Toronto's Houses Evaluation Analysis

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Abstract

Buildings and condo assessment data was pulled from the City of Toronto Open Portal to analyze houses that were built in Toronto and how the location and the build time affect the overall score of buildings. In 2021, construction of rental apartments in the GTA hits a 30-year high. In the meanwhile, the city of Toronto is boosting the management on the houses construction. In this report, we will look into the situation of department and buildings built after 1960, finding the pattern of evaluation scores in terms of the houses' ward and build year.

The code and data can be found in this link.[1]

1 Introduction

Housing market is very hot in these decades in Toronto, while a home safety evaluation is very important for household, which is a thorough assessment of potential hazards in and around your home. Certain evaluation to the houses can avoid potential hazards, including anything that could cause personal injury, lead to a fire or flooding in your home, or jeopardize your safety by making it easy for an intruder to enter your home (Tholen (2021)).

In this analysis, we will use the houses evaluation data conducted by RentSafeTO, a government assessment organization, and analyze the houses' scores distribution which are built after 1940 in terms of the location and build year("RentSafeTO: Apartment Building Standards" (2022)). It is a good guide for people who want to choose houses or condo to buy. Through using scatter plot, bar plot etc to analyze, we find that people's houses and living level in Toronto depends on several factors, such as location, build year and rules by City of Toronto. In the end, it shows that there are positive relationships between the buildings' scores and the location in Toronto, as well as the relationship between the buildings' scores and the build year. Let's see what pattern we get in the following in details!

The data set will be processed and analyzed in R (R Core Team (2020)) primarily using the tidyverse (Wickham et al. (2019)) and dplyr (Wickham et al. (2021)) packages. Figures and tables will be created with ggplot2(Wickham (2016)). The packages knitr (Xie (2021a)), tinytex (Xie (2021b)), and Lahman(Friendly et al. (2020)) are used to generate the R markdown report.

2 Data

2.1 Data Source

This report utilizes data on Apartment Building Evaluation in Toronto obtained from Open Data Toronto. This valuation is conducted by RentSafeTO, which is a bylaw enforcement program established in 2017.

[1]The code and data can be found in https://github.com/Nan-An-1/P1

Apartment Building Standards are made by them to ensure that owners and operators of apartment buildings comply with building maintenance standards("RentSafeTO: Apartment Building Standards" (2022)).

To make the Apartment Building Evaluation data more accurate, these buildings undergo evaluation at least once every three years, including common areas, mechanical and security systems, parking and exterior grounds("RentSafeTO Building Evaluations & Audits" (2022)). Except the separate scores for each item, there is a overall score for each department. In addition, this data frame also includes the information such as the ID number for a building, the year that the building was built in, the ward that the building is located in. The dataset was last updated on Feb 5, 2022.

2.2 Methodology and Data Collection

Apartment and building are inspected by each item, assigned a score from one to five, with one being the lowest and five being the highest. The scales include evaluating comprehensive aspects, such as the condition of the lobby, entrance doors and windows, the security system, elevator, as well as the garbage bin storage room. If an item is not applicable to the building at the time of evaluation, the score will show as blank in the data set.

In the following analysis, we will focus on the overall score to evaluate each building, which is the sum total of each item that was evaluated. The formula is calculated as follows: sum of all assigned scores during the evaluation/ (number of unique items reviewed *5)("RentSafeTO: Apartment Building Standards" (2022)).

According to Bloomberg, most current Toronto houses are built between 1946 and 1960, especially up to a million Victory Houses across Canada, where some of them are still stand in Toronto(Bochove (2021)). Thus, we select the data of buildings built after 1940 to make a more accurate analysis in terms of overall existing houses in Toronto.

The disadvantage of this data is that the sample number of buildings built between 1970 to 2021 in Toronto is not that great, compared to the total population. Each year,there are around 10,000 to 13,000 new homes that are built in GTA("RECORD YEAR FOR THE GTA NEW HOMES MARKET" (2017)). However, after filtering the data of buildings built after 1970, there are only 2028 buildings' information left in total.There might be discrepancy when getting the evaluation result of the buildings. However, we can still use it as this data is that the evaluation way through RentSafeTO, which is a generally applicable standard set up by The City of Toronto, which is a standardized and convincing building evaluation method("RentSafeTO: Apartment Building Standards" (2022)).

