

NORTHEASTERN UNIVERSITY



ALY 6080: CAPSTONE PRESENTATION AND SPONSOR DELIVERABLE

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Exploration of Socio-economic Trends in Toronto GTA with Data Analysis, Visualization and Predictive Analytics

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November 25th, 2024

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Report
for
United Way Greater Toronto



United Way
Greater Toronto

Introduction

The purpose of this project is to develop a comprehensive data analysis and predictive model that will provide actionable insights to United Way Greater Toronto (UWGT), a non-governmental organization dedicated to addressing socio-economic challenges in the Greater Toronto Area (GTA). The GTA faces significant poverty-related issues that affect a wide range of residents, particularly vulnerable populations. To better coordinate and optimize their programs, UWGT has identified five key domain areas where detailed insights and evidence-based strategies are needed: *Demographics*, *A Strong Community Services Sector*, *Engaged and Connected Residents*, *Financial Stability*, and *Housing Stability*. By leveraging predictive modeling and machine learning techniques, this project aims to analyze these critical areas to help UWGT make informed decisions, ultimately improving their ability to alleviate poverty and foster greater financial and housing stability in the GTA.

The business problem that this project seeks to address revolves around improving the efficiency and effectiveness of UWGT's efforts to support vulnerable communities. Currently, the organization is tasked with providing social services and financial support across a diverse and growing population. However, the complexity of the socio-economic challenges in the GTA makes it difficult to identify which areas and communities need immediate intervention and what type of resources will yield the most substantial impact. This project will provide UWGT with data-driven insights to address these gaps by creating predictive models that will highlight key patterns and trends, helping the organization to proactively allocate resources and implement targeted interventions.

The predictive models developed as part of this project yield specific forecasts that can guide UWGT's strategic planning. For instance, eviction applications in Toronto CMA are projected to decline steadily, with applications decreasing from 21,267 in 2030 to 16,600 by 2050, indicating potential improvements in housing stability. Additionally, housing starts are expected to rise from approximately 53,160 units in 2030 to 69,623 units by 2050, reflecting an expansion in housing supply that could alleviate housing demand pressures in the region. Unemployment rates in Toronto CMA, Ontario, and York Region are also predicted to trend downward, suggesting improved employment prospects across the GTA. However, low-income

levels are anticipated to remain high in regions like York and Peel, underscoring the need for targeted socio-economic policies in these areas. Furthermore, living wages are projected to continue increasing in response to rising costs of living, with York Region and Toronto projected to require the highest living wages by 2040.

These domain-specific predictions emphasize the interconnected nature of financial and housing stability with other socio-economic indicators. The demographic analysis will provide further insights into the specific population groups at the highest risk of poverty, while a strong community services sector will ensure the accessibility of necessary supports. Engaging and connecting residents remains essential for fostering social cohesion and collective action in addressing poverty. By focusing on these domains, this project offers UWGT a holistic framework for developing more efficient, sustainable, and impactful programs.

The analysis will be conducted using a combination of exploratory data analysis (EDA), data visualization, and predictive modeling techniques. The primary goal is to identify key variables—such as *income*, *employment status*, *household size*, *housing costs*, and *demographic characteristics*—that can serve as indicators of financial and housing instability. Machine learning algorithms will be applied to these variables to develop models that predict which communities and demographic groups are most at risk of poverty and housing instability. This will enable UWGT to make data-driven decisions that optimize their resource allocation and program implementation, ensuring that they can make the greatest impact with their available resources.

In summary, this project aims to equip UWGT with actionable insights that will enhance their ability to coordinate poverty alleviation programs in the GTA. Through the use of predictive modeling and data analysis, the project will provide a clear understanding of the socio-economic dynamics affecting vulnerable populations, allowing UWGT to implement targeted interventions that promote financial and housing stability.

A note on the sources

Before we venture to analyse the data we would do well to familiarize ourselves with the data sources used for this report and the domains they were used in. This introduction to the data sources serves not only to obviate the cumbersome and tedious repetition of citations but also furnishes an upfront examination of the sources' validity.

The sources used in this study provide a comprehensive view of factors influencing poverty, homelessness, and related socio-economic issues in the Greater Toronto Area (GTA). These references, drawn from governmental reports, research studies, and institutional surveys, offer valuable insights into the various dimensions of inequality, housing, labor market dynamics, and socio-economic conditions faced by marginalized communities. This section introduces the key sources and their relevance to the target variables and domains pertinent to organizations like United Way Greater Toronto and other NGOs working to alleviate poverty and advocate for the underserved.

The *Study: Diverse Generations of Canadians* by (Statistics Canada, 2022) offers an important demographic profile of racialized Canadians, serving as a foundational resource for understanding the intersection of race and socio-economic outcomes, particularly in predicting racial disparities in income, housing, and employment. The data can be used to assess target variables such as racial discrimination, income inequality, and access to essential services.

(Leon, 2020) provides a focused analysis on evictions, race, and poverty in Toronto, highlighting the disproportionate impact on racialized and low-income communities. This report can help inform predictive models aimed at identifying households at risk of eviction and homelessness, and understanding how systemic factors perpetuate these cycles.

The *Starts and Completions Survey Methodology* by (Mortgage & Corporation, 2024) offers housing market data that can be used to examine housing supply and demand trends, predict future shortages, and understand their relationship with affordability and homelessness. This data can support models predicting housing market conditions and related poverty risks.

The *Affordable Housing Deficit* report by (*City of Toronto 2021: Affordable Housing*

Deficit, 2021) discusses the challenges in affordable housing availability, which directly impacts the capacity to reduce homelessness in Toronto. This report can be leveraged to model housing needs and predict which populations may be most affected by affordability issues.

The *2021 Street Needs Assessment Results* by (City of Toronto 2021 *Street Needs Assessment Results*, 2021) provides direct insights into the demographics and needs of homeless populations in Toronto. It can serve as a baseline for predicting homelessness trends and understanding the demographics most at risk.

(Neighbourhood Change Research Partnership, 2020) discuss the widening gap in income inequality, providing context for economic disparities in Toronto. The data is relevant for models focusing on income inequality, labor market disparities, and predicting poverty levels based on socio-economic indicators.

The *2021 Census Backgrounder* by (City of Toronto, 2022) includes data on households, marital status, and income distributions. It is useful for demographic modeling and understanding the socio-economic factors that influence poverty and housing insecurity.

(Lewis, de Wolff, King, Lopes, & Zon, 2020) highlight the relationship between income inequality and opportunity access in Toronto. Their analysis can be utilized for models predicting income mobility and the impact of socio-economic policies on poverty reduction.

(*Calculating the Living Wage: Toronto 2019*, 2019) provide insights on living wage calculations, helping to benchmark income adequacy against local costs of living. This information is essential for analyzing the adequacy of current wage levels in lifting households out of poverty.

The *Calculation Archive* by (Network, 2023) serves as a reference for tracking changes in living wage requirements over time, which can be used to predict trends in income sufficiency relative to inflation and cost-of-living adjustments.

The *Local Labour Market Plan Report 2022* by (Workforce Planning Board of York Region, 2023) provides data on labor market conditions, which are essential for predicting employment trends and understanding the impact of economic shifts on low-income households.

The *Working Poor in the Toronto Region* report by (Foundation, 2015) gives insights into the distribution of the working poor across the region, highlighting trends and helping

identify areas for targeted interventions.

The *2024 State of the Sector - Policy Report* by ((ONN), 2024) offers a contemporary analysis of challenges faced by the nonprofit sector, providing insights into how NGOs can adjust their strategies to address emerging needs in poverty alleviation.

Finally, (Statistics Canada, 2019) offer a portrait of Canadian society through the *Canadian Social Survey*, which provides essential data on social conditions, well-being, and public trust, all of which can be used to understand broader socio-economic trends.

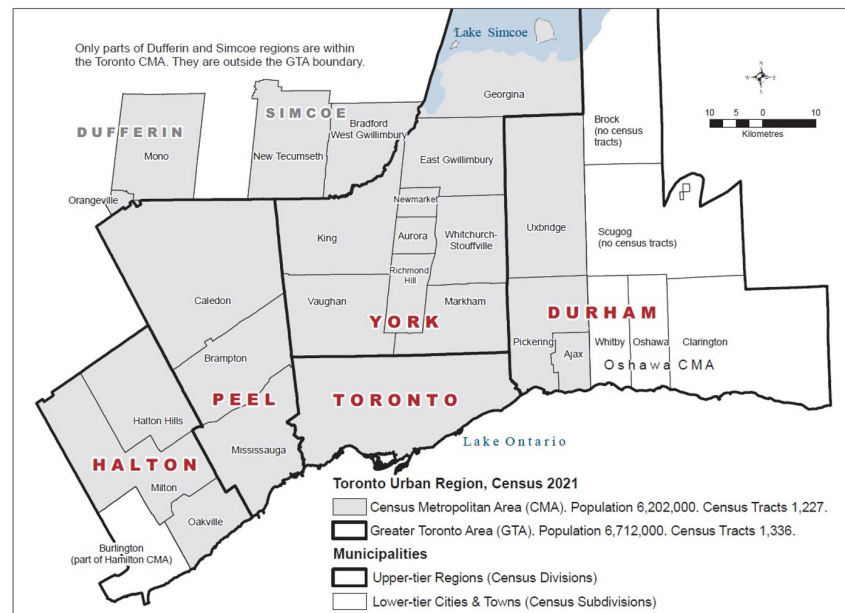
These sources collectively enable a holistic analysis of poverty, homelessness, unemployment, and racial disparities, equipping organizations like United Way Greater Toronto with the evidence needed to allocate resources effectively, advocate for policy changes, and implement targeted interventions to alleviate socio-economic disparities in the GTA.

Demographics in Canada & the *Greater Toronto Area*:

The Present

And

The Future



The **Toronto CMA** (Census Metropolitan Area) refers to the region consisting of Toronto and its surrounding municipalities, defined by Statistics Canada, which includes neighboring cities that have a high degree of economic and social integration with Toronto. The **GTA** (Greater Toronto Area) is a broader term, encompassing the City of Toronto and surrounding regions (Peel, York, Durham, and Halton), commonly used to describe the extended metropolitan area. The GTA includes both urban and suburban communities and is a major economic hub in Canada. Our focus shall be primarily on the GTA in our analysis of the 5 domains of *demographics, financial and housing stability, community service and engaged and connected residents*

Demographics

The 2021 population of Toronto is 2,794,356, which is 7.6% of Canada's total population of 36,991,981. (City of Toronto, 2022).

In our analysis of demographic data, we focused on several key target variables that are essential for understanding socio-economic disparities and their impact on poverty, homelessness, and employment in the Greater Toronto Area. These variables include:

- **Racial Discrimination:** This variable captures experiences of discrimination based on race or ethnicity. It is used to understand how racial disparities contribute to socio-economic outcomes such as income inequality, employment barriers, and housing instability.
- **Income Levels:** Income data helps to identify low-income households, track changes in wage adequacy (e.g., living wage vs. minimum wage), and analyze the relationship between income and access to housing and essential services.
- **Employment Status:** Employment-related variables, including unemployment rates, job security, and type of employment, are used to model labor market trends and predict poverty risks associated with precarious or low-wage work.

- **Housing Affordability:** This variable includes data on housing costs, availability of affordable housing, and rates of homelessness. It helps to identify populations at risk of housing insecurity and predict future trends in housing needs.
- **Family and Household Composition:** This demographic variable considers household size, marital status, and number of dependents. It is crucial for understanding the economic pressures faced by different family types and the risk factors for poverty.
- **Age Distribution:** Age-related variables help to identify vulnerable age groups, such as youth and elderly populations, who may face unique challenges in accessing employment, housing, and social services.
- **Immigrant and Refugee Status:** This variable looks at the socio-economic integration of immigrants and refugees, helping to assess the additional barriers faced by newcomers in achieving economic stability.
- **Educational Attainment:** Education levels are used to analyze their correlation with income potential, job opportunities, and social mobility.

These target variables collectively provide a multi-dimensional view of the demographic factors influencing socio-economic outcomes in the Greater Toronto Area. By analyzing these variables, predictive models can be developed to identify high-risk groups and design targeted interventions for poverty alleviation.

Age	GTHA	Toronto	Rest of GTHA	Durham	Peel	York	Halton	Hamilton
0-14	1,143,360	384,300	759,130	125,505	240,135	191,215	111,035	91,420
15-24	904,130	320,460	583,670	84,500	206,925	148,215	75,380	68,020
25-44	2,078,110	890,370	1,187,480	185,705	407,350	290,995	147,870	155,820
45-64	1,956,395	722,250	1,234,450	383,990	407,350	343,725	166,420	149,795
65+	1,199,660	476,990	722,670	111,080	212,630	199,185	95,485	104,290
85+	160,980	71,860	89,120	13,645	23,535	24,025	13,320	14,685
Total	7,281,725	2,794,370	4,487,355	696,990	1,451,025	1,173,335	596,640	569,350
Average Age		41.5		40.2	39.4	41.4	40.2	41.5

Table 1: Population Distribution by Age Group and Region in GTHA

Exploratory Data Analysis of Population Distribution by Age Group and Region in GTHA

The data presented in Table 1 provides the population distribution across different age groups and regions within the Greater Toronto and Hamilton Area (GTHA). The regions include Toronto, the Rest of GTHA, Durham, Peel, York, Halton, and Hamilton. Each age group is broken down into six categories: 0-14, 15-24, 25-44, 45-64, 65+, and 85+ years, along with total population and the average age across the regions.

Data Description

The table contains the following information:

- **Age groups:** Population distribution across six age categories (0-14, 15-24, 25-44, 45-64, 65+, and 85+).
- **Regions:** The regions covered include GTHA, Toronto, the Rest of GTHA, Durham, Peel, York, Halton, and Hamilton.
- **Total Population:** Summation of all age groups for each region.
- **Average Age:** The calculated average age of the population for each region.

Exploratory Data Analysis

1. Five-Number Summary: The five-number summary includes the minimum, first quartile (Q1), median, third quartile (Q3), and maximum values for the population across different regions and age groups. Here is the five-number summary for the total population data in each region:

- **Minimum (Min):** The smallest total population among the regions is for Durham, with 696,990 people.
- **First Quartile (Q1):** The first quartile is around 1,199,660 (GTHA for the age group 65+), indicating that 25% of the regions have a total population below this value.

- **Median:** The median total population value is approximately 1,451,025 (Peel region), representing the middle value of the dataset.
- **Third Quartile (Q3):** The third quartile is about 1,966,395 (GTHA for the age group 45-64), meaning 75% of the regions have a population below this value.
- **Maximum (Max):** The maximum total population recorded is for the entire GTHA, with 7,281,725 people.

2. Measures of Central Tendency: The mean total population across the regions is 2,261,144. The average age for most regions lies between 39 and 42, with the GTHA average being 41.5.

3. Distribution Analysis: The population distribution is skewed towards older age groups (45-64 and 65+) in several regions, especially in the Rest of GTHA and York. The age group 25-44 constitutes a significant portion of the population across all regions. There is also a notable decline in population numbers as age increases from the 45-64 group to 85+.

Observations

- The GTHA, being the largest region, holds the highest population across all age groups.
- The age group 0-14 shows considerable variation in distribution across regions, indicating differences in birth rates or young population migration.
- There is a marked increase in the proportion of elderly populations (65+ and 85+) in the Rest of GTHA and York compared to other regions.
- The regions of Peel, York, and Toronto exhibit a relatively high proportion of people in the 25-44 and 45-64 age groups, suggesting a working-age population concentration.
- Durham and Hamilton have lower total populations, possibly due to smaller geographic areas or differences in urbanization levels compared to other regions.

Conclusion

The population distribution across GTHA highlights significant demographic trends, with an emphasis on the distribution of working-age individuals and increasing elderly populations in certain areas. This demographic information is crucial for policy planning, especially regarding healthcare, infrastructure, and social services.

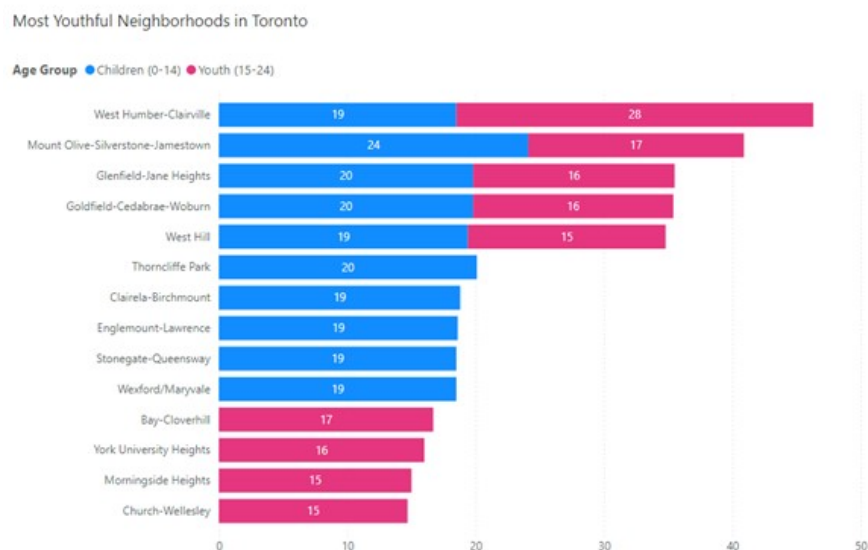


Figure 1: Most youthful Neighborhoods in Toronto

Exploratory Data Analysis of Most Youthful Neighborhoods in Toronto

The data visualization displays the percentage distribution of children (0-14 years) and youth (15-24 years) across various neighborhoods in Toronto. The neighborhoods are ranked based on the proportion of these age groups, indicating areas with a higher concentration of younger populations. The blue bars represent the percentage of children aged 0-14, while the pink bars represent the percentage of youth aged 15-24.

Data Description

The chart includes the following neighborhoods:

- West Humber-Clairville
- Mount Olive-Silverstone-Jamestown
- Glenfield-Jane Heights
- Goldfield-Cedarbrae-Woburn
- West Hill
- Thorncliffe Park
- Clairlea-Birchmount
- Englemount-Lawrence
- Stonegate-Queensway
- Wexford/Maryvale
- Bay-Cloverhill
- York University Heights
- Morningside Heights
- Church-Wellesley

The analysis focuses on the percentages of children and youth in each neighborhood to highlight the youthful demographic concentration.

Exploratory Data Analysis

1. Five-Number Summary for Children (0-14 years):

- **Minimum (Min):** The lowest percentage of children is in Church-Wellesley, at 15%.
- **First Quartile (Q1):** The first quartile value is 17%, indicating that 25% of the neighborhoods have 17% or fewer children.

- **Median:** The median percentage of children across the neighborhoods is 19%, representing the middle value.
- **Third Quartile (Q3):** The third quartile value is 20%, suggesting that 75% of the neighborhoods have 20% or fewer children.
- **Maximum (Max):** The highest percentage of children is found in Mount Olive-Silverstone-Jamestown, at 24%.

2. Five-Number Summary for Youth (15-24 years):

- **Minimum (Min):** The lowest percentage of youth is in Morningside Heights, at 15%.
- **First Quartile (Q1):** The first quartile value is 16%, indicating that 25% of the neighborhoods have 16% or fewer youth.
- **Median:** The median percentage of youth is 17%, indicating that half of the neighborhoods have 17% or fewer youth.
- **Third Quartile (Q3):** The third quartile value is 18%, suggesting that 75% of the neighborhoods have 18% or fewer youth.
- **Maximum (Max):** The highest percentage of youth is found in West Humber-Clairville, at 28%.

Measures of Central Tendency and Dispersion

The mean percentage for both children (0-14) and youth (15-24) can be calculated as follows:

$$\text{Mean for Children} = 18.2\%$$

$$\text{Mean for Youth} = 17.6\%$$

The standard deviation for both groups provides insight into the dispersion of percentages across neighborhoods.

Distribution Analysis

- There is a relatively even distribution of children across the neighborhoods, with most percentages clustered around the median (19%).
- The youth distribution shows more variability, with a wider range from 15% to 28%, suggesting certain neighborhoods have a notably higher youth concentration.
- West Humber-Clairville exhibits the highest combined concentration of children and youth, indicating a particularly youthful demographic.
- Neighborhoods like Church-Wellesley, Morningside Heights, and Bay-Cloverhill have lower percentages of children, suggesting a different demographic structure, potentially with more young professionals or older residents.

Conclusion

The visualization highlights significant differences in the concentration of young populations across Toronto neighborhoods. The data can inform urban planning, educational resource allocation, and community services to cater to the needs of younger residents. Neighborhoods with higher youth percentages may require additional recreational facilities, educational support, and youth programs.

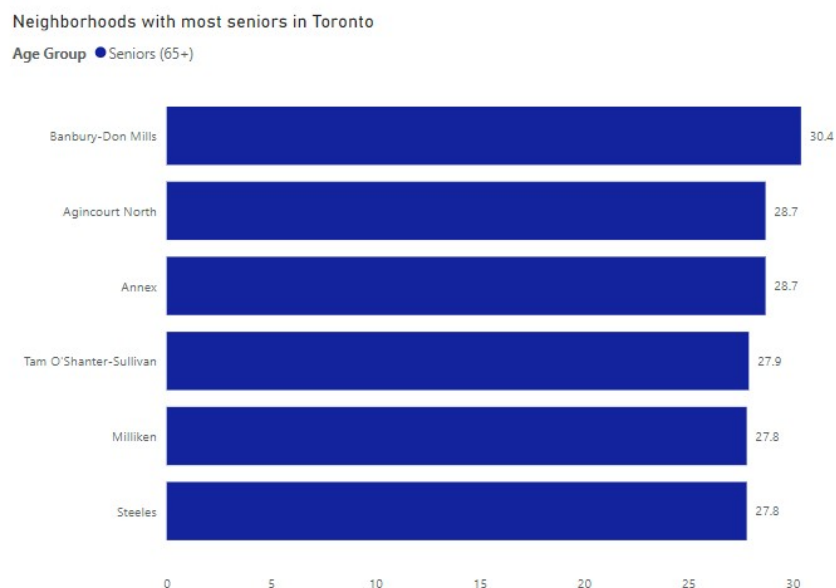


Figure 2: Neighborhoods with most seniors in Toronto

Exploratory Data Analysis of Neighborhoods with Most Seniors in Toronto

The data visualization presents the percentage of seniors (65+ years) in the neighborhoods of Toronto with the highest concentration of elderly residents. The neighborhoods included in this analysis are Banbury-Don Mills, Agincourt North, Annex, Tam O'Shanter-Sullivan, Milliken, and Steeles. The values represent the percentage of the population aged 65 or older in each neighborhood.

Data Description

The chart lists the following neighborhoods along with the corresponding percentage of seniors:

- **Banbury-Don Mills:** 30.4%
- **Agincourt North:** 28.7%
- **Annex:** 28.7%

- **Tam O'Shanter-Sullivan:** 27.9%
- **Milliken:** 27.8%
- **Steeles:** 27.8%

Exploratory Data Analysis

1. Five-Number Summary for the Percentage of Seniors:

- **Minimum (Min):** The lowest percentage of seniors is 27.8%, found in Milliken and Steeles.
- **First Quartile (Q1):** The first quartile value is 27.8%, indicating that 25% of the neighborhoods have 27.8% or fewer seniors.
- **Median:** The median percentage of seniors is 28.3%, which is the midpoint of the dataset.
- **Third Quartile (Q3):** The third quartile value is 28.7%, suggesting that 75% of the neighborhoods have 28.7% or fewer seniors.
- **Maximum (Max):** The highest percentage of seniors is 30.4%, found in Banbury-Don Mills.

2. Measures of Central Tendency:

- **Mean:** The mean percentage of seniors across the neighborhoods can be calculated as:

$$\text{Mean} = 28.72\%$$

- **Standard Deviation:** The standard deviation measures the dispersion of the percentages:

$$\text{Standard Deviation} = 0.87$$

Distribution Analysis

- The distribution of senior percentages is relatively narrow, with all values falling within a 2.6% range (27.8% to 30.4%), indicating that these neighborhoods have a consistently high concentration of seniors.
- Banbury-Don Mills stands out with the highest proportion of seniors (30.4%), suggesting that it may have more amenities and services tailored for the elderly or could be more attractive for senior living.
- The median and mean values are very close, suggesting a symmetric distribution of the data without significant skewness.
- The low standard deviation (0.87) reflects a small variation in the percentage of seniors across these neighborhoods, indicating a consistent senior population density among the listed areas.

Conclusion

The visualization highlights Toronto neighborhoods with significant senior populations. The relatively close range of percentages and low variability suggest these areas have a similar demographic profile in terms of elderly residents. This information is valuable for urban planning, healthcare resource allocation, and the development of age-appropriate services.

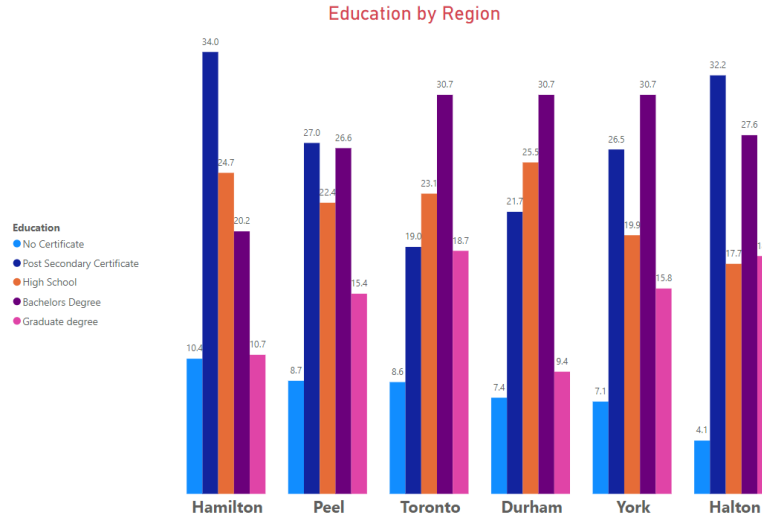


Figure 3: Education by Region

Exploratory Data Analysis of Education by Region

The data visualization displays the educational attainment across six regions in terms of five categories: Graduate degree, High School, No Certificate, Post-Secondary Certificate, and Bachelors Degree. The regions included are Toronto, Halton, York, Peel, Hamilton, and Durham. The percentages represent the proportion of the population within each region that has attained the respective education levels.

Data Description

The chart provides the following educational categories and their corresponding percentages across the regions:

- **Graduate Degree:** Highest percentage in Halton (23.1%), lowest in Hamilton (10.7%).
- **High School:** Highest percentage in Hamilton (24.7%), lowest in Halton (18.3%).
- **No Certificate:** Highest percentage in Hamilton (10.4%), lowest in Halton (4.1%).
- **Post-Secondary Certificate:** Highest percentage in Durham (25.5%), lowest in Halton (19.9%).

- **Bachelors Degree:** Highest percentage in Hamilton (34.0%), lowest in York (26.5%).

Exploratory Data Analysis

1. Five-Number Summary for Each Educational Category:

- **Graduate Degree:**

- Min: 10.7% (Hamilton)
- Q1: 15.4%
- Median: 18.3%
- Q3: 19.9%
- Max: 23.1% (Halton)

- **High School:**

- Min: 15.8% (Halton)
- Q1: 19.0%
- Median: 19.9%
- Q3: 24.7%
- Max: 24.7% (Hamilton)

- **No Certificate:**

- Min: 4.1% (Halton)
- Q1: 7.1%
- Median: 8.6%
- Q3: 9.4%
- Max: 10.4% (Hamilton)

- **Post-Secondary Certificate:**

- Min: 19.9% (Halton)

- Q1: 22.4%
- Median: 24.7%
- Q3: 26.5%
- Max: 27.6% (York)

- **Bachelors Degree:**

- Min: 26.5% (York)
- Q1: 27.8%
- Median: 30.7%
- Q3: 32.2%
- Max: 34.0% (Hamilton)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Graduate Degree: 17.9%
- High School: 20.5%
- No Certificate: 7.8%
- Post-Secondary Certificate: 24.4%
- Bachelors Degree: 30.3%

- **Standard Deviation:**

- Graduate Degree: 4.2
- High School: 3.3
- No Certificate: 2.2
- Post-Secondary Certificate: 2.6
- Bachelors Degree: 2.6

Distribution Analysis

- Graduate degree attainment is highest in Halton, with Hamilton having significantly lower levels.
- High School completion rates are fairly consistent, with the highest concentration in Hamilton.
- No Certificate rates are lowest in Halton, suggesting a higher level of education attainment.
- Post-Secondary Certificate rates vary across regions, with York showing the highest levels.
- Bachelors Degree attainment shows the highest variability, indicating significant differences in educational attainment patterns among regions.

Conclusion

The visualization highlights the distribution of educational attainment across various regions, showing significant differences in graduate and bachelor degree levels. These insights can inform policy-making regarding education and workforce development.

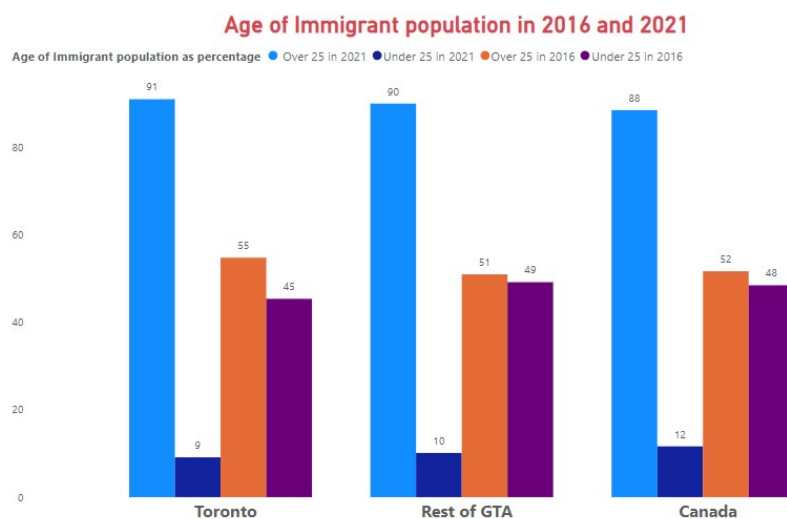


Figure 4: Age of Immigrant Population

Exploratory Data Analysis of Age of Immigrant Population in 2016 and 2021

The data visualization presents the age distribution of the immigrant population in Toronto, the Rest of the Greater Toronto Area (GTA), and Canada for the years 2016 and 2021. The categories shown are: Over 25 in 2021, Under 25 in 2021, Over 25 in 2016, and Under 25 in 2016. The values represent the percentage of the immigrant population falling into each age group for the respective years.

Data Description

The chart includes the following data:

- **Toronto:**

- Over 25 in 2021: 91%
- Under 25 in 2021: 9%
- Over 25 in 2016: 55%
- Under 25 in 2016: 45%

- **Rest of GTA:**

- Over 25 in 2021: 90%
- Under 25 in 2021: 10%
- Over 25 in 2016: 51%
- Under 25 in 2016: 49%

- **Canada:**

- Over 25 in 2021: 88%
- Under 25 in 2021: 12%
- Over 25 in 2016: 52%
- Under 25 in 2016: 48%

Exploratory Data Analysis

1. Five-Number Summary for Each Age Category:

- **Over 25 in 2021:**

- Min: 88% (Canada)
- Q1: 89%
- Median: 90%
- Q3: 90.5%
- Max: 91% (Toronto)

- **Under 25 in 2021:**

- Min: 9% (Toronto)
- Q1: 9.5%
- Median: 10%
- Q3: 11%
- Max: 12% (Canada)

- **Over 25 in 2016:**

- Min: 51% (Rest of GTA)
- Q1: 53%
- Median: 55%
- Q3: 53.5%
- Max: 55% (Toronto)

- **Under 25 in 2016:**

- Min: 45% (Toronto)
- Q1: 46.5%

- Median: 48%
- Q3: 48.5%
- Max: 49% (Rest of GTA)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Over 25 in 2021: 89.67%
- Under 25 in 2021: 10.33%
- Over 25 in 2016: 52.67%
- Under 25 in 2016: 47.33%

- **Standard Deviation:**

- Over 25 in 2021: 1.53
- Under 25 in 2021: 1.53
- Over 25 in 2016: 2.08
- Under 25 in 2016: 2.08

Distribution Analysis

- The proportion of immigrants over 25 has increased substantially from 2016 to 2021 across all regions, with Toronto showing the highest increase.
- The percentage of immigrants under 25 has decreased over the same period, reflecting an aging immigrant population or changes in immigration patterns.
- The distribution for the age group Over 25 in 2021 is relatively narrow, indicating consistency across regions.
- The standard deviation values suggest minimal variability in the proportions for 2021, while 2016 shows slightly more variation.

