Toronto's Social and Affordable Housing units from 2020 to 2022

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Date: January 23, 2024

Acknowledgement

Github repository for the paper

Abstract

Provision of social housing and affordable housing are some of the city's intervention in combating the expensive housing situation, and in this analysis paper, data on the number of social housing and affordable housing units are gathered and examined to showcase how many of these housing units have been provided by the city. With Toronto (2023) experiencing population growth every year, these numbers of units will be able to give readers an insight into the pattern of increase number of units quarterly from post Covid period of 2020 to 2022. The data on number of social housing and affordable housing units in Toronto will be prevalent in understanding trends in housing affordability, even at a larger scale, where in a global city such as Toronto where housing accessibility is important for urban growth, and observing how social policies such as provision of housing can help understand the impact of social factors to the economic and urban components of a city.

Section 1: Introduction

The housing situation in Toronto has been known to be notorious for its high cost, to the extent where many of the city residents found themselves living with expensive rent and inadequate living condition (Pinki, 2019). The lack of affordable housing has been an issue to the city for decades, where it has established to be the source to many urban issues such as rising homelessness, high crime rates, loss of communities, and social inequality (Pinki, 2019). To

mitigate this issue, the city of Toronto (2023) initiated two policies that includes building more social housing units, and ensure existing rental units are affordable.

Although they may appeared similar, the two policies shares the same objective which is to promote accessibility to cheaper housing. The two following housing units will be focused in this paper, where their numbers over the two years will be analyzed to determine patterns in the growth of the housing units. When using the data of these two housing, it is important to understand what they are and how they are different before proceeding with working with it. Social housing are managed by the City to ensure low rent and affordable cost of housing for low- middle income households. In a sense, it can be looked as a subsidized housing initiative as certain aspects of the housing costs are covered by the City. Affordable housing are existing rental units that are ensured by the City to operate within their affordable requirements and guidelines, therefore these units can be classified by the City as "affordable".

Over the course of the paper, data on the number of housing units extracted from the Open Data Toronto website, provided by the City of Toronto, will be investigated to build an analysis on the housing situation in Toronto in the time period. The data will be presented and discussed in Section 2: Data, where examination of the data trends and outcome using graphs and a table will occur. Section 3 will include the references and citations of all packages, articles, and online source that contributed to the paper. Section 4 is an appendix, where any less significant details about the paper and process of the data analysis will be highlighted.

Section 2: Data

The data used in this paper is sourced from the Open Data Toronto catalogue website , provided by the City of Toronto. The site is publicly accessible, where members of the public can access socio-economic data sets regarding the city. The data chosen for the paper contains the number of social housing and affordable housing units in Toronto, sorted quarterly from 2020 to 2022. As described on [@citeHousingData], the data presents the active social housing stock and the active affordable housing stock administered under the City, and is intended for informative study purposes.

I've chosen this data to use for analysis on the housing situation in Toronto because it gives a simple data set on number of units that are considered to battle the lack of affordable housing issues, as the number of affordable housing alternatives provided in the data set can help to offer data to work with to build a case whether the City's initiative is efficient or not.

The raw housing data set were found to be short and direct. It contains four columns, eleven variables, and a total of forty four values. There were columns of id, quarter, subsidized housing units, and affordable housing units. The social housing units will be referred to subsidized housing unit in the data set. The quarter variables starts from Q1 2020 to Q3 2022, giving an incomplete insight to the year of 2022, however the data will still be used to determine pattern changes. The first four variables of the subsidized housing units are not available, but there are available data for affordable housing units, therefore the variables will be included in

the analysis and will appear as zero when visualized. The data types for the column includes numerical data for the id, and character data for the remaining columns.

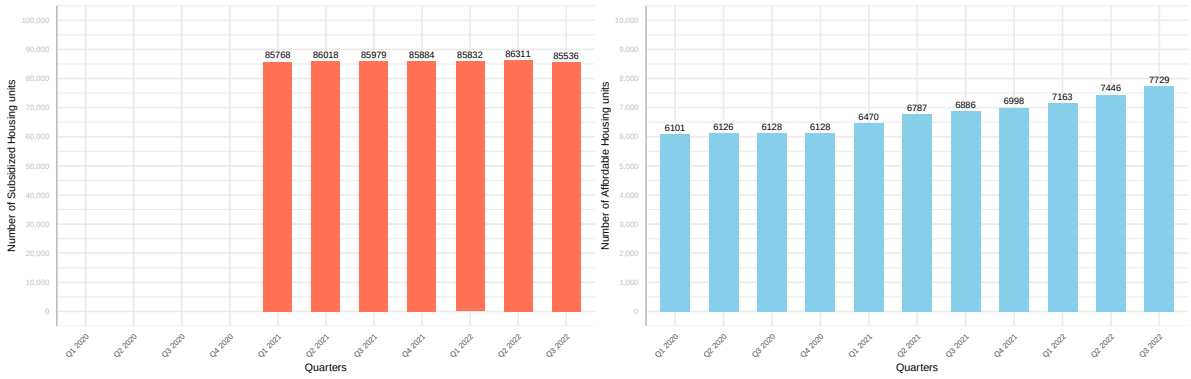
Table 1: The number of social housing and affordable housing units from Q1 2020 to Q3 2022 in Toronto.

