of education and higher crime rate. The idea is such conditions set up a vicious cycle that feeds into the higher eviction rate. This is an academic exercise to verify this belief. I do that by studying if such socioeconomic conditions truly coexist in neighborhoods with high rates of residential evictions.

There are quite a few possible ways of approaching this problem: some more mathematical, while others primarily visual. In this study, my chosen mode of answering this question is largely descriptive and visual. Since we are addressing evictions, I started with the eviction data sourced from NYC Open Data. The original dataframe was grouped by zip code and only columns showing zip code, neighborhood name and count of evictions by zip code were retained. The dataframe was merged with a separate dataframe listing latitude and longitude for zip codes across the country. The location of evictions, residential as well as commercial, were plotted on a map of New York City. It's important to note that the rest of the project, from this point onwards, focuses exclusively on residential evictions.

Unfortunately I could not find latitude and longitude for several zip codes and there were no reliable source of population data grouped by zip code. So I had to change direction. The new approach involved grouping data by neighborhood names (also referred to as cities in some regions). OpenStreetMap Nominatim was used to add geographical coordinates to the dataframe. Population, grouped by neighborhood, was obtained from "New York City Population by Neighborhood Tabulation Areas" dataset obtained through NYC Open Data. Missing values were filled in using data from Wikipedia. Number of evictions for each neighborhood was normalized by population and expressed as per capita (per thousand). The data was plot on a map. The data on socioeconomic factors such as median income and estimate of percentage of residents with a bachelor's degree or higher were treated and mapped in a similar manner.

As mentioned previously, crime has a large effect on the perception of safety, and in turn property prices. The total number of arrests for certain types of crimes were plotted on a map at the precinct level. The types of criminal activities included are the ones NYPD describes as the 'seven major felony offenses': i) murder and non-negligent manslaughter; ii) rape; iii) felony assault; iv) robbery; v) burglary; vi) grand larceny; and, vii) grand larceny of motor vehicle.

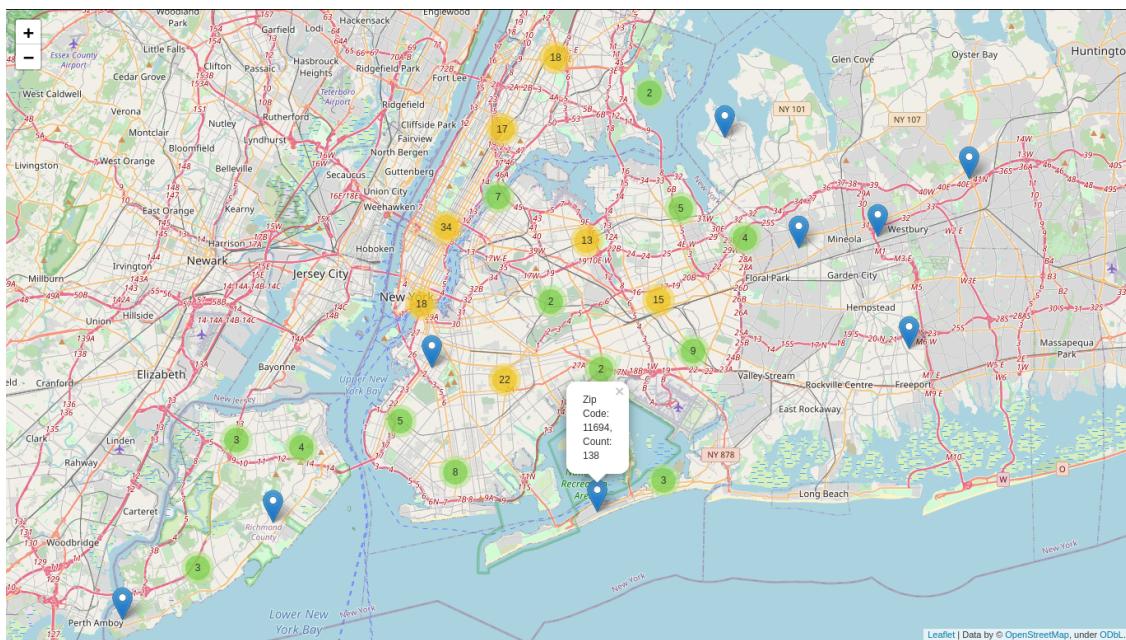
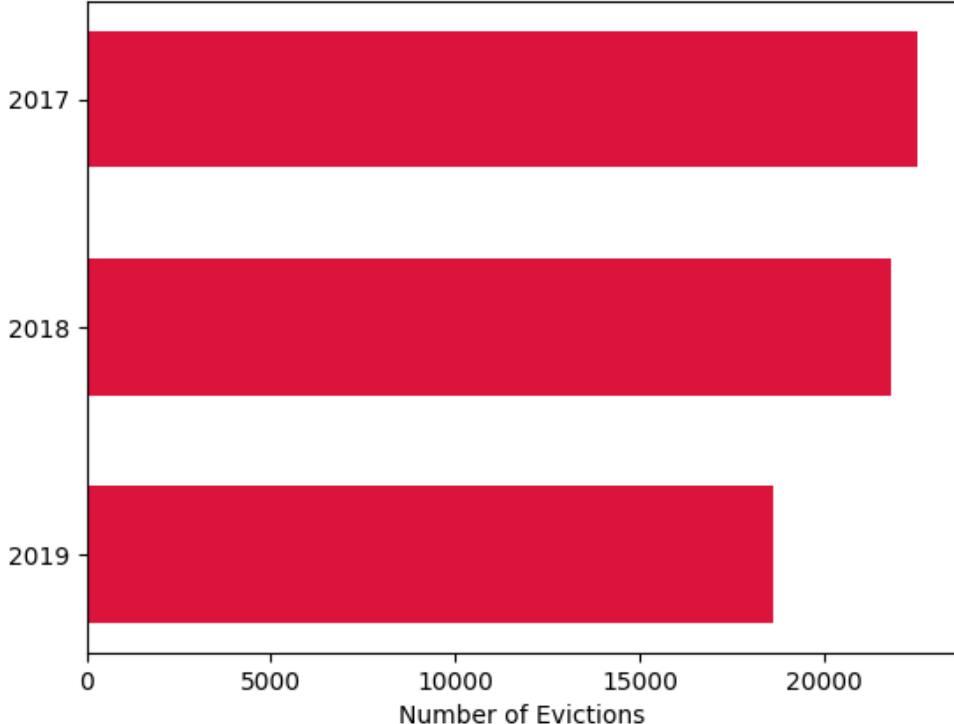
### 4 Results