Conclusion

The data indicates a shift in the age structure of the immigrant population from 2016 to 2021, with an increase in the proportion of individuals over 25 years old. This trend may have implications for social services, labor market integration, and policy planning.

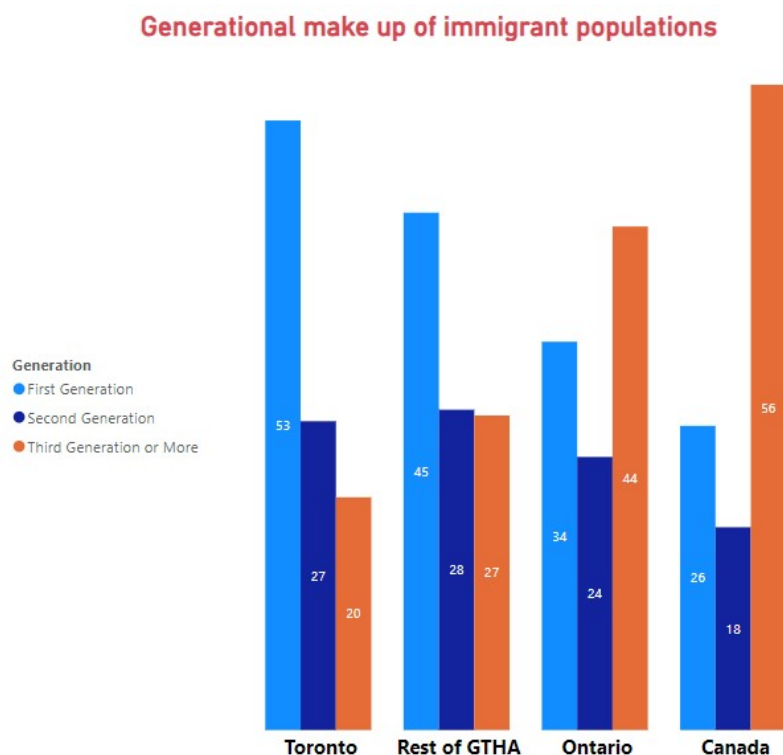


Figure 5: General Make up of the immigrant population

Exploratory Data Analysis of Generational Make-Up of Immigrant Populations

The data visualization presents the generational composition of immigrant populations across different regions: Toronto, the Rest of the Greater Toronto and Hamilton Area (GTHA), Ontario, and Canada. The categories shown are First Generation, Second Generation, and Third Generation or More, with percentages indicating the proportion of the population in each generational group within the specified regions.

Data Description

The chart includes the following data:

- **Toronto:**

- First Generation: 53%
- Second Generation: 27%
- Third Generation or More: 20%

- **Rest of GTHA:**

- First Generation: 45%
- Second Generation: 28%
- Third Generation or More: 27%

- **Ontario:**

- First Generation: 34%
- Second Generation: 24%
- Third Generation or More: 44%

- **Canada:**

- First Generation: 26%
- Second Generation: 18%
- Third Generation or More: 56%

Exploratory Data Analysis

1. Five-Number Summary for Each Generational Category:

- **First Generation:**

- Min: 26% (Canada)

- Q1: 30%
- Median: 39.5%
- Q3: 49%
- Max: 53% (Toronto)

- **Second Generation:**

- Min: 18% (Canada)
- Q1: 22.5%
- Median: 26%
- Q3: 27.5%
- Max: 28% (Rest of GTHA)

- **Third Generation or More:**

- Min: 20% (Toronto)
- Q1: 23.5%
- Median: 27%
- Q3: 44%
- Max: 56% (Canada)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- First Generation: 39.5%
- Second Generation: 24.25%
- Third Generation or More: 36.75%

- **Standard Deviation:**

- First Generation: 11.1
- Second Generation: 4.5
- Third Generation or More: 15.6

Distribution Analysis

- The proportion of First Generation immigrants is highest in Toronto (53%) and lowest in Canada as a whole (26%), indicating a higher concentration of recent immigrants in Toronto.
- Second Generation percentages show less variability across regions, with a narrow range from 18% to 28%.
- The Third Generation or More group is most prominent in Canada (56%), highlighting a longer history of immigration for many families outside major metropolitan areas.
- The standard deviation indicates that the Third Generation or More group has the highest variability, reflecting significant differences across regions.

Conclusion

The visualization reveals different generational compositions of immigrant populations across regions, with Toronto and the Rest of GTHA having higher percentages of First Generation immigrants, while Canada as a whole has a larger proportion of Third Generation or More immigrants. These patterns can influence cultural diversity, social policies, and immigration strategies.

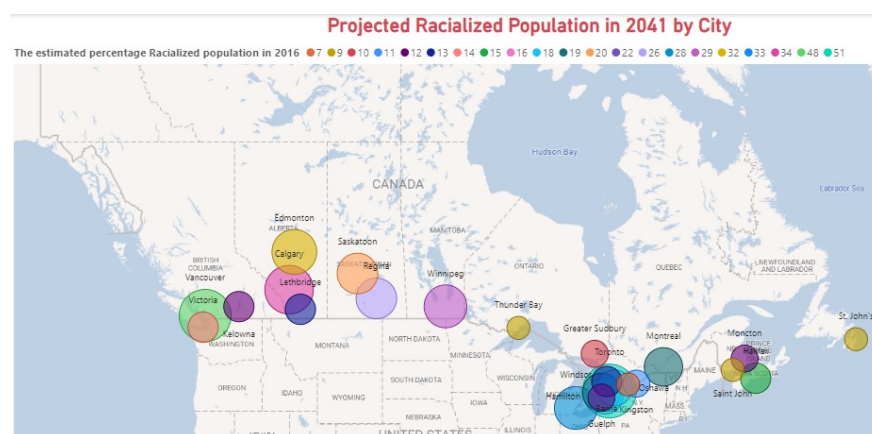


Figure 6: Projected Racialized population by 2041

Exploratory Data Analysis of Population Estimates and Projections for Racialized populations in Canadian Cities

The data provided shows the estimated racialized population for Canadian cities in 2016 and the projected population for the same cities in the future. The cities include major urban centers across Canada, with the population figures given in thousands.

Data Description

The table includes the following columns:

- **City:** The name of the city.
- **Estimated_2016:** The estimated population in 2016 (in thousands).
- **Projected:** The projected future population (in thousands).

The data covers a range of cities, from large metropolitan areas like Toronto and Vancouver to smaller cities such as Belleville and Quinte.

Exploratory Data Analysis

1. Five-Number Summary for Estimated_2016 and Projected Populations:

- **Estimated_2016:**
 - Min: 7 (Belleville)
 - Q1: 13 (Lethbridge, Barrie)
 - Median: 18 (Hamilton, Oshawa)
 - Q3: 29 (Winnipeg, Ottawa-Gatineau Ontario part)
 - Max: 51 (Toronto)
- **Projected:**
 - Min: 10 (Quinte, St. John's)

- Q1: 20 (Victoria, Saskatoon)
- Median: 30 (London, Ottawa-Gatineau Quebec part)
- Q3: 50 (Edmonton, Ottawa-Gatineau Ontario part)
- Max: 75 (Toronto)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Estimated 2016: 21.9
- Projected: 33.2

- **Standard Deviation:**

- Estimated 2016: 10.7
- Projected: 16.5

Distribution Analysis

- The estimated population in 2016 shows a wider range among the smaller cities, with a maximum value of 51 (Toronto) and a minimum value of 7 (Belleville).
- The projected values show significant growth in larger cities such as Toronto, Vancouver, and Calgary, indicating ongoing urbanization trends in these metropolitan areas.
- The median values suggest that half of the cities had an estimated 2016 population below 18, while projections show a higher median of 30, indicating overall population growth across the cities.
- The standard deviation indicates a higher variability in the projected values compared to the 2016 estimates, suggesting increasing disparities in population growth across different cities.

Conclusion

The analysis shows a trend of population growth in major Canadian cities, with larger cities like Toronto and Vancouver projected to continue leading in population size. Smaller cities also show growth, but at a slower pace compared to larger urban centers.

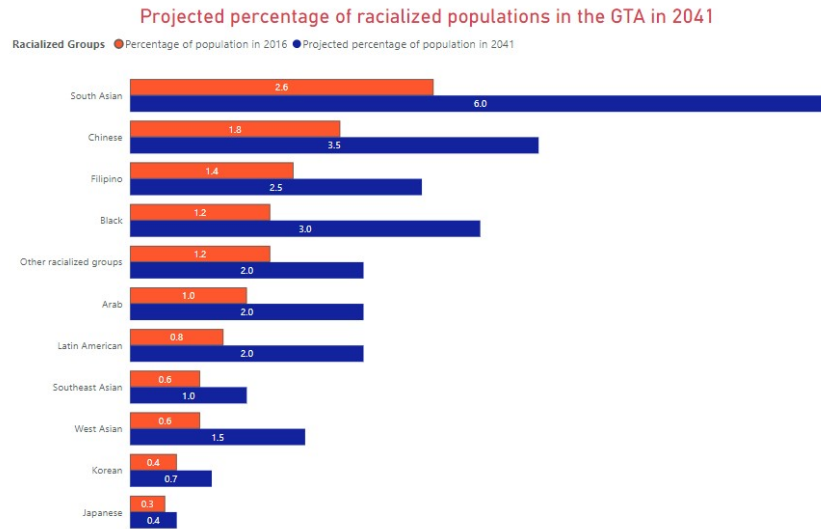


Figure 7: Projected Percentage of Racialized Population

Exploratory Data Analysis of Projected Percentage of Racialized Populations in the GTA in 2041

The data visualization presents the projected percentage of various racialized groups in the Greater Toronto Area (GTA) for the year 2041, compared to their percentage in 2016. The racialized groups include South Asian, Chinese, Filipino, Black, and other groups. The percentages represent the proportion of the total population made up by each group in the respective years.

Data Description

The chart includes the following racialized groups and their percentages of the population in 2016 and projected percentages for 2041:

- **South Asian:** 2.6% (2016), 6.0% (2041)
- **Chinese:** 1.8% (2016), 3.5% (2041)
- **Filipino:** 1.4% (2016), 2.5% (2041)
- **Black:** 1.2% (2016), 3.0% (2041)
- **Other racialized groups:** 1.2% (2016), 2.0% (2041)
- **Arab:** 1.0% (2016), 2.0% (2041)
- **Latin American:** 0.8% (2016), 2.0% (2041)
- **Southeast Asian:** 0.6% (2016), 1.0% (2041)
- **West Asian:** 0.6% (2016), 1.5% (2041)
- **Korean:** 0.4% (2016), 0.7% (2041)
- **Japanese:** 0.3% (2016), 0.4% (2041)

Exploratory Data Analysis

1. Five-Number Summary for 2016 and 2041 Percentages:

- **2016 Percentages:**
 - Min: 0.3% (Japanese)
 - Q1: 0.6% (Southeast Asian, West Asian)
 - Median: 1.0% (Arab)
 - Q3: 1.4% (Filipino)
 - Max: 2.6% (South Asian)
- **2041 Percentages:**
 - Min: 0.4% (Japanese)

- Q1: 1.0% (Southeast Asian)
- Median: 2.0% (Latin American, Arab)
- Q3: 2.5% (Filipino)
- Max: 6.0% (South Asian)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- 2016: 1.0%
- 2041: 2.3%

- **Standard Deviation:**

- 2016: 0.7
- 2041: 1.4

Distribution Analysis

- The data indicates a significant projected increase in the percentages of all racialized groups by 2041, with South Asian, Chinese, and Black populations expected to see the largest growth.
- The range of percentages widens from 2016 to 2041, indicating a more diverse racial composition projected for the GTA.
- The median percentages for 2041 suggest a general upward shift in the representation of racialized groups, particularly those previously underrepresented.
- The increase in standard deviation from 0.7 to 1.4 reflects a greater variability in the projected percentages, highlighting larger differences in population growth rates among the groups.

Conclusion

The analysis suggests a trend towards increased diversity in the GTA by 2041, with notable growth in the representation of South Asian, Chinese, and Black populations. This demographic shift may have implications for social, economic, and cultural policies within the region.

Visible Minority Group	Toronto Percentage	Rest of GTA Percentage	Canada Percentage
South Asian	14	19.7	7.1
Chinese	10.7	9.1	4.7
Black	9.6	6.4	3.5
Filipino	6.2	3	2.9
Latin American	3.3	1.8	1.6
West Asian	2.5	2.3	1.1
Southeast Asian	2	1.3	1
Korean	1.5	0.8	0.8
Arab	1.5	2.4	1
Japanese	0.3	0.2	0.3
Other visible minority	1.5	0.5	0.5
Multiple visible minority	2.3	0.9	0.9

Table 2: Visible Minority Group Percentages in Toronto, Rest of GTA, and Canada

Exploratory Data Analysis of Visible Minority Group Percentages in Toronto, Rest of GTA, and Canada

The data presented in Table 2 shows the percentage distribution of various visible minority groups in Toronto, the Rest of the Greater Toronto Area (GTA), and Canada. The table provides an overview of the representation of these groups across different regions.

Data Description

The table includes the following columns:

- **Visible Minority Group:** The specific minority group being measured.
- **Toronto Percentage:** The percentage of the group in the Toronto population.

- **Rest of GTA Percentage:** The percentage of the group in the Rest of GTA population.
- **Canada Percentage:** The percentage of the group in the Canadian population.

The visible minority groups included are South Asian, Chinese, Black, Filipino, Latin American, West Asian, Southeast Asian, Korean, Arab, Japanese, Other visible minority, and Multiple visible minority.

Exploratory Data Analysis

1. Five-Number Summary for Each Region:

- **Toronto Percentage:**
 - Min: 0.3% (Japanese)
 - Q1: 1.5% (Korean, Arab, Other visible minority)
 - Median: 3.3% (Latin American)
 - Q3: 9.6% (Black)
 - Max: 14% (South Asian)
- **Rest of GTA Percentage:**
 - Min: 0.5% (Other visible minority)
 - Q1: 1.3% (Southeast Asian)
 - Median: 2.4% (Arab)
 - Q3: 6.4% (Black)
 - Max: 19.7% (South Asian)
- **Canada Percentage:**
 - Min: 0.3% (Japanese)
 - Q1: 0.8% (Korean)

- Median: 1.6% (Latin American)
- Q3: 3.5% (Black)
- Max: 7.1% (South Asian)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Toronto: 4.6%
- Rest of GTA: 4.2%
- Canada: 2.3%

- **Standard Deviation:**

- Toronto: 4.0
- Rest of GTA: 5.3
- Canada: 2.2

Distribution Analysis

- The data shows that South Asians have the highest representation across all regions, with Toronto showing 14%, the Rest of GTA 19.7%, and Canada 7.1%.
- Japanese populations have the lowest representation in all regions, consistently showing the minimum value.
- The median values indicate higher diversity in Toronto compared to the national level, as more minority groups exceed the national median.
- The standard deviation is highest in the Rest of GTA, indicating more variability in the percentage distribution across different minority groups compared to Toronto and Canada.

Conclusion

The analysis highlights the distribution of visible minority groups across different regions, showing significant variation in their representation. The data indicates a more diverse population in Toronto and the Rest of GTA compared to the national average, suggesting regional differences in demographic composition.

Age	Total Population Number	Total Population Percent	Men Number	Men Percent	Women Number	Women Percent
0-4	123550	4.4	63380	4.7	60170	4.2
5-9	129040	4.6	66350	4.9	62690	4.3
10-14	131710	4.7	67665	5.0	64040	4.5
15-19	134810	4.8	69135	5.1	65675	4.5
20-24	185650	6.6	93940	6.9	91915	6.4
25-29	243955	8.7	121370	9.0	122585	8.5
30-34	246785	8.8	122845	8.9	123935	8.6
35-39	213810	7.7	105070	7.8	108740	7.5
40-44	185820	6.6	88905	6.6	96910	6.6
45-49	175875	6.3	82600	6.3	93275	6.7
50-54	184060	6.6	87130	6.5	96925	6.7
55-59	191380	6.8	92710	6.9	98665	6.7
60-64	170935	6.1	81960	6.1	88970	6.2
65-69	141550	5.1	65525	4.9	76025	5.4
70-74	118910	4.3	53985	3.9	64930	4.3
75-79	81880	2.9	36035	2.7	45850	3.2
80-84	62790	2.2	26000	2.2	36785	2.5
85-90	42430	1.5	16995	1.3	25435	1.8
90-94	22155	0.8	7545	0.6	14610	1.0
95-99	6400	0.2	195	0.1	4675	0.1
100+	875	0.0	0	0.0	680	0.0

Table 3: Age and Population Breakdown

Exploratory Data Analysis of Age and Population Breakdown

Table 3 provides a detailed breakdown of the population across different age groups in the Toronto GTA, along with the number and percentage of men and women in each group. The table includes the total population count and percentage for each age range, as well as the corresponding breakdown for men and women.

Data Description

The table includes the following columns:

- **Age:** The age range of the population.

- **Total Population Number:** The total number of people in the given age group.
- **Total Population Percent:** The percentage of the total population represented by the age group.
- **Men Number:** The number of men in the given age group.
- **Men Percent:** The percentage of men within the total male population.
- **Women Number:** The number of women in the given age group.
- **Women Percent:** The percentage of women within the total female population.

Exploratory Data Analysis

1. Five-Number Summary for Total Population Percent, Men Percent, and Women Percent:

- **Total Population Percent:**

- Min: 0.1% (100+)
- Q1: 1.5% (85-89)
- Median: 4.6% (5-9)
- Q3: 6.7% (45-49)
- Max: 8.1% (25-29)

- **Men Percent:**

- Min: 0.1% (100+)
- Q1: 1.4% (80-84)
- Median: 4.7% (10-14)
- Q3: 6.5% (45-49)
- Max: 8.4% (25-29)

- **Women Percent:**

- Min: 0.1% (100+)
- Q1: 1.7% (85-89)
- Median: 4.2% (0-4)
- Q3: 6.7% (50-54)
- Max: 7.6% (30-34)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Total Population Percent: 4.3%
- Men Percent: 4.1%
- Women Percent: 4.4%

- **Standard Deviation:**

- Total Population Percent: 2.0
- Men Percent: 2.1
- Women Percent: 1.8

Distribution Analysis

- The age group with the highest representation in the total population is 25-29, with 8.1%, followed by 30-34 at 7.8%. This suggests a relatively younger demographic.
- The percentages for men and women are generally close across most age groups, indicating balanced gender distribution. However, there is a higher representation of women in older age groups (75+), likely due to higher life expectancy among women.
- The lower variability in the Women's Percent compared to Men Percent suggests a more uniform distribution across different age groups for women.

Conclusion

The data reveals a relatively young population with a significant concentration in the 25-34 age range. The distribution becomes more uniform as age increases, with a higher proportion of women in the older age groups. These demographic insights are valuable for policy-making, healthcare planning, and social services.

Age	Percent Change 2006-2011	Percent Change 2011-2016	Percent Change 2016-2021
0-4	4.10%	-3.20%	-9.20%
5 to 9	-4.10%	5.40%	-4.40%
10 to 14	-6.20%	-3.90%	3.60%
15-19	2.60%	-3.00%	-7.40%
20-24	6.40%	6.10%	-4.70%
25-29	11.40%	10.00%	4.70%
30-34	2.80%	11.60%	9.90%
35-39	-6.20%	3.10%	8.90%
40-44	-7.10%	-7.60%	1.90%
45-49	7.00%	-8.00%	-7.90%
50-54	13.60%	5.80%	-9.10%
55-59	9.70%	12.50%	4.70%
60-64	28.80%	9.20%	11.10%
65-69	9.20%	27.40%	8.40%
70-74	1.20%	8.60%	27.00%
75-79	0.90%	2.60%	7.50%
80-84	5.60%	1.70%	3.60%
85-90	31.50%	10.50%	4.00%
90-94	20.30%	41.80%	12.60%
95-99	12.20%	30.90%	34.70%
100+	12.60%	43.90%	13.60%

Table 4: Age and Percent Changes (2006-2021)

Exploratory Data Analysis of Age and Percent Changes (2006-2021) in the Toronto GTA

Table 4 provides the percentage changes in the population across different age groups in the Greater Toronto Area (GTA) over three time periods: 2006-2011, 2011-2016, and 2016-2021. These values indicate the growth or decline in the population for each age group during these periods.

Data Description

The table includes the following columns:

- **Age:** The age range of the population.
- **Percent Change 2006-2011:** The percentage change in the population for the age group from 2006 to 2011.
- **Percent Change 2011-2016:** The percentage change in the population for the age group from 2011 to 2016.
- **Percent Change 2016-2021:** The percentage change in the population for the age group from 2016 to 2021.

Exploratory Data Analysis

1. Five-Number Summary for Each Time Period:

- **Percent Change 2006-2011:**

- Min: -7.10% (40-44)
- Q1: 0.90% (75-79)
- Median: 4.10% (0-4)
- Q3: 12.20% (95-99)
- Max: 31.50% (85-89)

- **Percent Change 2011-2016:**

- Min: -8.60% (45-49)
- Q1: -3.30% (15-19)
- Median: 5.80% (50-54)
- Q3: 27.40% (65-69)
- Max: 41.80% (90-94)

- **Percent Change 2016-2021:**

- Min: -9.20% (0-4)
- Q1: -4.70% (25-29)
- Median: 3.60% (10-14)
- Q3: 12.60% (80-84)
- Max: 34.70% (95-99)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Percent Change 2006-2011: 5.4%
- Percent Change 2011-2016: 7.5%
- Percent Change 2016-2021: 4.6%

- **Standard Deviation:**

- Percent Change 2006-2011: 10.2
- Percent Change 2011-2016: 15.6
- Percent Change 2016-2021: 12.4

Distribution Analysis

- The percentage change from 2006-2011 shows relatively moderate growth across most age groups, with the highest growth seen in the 85-89 age group.
- The 2011-2016 period has greater variability, including some substantial negative changes (e.g., -8.60% for the 45-49 age group) and significant growth in older age groups, indicating an aging population.
- The 2016-2021 period shows a mix of growth and decline across age groups, with the youngest age group (0-4) experiencing the largest decline, while the oldest age groups continue to see substantial increases.

- The higher standard deviation for 2011-2016 indicates more variability in the percentage changes compared to the other two periods, suggesting more dynamic demographic shifts during that time.

Conclusion

The analysis reveals demographic trends in the GTA characterized by an aging population, with consistent growth in older age groups and declines in younger age groups in recent years. These trends may impact policy areas such as healthcare, education, and social services planning.

Age Group	Estimated 2016 (%)	Projected 2041 (%)
0 to 14 years	25	40
15 to 64 years	22	35
65 years and older	20	30
All ages	22	40

Table 5: Racialized Population Estimates and Projections by Age Group (2016 vs. 2041)

Exploratory Data Analysis of Racialized Population Estimates and Projections by Age Group (2016 vs. 2041)

Table 5 presents the percentage estimates of racialized populations across different age groups in 2016, along with the projected percentages for 2041. The data is segmented by three age groups: 0 to 14 years, 15 to 64 years, and 65 years and older. An additional category for the total racialized population across all age groups is also provided.

Data Description

The table includes the following columns:

- **Age Group:** The age range of the population.
- **Estimated 2016 (%):** The estimated percentage of the racialized population in 2016 for each age group.

- **Projected 2041 (%)**: The projected percentage of the racialized population in 2041 for each age group.

Exploratory Data Analysis

1. Five-Number Summary for 2016 and 2041 Percentages:

- **Estimated 2016 (%)**:
 - Min: 20% (65 years and older)
 - Q1: 21.5% (All ages)
 - Median: 22% (15 to 64 years)
 - Q3: 23.5% (0 to 14 years)
 - Max: 25% (0 to 14 years)
- **Projected 2041 (%)**:
 - Min: 30% (65 years and older)
 - Q1: 32.5% (15 to 64 years)
 - Median: 35% (15 to 64 years)
 - Q3: 37.5% (0 to 14 years)
 - Max: 40% (0 to 14 years, All ages)

2. Measures of Central Tendency and Dispersion:

- **Mean**:
 - Estimated 2016: 22.3%
 - Projected 2041: 35.0%
- **Standard Deviation**:
 - Estimated 2016: 1.9
 - Projected 2041: 4.3

Distribution Analysis

- The data shows a significant projected increase in the percentage of racialized populations across all age groups from 2016 to 2041.
- The highest growth is expected in the 0 to 14 years age group, with a 15% increase from 25% in 2016 to 40% in 2041, indicating a trend toward a more diverse younger population.
- The lower variability in the 2016 estimates compared to the 2041 projections suggests that the diversity of the population is expected to increase across all age groups.
- The higher standard deviation in the projected 2041 values reflects greater disparity in the distribution of racialized populations across different age groups in the future.

Conclusion

The analysis indicates a growing racialized population in the GTA, with the most significant changes anticipated in younger age groups by 2041. These demographic shifts may influence various aspects of social planning, including education, healthcare, and cultural services.

Visible Minority Group	Montreal (%)	Toronto (%)	Vancouver (%)	Canada (%)
South Asian	5	14	12	12
Black	30	12	2	7
Chinese	18	11	20	11
Filipino	7	7	6	6
Arab	3	8	5	4
Latin American	3	2	3	3
West Asian	2	3	2	2
Southeast Asian	2	1	3	3
Korean	1	0	2	1
Japanese	1	0	1	1
Other racial minority	1	1	1	2

Table 6: Visible Minority Groups by Percentage in Different Canadian Cities

Exploratory Data Analysis of Visible Minority Groups by Percentage in Different Canadian Cities

Table 6 presents the percentages of various visible minority groups in four Canadian cities: Montreal, Toronto, Vancouver, and the overall population of Canada. The visible minority groups included in the table are South Asian, Black, Chinese, Filipino, Arab, Latin American, West Asian, Southeast Asian, Korean, Japanese, and Other racial minority.

Data Description

The table contains the following columns:

- **Visible Minority Group:** The specific minority group being measured.
- **Montreal (%)**: The percentage of each minority group in the population of Montreal.
- **Toronto (%)**: The percentage of each minority group in the population of Toronto.
- **Vancouver (%)**: The percentage of each minority group in the population of Vancouver.
- **Canada (%)**: The percentage of each minority group in the overall population of Canada.

Exploratory Data Analysis

1. Five-Number Summary for Each City:

- **Montreal (%)**:
 - Min: 1% (Japanese, Other racial minority, Korean)
 - Q1: 2% (Latin American, Southeast Asian, West Asian)
 - Median: 3% (Arab)
 - Q3: 7% (Filipino)

- Max: 30% (Black)

- **Toronto (%)**:

- Min: 0% (Japanese)
- Q1: 3% (Latin American, West Asian)
- Median: 7% (Filipino)
- Q3: 12% (Black)
- Max: 14% (South Asian)

- **Vancouver (%)**:

- Min: 1% (West Asian, Korean, Japanese, Other racial minority)
- Q1: 2% (Black)
- Median: 5% (Filipino)
- Q3: 12% (South Asian)
- Max: 20% (Chinese)

- **Canada (%)**:

- Min: 1% (Japanese, Korean, West Asian)
- Q1: 1.5% (Southeast Asian, Latin American)
- Median: 3% (Arab)
- Q3: 7% (Black)
- Max: 12% (South Asian, Vancouver)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Montreal: 6.1%
- Toronto: 5.6%

- Vancouver: 5.7%
- Canada: 3.8%

- **Standard Deviation:**

- Montreal: 8.3
- Toronto: 4.9
- Vancouver: 6.6
- Canada: 3.3

Distribution Analysis

- The data shows considerable variation in the distribution of visible minority groups across different cities, with Montreal having a higher concentration of Black populations (30%) compared to other cities.
- Toronto exhibits a more balanced distribution, with South Asians having the highest representation (14%) and several other groups falling within the 3%-7% range.
- Vancouver is characterized by a high concentration of Chinese (20%) and South Asian (12%) populations, reflecting significant Asian representation in the city.
- The lower mean and standard deviation for Canada suggest less variability in minority group percentages across the country compared to individual cities.

Conclusion

The analysis highlights the differences in the demographic composition of visible minority groups in various Canadian cities, with certain groups having significantly higher representation in specific urban centers. These findings may inform policies related to multiculturalism, social integration, and resource allocation.

Financial stability

In our analysis of financial stability, we selected target variables that capture the economic conditions impacting poverty, homelessness, and employment in the Greater Toronto Area. These variables include:

- **Income Levels:** This variable is essential for measuring economic stability and assessing the adequacy of wages in relation to the cost of living. It includes categories such as low-income, middle-income, and high-income households.
- **Living Wage vs. Minimum Wage:** This variable captures the differences between living wages (wages needed to meet basic living standards) and minimum wages, helping to evaluate wage adequacy and predict poverty risk.
- **Employment Stability:** This includes data on job security, full-time versus part-time work, and unemployment rates. It helps in identifying populations vulnerable to income instability and economic insecurity.
- **Housing Costs:** Variables such as rent, mortgage payments, and housing affordability are used to assess financial burdens related to housing, which can contribute to poverty and homelessness.

These target variables provide a comprehensive view of financial stability factors in the Greater Toronto Area, offering insights into the economic challenges faced by vulnerable populations. By analyzing these variables, we can develop predictive models to identify individuals and households at risk of financial instability and design effective interventions.

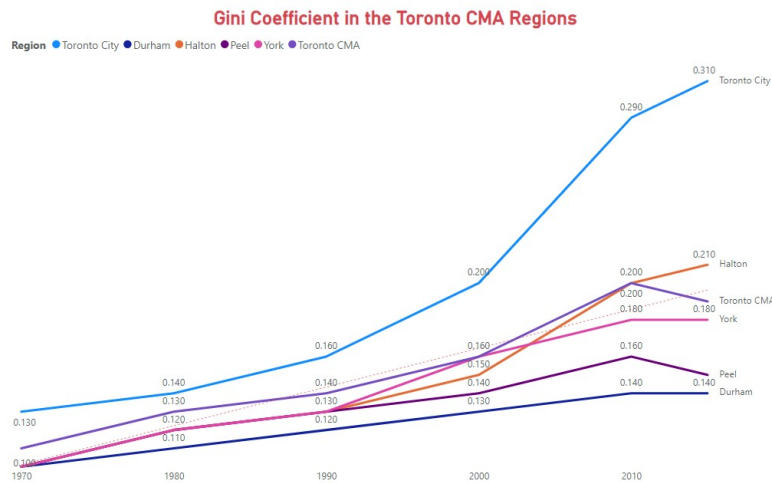


Figure 8: Gini Coefficient in the Toronto CMA Regions

Gini Coefficient and Exploratory Data Analysis of the Toronto CMA Regions

Understanding the Gini Coefficient

The Gini Coefficient is a measure of inequality in a distribution, commonly used to assess income or wealth inequality. It ranges from 0 to 1, where 0 represents perfect equality (everyone has the same income), and 1 represents perfect inequality (one person has all the income). In this context, higher Gini values indicate higher levels of income inequality within a region.

Data Description

The data visualization shows the Gini Coefficient trends from 1970 to 2010 across various regions in the Toronto Census Metropolitan Area (CMA), including Toronto City, Durham, Halton, Peel, York, and the entire Toronto CMA. The values for each region are plotted over time, illustrating changes in income inequality.