3 Evaluation Scale

3.1 Buildings' Score Distribution

The following table contains some critical data information about the assessment scores of houses that are built after 1960 in Toronto.

min	Q1	median	Q3	max	IQR	mean	sd	Small_Outliers	Large_Outliers
0	65	73	80	100	15	72.76797	10.03668	13	0

From the histogram and the table, we can tell that the mode, mean and median of Number of the houses' scores are similar at 73, which supports that the distribution of the houses' scores in Toronto is symmetric. The average score of overall departments that are built after 1960 in Toronto is 73. The data are almost concentrated, there are little outliers. Thus, we can say that the building assessment of RentSafeTO is certainly fair.

3.2 Some Spots

The overall evaluation score will determine next steps for City action. According to RentSafeTO official website, if buildings score 65 per cent or less, then the next evaluation will take place within one year. If the score is between 66 – 85 per cent, the next evaluation will take place within two years and if buildings score 86 percent and above the next evaluation with be within three years("RentSafeTO Building Evaluations & Audits" (2022)).

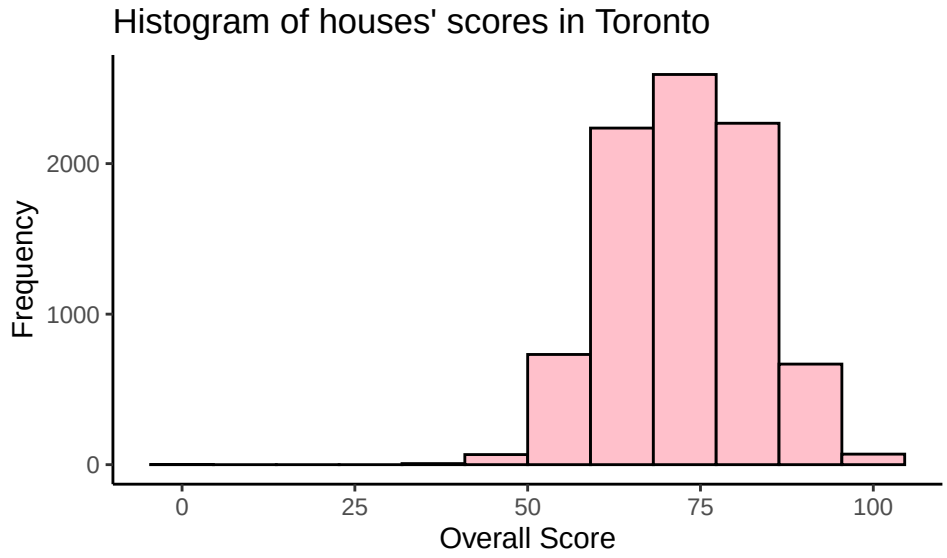


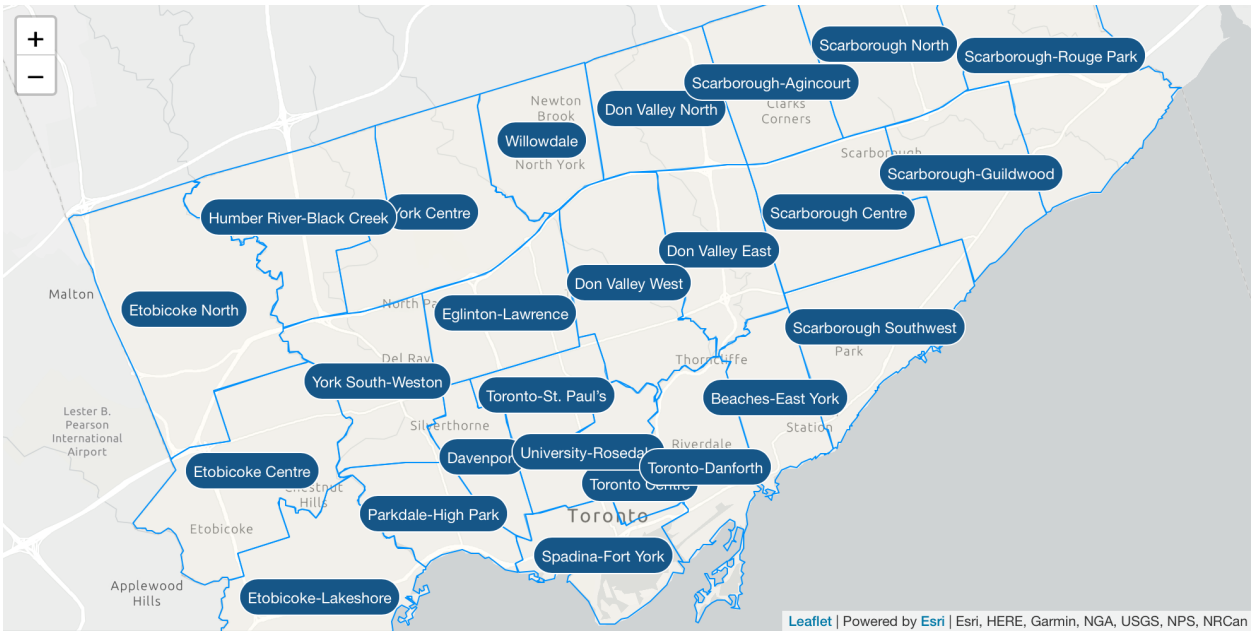
Figure 1: Houses' Scores in Toronto

From calcualtion, there are 67.18% of the departments that hold a score between 65 to 85. Thus, we can say that the evaluation scales of RentSafeTO is like normal distribution, which matches the actions of bylaw enforcement officer.