Chart below shows total number of evictions across the city for each of the three years between 2017 and 2019. The numbers includes evictions from both, residential as well as commercial properties. The number decreased each year. The actual values reveal a little over 17 percent drop in evictions

in the 3 years. While outside the scope of this project, a possible reason behind the drop is the improving economy and decreasing unemployment.

An interactive map illustrating distribution of evictions by zip code was created using the Folium package (see screenshot below). The yellow and green circles represent clusters of zip codes. When zoomed in the map shows markers for individual zip codes along with the number of evictions.

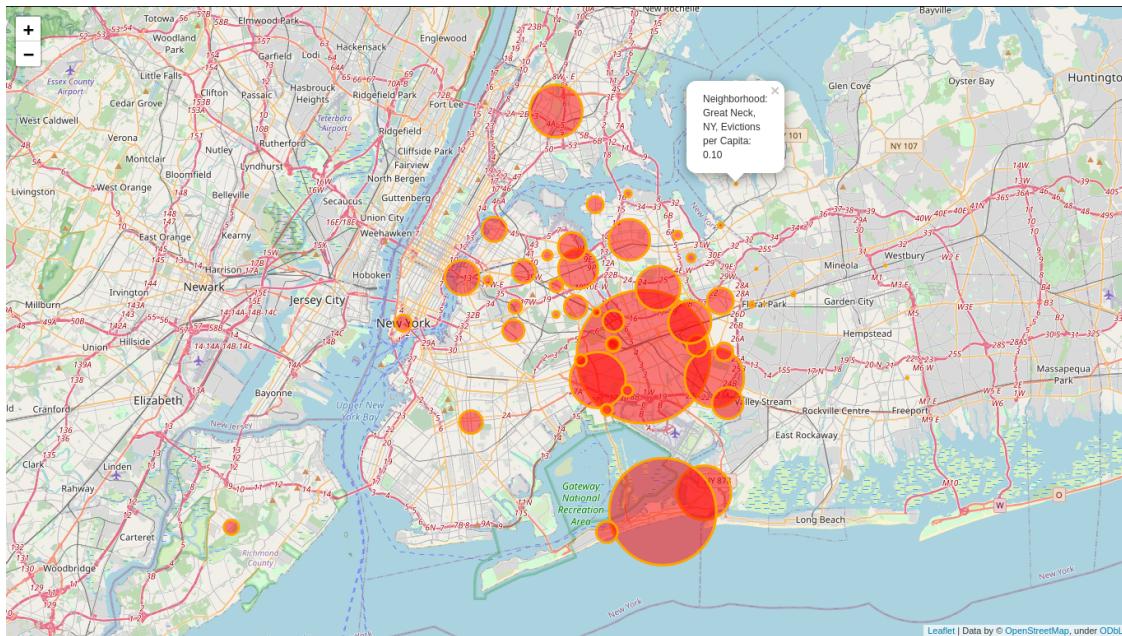
### Number Of Evictions In New York City Between The Years 2017 And 2019