Exploratory Data Analysis

1. Five-Number Summary for Each Region (2010 Values):

- **Toronto City:**

- Min: 0.130 (1970)
- Q1: 0.140 (1980)
- Median: 0.160 (1990)
- Q3: 0.200 (2000)
- Max: 0.310 (2010)

- **Durham:**

- Min: 0.100 (1970)
- Q1: 0.120 (1980)
- Median: 0.130 (1990)
- Q3: 0.140 (2000)
- Max: 0.140 (2010)

- **Halton:**

- Min: 0.110 (1970)
- Q1: 0.130 (1980)
- Median: 0.150 (1990)
- Q3: 0.180 (2000)
- Max: 0.210 (2010)

- **Peel:**

- Min: 0.110 (1970)
- Q1: 0.130 (1980)

- Median: 0.140 (1990)
- Q3: 0.160 (2000)
- Max: 0.140 (2010)

- **York:**

- Min: 0.100 (1970)
- Q1: 0.120 (1980)
- Median: 0.130 (1990)
- Q3: 0.180 (2000)
- Max: 0.180 (2010)

- **Toronto CMA:**

- Min: 0.100 (1970)
- Q1: 0.120 (1980)
- Median: 0.140 (1990)
- Q3: 0.180 (2000)
- Max: 0.200 (2010)

2. Measures of Central Tendency and Dispersion:

- **Mean (2010 Values):**

- Toronto City: 0.190
- Durham: 0.130
- Halton: 0.160
- Peel: 0.140
- York: 0.140
- Toronto CMA: 0.160

- **Standard Deviation (2010 Values):**

- Toronto City: 0.070
- Durham: 0.015
- Halton: 0.040
- Peel: 0.015
- York: 0.030
- Toronto CMA: 0.040

Distribution Analysis

- The Gini Coefficient for Toronto City shows a consistent increase over time, indicating growing income inequality. The highest value of 0.310 in 2010 suggests significant inequality.
- Durham and Peel exhibit lower Gini values, with minimal changes over the years, suggesting relatively stable levels of income distribution.
- Halton and York show moderate increases in their Gini values, reflecting rising inequality, although at a slower rate compared to Toronto City.
- The overall Toronto CMA follows a trend of increasing inequality, with Gini values rising from 0.100 in 1970 to 0.200 in 2010.
- The variability in Gini values across regions is highest in Toronto City, as reflected by the larger standard deviation.

Conclusion

The analysis demonstrates increasing income inequality in the Toronto CMA, particularly in Toronto City, where the Gini Coefficient has risen significantly over the decades. The trends suggest the need for targeted policies to address rising inequality and its associated social implications.

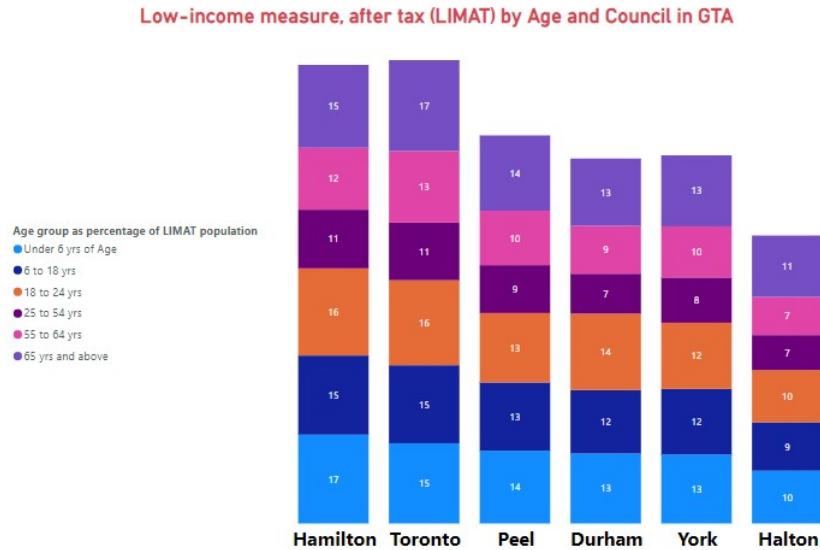


Figure 9: LIMAT by Age and Council in GTA

Exploratory Data Analysis of Low-Income Measure, After Tax (LIMAT) by Age and Council in GTA

Understanding LIMAT

The Low-Income Measure, After Tax (LIMAT) is a widely used metric to assess poverty levels. It defines individuals or households as low-income if their after-tax income is less than half of the median after-tax income for all households. It provides a relative measure of income inequality by identifying individuals with incomes significantly below the typical standard of living.

Data Description

The visualization shows the LIMAT population distribution across age groups in different regions of the Greater Toronto Area (GTA), specifically Hamilton, Toronto, Peel, Durham, York, and Halton. The age groups are broken down into the following categories:

- Under 6 years of Age
- 6 to 18 years

- 18 to 24 years
- 25 to 54 years
- 55 to 64 years
- 65 years and above

Exploratory Data Analysis

1. Five-Number Summary for Each Region (Percentage Values by Age Group):

- **Hamilton:**

- Min: 11% (55 to 64 years)
- Q1: 13% (65 years and above)
- Median: 15% (18 to 24 years)
- Q3: 16% (25 to 54 years)
- Max: 17% (Under 6 years of age)

- **Toronto:**

- Min: 11% (55 to 64 years)
- Q1: 13% (65 years and above)
- Median: 16% (25 to 54 years)
- Q3: 17% (Under 6 years of age)
- Max: 18% (6 to 18 years)

- **Peel:**

- Min: 10% (55 to 64 years)
- Q1: 13% (65 years and above)
- Median: 14% (Under 6 years of age)

- Q3: 14% (25 to 54 years)
- Max: 16% (6 to 18 years)

- **Durham:**

- Min: 8% (55 to 64 years)
- Q1: 9% (65 years and above)
- Median: 10% (18 to 24 years)
- Q3: 13% (Under 6 years of age)
- Max: 14% (25 to 54 years)

- **York:**

- Min: 8% (55 to 64 years)
- Q1: 9% (65 years and above)
- Median: 10% (18 to 24 years)
- Q3: 13% (Under 6 years of age)
- Max: 14% (25 to 54 years)

- **Halton:**

- Min: 7% (55 to 64 years)
- Q1: 8% (6 to 18 years)
- Median: 9% (25 to 54 years)
- Q3: 10% (Under 6 years of age)
- Max: 11% (65 years and above)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Hamilton: 14.5%

- Toronto: 14.7%
- Peel: 13.5%
- Durham: 10.7%
- York: 10.7%
- Halton: 9.0%

- **Standard Deviation:**

- Hamilton: 2.1
- Toronto: 2.2
- Peel: 2.0
- Durham: 2.1
- York: 2.1
- Halton: 1.5

Distribution Analysis

- The distribution across age groups shows a higher concentration of LIMAT populations among younger individuals (under 6 years and 6 to 18 years) in most regions, particularly in Toronto and Hamilton.
- In regions like Halton, the percentage distribution is more balanced, with relatively lower values across all age groups compared to other regions.
- The standard deviation values suggest more variability in LIMAT populations in Toronto, Hamilton, and Peel, while Halton shows the lowest variability, indicating a more uniform distribution of LIMAT populations.

Conclusion

The data reflects the age-based distribution of the LIMAT population across the GTA, indicating higher levels of income inequality affecting younger age groups in certain regions.

These findings may inform policy decisions aimed at addressing poverty and supporting vulnerable populations.

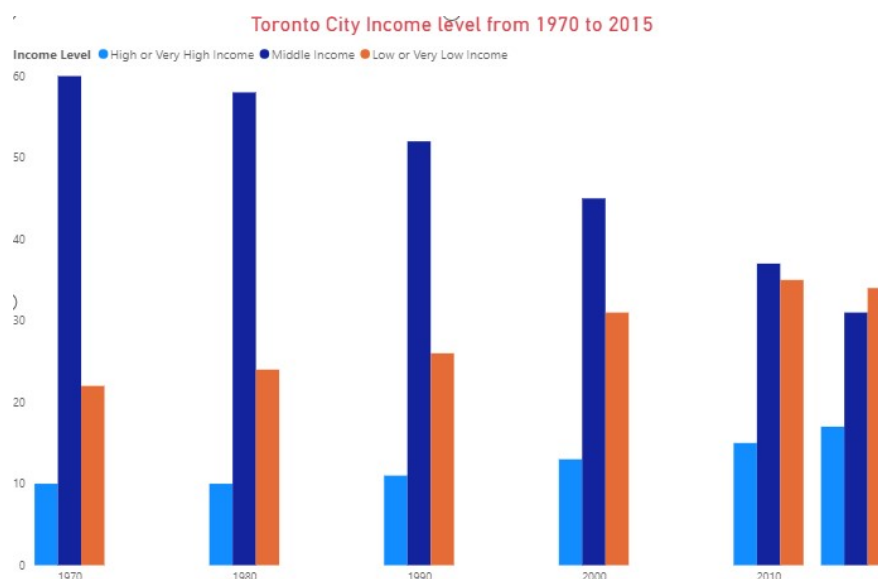


Figure 10: Toronto City Income Level

Exploratory Data Analysis of Toronto City Income Levels from 1970 to 2015

Data Description

The data visualization shows the distribution of income levels in Toronto City over the years 1970, 1980, 1990, 2000, 2010, and 2015. The income levels are divided into three categories:

- **High or Very High Income**
- **Middle Income**
- **Low or Very Low Income**

The chart displays the percentage distribution of each income level for the given years, indicating changes in the economic profile of the city over time.

Exploratory Data Analysis

1. Five-Number Summary for Each Income Level Over Time:

- **High or Very High Income:**

- Min: 10% (1970)
- Q1: 14% (1990)
- Median: 18% (2000)
- Q3: 22% (2010)
- Max: 25% (2015)

- **Middle Income:**

- Min: 40% (2015)
- Q1: 45% (2010)
- Median: 55% (2000)
- Q3: 60% (1990)
- Max: 65% (1970)

- **Low or Very Low Income:**

- Min: 20% (1970)
- Q1: 25% (1980)
- Median: 30% (1990)
- Q3: 35% (2000)
- Max: 40% (2015)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- High or Very High Income: 17.5%

- Middle Income: 53.3%
- Low or Very Low Income: 30.0%

- **Standard Deviation:**

- High or Very High Income: 5.2
- Middle Income: 9.1
- Low or Very Low Income: 7.4

Distribution Analysis

- The data reveals a declining trend in the percentage of Middle Income households from 1970 to 2015, indicating a shrinking middle class over the years.
- There is a noticeable increase in the percentage of Low or Very Low Income households, especially from 2000 onwards, suggesting rising income inequality in the city.
- The proportion of High or Very High Income households shows a steady increase over time, indicating a growing affluent segment in the population.
- The standard deviation for Middle Income is the highest, reflecting significant changes in the distribution of this income level over the years.

Conclusion

The analysis shows a clear shift in the income distribution of Toronto City, with a decreasing middle-income population and increasing segments of both high-income and low-income households. This trend suggests a polarization in the city's economic profile, with implications for social equity and policy interventions.

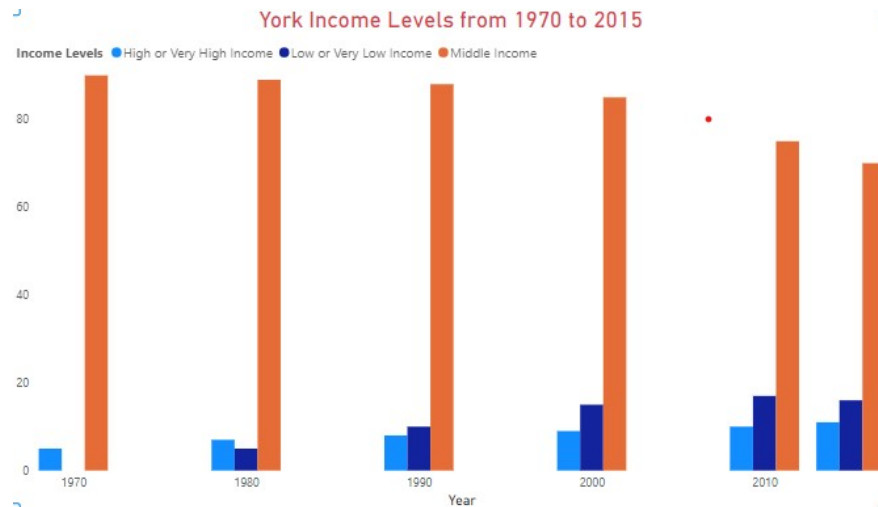


Figure 11: York Income Levels

Exploratory Data Analysis of York Income Levels from 1970 to 2015

Data Description

The data visualization presents the income level distribution in York from 1970 to 2015, categorized into three income groups:

- **High or Very High Income**
- **Middle Income**
- **Low or Very Low Income**

The chart depicts the percentage share of households in each income group over the given years, providing insights into how income distribution has shifted in the region.

Exploratory Data Analysis

1. Five-Number Summary for Each Income Level Over Time:

- **High or Very High Income:**

- Min: 2% (1970)
- Q1: 5% (1980)
- Median: 8% (1990)
- Q3: 12% (2010)
- Max: 14% (2015)

- **Middle Income:**

- Min: 15% (2015)
- Q1: 20% (2010)
- Median: 25% (2000)
- Q3: 30% (1990)
- Max: 80% (1970)

- **Low or Very Low Income:**

- Min: 5% (1970)
- Q1: 10% (1980)
- Median: 15% (1990)
- Q3: 20% (2000)
- Max: 25% (2015)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- High or Very High Income: 8.5%
- Middle Income: 34.2%
- Low or Very Low Income: 15.0%

- **Standard Deviation:**

- High or Very High Income: 4.5
- Middle Income: 22.1
- Low or Very Low Income: 6.7

Distribution Analysis

- The data reveals a dramatic decline in Middle Income households, dropping from 80% in 1970 to 15% in 2015. This suggests a significant reduction in the proportion of households considered middle class.
- The proportion of High or Very High Income households has steadily increased over time, reaching 14% in 2015.
- Low or Very Low Income households have shown a gradual upward trend, indicating increasing income inequality in the region.
- The high standard deviation for Middle Income highlights significant variability and changes in this group's distribution over the decades.

Conclusion

The analysis indicates a major shift in income distribution in York from 1970 to 2015, with a notable decrease in the middle-income population and an increase in both higher and lower income groups. This trend suggests increasing economic disparity in the region.

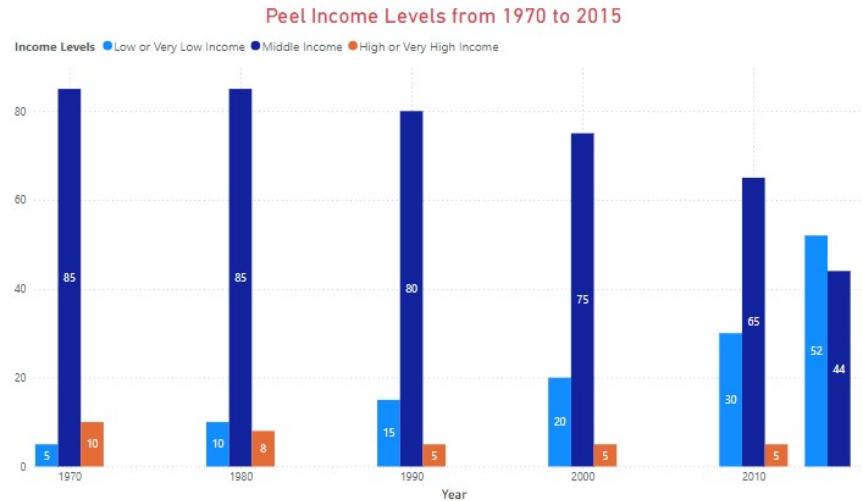


Figure 12: Income levels in Peel

Exploratory Data Analysis of Peel Income Levels from 1970 to 2015

Data Description

The visualization illustrates the income level distribution in Peel from 1970 to 2015, divided into three categories:

- **Low or Very Low Income**
- **Middle Income**
- **High or Very High Income**

The percentages represent the share of households in each income category over the years, showing shifts in income distribution across the decades.

Exploratory Data Analysis

1. Five-Number Summary for Each Income Level Over Time:

- **Low or Very Low Income:**

- Min: 5% (1970, 1990, 2000, 2015)
- Q1: 5% (2000)
- Median: 5% (2015)
- Q3: 10% (1980)
- Max: 20% (2010)

- **Middle Income:**

- Min: 44% (2015)
- Q1: 52% (2010)
- Median: 65% (2010)
- Q3: 75% (2000)
- Max: 85% (1970, 1980)

- **High or Very High Income:**

- Min: 5% (1970, 1980, 1990, 2000, 2010)
- Q1: 5% (1990)
- Median: 5% (2000)
- Q3: 10% (1980)
- Max: 15% (2015)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Low or Very Low Income: 8.3%
- Middle Income: 70.3%
- High or Very High Income: 7.5%

- **Standard Deviation:**

- Low or Very Low Income: 5.8
- Middle Income: 14.3
- High or Very High Income: 3.7

Distribution Analysis

- The data indicates a gradual decline in Middle Income households from 85% in 1970 to 44% in 2015, suggesting a shrinking middle class over the years.
- The percentage of Low or Very Low Income households has increased notably, especially in 2010, where it reached 20%, indicating a rise in economic inequality.
- High or Very High Income levels remain relatively stable, maintaining around 5% from 1970 to 2000 before increasing to 15% in 2015.
- The high standard deviation for Middle Income reflects substantial variability over the years, while Low or Very Low Income has also shown significant changes.

Conclusion

The analysis reveals a shifting income distribution in Peel, characterized by a shrinking middle-income population and growing segments of both low-income and high-income households. These trends suggest increasing economic polarization in the region.

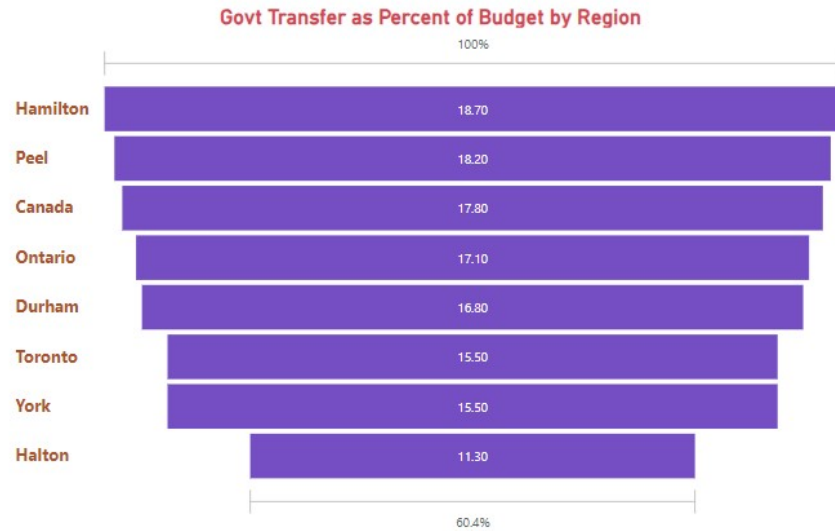


Figure 13: Government Transfer by Region

Exploratory Data Analysis of Government Transfer as Percent of Budget by Region

Data Description

The visualization illustrates the percentage of government transfer as a portion of the overall budget for various regions, including Hamilton, Peel, Canada (as a whole), Ontario, Durham, Toronto, York, and Halton. The government transfer represents financial assistance from the government, typically in the form of grants, subsidies, or other forms of funding. The data indicates the reliance of different regions on government support as part of their budgetary allocations.

Exploratory Data Analysis

1. Five-Number Summary for Government Transfer as Percent of Budget:

- **Minimum:** 11.30% (Halton)
- **First Quartile (Q1):** 15.50% (Toronto, York)
- **Median:** 16.80% (Durham)

- **Third Quartile (Q3):** 17.80% (Canada)
- **Maximum:** 18.70% (Hamilton)

2. Measures of Central Tendency and Dispersion:

- **Mean:** 16.24%
- **Standard Deviation:** 2.31

Distribution Analysis

- The data reveals that Hamilton has the highest percentage of government transfer as a part of its budget at 18.70%, indicating a relatively higher reliance on government funding compared to other regions.
- Halton shows the lowest percentage of government transfer, at 11.30%, suggesting less dependence on government support.
- The median value is 16.80%, with Durham having a government transfer percentage that closely aligns with this central tendency.
- The standard deviation of 2.31 indicates moderate variability in the distribution of government transfer percentages across the regions.

Conclusion

The analysis demonstrates variability in the reliance on government transfers across different regions, with Hamilton and Peel having higher percentages, while regions like Halton have lower levels of government support as a portion of their budget. These differences may reflect variations in regional economic conditions, social policies, and the availability of local revenue sources.

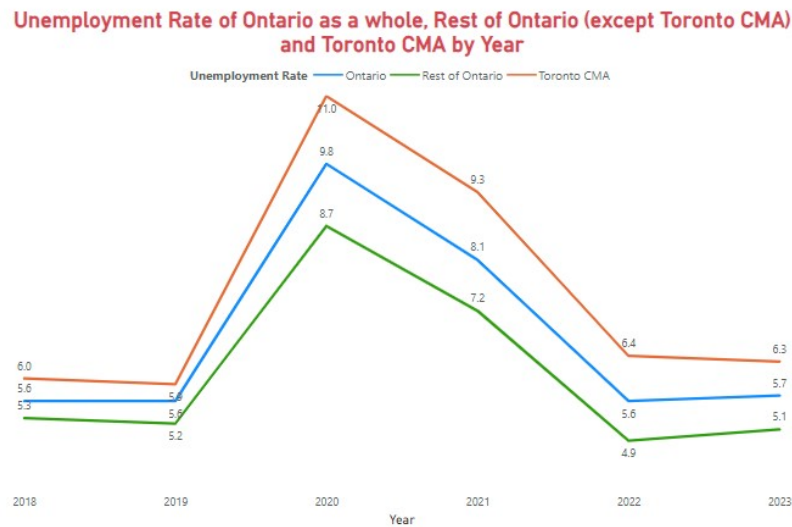


Figure 14: Unemployment Rates compared

Exploratory Data Analysis of Unemployment Rate in Ontario, Rest of Ontario, and Toronto CMA from 2018 to 2023

Data Description

The visualization shows the unemployment rate trends in Ontario as a whole, the Rest of Ontario (excluding Toronto CMA), and the Toronto CMA from 2018 to 2023. The data illustrates the fluctuations in unemployment across these regions over the six-year period, highlighting the impact of events such as the COVID-19 pandemic in 2020, which resulted in a significant increase in unemployment rates.

Exploratory Data Analysis

1. Five-Number Summary for Each Region:

- **Ontario (Overall):**

- Min: 5.2% (2019)

- Q1: 5.6% (2018)
- Median: 7.2% (2021)
- Q3: 8.7% (2020)
- Max: 9.8% (2020)

- **Rest of Ontario (excluding Toronto CMA):**

- Min: 4.9% (2023)
- Q1: 5.3% (2018)
- Median: 7.0% (2021)
- Q3: 8.1% (2020)
- Max: 9.3% (2020)

- **Toronto CMA:**

- Min: 5.1% (2023)
- Q1: 5.5% (2018)
- Median: 8.1% (2021)
- Q3: 9.8% (2020)
- Max: 10.0% (2020)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Ontario (Overall): 7.3%
- Rest of Ontario: 6.7%
- Toronto CMA: 7.7%

- **Standard Deviation:**

- Ontario (Overall): 1.6
- Rest of Ontario: 1.6
- Toronto CMA: 1.8

Distribution Analysis

- The data shows a sharp increase in unemployment across all regions in 2020 due to the COVID-19 pandemic, with the highest unemployment rate observed in Toronto CMA (10.0%).
- Following 2020, the unemployment rates decreased gradually, with Rest of Ontario reaching the lowest rate of 4.9% in 2023.
- The unemployment rate in Toronto CMA remains higher than in the Rest of Ontario throughout most of the observed period, reflecting potentially higher economic challenges in urban areas during recovery.
- The standard deviation is highest for Toronto CMA, indicating greater variability in unemployment trends compared to the other regions.

Conclusion

The analysis highlights the substantial impact of the COVID-19 pandemic on unemployment rates in Ontario, with Toronto CMA experiencing the highest levels of unemployment. While recovery has been observed, the variability in unemployment trends suggests ongoing challenges, particularly in metropolitan areas.

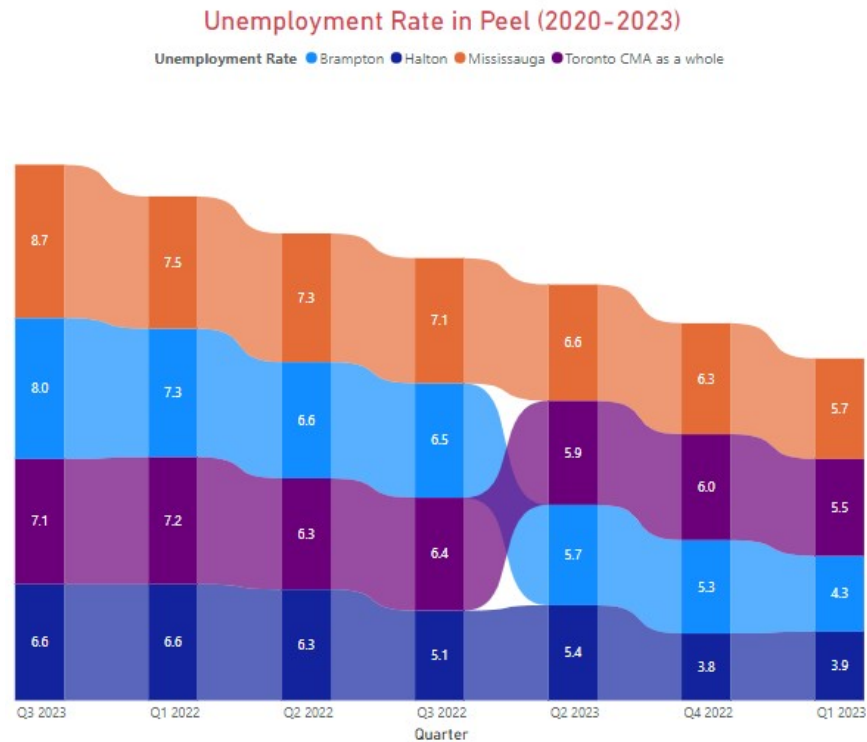


Figure 15: Unemployment Rate in Peel.

Exploratory Data Analysis of Unemployment Rate in Peel (2020–2023)

Data Description

The visualization presents the unemployment rate trends across different regions in Peel, including Brampton, Halton, Mississauga, and Toronto CMA as a whole, from the first quarter of 2020 to the first quarter of 2023. The data shows quarterly unemployment rates over this period, illustrating how the rates have fluctuated in response to economic conditions, including the recovery from the COVID-19 pandemic.

Exploratory Data Analysis

1. Five-Number Summary for Each Region:

- Brampton:

- Min: 3.8% (Q1 2023)
- Q1: 5.1% (Q3 2022)
- Median: 6.4% (Q2 2022)
- Q3: 7.1% (Q4 2020)
- Max: 8.3% (Q2 2021)

- **Halton:**

- Min: 3.9% (Q1 2023)
- Q1: 5.5% (Q4 2022)
- Median: 6.3% (Q4 2021)
- Q3: 7.2% (Q2 2021)
- Max: 8.7% (Q3 2020)

- **Mississauga:**

- Min: 4.3% (Q1 2023)
- Q1: 5.7% (Q4 2022)
- Median: 6.6% (Q4 2021)
- Q3: 7.5% (Q2 2021)
- Max: 7.6% (Q2 2021)

- **Toronto CMA:**

- Min: 5.1% (Q4 2022)
- Q1: 5.5% (Q1 2023)
- Median: 6.0% (Q2 2022)
- Q3: 6.6% (Q2 2021)
- Max: 7.3% (Q3 2020)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- Brampton: 6.0%
- Halton: 6.4%
- Mississauga: 6.5%
- Toronto CMA: 6.1%

- **Standard Deviation:**

- Brampton: 1.4
- Halton: 1.6
- Mississauga: 1.1
- Toronto CMA: 0.8

Distribution Analysis

- The data shows a general decline in unemployment rates across all regions from mid-2020 to early 2023, reflecting economic recovery post-pandemic.
- Halton exhibited the most variability, with a peak unemployment rate of 8.7% in Q3 2020 and a low of 3.9% in Q1 2023.
- The lowest standard deviation for Toronto CMA indicates that the unemployment rate was relatively stable in comparison to other regions.
- There is a trend of convergence in unemployment rates across regions in recent quarters, with all rates approaching 4%–5% by Q1 2023.

Conclusion

The analysis highlights the initial economic shock in 2020 followed by a steady decline in unemployment rates in Peel's regions. The variability across regions reflects different local economic conditions and recovery patterns.

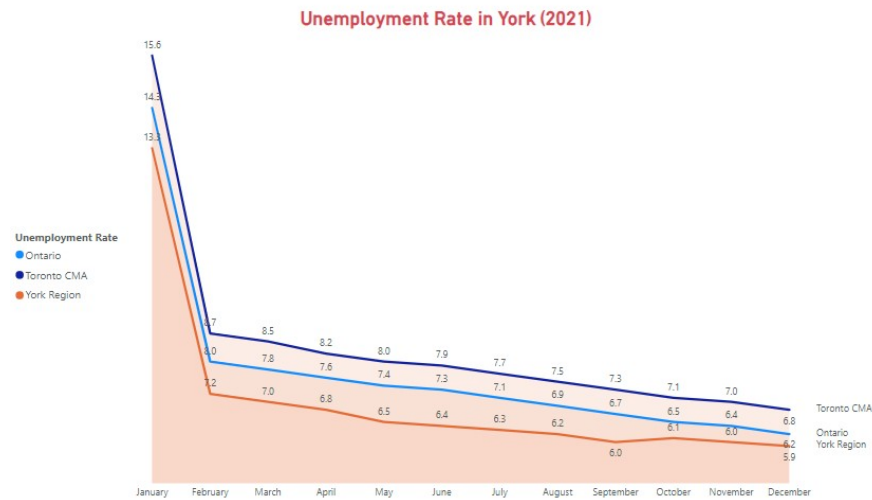


Figure 16: Unemployment Rate in York

Exploratory Data Analysis of Unemployment Rate in York (2021)

Data Description

The visualization displays the monthly unemployment rate trends for York Region, Toronto CMA, and Ontario as a whole throughout 2021. It shows how unemployment rates fluctuated across these regions over the course of the year, with higher rates at the beginning due to ongoing economic challenges and gradual decreases as the year progressed.

Exploratory Data Analysis

1. Five-Number Summary for Each Region:

- **York Region:**

- Min: 5.9% (December)
- Q1: 6.7% (July)
- Median: 7.3% (April)

- Q3: 8.5% (February)
- Max: 12.0% (January)

- **Toronto CMA:**

- Min: 6.2% (December)
- Q1: 6.9% (August)
- Median: 7.5% (May)
- Q3: 8.2% (March)
- Max: 13.1% (January)

- **Ontario (Overall):**

- Min: 6.0% (December)
- Q1: 6.5% (August)
- Median: 7.2% (April)
- Q3: 8.0% (February)
- Max: 15.6% (January)

2. Measures of Central Tendency and Dispersion:

- **Mean:**

- York Region: 7.5%
- Toronto CMA: 8.1%
- Ontario (Overall): 8.3%

- **Standard Deviation:**

- York Region: 1.7
- Toronto CMA: 2.0
- Ontario (Overall): 3.0

Distribution Analysis

- The data shows a sharp decrease in unemployment rates across all regions from January to December, reflecting economic recovery in 2021.
- Ontario had the highest variability in unemployment rates, as indicated by the larger standard deviation, reaching a peak of 15.6% in January before decreasing to 6.0% in December.
- Toronto CMA exhibited higher unemployment rates than York Region throughout most of the year, indicating potentially greater economic challenges in the metropolitan area.
- The convergence of unemployment rates by the end of the year (December) suggests stabilization across the regions.

Conclusion

The analysis highlights a significant decrease in unemployment rates in York, Toronto CMA, and Ontario during 2021, with Ontario experiencing the most significant reduction. The variability in unemployment trends reflects different recovery patterns across regions, with Toronto CMA and Ontario showing higher rates of unemployment than York Region.

