

The long term effect of the COVID-19 pandemic on the criminal landscape in London

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Abstract— The aim of this project is to analyse how the COVID-19 pandemic affected crime across London.

I. INTRODUCTION

The disruption caused by the COVID-19 pandemic placed major cities around the globe, including London, at a standstill. Now approaching three years since the ease of the final restrictions, a pressing need arises to comprehend how this crisis altered our world. Having lived through a life-altering event like that, it is natural to seek understanding and process its' effect on the everyday life.

Various criminal activities are frequently highlighted in media reports seemingly in the same volume as they were pre pandemic, begging the question; could an event that caused so many global disruptions similarly impact the criminal landscape? Existing studies analyse the potential COVID-19 affected crime in England and Wales (Kirchmaier and Villalera, 2020), fuelling curiosity on how these circumstances apply for London.

This project seeks to understand and investigate the relationship between the pandemic and the crime trends in London both during 2020 and nearly 3 years afterwards. Documenting and analysing a significant event such as this, allows to anticipate potential patterns and provides better preparation for any future crises. This report can also stand as a general update for local citizens and a reminder regarding public safety.

II. ANALYTICAL QUESTIONS

1. Did crime in London increase or decrease during COVID-19 and how did the enforcement of lockdowns affect crime rates from March 2020 to April 2021?
2. Which London boroughs and which types of offences across the city, faced the most change in 2020?
3. How have crime numbers shifted following the ease of restrictions, and what factors have potentially influenced these changes?

This analysis explores the overall impact of COVID-19 on crime from September 2017 to September 2023, spanning 2 and a half years before the 1st lockdown and 2 and a half years after the 3rd and last lockdown. This is necessary to have an overall view of the trends for the chosen timeframe.

Investigating the varying rate of change experienced by different London boroughs alongside the changes in the types of offences across the city most impacted during 2020. This gives an insight more context as to how the pandemic affected societal landscapes such as what kind of offences people were able to commit as well as how borough safety has been affected.

Data as recent as September 2023, are compared to pre-2020 data, noting if lower, higher, or consistent. This is to note if the pandemic and its' restrictions potentially had a long term effect. Exploring a potential societal influence on crime rates. An analysis of the lack of trust the citizens of London have for

the police, potentially results in authority being undermined and not feared hence increasing crime levels.

Whenever "post COVID-19" is referenced both in this report and the Jupyter Notebook, refers to the period following the ease of the final official COVID-19 restrictions by the U.K. government. This reports acknowledges the current presence of the virus but does not comment on it.

III. DATA

The data utilised in this report consist of four datasets. Three datasets are sourced from the London Datastore website [1], while the fourth is derived from [2]. The initial two datasets contain the monthly count of crimes within each London borough and each specific crime type. The first dataset spans 2010 to September 2021, as the second covers the timeframe from October 2021 to September 2023. To examine the data in further detail for the period September 2017 to September 2023, these two datasets were merged.

The third dataset contains data on the perceptions of London's citizens concerning their local police force, taken from the Metropolitan Police Service Public Attitude Survey [2] spanning the period December 2014 to June 2023. The information is quantified in proportions with only one key response of the 6 chosen - 'Police do a good job in the local area'. This is made due to its suitability to represent public opinion in a broader context. The decision to select a single response was to streamline the dataset for practicality. Important to note that this decision may have compromised accuracy of the data and the findings derived.

The fourth dataset is compiled using information from [2] and denotes the dates of the 2020 lockdowns as seen in table 1. This facilitates precise comparisons between specific months and their corresponding crime values.

	Start date	End date
1st lockdown	26th March	1st June
2nd lockdown	5th November	2nd December
3rd lockdown	6th January	8th March

Table 1

These datasets, organised by month, are ideal as they allow for a detailed analysis on the influence of lockdowns which span over several months. This provides clear understanding into fluctuations in crime rates, granting flexibility in manipulating data for any period and format (yearly, quarterly), answering the analytical questions successfully.

IV. ANALYSIS

A. Data Preparation

- a. Cleaning the data includes checking if any null values are present and needed to be handled.
- b. The presence of outliers is not an issue as the merged dataset contains monthly records, hence they

represent fluctuations in crime rates for specific months.