As I mentioned previously, the only type of socioeconomic data I could find was by neighborhood,

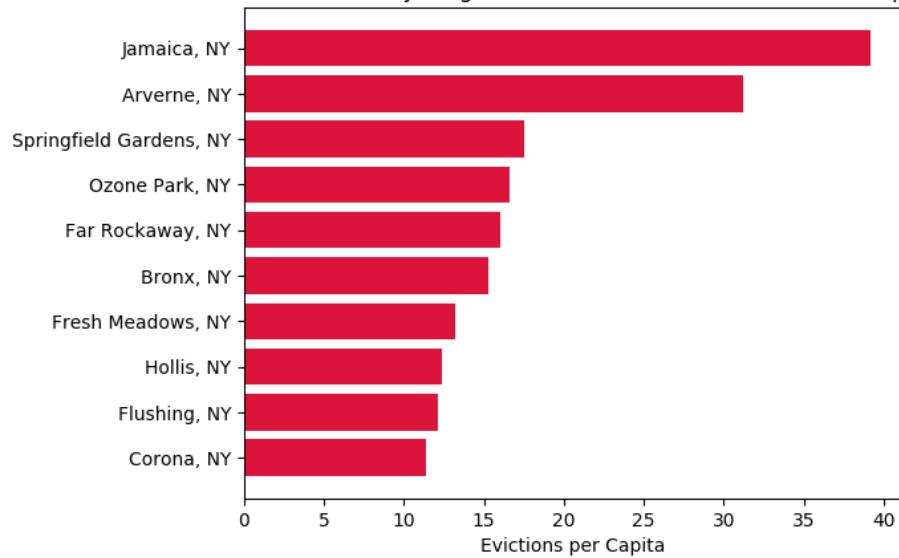
and not zip code. To accomodate this, I switched to showing data by neighborhood. Since each neighborhood contains multiple zip codes within its boundary, showing data by zip code provides better spatial resolution. However, there are a large number of neighborhoods in New York City and the minor loss in resolution resulting from showing data by neighborhood is of little consequence for our purpose.

Map below shows the distribution of evictions in various New York City neighborhoods. Number of evictions in each neighborhood was normalized by population and expressed as per capita. The disparity between neighborhoods is immediately evident. In theory, this large contrast should make visual differences easier to observe.