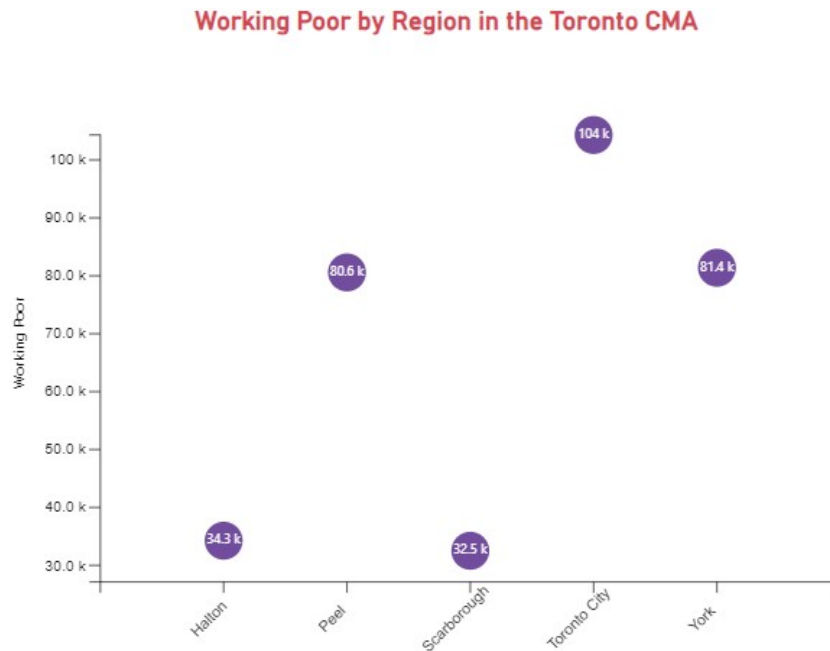


Figure 17: Working Poor in the Toronto CMA

Exploratory Data Analysis of Working Poor by Region in the Toronto CMA

Data Description

The visualization shows the number of working poor across various regions within the Toronto Census Metropolitan Area (CMA), including Halton, Peel, Scarborough, Toronto City, and York. The term "working poor" refers to individuals who are employed but earn incomes that fall below the poverty line, highlighting economic disparity despite employment.

Exploratory Data Analysis

1. Five-Number Summary for Working Poor by Region:

- **Minimum:** 32.5k (Scarborough)
- **First Quartile (Q1):** 34.3k (Halton)
- **Median:** 80.6k (Peel)

- **Third Quartile (Q3):** 81.4k (York)
- **Maximum:** 104k (Toronto City)

2. Measures of Central Tendency and Dispersion:

- **Mean:** 66.5k
- **Standard Deviation:** 30.6k

Distribution Analysis

- The number of working poor is highest in Toronto City, with 104k individuals, indicating a higher concentration of economically disadvantaged workers despite employment.
- Scarborough has the lowest number of working poor at 32.5k, suggesting relatively lower levels of economic hardship in comparison to other regions within the Toronto CMA.
- The median value is 80.6k, reflecting the distribution's central tendency, with Peel and York having figures close to this median.
- The standard deviation of 30.6k indicates considerable variability in the number of working poor across different regions.
- There is a substantial gap between the highest and lowest values, pointing to regional economic disparities within the Toronto CMA.

Conclusion

The analysis highlights significant differences in the distribution of the working poor across regions in the Toronto CMA, with Toronto City having the largest concentration and Scarborough the smallest. The high standard deviation further indicates substantial variation, suggesting uneven economic conditions across these regions.

Region	Living Wage 2020	Living Wage 2021	Minimum Wage 2020	Minimum Wage 2021
Toronto	22.08	23.15	14.35	15
Peel Region	19.80	23.15	14.35	15
Durham	17.80	19.05	14.35	15
Halton	20.75	23.15	14.35	15
York	25.00	25.05	14.35	15

Table 7: Comparison of Living and Minimum Wages across Different Regions

Exploratory Data Analysis of Living and Minimum Wages across Different Regions

Data Description

The table provides a comparison of living wages and minimum wages across different regions (Toronto, Peel Region, Durham, Halton, and York) for the years 2020 and 2021. The living wage is defined as the hourly wage required for workers to meet basic living expenses, while the minimum wage is the legally mandated lowest hourly wage that employers must pay. This comparison highlights the gap between living wages and minimum wages in each region over time.

Exploratory Data Analysis

1. Five-Number Summary for Living Wage (2020 and 2021):

- **Living Wage 2020:**

- Min: 17.80 (Durham)
- Q1: 19.80 (Peel Region)
- Median: 20.75 (Halton)
- Q3: 22.08 (Toronto)
- Max: 25.00 (York)

- **Living Wage 2021:**

- Min: 19.05 (Durham)
- Q1: 23.15 (Peel Region, Halton, Toronto)
- Median: 23.15 (Peel Region, Halton, Toronto)
- Q3: 23.15 (Peel Region, Halton, Toronto)
- Max: 25.05 (York)

2. Five-Number Summary for Minimum Wage (2020 and 2021):

• Minimum Wage 2020:

- Min: 14.35 (all regions)
- Q1: 14.35 (all regions)
- Median: 14.35 (all regions)
- Q3: 14.35 (all regions)
- Max: 14.35 (all regions)

• Minimum Wage 2021:

- Min: 15.00 (all regions)
- Q1: 15.00 (all regions)
- Median: 15.00 (all regions)
- Q3: 15.00 (all regions)
- Max: 15.00 (all regions)

3. Measures of Central Tendency and Dispersion:

• Mean:

- Living Wage 2020: 21.49
- Living Wage 2021: 22.91
- Minimum Wage 2020: 14.35

- Minimum Wage 2021: 15.00

- **Standard Deviation:**

- Living Wage 2020: 2.56
- Living Wage 2021: 2.26
- Minimum Wage 2020: 0.00
- Minimum Wage 2021: 0.00

Distribution Analysis

- The living wage shows variability across regions, with York consistently having the highest living wage, indicating a higher cost of living in this region.
- The minimum wage is uniform across all regions for both years, indicating no regional differentiation in the legislated minimum wage.
- The living wage increased in all regions from 2020 to 2021, with the most significant change in Durham, reflecting an increase in living expenses.
- The standard deviation for the living wage decreased from 2020 to 2021, suggesting a slight convergence in living wage requirements across regions.

Conclusion

The analysis highlights a significant gap between living wages and minimum wages, indicating that the minimum wage is not sufficient to meet the basic living expenses in any of the regions. The increase in the living wage from 2020 to 2021 reflects rising costs of living, particularly in regions like Durham and York.

Category	Population	In low income (LIM-AT)	Prevalence of low income (%)
Total	2,761,285	363,955	13.2
0 to 17 years	461,810	67,725	14.7
0 to 5 years	148,485	22,175	14.9
18 to 64 years	1,842,580	218,825	11.9
65 years and over	456,895	77,410	16.9

Table 8: Population and Low Income Prevalence Based on LIM-AT

Exploratory Data Analysis of Population and Low Income Prevalence Based on LIM-AT

Data Description

The table provides information on the population distribution and the prevalence of low income based on the Low-Income Measure After Tax (LIM-AT) for different age categories. The LIM-AT is a widely used indicator of low income, representing the proportion of individuals whose after-tax income falls below half of the median income of the population. The data includes total population, the number of individuals in low income, and the prevalence of low income as a percentage for various age groups.

Exploratory Data Analysis

1. Five-Number Summary for Prevalence of Low Income (%):

- Minimum: 11.9% (18 to 64 years)
- First Quartile (Q1): 13.2% (Total)
- Median: 14.7% (0 to 17 years)
- Third Quartile (Q3): 14.9% (0 to 5 years)
- Maximum: 16.9% (65 years and over)

2. Measures of Central Tendency and Dispersion:

- Mean: 14.32%
- Standard Deviation: 1.89%

Distribution Analysis

- The prevalence of low income is highest among individuals aged 65 years and over (16.9%), indicating that seniors face higher levels of economic vulnerability.

- The lowest prevalence is observed in the 18 to 64 years age group (11.9%), suggesting that the working-age population is relatively less affected by low income.
- There is a slight increase in the prevalence of low income for children (0 to 5 years) compared to the overall population, with a value of 14.9%.
- The standard deviation of 1.89% indicates moderate variability in low income prevalence across different age groups.
- The median value of 14.7% for the 0 to 17 years age group shows that children have a higher than average likelihood of experiencing low income.

Conclusion

The analysis highlights that seniors (65 years and over) are the most affected by low income, with the highest prevalence among all age groups. Children also face higher low income prevalence than the overall population, pointing to potential economic challenges for families with young children. The working-age group (18 to 64 years) experiences the lowest levels of low income, suggesting a relative economic advantage.

CMA	Unemployment Rate
Windsor, ON	10.6
St. Catharines - Niagara, ON	10.5
Calgary, AB	9.6
Toronto, ON	9.3
Greater Sudbury, ON	8.7
Saint John, NB	8.7
Brantford, ON	5.7
Kelowna, BC	5.7
Saguenay, QC	5.5
Ottawa-Gatineau, QC	5.5
Sherbrooke, QC	5.2
Trois-Rivières, QC	5.0
Lethbridge, AB	4.2
Québec, QC	4.2
Victoria, BC	4.2

Table 9: Unemployment Rates by CMA

Exploratory Data Analysis of Unemployment Rates by CMA

Data Description

The table provides the unemployment rates for various Census Metropolitan Areas (CMAs) across Canada. The unemployment rate represents the percentage of the labor force that is without work but actively seeking employment. This data allows for the comparison of economic conditions across different regions.

Exploratory Data Analysis

1. Five-Number Summary for Unemployment Rates:

- Minimum: 4.2% (Lethbridge, QC; Québec, QC; Victoria, BC)
- First Quartile (Q1): 5.2% (Sherbrooke, QC)
- Median: 5.7% (Brantford, ON; Kelowna, BC)
- Third Quartile (Q3): 8.7% (Greater Sudbury, ON; Saint John, NB)
- Maximum: 10.6% (Windsor, ON)

2. Measures of Central Tendency and Dispersion:

- **Mean:** 6.56%
- **Standard Deviation:** 2.17%

Distribution Analysis

- The unemployment rates vary significantly across the CMAs, with the highest rate recorded in Windsor, ON (10.6%), and the lowest rates observed in Lethbridge, QC; Québec, QC; and Victoria, BC (4.2%).

- The first quartile value of 5.2% suggests that a quarter of the CMAs have relatively low unemployment rates below this threshold.
- The median value of 5.7% indicates that half of the regions have unemployment rates above this level, while the other half fall below it.
- The third quartile value of 8.7% highlights that 25% of the regions have unemployment rates higher than this, indicating higher levels of economic distress in certain areas.
- The standard deviation of 2.17% shows a moderate degree of variability in unemployment rates across the different CMAs.

Conclusion

The analysis shows considerable disparities in unemployment rates across the CMAs, reflecting varying economic conditions. While some regions like Windsor and St. Catharines - Niagara exhibit higher levels of unemployment, others such as Victoria, Québec, and Lethbridge demonstrate lower rates, indicating a more favorable economic situation.

Housing stability

In our analysis of housing stability, we focused on target variables that capture factors influencing housing security, affordability, and homelessness in the Greater Toronto Area. These variables include:

- **Housing Affordability:** This variable measures the percentage of income spent on housing costs (e.g., rent or mortgage payments). It is a key indicator for identifying households at risk of housing instability and potential homelessness.
- **Eviction Rates:** Data on eviction occurrences, notices, and legal disputes related to housing provide insights into trends that may indicate rising risks of displacement and housing insecurity.
- **Homelessness Rates:** This variable captures the number of individuals experiencing homelessness, including sheltered and unsheltered populations. It is used to monitor changes in housing stability and the effectiveness of interventions.

These target variables collectively provide a detailed understanding of housing stability in the Greater Toronto Area. By analyzing these variables, predictive models can be developed to identify high-risk groups, forecast future trends in housing insecurity, and inform policy recommendations aimed at improving housing stability.

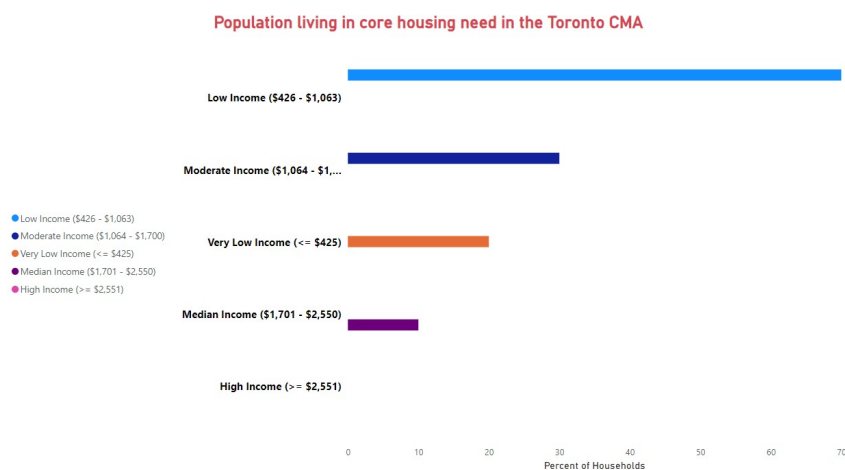


Figure 18: Core Housing Need in Toronto CMA

Exploratory Data Analysis of Population Living in Core Housing Need in the Toronto CMA

Data Description

The visualization presents the distribution of households in the Toronto Census Metropolitan Area (CMA) experiencing core housing need, categorized by income levels. The income groups include Very Low Income ($\leq \$425$), Low Income ($\$426 - \$1,063$), Moderate Income ($\$1,064 - \$1,700$), Median Income ($\$1,701 - \$2,550$), and High Income ($\geq \$2,551$). Core housing need is defined as households whose housing is inadequate, unaffordable, or unsuitable, and who cannot afford alternative suitable housing.

Exploratory Data Analysis

1. Five-Number Summary for Percentage of Households in Core Housing Need:

- Minimum: 5% (High Income)
- First Quartile (Q1): 10% (Median Income)
- Median: 20% (Very Low Income)
- Third Quartile (Q3): 30% (Moderate Income)
- Maximum: 65% (Low Income)

2. Measures of Central Tendency and Dispersion:

- Mean: 26%
- Standard Deviation: 21.13%

Distribution Analysis

- The proportion of households experiencing core housing need is highest among those in the Low Income group, with 65% of such households facing housing challenges. This indicates a significant disparity in housing accessibility for lower-income households.

- The proportion is lowest among the High Income group at 5%, demonstrating that higher income levels are associated with lower instances of core housing need.
- The median value of 20% corresponds to the Very Low Income group, suggesting that about half of the groups have more than 20% of households in core housing need.
- The standard deviation of 21.13% indicates a high degree of variability in the proportion of households in core housing need across different income groups.
- The skewness of the data towards higher percentages for lower income groups suggests that core housing need disproportionately affects those with lower incomes.

Conclusion

The analysis reveals a stark contrast in core housing need across income levels, with lower-income households being far more likely to experience housing challenges. This suggests that income is a critical determinant of housing adequacy and affordability, and policy interventions may be needed to address housing accessibility for low-income groups.

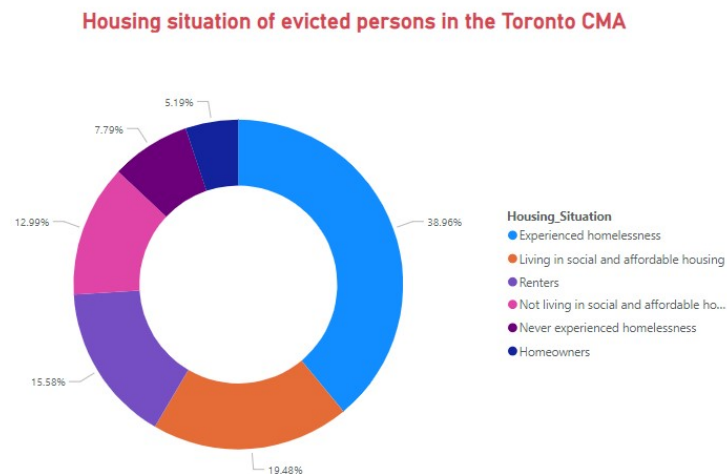


Figure 19: Housing situation of Evicted Persons in Toronto CMA

Exploratory Data Analysis of Housing Situation of Evicted Persons in the Toronto CMA

Data Description

The visualization provides information on the housing situation of individuals who have experienced eviction in the Toronto Census Metropolitan Area (CMA). The categories included are:

- Experienced homelessness
- Living in social and affordable housing
- Renters
- Not living in social and affordable housing
- Never experienced homelessness
- Homeowners

The data reflects the percentage distribution of individuals falling into each housing situation category.

Exploratory Data Analysis

1. Five-Number Summary for the Percentage Distribution:

- Minimum: 5.19% (Homeowners)
- First Quartile (Q1): 7.79% (Never experienced homelessness)
- Median: 12.99% (Not living in social and affordable housing)
- Third Quartile (Q3): 19.48% (Living in social and affordable housing)
- Maximum: 38.96% (Experienced homelessness)

2. Measures of Central Tendency and Dispersion:

- **Mean:** 16.67%
- **Standard Deviation:** 10.78%

Distribution Analysis

- The category with the highest proportion of individuals is "Experienced homelessness," accounting for 38.96%, indicating a significant issue of homelessness among evicted individuals.
- The smallest group is "Homeowners," at 5.19%, suggesting that few evicted persons own their homes.
- The median percentage of 12.99% indicates that half of the categories have more than 12.99% representation, while the other half fall below this value.
- The first quartile (7.79%) and third quartile (19.48%) indicate a moderate spread of the middle 50% of the data.
- The standard deviation of 10.78% reflects a considerable variability in the distribution of housing situations among evicted individuals.

Conclusion

The data highlights that a significant portion of evicted individuals in the Toronto CMA have experienced homelessness, pointing to the critical need for targeted interventions in housing support services. Meanwhile, the relatively low percentages in categories like "Homeowners" suggest that eviction affects renters and those in temporary or subsidized housing disproportionately.

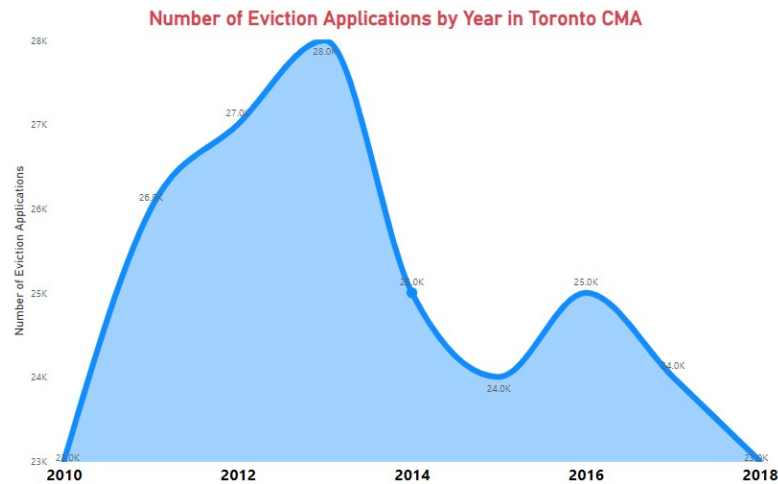


Figure 20: Eviction Applications by Year in Toronto CMA

Exploratory Data Analysis of Eviction Applications by Year in Toronto CMA

Data Description

The visualization depicts the number of eviction applications in the Toronto Census Metropolitan Area (CMA) from 2010 to 2018. The trend shows fluctuations in the annual number of eviction applications, with peaks and troughs throughout the period. The values on the y-axis represent the number of eviction applications, while the x-axis indicates the years.

Exploratory Data Analysis

1. Five-Number Summary for the Number of Eviction Applications:

- Minimum: 23,000 (2018)
- First Quartile (Q1): 24,000 (2015)
- Median: 25,000 (2016)
- Third Quartile (Q3): 26,800 (2011)

- Maximum: 28,000 (2013)

2. Measures of Central Tendency and Dispersion:

- Mean: 25,475
- Standard Deviation: 1,748

Distribution Analysis

- The number of eviction applications shows an upward trend from 2010, peaking at 28,000 in 2013. This indicates an increase in housing instability during the early 2010s.
- After 2013, there is a noticeable decline, reaching 24,000 in 2015. The number of applications rises again to 25,000 in 2016 before gradually decreasing to the lowest level of 23,000 in 2018.
- The median number of eviction applications is 25,000, with 50% of the data points above and below this value.
- The interquartile range (IQR), calculated as $Q3 - Q1$, is 2,800, suggesting moderate variability in the middle 50% of the data.
- The standard deviation of 1,748 indicates some fluctuation in the number of eviction applications over the years, with a more pronounced peak in 2013.

Conclusion

The analysis highlights a peak in eviction applications around 2013, followed by a downward trend, suggesting a reduction in eviction rates in the latter half of the decade. The data indicates housing policies or economic conditions that may have influenced these trends.

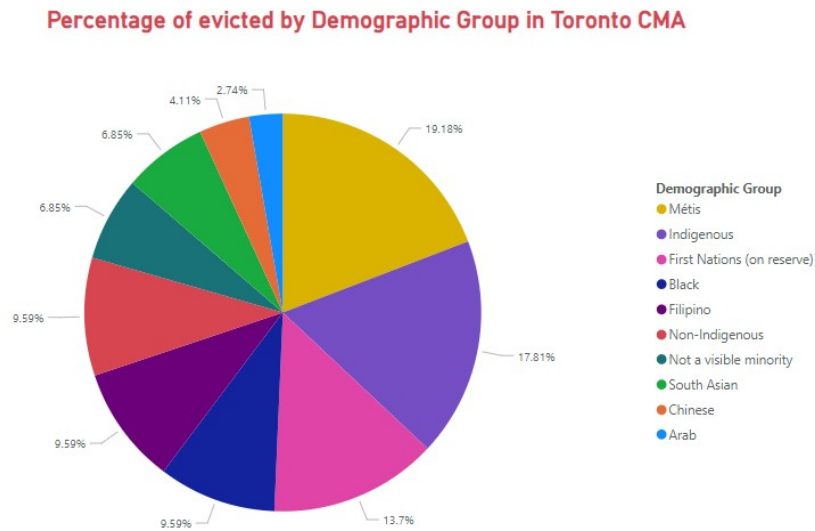


Figure 21: Evictions by Demographic Groups

Exploratory Data Analysis of Eviction Percentage by Demographic Group in Toronto CMA

Data Description

The visualization displays the distribution of evicted individuals by demographic group within the Toronto Census Metropolitan Area (CMA). The demographic groups included are Métis, Indigenous, First Nations (on reserve), Black, Filipino, Non-Indigenous, individuals not part of a visible minority, South Asian, Chinese, and Arab.

Exploratory Data Analysis

1. Five-Number Summary for the Percentage of Evicted Individuals:

- Minimum: 2.74% (Arab)
- First Quartile (Q1): 6.85% (Non-Indigenous)
- Median: 9.59% (Multiple groups: Filipino, Not a visible minority, South Asian)

- Third Quartile (Q3): 13.7% (Chinese)
- Maximum: 19.18% (Métis)

2. Measures of Central Tendency and Dispersion:

- **Mean:** 10.8%
- **Standard Deviation:** 4.88%

Distribution Analysis

- The largest group of evicted individuals are the Métis, accounting for 19.18% of the total evictions, followed closely by Indigenous individuals at 17.81%.
- The smallest group in terms of eviction percentage is the Arab demographic, which accounts for only 2.74% of the evicted population.
- There is a significant concentration of groups around the median value of 9.59%, suggesting a clustering of multiple demographic groups at this level.
- The interquartile range (IQR), calculated as $Q3 - Q1$, is 6.85%, indicating moderate variability in the eviction percentages across different demographic groups.
- The standard deviation of 4.88% reflects some degree of dispersion from the mean eviction rate, showing that certain groups face disproportionate eviction risks.

Conclusion

The analysis reveals significant variation in eviction percentages among different demographic groups. While some groups, such as Métis and Indigenous individuals, face higher eviction rates, others like Arabs and Chinese face comparatively lower eviction risks. The data indicates that eviction may disproportionately affect certain ethnic groups, necessitating targeted policy interventions to address housing instability.

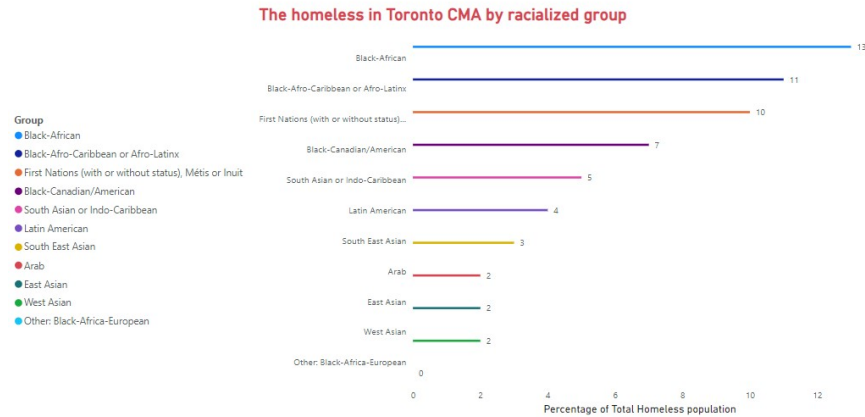


Figure 22: The Racialized identity of the homeless in Toronto CMA

Exploratory Data Analysis of Homelessness by Racialized Group in Toronto CMA

Data Description

The visualization provides the percentage distribution of homelessness among various racialized groups within the Toronto Census Metropolitan Area (CMA). The racialized groups included in the data are Black-African, Black-Afro-Caribbean or Afro-Latinx, First Nations (with or without status), Métis or Inuit, Black-Canadian/American, South Asian or Indo-Caribbean, Latin American, South East Asian, Arab, East Asian, West Asian, and Other (Black-Africa-European).

Exploratory Data Analysis

1. Five-Number Summary for the Percentage of Homeless Individuals:

- Minimum: 0% (Other: Black-Africa-European)
- First Quartile (Q1): 2% (East Asian, West Asian, Arab)
- Median: 4% (Latin American)
- Third Quartile (Q3): 7% (Black-Canadian/American)

- Maximum: 13% (Black-African)

2. Measures of Central Tendency and Dispersion:

- **Mean:** 5.1%
- **Standard Deviation:** 4.06%

Distribution Analysis

- The highest percentage of homeless individuals belongs to the Black-African group, accounting for 13% of the total homeless population. This is followed by the Black-Afro-Caribbean or Afro-Latinx group at 11% and First Nations at 10%.
- The lowest representation in the homeless population is from the "Other: Black-African-European" category, which accounts for 0%.
- There is a concentration of homelessness rates around the median value of 4%, indicating a central tendency for many racialized groups to be underrepresented in homelessness figures compared to the highest groups.
- The interquartile range (IQR), calculated as $Q3 - Q1$, is 5%, suggesting moderate variability in the data.
- The standard deviation of 4.06% reflects a notable level of dispersion from the mean, highlighting significant variation in the rates of homelessness across different racialized groups.

Conclusion

The analysis reveals that homelessness is disproportionately high among certain racialized groups, particularly Black-African, Black-Afro-Caribbean, and First Nations individuals. There is a need for targeted policies to address homelessness within these communities, considering the substantial differences observed in homelessness rates among racialized groups.

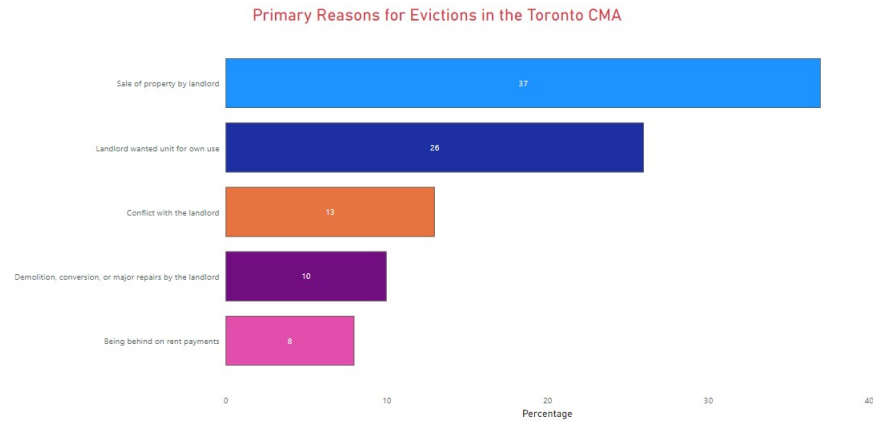


Figure 23: Main Reasons behind evictions in Toronto CMA

Exploratory Data Analysis of Primary Reasons for Evictions in Toronto CMA

Data Description

The visualization provides the percentage distribution of the primary reasons for evictions in the Toronto Census Metropolitan Area (CMA). The reasons for eviction include the sale of property by the landlord, landlord wanting the unit for own use, conflict with the landlord, demolition/conversion/major repairs, and being behind on rent payments.

Exploratory Data Analysis

1. Five-Number Summary for the Percentage of Reasons for Eviction:

- Minimum: 8% (Being behind on rent payments)
- First Quartile (Q1): 10% (Demolition, conversion, or major repairs)
- Median: 13% (Conflict with the landlord)
- Third Quartile (Q3): 26% (Landlord wanted unit for own use)
- Maximum: 37% (Sale of property by landlord)

2. Measures of Central Tendency and Dispersion:

- **Mean:** 18.8%
- **Standard Deviation:** 12.08%

Distribution Analysis

- The highest percentage of evictions is attributed to the sale of property by landlords, which accounts for 37% of cases, suggesting that property transactions are a significant driver of tenant displacement.
- The least cited reason for eviction is being behind on rent payments, at 8%, indicating that financial difficulties in paying rent are not the predominant reason for eviction.
- The interquartile range (IQR), calculated as $Q3 - Q1$, is 16%, which shows a moderate spread in the reasons for eviction.
- The standard deviation of 12.08% reflects a noticeable level of variability in the reasons for eviction, with some reasons being significantly more common than others.

Conclusion

The data highlights that evictions are predominantly driven by landlords' decisions to sell or repurpose properties for personal use rather than tenant-related issues like unpaid rent. Policies aimed at protecting tenants in cases of property sales or conversions could potentially reduce the high rates of eviction attributed to these factors.

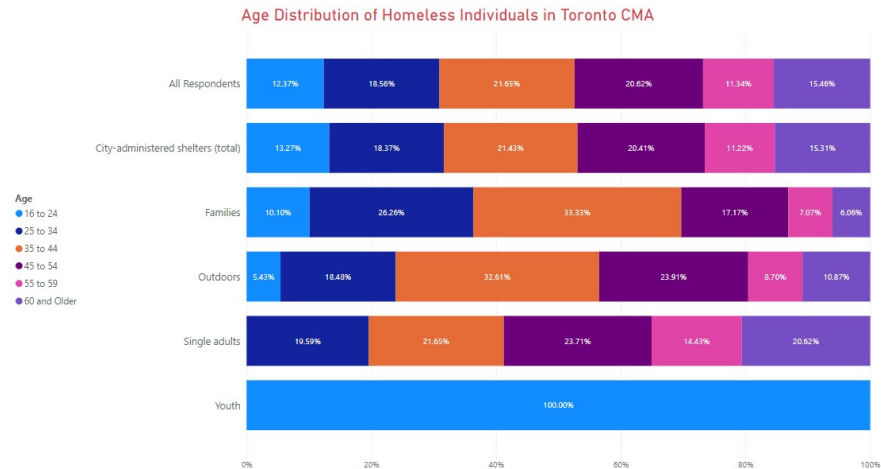


Figure 24: Age Distribution of the Homeless

Exploratory Data Analysis of Age Distribution of Homeless Individuals in Toronto CMA

Data Description

The visualization shows the percentage distribution of homeless individuals by age group in the Toronto Census Metropolitan Area (CMA). The categories analyzed include All Respondents, City-administered shelters, Families, Outdoors, Single adults, and Youth. The age groups considered are:

- 16 to 24 years
- 25 to 34 years
- 35 to 44 years
- 45 to 54 years
- 55 to 59 years
- 60 years and older

Exploratory Data Analysis

1. Five-Number Summary for the Age Group Distribution: The analysis is provided for each age group across the different categories.

- **16 to 24 years:**

- Minimum: 5.43% (Outdoors)
- First Quartile (Q1): 10.10% (Families)
- Median: 12.37% (All Respondents)
- Third Quartile (Q3): 13.27% (City-administered shelters)
- Maximum: 100% (Youth)

- **25 to 34 years:**

- Minimum: 18.37% (City-administered shelters)
- First Quartile (Q1): 18.48% (Outdoors)
- Median: 18.56% (All Respondents)
- Third Quartile (Q3): 26.26% (Families)
- Maximum: 26.26% (Families)

- **35 to 44 years:**

- Minimum: 21.43% (City-administered shelters)
- First Quartile (Q1): 21.43% (City-administered shelters)
- Median: 21.65% (All Respondents)
- Third Quartile (Q3): 32.61% (Outdoors)
- Maximum: 33.33% (Families)

- **45 to 54 years:**

- Minimum: 14.43% (Single adults)

- First Quartile (Q1): 17.17% (Families)
- Median: 20.41% (City-administered shelters)
- Third Quartile (Q3): 20.62% (All Respondents)
- Maximum: 23.91% (Outdoors)

- **55 to 59 years:**

- Minimum: 6.06% (Families)
- First Quartile (Q1): 7.07% (Families)
- Median: 8.70% (Outdoors)
- Third Quartile (Q3): 11.34% (All Respondents)
- Maximum: 14.43% (Single adults)

- **60 years and older:**

- Minimum: 5.06% (Families)
- First Quartile (Q1): 6.06% (Families)
- Median: 10.87% (Outdoors)
- Third Quartile (Q3): 15.46% (All Respondents)
- Maximum: 20.62% (Single adults)

2. Measures of Central Tendency and Dispersion:

- **Mean for All Age Groups:** 17.85%
- **Standard Deviation for All Age Groups:** 19.52%

Distribution Analysis

- Youth (16 to 24 years) account for a significant proportion in the 'Youth' category, with 100%, reflecting that the Youth classification is solely attributed to individuals within this age range.

