Income Inequality is Revealed in Torontonian Apartment Maintenance[*]

Olaedo Okpareke

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Abstract

Housing maintenance benefits residents as it ensures proper functioning of ammenities, maintains structural integrity, and adds value to homes. However, previous research has found that there is lower priority in maintenance for public housing apartments and lower income apartments compared to their more privileged counterparts. We use data from Open data Toronto to further analyze this by using plots and tables to break down apartment scores and other attributes by Ward and apartment type,using R (R Core Team 2020) and other packages. We find that apartments in higher income wards and privately owned apartments tend to have better evaluation scores than those in lower income wards and public housing respectively. Private apartments also have higher levels of security than social housing. This report shows the inequality in standards for housing in Toronto, as well as the need for better government accountability and housing justice, as improving the gap in aparment quality helps improve the lives of poor and marginalized people.

1 Introduction

Toronto is a large Canadian city divided into 25 wards. In order to make sure building maintenance standards are upheld and to allow apartment residents to look up safety scores of their apartments, RentSafeTO provides an apartment evaluation data set data set. According to a set criteria not revealed to public, this data set rates apartment attributes according to a 5 point system, and then uses a formula to assign them an overall score over 100. In this report, we are interested in how attributes such as relative wealth of the ward and the type of apartment affects the total maintenance score of an apartment and its level of security, as well as how these scores have changed over the years.

We obtained the data set from the City of Toronto Open Data Portal (OpenDataToronto 2022) with `opendatatoronto` (Gelfand 2020), and cleaned and analyzed the data set using `R` (R Core Team 2020), `dplyr`, (Wickham et al. 2021) and `tidyverse` (Wickham et al. 2019) packages. Figures and tables were created with `ggplot2` (Wickham 2016), `knitr` (Xie 2014), `dplyr` (Wickham et al. 2021) and `kableExtra` (Zhu 2021). We first created tables and graphs that showed the data. We then went into showing the relevant information for apartment types and wards using box plots, linear model graphs and percentage bar charts. These all highlighted inequality in housing evaluation scores.

Not all apartments are equal, as this report shows that although general housing maintenance has increased in recent years (OECD 2020), there is still a large difference in quality of apartments around the city. Social housing, both operated by the Toronto Housing Corporation (TCHC) and by other institutions, tend to have lower median maintenance scores than their private counterparts. These higher scores for private apartments have been consistent over the years. Apartments in some wealthier wards also have a higher median maintenance score than those in poorer wards. These wealthier wards also have a higher amount of high quality apartment blocks. Private apartments also tend to have better security than their social housing counterparts. According to (OECD 2020) and (Desroches and Poland 2021), these disparities are due to a decline in public investment in social housing.

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[*]Code and data are available at: https://github.com/OlaedoOkpareke/starter_folder

These scores are widely used to rate apartments, however biased scoring and issues in measurement could create inaccurate property pricing, or otherwise give false impressions on the apartment block, and thus the type of people living there (Konadu-Agyemang, Noonan, and McCord 1994). Low scores for public housing also exacerbate the already low view of people who need them (Konadu-Agyemang, Noonan, and McCord 1994). This data and the statistics shows that vulnerable populations such as low income people and minorities suffer systemic marginalization in many facets of society. This includes the housing sector as well maintained, secure housing is still unattainable for the city's most vulnerable, questioning the extent of the achievements of social housing. There are also concerns about the possible grading bias, as well as the societal impact of these scores such as gentrification.

2 Data

2.1 Data Source and collection

The data for this report was gotten from the Apartment Building Evaluation (RentSafeTO 2022a) of the Toronto Open Data Portal (OpenDataToronto 2022) using the R package `opendatatoronto` (Gelfand 2020). This data is compiled by RentSafeTO and was last accessed on January 22nd, 2022. Rent Safe TO collects data on apartments in the Greater Toronto Area (GTA) that are 3 or more stories tall or had 10 more units (RentSafeTO 2022b), and response is mandatory for qualifying apartments, i.e the population. RentSafeTO collects the data by setting up an appointment with the landlord of the apartment block for inspection, takes notes and photographs of their inspection to upload to the City's mobile investigation application. Later, the total building evaluation score is calculated and made available to review and post on the Tenant Notification Board (RentSafeTO 2022b). The raw data includes 9758 apartment blocks from the GTA and their categorical characteristics such as location and Type of property, as well as numeric characteristics such as Security,amenities and state of common areas. It also includes an overall score over 100 for each apartment block, and there are 40 variables in total.