4 Location and Build-year Analysis

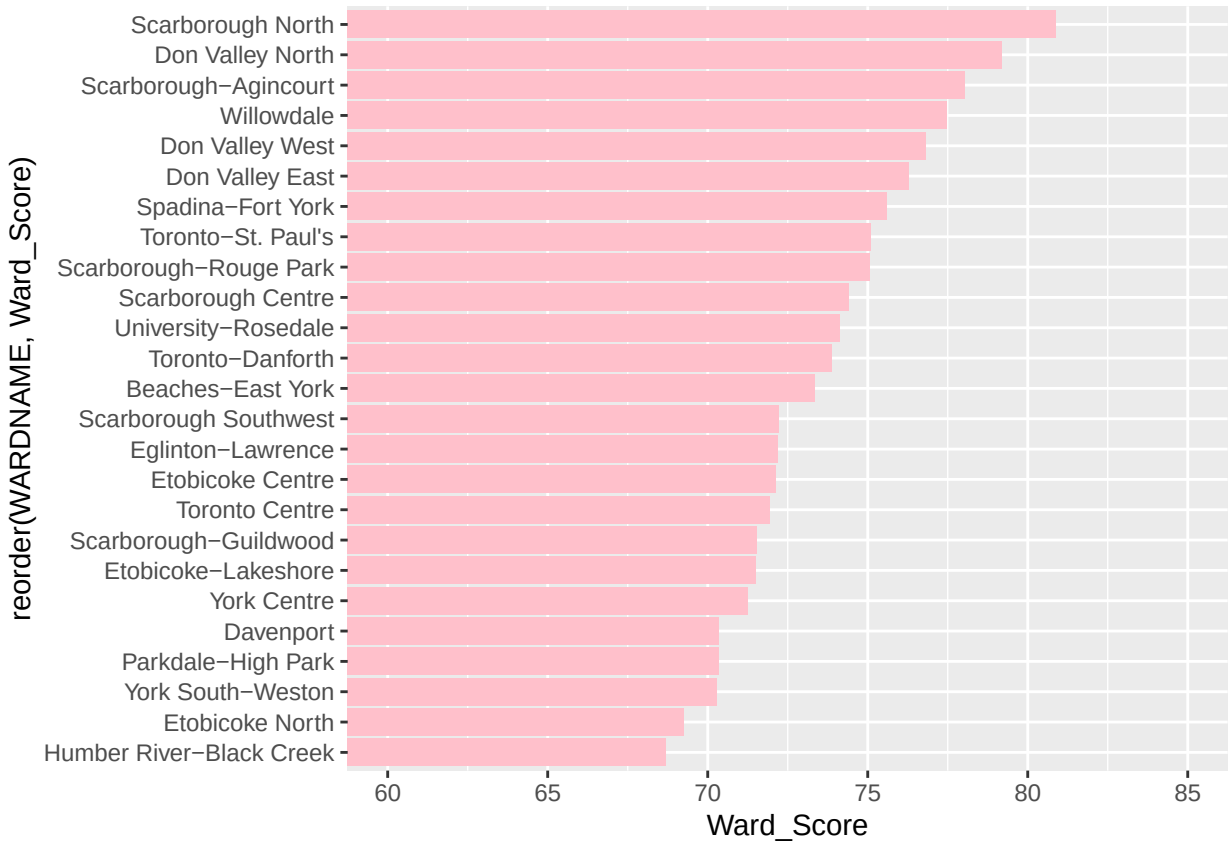
4.1 Average houses' scores by wards

Refer the ranking of scores with the map of wards in Toronto

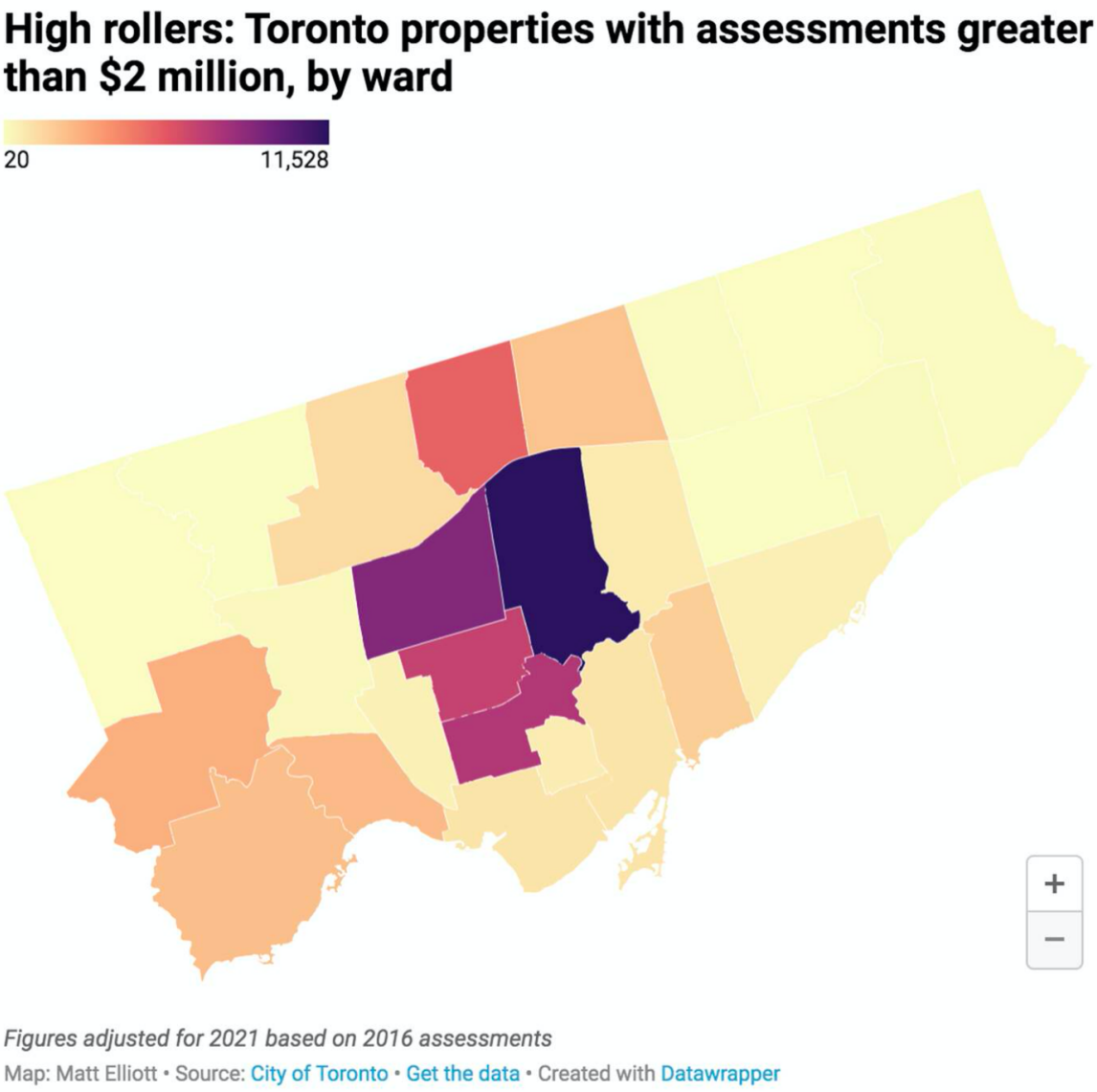


("Ward Profiles" (2022))

WARDNAME	Ward_Score
Scarborough North	80.88235
Don Valley North	79.19310
Scarborough-Agincourt	78.01980
Willowdale	77.46729
Don Valley West	76.82396
Don Valley East	76.29343
Spadina-Fort York	75.61261
Toronto-St. Paul's	75.09329
Scarborough-Rouge Park	75.05479