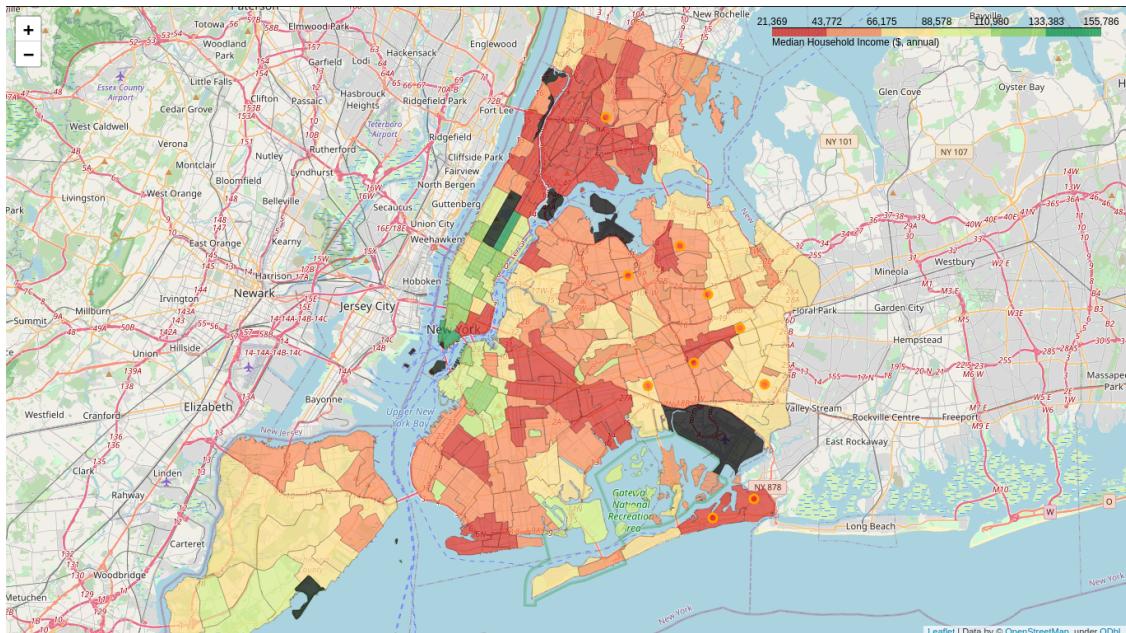
Neighborhoods were sorted by number of evictions per capita and ten neighborhoods with the most residential evictions were identified. Chart below compares the number of evictions per capita in those ten neighborhoods.

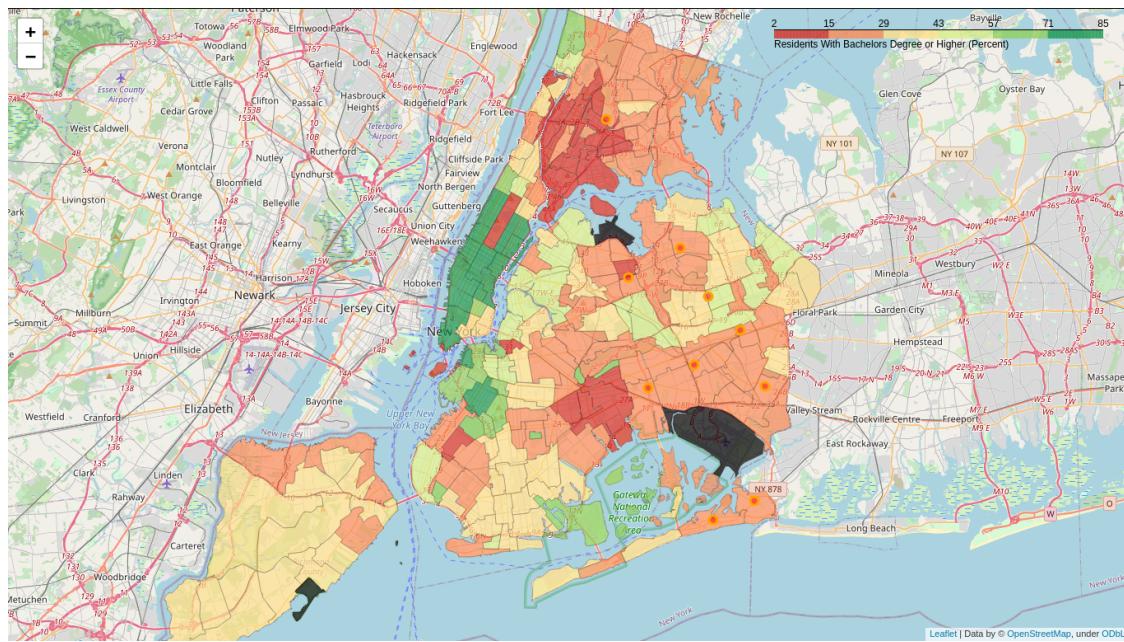
### Ten New York City Neighborhoods With Most Evictions Per Capita



