

Topic: Spatial Inequalities, Socioeconomic Deprivation and Drug Related Crime Patterns across Wales at MSOA Level: A GIS and Statistical Analysis

GIS REPORT BY POWELL ANDLOVU

1. Acknowledgements

AI tools (ChatGPT, OpenAI, 2025) were used during python debugging, the planning and drafting stages to support idea development and research. All data analysis, interpretation, and final revisions were conducted independently by the author.

2. Introduction

Area level crime patterns are shaped by multiple interactions between socioeconomic conditions, population dynamics and environmental context. Within various categories of crime, drugs related offences present unique challenges for public policy and community wellbeing. This is because of their linkage with social disadvantages, substance misuse and economic opportunity structures. This study focuses on revealing insights of patterns of drug crimes and their linkage with measures of deprivation. In this study we focused on spatial linkages between drug crimes and income deprivation index, employment deprivation index and population density at MSOA level in Wales. This study seeks to uncover insights on whether disadvantaged communities experience disproportionate exposure to crime risks. Several studies have consistently proven that there is a relationship between unemployment, income deprivation and substance abuse (Lauren O'Gorman, 2021). Unemployment and economic inactiveness are associated with higher rates of substance use disorders and drug related behaviours, suggesting that labour market disadvantage may correlate with increased crime risks in affected communities (Carina Nolte-Troha 1, 2023). Poverty and community disadvantage have been linked to increased drug activity and criminal behaviour at aggregate levels, reflecting contextual effects on social outcomes (Fischer et al., 2010). This research draws on these established socio economic and spatial frameworks to investigate drug crime distribution relative to employment and income deprivation indices and population density. By integrating spatial analysis with socio-demographic indicators, the study aims to evaluate whether areas with higher deprivation and population concentration also show higher levels of drug crime. Understanding these patterns can inform targeted interventions and resource allocation to address crime and its underlying structural determinants

3. Background

Crime incidence is not uniformly distributed across geographic space, instead, it often clusters in areas characterised by socioeconomic deprivation and demographic stressors. The concept of economic deprivation refer to local socioeconomic conditions such as poverty, unemployment and income inequality, create environments that influence individual behaviours and community outcomes, including exposure to crime and substance misuse (Wilson., 2012). In terms of drug crime, individuals in communities with limited economic opportunities are more likely to experience stressors that correlate with substance misuse and associated criminal activity.

Literature review

Empirical studies have shown that areas with high unemployment rates often report higher levels of substance abuse and related crime, partly because limited labour market opportunities may increase engagement in illicit activities as alternative sources of income or coping mechanisms (Carina Nolte-Troha 1, 2023). Additionally, income deprivation which encompasses low household income and reliance on social support systems, can correlate with increased crime rates, including drugs offences, as community disadvantage erodes conventional social controls and opportunities (Newman, 2001). Population density also shapes crime distribution, densely populated urban communities tend to have higher crimes incidence rates because of greater social interaction opportunities, whereas lower population density communities exhibit lower crime incidences (Fleming, 2011).

Aim and objectives

To investigate how socioeconomic deprivation and population distribution influence spatial patterns of drug related crimes across Wales at MSOA scale, using GIS visualization and statistical modelling.

Objectives

Objective 1: Create thematic GIS maps showing the spatial distribution of:

- Drug crime intensity
- Population density
- Employment deprivation
- Income deprivation

Objective 2: Statistical association Analysis

- Drug crimes and socioeconomic indicators
- Drug crimes and population size

Using:

- Correlation analysis
- Scatter plots
- Multi correlation analysis

Objective 3: Hot spot identification

Identify MSOA hotspots using:

Choropleth mapping

Heat map

Web Heat Map

Web Cluster Map

Objective 4: Predictive Modelling

Develop a simple regression models and Random Forest Machine Learning to test whether:

Employment Deprivation Score

Income Deprivation Score

Population

Predict drug crime levels

Hypotheses (statistical test)

H1: There is no relationship between MSOA population size and drug crime counts

Ho: There is no relationship between MSOA population size and drug crime counts

Outcome

H1: Higher population MSOAs have a higher drug crime counts

H2 Employment Deprivation Relationship

Ho: Employment deprivation score is not associated with drug crime levels.

H1: Higher employment deprivation is associated with higher drug crime levels

Outcome

H1: Higher employment deprivation is associated with higher drug crime levels.

H3: Income Deprivation Relationship

Ho: Income deprivation score is not associated with drug crime levels.

H1 Higher income deprivation score is associated with drug crime levels.

Outcome

HI: Higher income deprivation score is associated with drug crime levels

H4 Spatial Clustering

Ho: Drug crime is randomly distributed across Wales.

H1: Drug crime exhibits spatial clustering (Hotspots/Cold spots)

Outcome

HI: Drug crime exhibit spatial clustering and hot spots.

4. Study site and data sources



Figure 4.1 Study area showing the principal administrative areas of Wales. The map situates Wales within the United Kingdom (insert) and illustrates the spatial extent of the study area used for analysing drug crime hot spots in association to income and employment deprivation index and population density. Major Principal Areas are delineated and labelled to provide geographic context for subsequent spatial and statistical analyses. The map employs British National Grid coordinate reference system (EPSG: 27700)

The study focuses on Wales, with analysis conducted at the Middle Layer Super Output Area (MSOA) level. MSOAs are statistical geographic units designed by the Office for National Statistics (ONS) in United Kingdom to represent areas with broadly consistent population sizes (typically between 500 and 15000 residence). The use of MSOAs provides an appropriate spatial scale for examining area level crime patterns and socioeconomic conditions, balancing spatial detail with statistical robustness. Wales was selected as a study area because of its spatial inequalities in income, employment, health outcomes and crime, especially in urban regions in South Wales and more rural areas in Mid and West Wales. South Wales contains densely populated urban and post-industrial communities that have been widely documented as experiencing elevated levels of socioeconomic deprivation and drug related crimes. Analysing patterns at MSOA level allows for meaningful comparisons across communities while minimising issues related to small number suppression and volatility often present at finer spatial scales.

