Problem Statement

Impact of the Covid Lockdown (Introduction of shelter-in-place policy) on different types of crimes & Arrests in Chicago - An RDD Analysis

Objective:

The goal of this assignment is to is to conduct an analysis using Regression Discontinuity Design (RDD) to understand if the Coronavirus (COVID-19) lockdown measures caused the crime rates in Chicago to increase or decrease. This study aims to explore whether and how the enforcement of lockdown rules - as a significant, time-specific intervention – caused changes in crime patterns.

Dataset:

The dataset for this assignment is a collection of crime reports from the Chicago Police Department, specifically for a time that spans from 2019 to 2020. This period is deliberately chosen to cover significant dates relative to the COVID-19 pandemic, particularly focusing on the first shelter-in-place order issued in Chicago on March 18, 2020. The dataset's time frame allows for a comparative analysis of crime rates and patterns before, during, and after the onset of the pandemic lockdown measures.

Data Cleaning and Manipulation:

1. Explore the variables included in the dataset.
2. Load the data into your environment and perform any necessary cleaning steps and any data preprocessing steps needed for your analysis. one important variable needs to be formatted.
3. Conduct a descriptive analysis of the key variables.
4. Using the ggplot, create a line plot of crime incidents over time, with a focus on the impact of a specific change. The visualization should highlight the cutoff point of this change. Draw the time plots with month-year as x-axis.
5. Do you see any change in crimes after the cutoff point?
6. How has the distribution of the top 5 types of crimes and other crimes (variable 'others') changed before and after the onset of the COVID-19 pandemic in Chicago?

Analysis:

7. Suppose you decide to apply the RD design to draw causal inference. What would be your dependent variable? Why? How would you create the DV?
8. For RDD analysis, how would you choose/create an independent variable and identify a specific cutoff date? Discuss the importance of the cutoff date and the creation of the independent variable.
9. Set up the model suitable for RDD Analysis and conduct the analysis. Interpret the results.