Electric Vehicle Incentives Analysis

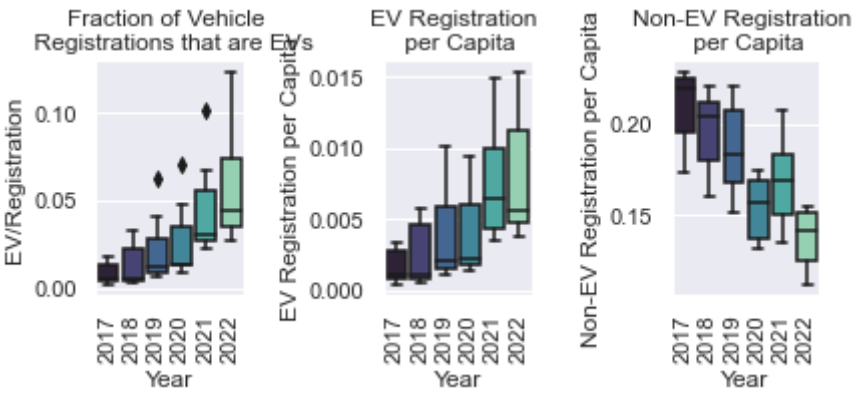
Objectives and Data Preparation

We wanted to discover how effective the Incentives for Zero-Emission Vehicles (iZEV) program has been at encouraging Canadian consumers to purchase electric vehicles as apposed to traditional ones. The data that we were interested in analyzing were data related to the number of vehicles registered in Canada in the years before and after the IZEV program was intruduced. We also wanted to look at how popular the iZEC program is, how much it has been used and how the incentives offered through the program have been related to the change in vehicle registrations.

Data about new vehicle registrations in Canada was retrieved from Statistics Canada. The data included the number of vehicle registrations in each province, for the years 2017-2022, sorted by vehicle type. Data was not available for Alberta, Newfoundland or New Brunswick. The data was downloaded as a .csv file from the Statistics Canada website. Data related to the economic incentives granted by the iZEV program was also retrieved from the government of Canada's Open Government Portal. The data summarizes all instances of incentives recieved by consumers, sorted by province and vehicle type. The data was also downloaded as a .csv file from the Government of Canada Open Government website.

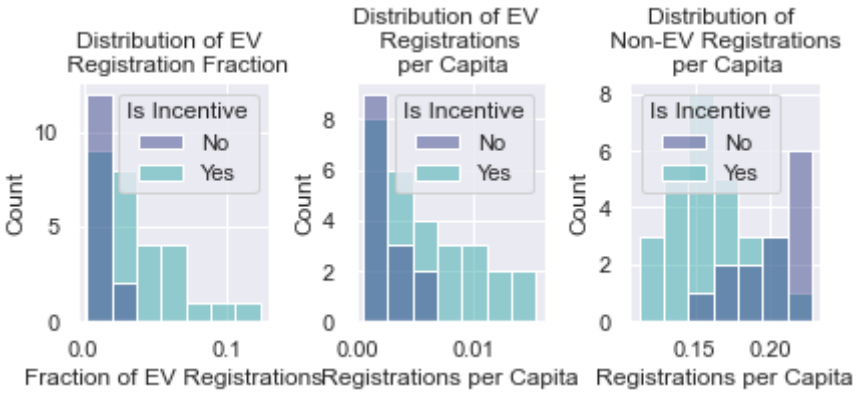
Initial Analysis

The first step in the analysis was to examine the trends that took place over the 2017-2022 period that was being examined. By looking first at the change in the fraction of vehicle regitrations that are EVs, and the EV and non-EV registrations per capita, several trends become clear. Not only has the fraction of vehicles that are EVS consistently been increasing, but the raw number of EV registrations per capita has been increasing, while the non-EV registrations have been decreasing. It can be seen there is a clear trend towards more EV registrations and a higher fraction of EV vehicles.



Hypothesis Testing

If we compare the distributions of EV and non-EV vehicles per capita registration, depending on whether they were registered during a period of time that the iZEV incentives were in place, it is possible to see that EV registrations are higher after the incentives came into place, and non-EV registrations were lower. This all combines to give us some motivation to determine if the incentives were specifically influenced by the iZEV incentives. The below t-tests show that there is a significant difference in the mean of the fraction of EV registrations before and after the incentives with an α = 0.05. There is also significant result showing an increase in the EV registrations per capita, and a decrease in the non-EV registrations per capita over the same time periods.



	T-test Statistic	p Value
EV Fraction	3.343128	0.001807
EV Registrations	3.147916	0.003104
Non-EV Registrations	-4.796601	0.000023

However, looking at year-to-year comparisons instead of simply comparing the before and after periods shows that there is no significant difference in the jump from 2018 to 2019 - or in an individual year - which casts doubt on the idea that the iZEV incentives are specifically responsible for the difference noted above, instead of simply the trend of increased popularity of EV that can be seen in the yearly registration data.

	Years	p Value of T-test for EV fraction	p Value of T-test for Registrations per Capita
0	2018-2019	0.368296	0.407797

Conclusions

While it is certainly the case that electric vehicles have increased in popularity over the years from 2017-2022, and there is a correlation between the increase and the iZEV incentive program, there does not appear to be strong evidence that the incentive program itself had a significant effect. If it had had an effect, we would probably expect to see a particularly large increase in EV registrations in the year or two after they came into effect, and while there is an increase, there does not seem to be anything special about the jump from 2018-2019.