Data Sources Link

1. Drug Crime Data

Drug crime data were obtained from the UK police open data portal, which is provided for public access. The records cover reported crimes across England and Wales. The data set includes point based records of drugs related offences, with attributes such as date, longitude and latitude, MSOA Code, MSOA Name and type of offence committed. These data sets are released by individual police officers and standardised nationally. For this study drug crime incidents occurring within Wales were extracted and spatially aggregated to the MSOA level to produce area based counts of drug offences. The UK police data are widely used in academic research and policy analysis and can be independently verified via the official website:

<https://data.police.uk/data/>

Data was manipulated using python code to filter Drug crime arrest for the year 2024.

2. Population Data

Population data was sourced from the ONS Census 2021, which provides authoritative population counts and density measures for MSOA across Wales. Estimates by quinary age groups and sex for 2021 Middle layer Super Output Areas, mid-2022 was used to represent settlement intensity and to assess whether drug crime patterns vary with population concentration. Census data sets are produced by the Office for National Statistics and are fully verifiable via the ONS open data portal: Middle layer Super Output Area population estimates (Accredited official statistics)

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/middlesuperoutputareamidyearpopulationestimatesnationalstatistics>

3. Middle layer Super Output Areas (December 2011) Boundaries EW BSC (V3)

MSOA boundary shapefiles were obtained from the ONS open Geography Portal, ensuring consistency between statistical data and spatial units. These boundaries are the official MSOA definitions used in national statistics and policy analysis:

<https://geoportal.statistics.gov.uk/datasets/ons::middle-layer-super-output-areas-december-2011-boundaries-ew-bsc-v3-2/about>

4. Welsh Index of Multiple Deprivation (WIMD) 2019 Income and Employment Combined

Measures of socioeconomic deprivation were derived from the Welsh Index of Multiple Deprivation (WIMD), produced by the Welsh Government. Income deprivation and Employment deprivation domains were used. These indices capture structural economic disadvantage that has been shown to correlate with crime and substance misuse. The WIMD is the official deprivation index for Wales and is compiled using multiple administrative data sources. These data sets are at Lower Super Output Area hence the Look up Output Area boundaries data set are required to convert WIMD to MSOA level. Domain scores and ranks are published at small area level and are publicly available through Stats Wales and Welsh Government statistical releases:

https://datamap.gov.wales/layers/inspire-wg:wimd2019_income

https://datamap.gov.wales/layers/inspire-wg:wimd2019_employment

5. Output Area (2011) to LSOA to MSOA to LAD (December 2011) Exact Fit Lookup in EW

Output area boundary shapefiles were obtained from the ONS open Geography Portal, used to join data sets of different levels to common MSOA level.

<https://www.data.gov.uk/dataset/d54db05f-cee0-4436-98fc-6a2e2ea7ab41/output-area-2011-to-lsoa-to-msoa-to-lad-december-2011-exact-fit-lookup-in-ew>

5. Methodology

Data Manipulation

- Downloaded data sets from the websites.
- Used python code to combine the month's datasets for drug crime data sets.
- In QGIS using joint attributes by location combined the police point data with the principal counties of Wales's shapefile creating drug crime data in Wales.
- Loaded the following data sets in QGIS 3.44
 - MSOA boundary shapefile
 - OA01_LSOA01_EW_LU.CSV
 - Population CSV (MSOA LEVEL)
 - Income deprivation score csv (LSOA level)
 - Employment CSV (LSOA level)
- Changed Income and Employment deprivation score from LSOA to MSOA level
 - Joined Income/Employment deprivation score with look up table.
 - Join layer: Look up table
 - Join Field: LSOA01CD
 - Target field: LSOA Code (2011)
 - Prefix 1k
 - Aggregate Income and Employment to MSOA
 - ✓ Aggregate to mean standard for deprivation indices
 - ✓ Use statistics by categories algorithm
 - ✓ This give us the means of both Income and Employment Deprivation Score
 - ✓ Delete all other fields such as sum, quartile and range, count so that we are left with only MSOA code and Mean.
 - ✓ On input vector you select the OA01_LSOA01_EW_LU.CSV
 - ✓ Field to calculate input Income and Employment
 - ✓ Fields with categories you input MSOA 11CD which represent the MSOA boundaries.
 - ✓ Save your file to a folder and the algorithm
 - ✓ This is done by running as batch process for both income and employment at once.
- Now we prepare for the drug crime data set.
 - Originally the data set has multiple csv files aggregated by months of the whole year of 2024
 - Used python to combine all these data sets into a single file.
 - Load the crime data set into QGIS
 - Load the income and employment deprivation scores data set that we prepared earlier
 - In attributes table of the prepared data set we add a field using toggle editing and we name it drug count then select the boundary layer
 - Use count points in polygon algorithm
 - Under points we input the drugs data from the police.
 - In count field we select the drug count field that we selected.

- Select modify all features.
 - Now the drug crime is at MSOA level.
- Now we prepare for the population data set.
- This data set has many rows so we will clean the data by deleting all other rows the we remain with Total Population column and MSOA 2021 columns.
 - This data is already at MSOA level so we just have to join it on the existing data file which contains income and employment deprivation mean index and the drug crime data.
 - We select the modified shapefile go to properties.
 - Select joins
 - Select the population csv file
 - Join field : MSOA11CD
 - Target field: MSOA11CD of the look up file which has been joined by Employment and Income deprivation index and drug crime data.
 - Check in cache join layer
 - Check in Join fields and select population that is what we interested in.
- Now we have a shapefile that contains a joint of lookup data code, drug crime, population, and income and employment deprivation index.
- Export this file into csv for data analysis and statistics using python.
- The joined shapefile is saved again as gpkg file.

Creating Maps.