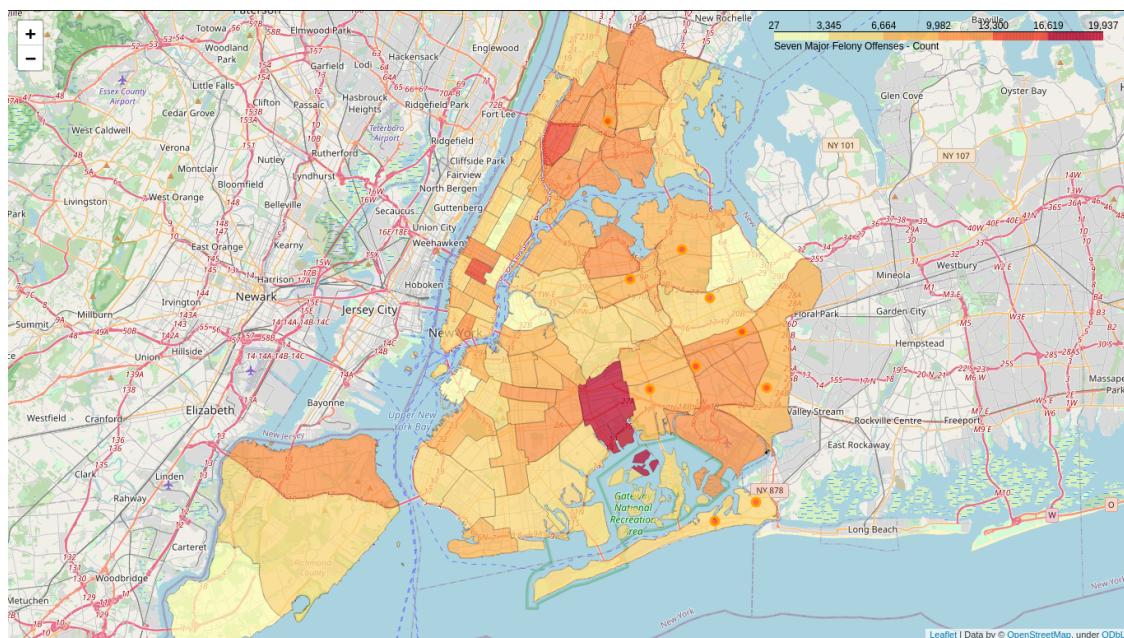
The next two figures are choropleth maps of New York city divided by neighborhood. In the first map, red stands for lower median household income and green represents neighborhoods where median income of residents is higher. Darker the shade of a neighborhood, the further it is from the middle. The second map captures the level of education in each neighborhood. It is designed in a manner similar to the first one: greener neighborhoods having a larger percentage of population who have a bachelor's degree or higher.

The orange circles identify the ten neighborhoods with the most evictions per capita. It is noteworthy that a large majority of the 10 neighborhoods fall in the pink or red zone: both, for median household income (8 out of 10) and percentage of residents with bachelor's degree or higher (9 out of 10).





Choropleth map below shows the distribution of the number of arrests, by police precinct, made for what New York Police Department (NYPD) lists as the seven major felony offenses. The criminal actions included in this list of major felonies are: i) murder and non-negligent manslaughter; ii) rape; iii) felony assault; iv) robbery; v) burglary; vi) grand larceny; and, vii) grand larceny of motor vehicle. Darker shades represent precincts with higher total count of such criminal activities. I could not find population data at the precinct level to normalize the data. However, regardless of population density, crime within geographical vicinity of a community influence how safe residents feel. So the raw data by is relevant even without normalization. The 10 neighborhoods with the most evictions are marked by orange circles on the choropleth map.



Contrary to what one might expect, 7 out of the 10 neighborhoods with most evictions are in areas where frequency of the seven major felonies are relatively moderate. A similarity between the distribution of crime and number of residential evictions is not immediately evident.

## 5 Discussion and Summary

This was a study on evictions, specifically residential, in New York City and how it varies with socioeconomic factors such as household income, level of education and crime. The approach used in the analysis is largely visual.

The total number of evictions, including commercial evictions, has fallen each year between 2017 and 2019. While outside of the scope of the current work, improving economy and falling unemployment are the most likely factors behind the decrease. Focusing exclusively on residential evictions, 9 out of 10 neighborhoods are in areas where less than 29% of people hold a bachelor's degree or higher. In terms of income, not a single one of the 10 neighborhoods are in areas where median household income is  $\geq \$88,578$  while 8 of them are in areas with median income  $\leq \$66,175$ .

The similarity between distribution of crimes and eviction rate is not immediately evident. This is counter-intuitive. Since crime deteriorates people's perception of how safe a neighborhood is, local economy suffers and property prices drop in high crime neighborhoods. This trend in turn increases poverty in the area, which brings economic uncertainties with it. So I expected distribution of crimes to show a pattern very similar to residential eviction per capita. Further study using a more rigorous quantitative methodology is required to identify and confirm existence of any such relationship.

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