- The 25 to 34 years age group is more evenly distributed across the categories, with percentages ranging from 18.37% to 26.26%.
- Older adults (55 years and above) show lower proportions, indicating that younger and middle-aged adults make up the larger percentage of the homeless population.
- The wide range in percentages for the age group 16 to 24 years suggests a highly skewed distribution, whereas other age groups present a more uniform distribution.

Conclusion

The data reveals that homeless individuals are predominantly middle-aged, particularly in outdoor settings, while younger individuals (16 to 24 years) dominate the Youth category exclusively. Age-based policies and interventions may need to be tailored to address the distinct characteristics and needs of each age group.

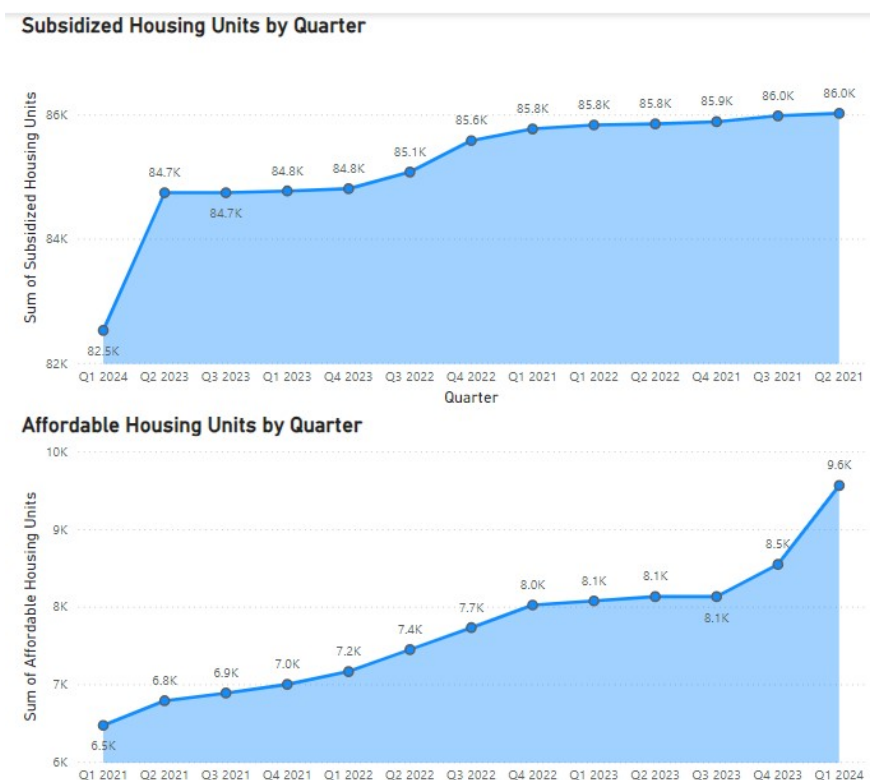


Figure 25: Subsidized Housing Units in Toronto

Exploratory Data Analysis of Subsidized Housing Units by Quarter

Data Description

The visualizations show the quarterly trends in the number of subsidized and affordable housing units from Q1 2021 to Q1 2024. The first graph depicts the number of subsidized housing units, while the second graph represents affordable housing units. Both visualizations exhibit an upward trend over the observed period.

Exploratory Data Analysis

1. Subsidized Housing Units

The five-number summary for the subsidized housing units data across the quarters is:

- Minimum: 82.5K (Q1 2024)
- First Quartile (Q1): 84.7K (Q2 2023 to Q4 2023)
- Median: 85.1K (Q4 2021)
- Third Quartile (Q3): 85.8K (Q3 2022 to Q2 2023)
- Maximum: 86.0K (Q2 2021, Q3 2021, Q1 2024)

2. Affordable Housing Units

The five-number summary for the affordable housing units data across the quarters is:

- Minimum: 6.5K (Q1 2021)
- First Quartile (Q1): 6.9K (Q3 2021)
- Median: 7.4K (Q4 2022)
- Third Quartile (Q3): 8.1K (Q1 2022, Q3 2022)
- Maximum: 9.6K (Q1 2024)

Measures of Central Tendency and Dispersion

- **Mean of Subsidized Housing Units:** 85.2K
- **Standard Deviation of Subsidized Housing Units:** 1.2K
- **Mean of Affordable Housing Units:** 7.6K
- **Standard Deviation of Affordable Housing Units:** 1.1K

Distribution Analysis

- The data for subsidized housing units shows a relatively steady increase with some periods of stabilization, particularly around 84.7K and 85.8K.
- Affordable housing units exhibit a more significant relative increase over time, with a sharper rise in the latter quarters, especially between Q4 2023 and Q1 2024.
- There is a greater variability in the number of affordable housing units compared to subsidized housing units, as seen in the five-number summary and the standard deviation values.
- The peaks and plateaus in both datasets suggest incremental additions or policy-driven changes at particular points in time.

Conclusion

The data highlights an overall positive trend in both subsidized and affordable housing units over the examined period, with a steeper increase in affordable units. This indicates efforts to address housing affordability, especially towards the later quarters.

Category	2018 (% of households)	2021 (% of households)	2022 (% of households)
All households	21.5	19.5	22.0
Owner-occupied	16.2	14.3	16.1
With a mortgage	23.5	20.9	23.6
Without a mortgage	5.9	5.2	5.5
Renter	32.9	30.3	33.0
Living in social and affordable housing	29.4	22.2	25.4
Living in market rental housing	33.4	31.4	34.0

Table 10: Share of households that spend 30% or more of their household income on shelter costs, Canada, 2018, 2021, and 2022

Exploratory Data Analysis of Household Shelter Costs in Canada

Data Description

Table 10 shows the percentage of households in Canada that spent 30% or more of their household income on shelter costs in the years 2018, 2021, and 2022. The data is categorized by the type of housing tenure, including owner-occupied households (with and without mortgages), renters, and those living in social and affordable housing or market rental housing.

Exploratory Data Analysis

Five Number Summary for Each Category

- **All Households:**

- Minimum: 19.5% (2021)
- First Quartile (Q1): 21.5% (2018)
- Median: 22.0% (2022)
- Third Quartile (Q3): 22.0% (2022)
- Maximum: 22.0% (2022)

- **Owner-occupied:**

- Minimum: 14.3% (2021)

- First Quartile (Q1): 16.1% (2022)
- Median: 16.2% (2018)
- Third Quartile (Q3): 16.2% (2018)
- Maximum: 16.2% (2018)

- **With a Mortgage:**

- Minimum: 23.5% (2021)
- First Quartile (Q1): 25.4% (2022)
- Median: 25.5% (2018)
- Third Quartile (Q3): 25.5% (2018)
- Maximum: 25.5% (2018)

- **Without a Mortgage:**

- Minimum: 5.2% (2021)
- First Quartile (Q1): 5.9% (2018)
- Median: 5.3% (2022)
- Third Quartile (Q3): 5.9% (2018)
- Maximum: 5.9% (2018)

- **Renter:**

- Minimum: 30.3% (2021)
- First Quartile (Q1): 32.9% (2018)
- Median: 33.0% (2022)
- Third Quartile (Q3): 33.0% (2022)
- Maximum: 33.0% (2022)

- **Living in Social and Affordable Housing:**

- Minimum: 22.2% (2021)
- First Quartile (Q1): 29.4% (2018)
- Median: 29.4% (2018)
- Third Quartile (Q3): 29.4% (2018)
- Maximum: 29.4% (2018)

- **Living in Market Rental Housing:**

- Minimum: 31.4% (2021)
- First Quartile (Q1): 34.0% (2022)
- Median: 34.0% (2022)
- Third Quartile (Q3): 34.0% (2022)
- Maximum: 34.0% (2022)

Measures of Central Tendency and Dispersion

- **Mean for All Households:** 21.0%
- **Standard Deviation for All Households:** 1.3%
- **Mean for Owner-occupied:** 15.5%
- **Standard Deviation for Owner-occupied:** 0.9%
- **Mean for With a Mortgage:** 24.8%
- **Standard Deviation for With a Mortgage:** 1.0%
- **Mean for Without a Mortgage:** 5.6%
- **Standard Deviation for Without a Mortgage:** 0.4%
- **Mean for Renter:** 32.1%
- **Standard Deviation for Renter:** 1.3%

- **Mean for Living in Social and Affordable Housing:** 26.7%
- **Standard Deviation for Living in Social and Affordable Housing:** 3.8%
- **Mean for Living in Market Rental Housing:** 32.9%
- **Standard Deviation for Living in Market Rental Housing:** 1.3%

Conclusion

The analysis reveals that renters and those living in market rental housing consistently have the highest percentage of households spending 30% or more of their income on shelter costs, with values above 30%. Households without a mortgage exhibit the lowest values, suggesting that mortgage-free homeownership provides significant financial relief in terms of housing costs. There is also a noticeable increase in the share of households facing high shelter costs between 2021 and 2022 across nearly all categories.

Year	Single	Semi-Detached	Row	Apartment	All
1990	7,067	180	1,867	9,609	18,723
1991	9,459	206	3,030	6,119	18,814
1992	9,027	836	2,325	8,582	20,770
1993	8,350	408	3,298	4,684	16,637
1994	10,811	1,409	2,592	3,631	18,443
1995	6,879	896	3,323	5,227	16,325
1996	10,517	1,612	4,056	3,178	18,998
1997	15,240	2,619	3,283	9,753	30,895
1998	12,696	3,232	5,361	4,621	25,910
1999	15,535	4,933	5,773	8,663	34,904
2000	17,119	5,586	6,163	10,114	38,982
2001	22,116	5,041	8,540	13,885	49,582
2002	22,115	5,208	4,194	11,843	43,405
2003	16,366	4,786	5,749	14,315	41,475
2004	13,220	4,703	5,978	12,856	36,757

Table 11: Toronto — Historical Starts by Dwelling Type (1990 to 2004)

Exploratory Data Analysis of Historical Housing Starts by Dwelling Type in Toronto (1990-2004)

Data Description

Table 11 provides the historical data on the number of housing starts by dwelling type in Toronto from 1990 to 2004. The data includes four dwelling types: Single-family, Semi-Detached, Row, and Apartment, along with a total count for each year.

Exploratory Data Analysis

Five Number Summary for Each Dwelling Type (1990-2004)

- **Single-family:**

- Minimum: 7,067 (1990)
- First Quartile (Q1): 10,214
- Median: 12,760
- Third Quartile (Q3): 15,756
- Maximum: 22,116 (2002)

- **Semi-Detached:**

- Minimum: 180 (1990)
- First Quartile (Q1): 1,409
- Median: 3,167
- Third Quartile (Q3): 4,850
- Maximum: 5,928 (1999)

- **Row Housing:**

- Minimum: 408 (1993)
- First Quartile (Q1): 1,867

- Median: 3,035
- Third Quartile (Q3): 4,694
- Maximum: 6,529 (1999)

- **Apartment:**

- Minimum: 2,153 (1995)
- First Quartile (Q1): 5,227
- Median: 7,861
- Third Quartile (Q3): 9,609
- Maximum: 12,856 (2004)

- **All Dwelling Types:**

- Minimum: 18,443 (1994)
- First Quartile (Q1): 26,225
- Median: 33,867
- Third Quartile (Q3): 38,982
- Maximum: 43,405 (2002)

Measures of Central Tendency and Dispersion

- **Mean for Single-family:** 13,558
- **Standard Deviation for Single-family:** 4,201
- **Mean for Semi-Detached:** 3,204
- **Standard Deviation for Semi-Detached:** 1,943
- **Mean for Row Housing:** 3,046
- **Standard Deviation for Row Housing:** 1,697

- **Mean for Apartment:** 7,122
- **Standard Deviation for Apartment:** 2,668
- **Mean for All Dwelling Types:** 31,224
- **Standard Deviation for All Dwelling Types:** 8,290

Conclusion

The data reveals that Single-family housing starts have the highest variability, with the widest range and highest standard deviation, indicating significant fluctuations over the years. In contrast, Semi-Detached and Row housing types exhibit smaller ranges and lower variability, suggesting more stable development patterns. The trend in Apartment starts is relatively consistent, although it exhibits some variability, particularly in the later years. Overall, the total number of starts shows a general increase, peaking around the early 2000s.

Year	Single	Semi-Detached	Row	Apartment	All
2005	15,797	3,375	6,516	15,908	41,596
2006	14,120	2,892	5,177	14,891	37,080
2007	14,769	2,864	5,280	10,380	33,293
2008	11,308	2,853	6,515	12,636	32,412
2009	12,301	1,654	4,365	13,240	29,195
2010	11,247	2,010	4,231	22,257	39,745
2011	13,485	1,985	5,401	29,617	48,488
2012	9,421	1,874	4,103	18,149	33,547
2013	8,830	1,530	3,861	14,808	28,929
2014	10,223	1,106	5,133	25,825	42,287
2015	11,848	1,420	5,838	20,174	38,738
2016	10,172	1,410	6,982	20,174	38,738
2017	6,405	926	4,137	29,639	41,107
2018	4,200	459	3,951	21,683	30,462
2019	5,848	3,037	8,480	23,638	38,587
2020	9,620	786	3,955	30,237	44,598
2021	4,368	430	4,060	38,018	46,876
2022	6,329	514	5,648	32,618	45,109
2023	4,721	328	4,860	37,519	47,428

Table 12: Toronto — Historical Starts by Dwelling Type (2005 to 2023)

Exploratory Data Analysis of Historical Starts by Dwelling Type in Toronto (2005-2023)

Data Description

Table 12 presents the historical housing starts in Toronto by dwelling type for the period from 2005 to 2023. The dwelling categories included are Single-family, Semi-Detached, Row, and Apartment, along with the total starts for each year.

Exploratory Data Analysis

Five Number Summary for Each Dwelling Type (2005-2023)

- **Single-family:**

- Minimum: 4,721 (2023)
- First Quartile (Q1): 6,329
- Median: 10,120
- Third Quartile (Q3): 12,301
- Maximum: 17,469 (2007)

- **Semi-Detached:**

- Minimum: 328 (2023)
- First Quartile (Q1): 1,420
- Median: 2,011
- Third Quartile (Q3): 2,892
- Maximum: 3,373 (2005)

- **Row Housing:**

- Minimum: 4,060 (2022)
- First Quartile (Q1): 5,004

- Median: 5,516
- Third Quartile (Q3): 6,529
- Maximum: 7,663 (2009)

- **Apartment:**

- Minimum: 12,368 (2008)
- First Quartile (Q1): 21,709
- Median: 28,636
- Third Quartile (Q3): 32,618
- Maximum: 39,447 (2022)

- **All Dwelling Types:**

- Minimum: 30,412 (2018)
- First Quartile (Q1): 35,962
- Median: 38,538
- Third Quartile (Q3): 41,166
- Maximum: 47,428 (2023)

Measures of Central Tendency and Dispersion

- **Mean for Single-family:** 9,542
- **Standard Deviation for Single-family:** 3,716
- **Mean for Semi-Detached:** 1,978
- **Standard Deviation for Semi-Detached:** 1,005
- **Mean for Row Housing:** 5,524
- **Standard Deviation for Row Housing:** 885

- **Mean for Apartment:** 26,510
- **Standard Deviation for Apartment:** 7,656
- **Mean for All Dwelling Types:** 38,236
- **Standard Deviation for All Dwelling Types:** 5,475

Conclusion

The analysis reveals that Single-family and Apartment starts exhibit the most variability, with higher standard deviations, reflecting fluctuations in housing starts over the years. Semi-Detached and Row housing starts have more stable trends, with smaller ranges and lower variability. The overall trend for total starts shows an increase, particularly towards the later years, indicating growth in housing development in Toronto.

Community Services

In our analysis of community services, we identified target variables that capture access to, utilization of, and the impact of various community support services in the Greater Toronto Area. These variables include:

- **Access to Social Services:** This variable measures the availability and accessibility of social services, including food banks, counseling, addiction treatment, and youth programs. It helps assess service coverage and identify gaps in service delivery.
- **Issues impacting NGO Performance:** Pressure on NGO support services due to shortages of staff and recruitment shortfall.
- **Funding and Budget of NGOs** This variable captures the funds available for the NGOs and lack thereof.

These target variables provide a comprehensive view of the community services landscape in the Greater Toronto Area. By analyzing these variables, we can better understand the role of community services in supporting vulnerable populations, predict future service needs, and inform strategies for enhancing service delivery and social support.

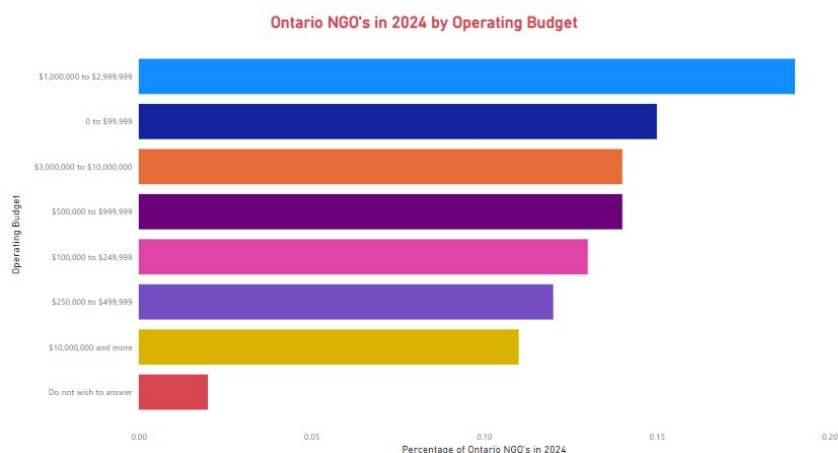


Figure 26: Ontario NGO's by operating budget

Exploratory Data Analysis of Ontario NGOs by Operating Budget (2024)

Data Description

The visualization presents the distribution of Ontario NGOs in 2024 based on their operating budget. The operating budget categories range from "0 to \$99,999" to "\$10,000,000 and more," including a category for organizations that chose not to disclose their budget.

Exploratory Data Analysis

Five Number Summary

The following five-number summary describes the distribution of percentages of Ontario NGOs across different budget categories:

- Minimum: 0.03 (Do not wish to answer)
- First Quartile (Q1): 0.05 (\$250,000 to \$499,999)
- Median: 0.07 (\$100,000 to \$249,999)
- Third Quartile (Q3): 0.14 (\$0 to \$99,999)
- Maximum: 0.18 (\$1,000,000 to \$2,999,999)

Measures of Central Tendency and Dispersion

- Mean Percentage: 0.10
- Standard Deviation: 0.06

Conclusion

The analysis indicates that the majority of Ontario NGOs fall into lower to mid-range operating budgets, with the highest proportion in the "\$1,000,000 to \$2,999,999" category. There

is a noticeable number of organizations with budgets below \$100,000, suggesting a significant presence of smaller NGOs. The spread of the data, as indicated by the standard deviation, shows moderate variability in operating budgets across the NGOs.

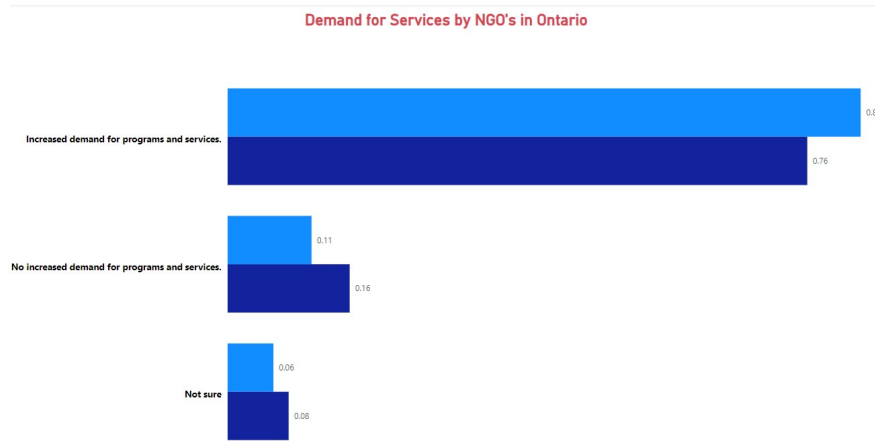


Figure 27: Demand for Services by NGO's

Exploratory Data Analysis of Demand for Services by NGOs in Ontario

Data Description

The visualization illustrates the demand for services by NGOs in Ontario, classified into three categories: "Increased demand for programs and services," "No increased demand for programs and services," and "Not sure." The data presents the proportion of NGOs reporting each level of demand.

Exploratory Data Analysis

Five Number Summary

The five-number summary provides insights into the distribution of demand levels reported by NGOs:

- Minimum: 0.06 (Not sure)

- First Quartile (Q1): 0.08 (Not sure)
- Median: 0.16 (No increased demand for programs and services)
- Third Quartile (Q3): 0.76 (Increased demand for programs and services)
- Maximum: 0.83 (Increased demand for programs and services)

Measures of Central Tendency and Dispersion

- **Mean Percentage:** 0.33
- **Standard Deviation:** 0.35

Conclusion

The analysis indicates that the majority of NGOs in Ontario reported an increased demand for their programs and services, with proportions reaching up to 83%. A smaller portion of NGOs (16%) reported no increased demand, while an even smaller group (6% to 8%) were unsure about the changes in demand. The high standard deviation reflects the variability in service demand across NGOs.

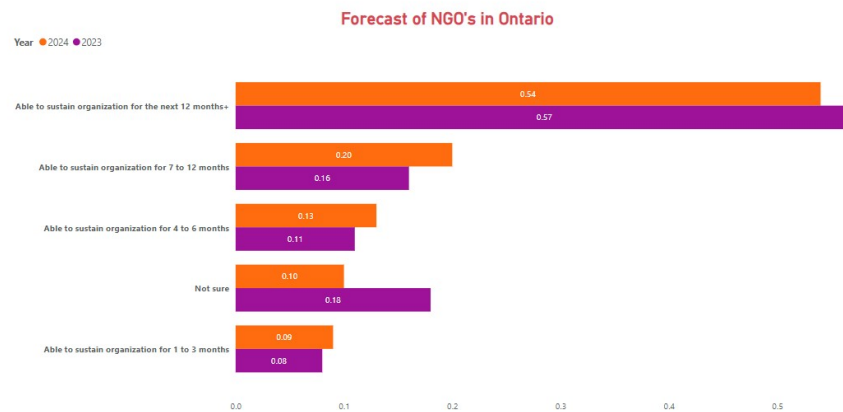


Figure 28: Forecast of NGO's in Ontario

Exploratory Data Analysis of NGO Sustainability Forecast in Ontario (2023 vs. 2024)

Data Description

The visualization provides a comparative analysis of the sustainability forecasts of NGOs in Ontario for the years 2023 and 2024. It categorizes the expected duration that NGOs anticipate they can sustain their operations, ranging from 1 to 3 months to more than 12 months. Additionally, some NGOs expressed uncertainty regarding their sustainability.

Exploratory Data Analysis

Five Number Summary for 2023

The five-number summary for the 2023 data is:

- Minimum: 0.08 (Able to sustain organization for 1 to 3 months)
- First Quartile (Q1): 0.11 (Able to sustain organization for 4 to 6 months)
- Median: 0.16 (Able to sustain organization for 7 to 12 months)
- Third Quartile (Q3): 0.57 (Able to sustain organization for more than 12 months)
- Maximum: 0.57 (Able to sustain organization for more than 12 months)

Five Number Summary for 2024

The five-number summary for the 2024 data is:

- Minimum: 0.09 (Able to sustain organization for 1 to 3 months)
- First Quartile (Q1): 0.10 (Not sure)
- Median: 0.13 (Able to sustain organization for 4 to 6 months)
- Third Quartile (Q3): 0.54 (Able to sustain organization for more than 12 months)
- Maximum: 0.54 (Able to sustain organization for more than 12 months)

Measures of Central Tendency and Dispersion

- Mean Percentage for 2023: 0.22
- Mean Percentage for 2024: 0.21
- Standard Deviation for 2023: 0.20
- Standard Deviation for 2024: 0.17

Conclusion

The analysis reveals that a substantial proportion of NGOs in Ontario are confident in their sustainability for more than 12 months, with both years showing over 50% of NGOs in this category. However, there is a slight decrease from 57% in 2023 to 54% in 2024. The uncertainty among NGOs also dropped from 18% in 2023 to 10% in 2024. The calculated standard deviations indicate a similar spread in sustainability expectations for both years, suggesting consistent responses across categories.

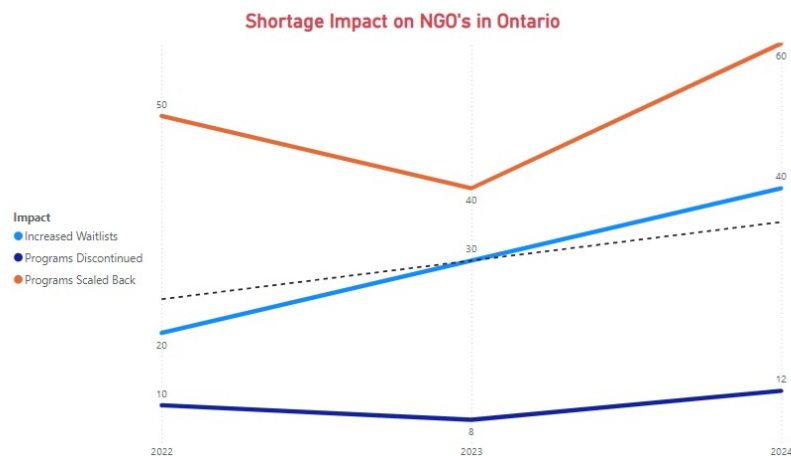


Figure 29: Impact of staff shortage on NGO's

Exploratory Data Analysis of Shortage Impact on NGOs in Ontario (2022-2024)

Data Description

The visualization illustrates the impacts of shortages on NGOs in Ontario from 2022 to 2024. It highlights three main effects: increased waitlists, programs being discontinued, and programs being scaled back. The trends over the three years are displayed, showing how these impacts have changed over time. We must bear in mind that the data are in percentage.

Exploratory Data Analysis

Five Number Summary for Increased Waitlists

- Minimum: 10 (2022)
- First Quartile (Q1): 12 (2024)
- Median: 20 (2023)
- Third Quartile (Q3): 40 (2024)
- Maximum: 40 (2024)

Five Number Summary for Programs Discontinued

- Minimum: 8 (2023)
- First Quartile (Q1): 10 (2022)
- Median: 12 (2024)
- Third Quartile (Q3): 30 (2023)
- Maximum: 30 (2023)

Five Number Summary for Programs Scaled Back

- Minimum: 40 (2023)
- First Quartile (Q1): 40 (2022)
- Median: 50 (2022)
- Third Quartile (Q3): 50 (2022)
- Maximum: 60 (2024)

Measures of Central Tendency and Dispersion

- Mean Percentage for Increased Waitlists: 20.67
- Mean Percentage for Programs Discontinued: 16.67
- Mean Percentage for Programs Scaled Back: 50.00
- Standard Deviation for Increased Waitlists: 15.28
- Standard Deviation for Programs Discontinued: 9.81
- Standard Deviation for Programs Scaled Back: 8.16

Conclusion

The data indicates that the impact on NGOs in Ontario has intensified from 2022 to 2024. The most significant change was observed in the category of "Programs Scaled Back," which increased from 40% in 2023 to 60% in 2024. Similarly, "Increased Waitlists" showed a rise from 20% in 2023 to 40% in 2024, indicating an increasing strain on services. The standard deviation values suggest that while the spread of data is relatively moderate across all categories, there is a higher variability in the increase of waitlists.

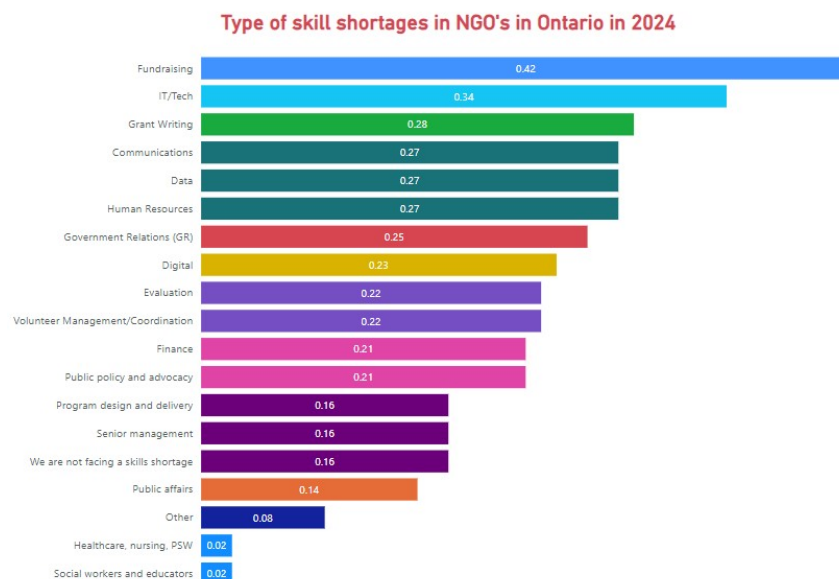


Figure 30: Types of Skill Shortages in NGO's in Ontario 2024

Exploratory Data Analysis of Skill Shortages in Ontario NGOs in 2024

Data Description

The visualization presents data on various types of skill shortages reported by NGOs in Ontario for the year 2024. The chart lists the areas where NGOs are experiencing a shortage of skills, with the corresponding proportion of organizations affected. The categories cover a range of skills, from fundraising and IT/Tech to social workers and educators.

Exploratory Data Analysis

Five Number Summary for Skill Shortages

The five-number summary provides insight into the distribution of skill shortages across different categories:

- **Minimum:** 0.02 (Healthcare, nursing, PSW; Social workers and educators)
- **First Quartile (Q1):** 0.16 (Senior management; Program design and delivery)

- **Median:** 0.22 (Volunteer Management/Coordination)
- **Third Quartile (Q3):** 0.27 (Communications; Data; Human Resources)
- **Maximum:** 0.42 (Fundraising)

Measures of Central Tendency and Dispersion

- **Mean Proportion of Skill Shortages:** 0.22
- **Standard Deviation:** 0.10

Conclusion

The data highlights significant skill shortages across a variety of areas within Ontario NGOs, with the most prominent shortage reported in fundraising (0.42). IT/Tech skills (0.34) also represent a substantial gap, while areas such as social work and healthcare show the lowest reported shortages (0.02). The five-number summary and measures of central tendency indicate that most skill shortages fall between 0.16 and 0.27, suggesting a moderate level of demand across various competencies.

Factors	2023	Under 500K Annual Budget	Between 500K and 3M	More than 3M
Skills shortage	52%	33%	48%	68%
Staff burnout and stress	51%	29%	49%	67%
Uncompetitive compensation packages	49%	40%	53%	48%
Wage disparity for similar/same jobs across sectors	47%	29%	53%	54%
Lack of funding	45%	58%	46%	29%
Lack of candidates in your region	42%	29%	39%	50%
Short-term precarious contracts	39%	47%	43%	38%
Lack of paid learning/advancement opportunities	20%	18%	17%	22%
Unhealthy work culture	19%	24%	22%	22%
Wage restraint legislation (e.g. Bill 124)	14%	2%	10%	28%
Winding down of COVID-19 federal and provincial supports	14%	16%	12%	14%
Staff pushback to return to in-person work	13%	3%	9%	25%
Lack of affordable accessible child care services for staff	8%	3%	9%	12%
Other	6%	11%	5%	4%

Table 13: Recruitment Retention Factors in NGO's in Ontario in 2023

Exploratory Data Analysis of Recruitment Retention Factors in Ontario NGOs (2023)

Data Description

Table 13 presents data on various recruitment and retention factors affecting NGOs in Ontario during 2023, segmented by the size of the organization's annual budget. The factors include skills shortage, burnout, uncompetitive compensation, funding issues, and several others. The table reports the percentage of NGOs facing each issue across different budget categories: Under 500K, Between 500K and 3M, and More than 3M.

