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CS 418 Final Report

1. **Introduction**

    We will be looking at crimes committed in Chicago for the years 2005-2017. The data we will be using is from Kaggle. The questions we had going head-on into this research project was whether things that happened nationally affected Chicago, Illinois specifically during two mayors of Chicago; Richard M. Daley (2005-2011 dataset) and Rahm Emanuel (2012-2017). We also wanted to know what were the most frequent crimes committed as well as which districts these crimes happened most in. We have come to an understanding that the United States 2008 market housing crash may have contributed to our findings in more than one way.

2. **Data**

    Attributes
    - We will look at 9 specific attributes from the Chicago Database in order to comb and organize relevant data: Date, Primary Type, Description, Location Description, Arrested, Domestic, District Community Area, FBI Code
        - The years we will be focusing on:
            - Richard Daley: 2005-2011, represented in blue
            - Rahm Emanuel: 2012-2017, represented in red

    Methods for Cleaning and Organizing
    - We will be dropping rows that have missing values or NULL values in order to improve completeness across both mayors
    - We will also be merging two .csv files for mayor Daley (2005-2007 and 2008-2011) in order to have a closer number of years compared to Emanuel (7 and 6 years, respectively)

3. **Questions Answered**

    - What differences can we see in crimes being committed during each of the mayors' terms in office as Chicago Mayor?
    - Which district did most of these crimes happen in?
    - What were the most frequent crimes being committed? What is the number one?
    - What major economic impacts may have contributed to these findings?
    - What crime decreased between the two mayors?

4. Analysis and Results

Top 3 Crimes

The first set of data we looked at was the top 15 Primary Types of crimes between Daley and Emanuel. What we noticed: Theft, Battery, and Criminal Damage were among the top crimes committed during both terms.

Daley:
- Theft counts surpassed *900,000*
- Battery counts surpassed *800,000*
- Criminal Damage counts surpassed *500,000*

Emanuel:
- Theft counts surpassed *300,000*
- Battery counts surpassed *250,000*
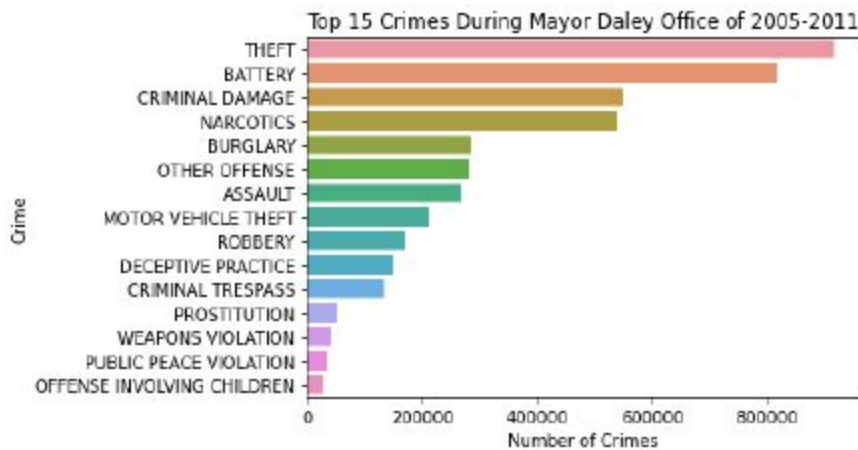- Criminal Damage counts surpassed *150,000*