2.2 Data cleaning

For data cleaning, our intended sample was apartments that included all available rooms, amenities, and other characteristics. This was because we wanted an "all things being equal" analysis, the assumption that amenities wise, the apartments were alike. That is, we wanted to compare apartments that had poor/lacking characteristics, not no characteristic at all. We thought it would also be helpful for the analysis to have the full picture in order to observe the possibility of bias in grading. We removed all rows with missing values as they indicated one or more of the previous criteria was missing. The missing values seemed to be randomly dispersed about the data set so removing them would not cause much deviation.

We included a variable in our data frame if there was anything important that made it stand out for our analysis. We omitted most variables in the original set as their direct effects were not important to the analysis, and the total score variable encompassed all of their individual scores. We first removed _id and RSN as they were merely ID variables. We also excluded the numeric ward variable as the ward names variable, which contains the 25 Toronto wards, was easier to use for identification. We included year built as we wanted to see the changes in apartment evaluation between older and newer apartments. We included score as it was the main determinant of maintenance standards. We also included Security (which measures the condition of security systems of the apartment) to observe the the direct relationship and differences in security between different groups of apartments. We then included property type, which states whether an apartment was privately owned, owned by the TCHC, or owned by some other non-private institution, as our analysis focuses on social/affordable housing. The final data frame included 493 observations with 5 variables.

2.3 Data Visualization

We are interested in the relationships between apartment Type, Ward,Score and Security, as well as the trend of Score over time. These relationships show a measure of income inequality in housing, and have possible implications for public policy. A glimpse of the data, (Table 1), using `kableextra` (Zhu 2021), and `knitr` (Xie 2014) are shown below.

Table 1: Toronto Apartment Evaluation Data

Score	Ward	Year built	Type	Security
81	Toronto-Danforth	1996	SOCIAL HOUSING	5
78	Scarborough Southwest	1992	SOCIAL HOUSING	5
91	Eglinton-Lawrence	1965	PRIVATE	5
59	Davenport	1968	TCHC	4
88	Toronto-Danforth	1967	PRIVATE	5
86	York Centre	1983	SOCIAL HOUSING	5

(Figure 1) and (Figure 2) using `ggplot2` (Wickham 2016) show the spread and distribution of apartments scores and their security levels respectively. We see that the data for Scores seems to be unimodal and normally distributed. There is an outlier of a very low apartment score, but it is not enough to skew the data to the left. The median apartment score seems to be the same or a bit above the mean apartment score, as there seems to be more apartments on the lower end than there are on the higher end. This indicates that there are many below average apartments. We can see from the figures that the average building has good maintenance and a high standard of security. However as there are still quite a lot of lower security apartments, it seems that the mean level of security may be lower than the median. Policy is needed to improve security for these apartments, and the observation that some evaluation Scores are quite lower than most are more thoroughly scrutinized later in the report.
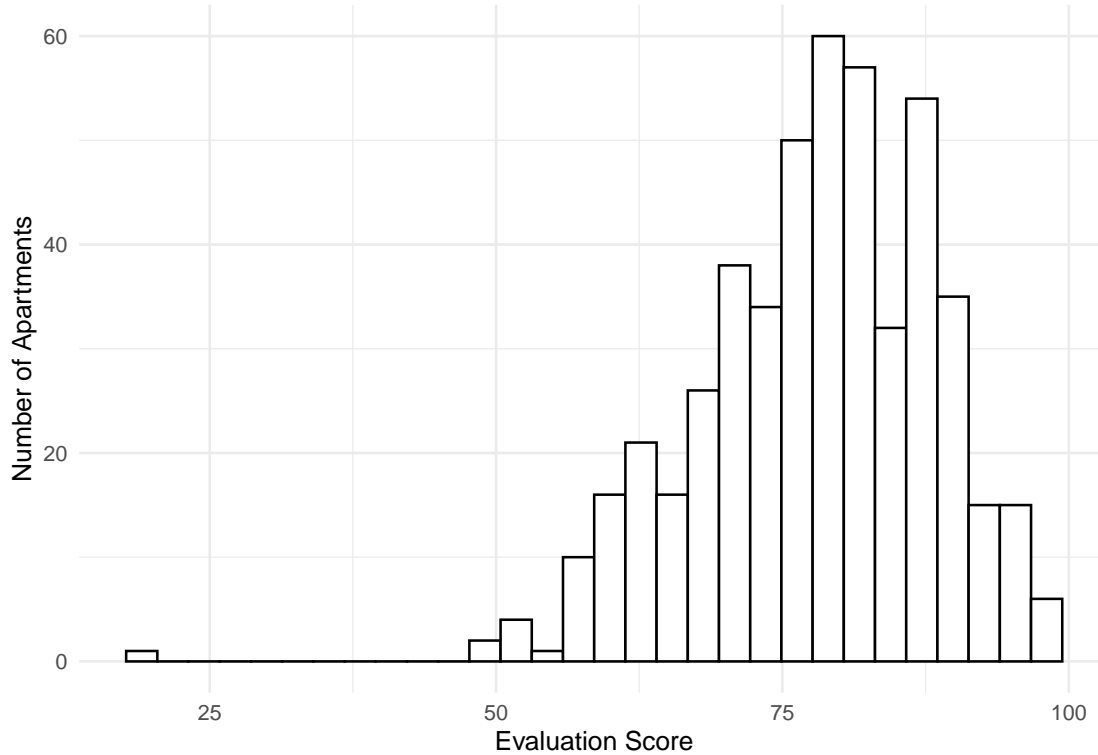