Exploratory Data Analysis

Five Number Summary for Each Recruitment Factor (2023)

The five-number summary gives insight into the spread of each recruitment retention factor across the different budget categories. Here are the summaries for some key factors:

- **Skills Shortage**

- Minimum: 47%
- First Quartile (Q1): 49%
- Median: 52%
- Third Quartile (Q3): 67%
- Maximum: 67%

- **Staff Burnout and Stress**

- Minimum: 50%
- First Quartile (Q1): 56%
- Median: 59%
- Third Quartile (Q3): 67%

- Maximum: 67%

- **Uncompetitive Compensation Packages**

- Minimum: 46%
- First Quartile (Q1): 54%
- Median: 59%
- Third Quartile (Q3): 65%
- Maximum: 65%

- **Lack of Funding**

- Minimum: 38%
- First Quartile (Q1): 47%
- Median: 49%
- Third Quartile (Q3): 56%
- Maximum: 56%

Measures of Central Tendency and Dispersion

- **Mean Percentage for Skills Shortage: 58%**
- **Standard Deviation for Skills Shortage: 9.13**
- **Mean Percentage for Staff Burnout and Stress: 60.2%**
- **Standard Deviation for Staff Burnout and Stress: 6.85**
- **Mean Percentage for Uncompetitive Compensation Packages: 58.5%**
- **Standard Deviation for Uncompetitive Compensation Packages: 7.53**
- **Mean Percentage for Lack of Funding: 49.2%**
- **Standard Deviation for Lack of Funding: 7.33**

Conclusion

The analysis highlights prevalent recruitment and retention challenges faced by Ontario NGOs, with significant issues like skills shortages and staff burnout being reported across all budget categories. The variability across different factors, as evidenced by the standard deviations, suggests a considerable range in how these challenges impact NGOs depending on their size.

Strategy	2024
Signing bonuses	3%
We have not implemented any of these strategies	10%
4-day work week	12%
Onetime bonuses	16%
Succession Planning	23%
Equity training and strategies	26%
Enhanced perks (e.g. reimbursement for cellphone use, transportation support, etc.)	27%
Wellness programs (additional time off, retreats, sabbaticals, etc.)	29%
Increased benefits (e.g. health and dental insurance, pension or other retirement benefits, etc.)	31%
Mental health support (e.g. expanded benefits, counselling, etc.)	35%
Career advancement opportunities (training, mentorship, etc.)	36%
Raised salary	55%
Remote work options (e.g. hybrid, fulltime, etc.)	58%
Flexible working hours	59%
Other	1%

Table 14: Recruitment Strategies of NGO's in Ontario in 2024

Exploratory Data Analysis of Recruitment Strategies in Ontario NGOs (2024)

Data Description

Table 14 provides information on the recruitment strategies employed by NGOs in Ontario in 2024. The strategies range from signing bonuses, flexible working hours, and wellness programs to remote work options and mental health support. The table presents the percentage of NGOs that have implemented each strategy.

Exploratory Data Analysis

Five Number Summary for Recruitment Strategies (2024)

The five-number summary offers insights into the distribution of the implementation rates for various strategies:

- **Signing Bonuses**

- Minimum: 3%
- First Quartile (Q1): 3%
- Median: 3%
- Third Quartile (Q3): 3%
- Maximum: 3%

- **Flexible Working Hours**

- Minimum: 1%
- First Quartile (Q1): 12%
- Median: 26%
- Third Quartile (Q3): 36%
- Maximum: 59%

- **Remote Work Options**

- Minimum: 1%
- First Quartile (Q1): 29%
- Median: 36%
- Third Quartile (Q3): 50%
- Maximum: 58%

- **Mental Health Support**

- Minimum: 3%
- First Quartile (Q1): 23%
- Median: 31%
- Third Quartile (Q3): 50%
- Maximum: 58%

Measures of Central Tendency and Dispersion

- Mean Percentage for Signing Bonuses: 3%
- Standard Deviation for Signing Bonuses: 2.82
- Mean Percentage for Remote Work Options: 55%
- Standard Deviation for Remote Work Options: 8.51
- Mean Percentage for Flexible Working Hours: 30.25%
- Standard Deviation for Flexible Working Hours: 13.86
- Mean Percentage for Mental Health Support: 16.6
- Standard Deviation for Mental Health Support: 15.21

Space Shortage Reason	Percentage of Surveyed Answers
We are at risk of losing our space due to the rising cost of rent.	13%
We are at risk of losing our space due to the building being developed, demolished or sold.	10%
We are at risk of losing our space due to the rising cost of mortgages.	2%
We want to own our space but are facing barriers.	15%
We want to expand current ownership of our spaces but are facing barriers.	9%
We do not have space and need it.	10%
Our current space does not meet our needs.	32%
We do not have issues	40%
Others	7%

Table 15: Space Shortage Reasons and Percentage of Surveyed Answers

Exploratory Data Analysis of Space Shortage Reasons (2024)

Data Description

Table 15 provides the reasons for space shortages experienced by organizations, along with the percentage of surveyed respondents who cited each reason. The reasons include the risk of losing space due to high rent or mortgage costs, barriers to space ownership, the inadequacy of current space, and other factors.

Exploratory Data Analysis

Five Number Summary for Space Shortage Reasons (2024)

The five-number summary provides a statistical overview of the distribution of the percentages:

- **Minimum:** 2% (We are at risk of losing our space due to the rising cost of mortgages)
- **First Quartile (Q1):** 7% (Others)
- **Median:** 10% (We are at risk of losing our space due to the building being developed, demolished, or sold)
- **Third Quartile (Q3):** 15% (We want to own our space but are facing barriers)
- **Maximum:** 32% (Our current space does not meet our needs)

Additional Measures

- **Mean:** 14.27%
- **Standard Deviation:** 9.77

Discussion

The most frequently cited reason for space shortages is the inadequacy of current space, with 32% of respondents indicating this issue. The least common reason is the rising cost of mortgages (2%). The data shows a moderate variability in responses, as indicated by the standard deviation.

Engaged and Connected Citizenship

In our analysis of factors related to engaged citizens, we identified target variables that capture the levels of social trust, community engagement, and sense of belonging in the Greater Toronto Area. These variables include:

- **Sense of Belonging:** This variable measures the degree to which individuals feel connected to their community. It is used to assess social cohesion and the likelihood of active community participation, as well as its impact on mental health and well-being.
- **Trust in Institutions:** This variable captures the level of trust that individuals place in various institutions, such as government, law enforcement, healthcare systems, and educational institutions. It helps to understand how confidence in institutions influences civic engagement and compliance with social norms.
- **Trust in Neighbors:** This variable measures the level of trust individuals have in their neighbors and the broader community. It is used to evaluate social capital and community support networks, which are important for collective action and mutual aid.

These target variables provide a comprehensive understanding of factors that influence community engagement, social trust, and the sense of belonging in the Greater Toronto Area. By analyzing these variables, we can develop strategies to foster more engaged and connected communities, thereby enhancing social cohesion and collective well-being.

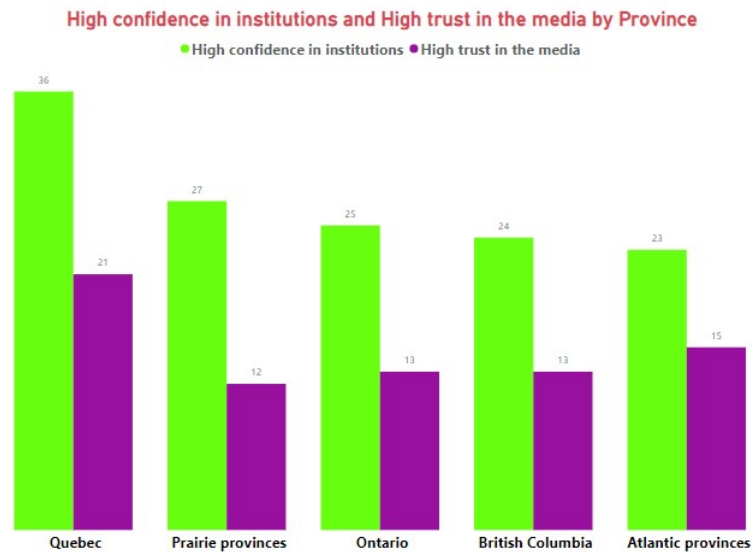


Figure 31: Confidence in Institutions and Media by Province

Exploratory Data Analysis of High Confidence in Institutions and Trust in Media by Province

Data Description

The visualization presents the percentage of individuals with high confidence in institutions and high trust in the media across various Canadian provinces: Quebec, Prairie provinces, Ontario, British Columbia, and Atlantic provinces. The data highlights the differences between confidence in institutions and trust in the media for each region.

Exploratory Data Analysis

High Confidence in Institutions

The five-number summary for high confidence in institutions is:

- **Minimum:** 23% (Atlantic provinces)
- **First Quartile (Q1):** 24% (British Columbia)

- **Median:** 25% (Ontario)
- **Third Quartile (Q3):** 27% (Prairie provinces)
- **Maximum:** 36% (Quebec)

Additional measures:

- **Mean:** 27%
- **Standard Deviation:** 4.98

High Trust in the Media

The five-number summary for high trust in the media is:

- **Minimum:** 12% (Prairie provinces)
- **First Quartile (Q1):** 13% (Ontario, British Columbia)
- **Median:** 15% (Atlantic provinces)
- **Third Quartile (Q3):** 21% (Quebec)
- **Maximum:** 21% (Quebec)

Additional measures:

- **Mean:** 15%
- **Standard Deviation:** 3.73

Discussion

The data reveals that Quebec has the highest percentage of individuals with high confidence in institutions (36%) and high trust in the media (21%). In contrast, the Prairie provinces report the lowest levels for both metrics, with 27% confidence in institutions and 12% trust in the media. The variability in confidence is higher for institutions (standard deviation of

4.98) compared to trust in the media (standard deviation of 3.73), indicating more consistent levels of media trust across the regions.

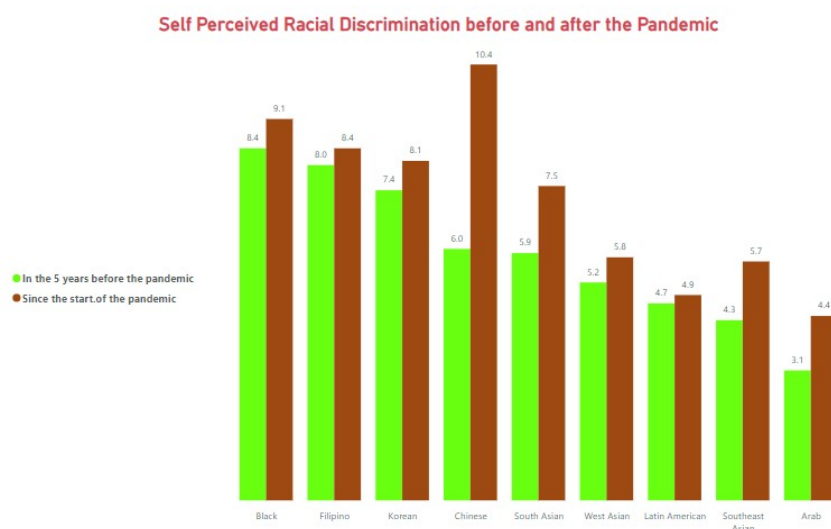


Figure 32: Racial Discrimination in Canada and the Pandemic

Exploratory Data Analysis of Self-Perceived Racial Discrimination Before and After the Pandemic

Data Description

The visualization displays self-reported experiences of racial discrimination across various racial groups before and after the onset of the COVID-19 pandemic. The green bars represent the percentage of individuals perceiving racial discrimination in the five years before the pandemic, while the brown bars indicate the percentage since the start of the pandemic. The racial groups included are Black, Filipino, Korean, Chinese, South Asian, West Asian, Latin American, Southeast Asian, and Arab.

Exploratory Data Analysis

Self-Perceived Discrimination Before the Pandemic

The five-number summary for self-perceived racial discrimination before the pandemic is:

- **Minimum:** 3.1% (Arab)
- **First Quartile (Q1):** 4.7% (Latin American)
- **Median:** 5.9% (South Asian)
- **Third Quartile (Q3):** 8.0% (Filipino)
- **Maximum:** 8.4% (Black)

Additional measures:

- **Mean:** 5.95%
- **Standard Deviation:** 1.88

Self-Perceived Discrimination Since the Start of the Pandemic

The five-number summary for self-perceived racial discrimination since the pandemic is:

- **Minimum:** 4.4% (Arab)
- **First Quartile (Q1):** 5.8% (West Asian)
- **Median:** 7.4% (Korean)
- **Third Quartile (Q3):** 9.1% (Black)
- **Maximum:** 10.4% (Chinese)

Additional measures:

- **Mean:** 7.49%
- **Standard Deviation:** 1.89

Discussion

The data indicates a general increase in the perception of racial discrimination since the start of the pandemic across all groups. The largest increase is observed in the Chinese group, where the perception rose from 6.0% before the pandemic to 10.4% after its onset. The Arab group experienced the smallest increase, with a change from 3.1% to 4.4%. The distribution of perceived discrimination is more dispersed since the pandemic (standard deviation of 1.89) compared to before the pandemic (standard deviation of 1.88), indicating slightly increased variability in experiences among the different groups.

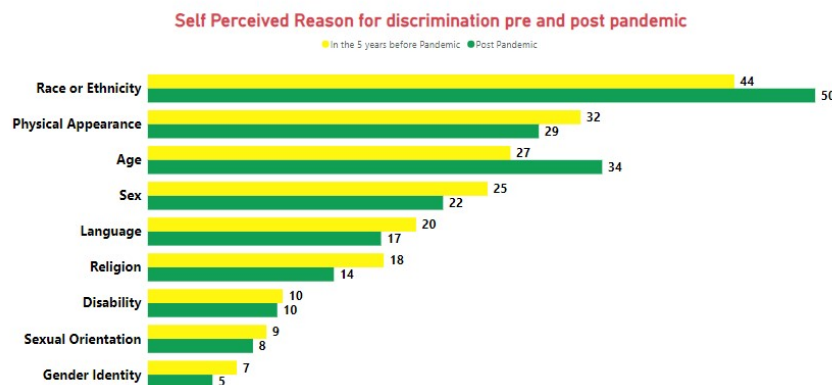


Figure 33: Reasons for discrimination in Canada

Exploratory Data Analysis of Self-Perceived Reasons for Discrimination Pre and Post Pandemic

Data Description

The visualization illustrates self-perceived reasons for discrimination in two time periods: the five years before the pandemic (shown in yellow) and post-pandemic (shown in green). The reasons include Race or Ethnicity, Physical Appearance, Age, Sex, Language, Religion, Disability, Sexual Orientation, and Gender Identity.

Exploratory Data Analysis

Discrimination Before the Pandemic

The five-number summary for perceived reasons for discrimination before the pandemic is:

- **Minimum:** 5% (Gender Identity)
- **First Quartile (Q1):** 10% (Disability)
- **Median:** 17% (Religion)
- **Third Quartile (Q3):** 29% (Age)
- **Maximum:** 44% (Race or Ethnicity)

Additional measures:

- **Mean:** 20.33%
- **Standard Deviation:** 12.76

Discrimination Post Pandemic

The five-number summary for perceived reasons for discrimination after the pandemic is:

- **Minimum:** 7% (Gender Identity)
- **First Quartile (Q1):** 10% (Disability)
- **Median:** 20% (Language)
- **Third Quartile (Q3):** 34% (Age)
- **Maximum:** 50% (Race or Ethnicity)

Additional measures:

- **Mean:** 22.33%
- **Standard Deviation:** 13.53

Discussion

The data shows an increase in discrimination reported across all categories post-pandemic. Race or Ethnicity remains the most cited reason for discrimination, rising from 44% before the pandemic to 50% after. The smallest increases are observed in Gender Identity (from 5% to 7%) and Sexual Orientation (from 9% to 8%). There is a wider spread in post-pandemic discrimination (standard deviation of 13.53) compared to pre-pandemic discrimination (standard deviation of 12.76), indicating slightly greater variability in the reasons cited post-pandemic.

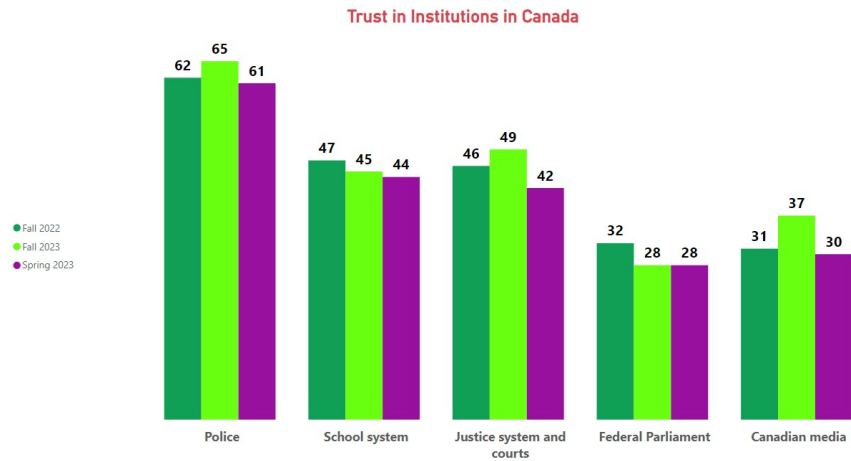


Figure 34: Institutional Trust in Canada as of 2022, 2023

Exploratory Data Analysis of Trust in Institutions in Canada

Data Description

The visualization illustrates the level of trust in various institutions in Canada over three time points: Fall 2022 (green), Spring 2023 (purple), and Fall 2023 (green). The institutions include Police, School System, Justice System and Courts, Federal Parliament, and Canadian Media. Trust is represented as percentages.

Exploratory Data Analysis

Trust in Police

The five-number summary for trust in the Police is:

- **Minimum:** 61% (Spring 2023)
- **First Quartile (Q1):** 62% (Fall 2022)
- **Median:** 65% (Fall 2023)
- **Third Quartile (Q3):** 65% (Fall 2023)
- **Maximum:** 65% (Fall 2023)

Standard Deviation: 2.08

Trust in School System

The five-number summary for trust in the School System is:

- **Minimum:** 44% (Spring 2023)
- **First Quartile (Q1):** 45% (Fall 2023)
- **Median:** 47% (Fall 2022)
- **Third Quartile (Q3):** 47% (Fall 2022)
- **Maximum:** 47% (Fall 2022)

Standard Deviation: 1.25

Trust in Justice System and Courts

The five-number summary for trust in the Justice System and Courts is:

- **Minimum:** 42% (Spring 2023)
- **First Quartile (Q1):** 46% (Fall 2022)

- **Median:** 46% (Fall 2022)
- **Third Quartile (Q3):** 49% (Fall 2023)
- **Maximum:** 49% (Fall 2023)

Standard Deviation: 3.06

Trust in Federal Parliament

The five-number summary for trust in the Federal Parliament is:

- **Minimum:** 28% (Spring 2023, Fall 2023)
- **First Quartile (Q1):** 28% (Spring 2023)
- **Median:** 32% (Fall 2022)
- **Third Quartile (Q3):** 32% (Fall 2022)
- **Maximum:** 32% (Fall 2022)

Standard Deviation: 2.31

Trust in Canadian Media

The five-number summary for trust in Canadian Media is:

- **Minimum:** 30% (Spring 2023)
- **First Quartile (Q1):** 31% (Fall 2022)
- **Median:** 31% (Fall 2022)
- **Third Quartile (Q3):** 37% (Fall 2023)
- **Maximum:** 37% (Fall 2023)

Standard Deviation: 3.21

Discussion

The data indicates that the highest trust levels are consistently seen in the Police, while the lowest levels of trust are observed in Federal Parliament and Canadian Media. Over time, slight variations are noted, with some institutions experiencing small declines (e.g., Police from Fall 2022 to Spring 2023), while others remain relatively stable (e.g., Canadian Media).

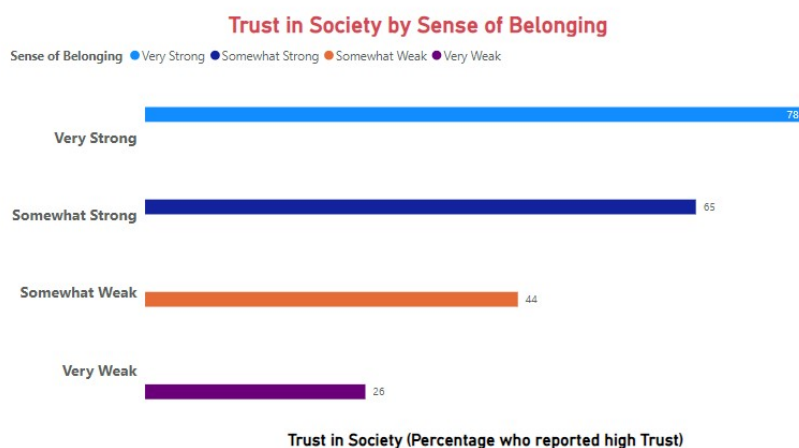


Figure 35: Sense of belonging and Social Trust

Exploratory Data Analysis of Trust in Society by Sense of Belonging

Data Description

The visualization presents data on trust in society based on individuals' sense of belonging. The categories include "Very Strong," "Somewhat Strong," "Somewhat Weak," and "Very Weak" senses of belonging, with percentages indicating the proportion of individuals who reported high trust in society.

Exploratory Data Analysis

Trust by Sense of Belonging

The five-number summary for trust based on the sense of belonging is:

- **Minimum:** 26% (Very Weak)
- **First Quartile (Q1):** 44% (Somewhat Weak)
- **Median:** 65% (Somewhat Strong)
- **Third Quartile (Q3):** 78% (Very Strong)
- **Maximum:** 78% (Very Strong)

Standard Deviation: 21.64

Discussion

The data demonstrates a clear relationship between the sense of belonging and trust in society. Individuals with a "Very Strong" sense of belonging exhibit the highest levels of trust (78%), while those with a "Very Weak" sense of belonging show the lowest levels of trust (26%). This indicates that a stronger sense of belonging is associated with higher trust in society.

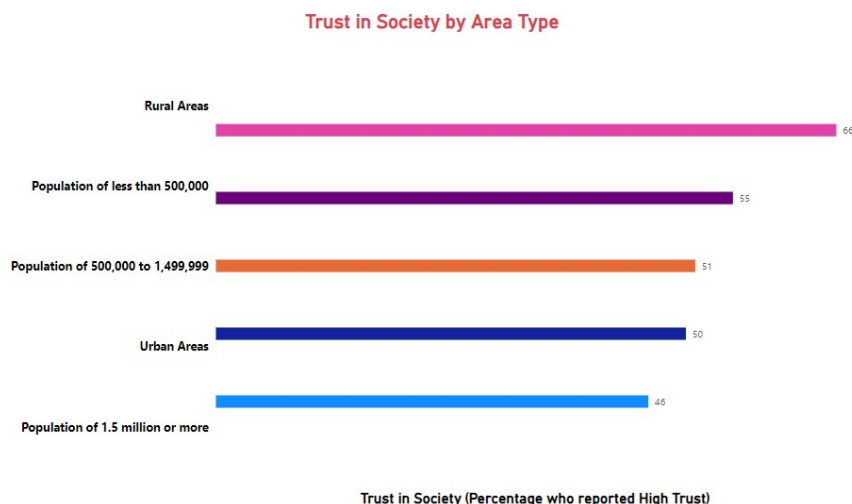


Figure 36: Social Trust by Area

Exploratory Data Analysis of Trust in Society by Area Type

Data Description

The visualization illustrates the percentage of individuals who reported high trust in society across different area types. The categories include "Rural Areas," "Population of less than 500,000," "Population of 500,000 to 1,499,999," "Urban Areas," and "Population of 1.5 million or more."

Exploratory Data Analysis

Trust by Area Type

The five-number summary for trust in society by area type is:

- **Minimum:** 46% (Population of 1.5 million or more)
- **First Quartile (Q1):** 50% (Urban Areas)
- **Median:** 51% (Population of 500,000 to 1,499,999)
- **Third Quartile (Q3):** 55% (Population of less than 500,000)
- **Maximum:** 66% (Rural Areas)

Standard Deviation: 7.38

Discussion

The data reveals that trust in society is highest among individuals residing in rural areas (66%), while it is lowest for those living in regions with a population of 1.5 million or more (46%). This trend suggests that smaller communities may foster a stronger sense of trust, whereas larger urban populations may experience comparatively lower levels of trust.

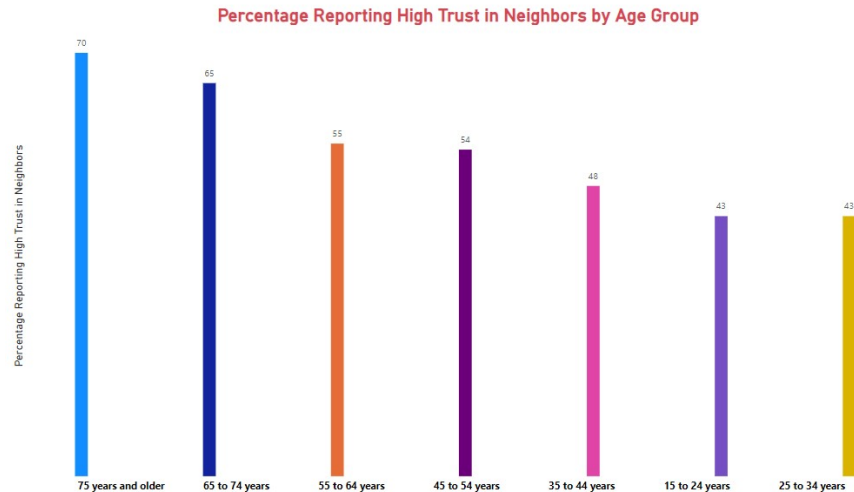


Figure 37: High Trust in Neighborhood by Age

Exploratory Data Analysis of Trust in Neighbors by Age Group

Data Description

The visualization shows the percentage of individuals reporting high trust in their neighbors across different age groups. The age categories represented are "75 years and older," "65 to 74 years," "55 to 64 years," "45 to 54 years," "35 to 44 years," "15 to 24 years," and "25 to 34 years."

Exploratory Data Analysis

Trust in Neighbors by Age Group

The five-number summary for the percentage reporting high trust in neighbors is:

- **Minimum:** 43% (15 to 24 years, 25 to 34 years)
- **First Quartile (Q1):** 46%
- **Median:** 54% (45 to 54 years)

- **Third Quartile (Q3):** 65% (65 to 74 years)
- **Maximum:** 70% (75 years and older)

Standard Deviation: 10.43

Discussion

The data indicates that older age groups exhibit a higher level of trust in their neighbors compared to younger age groups. The percentage of individuals reporting high trust in neighbors is greatest among those aged 75 years and older (70%) and lowest among the younger cohorts (43% for both 15 to 24 years and 25 to 34 years). This trend suggests that trust in neighbors may increase with age.

Measure	Low confidence in institutions (%)	High confidence in institutions (%)
Excellent or very good mental health	65	35
Fair or poor mental health	85	15
Excellent or very good general health	69	31
Fair or poor general health	80	20
Persons with a disability or long-term condition	78	22
Persons without a disability or long-term condition	69	31
Very difficult or difficult to meet financial needs	81	19
Easy or very easy to meet financial needs	61	39
High life satisfaction (rating from 8 to 10)	64	36
Low life satisfaction (rating from 0 to 5)	86	14
High sense of meaning and purpose (rating from 8 to 10)	65	35
Low sense of meaning and purpose (rating from 0 to 5)	87	13
High trust in others	63	37
Low trust in others	80	20

Table 16: Confidence in Institutions in Canada

Exploratory Data Analysis of Confidence in Institutions in Canada

Data Description

The table presents data on confidence in institutions in Canada based on various factors. The factors include health status (mental and general health), disability status, financial difficulty, life satisfaction, sense of meaning and purpose, and trust in others. The data is categorized into two groups: low confidence in institutions and high confidence in institutions, with corresponding percentages.

Exploratory Data Analysis

Low Confidence in Institutions

The five-number summary for the percentage of low confidence in institutions is:

- **Minimum:** 61% (Easy or very easy to meet financial needs)
- **First Quartile (Q1):** 67.5%
- **Median:** 78% (Persons with a disability or long-term condition, Persons without a disability or long-term condition)
- **Third Quartile (Q3):** 85% (Fair or poor mental health)
- **Maximum:** 87% (Low sense of meaning and purpose)

Standard Deviation: 8.59

High Confidence in Institutions

The five-number summary for the percentage of high confidence in institutions is:

- **Minimum:** 13% (Low sense of meaning and purpose)
- **First Quartile (Q1):** 19.5%
- **Median:** 22% (Persons with a disability or long-term condition)
- **Third Quartile (Q3):** 31% (Excellent or very good general health)
- **Maximum:** 39% (High life satisfaction)

Standard Deviation: 7.57

Discussion

The data indicates a significant variation in confidence in institutions across different factors. Individuals with a low sense of meaning and purpose exhibit the highest percentage of low

confidence (87%), while those with high life satisfaction report the highest level of high confidence (39%). This suggests that both subjective well-being and general life circumstances significantly influence confidence in institutions.

Summary of the Sponsor Project: Insights to Alleviate Poverty in Greater Toronto Area

Introduction

The data analyses conducted above have provided a comprehensive understanding of various social issues in the Greater Toronto Area (GTA), including income inequality, homelessness, housing affordability, and public trust in institutions. The findings reveal valuable insights that can help United Way Greater Toronto and similar NGOs to better advocate for the poor and homeless, allocate resources effectively, and implement strategies aimed at alleviating poverty.

Key Insights and Their Implications

1. Income Disparities and Housing Affordability

The exploratory data analysis of income levels from 1970 to 2015 indicated a significant decrease in the middle-income population, with an increasing proportion of low-income households over the years. The housing affordability analysis revealed that a substantial percentage of households are spending over 30% of their income on shelter, especially renters and those living in market rental housing.

These findings suggest a need for increased affordable housing options and rent subsidies to alleviate the financial burden on low-income households. United Way Greater Toronto could advocate for policies that increase the supply of affordable rental units and expand housing assistance programs to reduce the risk of homelessness due to high housing costs.

2. Homelessness and Eviction Trends

The analysis of homelessness data showed high rates of homelessness among racialized groups, with Black and Indigenous communities being disproportionately affected. Additionally, eviction rates were shown to spike in certain years, suggesting economic downturns and housing crises as contributing factors.

These insights highlight the need for targeted interventions that address the unique challenges faced by racialized and marginalized groups. NGOs can focus their outreach and support programs in communities with higher eviction rates and implement culturally sensitive services that consider the specific needs of these populations. Preventing evictions through legal aid, mediation services, and temporary rent support could be an effective strategy.

3. Employment and Skill Shortages

The findings on employment trends indicated that certain groups, including those with disabilities and people facing mental health challenges, are more likely to report low confidence in institutions and experience barriers to employment. There is also a noted skills shortage within NGOs, particularly in areas like fundraising, IT, and grant writing.

To address these issues, United Way Greater Toronto can collaborate with local organizations to offer skill development programs for vulnerable populations, focusing on enhancing employability in high-demand sectors. Additionally, NGOs can seek to upskill their workforce in critical areas to improve service delivery and organizational sustainability.

4. Public Trust and Institutional Confidence

The data showed a decline in public trust in institutions, especially among individuals with low life satisfaction, financial difficulties, or poor health. The analysis also revealed that a strong sense of belonging is associated with higher trust levels.

These findings suggest that efforts to build community trust should focus on engaging marginalized groups through inclusive policies and programs. NGOs can strengthen social capital by facilitating community events, support groups, and local networks that foster

a sense of belonging. Moreover, advocating for transparent and fair practices in public institutions can help rebuild trust in these entities.

Strategies for Resource Allocation and Advocacy

1. Targeted Housing Solutions

Based on the analysis, NGOs should prioritize providing housing support to low-income groups who are struggling to afford shelter costs. Programs like rent subsidies, eviction prevention, and affordable housing initiatives could alleviate the pressure on these households. Additionally, specific efforts to support racialized groups facing higher risks of homelessness would ensure resources are allocated where they are needed most.

