Toronto Property Crime Analysis: Changes in Rates and Types of Property Crimes (2014-2023)*

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This paper aims to explore Toronto's property crime rates and types of property crimes from 2014 to 2023. The analysis reveals a spike in property crimes in 2023, with shifts towards crime types such as break-and-enter and auto thefts.

1 Introduction

Property crimes, which includes offenses such as theft, burglary, and vehicle-related crimes, significantly impact residents' perceptions on safety and security, influencing both the social and economic well-being of communities.

In 2023, Toronto's property crime rate rose by 22.28% from 2022, reaching a total of 189,977 recorded incidents, breaking the highest recorded value of property crimes in the city (Department (2023)). This paper performs a trend analysis on property crime trends from 2014 to 2023, focusing on the sharp rise in 2023. The study begins by examining annual crime rates across the 10-year range, followed by an analysis of the distribution of property crime categories in 2023 to explore the factors behind the sudden spike. This paper provides insights into geographic and crime-type patterns influencing the increase in property-related offences.

2 Data

The dataset used in this paper is the "Police Annual Statistical Report - Reported Crimes" (Services (2024a)), provided by the Toronto Police Services and accessed through OpenData-Toronto (Gelfand (2022)). It includes data from 2014 to 2023, aggregated by year, crime

*Code and data are available at: https://github.com/jamiejiminlee/Toronto-Reported-Crimes.git

category, subtype, total count, resolved count, and police division - offering a comprehensive view of reported crime trends over this period.

This dataset was chosen for its structured format, which allows for easy data cleaning and filtering to isolate "Crimes Against Property" under the crime category. The data was simulated, downloaded, cleaned, and analyzed using the R programming language (R Core Team (2023)). While other datasets such as "Police Annual Statistical Report - Victims of Crimes"(Services (2024b)) were available on OpenDataToronto (Gelfand (2022)), it was not selected for this analysis since the paper focuses exclusively on property crimes.

The following graph displays the trend in the number of property crimes from 2014 to 2023, revealing a sudden spike in 2023, with the reported number of property crimes exceeding 100,000.

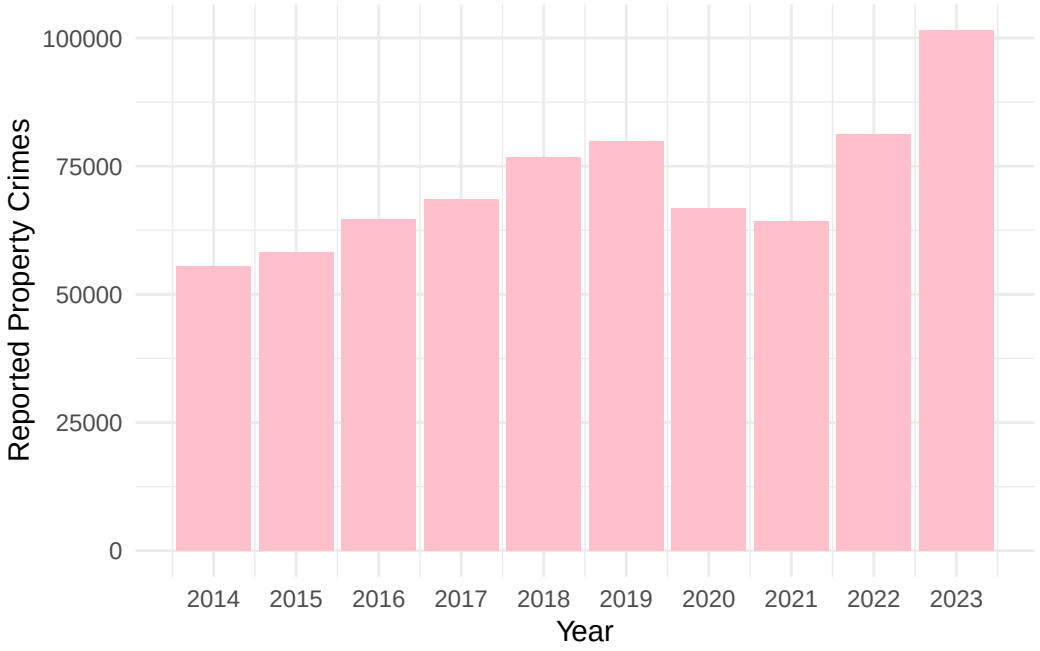

Figure 1: Graph compares the number of property crimes from 2013 to 2024, in 1-year increments. Figure displays a sudden spike in property crimes in 2023 - we will be analyzing the data from 2023 to compare different types of property crimes that occured

Due to the evident spike of property crimes in 2023 from Figure 1, we now investigate the types of property crimes that occured in 2023, to determine if the breakdown of different offence categories would provide insight into the reasoning behind the sudden spike. By analyzing the distribution of various subtypes under the "Crime Against Property" category, such as "Auto Theft" and "Break & Enter".