- Reshaping and splicing, as the first dataset starts from 2010.
- Renaming columns for practicality.
- Grouping values by the columns “Borough” to avoid multiple rows of the same boroughs, to make the construction of models easier.
- Changing the format of the dates from the notation for example, “201702” to “February 2017” to ensure it is clear and avoid confusion or misleading.

Depending on the analysis, the data is selectively filtered each time to include or exclude features. These features pertain either to specific time periods or columns containing data related to London boroughs or types of crime. The excluded features are retained for use in subsequent analyses. The markdown notes on the Notebook document these steps very precisely.

B. Data Derivation

Feature engineering: This is used to sum the data for each month into a single newly created feature. This captures the total count of crimes for each borough per month or each type of crime per month depending on the analysis being executed. This makes the plotting of graphs a lot easier.

This is also used to create a new feature consisting of the data for when lockdowns have happened.

This way the new features for the comparisons will be

Variable	Description
Crime count	The summed crime count for all boroughs and all types of crime displayed monthly
Lockdown dates	Notation 0 and 1 is used with 1 being used every month that has a restriction and 0 for every month that didn't.

Table 2

Annual resampling: The cleaned-up dataset presents data monthly. When needed to draw comparisons between various features such as the London boroughs and their crime change over covid but also to analyse how the most prevalent types of crime have seen changes over covid as well, a good comparison compares this data yearly rather than monthly. This is done by performing annual resampling through temporal aggression which converts the data from a monthly time frequency to a yearly one. This generalises the data and the comparisons from year to year become a lot easier. See Notebook.

C. Contrstuction of models

Graphical visualisation through scatterplots, line plots, stacked bar plots and pie charts is applied into the research. To identify relationships between variables, such as crime count and lockdown correlation matrices are also used.

Statistical testing, t-test is applied to determine whether there is a significant difference between the citizen’s opinion on the police with the crime trends. Conclusions are derived from the p-value and whether it is able to reject the null hypothesis. This is selected based on its’ ability to perform when the datasets are scaled differently. In the case this was used, the crime dataset presented information in raw numbers but the data in the police dataset was in proportions.

D. Validation of results

The validation of results is done in two different ways. Using heatmaps, the correlation matrices can be visualised for a better understanding. The main validation, however, comes from cross-validation from trends found on the derived plots and literary sources.

As will be seen in the findings chapter, [4], [5] and [6] are used to support the results from the correlation matrices and the t-test statistical analysis.

V. FINDINGS, REFLECTIONS AND FURTHER WORK

1. Findings:

a) Overall crime trend:

Initially, the analysis evaluates the overall crime trends as illustrated in a line plot in Figure 1.