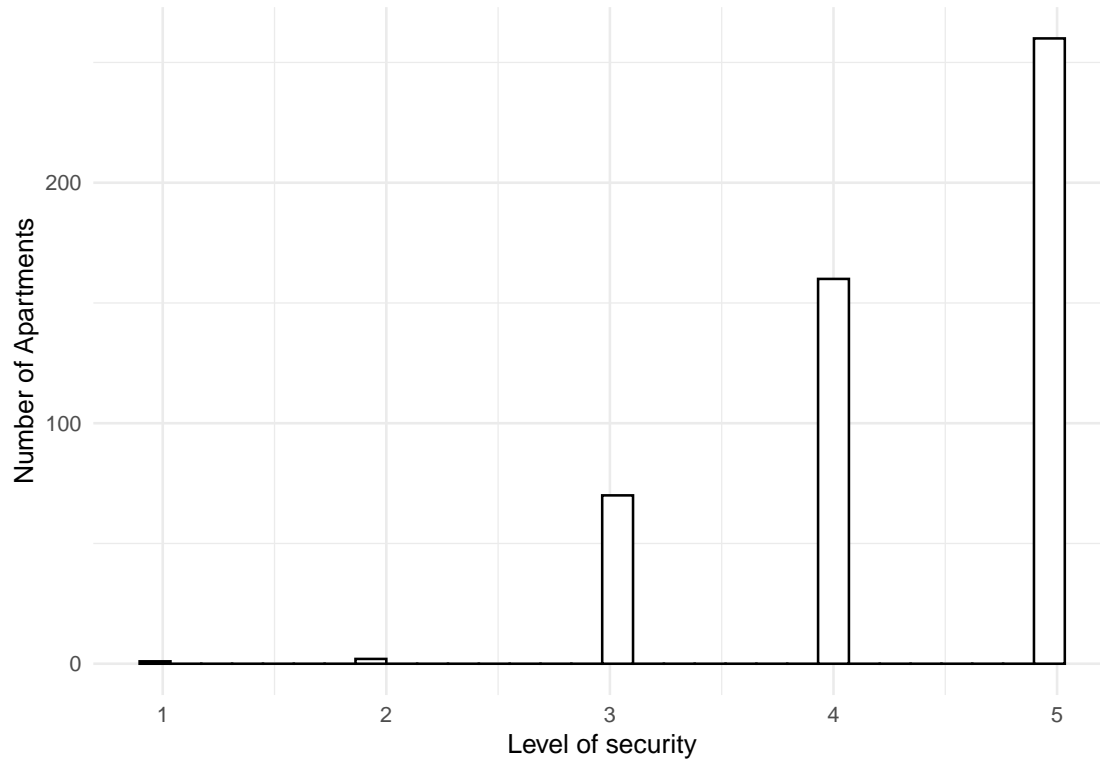Figure 1: Histogram of the Distribution of Apartment Scores