Scarborough Centre	74.41192
University-Rosedale	74.11808
Toronto-Danforth	73.88785
Beaches-East York	73.34987
Scarborough Southwest	72.23171
Eglinton-Lawrence	72.20424
Etobicoke Centre	72.11860
Toronto Centre	71.94949
Scarborough-Guildwood	71.52941
Etobicoke-Lakeshore	71.51379
York Centre	71.24745
Davenport	70.36047
Parkdale-High Park	70.34180
York South-Weston	70.28085
Etobicoke North	69.23984
Humber River-Black Creek	68.69040



From this ranking table, we can find the top three wards with the highest scores are Scarborough North(80.9), Don Valley North(79.2) and Scarborough-Agincourt(78.0), and the ward with the lowest score is Humber River-Black Creek(68.7). Most wards with high scores are centralized in the center of GTA. Let's see the value of property in different wards in Toronto and figure out whether there is relationship between the property's value and the property's scores!



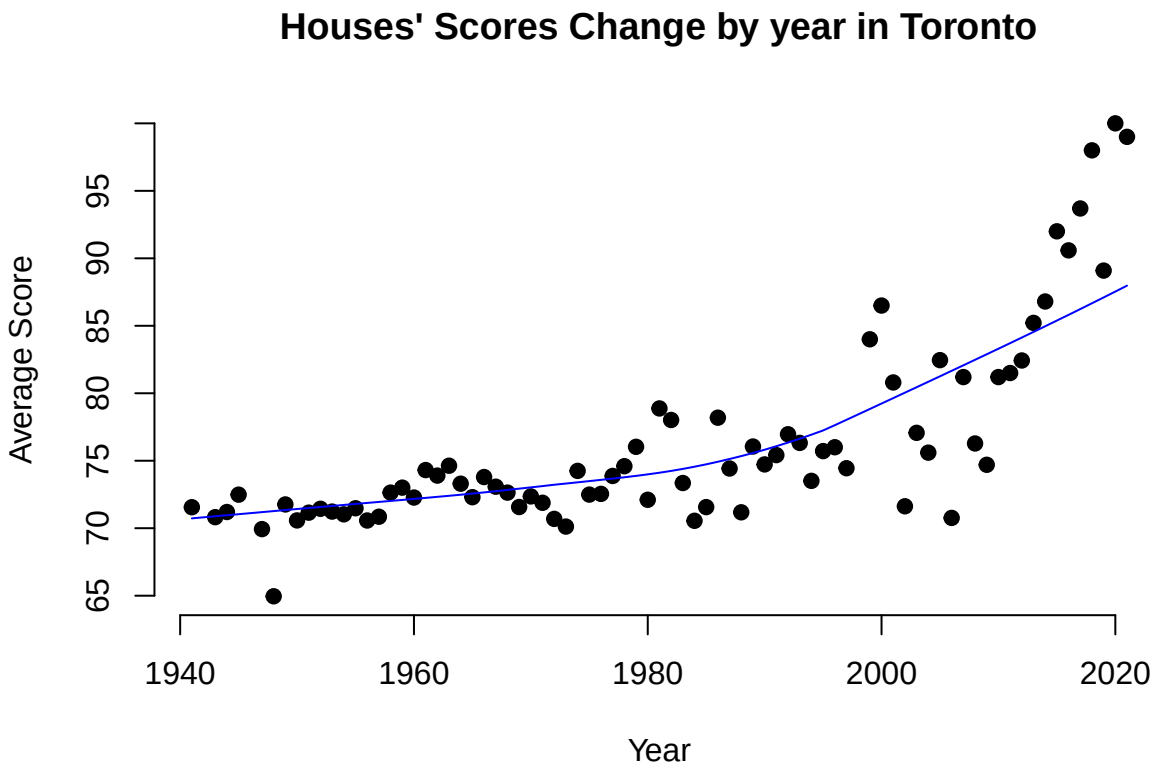
The areas of Toronto that have the most luxury homes. Map from Matt Elliott's City Hall Watcher newsletter.