1. Choropleth mapping

- Right click on our shapefile
- Properties
- Symbology
- Selected graduated by Drug crime
- Color ramp – select create color ramp – select catalog colour brewer – Scheme name select RdPu – select 9 classes – Mode equal count the select classify – select apply and Ok.
- Use the layout panel to add north arrow, legend, scale, title, add map, add grid and print out map.
- Follow the same process for income, employment deprivation Indies and population column.
- You will have 4 maps showing where crime associated with drugs is most dominant and compare with other variables maps to see how these are linked with each other.
- Statistical operations are conducted in python code to quantify the relationship between the variables

2. Heat map

- After exporting the joined shapefile to CSV file, the CSV file was used to create a Web Heat and Cluster Map using python in jupyter note book.
- Another static heat map was constructed using QGIS using the following procedures:

- A kernel Density Map was created.
- Used the joined drug crimes in wales shapefile data set.
- It was made sure that the data set is in British National Grid (EPSG: 27700) coordinate reference system for correct distance calculations.
- Select processing
- Select tool box
- Search for Heat map (Kernel Density Estimation)
- Radius 10 km
- Weighted field leave empty
- Kernel shape Quartic
- Run the algorithm.
- Change your colour ramp to Reds where Red will represent high values and yellow low values.
- Using layout platform create a map and export as jpg.

Final Attributes Table for the data set.

MSOA_DrugArrest_Emply_Pop_Income — Features Total: 437, Filtered: 437, Selected: 0												
	MSOA11CD	MSOA11NM	MSOA11NMW	BNG_E	BNG_N	LONG	LAT	GlobalID	Drug_count	Employmen_	Population	Incomemean
2	W02000288	Merthyr Tydfil ...	Merthyr Tudful ...	307204	201755	-3.3443600000...	51.7068000000...	b6697967-35c7...	6	0.20271428571...	8340	0.21014285714...
3	W02000289	Merthyr Tydfil ...	Merthyr Tudful ...	309401	197218	-3.3113900000...	51.6664000000...	905ec24c-f85b...	14	0.16153846153...	8241	0.16538461538...
4	W02000290	Caerphilly 001	Caerffili 001	310459	208125	-3.2989000000...	51.7646000000...	46e886d9-22f...	23	0.2663	8845	0.2751666666...
5	W02000291	Caerphilly 002	Caerffili 002	312315	201786	-3.2704200000...	51.7079000000...	fc36411f-fd92...	11	0.2323333333...	7573	0.2604166666...
6	W02000292	Caerphilly 003	Caerffili 003	315439	199528	-3.2246700000...	51.6880999999...	27e6e4d8-7bb...	8	0.22068421052...	5704	0.25347368421...
7	W02000293	Caerphilly 004	Caerffili 004	314450	199647	-3.2390000000...	51.6890000000...	8bc19cb-0cb7...	18	0.23647619047...	6196	0.25119047619...
8	W02000294	Caerphilly 005	Caerffili 005	317504	201477	-3.1952600000...	51.7059000000...	0439f51a-0417...	8	0.1528333333...	5715	0.17455555555...
9	W02000295	Caerphilly 006	Caerffili 006	320255	199797	-3.1550700000...	51.6912000000...	d210db19-353f...	12	0.12993103448...	9429	0.13489655172...
0	10 W02000296	Caerphilly 007	Caerffili 007	316013	197079	-3.2157700000...	51.6662000000...	f8f0e5f3-075f-4...	13	0.2076666666...	7742	0.2295416666...
1	11 W02000297	Caerphilly 008	Caerffili 008	313308	197354	-3.2549500000...	51.6683000000...	b804c5-d456...	15	0.172625	7817	0.190625
2	12 W02000314	Blaenau Gwent ...	Blaenau Gwent ...	315918	212357	-3.2208400000...	51.8035000000...	270423d1-a6c3...	15	0.1802083333...	7100	0.20525
3	13 W02000315	Blaenau Gwent ...	Blaenau Gwent ...	319542	212400	-3.1683100000...	51.8044000000...	4751c938-a134...	10	0.18215	5530	0.20025
4	14 W02000316	Blaenau Gwent ...	Blaenau Gwent ...	312560	211848	-3.2694000000...	51.7984000000...	9e9d7d71-ad78...	26	0.22088	7125	0.23276
5	15 W02000317	Blaenau Gwent ...	Blaenau Gwent ...	316453	210460	-3.2126300000...	51.7864999999...	dfabf4db-01f6...	23	0.19246153846...	7671	0.21961538461...
6	16 W02000318	Blaenau Gwent ...	Blaenau Gwent ...	320061	208287	-3.1598300000...	51.7674999999...	7e55f2b9-b219...	19	0.20874193548...	9443	0.23635483870...
7	17 W02000319	Blaenau Gwent ...	Blaenau Gwent ...	314487	207439	-3.2403800000...	51.7590999999...	535d9bef-c300...	32	0.2033	7978	0.2148666666...
8	18 W02000320	Blaenau Gwent ...	Blaenau Gwent ...	318115	206844	-3.1876900000...	51.7543000000...	44c19e84-438c...	17	0.182	8569	0.20810714285...
9	19 W02000321	Blaenau Gwent ...	Blaenau Gwent ...	321557	206315	-3.1377100000...	51.7500000000...	4790d3b2-98ee...	31	0.20251612903...	9119	0.21454838709...
10	20 W02000322	Blaenau Gwent ...	Blaenau Gwent ...	321873	201998	-3.1321700000...	51.7113000000...	230b055f-c409...	19	0.21923076923...	7279	0.24396153846...
11	21 W02000323	Torfaen 001	Torfaen 001	324825	209227	-3.0908700000...	51.7766000000...	hd49r-fiff-d3r9-	10	0.18604761904	6055	0.21571428571

The workflow for data analysis using python code and also creation of a Web maps can be accessed through my GitHub repository:

https://kabila96.github.io/python_code_workflow_drugcrime_spatialandstatistical_analysis_Wales_2024

Results

Objective 1: Create thematic GIS maps showing the spatial distribution of:

Drug crime intensity Choropleth Map

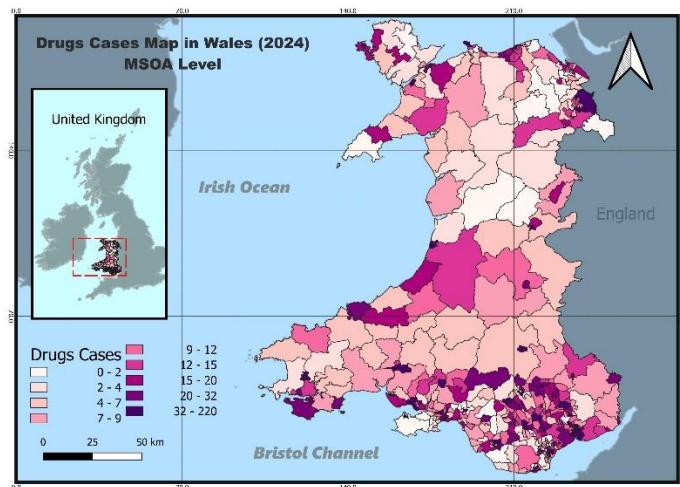


Figure 1. Drug Incidence in Wales (2024) at MSOA Level.

