

## **Econometrics Research Project:**

**Hypothesis:** New York City boroughs with higher levels of crime rates have lower income inequality.

**Null Hypothesis:** There is no relationship between crime rates and income inequality in New York City boroughs.

## **Literature Review:**

"Correlation of Income and Crime Rates in NYC"

[https://storymaps.arcgis.com/stories/306f8205cf2b49c2b270bca107296d6f?utm\\_source=](https://storymaps.arcgis.com/stories/306f8205cf2b49c2b270bca107296d6f?utm_source=)

Explores the relationship between high crime areas and income disparities in NYC.

Highlights recent declines in overall index crime, with data visualizations linking income levels to crime hotspots.

"Correlation Between NYC Crime Rates and Household Incomes"

[https://storymaps.arcgis.com/stories/55a744e4ec7f4fe6995e1cac087bf0fd?utm\\_source=](https://storymaps.arcgis.com/stories/55a744e4ec7f4fe6995e1cac087bf0fd?utm_source=)

Discusses strong correlations between income inequality and crime rates, showing that lower-income areas face higher crime incidents. Includes visual data for clarity.

"Let's Fight Crime the Proven Way: By Increasing the Minimum Wage"

[https://www.centrernyc.org/reports-briefs/the-latest-census-bureau-data-on-incomes-and-poverty-show-just-how-far-nyc-has-slipped-from-pre-pandemic-levels-in-relation-to-the-us-overall-and-the-nations-other-large-cities?utm\\_source=](https://www.centrernyc.org/reports-briefs/the-latest-census-bureau-data-on-incomes-and-poverty-show-just-how-far-nyc-has-slipped-from-pre-pandemic-levels-in-relation-to-the-us-overall-and-the-nations-other-large-cities?utm_source=)

Highlights a Brennan Center study linking increased income to significant reductions in crime rates between 1990 and 2013, advocating wage increases as a crime reduction strategy.

"The Latest Census Bureau Data on Incomes and Poverty"

[https://www.centrernyc.org/urban-matters-2/lets-fight-crime-the-proven-way-by-increasing-the-minimum-wage?utm\\_source=](https://www.centrernyc.org/urban-matters-2/lets-fight-crime-the-proven-way-by-increasing-the-minimum-wage?utm_source=)

Reports NYC has the highest income inequality among the 10 largest U.S. cities, with the Gini index worsening from 2019 to 2022. Highlights the growing disparity compared to national trends.

# **CRIME RATES IN NYC:**

Topics for the Essay:

- 1. Arrests by Race and Gender**
- 2. Crime Rates by Borough and Income Inequality**
- 3. Income Inequality and Arrest Levels**
- 4. Top 10 Crime Types in NYC**
- 5. Crime types by borough**
- 6. Crime Rates by Borough: Shootings and Arrests**
- 7. Heat map of total arrest by borough and offense types**
- 8. Total shooting: Age, Race, and Gender**
- 9. Arrest by race in NYC**
- 10. Arrest by age group & borough**
- 11. Crime Hotspots by Precinct**
- 12. Arrest by race in NYC**
- 13. Linear Regression: Total Crime vs. Income Inequality**
- 14. Comparison of NYC and US Crime Trends**
- 15. Age Distribution of Perpetrators: US vs. NYC**
- 16. Conclusion**

TOPICS EXPLAINED:

**Arrests by Race and Gender**

**Code Summary:**

- This script analyzes the count of arrests by race (PERP\_RACE) and gender (PERP\_SEX).
- A bar plot is created to visualize the distribution of arrests by race and gender.

**Purpose:**

- To identify potential disparities in arrest patterns across different demographic groups.
- Visualization provides a clear view of which groups have higher arrest counts.

**2. Income Inequality and Crime Rates**

**Code Summary:**

- Uses Gini Index as a measure of income inequality and compares it to total crimes by borough.
- The crime\_summary dataset is merged with a placeholder income inequality dataset.
- A scatter plot shows the relationship between income inequality and crime rates.

**Purpose:**

- To test the hypothesis that boroughs with higher crime rates have higher/lower income inequality.

### **3. Crime Types and Top Offenses**

**Code Summary:**

- Groups data by OFNS\_DESC (offense description) to count the frequency of each crime type.
- The top 10 crime types are visualized using a bar plot.

**Purpose:**

- To identify the most common crimes in NYC and understand crime trends.

### **4. Demographics and Crime**

**Code Summary:**

- Groups arrests by borough, age group, race, and gender to count occurrences.
- Bar plots are used to visualize arrest demographics.

**Purpose:**

- To explore the relationship between demographic characteristics and arrest patterns.

### **5. Shooting Hotspots by Precinct**

**Code Summary:**

- Groups shootings by precinct and borough to identify areas with the highest number of incidents.
- Creates a bar plot to highlight shooting hotspots.

**Purpose:**

- To locate areas with the most concentrated shooting activity, aiding in targeted interventions.

### **6. US and NYC Crime Rates**

**Code Summary:**

- Summarizes US and NYC crime rates by year.
- Merges data from both datasets for comparison.
- Line charts are created to visualize trends over time.

**Purpose:**

- To compare overall crime trends between NYC and the broader US context.

**7. Age Distribution of Perpetrators****Code Summary:**

- Combines US and NYC crime datasets to analyze age distributions.
- Visualizes the distribution of crimes committed by age.

**Purpose:**

- To examine age-related patterns in crime across NYC and the US.

**8. NYC and US Gun Violence****Code Summary:**

- Analyzes shooting incidents from NYC and compares them to broader US gun violence data.
- Trends over time are visualized using line charts.

**Purpose:**

- To assess trends in gun-related crimes in NYC versus the US over the years.

**9. K-Nearest Neighbors (KNN) Classification****Code Summary:**

- Prepares NYC and US shooting data for classification using KNN.
- Classifies incidents as originating from either NYC or the US based on year and frequency.

**Purpose:**

- To explore the potential of machine learning (KNN) in distinguishing crime data patterns between NYC and the US.