Figure 1: *Top 15 Crimes During Mayor Daley Office of 2005-2011*
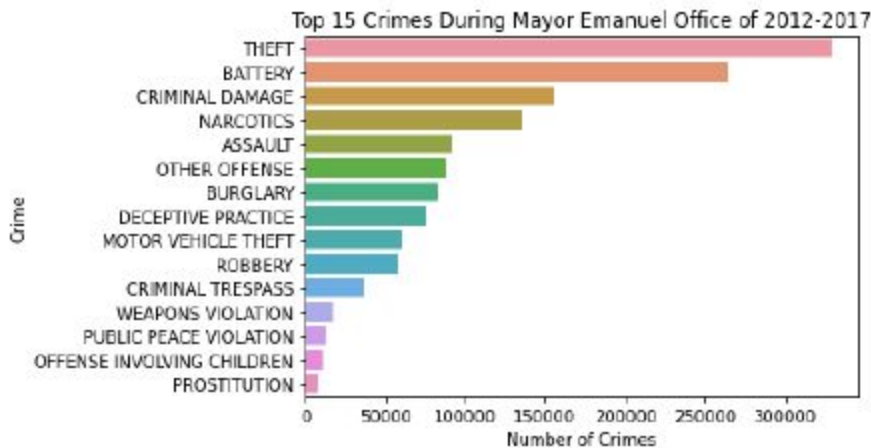
Figure 2: *Top 15 Crimes During Emanuel Daley Office of 2012-2017*

Prostitution
One thing to keep notice in **Figure 1** is where prostitution is ranked (11th) during Mayor Daley's term. We then can see that prostitution has dramatically dropped to rank 15 in **Figure 2** during Mayor Emanuel's term.

Local Impact
Although we cannot definitively confirm this to be the cause, back in 2015, Mayor Rahm Emanuel had hosted a handful of discussions with small businesses owners and wanted to focus on beginning more economic development in a variety of neighborhoods. We believe that this may have led to open discussions and opportunities to be presented to many businesses of Chicago.

Top Crime
According to **Figure 1** and **Figure 2**, Theft was the highest of all crimes for both mayoral terms.

National Impact
We believe this to be related to the national poverty rate that the United States fell victim to due to the housing market crash of 2008 and resulted in more crime to take place. According to **Figure 3**, the poverty rate increased during the years of 2006-2008 and kept rising until the year 2010. After 2010, the poverty rate slightly dipped and did not fall back down below 12.5% until 2017.
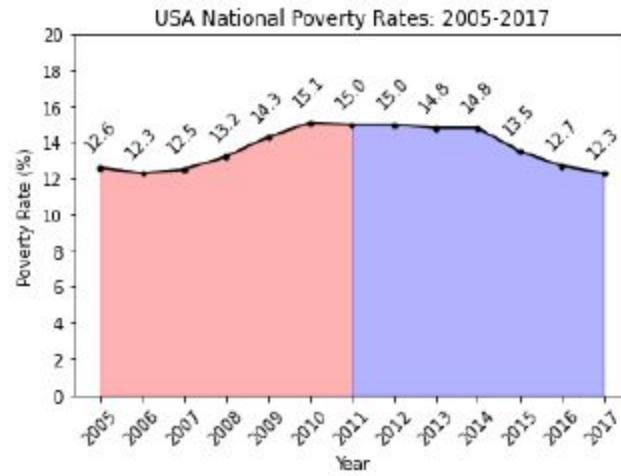
Figure 3: *USA National Poverty Rates: 2005-2017*
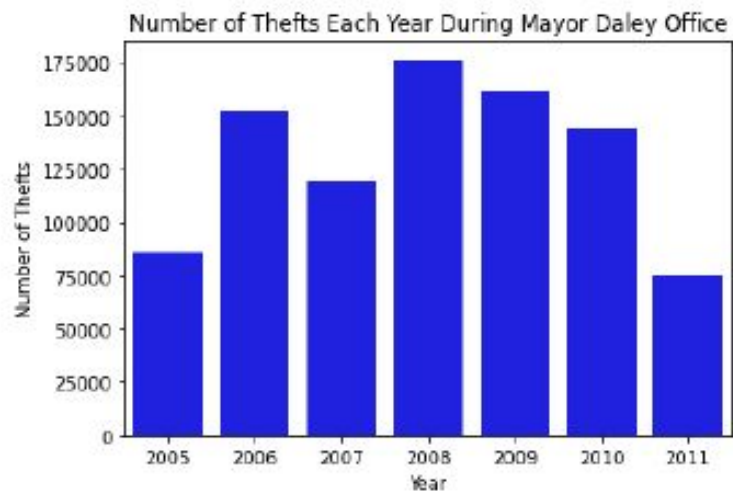
Crimes by the Year