This map shows the spatial hot spots of drug crimes in Welsh MSOA based on 2024 crime arrests. Increased levels of drug crimes are concentrated in South Wales and parts of North Wales and major urban centers, providing essential information for interpreting crime counts and exposure. The map employs British National Grid coordinate reference system (EPSG: 27700)

Population density Choropleth Map

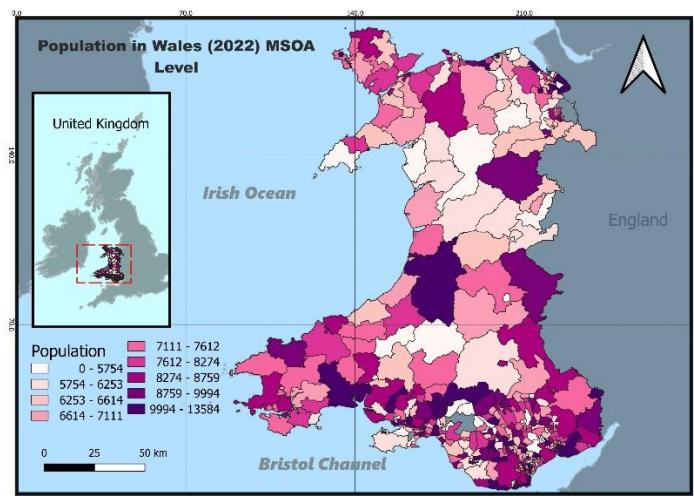


Figure 2. Population Distribution in Wales (2022) at MSOA Level

This map shows the spatial variation in total population across Welsh MSOA based on 2022 estimates. Higher population densities are concentrated in South Wales and major urban centers, providing essential information for interpreting crime counts and exposure. The map employs British National Grid coordinate reference system (EPSG: 27700)

Employment deprivation Choropleth Map

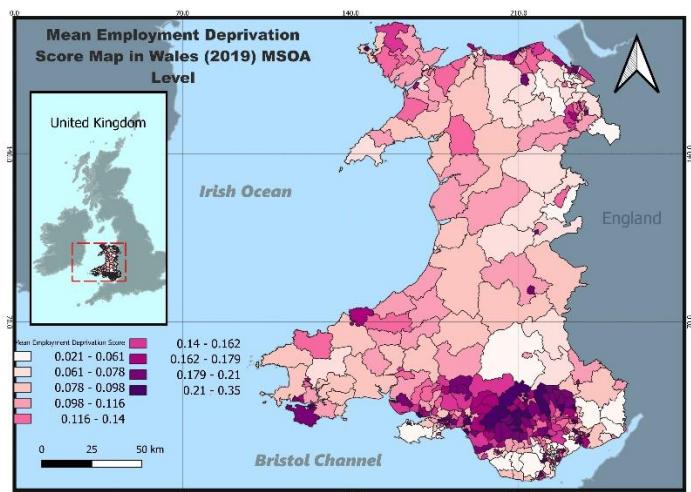


Figure 3. Mean Employment Deprivation Score in Wales (2019) at MSOA Level.

This map represents the mean employment deprivation score for each MSOA in Wales using the 2019 Welsh Index of Multiple Deprivation. Elevated deprivation levels are concentrated in South-Wales valleys and selected coastal and postindustrial regions, highlighting structural labor market inequalities. The map employs British National Grid coordinate reference system (EPSG: 27700)

Income deprivation Choropleth Map

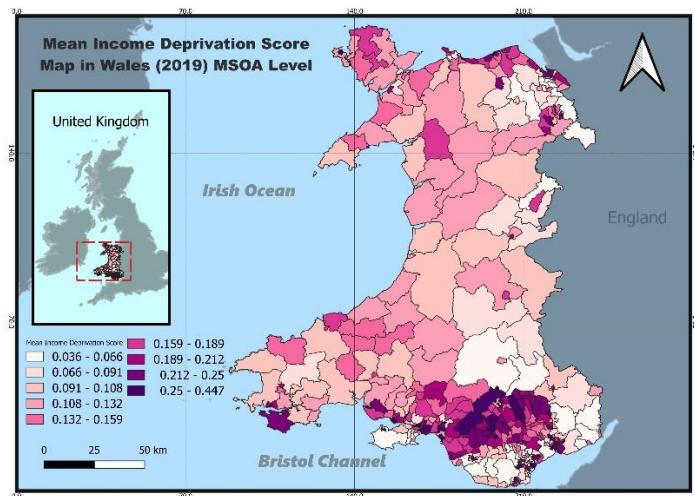


Figure 4. Mean Income Deprivation Score in Wales (2019) at MSOA Level

The map illustrates spatial variation in income deprivation across Welsh MSOAs. Higher income deprivation scores are spatially clustered in South Wales, overlapping with areas of elevated drug crime incidence, suggesting a potential relationship between socioeconomic disadvantage and crime exposure. The map employs British National Grid coordinate reference system (EPSG: 27700)