Figure 2: Histogram of the Distribution of Apartment Security levels

(Figure 3) shows the median and range of maintenance scores by ward. Cross referencing the income and demographics of each ward using (CityPlanning 2016), we see that the higher income wards such as Toronto Saint Paul and Toronto-Danforth (155,470 and 101,323 dollars for average yearly income respectively as of 2016) tend to have higher median scores than lower income wards, such as Davenport and Humber River-Black Creek (80,807 and 65,458 dollars for average yearly income as of 2016). An exception seems to be Scarborough North which has a low yearly average income and high racial minority population, but a high average apartment maintenance score. However note that the range for this ward is very small, implying that there are very few samples, so they may not be representative of the true state of apartments in the ward. Although there are some outliers, in general apartments are better in richer wards than in poorer wards. High income Wards also tend to have fewer racial minorities, with Toronto saint Paul and Toronto-Danforth having a 72% and 67% non-racial minority population respectively.
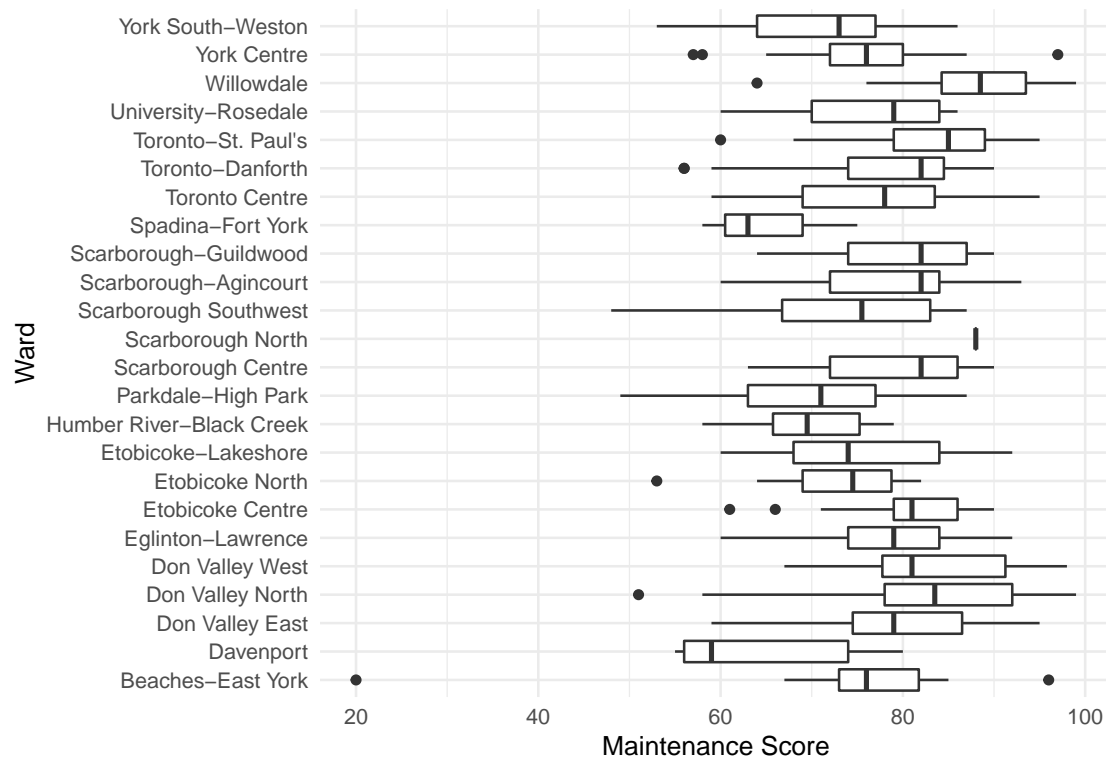
Figure 3: Boxplot of Apartment Maintenance Scores by Ward