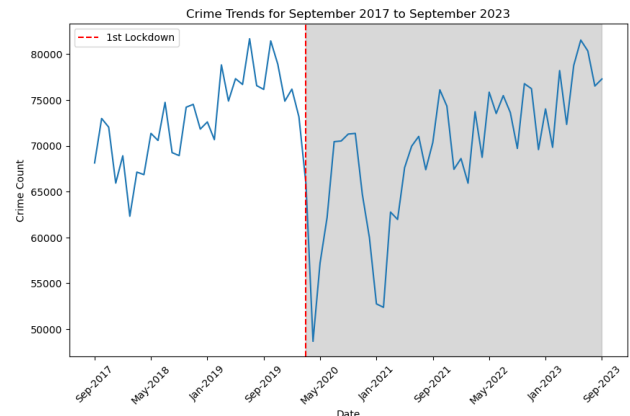


Figure 1

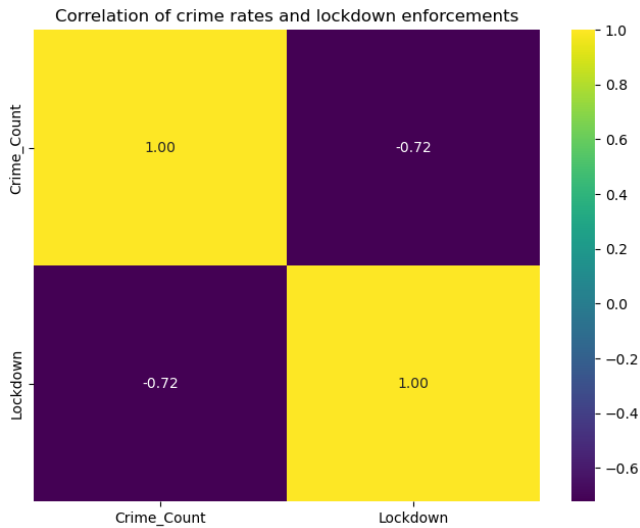


Figure 2

Figure 2 visualises a strong negative linear relationship, -0.72 , between lockdown enforcement and crime rates, suggesting that as lockdowns are imposed, crime rates tend to decrease. This can be validated by the line plot in Figure 3.

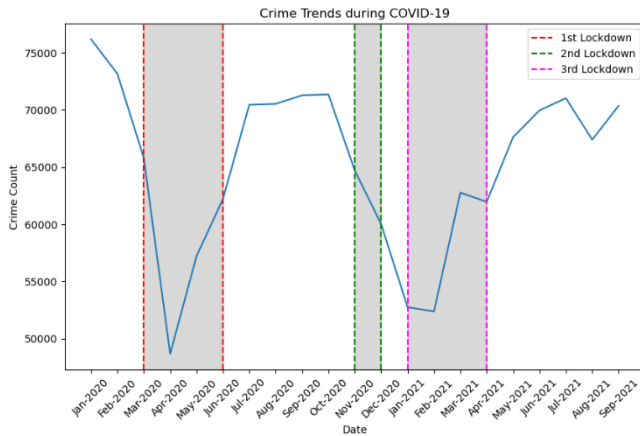


Figure 3

During the shaded periods, numbers indicate a decline or significantly lower figures compared to pre-COVID-19 levels.

b) Crime trends per London borough

A scatterplot analysis illustrating crime trends across London boroughs, detailing monthly crime numbers from September 2017 to December 2019 is seen in Figure 4.

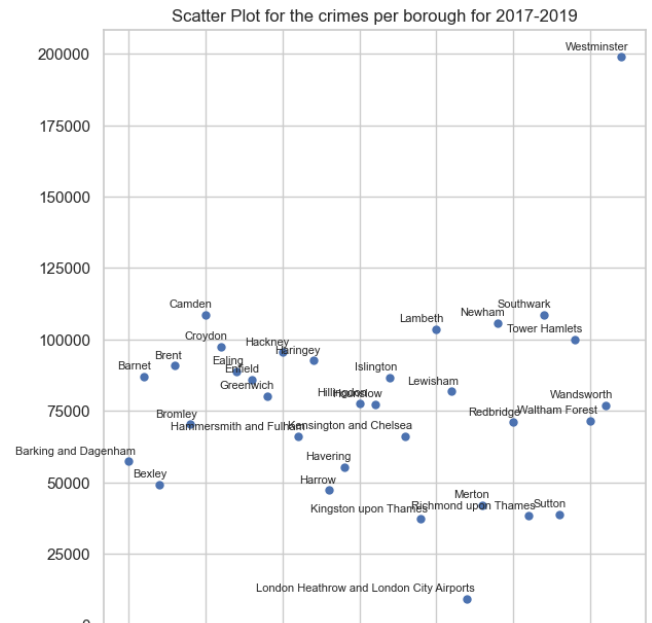


Figure 4

The three boroughs ranked by highest number of crimes are Westminster Camden and Southwark.

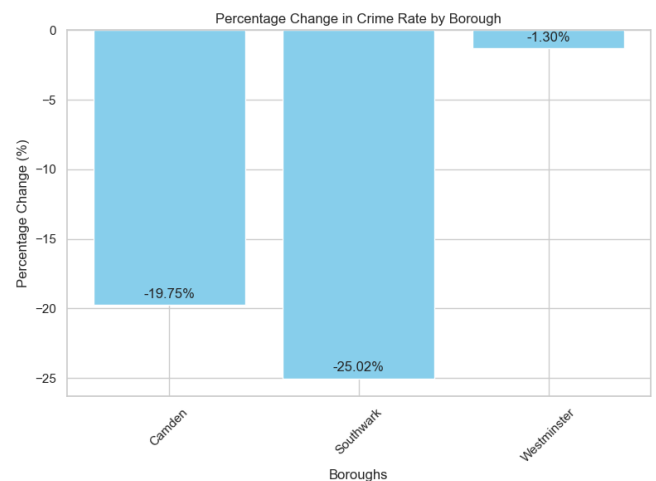


Figure 5: Southwark has seen the most decrease in crime, with Westminster the least.