Objective 2: Statistical association Analysis

Drug crimes and socioeconomic indicators

Drug Crimes and Population Size Scatterplot

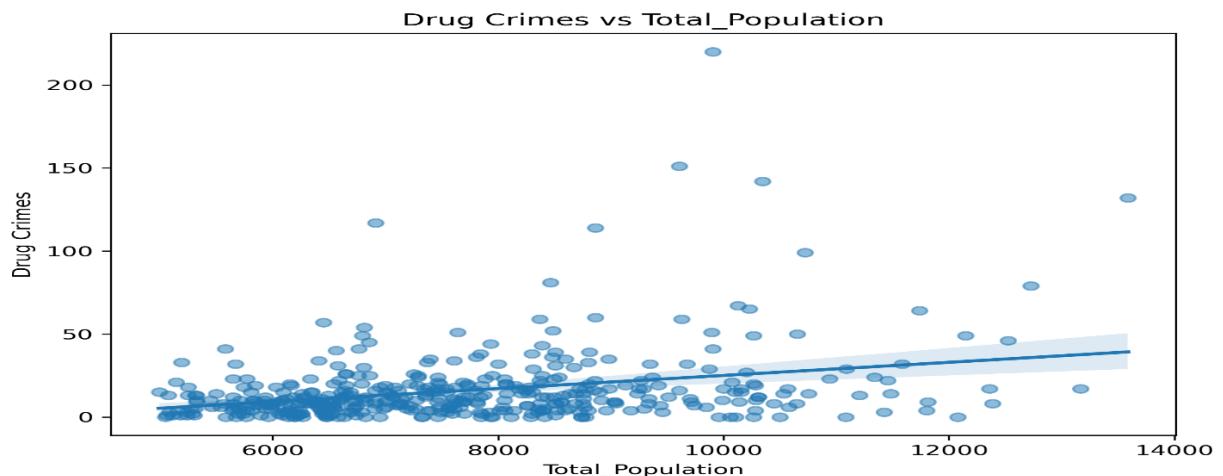


Figure 5. Relationship between Drug Crimes and Total Population

Drug Crimes and Mean Income Deprivation Score Scatterplot

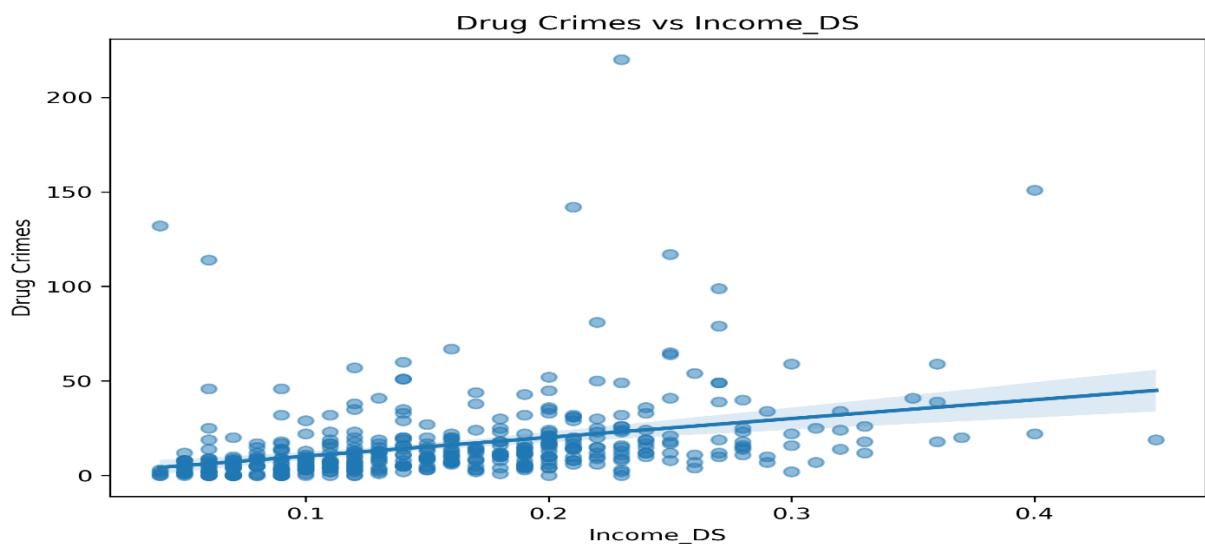


Figure 6. Relationship between drug crimes and income deprivation.

Drug Crimes and Mean Employment Deprivation Score Scatterplot

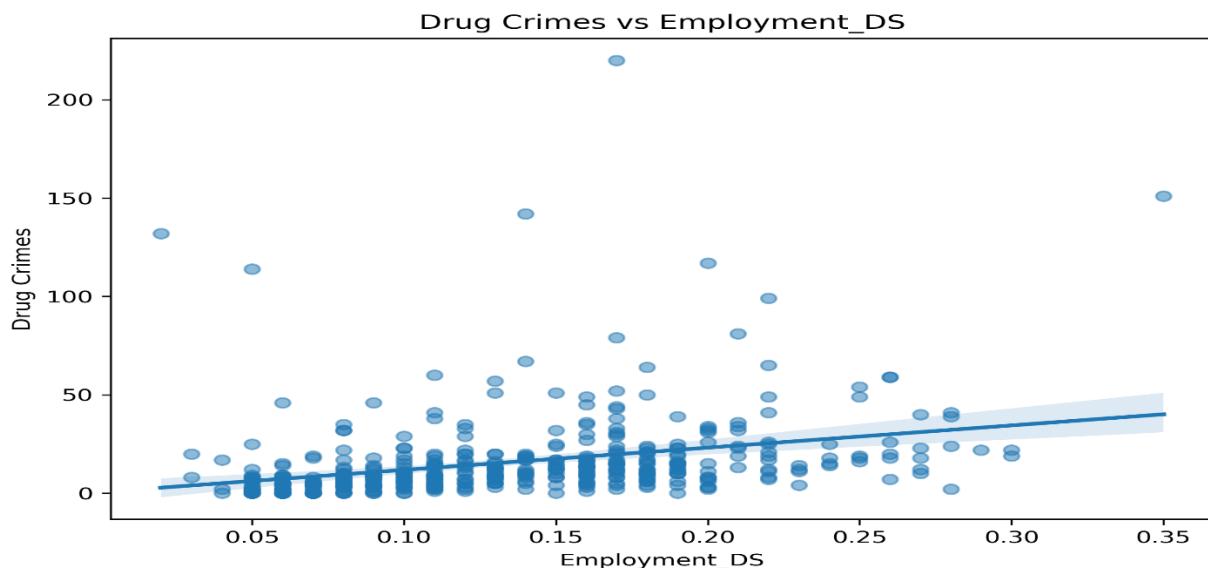


Figure 7. Relationship between drug crimes and employment deprivation.

