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Modelling Unwarranted Disparities in Sentencing:

Distinguishing between Bad and Good Controls

Jose Pina-Sánchez

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Background: Sentencing

- Sentencing: the judicial process by which a court determines the punishment for a person convicted of a crime
- In my view, the most consequential criminal justice decision
  - some sentences can destroy (and save) lives
  - offenders and victims, but also their families and communities

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- In my view, the most consequential criminal justice decision
  - some sentences can destroy (and save) lives
  - offenders and victims, but also their families and communities
- Sentencing is also a highly symbolic process
  - purposefully resembling a ceremonial ritual
  - conducted in public, frequently receiving media coverage
- If perceived to be discriminatory...
  - trust in public institutions is undermined
  - and with that compliance with the law

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Background: Literature

- Hundreds of studies documenting unwarranted disparities in sentencing
  - according to offender's characteristics: gender, race, nationality, social class, etc.
  - but also according to case, judge or court characteristics: legal defence, political affiliation, volume of cases processed, etc.
  - and even a priori spurious factors: sports results, weather, whether practitioners are hungry, etc.

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- In principle none of the above should be affecting sentencing
  - Is the criminal justice system irredeemably unreliable and biased?

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  - but also according to case, judge or court characteristics: legal defence, political affiliation, volume of cases processed, etc.
  - and even a priori spurious factors: sports results, weather, whether practitioners are hungry, etc.
- In principle none of the above should be affecting sentencing
  - Is the criminal justice system irredeemably unreliable and biased?
- It is complicated (lots of methods problems)
  - most researchers point at unobserved confounder bias
  - the 'differential involvement theory'
  - the field seems stuck in a methodological impasse

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Background: Methods

- Experimental designs are problematic
  - vignette studies with judges
  - random allocation of cases across judges

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Background: Methods

- Experimental designs are problematic
  - vignette studies with judges
  - random allocation of cases across judges
- Most studies follow the same research design
  - observational data: court observations, surveys with judges, administrative records, etc.
  - control for as many case characteristics as possible
  - so we can disentangle legitimate from unwarranted disparities
  - *"[...] it is the inclusion of the largest and most detailed set of variables defining the characteristics of the cases processed that distinguishes it from any other study on the topic worldwide;"* (Pina-Sánchez & Grech, 2017)

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- Is that the right modelling strategy?
  - Could lead to overfitted models
  - and post-treatment bias in particular

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Modelling Sentencing Disparities

- The traditional modelling strategy: Control for *all* case characteristics
  - we want to estimate the total effect of judges' perception (X^*) of a given offender characteristic (X) on sentence severity (Y)
  - but need to disentangle that relationship from any other offender or offence characteristics (Z) that might be confounding it

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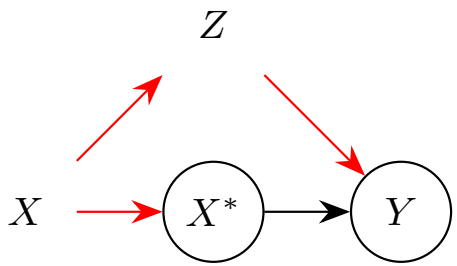

bad model

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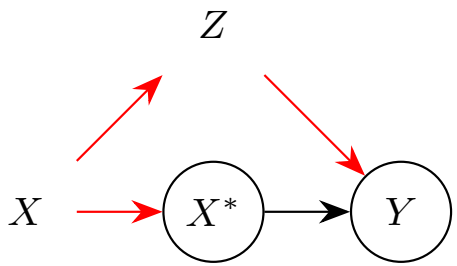

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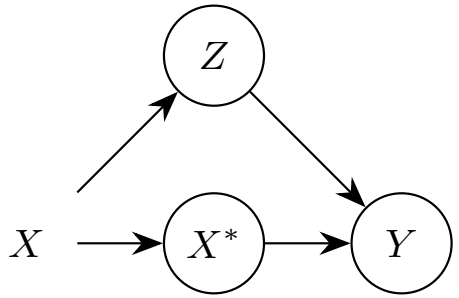