("These Are the Toronto Neighbourhoods" (2021))

From the figure of Toronto Property Value, we can see the property in the center area of GTA are almost with higher value. For example, Don Valley West, Willowdale, and Scarborough-Agincourt, which are the darker area in the Toronto Property Value figure, and they are also included into the top wards with the highest houses assessment scores. Thus, we can say there is a positive relationship between the houses' score and the Property Value in a ward in Toronto. The houses with higher property value have the possibility to have higher assessment scores.

4.2 Overall Scores change by time

The following graph shows the average scores of houses in Toronto in different years. In order to see the change trend much clearly, I choose lowess function to plot a fitted line that smooth the process of scores' data change.



Seeing from the above figure, the scatter plot and the upward blue fitted line shows that there is a certainly positive relationship between the houses' score and the houses' build time in Toronto. The houses that are built in later time always have higher assessment scores. The development of houses' living level benefits from the Construction Requirements & Guidelines by City of Toronto. Between 1998 to 2022, the government has set up a series of rules and requirement to make the management of houses in Toronto more standardized and have allowed the households to live in Toronto more comfortable and safer. For example, the basic construction site checklist from government's building inspections advice the household to renovate the old office, store or building properly("Construction Requirements & Guidelines" (2022)).

5 Conclusion

In above analysis, we mostly research on two topics, which are the relationship between the buildings' scores and the location in Toronto, as well as the relationship between the buildings' scores and the build year.

Before looking into it, we find the pattern of evaluation scale of RentSafeTO firstly. After doing a bar plot of the score distribution and collecting some critical statistics values, we find that the mode, mean and median of score of the houses are similar at 73, which supports that the distribution of the houses' scores in Toronto is symmetric. Apartment and building are inspected by each item, assigned a score from one to five, with one being the lowest and five being the highest. It matched that the overall evaluation score will determine next steps for City action.

In the further, we make a bar plot to list we can find that the several wards with the highest scores such as Scarborough North(80.9), Don Valley North(79.2) and Scarborough-Agincourt(78.0) are exactly the wards centralized in the center of GTA. What's more, after doing a research on the property value of each wards in Toronto, there is a positive relationship between the houses' score and the Property Value in a ward in Toronto. The houses with higher property value have the possibility to have higher assessment scores.

In terms of the overall scores in different build time, we make a scatter plot and draw a fitted line to smooth the process of average scores change. Finally, we find that there is a certainly positive relationship between the houses' score and the houses' build time in Toronto. The houses that are built in later time always have higher assessment scores.

All in all, people's houses and living level in Toronto depends on several factors, such as location, build year and rules by City of Toronto. In Toronto, condos saw a sharp price hike in these couple of years. This resulted in an immediate effect on the Toronto real estate market. In 2017, when the regional government levied a tax of 15% on foreign buyers(Scrinko (2021)). In the future, the living and houses cost in Toronto will keep soaring, while the houses will become more comfortable and safe. During the time to choose the houses or condo to buy, don't forget to select the location properly as well!

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