(Figure 4) shows the median apartment scores by type. The results show that private apartments have the best median maintenance quality, and those from the Toronto Housing Corporation have the lowest. The range of quality (interquartile range) seems to be equal for all three housing types, so even accounting for variation private housing is consistently better than their public counterparts. However it should be noted that (non TCHC owned) social housing maintenance is not very far behind private housing, showing a just upkeep of housing by other institutions. This indicates that the disparity for TCHC housing comes from a lack of government upkeep or funding. Nevertheless people in social housing often have to take maintenance and upkeep into their own hands or otherwise enter legal battles, as shown by (Bryks 2011).
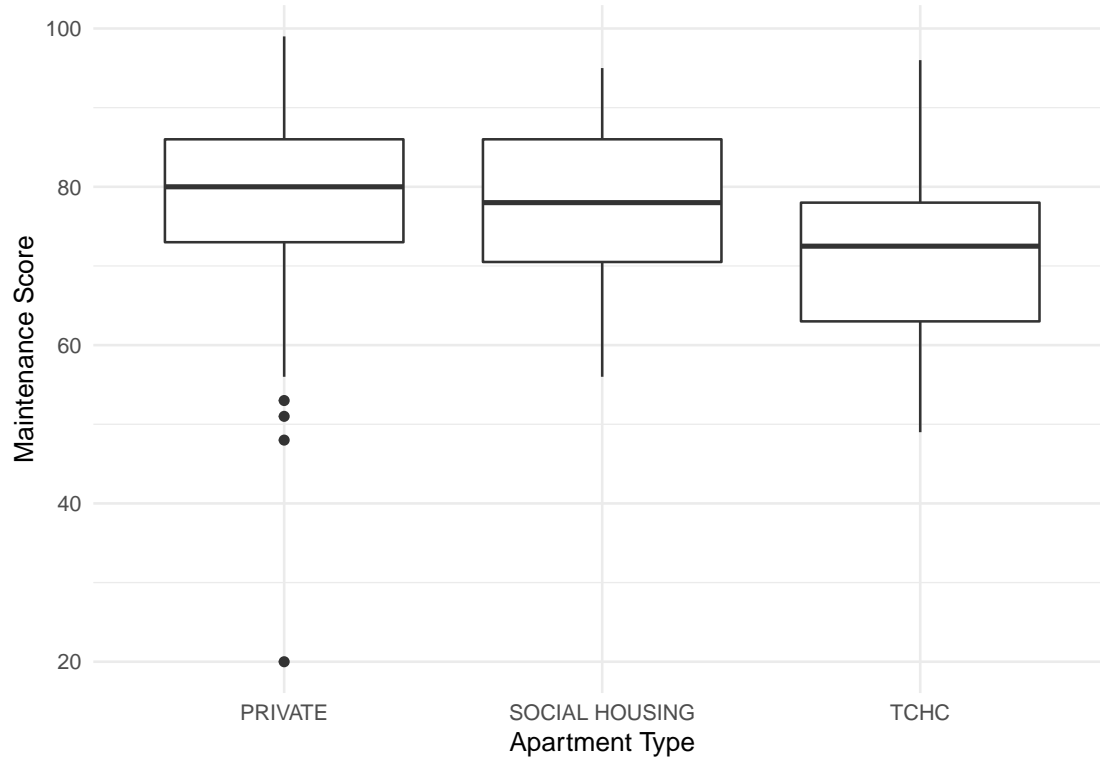
Figure 4: Boxplot of Apartment Maintenance Scores by Apartment Type

(Table 2) shows the difference in security among each housing type. We see that overall the average security levels are good for all types of apartment. However the median shows that both TCHC owned and non TCHC owned social buildings have less stellar security than that of the private buildings, so their average scores were driven up by a few very good apartments. This means that we can expect that a large number of social housing (which houses mainly low income populations) do not have the best security, which is counter-intuitive as poorer areas where this type of housing is often located are often in higher need of more security due to higher correlation with crime rates (Yen 1999).

Table 2: Table of Mean and Median security for each Apartment Type

Type	Mean	Median
PRIVATE	4.428947	5
SOCIAL HOUSING	4.237288	4
TCHC	4.111111	4

(Figure 5) shows the general trend of apartment maintenance scores for each apartment type according to the year they were built. We see that most apartments in the sample are quite old, being built between the 1950s to 1980s. Even though for all three types of apartment, newer buildings have better maintenance Scores than their older counterparts, private housing still gets consistently higher scores than the other two types for almost all the years. Most private apartments were built between the 1960s to 1970s while social housing was built between the 1980s to 2000s, so even the newer age of the social housing buildings is not enough to protect against lower rates of maintenance. This shows either the persistent lack of government and public maintenance or persistent bias in scoring, which both tie into income inequality. It should be noted that the trend for private apartments may be heavily influenced by the points at the far right end, and that many private apartments also have low scores. We also removed an outlier, an apartment built in 1910