Top 20 MSOA Areas by Drug Crimes Side Bar graph

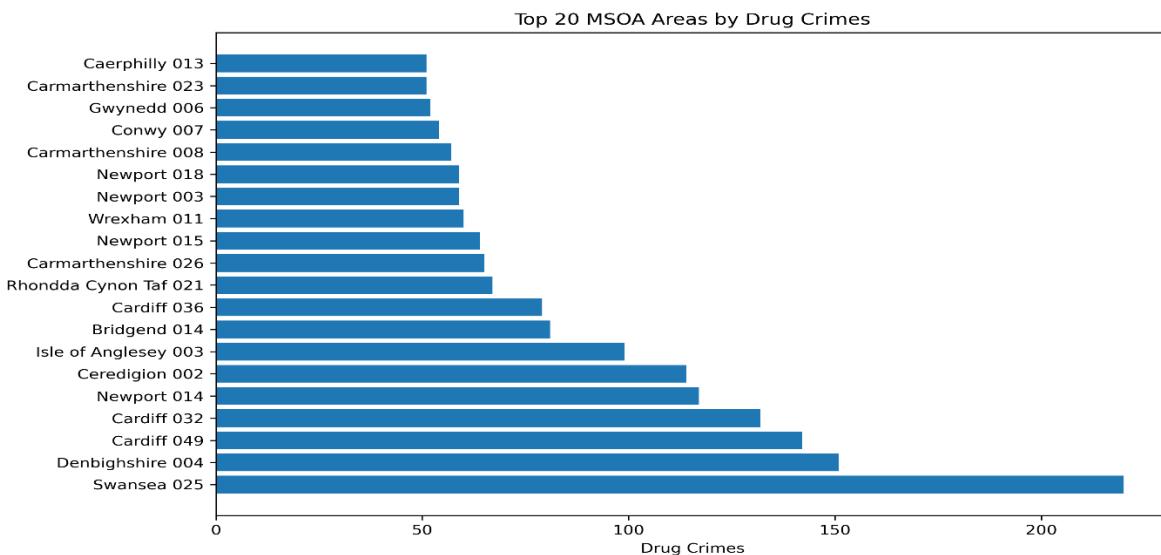


Figure 8. Top 20 MSOAs by recorded drug crimes.

Multi correlation regression analysis

OLS Regression Results									
Dep. Variable:	DrugCrimes	R-squared:	0.227						
Model:	OLS	Adj. R-squared:	0.222 <th data-cs="3" data-kind="parent"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th>						
Method:	Least Squares	F-statistic:	41.73						
Date:	Sat, 13 Dec 2025	Prob (F-statistic):	1.16e-23						
Time:	12:35:41	Log-Likelihood:	-1869.0						
No. Observations:	430	AIC:	3746.						
Df Residuals:	426	BIC:	3762.						
Df Model:	3								
Covariance Type:	nonrobust								

	coef	std err	t	P> t	[0.025	0.975]
const	-28.9575	4.783	-6.054	0.000	-38.359	-19.556
Total_Population	0.0039	0.001	7.130	0.000	0.003	0.005
Employment_DS	-46.0370	57.318	-0.803	0.422	-158.698	66.624
Income_DS	137.0565	45.886	2.987	0.003	46.865	227.248
Omnibus:	442.175	Durbin-Watson:			1.677	
Prob(Omnibus):	0.000	Jarque-Bera (JB):			19999.653	
Skew:	4.511	Prob(JB):			0.00	
Kurtosis:	35.169	Cond. No.			6.32e+05	

Figure 9. OLS regression output showing the association between drug crime counts (dependent variable) and total population, income deprivation score, and employment deprivation score across Welsh MSOAs ($n = 430$).

Objective 3: Hot spot identification

Choropleth mapping

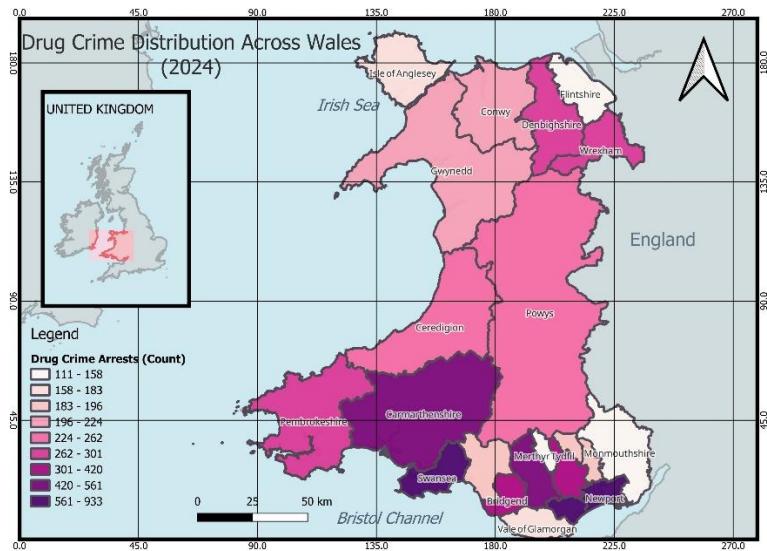


Figure 9. Drug crime distribution across Wales (2024)

This map shows the spatial hot spots of drug crimes in Welsh counties level based on 2024 crime arrests. Increased levels of drug crimes are concentrated in South Wales and parts of North Wales and major urban centers, providing essential information for interpreting crime counts and exposure. The map employs British National Grid coordinate reference system (EPSG: 27700)

Heat map

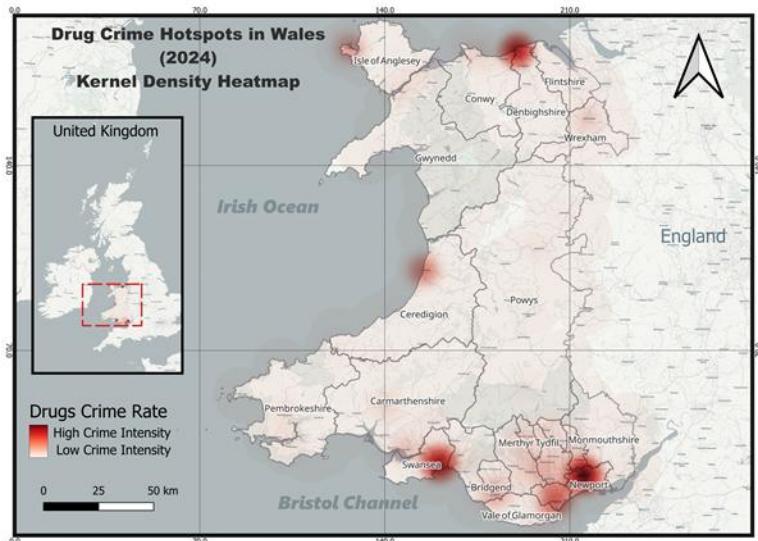


Figure 10. Drug crime hotspots in Wales (2024): Kernel Density Estimation.

