

Exploring Red Light Camera Annual Charges in the City of Toronto Between the Years of 2012 and 2022.*

Looking at Five Busy Intersections in Toronto

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A ticket for running a red light in Ontario cost \$325. Using data from five different intersections in Toronto as my sample, I looked at the number of charges issued for running red lights over a ten year period. Despite the cost of the ticket, there is a general trend of an average increase in the number of charges. These findings suggest red light camera charges do not necessarily disincentivize drivers from running lights in busy intersections in the City of Toronto.

1 Introduction

In this paper I looked at how the red light charges in the City of Toronto has changed throughout the years as well as the intersection that contains the most annual charges. These five intersections of interest were spread out; two of which are located a 1km radius of Lake Ontario whereas the other three are located within a ten km radius of York University. This was done to evaluate the different regions of the City and to get an idea about where there are more charges issued, downtown or on the outskirts of the city.

#TODO: add paper notes on red light cameras and whether they are efficient in incentivizing drivers to not run red lights - a safety concern.

The remainder of this paper is structured as follows: Section 2 discusses the data, Section 3 discusses the model, Section 4 presents the results and lastly Section 5 discusses my findings as well as areas of weaknesses and improvements. should cross-reference sections and sub-sections.

*Code and data are available at: https://github.com/LexiKnight/Red_light_camera.git

Table 1: Table:

Location	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total_Charges
Richmond St. and Parliament St.	1100	812	721	809	829	3994	6615	2937	2106	1400	1290	22613
Lake Shore Blvd. and York St.	592	249	310	410	271	45	324	321	1197	840	757	5316
Steeles Ave. and Carpenter Rd.	999	834	747	436	601	528	804	623	920	1830	1794	10116
Steeles Ave. and Hilda Ave.	1000	906	632	710	786	501	639	455	627	1314	1558	9128
Albion Rd. and Silverstone Dr.	1213	1289	1071	779	797	604	0	1181	947	912	1196	9989

2 Data

I retrieved the data from Open Data Tronto Portal through the library {cite opendatatoronto, Gelfand 2022}. The dataset {cite redlightcameraannualcharges} was used to analyze the intersections with red light cameras across the City of Toronto. After downloading the dataset, I proceeded to the cleaning and analyzing stage with open source staticaically programming language R {cite R, R core team 2022}, using function from tidyverse {cite tidyverse, wickham et al 2019}, dplyer {cite dypler wickham et al 2022}, ggplot2 {cite ggplot2 wickham 2016}, readxl {cite readxl}, janitor {cite janitor firke 2021} and usethis.

#TODO: citations!

3 Model, model set up, model justification

Here we breifly describe the Red Light Data model used to investigate two aspects of the charges. Firstly, it is to explore how the number of charges varies over the different intersections, particularly as two are located near Lake Ontario whereas the other three are up North by York University. Secondly, in looking at one intersection in depth, namely Steeles Ave and Carpender Rd, to explore how the number of charges given vary over a ten year strech, 2012 through 2022.