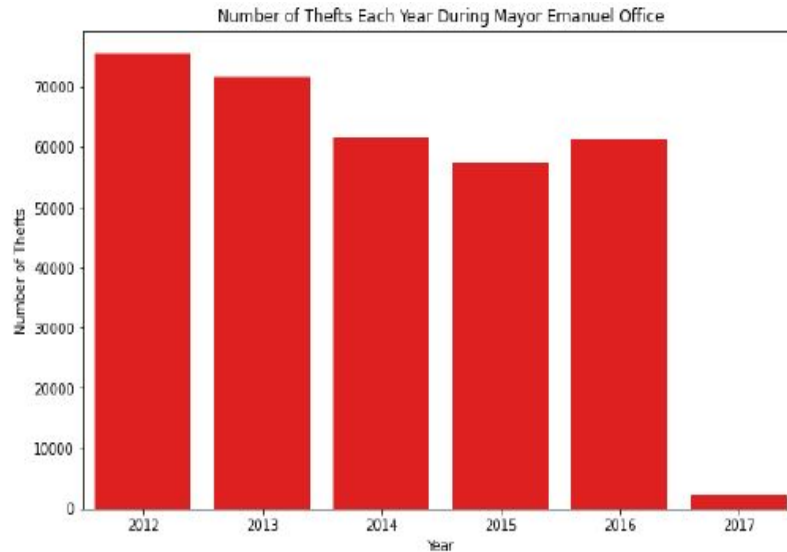**Figure 4:** *Number of Thefts Each Year During Mayor Daley Office*

Figure 5: *Number of Thefts Each Year During Mayor Emanuel Office*

We can see that in **Figure 4**, the most amount of Thefts was in 2008. We can also see that in **Figure 5**, the most amount of Thefts was in 2012. If we closely compare these figures to **Figure 3** and consider that the housing market crash, we believe this to be a factor as to why so many thefts occurred during 2008 specifically. As for the year 2012, we believe that people were still feeling the effects of the housing crash seeing that the poverty rate was among the top during 2005-2017 at 2012.
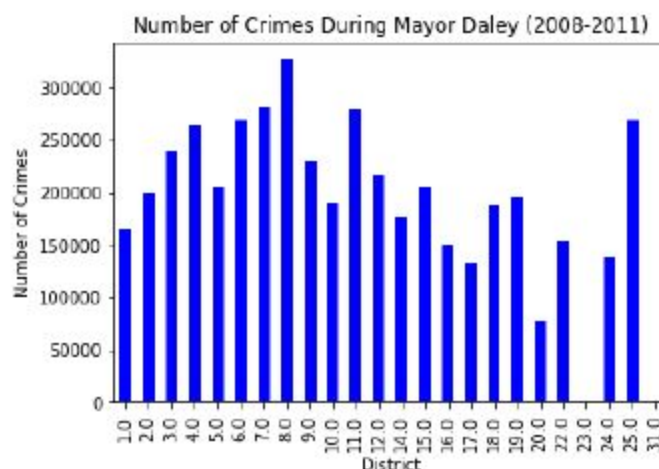
Crimes per District

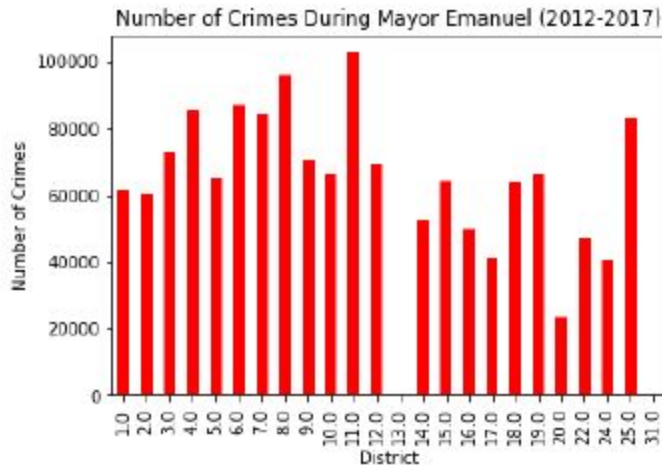**Figure 6:** *Number of Crimes During Mayor Daley (2008-2011)*