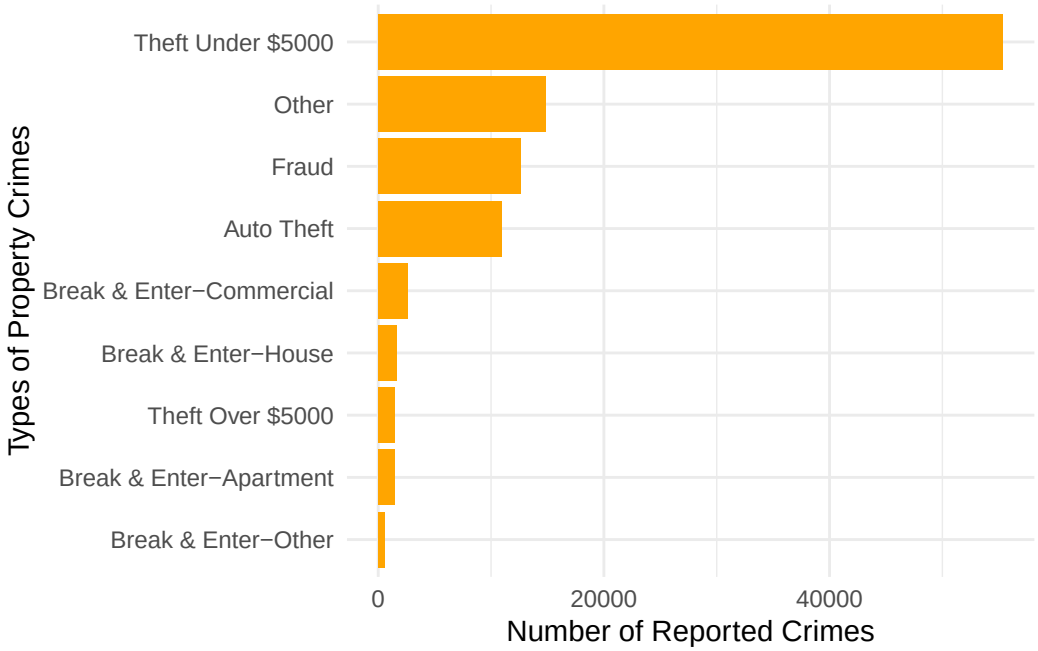

Figure 2: Graph compares the the types of property crimes reported in 2023.

3 Results

From Figure 2 in the Data section, it is clearly shown that thefts under $5000 covers the majority of the reported property crimes in Toronto in 2023. Such trend may be drive from the ongoing recovery period from economic challenges caused by the COVID-19 pandemic. As individuals and businesses struggled to adjust to the post-pandemic economy, economic pressures could have contributed to a rise in smaller thefts. (Drugs and Crime (2020)) Below are the summary table for the two graphs produced above - each table displaying the number of reported crimes based on "Report Year" and "Type of Property Crime"

```
# A tibble: 10 x 2
   report_year total_count
         <dbl>       <dbl>
 1        2014       55526
 2        2015       58226
 3        2016       64650
 4        2017       68534
 5        2018       76698
 6        2019       79932
```

```
 7        2020       66741
 8        2021       64206
 9        2022       81302
10        2023      101478
```

```
# A tibble: 9 x 2
  subtype                  total_count
  <chr>                          <dbl>
1 Theft Under $5000              55388
2 Other                          14826
3 Fraud                          12600
4 Auto Theft                     10926
5 Break & Enter-Commercial        2595
6 Break & Enter-House             1676
7 Theft Over $5000                1471
8 Break & Enter-Apartment         1433
9 Break & Enter-Other              563
```

The summary tables in Figures 3a) and 3b) display that 55388 cases out of 101478 reported crimes was "Theft Under $5000" - a notable 55.58% rate. This may also be due to the fact that 2023 was the year when more public places reopened and peopled went back to their normal lives, this may have provided increased opportunities for minor thefts. (Grawer (2024))

4 Discussion

4.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

4.2 Second discussion point

4.3 Third discussion point

4.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional data details

B Model details

B.1 Posterior predictive check

Examining how the model fits, and is affected by, the data

B.2 Diagnostics

Checking the convergence of the MCMC algorithm

References

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