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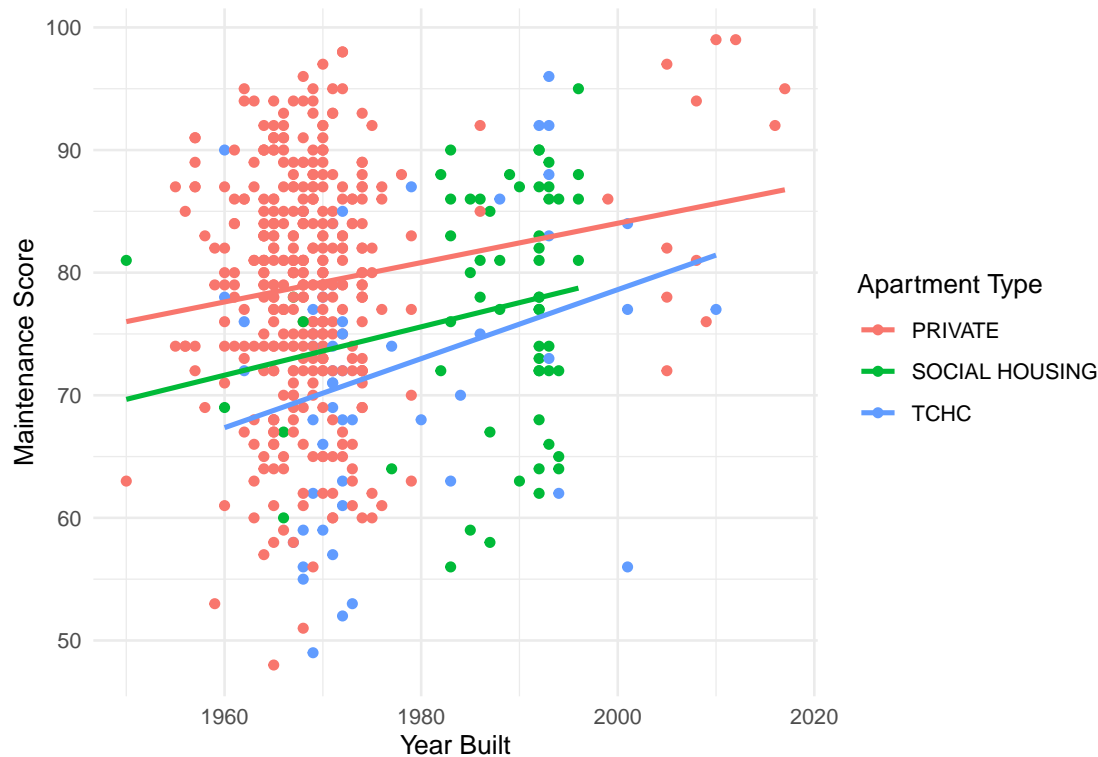as it affected the accuracy of the trend for private apartments.

Figure 5: Scatterplot and General Trend of Apartment Scores by Type from 1950 - 2021

(Figure 6) shows that wealthier wards have a larger percentage of their apartments scoring above 80 compared to lower income wards. Some of the poorer wards such as Humber River Black creek or Davenport do not have very highly rated apartments at all. The racial minority population in these two wards as of 2016 was 74% and 43% respectively (CityPlanning 2016). In 2016 the average annual income for these wards were 65,548 and 80,807 dollars respectively while in the richer wards like Toronto Saint Paul and Etobicoke Centre which both have a large percentage of highly rated apartments, the yearly average incomes were 155,470 and 128,448 dollars respectively (CityPlanning 2016). Many other wards follow the same trend, with the wards with higher income having larger percentages of their apartments scoring above 80, while a few lower income wards actually have some percentage of their apartments score less than 60. This is another way to see the inequality in housing standards, and communicates that housing maintenance disproportionately caters to higher income areas. This is possibly because lower income people pay less rent, are less likely to protest (August 2016), or because public housing receives less general funding compared to previous decades (Tsenkova 2021).
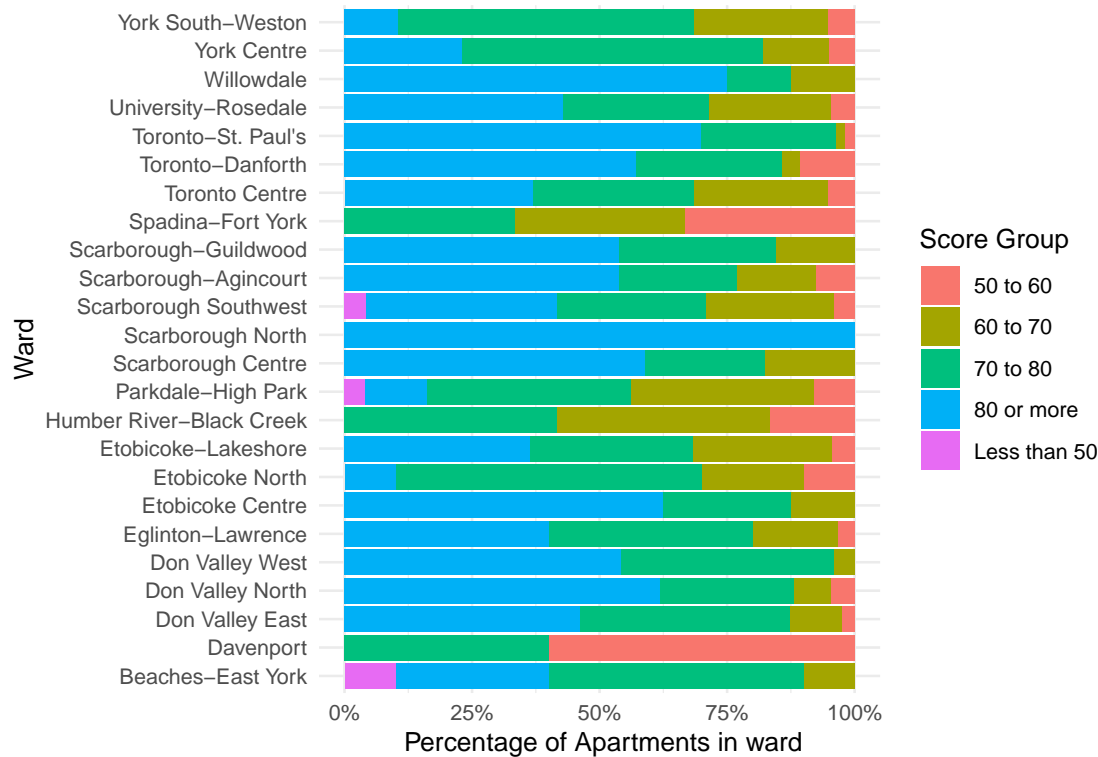
Figure 6: Percentage of apartments in each ward with scores in a certain range