Westminster and Southwark are located in Central London zone 1 whereas Camden in zone 2. These locations, full of popular attractions, draw in high volumes of tourists. This contributes to higher foot traffic making them more susceptible to various types of crime.

c) Types of crime

The following pie charts showcase the types of crimes present in the dataset.

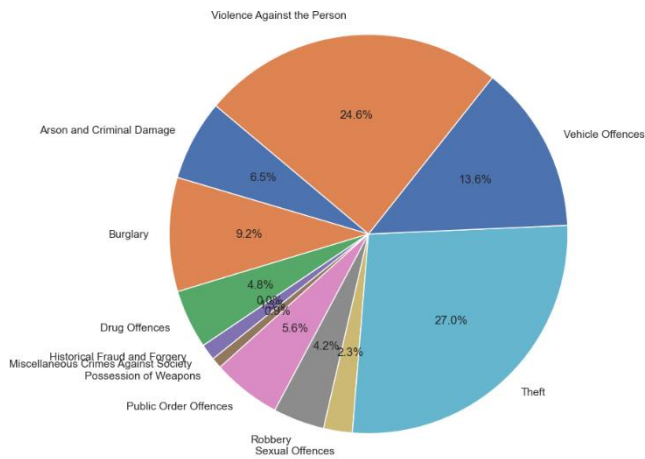


Figure 6

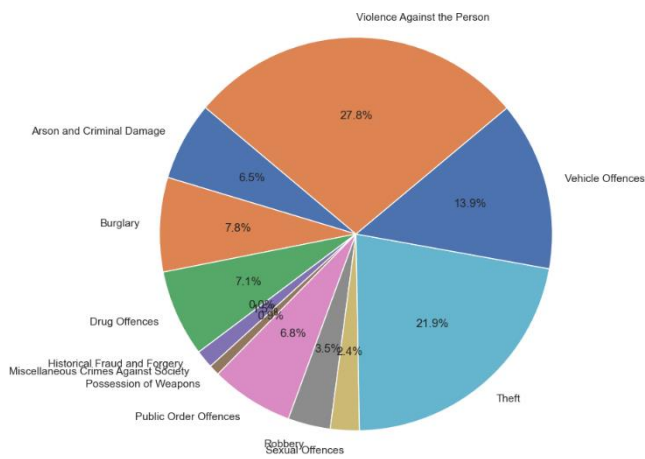


Figure 7

The predominant types of offences have been altered during the pandemic.

Theft - decrease of approximately 18.89%

Violence against the person - increase of approximately 13.01%.

Having reduced activities outdoors limits the opportunities of theft. Violence against the person includes situations of domestic violence that spiked during the pandemic according to [4].

d) Comparison to recent data

Figure 8 contrasts crime rates from 3 years before COVID to the latest data.

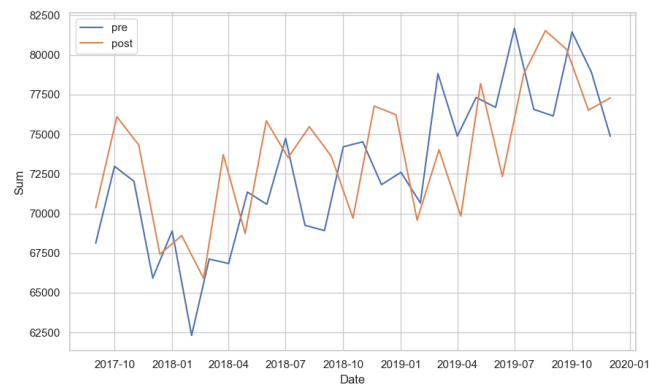


Figure 8

A zoom in on figure 8 displays that September 2023 has higher crime rates than in December 2019. (Figure 9).