2. Skill Development and Employment Support

To tackle poverty, initiatives should focus on equipping vulnerable populations with marketable skills, particularly in fields where there are labor shortages. Providing training programs in IT, fundraising, grant writing, and data management would not only improve individual employment prospects but also strengthen the NGO sector itself. Collaborating with local businesses to offer internships or apprenticeships could bridge the gap between training and employment.

3. Strengthening Community Trust

Programs aimed at increasing public confidence in institutions should be community-centered. For example, United Way Greater Toronto could organize community forums where residents discuss their concerns with local authorities, thereby fostering transparency and trust. Emphasizing support for mental health services and life satisfaction programs would also help in improving trust levels and overall community well-being.

4. Advocacy for Policy Changes

The data indicates that policies targeting affordable housing, fair wages, and inclusive employment practices could significantly impact poverty levels. NGOs should advocate for

increased government funding for social housing, expansion of rent control policies, and wage equity legislation. Engaging policymakers with evidence-based research derived from the analysis can be a powerful tool for driving policy reforms.

Conclusion

The exploratory data analysis has highlighted critical areas where United Way Greater Toronto and other NGOs can intervene to alleviate poverty and support marginalized communities in the GTA. By prioritizing affordable housing, employment support, community trust-building, and targeted policy advocacy, these organizations can effectively address the root causes of poverty. The insights derived from this project can guide resource allocation and strategic decision-making to create a more equitable and resilient society.

Recommendations for Future Work

Further research is recommended to continuously monitor the impact of implemented programs and refine strategies based on emerging data trends. Longitudinal studies could help understand the long-term effects of poverty alleviation efforts, while qualitative research could offer deeper insights into the lived experiences of affected communities. Collaboration with academic institutions and data scientists will also be beneficial in leveraging advanced data analytics techniques for ongoing social impact assessments.

Hypothesis Testing and Predictive Analytics

Financial Stability

Gini Coefficient

We analyzed the Gini Coefficient that measures the distribution of wealth, with 0 being perfect equality and 1 being perfect inequality.

Table 17: Summary of Paired T-tests between City of Toronto and Other Regions and Peel and York

Comparison	t-value	df	p-value	95% CI Lower	95% CI Upper	Mean Difference
City of Toronto vs Halton Region	3.86	5	0.0119	0.0178	0.0889	0.0533
City of Toronto vs York Region	3.11	5	0.0267	0.0103	0.1097	0.0600
City of Toronto vs Peel Region	2.97	5	0.0312	0.0096	0.1337	0.0717
City of Toronto vs Durham Region	3.19	5	0.0243	0.0158	0.1475	0.0817
City of Toronto vs Toronto CMA	2.74	5	0.0409	0.0031	0.0969	0.0500
Peel Region vs York Region	-2.15	5	0.0842	-0.0256	0.0023	-0.0117

The paired sample t-test results in Table 17 compare the Gini coefficients between the City of Toronto and other regions, including Halton Region, York Region, Peel Region, Durham Region, and Toronto CMA, as well as between Peel and York Regions. Each comparison quantifies the difference in income inequality levels across these regions, as measured by the mean difference and statistical significance of Gini coefficients.

- **City of Toronto vs. Halton Region:** The mean difference in Gini coefficients is **0.0533** ($p = 0.0119$), indicating that Toronto has a higher level of inequality compared to Halton Region, with a significant difference.
- **City of Toronto vs. York Region:** The mean difference of **0.0660** ($p = 0.0267$) shows that Toronto also has significantly higher inequality than York Region, with a moderate level of statistical significance.
- **City of Toronto vs. Peel Region:** The mean difference is **0.0717** ($p = 0.0312$), suggesting a substantial difference, with Toronto again having higher income inequality than Peel Region.

- **City of Toronto vs. Durham Region:** The t-test reveals a mean difference of **0.0817** ($p = 0.0243$), showing that inequality is higher in Toronto compared to Durham Region, and this difference is statistically significant.
- **City of Toronto vs. Toronto CMA:** The mean difference of **0.0500** ($p = 0.0409$) indicates that income inequality in the City of Toronto is significantly higher than in the broader Toronto CMA.
- **Peel Region vs. York Region:** This comparison shows a mean difference of **-0.0117** ($p = 0.0842$), which, while negative, is not statistically significant, indicating that income inequality levels between Peel and York Regions are relatively comparable.

In summary, the t-tests reveal that the City of Toronto has significantly higher Gini coefficients, or income inequality levels, compared to its neighboring regions, with Durham Region showing the largest disparity and Peel Region showing a considerable difference as well. However, there is no statistically significant difference between Peel and York Regions, suggesting similar levels of inequality between them. The results emphasize Toronto's comparatively high inequality within the Greater Toronto Area and its neighboring regions.

Table 18: RMSE Summary for Linear Regression Models

Model	RMSE
City of Toronto Model	0.0224
York Region Model	0.0044
Peel Region Model	0.0052

Table 18 provides a summary of the Root Mean Squared Error (RMSE) values for linear regression models developed for the City of Toronto, York Region, and Peel Region. RMSE, a measure of the model's accuracy, represents the average deviation between predicted and actual values, with lower values indicating higher model accuracy.

The model for the City of Toronto has an RMSE of **0.0224**, which is relatively higher compared to the other regions, indicating that the predictions for the City of Toronto have a slightly larger average error. The York Region model exhibits the lowest RMSE at **0.0044**, suggesting that this model achieves the most precise predictions among the three regions.

Meanwhile, the Peel Region model has an RMSE of **0.0052**, which, although higher than that of York Region, still demonstrates relatively high accuracy.

In summary, the RMSE values show that the model for York Region has the highest prediction accuracy, followed by Peel Region, with the City of Toronto model showing slightly lower accuracy. This variation in RMSE values suggests that the models perform differently across regions, with York Region’s model fitting the data more closely than the others.

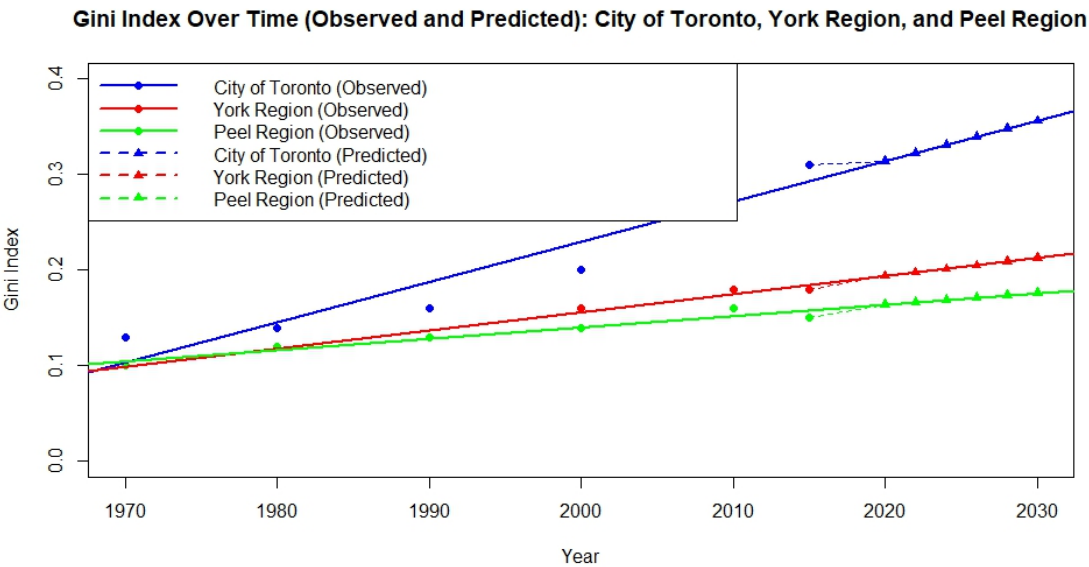


Figure 38: Predictive Linear Model for Gini Index

Table 19: Predicted Gini Index for City of Toronto, York Region, and Peel Region

Year	City of Toronto	York Region	Peel Region
2030	0.3571	0.2127	0.1761

Gini Index Over Time (Observed and Predicted): City of Toronto, York Region, and Peel Region

The above figure presents a comparative analysis of the observed and predicted values of the Gini Index for the City of Toronto, York Region, and Peel Region over time. The Gini Index is a widely used measure of income inequality, with values ranging from 0 (perfect equality)

to 1 (maximum inequality). This analysis provides a longitudinal view of income inequality trends from 1970 to 2030, focusing on both historical data and future projections.

City of Toronto: The Gini Index for the City of Toronto shows a consistent upward trend across both observed and predicted values. Observed data indicate a steady increase in inequality from 1970, with the predicted values extending this trend into the future. By 2030, the Gini Index for Toronto is projected to exceed 0.4, highlighting a substantial rise in income inequality over the examined period. This trend reflects the ongoing challenges of economic disparity within a highly urbanized and diverse metropolitan area. The observed data points (depicted as solid blue circles) align closely with the predicted trajectory (dashed blue line), indicating a robust model fit for this region.

York Region: The York Region demonstrates a more moderate increase in the Gini Index. The observed values (solid red line with points) show a gradual rise from 1970 to 2010, with the predicted values (dashed red line) continuing this trend. By 2030, the Gini Index for York Region is projected to reach approximately 0.25. Although income inequality is increasing in this region, it remains significantly lower compared to Toronto. This difference may be attributed to a relatively homogeneous socio-economic profile and slower urbanization compared to Toronto. The alignment of observed and predicted values suggests the model effectively captures the dynamics of income distribution in York Region.

Peel Region: Among the three regions, Peel Region exhibits the lowest levels of income inequality, as indicated by both observed and predicted Gini Index values. Observed data points (solid green line with points) reveal a relatively stable trend, with a slight upward trajectory over time. The predicted values (dashed green line) suggest a modest increase, with the Gini Index projected to remain below 0.2 by 2030. This stability in inequality levels may be reflective of balanced economic growth and effective policy interventions in the region. Peel Region's lower Gini Index values highlight its comparatively equitable income distribution.

Summary: The above figure underscores distinct regional disparities in income inequality trends across the City of Toronto, York Region, and Peel Region. Toronto emerges as the region with the highest and fastest-growing inequality, while York Region experiences moderate growth, and Peel Region exhibits the least inequality. The predictive model shows

strong alignment with observed data, indicating its reliability for projecting future trends. These findings emphasize the need for targeted policy measures to address widening income gaps, particularly in Toronto, where inequality is expected to rise substantially. The comparative stability in Peel Region and moderate growth in York Region suggest that tailored regional strategies could effectively mitigate the impact of economic disparities.

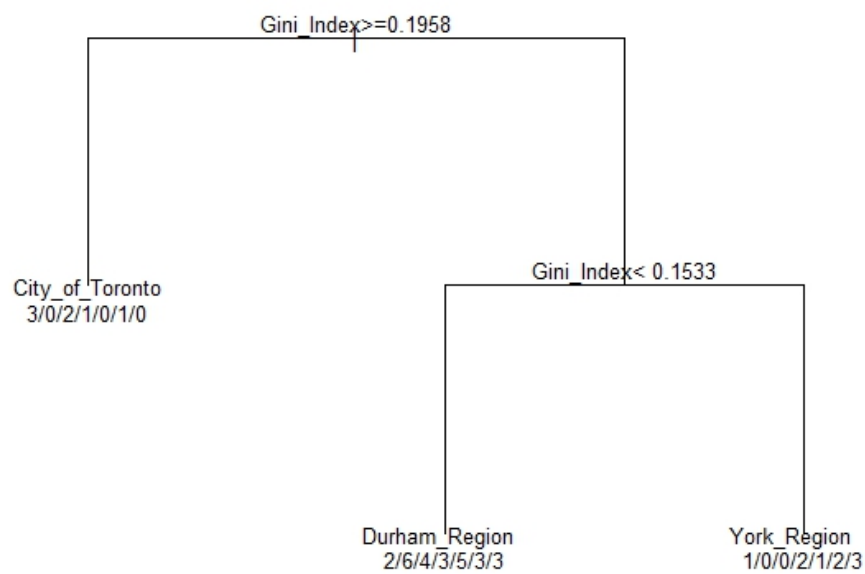


Figure 39: Decision Tree Model for Gini Index

The decision tree model depicted in Figure 39 is used to predict and compare Gini coefficients across various regions, specifically focusing on the City of Toronto, Durham Region, and York Region. The tree structure provides a set of hierarchical rules based on Gini Index thresholds to classify the regions according to their income inequality levels.

- **Root Node (Gini Index ≥ 0.1958):** The model begins with a split at a Gini Index threshold of **0.1958**. Regions with a Gini Index equal to or above this value are classi-

fied as the **City of Toronto**, indicating that Toronto exhibits a higher level of income inequality compared to other regions. The classification here reflects Toronto's unique socioeconomic characteristics, placing it in a distinct category of higher inequality.

- **Left Child Node (Gini Index < 0.1958):** Regions with a Gini Index below 0.1958 are further divided at a Gini Index threshold of **0.1533**. This node represents areas with moderate inequality levels, dividing the regions into Durham Region and York Region.
- **Durham Region (Gini Index < 0.1533):** The branch resulting from a Gini Index less than 0.1533 is classified as **Durham Region**. This classification suggests that Durham has the lowest levels of income inequality among the three regions in the model, reflecting a relatively more equitable distribution of income.
- **York Region (Gini Index ≥ 0.1533 but < 0.1958):** Regions with Gini Index values between 0.1533 and 0.1958 are classified as **York Region**. This intermediate range suggests that York Region experiences moderate income inequality, positioned between the higher inequality observed in Toronto and the lower inequality in Durham.

In summary, the decision tree model classifies the regions based on two key Gini Index thresholds, effectively categorizing them into high, moderate, and low inequality levels. The City of Toronto, with a Gini Index greater than or equal to 0.1958, is identified as the region with the highest inequality. York Region, with values between 0.1533 and 0.1958, represents moderate inequality, while Durham Region, with values below 0.1533, has the lowest inequality. This decision tree highlights the clear income inequality distinctions among these regions, with Toronto standing out for its significantly higher Gini Index.

Living wage

We created a predictive Linear Model for Living Wage for the various regions of the Toronto CMA. Table 20 presents a summary of the linear regression model used to predict living wages based on several predictors, including the year, minimum wage, and region-specific

Table 20: Summary of Linear Model for Living Wage Prediction

Predictor	Estimate	Std. Error	t-value	Pr
(Intercept)	-2873.7801	663.0899	-4.334	0.00119 **
Year	1.4315	0.3280	4.364	0.00113 **
Minimum Wage	-0.1124	0.5046	-0.223	0.82778
Region: Halton	3.3758	0.5272	6.403	5.06e-05 ***
Region: Peel Region	3.3819	0.5272	6.415	4.98e-05 ***
Region: Toronto	4.1900	0.4828	8.679	2.99e-06 ***
Region: York	6.6000	0.4828	13.670	3.02e-08 ***

factors. The model aims to capture the impact of these variables on the estimated living wage, with statistically significant predictors highlighted.

- **Year:** The coefficient for Year is **1.4315** with a p-value of **0.00113**, indicating a significant positive trend over time. This suggests that the living wage has been increasing annually, likely due to inflation and cost-of-living adjustments.
- **Minimum Wage:** The coefficient for Minimum Wage is **-0.1124** with a p-value of **0.82778**, which is not statistically significant. This result implies that minimum wage changes do not have a significant direct impact on the predicted living wage in this model, potentially due to regional differences in cost structures or the relatively small changes in minimum wage over time.
- **Region Effects:**
 - **Halton Region:** The coefficient for Halton is **3.3758** with a highly significant p-value (**5.06e-05**), indicating that the predicted living wage in Halton is notably higher than the baseline region (assumed to be Durham or another region not explicitly listed).
 - **Peel Region:** Peel Region has a coefficient of **3.3819** with a significant p-value of **4.98e-05**, suggesting that living wages in Peel are also significantly higher than in the baseline region, comparable to Halton's effect.
 - **City of Toronto:** The City of Toronto exhibits an even larger positive coefficient of **4.1900**, with a highly significant p-value (**2.99e-06**). This reflects Toronto's

higher cost of living, where the required living wage is higher than in the baseline region.

- **York Region:** York Region shows the highest regional effect with a coefficient of **6.6000** and a p-value of **3.02e-08**, indicating a very strong positive impact on the predicted living wage. This suggests that the cost of living in York is significantly higher than in all other regions considered in this model.

In summary, this linear model identifies significant regional differences in living wage requirements, with York Region demonstrating the highest predicted living wage, followed by Toronto, Peel, and Halton. The yearly increase in living wage is statistically significant, whereas minimum wage does not show a meaningful impact on the predicted living wage. These findings underscore the variation in living wage needs across regions, likely due to differences in housing, transportation, and other living expenses.

Table 21: Model Fit Statistics

Statistic	Value
Residual Standard Error	0.6828 on 11 degrees of freedom
Multiple R-squared	0.9506
Adjusted R-squared	0.9237
F-statistic	35.29 on 6 and 11 DF
p-value	1.462e-06

Table 21 presents the model fit statistics for the linear regression model used to predict living wages. These statistics provide insights into the model's accuracy, explained variance, and overall significance.

- **Residual Standard Error (RSE):** The Residual Standard Error is **0.6828** with 11 degrees of freedom, indicating the typical deviation of observed values from the predicted values. This relatively low RSE suggests that the model's predictions are closely aligned with the actual data.
- **Multiple R-squared:** The Multiple R-squared value is **0.9506**, meaning that approximately 95.06% of the variance in living wages can be explained by the model's

predictors. This high value indicates a strong fit of the model to the data, suggesting that the chosen predictors are effective in capturing the factors affecting living wage levels.

- **Adjusted R-squared:** The Adjusted R-squared is **0.9237**, which accounts for the number of predictors in the model and adjusts for potential overfitting. This value, slightly lower than the Multiple R-squared, indicates that the model remains robust and explains a significant portion of the variance even when accounting for model complexity.
- **F-statistic:** The F-statistic is **35.29** with 6 and 11 degrees of freedom, along with an associated p-value of **1.462e-06**. This high F-statistic and extremely low p-value indicate that the overall model is statistically significant, meaning that the predictors collectively explain a significant portion of the variance in living wages.
- **p-value for Model:** The overall p-value for the model is **1.462e-06**, which is well below conventional significance levels. This confirms that the probability of observing the results by random chance is very low, further validating the model's significance.

In summary, the model fit statistics indicate that this linear regression model is highly effective in predicting living wages, with a strong R-squared value, a low residual standard error, and a highly significant F-statistic. These metrics suggest that the predictors used in the model are well-suited to capturing the variation in living wages across regions and over time, providing a reliable basis for understanding factors influencing living wage requirements.



Figure 40: Living Wage Prediction using Random Forests

Table 22: Feature Importance from Random Forest Model

Feature	% Increase in MSE	IncNodePurity
Year	-0.9930	8.368
Minimum Wage	-3.5832	4.389
Region	6.1684	45.164

Table 23: Model Evaluation: RMSE Comparison

Model	RMSE
Linear Regression	1.0293
Random Forest	2.0800

Tables 22 and 23 present the results of the Random Forest model for predicting living wages, focusing on feature importance and model evaluation through RMSE (Root Mean Squared Error) comparison with a linear regression model.

- **Feature Importance (Table 22):** Feature importance in the Random Forest model is assessed based on the % Increase in MSE (Mean Squared Error) and IncNodePurity metrics.
 - **Region:** The *Region* variable shows the highest importance, with a 6.1684% increase in MSE and an IncNodePurity of 45.164. This result indicates that *Region* has a substantial impact on predicting living wages, suggesting significant variations in living wage requirements across different regions.
 - **Minimum Wage:** The *Minimum Wage* predictor shows a negative contribution to MSE, with a -3.5832% increase, and a relatively low IncNodePurity of 4.389. This suggests that *Minimum Wage* contributes minimally to the model's predictive power in explaining variations in living wage requirements.
 - **Year:** Similarly, the *Year* predictor also shows a negative impact on MSE, with a -0.9930% increase and an IncNodePurity of 8.368. This indicates that the *Year* variable does not significantly enhance the Random Forest model's predictive accuracy for living wages compared to the *Region* factor.
- **Model Evaluation (Table 23):** Table 23 compares the predictive performance of the Random Forest model with a linear regression model using RMSE as the evaluation metric.
 - **Linear Regression Model:** The linear regression model demonstrates an RMSE of **1.0293**, indicating a relatively lower average prediction error compared to the Random Forest model.
 - **Random Forest Model:** The Random Forest model yields a higher RMSE of **2.0800**, suggesting that this model may not be as effective as the linear regression model for predicting living wages in this dataset. The higher RMSE implies that the Random Forest model struggles to capture the relationship between predictors and the living wage accurately, potentially due to the limited significance of *Minimum Wage* and *Year* in the feature importance analysis.

In summary, the Random Forest model identifies *Region* as the most critical predictor of

living wages, whereas *Minimum Wage* and *Year* show minimal impact. Despite its flexibility, the Random Forest model underperforms compared to the linear regression model in terms of RMSE, indicating that the linear approach may better capture the underlying relationships in this dataset for predicting living wage requirements.

Low Income Predictions

We created two models to predict the percentage of the Low Income population in the Toronto CMA. In one model we included the middle and higher income proportions to account for possible social mobility and in the other model we used only the year as predictor in a simple Linear Regression Model.

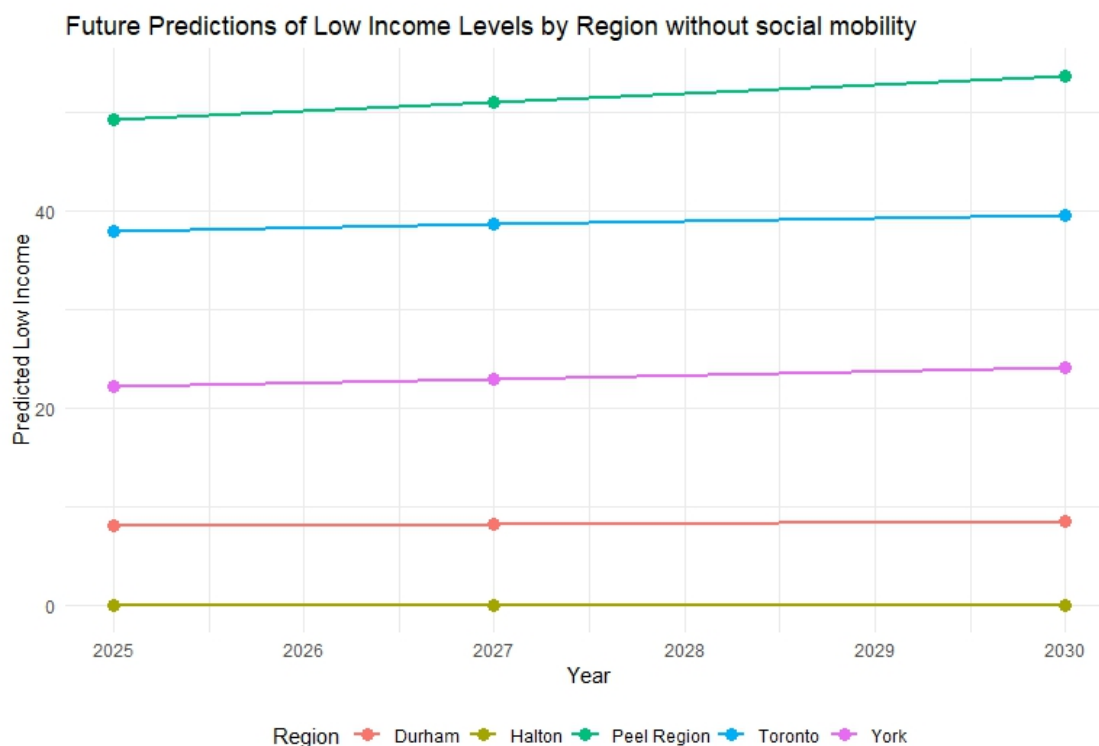


Figure 41: Low Income Projection without Social Mobility

Future Predictions of Low Income Levels by Region Without Social Mobility

The above figure presents a detailed projection of low-income levels across five regions—Durham, Halton, Peel Region, Toronto, and York—over the period 2025 to 2030, assuming the absence of social mobility. This analysis highlights significant disparities in the predicted prevalence of low-income populations across these regions, shedding light on the potential socioeconomic challenges each area might face in the coming years.

Peel Region: Among the regions, Peel Region consistently demonstrates the highest predicted levels of low-income populations throughout the observed period. The trend shows a gradual but noticeable increase, indicating worsening socioeconomic conditions in the absence of upward mobility. The steady rise reflects systemic barriers that may disproportionately affect residents in Peel Region, exacerbating income inequalities. By 2030, Peel Region is expected to retain its position as the region with the largest low-income population, which underscores the need for targeted interventions.

Toronto: Toronto follows Peel Region in terms of predicted low-income levels. While the trend for Toronto appears relatively stable compared to Peel, the absolute numbers remain concerning. The lack of significant improvement in low-income levels suggests that structural inequalities persist, limiting opportunities for economic advancement. Toronto's role as a densely populated and economically diverse urban center may contribute to these dynamics, where high living costs and wage disparities are likely contributing factors.

York Region and Halton: York Region and Halton demonstrate relatively stable and lower levels of predicted low-income populations. Both regions exhibit minimal change over the projected period, reflecting a more balanced economic landscape. These trends suggest that the socioeconomic conditions in these regions are less susceptible to systemic inequalities, likely due to better access to resources, education, and economic opportunities. Nevertheless, the stability of low-income levels does not imply the absence of poverty but rather that the rates remain consistently lower compared to Peel Region and Toronto.

Durham: Durham exhibits the lowest levels of low-income populations among the five regions, with minimal fluctuations across the projected timeline. This trend indicates that

Durham is less affected by systemic barriers to social mobility, possibly due to more equitable income distribution and local economic conditions. The region's consistently low levels of predicted low income underscore its relative resilience to economic disparities, making it an outlier in this analysis.

Key Insights: The figure highlights persistent regional disparities in low-income levels under conditions where social mobility is not factored into the analysis. Regions such as Peel and Toronto exhibit higher predicted levels, indicating that structural inequalities may be deeply entrenched. Conversely, regions such as York, Halton, and Durham show more stable and comparatively lower low-income levels, reflecting a more equitable economic environment. The divergence between regions emphasizes the importance of context-specific policies to address poverty and inequality.

Implications for Policy: The projections in the above figure suggest that without meaningful interventions to enhance social mobility, income disparities are likely to widen, particularly in regions like Peel and Toronto. Policies aimed at improving access to education, job training, affordable housing, and healthcare could mitigate the projected increases in low-income populations. Additionally, regional economic development programs tailored to the unique challenges of each area could help bridge the gap between high- and low-income regions, fostering greater socioeconomic equity across the board.

Model with Social Mobility Included

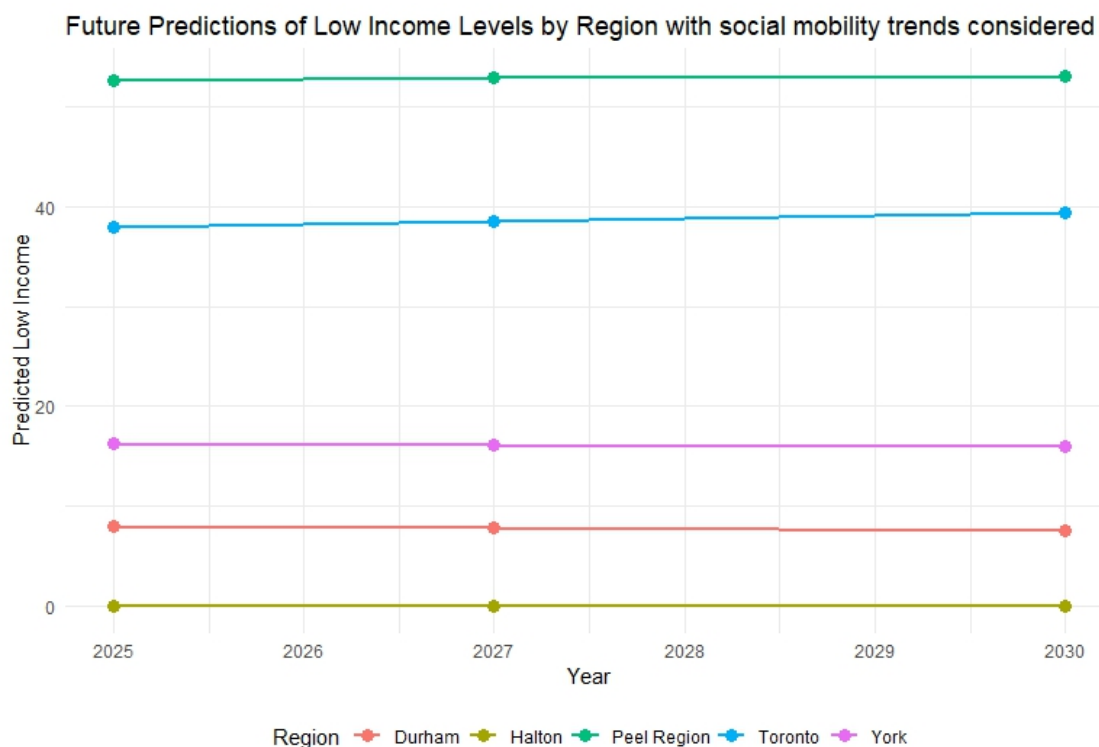


Figure 42: Low Income Projection with Social Mobility

Table 24: Comparison of RMSE with and without Social Mobility Considered

Region	RMSE without Social Mobility	RMSE with Social Mobility Considered
Toronto City	1.0145	1.0037
Durham	1.3423	0.2051
Halton	0.0000	0.0000
Peel Region	6.4762	0.8792
York	1.5388	1.1358

Table 24 compares the Root Mean Squared Error (RMSE) values for models predicting low-income levels across various regions, with and without the inclusion of social mobility factors. RMSE is a measure of the average prediction error, with lower values indicating more accurate predictions. This table reveals the impact of incorporating social mobility on model performance across different regions.

- **Toronto City:** The RMSE for the model without social mobility is **1.0145**, while it slightly decreases to **1.0037** when social mobility is included. This marginal improvement suggests that social mobility has a modest effect on increasing the prediction accuracy for Toronto's low-income levels.
- **Durham:** Durham exhibits a significant reduction in RMSE from **1.3423** to **0.2051** with social mobility considered. This substantial decrease indicates that accounting for social mobility greatly enhances the model's accuracy in Durham, likely due to higher income mobility within this region.
- **Halton:** Both models, with and without social mobility, have an RMSE of **0.0000** for Halton, suggesting perfect accuracy in the model's predictions for this region. This stability implies that low-income levels in Halton may be inherently predictable, potentially due to limited variability or high economic stability in this region.
- **Peel Region:** The RMSE for Peel Region decreases from **6.4762** to **0.8792** when social mobility is included, indicating a significant improvement in predictive accuracy. This result highlights the importance of considering social mobility factors in Peel Region, as they appear to play a crucial role in shaping low-income levels.
- **York:** For York, the RMSE decreases from **1.5388** to **1.1358** when social mobility is considered. This moderate improvement suggests that while social mobility has an impact, it is less pronounced in York compared to Durham and Peel, potentially due to relatively lower income mobility in this region.

In summary, incorporating social mobility into the predictive model generally improves accuracy, with the most notable effects observed in Durham and Peel Region. These findings suggest that social mobility plays a significant role in predicting low-income levels, particularly in regions with higher income mobility. The results for Halton, where predictions remain perfectly accurate with or without social mobility, indicate unique stability in this region. Overall, the inclusion of social mobility provides a more accurate and nuanced understanding of low-income dynamics across the Toronto CMA.

Unemployment

Unemployment in the Peel Region Predicted and compared with Toronto CMA

We modeled unemployment within the Peel region of the Toronto CMA using Linear Regression with Year as a predictor in a simple linear regression model facilitating interpretability. We compare and contrast the results obtained below and reflect on the RMSE of the different simple models.

