

Research Showcase 14-15 June 2022

Sara Geneletti

Department of Statistics
LSE



THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■

1 Overview

2 EPITOME

3 Ethnic Disparities in Sentencing

Evaluating Policy Implementations TO Predict MENTAL health [EPITOME] : a Bayesian hierarchical framework for quasi-experimental designs in longitudinal settings. Started 1st of June

- 1 Wellcome Trust Collaborative Awards in Science with Gianluca Baio (Statistics) and James Kirbride (Psychiatry/Epidemiology) at UCL and Marta Blangiardo (Epidemiology and Biostats) at IC
- 2 Substantive aims are to evaluate the impact of Conservative/Coalition government policies and subsequent interaction with the COVID pandemic on mental health in minority communities
- 3 Methodological advancements in the area of interrupted time series designs, negative outcome/synthetic controls

Exploring the Nature of Ethnic Disparities in Sentencing through Causal Inference. ESRC open call To start 1st of August

- 1 Collaboration with Jose Pina-Sanchez (School of Law) at Leeds University, Ana Morales-Gomez (School of Law) at Edinburgh University and Eion Guilfoyle (Law) at University of Bristol
- 2 Substantive aims to cast doubt on the generally held belief that there is no systematic racial discrimination in the UK judicial system using Causal DAGs and sensitivity analysis
- 3 Methodological advancements are likely to be minimal for this project but hope to lead into another project where I can explore proximal causal inference

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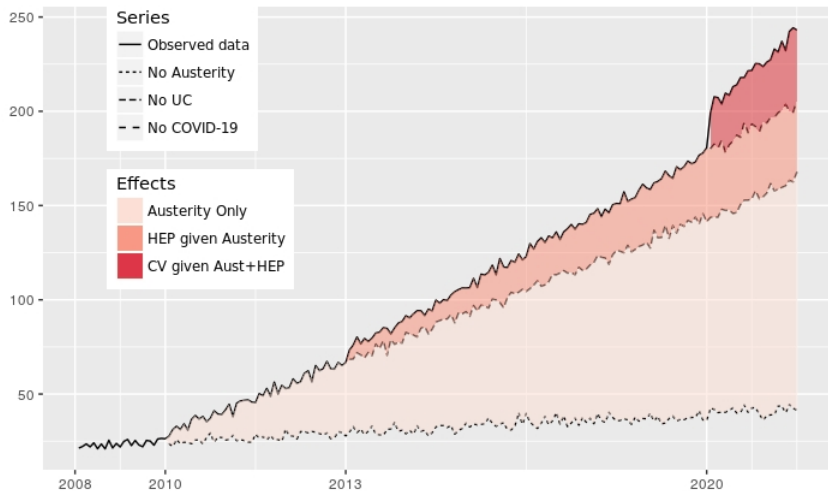
3 Ethnic Disparities in Sentencing

Background and Aims

- 1 Social inequities are strongly associated with mental ill-health and ethnic minorities are disproportionately affected by them. This has consequences on income, employment and housing security amongst others (Marmot Review).
- 2 Since the Conservative government came to power in 2010, they have implemented a number of policies that have resulted in an increase in the burden of mental health overall but disproportionately in minority communities.
 - 1 The introduction of austerity policies : reduction in public spending
 - 2 Universal Credit (UC) to replace existing welfare payments
 - 3 The Hostile Environment Policy (HEP) : the Windrush Scandal
- 3 The COVID-19 pandemic substantially aggravated mental health problems and the stripped infra-structure was unable to cope
- 4 The broad aim of this project is to quantify the extent to which the Conservative policies increased the prevalence of mental ill-health on minority communities and to predict the long-term consequences in the aftermath of COVID.

Overall idea : Interrupted Time Series

Figure 1



- 1 Project will last 4 years
- 2 4 post-docs, one per collaborator, for 2 years each covering 4 strands of the project
- 3 LSE is the third one starting 2023/24
- 4 Collaboration outside of academia :
 - 1 Charities such as Rethink :Mental Illness, Joint Council for the Welfare of Immigrants
 - 2 McPin foundation which sets up focus groups specifically to discuss mental health issues
- 5 A number of events to disseminate our findings in collaboration with our charity partners
- 6 Working with LSE public engagement to produce material for policy makers

Part 1 : Simulation studies

Part 2 : Application to data

Part 3 : Alternative control series

Part 4 : Predicting post-COVID health burden

Part 1 : Simulation studies

- 1 The main output of this research strand is a comprehensive simulation study exploring the sensitivity of estimates of the effect of a policy intervention under different methods.