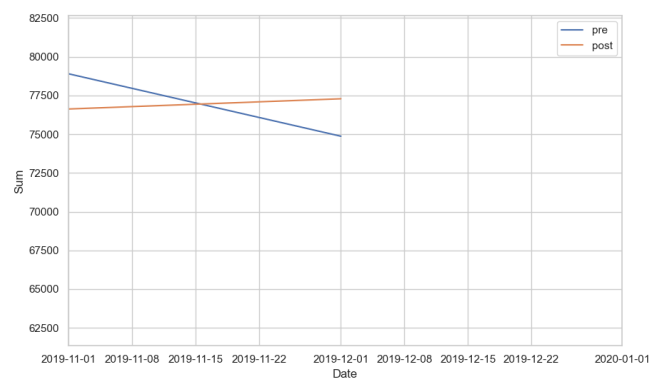


Figure 9

A potential societal factor for increased criminal activities could be the lack of London's citizens' confidence in the police. This is visualised in Figure 10.

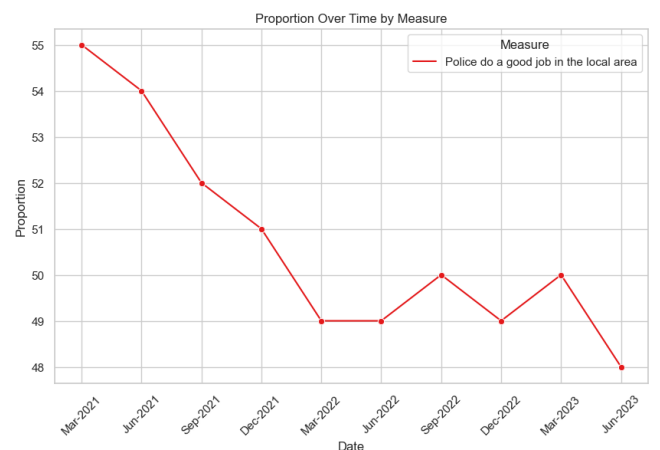


Figure 10

T-testing, provides a p-value of $1.78e-19$, suggesting a notable relationship between the drop of trust in the police and the rising crime. This can be corroborated by [5].

However, in all these findings it is crucial to note that correlation does not necessarily imply causation.

2. Reflections

Lockdowns notably reduced offences from March 2020 to April 2021. In 2020, boroughs with high rates and different

types of crime experienced significant decreases. Since restrictions eased, crime has surged, surpassing December 2019 levels as of September 2023. Analysis links this rise to the declining trust in police, supported by [5].

These results, highlight the impact of the COVID-19 pandemic on London's crime rates, providing insights into how a major city's criminal landscape can shift.

3. Data limitations

Recognising that not all offences get reported, the utilised data remains suitable and flexible in answering this report's analysis. Cybercrimes, despite their relevancy here, were excluded due to space constraints. Additionally, the report acknowledges the seasonal pattern in crime occurrences.

4. Further Work

Further work could involve exploring correlations between rising offences and factors such as unemployment or poverty levels, to provide insights into the socioeconomic implications of lockdowns. To add, the use of predictive modelling based on patterns from the past 2.5 years could forecast future crime trends.

Word Count:

Introduction: 190

Analytical Questions: 291

Data: 299

Analysis: 574

Findings, Reflections, Further Work: 539

REFERENCES

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The datasets picked were:
 1. MPS Borough Level Crime (Historical).csv
 2. MPS Borough Level Crime.csv
 3. Public_perception_data.csv
- [2] Institute for Government Analysis (2021). *Timeline of UK Coronavirus lockdowns, March 2020 to March 2021*. [online] www.instituteforgovernment.org.uk. Available at: <https://www.instituteforgovernment.org.uk/sites/default/files/timeline-lockdown-web.pdf>.
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- [6] Kirchmaier, T. and Villa-Llera, C. (2020). *Covid-19 Analysis Series Covid-19 and changing crime trends in England and Wales*. [online] Available at: <https://cep.lse.ac.uk/pubs/download/cepcovid-19-013.pdf>.