3 Discussion

3.1 Societal Impact of Scores

As previously stated, the impact of these scores might lead to inaccurate judgments of social housing apartments or apartments in lower income areas as lower quality. This perpetuates harmful views on low income people that further progresses their marginalization in society by casting blame on social housing residents for poor conditions instead of the organizations that are supposed to maintain apartment quality. Given the importance of these scores in rating apartments and housing choice, there is a need to understand the decisions that go into the scores and how they could be interpreted.

This report brings into discussion the impact of housing on well being and the needs of the low income that require low income housing or have less than standard housing. It has been shown that public housing apartments have lower quality amenities than their private counterparts, and these can have several effects on the residents. Previous research has shown that "Aspects of neighbourhoods that have been identified as having an impact on health are: ... "incivilities" such as the presence of graffiti, boarded up houses, garbage accumulation... and broken windows, and the signalling effect of these physical features that no one cares; the perception of neighbourhoods as "safe" and under effective informal social controls...Others have postulated that neighborhood conditions directly influence habits of privacy, child rearing, house keeping, and study, which can have an indirect effect on health." (Howden-Chapman 2004).

There is also the need to discuss the shortcomings of the Toronto Housing Corporation and why they have not been up to date with maintenance of their apartments, as well as public policy that could be approved to improve the maintenance and security of social housing apartments in low income areas. Housing for the lower income is often substandard because they are at lower priority in many government operations (Fleming et al. 2019) such as law enforcement, schooling, etc., either because they are often seen as net negative tax payers or that they are not as able to fight for their rights as the middle class (Crosby 2020).

This intersects with a large number of low income people being racial minorities, who are also often seen as less important in society. Housing is one of the ways that governmental discrimination of poor people and the lack of priority for them is shown. Lack of affordable housing, low quality housing, and evictions increases problems associated with poverty, drug use, race, education, and physical and mental health (Fleming et al. 2019).

The report has shown a disparity in priorities in apartment maintenance and upkeep between public and private apartments, as well as general housing inequality as those in social housing owned by the TCHC do not have the high apartment quality or security they deserve (OHRC, n.d.). Regarding these apartments that have less security, it is paradoxical as these people often live in more crime ridden areas that require the extra security (Stretesky, Schuck, and Hogan 2004). Lower income people often do not have money to protect themselves like the wealthy, so they need to rely on publicly provided assistance. This brings into question if their own lives are considered, as well as the failings of public landlords and the TCHC to provide security akin to those of private apartments.

The data showed that Scarborough North, which has a 90% visible minority population with an average yearly income of 78,892 dollars as of 2016 compared to the Toronto average of 102,721 dollars (CityPlanning 2016), only has highly scored apartment buildings. If this is not due to a sampling problem, it is hopeful that apartment scores for other wards with similar incomes increase in the future. However low income residents have concerns that a high level of apartment security, or highly rated apartments in an otherwise lower income area can make the area more attractive to wealthier people. This could lead to gentrification, which pushes the original low income inhabitants out, which is a problem with the already tenuous social housing situation for these marginalized groups (August 2014) and (Crosby 2020).