We will consider :

- 1 a range of true effect sizes (including the case of no effect) of the policies
 - 2 different functional relationships between the policy and the response (linear, quadratic, highly non- linear, e.g. represented using splines)
 - 3 the presence and type of dependency (e.g. local spatial dependency vs global dependency across all units)
- 2 The responses will be simulated to resemble realistic values based on the case-studies

Simulation studies

- 1 We will evaluate the impact of data availability (in terms of controls and time points for estimating trends) on the estimates.
- 2 Assess the sensitivity of our results to model specification (for both sampling and prior distributions), in order to provide examples of how reliably we can estimate the underlying effects of interest, given a particular dataset and an intervention.
- 3 This type of guideline would be very useful to practitioners and could also inform decision makers : if it is not possible to gather the necessary data to evaluate an intervention, is it wise to intervene ?
- 4 Modelling will be based on a Bayesian hierarchical specification as this provides a general framework to evaluate policy effects, embedding several quasi-experimental designs and naturally accounting for underlying spatial and temporal dependencies occurring in the data, while dealing with missing values and measurement error, typically present in observational studies.

Part 2 : Application to data

- 1 We will use the models developed in Part 1 to evaluate the causal effect of UC and HEP on psychological distress, depression and anxiety, psychotic disorders including bipolar disorder, self-harm and suicide. Specifically we will test whether :
 - 1 roll-out of UC is associated with worse mental health outcomes in people from deprived communities ;
 - 2 the introduction of HEP is associated with worse mental health outcomes, most notably in people from Black Caribbean, Black African and South Asian backgrounds in the UK given the targeted nature of HEP on the "Windrush generation" ;
 - 3 both policies have a multiplicative effect on the aforementioned minority groups.
- 2 In order to do this we will define the interventions as precisely as possible. This is of particular importance for UC as this was rolled out over a number of years by job-centre area
- 3 We will be using a step-wedge design to account for the gradual clustered intervention.

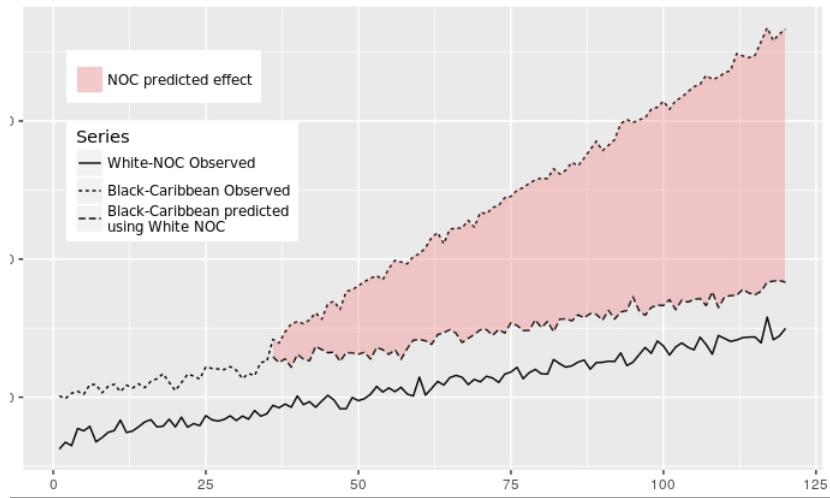
Data Sources

- 1 ONS mortality registry : in particular suicides.
- 2 UKHLS : A nationally-representative, longitudinal household survey which contains repeated measures on psychological distress and well-being and a ethnic minority boost sample.
- 3 NHS Digital IAPT data : data for research on national IAPT service use for depression and anxiety, including demographics and severity.
- 4 WSIC : electronic healthcare records on over 2.3m people from an ethnically diverse catchment in Northwest London including depression, anxiety and self-harm.
- 5 CRIS : anonymised electronic health records on all mental healthcare contacts with Camden Islington NHS Foundation Trust
- 6 Labour Force Survey : contains mostly labour/economic variables but also some health information including basic mental health indicators

Part 3 : Alternative controls

- 1 For some interventions e.g. HEP or UC, there is no obvious control as everyone in a specific group is affected.
- 2 To address this we can either predict the control series under no intervention using the pre-intervention period (like DID) or we can predict the control series using
 - 1 a synthetic control or
 - 2 a negative outcome control (HEP)
- 3 For UC which is applied at the job-centre level, we can create a synthetic control, by somehow combining other job-centres, not affected by the UC so as to resemble the treated UC in the pre-intervention period
- 4 For HEP we can assume that White Britons living in similar areas/with similar SEC can be seen as controls. These are termed negative outcome controls because they are affected by the same confounders but not the treatment

Figure 2



NOC on a different scale

- 1 Another approach for UC is to use NOC on a different scale.
- 2 This involves identifying a time series that is affected by the same confounders but not by the treatment.
- 3 One option could be take home income for individuals who earn close to the minimum wage but are not in receipt of UC.
- 4 We argue that these individuals will be similar across important socio economic and demographic characteristics as people in receipt of UC.
- 5 Take home income is on a different scale from e.g. number of individuals in a job-centre area who are referred to secondary mental health units.
- 6 We can re-scale both outcomes so they are on the same scale and then in the Bayesian way sample from the posterior predictive distribution of their difference

Part 4 : Predicting post-COVID health burden

- 1 We draw on the output and estimates produced in the previous 3 parts as well as methods commonly used in health economic modelling to simulate the additional demand on mental health services, under a set of scenarios following the COVID-19 pandemic.
- 2 A recent study by the Centre for Mental Health (CMH) has predicted that up to 10 million people — almost a fifth of the population — will need mental health support as a direct consequence of COVID-19
- 3 However, the model used by CMH is based on the best-case estimates obtained using typically a single source of evidence.
- 4 We will explore extensions to this framework, by embedding our model in a fully integrated Bayesian set up.