Figure 7: *Number of Crimes During Mayor Emanuel (2012-2017)*

In **Figure 6**, we can see that the district that had the most crimes reported during Mayor Daley's term was *District 8*. In **Figure 7**, we see that the district that had the most crimes reported during Mayor Emanuel's term was *District 11*. When we put the two graphs in a single histogram as shown in **Figure 8**, we can see that there were a lot more reported crimes during Mayor Daley's term. For both mayoral terms, Districts 7, 8, and 11 were similarly among the top districts with the highest number of reported crimes.
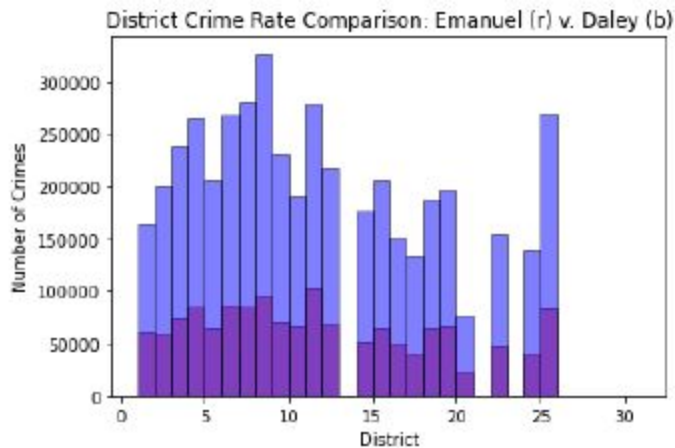

Figure 8: *District Crime Rate Comparison: Emanuel (r) v. Daley (b)*

5. Conclusion

Although we could not specifically see the city of Chicago's poverty rate, what we can take away from this study is that crime in Chicago seems to be impacted by national poverty rates. Although we saw a great amount of petty crime peak during 2008 and 2012 during both mayoral terms. We also noticed that a lot more crimes took place during Richard M. Daley's mayoral term compared to Rahm Emanuel's. We believe this

to have been due to both negative impacts of the 2008 United States housing as well as positive impacts of Emanuel's initiative to help and incentivize small businesses to grow in the city of Chicago. We also saw that a large number of crimes took place across three districts: 7, 8, and 11 throughout both mayoral terms.

6. Appendix

Combining 2005-2007 and 2008-2011 Chicago Crime Database During Mayor Daley's terms

```python
#Import the csv files
Chi5 = pd.read_csv('Chicago_Crimes_2005_to_2007.csv', usecols=colsUsed)
Chi8 = pd.read_csv('Chicago_Crimes_2008_to_2011.csv', usecols=colsUsed)
Chi12 = pd.read_csv('Chicago_Crimes_2012_to_2017.csv', usecols=colsUsed)

merged = pd.concat([Chi5, Chi8], ignore_index = True)
merged.to_csv("output.csv")
```

Remove any null value rows

```python
daleyFull = daleyFull.dropna()
emanuelFull = emanuelFull.dropna()
```

7. Sources

Chicago Crime Database .csv Files
Kaggle: https://www.kaggle.com/currie32/crimes-in-chicago

United States National Poverty Rates
Statistica:
https://www.statista.com/statistics/200463/us-poverty-rate-since-1990/#:~:text=In%2020 19%2C%20the%20poverty%20rate%20was%2010.5%20percent%20in%20the%20U.S. &text=As%20shown%20in%20the%20statistic,within%20the%20last%2015%20years

United States 2008 National Housing Market Crash
Curbed:
https://archive.curbed.com/2018/8/29/17788844/financial-crisis-2008-cause-housing-mor tgage-lending

Rahm Emanuel Small Business Initiative (SBI)
City Of Chicago:
https://www.chicago.gov/content/dam/city/depts/dps/RulesRegulations/DPSPolicy_Small BusinessInitiative_011014.pdf