This map shows the spatial hot spots of drug crimes in Welsh counties level based on 2024 crime arrests. Increased levels of drug crimes are concentrated in South Wales and parts of North Wales and major urban centers, providing essential information for interpreting crime counts and exposure. The map employs British National Grid coordinate reference system (EPSG: 27700)

Objective 4: Predictive Modelling

Correlation Matrix

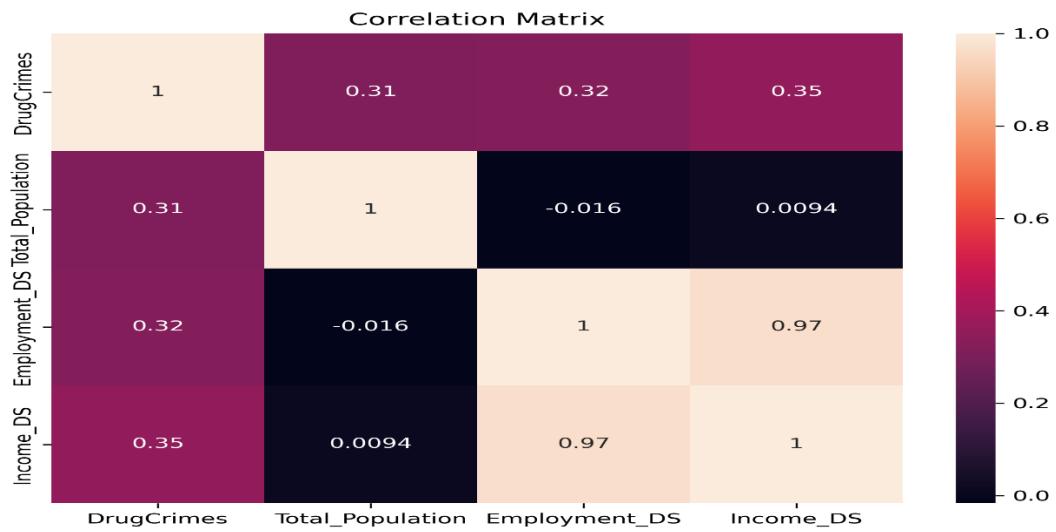


Figure 11. Pearson correlation matrix showing relationships between drug crimes counts, total population, income deprivation and employment deprivation at MSOA level in Wales.