Quarters	Social_housing_units	Affordable_housing_units
Q1 2020	NA	6101
Q2 2020	NA	6126
Q3 2020	NA	6128
Q4 2020	NA	6128
Q1 2021	85768	6470
Q2 2021	86018	6787
Q3 2021	85979	6886
Q4 2021	85884	6998
Q1 2022	85832	7163
Q2 2022	86311	7446
Q3 2022	85536	7729

Table 1 is consists of the data regarding number of units for both social and affordable housing from Q1 2020 to Q3 2022. One of the few standouts from Table 1 is the NA values for variable Q1 2020 to Q4 2020 accounting the number of social housing units. This rules out an analysis on the number of social housing units established in 2020, however analysis for year 2021 and up to Q3 of 2022 can be made for social housing. The result of the NA values is uncertain, possible not provided or missing, the values were kept to allow data for affordable housing.

As for the result of data in Table 1, we can see that the City has provided up to 86311 units of social housing within the two years, with the lowest number of units being Q3 2022 with only 85536 units. The quarterly changes in number of units is very slight with only about a few hundreds of increase or decrease per quarter. However, the biggest challenge in analyzing the data with Table 1 is that the values of NA are unknown. From the pattern of social housing we can observe in Table 1, the values of NA could either be significantly larger or smaller, which would change the pattern of the housing units. Although, we can also assume using the visible values that the values of NA could be somewhere around the similar range of 85000 to 87000, but regardless, no drastic change in number of social housing units indicates a level of provision for housing by the City.

On the other hand, the affordable housing number of units are significantly lower than the social housing units, where the data range for the column is within 6000 to 8000 units. Unlike the social housing units, all data values for the affordable housing are present, where we can account for the number of units in 2020. In Q1 2020, the number of affordable housing units were at the lowest for the data set, which would then reached the highest number of units in Q3 2022 at 7729 units.



(a) Social Housing

(b) Affordable Housing

Figure 1: Types of housing

In Figure 1.a, the bar graph shows the pattern of the number of social housing units from Q1 2020 to Q3 2023. However, the first four quarters, the year 2020, does not result with any data. The data values being NA has resulted for the graph to display as there are no social housing units established in the year 2020, however, that may or may not be the case as the data are nowhere to be found. Regardless, Figure 1.a does not accurately represent the number of social housing units in Toronto over time, however from Q1 2021 to Q3 2022, the bar graph presents the data of social housing to be consistent over time, highlighting the City's ensuring that the number of units were kept consistent to not drop below the 85000 units mark. With almost all six data values being the same height, we can confirm that the number of social housing units from 2021 to 2022 remains the same with no significant differences that could impact the pattern of social housing data.

Referring to Figure 2.b, the most prominent detail that can be observed is the slight increase in number of affordable housing units over time from Q1 2020 to Q3 2022. From 6101 units in beginning of 2020 to 7729 units in Q3 2022, the number of affordable housing has slightly rises with increase of about 20 to 200 new affordable units per quarter. As for now, the bar graph in Figure 2.b shows a slight left skewed trend in affordable housing units, however, with more variables, the skewness could be more significant. This tells us that the City's initiative to mitigate expensive housing cost is productive, based on the trend of the increase of 1800 new affordable units within 2020 to 2022.

Section 3: References

[@citeR]

[@citetidyverse]

[@tellingstories]

[@citeODT]

[@citeHousingData]

[@citeReadR]

[@citeAER]

[@citejanitor]

[@citeknitR1] [@citeknitR2] [@citeknitR3]

[@citeggplot2]

[@pinki2019housing]

[@Toronto2023]

[1]

Section 4: Appendix

Upon importing the raw data, the process of data cleaning will be commenced in this stage of the paper. Data cleaning is an early stage in data analysis where it involves the identification and correction of errors, inconsistencies, outlines, and missing data that may affect the data set's quality and reliability.

The data cleaning process for this analysis include:

- Get an overview of the data set by using a data frame displaying the raw data with the variables and columns included in the data set.
- Inspect the data types and data structure of the data set, as well as the statistical properties of the variables.
- Reformat column names to be more consistent, organized, and user friendly.
- Change the housing units data from character data type to a numerical data type to ensure producibility with graphs and analysis.

[1] https://github.com/brndnjbenson/Toronto_Housing_unit_2020_2022.git