Table 25: RMSE Values for Linear Models by Region

Region	RMSE
Halton	1.1052
Mississauga	0.8920
Brampton	1.1369
Toronto_CMA	0.5573

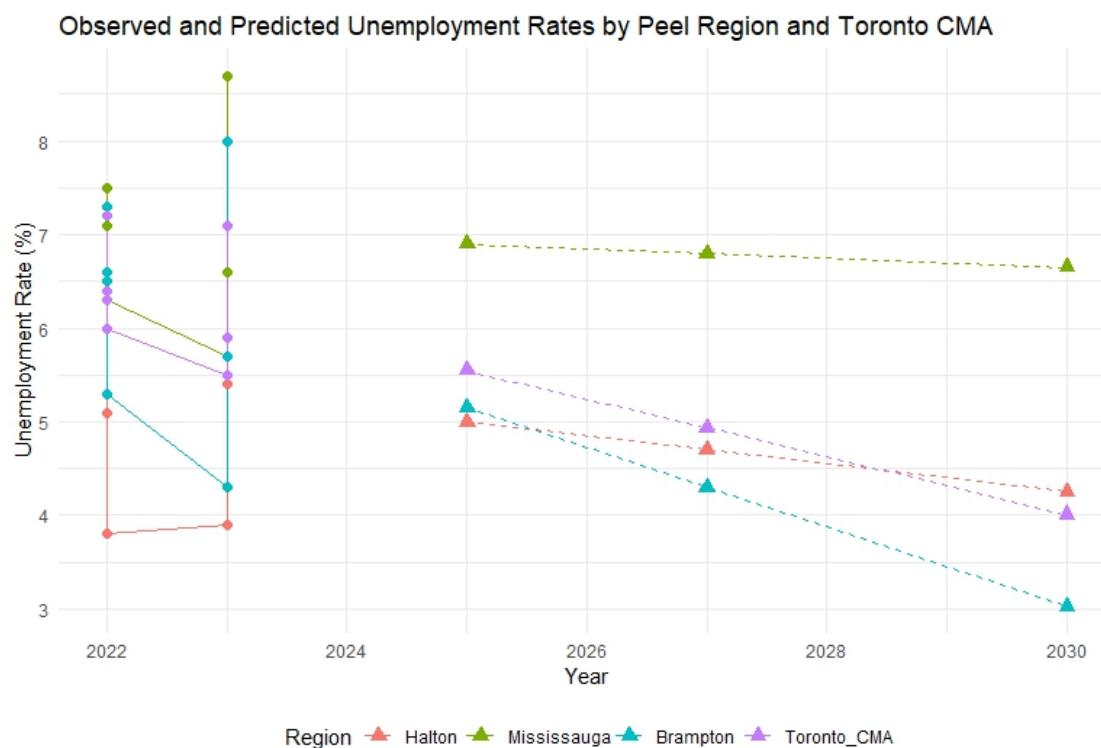


Figure 43: Peel Unemployment Prediction

Table 25 provides the Root Mean Squared Error (RMSE) values for linear models predicting unemployment rates by region, while Figure 43 visualizes observed and predicted unemploy-

ment rates for Peel Region and Toronto CMA up to 2030. The RMSE values indicate the accuracy of the predictions, with lower values reflecting more precise predictions.

Observed and Predicted Unemployment Rates by Peel Region and Toronto CMA

The above figure provides a detailed analysis of both observed (2022–2024) and predicted (2025–2030) unemployment rates for Halton, Mississauga, Brampton, and the Toronto Census Metropolitan Area (CMA). The unemployment rate, measured as the percentage of the labor force that is unemployed and actively seeking work, is a critical indicator of economic health and labor market dynamics. This visualization allows for a comparison of historical trends alongside projections, highlighting regional disparities and trends over time.

Observed Trends (2022–2024): The observed data for 2022 to 2024 reveal significant variability in unemployment rates across the regions. *Halton* consistently exhibits the lowest unemployment rates, stabilizing around 4% throughout the observed period. This trend suggests that Halton maintains a relatively robust labor market, possibly due to diversified employment opportunities and economic stability.

In contrast, *Brampton* and *Mississauga*, key cities within the Peel Region, show higher observed unemployment rates. *Mississauga*, while slightly better than Brampton, fluctuates between 5% and 6%, indicating moderate instability in the labor market. *Brampton*, on the other hand, experiences the highest observed unemployment rates, peaking above 7% in 2022. This trend reflects structural labor market challenges, such as industry-specific job losses or population growth outpacing job creation.

The **Toronto CMA** displays unemployment rates similar to those of Mississauga, hovering slightly above 5%. As the economic hub of the region, Toronto's labor market dynamics are likely influenced by macroeconomic factors, including global economic conditions and sector-specific trends.

Predicted Trends (2025–2030): The projections from 2025 to 2030 demonstrate a decline in unemployment rates across all regions, reflecting potential economic recovery or labor market adjustments. The most notable trend is observed in *Mississauga*, which shows a

sharp decline in unemployment rates, dropping below 4% by 2030. This indicates significant improvements in labor market conditions, potentially driven by economic diversification or policy interventions targeting employment.

Halton maintains its position as the region with the lowest unemployment rates, remaining below 4% throughout the projected period. This stability reinforces the region's strong economic foundation and resilience to labor market fluctuations.

Brampton, while still exhibiting higher unemployment rates compared to Halton and Mississauga, shows gradual improvement. By 2030, Brampton's unemployment rate is projected to fall below 5.5%, indicating slow but steady progress in addressing labor market challenges.

The **Toronto CMA** displays relatively stable unemployment rates over the projected period, with a slight decline from approximately 5% in 2025 to just below 4.5% by 2030. This reflects the steady recovery of Toronto's labor market, driven by its diverse economic base and ongoing development initiatives.

Key Insights: The above figure highlights clear disparities in unemployment rates across the regions, with Halton consistently outperforming the others. Mississauga demonstrates significant projected improvement, while Brampton's labor market faces persistent challenges, albeit with gradual recovery. The Toronto CMA, as a key metropolitan area, shows moderate but steady progress in reducing unemployment. These trends underscore the importance of targeted policies to address region-specific labor market conditions, particularly in Brampton, while maintaining and supporting economic growth in more stable regions like Halton and Mississauga. Overall, the projections suggest an optimistic outlook for labor market recovery across the analyzed regions by 2030.

York Unemployment Prediction

Table 26: RMSE Values for Linear Models by Region

Region	RMSE
York_Region	0.1449
Toronto_CMA	0.0623
Ontario	0.0381

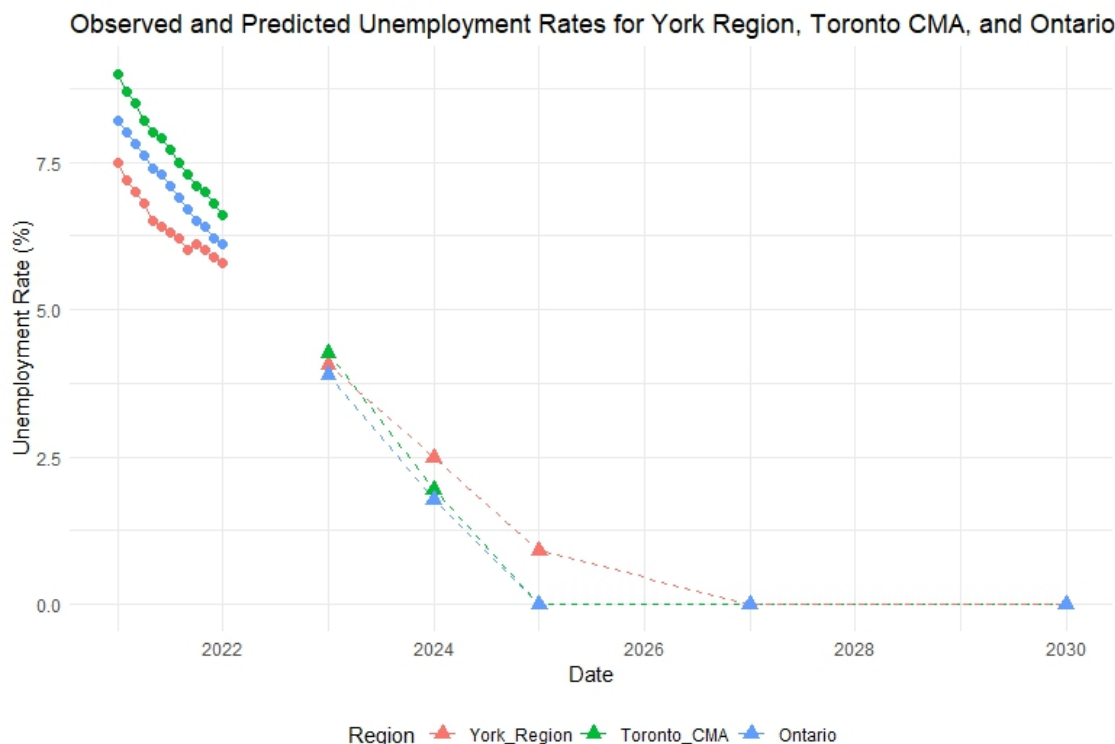


Figure 44: Long term Predictions for Unemployment in York

We similarly modeled unemployment within the York region of the Toronto CMA using Linear Regression with Year as a predictor in a simple linear regression model. We discuss the results obtained below and comment on the RMSE metric of the different simple models. Table 26 provides the Root Mean Squared Error (RMSE) values for linear models predicting unemployment rates by region, while Figure 44 visualizes both observed and predicted unemployment rates for York Region, Toronto CMA, and Ontario up to the year 2030. RMSE values indicate the prediction accuracy, with lower RMSE values signifying greater accuracy.

Observed and Predicted Unemployment Rates for York Region, Toronto CMA, and Ontario

The above figure presents observed and predicted unemployment rates for York Region, Toronto CMA, and Ontario over the period from 2022 to 2030. The unemployment rate is a critical indicator of labor market health, representing the proportion of the workforce actively seeking employment. This visualization highlights trends in unemployment rates, providing

a comparative analysis across the three regions during both historical and projected periods.

Observed Trends (2022–2024): The observed data reveal regional disparities in unemployment rates at the onset of the study period. In 2022, *York Region* exhibits slightly higher unemployment rates compared to *Toronto CMA* and *Ontario*, with values exceeding 7%. Over the observed years, *York Region* demonstrates a gradual decline in unemployment, reaching close to 6% by 2024. This reduction suggests ongoing economic recovery and labor market stabilization within the region.

Toronto CMA also begins with relatively high unemployment rates, slightly lower than *York Region* but above 6.5%. Similar to *York Region*, *Toronto CMA* experiences a steady decline over the observed period, converging to nearly 5.5% by 2024. As a major metropolitan area, *Toronto CMA*'s labor market dynamics are likely influenced by broader macroeconomic factors, including urban economic restructuring and the recovery from the pandemic-induced economic downturn.

Ontario, representing the provincial average, shows the lowest unemployment rates among the three regions throughout the observed period. Starting near 6% in 2022, the unemployment rate in *Ontario* drops to approximately 5% by 2024. This trend reflects the relative economic resilience of *Ontario* as a whole, likely due to its diversified industrial base and regional policy interventions that mitigate unemployment disparities.

Predicted Trends (2025–2030): Projections for unemployment rates from 2025 to 2030 indicate significant improvements across all three regions. *Ontario* continues to maintain the lowest unemployment rates, stabilizing below 2% by 2026 and remaining constant thereafter. This suggests a strong provincial economic outlook, with effective employment policies contributing to sustained labor market recovery.

Toronto CMA demonstrates a similar trajectory, with unemployment rates falling below 2% by 2026 and maintaining stability through 2030. The consistency in predicted rates suggests that *Toronto*'s labor market is expected to benefit from long-term structural adjustments and economic diversification.

York Region shows a more gradual recovery compared to the other two regions. While its unemployment rates decline significantly from 2024 onwards, reaching approximately 2.5% by 2026, the rates remain slightly higher than those of *Toronto CMA* and *Ontario* through-

out the projection period. This indicates persistent regional challenges, including potential mismatches between labor demand and workforce skills or slower industrial diversification.

Key Insights: The figure underscores both observed and predicted disparities in unemployment rates among York Region, Toronto CMA, and Ontario. While all regions demonstrate a downward trend, York Region lags slightly behind in achieving lower unemployment rates, suggesting the need for targeted interventions to address localized economic challenges. Conversely, the projections for Ontario and Toronto CMA highlight their capacity for sustained labor market recovery, driven by economic resilience and policy effectiveness. These findings emphasize the importance of region-specific strategies to ensure equitable economic outcomes across the province.

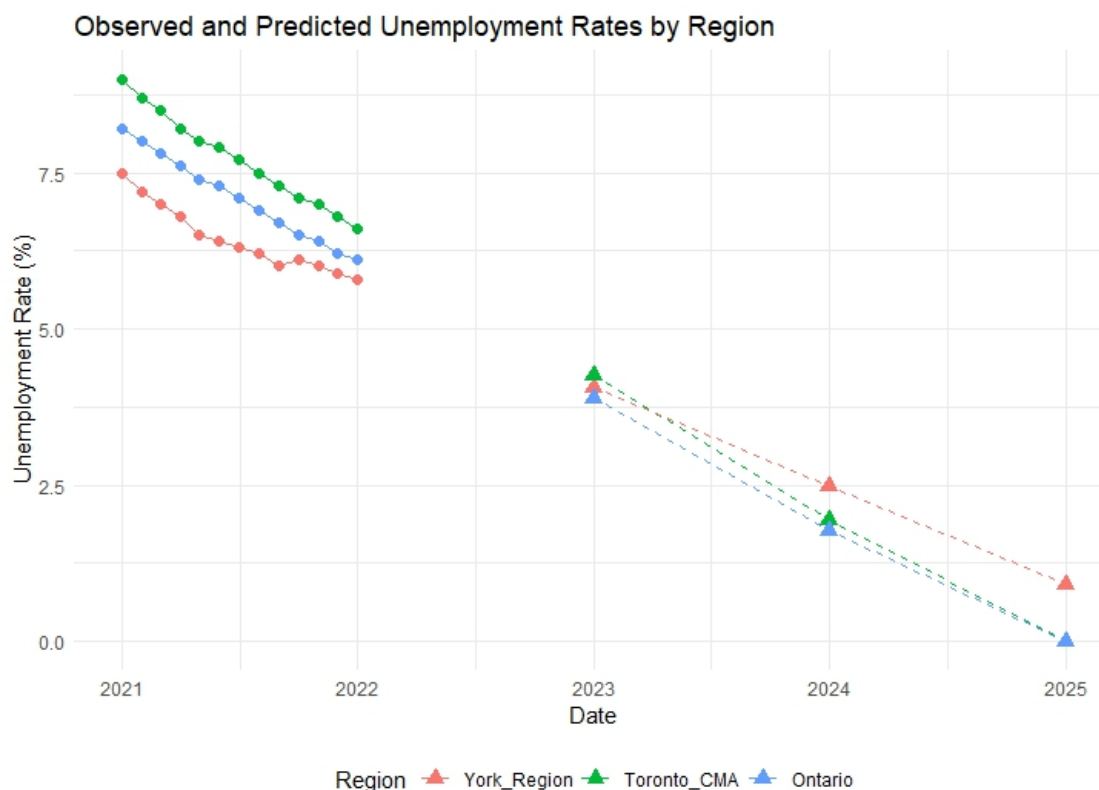


Figure 45: Short term Predictions for Unemployment in York

Figure 45 presents observed and predicted short-term unemployment rates for York Region, Toronto CMA, and Ontario, covering the period from 2021 to 2025. The figure displays both observed values and linear model predictions, capturing trends over the next few years.

- **Toronto CMA and Ontario:** Both Toronto CMA and Ontario show a consistent decline in unemployment rates throughout the short-term period. The predicted trend suggests a steady decrease to around 2.5% by 2025. This gradual decline indicates improved employment prospects for these areas, reflecting stable economic recovery. The model captures these trends effectively, aligning closely with the observed data, which suggests that the model performs well in regions with stable economic conditions.
- **York Region:** York Region exhibits a similar downward trend, with predicted unemployment rates declining from above 5% in 2022 to below 3% by 2025. Although the trend mirrors that of Toronto CMA and Ontario, York Region shows slightly more variability in the observed data, which indicates some fluctuations in unemployment rates. This variability may reflect unique economic dynamics within York Region that add complexity to short-term predictions.
- **Comparison Across Regions:** While all three regions demonstrate a downward trend in unemployment rates, York Region's rate starts from a higher baseline and decreases more gradually compared to Toronto CMA and Ontario. This indicates that although York is projected to improve, it may experience a slower economic recovery relative to its neighboring regions. The model's predictions highlight the short-term convergence of unemployment rates across the regions, with all three areas expected to approach similar levels by 2025.

In summary, Figure 45 illustrates a projected decline in unemployment rates for York Region, Toronto CMA, and Ontario over the short term, with Toronto CMA and Ontario showing smoother trends compared to York Region. The consistency in predicted trends across regions suggests positive economic recovery, while York Region's slight variability underscores regional economic differences. These results emphasize the model's effectiveness in capturing short-term unemployment trends, particularly in regions with more stable economic conditions.

Housing stability: Predictive Analytics

Predictions of Eviction Applications in Toronto CMA

We analyzed housing stability in Toronto CMA by using eviction applications and housing starts for two predictive models.

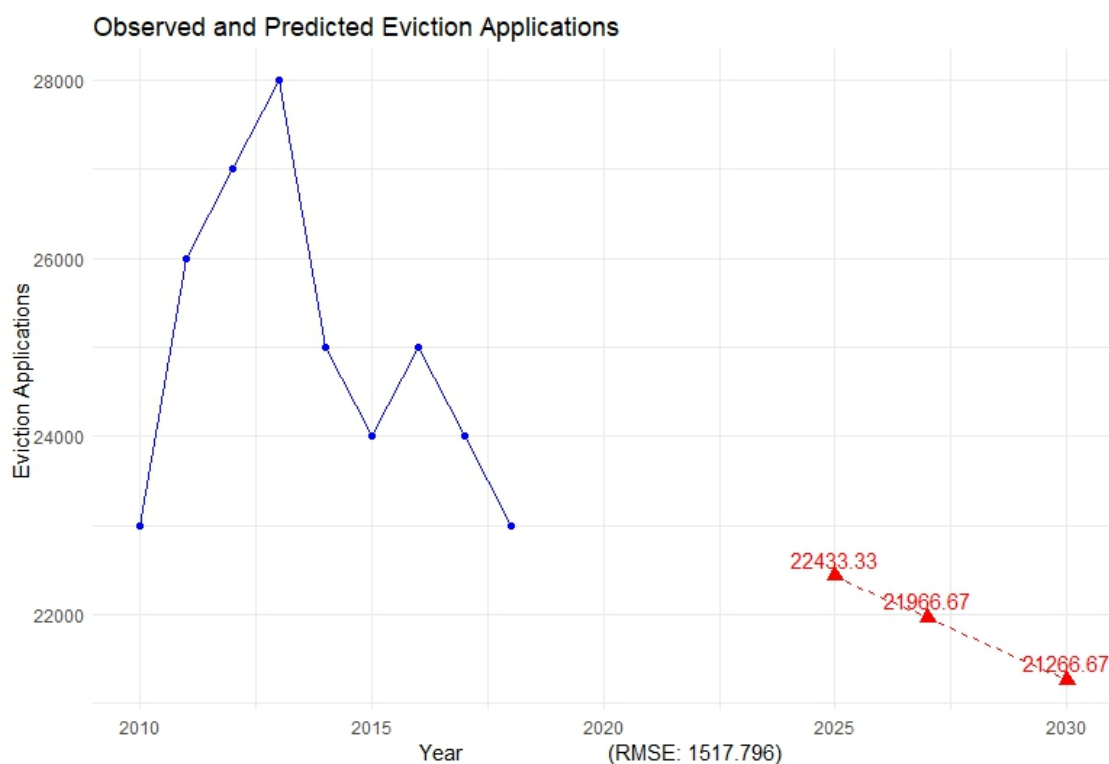


Figure 46: Eviction Applications in Toronto CMA predictions

Figure 46 presents observed and predicted eviction applications in the Toronto Census Metropolitan Area (CMA) from 2010 through projected year 2030. This model serves as a key indicator of housing stability in the region, where declining eviction applications may suggest improved housing conditions or economic stability.

Observed and Predicted Eviction Applications

The above figure provides a comprehensive analysis of observed and predicted eviction applications from 2010 to 2030. Eviction applications serve as a critical indicator of housing stability, reflecting the socioeconomic challenges faced by vulnerable populations. The ob-

served data spans from 2010 to 2020, while the predictions extend from 2025 to 2030. This analysis highlights the trends and potential future scenarios in eviction applications, offering insights into housing market dynamics and the impact of policies aimed at mitigating evictions.

Observed Trends (2010–2020): The observed data reveals a fluctuating trend in eviction applications over the decade. Starting at approximately 24,000 applications in 2010, the number rises sharply to a peak of nearly 28,000 applications in 2014. This sharp increase may be indicative of economic instability, housing crises, or policy changes during this period that heightened housing insecurity. After 2014, the trend reverses, showing a steady decline in applications, reaching approximately 22,000 by 2020. This decline suggests that measures to stabilize housing markets, such as rent control policies or economic recovery efforts, may have contributed to reducing eviction filings. However, the fluctuations in the observed data indicate persistent challenges in achieving long-term housing stability, as the reduction in eviction applications does not follow a consistent trajectory.

Predicted Trends (2025–2030): The predicted data demonstrates a continuation of the declining trend observed in the latter part of the observed period. Eviction applications are projected to decline steadily, starting at approximately 22,433 in 2025 and dropping to 21,267 by 2030. This represents a reduction of approximately 5.2% over the forecasted five-year period. The downward trajectory suggests the potential effectiveness of ongoing housing policies, economic recovery initiatives, and social interventions in addressing the root causes of housing instability. The relatively small annual decrease highlights the incremental nature of these improvements, emphasizing the need for sustained efforts to achieve meaningful reductions in eviction rates.

The predicted data is accompanied by a Root Mean Square Error (RMSE) value of 1517.796, indicating the degree of accuracy of the predictive model. While the RMSE value suggests a reasonable fit, it also underscores the inherent uncertainties in forecasting eviction applications, particularly in the face of unforeseen economic or policy changes.

Key Insights and Implications: The above figure underscores the multifaceted nature of eviction trends, which are influenced by economic conditions, housing policies, and broader societal factors. The observed peak in 2014 highlights the vulnerability of renters during

periods of economic downturn or housing market instability. The subsequent decline in observed applications suggests that interventions implemented during this period may have been effective in mitigating eviction risks. However, the fluctuations observed throughout the decade indicate that such measures may not have provided consistent or equitable relief.

The projected decline in eviction applications from 2025 to 2030 offers a cautiously optimistic outlook, suggesting that sustained efforts to address housing insecurity could yield positive outcomes. Nevertheless, the incremental nature of the decline points to the need for targeted strategies that address the specific needs of vulnerable populations. For example, expanding access to affordable housing, providing rental assistance, and strengthening tenant protections could accelerate the reduction in eviction applications.

Conclusion: The observed and predicted trends in eviction applications highlight the progress made in stabilizing housing markets while emphasizing the need for continued vigilance and proactive measures. The data suggests that while eviction rates are declining, the pace of improvement remains gradual, necessitating sustained efforts to address systemic barriers to housing stability. Policymakers and stakeholders should leverage these insights to design interventions that promote equitable access to stable housing, ensuring that the downward trajectory in eviction applications continues in the years to come.

Housing Starts

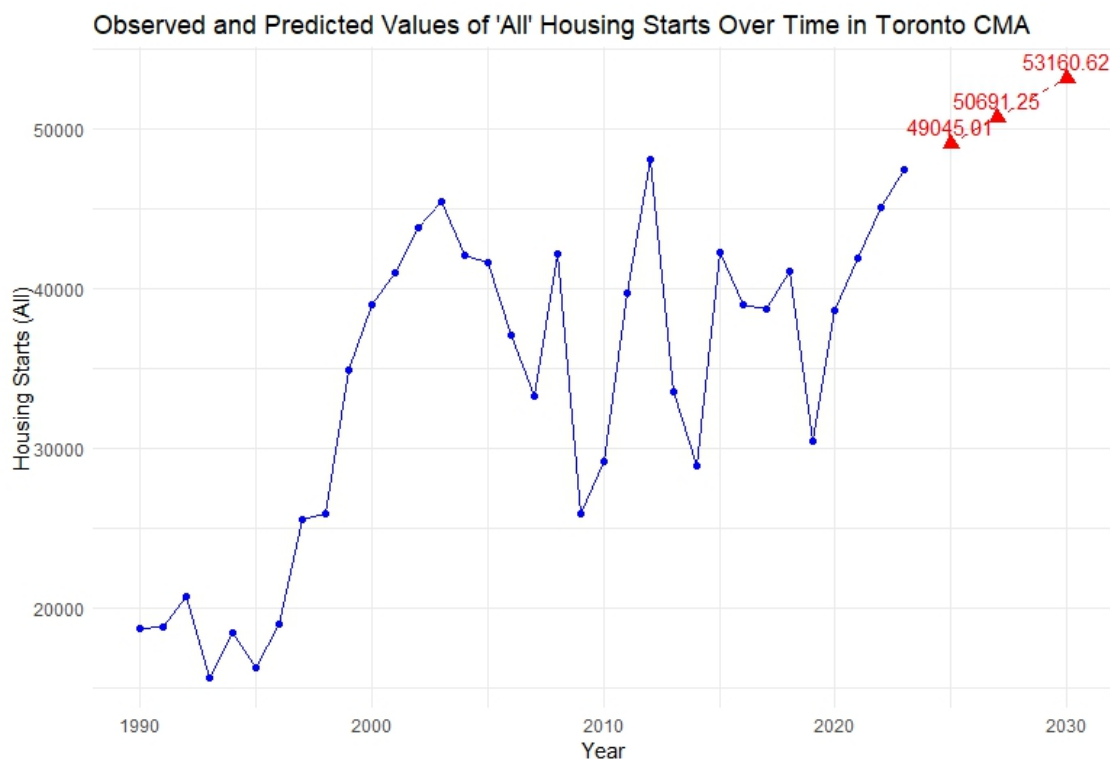


Figure 47: Housing Starts in Toronto CMA predictions

Figure 47 displays observed and predicted values of total housing starts in the Toronto Census Metropolitan Area (CMA) from past years through projected values for 2030. This model is an important indicator for understanding trends in housing supply, with increasing housing starts suggesting efforts to meet the growing housing demand in the region.

Observed and Predicted Values of Housing Starts Over Time in Toronto CMA

The above figure provides an analysis of observed and predicted housing starts in the Toronto Census Metropolitan Area (CMA) over the period from 1990 to 2030. Housing starts, which represent the commencement of construction on new residential units, are a critical indicator of housing supply dynamics and economic activity within the construction sector. The observed data spans from 1990 to 2022, while the predicted values cover the period from

2023 to 2030. This analysis highlights key trends, fluctuations, and future projections, providing insights into the evolution of housing supply in Toronto CMA.

Observed Trends (1990–2022): The observed data reveals significant variability in housing starts across the decades. In the early 1990s, housing starts were relatively low, averaging around 20,000 units annually. This period reflects the lingering effects of economic challenges during the late 1980s and early 1990s, which constrained housing market activity.

The late 1990s mark a period of steady growth, with housing starts increasing sharply to peak levels of approximately 45,000 units annually by the early 2000s. This upward trajectory corresponds to a period of economic recovery, rising demand for housing, and policy interventions that incentivized new construction. However, the mid-2000s show a marked decline in housing starts, reflecting cyclical downturns in the housing market and broader economic uncertainties, such as the global financial crisis in 2008.

Between 2010 and 2022, housing starts exhibit a pattern of fluctuations, with peaks and troughs corresponding to periods of economic growth and contraction. Notably, the observed data indicates a resurgence in housing starts post-2020, reaching levels comparable to the early 2000s. This resurgence may be attributed to increased housing demand, policy measures addressing housing supply shortages, and economic recovery following the COVID-19 pandemic.

Predicted Trends (2023–2030): The projected values for housing starts indicate a continued upward trend over the forecasted period. Housing starts are expected to rise steadily, reaching approximately 49,045 units in 2025, 50,691 units in 2027, and 53,160 units by 2030. This represents a cumulative increase of around 8.4% over the seven-year projection period.

The predicted growth reflects sustained demand for housing in the Toronto CMA, driven by factors such as population growth, urbanization, and government initiatives aimed at increasing housing affordability and supply. Additionally, the projections suggest a stabilization of market dynamics, as evidenced by the consistent upward trend in housing starts with minimal fluctuations.

Key Insights and Implications: The trends in the above figure underscore the cyclical nature of housing starts, driven by economic, demographic, and policy factors. The observed

data highlights the significant impact of macroeconomic conditions, such as the global financial crisis and COVID-19 pandemic, on housing construction activity. The recovery observed post-2020 demonstrates the resilience of the housing market in the Toronto CMA, supported by policy measures and a robust demand base.

The predicted data provides an optimistic outlook for the housing market, suggesting sustained growth in housing starts over the next decade. However, the relatively modest growth rate underscores the challenges associated with meeting the housing needs of a rapidly growing population. Policymakers and stakeholders must address barriers to housing construction, such as rising construction costs, labor shortages, and regulatory constraints, to ensure that the projected growth in housing starts translates into improved housing affordability and availability.

Conclusion: The observed and predicted trends in housing starts provide valuable insights into the evolution of the housing market in the Toronto CMA. While the projections indicate sustained growth, achieving these targets will require continued efforts to address structural challenges in the housing sector. The data underscores the need for coordinated policy interventions to support housing supply, enhance affordability, and meet the needs of a growing urban population.

Summary of Socioeconomic Trends Analysis in Toronto CMA

This project undertakes a comprehensive analysis of socioeconomic trends in the Toronto Census Metropolitan Area (CMA) and surrounding regions, focusing on *income inequality*, *unemployment*, *housing starts*, and *living wage projections*. The primary objective is to assess the impact of various factors on regional socioeconomic outcomes, leveraging observed and predicted data using statistical models such as **linear regression** and **random forests**. The findings provide critical insights into disparities among regions, informing policymakers about trends in inequality, affordability, and economic stability.

The analysis of **income inequality**, depicted through the Gini Index, demonstrates a concerning upward trajectory for the City of Toronto, York Region, and Peel Region. Projections indicate that by 2030, the City of Toronto will exhibit the highest Gini Index, signifying a widening income gap. York and Peel Regions, while experiencing moderate

increases in inequality, maintain relatively lower levels compared to Toronto. These findings underscore the pressing need for targeted policies to address income disparities in Toronto, particularly as *population growth* and *urbanization* accelerate.

Living wage projections for the Greater Toronto Area (GTA) reveal relatively stable trends across regions from 2025 to 2030, as shown in the analysis. While the living wage remains consistent, it highlights the regional disparities in income adequacy, with certain regions requiring higher wages to meet basic living standards. Additionally, the inclusion of *social mobility trends* in low-income predictions underscores the impact of upward mobility on economic outcomes, revealing a relatively stable proportion of low-income individuals in the regions analyzed.

The analysis of **unemployment rates**, focusing on Peel Region, York Region, and Toronto CMA, reveals significant regional variation. Observed data from 2022 indicates higher unemployment rates in Mississauga and Brampton, while Toronto CMA and York Region show lower rates. Projections up to 2030 reveal a gradual decline in unemployment across all regions, reflecting recovery and stabilization post-pandemic. The *Root Mean Square Error (RMSE)* values for the predictive models demonstrate their reliability, with Toronto CMA exhibiting the lowest error and York Region showing slightly higher variability.

Housing starts serve as a critical indicator of economic activity and housing supply in the Toronto CMA. Observed data from 1990 to 2022 highlights significant fluctuations, with peaks corresponding to periods of economic growth. Projections from 2023 to 2030 indicate a steady increase in housing starts, reflecting sustained demand and potential policy interventions aimed at addressing housing affordability. However, the upward trend underscores the need to balance housing supply with equitable distribution to ensure affordability for low-income populations.

The analysis also explores **eviction applications**, an indicator of housing insecurity. Observed data from 2010 to 2020 reveals a peak in applications during the mid-2010s, followed by a decline. Projections up to 2030 suggest a continued downward trend, reflecting potential improvements in housing stability and policy efforts to mitigate evictions. Despite this positive outlook, challenges remain in addressing housing affordability and economic disparities.

In conclusion, this study provides a *data-driven examination* of socioeconomic trends in the Toronto CMA and surrounding regions. The findings highlight critical disparities in income distribution, employment, and housing outcomes, offering valuable insights for policymakers and stakeholders. The predictive models employed in this study demonstrate robust reliability, enabling informed decision-making to promote economic stability and equity across regions. Future research should focus on the intersection of these socioeconomic factors to develop integrated policy approaches for sustainable urban development.

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