3.2 Bias and Ethical Concerns

There are some areas for possible bias in the data which perpetuate preconceived notions of marginalized groups. As RentSafeTO does not release its criteria for grading, it is unknown what specific qualities they look for during the process. Measurement issues could occur as there is not a way to objectively grade an apartment, i.e it is unclear what distinguishes a rating of 4 from a rating of 5. It is thus possible to then give an apartment attribute of the same quality a higher score in a wealthier ward/private building with other good amenities, whilst giving apartments in poorer wards/social housing a lower score, due to bias against the general area or the social status of residents and not because of the apartment block itself. This maintains biases against the lower income and minorities as people get their previously held beliefs about the poor status of those communities confirmed (Kamphuis et al. 2010). Lower scores are prevalent in poorer wards and wards with high visible minority populations, and biases against these people and the general "feel" of an area may influence people to rent at a more expensive apartment block with good scores when there's a cheaper apartment that was inaccurately graded. On the other side, being in a more affluent ward may artificially prop up a mediocre apartment's score, thus inflating prices and making it less affordable even though its maintenance is lacking. There is thus a need for a more transparent grading system so that outsiders can cross check and make sure that no historic inequalities perpetuate themselves through biased scoring against those living in poor areas or social housing.

3.3 Data Collection Concerns

There are some data collection problems with this data set. RentSafeTO collects data only for apartment blocks with 3 or more stories or ten or more units (RentSafeTO 2022b), meaning that some buildings that are in dire need of maintenance may be left behind as the organization simply does not collect data for them, even though most people may see them as apartments (i.e a three story block of 9 flats). This leaves out a big piece of the full picture on apartment quality, and may also be why some known wealthier wards are getting higher average scores as the low income housing there does not count. It also leaves out the full effect of income inequality as lower income people are now more likely to live in such types of "apartments" than the wealthy (Musterd 2014). For apartments that do qualify for data collection, the grading is a scheduled event organized with the landlord ahead of time (RentSafeTO 2022b). This means that scores presented may not be an entirely accurate measure of the general upkeep of a building as landlords who neglect their property

can hurriedly make repairs and straighten out the apartment block before the inspector/enforcement officer arrives. It may thus be necessary for inspectors to come up semi-unannounced to get the true evaluation of the building.

3.4   Income

It is important to note that not all living in private apartments are wealthy. In fact, there are many private apartments inhabited mainly by low income people so this disparity in scores between private and social housing may be due to reasons other than income inequality. It is important not to overlook those who are struggling to pay rent to access these improved amenities. Not all those who live in private areas or wealthier wards are rich as wealthier wards still have poor areas, so their own experiences may be neglected.

The average income for each ward was an important variable because it would have put other information from the data into context, as it determines the priority in government funding not just for apartments but in general. This is because lower income areas get less funding but wealthier income areas are often full of funding when it comes to public infrastructure, outside maintenance, and other social amenities, all of which could have gone into the scoring bias. Unfortunately this variable was not included in the data set, so information on income had to come from a less up to date source.

Private housing is now itself getting harder to afford due to rising apartment costs, forcing many so called middle class people into social housing or lower rated private apartments. The effect of rising prices has led to the movement of people that would not have been considered low income into social housing apartments or apartments in lower income wards, causing a higher demand for these apartments and thus leading to a larger strain on already heavily strained available social housing funds (Irwin 2004).

3.5   Weaknesses and next steps

As average income was not provided for the data set, we had to collect external data which was set in 2016 and may not be accurate as it is not current to the modern day. While the missing values were dispersed randomly throughout the data set, removing them may have caused bias in the data set so our analysis of Scores, security and year built may have been different if the missing values had been filled. Also, removing variables even if they were already present in the Score variable may have caused incorrect analysis. This is because there may be some important information in the rejected variables that either brings a new perspective or aids one of the accepted variable in explaining the relationships between apartment type, ward, maintenance scores and security.

For next steps we could use the geo-location variable that was omitted for this report to see if the scores for apartments on boundaries between poorer or richer wards had the negative bias of the poor wards or positive bias of the rich. We could also use this variable for a spatial comparison in contrast to the graphical comparison used in the report. We could then include apartment blocks that did not have all amenities in the comparison of income and scores to further observe evidence of inequality, as apartments in poor areas tend to have complete absence of some amenities.

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