RANDOM FOREST MACHINE LEARNING REGRESSOR FEATURE IMPORTANCES

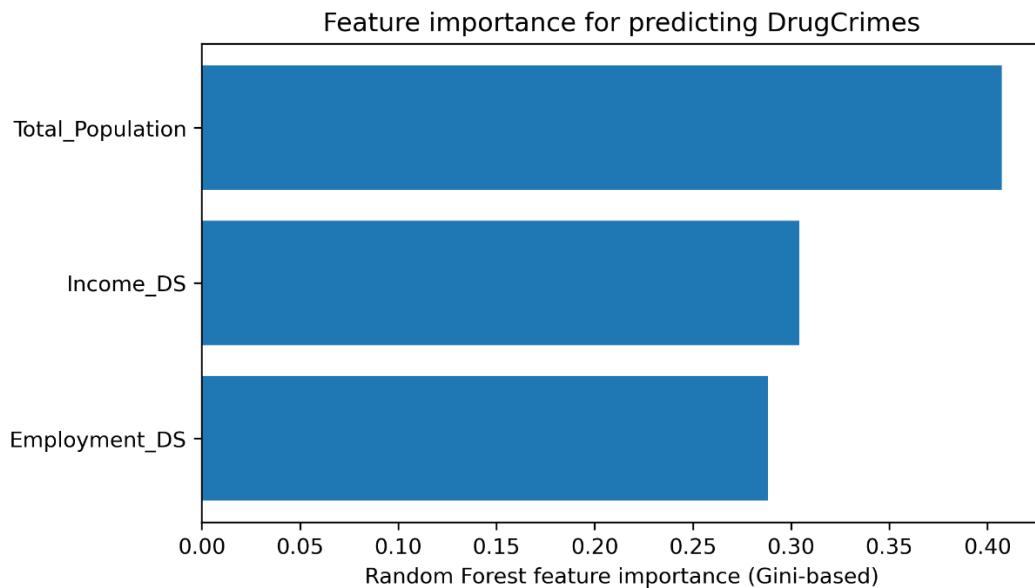


Figure 12. Random Forest Feature Importance's for drug crime prediction

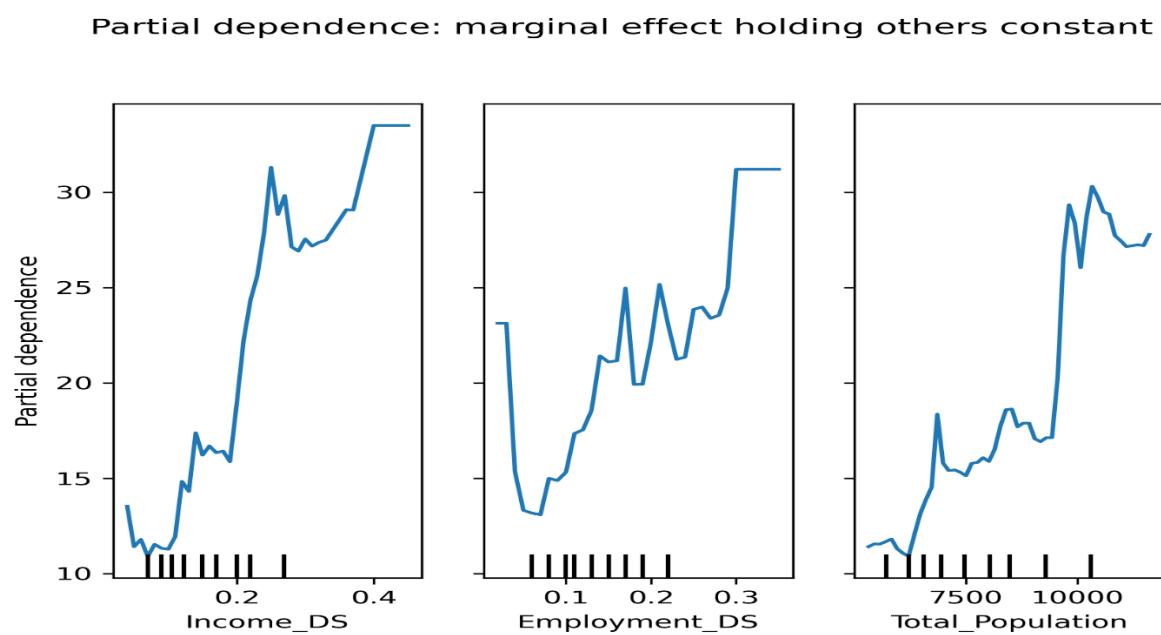


Figure 13. Random Forest Feature Importance and Partial Dependence Analysis.

6. Discussion and conclusions

The study shows that both statistically and spatially, that there is a link between drug crimes and socioeconomic inequalities at MSOA level. The analysis also revealed key association between drug crimes and population density. Drug crimes exhibit moderate positive associations with income deprivation ($r = 0.35$), employment deprivation ($r = 0.32$), and population size ($r = 0.31$). Income and employment deprivation are highly correlated ($r = 0.97$), indicating multicollinearity and reflecting a shared underlying socioeconomic structure.

Spatially, the highest numbers of drug crimes were recorded in South Wales, particularly within urban centres such as Swansea, Denbighshire, Cardiff and Newport. This pattern highlights a strong spatial concentration and inequality in the distribution of drug crime burden. Most urban areas tend to show a pronounced gradient of drug abuse (Sundquist and Frank, 2004). Research also suggests that geographical context shapes risks of drug abuse, with post-industrial areas at higher risks due to increased economic deprivation, particularly employment and income pressures associated to shifts in labour markets (Keyes et al., 2014). In addition sociodemographic factors such as limited employment opportunities and economic inactivity may significantly influence drug use and exposure to drug related crimes (Lauren O’Gorman, 2021) and (Samuel R Friedman a, 2016).

The multiple-correlation model explains approximately 22.7% of the variance in drug crime counts ($R^2 = 0.227$).

Total population and income deprivation exhibit statistically positive associations with drug crimes, while employment deprivation is not statistically significant when included alongside income deprivation, consistent with multicollinearity between deprivation indicators. The Random Forest machine learning model, although demonstrating very low predictive power, indicates that the results reflect relative and marginal associations, which supports the statistical outcomes. These results are consistent with (Chrysoulakis AP, 2025), who found that drug crimes were associated with lower socioeconomic communities. To reduce the burden of drug related crime in South Wales, the Welsh government should adopt an integrated, place based approach that addresses both structural and immediate drivers. Targeted economic regeneration and employment support in deprived communities can reduce the underlying conditions associated with drug crime, while expanded public health led interventions, including treatment and harm reduction services, can address substance dependency and reduce re offending. Data driven and hot spot focused policing, supported by GIS analysis, and should be combined with improvements to urban areas and neighbourhood conditions to reduce drug related offences. The government should also invest in youth engagements, education and community resilience in densely populated areas. In summary there is need to align drug crimes reduction strategies with broader policies on inequality, health, housing and social inclusion offering the most sustainable way of reducing drug related crimes in South Wales. Further studies should focus on identifying the most lethal drug being exploited and the health risks associated with these drug crimes.

References

1. CARINA NOLTE-TROHA 1, P. R., DIETER HENKEL 3, NORBERT SCHERBAUM 2, GABRIELE KOLLER 1, ANDREAS G FRANKE 4,* 2023. Unemployment and Substance Use: An Updated Review of Studies from North America and Europe.
2. CHRYSOULAKIS AP, G. M., MAGNUSSON MM. 2025. Open drug scenes across city sizes: Socioeconomic status, crime patterns and community perspectives. 210–225.
3. FISCHER, B., RUDZINSKI, K., IVSINS, A., GALLUPE, O., PATRA, J. & KRAJDEN, M. 2010. Social, health and drug use characteristics of primary crack users in three mid-sized communities in British Columbia, Canada. *Drugs: Education, Prevention and Policy*, 17, 333–353.
4. FLEMING, L. 2011. The Relationship Between Poverty and Crime: A Cross Section Analysis 4.
5. KEYES, K. M., CERDA, M., BRADY, J. E., HAVENS, J. R. & GALEA, S. 2014. Understanding the rural-urban differences in nonmedical prescription opioid use and abuse in the United States. *Am J Public Health*, 104, e52–9.
6. LAUREN O'GORMAN, R. P., COLUMBUS OHAERI, IAN FARR1, HYWEL T EVANS1, JOSH DIXON3, JOSIE SMITH 2021. *Long-term outcomes of people treated for substance misuse in Wales - A data linkage study*. Wales, Public Health Swansea.
7. NEWMAN, M. L. S. A. K. 2001. Urban Poverty after The Truly Disadvantaged: The Rediscovery of the Family, the Neighborhood, and Culture. 27:23-45.
8. SAMUEL R FRIEDMAN A, BARBARA TEMPALSKI A, JOANNE E BRADY B, BROOKE S WEST C, ENRIQUE R POUGET A, LESLIE D WILLIAMS A, DON C DES JARLAIS D, HANNAH LF COOPER E 2016 Income inequality, drug-related arrests, and the health of people who inject drugs: Reflections on seventeen years of research.
9. SUNDQUIST, K. & FRANK, G. 2004. Urbanization and hospital admission rates for alcohol and drug abuse: a follow-up study of 4.5 million women and men in Sweden. *Addiction*, 99, 1298–305.
10. WILSON., W. J. 2012. *Public policy, poverty, racial inequality in the United States*, United States.