Predicting post-COVID health burden

- 1 We will construct a generalised evidence synthesis of the relevant literature and data to account for the potential correlation across the different population subgroups
- 2 We will propagate the (potentially substantial) uncertainty over the estimates for the effect of different policies and the impact of COVID-19, so as to give a more precise and realistic evaluation of the impact on mental health services across the UK

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Background and Aims

- 1 Empirical studies have shown that offenders from ethnic minority groups tend to receive harsher punishments than white offenders after committing similar crimes.
- 2 However, the question remains whether we can take such disparities be taken as evidence of discrimination.
- 3 Leading Criminal Justice scholars argue that discrimination in sentencing cannot be tested since it is impossible to record all potentially relevant case characteristics considered by a judge, preventing 'like with like' comparisons.
- 4 The aim of this project is to challenge that view using causal DAGs, simulation studies and sensitivity analysis.
- 5 Data will be available via the Data First Project, a new collaboration between the MoJ and Administrative Data Research UK.

- 1 Part A : Developing a casual framework to investigate the presence of discrimination in sentencing
 - 1 Use causal DAGs to clarify the many ways in which discrimination enters the process
 - 2 Use the DAGs to inform simulation studies to demonstrate that given observed constraints discrimination cannot be ruled out
 - 3 Use sensitivity analysis to investigate how strong biases have to be to eliminate/explain the observed ethnic disparities
- 2 Part B : Testing alternative theories used to explain observed ethnic disparities. We ask
 - 1 To what extent are ethnic disparities concentrated in different courts ?
 - 2 To what extent are area level deprivation measures confounding ethnic disparities ?

Causal DAGs : Unobserved case characteristics

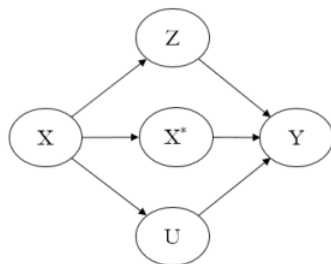


Figure – X is ethnicity, X^* is perceived ethnicity, Z is an observed case characteristic, Y is incarceration and U is an unobserved case characteristic. Of inferential interest is the "direct effect" of X on Y

- 1 Using a simplified version of this DAG and two hard constraints : the percentage of the incarcerated population and the size of the OR of incarceration if the person is Black
- 2 We have shown that the size of the association between ethnicity and any observed case characteristic (Z) does not matter except in really extreme (and unlikely) cases
- 3 I.e. the argument that discrimination isn't happening and that higher rates of incarceration are simply due to Black people being more likely to be in possession of a weapon than white people – doesn't hold.

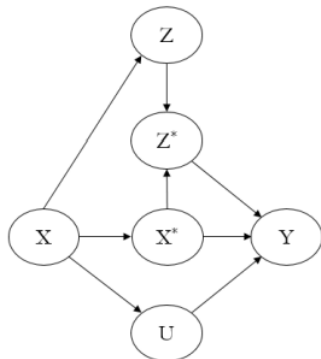


Figure – Z^* whether the case characteristic is perceived to be there by the judge

Causal DAGs : Selection bias

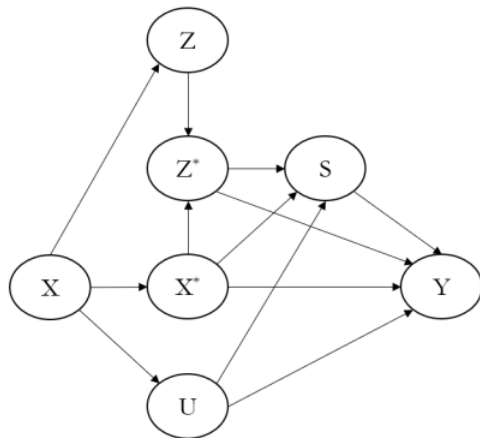


Figure – S whether the case is being processed through the criminal justice system

Communicating results

- 1 One of the team members (Eoin Guilfoyle) is a legal scholar who will be instrumental in translating the statistical analyses into "legalese"
- 2 Both Jose and Eoin have experience in trying to convey information of a quantitative nature to members of the judicial system
- 3 There is wide-spread denial about the presence of racial discrimination in the judicial system and it is therefore of utmost importance to make results as accessible as possible as lack of understanding quickly turns into rejection

Thanks

Thanks for listening
Any questions?