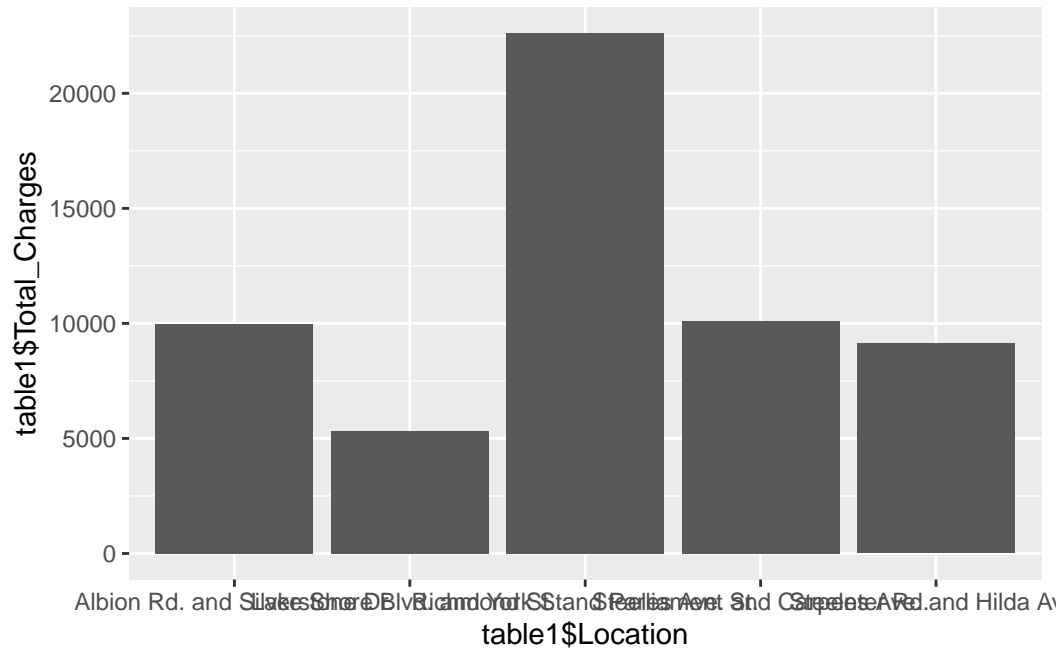
- 4 specify the equations that describe the model used and explain their components w/ plain language and cross-references
- 5 start section by writing out model, explaining it and justifying it. can add background info if needed.
- 6 after specifying the model with appropriate mathematical notation and cross-referencing it, the components of the model should then be defined and explained. convincing reader model well chosen and enhances credibility of the reader
- 7 model variables should correspond to those that were discussed in the data section, clear link b/w the two sections.
- 8 close model section with discussion of assumptions underpinning the model. brief discussion of alternative models/variants. Clearly explain strengths and weaknesses.
- 9 evidence of model validation and checking, model convergence and or diagnostic issues (some of which perhaps more appropriate in appendix)
- 10 some papers do not include statistical model and instead replace section by “methodology” section - describe simulation conducted or contain more general details about the approach.

11 Results

- 12 clearly communicate outcomes of the analysis and w/out too much focus on the discussion of implications.
- 13 section requires summary statistics, tables, graphs - each cross referenced and test associated with them that details what is seen in each figure.
- 14 what results are rather than what results mean⁴
- 15 tables of graphs of coefficient estimates based on the modeling. discuss features of the estimates and differences b/w the models

- 16 amount of text = amount space table/graph take up

trend in the last five years for four out of five of the intersections.



	Location	Total_Charges
1	Richmond St. and Parliament St.	22613
2	Lake Shore Blvd. and York St.	5316
3	Steeles Ave. and Carpenter Rd.	10116
4	Steeles Ave. and Hilda Ave.	9128
5	Albion Rd. and Silverstone Dr.	9989

17 Discussion

18 brief summary of what was done in the paper

19 2-3 subsections devoted to key things learned about the world from the paper. justify / detail the implications of the story being told in the paper. explain what we learn from the graphs/tables

19.1 First discussion point

Note did not use data for the years 2007 through 2010 as I wanted to look specifically at a ten year range. Additionally, the dataset downloaded from opendatatoronto had minimal data for ten consecutive years, limiting my options. Moreover, locations were roughly spread out into two regions, downtown 1km away from Lake Ontario and North about 9km away from York University. The reason for this was to get data on a larger area.

19.2 Second discussion point

19.3 Third discussion point

19.4 Weaknesses and next steps

I should note that the data only includes drivers that did get charged for running the light and thus there could be data missing for those drivers that did not get charged. Future work could look at for example intersections specifically around the university of toronto as this would implicate safety for these students. However, more and consistent data is needed as mentioned above for particular intersections and to be able to accurately compare data over several years. Future work could look at several intersections that are closer together, in a more confined area to allow for more understanding of which intersections drivers are more likely to run red lights. # data used, approach, model # model - aspects that would affect the findings # what there is left to learn and how future work could proceed. # discussion is 25% of the entire paper

Appendix

A This is where show all the data

B This is where include background details and diagnostics

C References