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Post-treatment Bias

- Many of the factors we control for are affected by the judge's perception of the offender
  - intermediate decisions like remand, or offence seriousness
  - subjectively defined factors like offenders' good character or remorse
  - even past decisions like previous convictions

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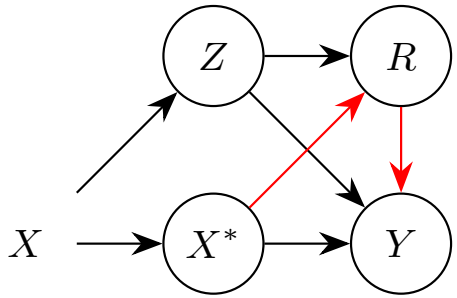

Post-treatment bias 1

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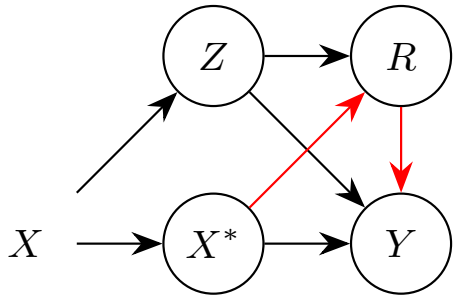

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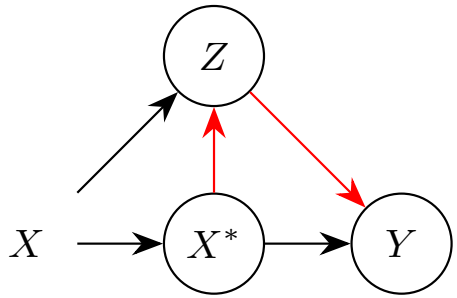

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Race-Neutral Case Characteristics?

- Preprint at *CrimRxiv* (Guilfoyle & Pina-Sánchez, 2024)
  - survey data detailing the factors considered by judges in sentencing drug and assault offences

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  - survey data detailing the factors considered by judges in sentencing drug and assault offences
  - we focus on factors that are more likely to be racially determined
  - those that involve a high degree of judicial discretion and are based solely on an assessment of the offender
  - five factors satisfy both criteria: remorse, good character, ability to rehabilitate, mental disorder, and lack of maturity

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- Most other aggravating and mitigating factors appear evenly distributed across ethnic groups
  - out of 70 factors only 27 (39%) show a substantive disparity between the White and ethnic minority offenders
  - and only 16 of those (23%) favour the White group

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- Most other aggravating and mitigating factors appear evenly distributed across ethnic groups
  - out of 70 factors only 27 (39%) show a substantive disparity between the White and ethnic minority offenders
  - and only 16 of those (23%) favour the White group
- A different picture emerges when we look at subjectively defined offender's characteristics
  - four out of five are clearly unevenly distributed across ethnic groups

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Race-Neutral Case Characteristics?

- Remorse
  - Always more prevalent amongst White offenders
  - E.g. present in 28% White drug offenders, but only in 19% Black drug offenders

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  - More prevalent amongst White drug offenders (16%) than Black drug offenders (11%)
  - However, also more present amongst Asian and Other assault offenders (22%) compared to White assault offenders (14%)

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- Ability to rehabilitate
  - Always more prevalent amongst White offenders
  - E.g. present in 9% of White assault offenders but only in 4% of Asian assault offenders

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  - However, also more present amongst Asian and Other assault offenders (22%) compared to White assault offenders (14%)
- Ability to rehabilitate
  - Always more prevalent amongst White offenders
  - E.g. present in 9% of White assault offenders but only in 4% of Asian assault offenders
- Lack of maturity
  - Present in 13% of Black drug offenders but only in 7% of their White counterparts
  - Doesn't benefit White offenders, possibly reflecting wider infantilising perceptions of Black people

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A more Robust Modelling Framework

1. Start by defining 'sentencing disparities'
   - overall or unwarranted disparities?
   - indirect or direct discrimination?

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1. Start by defining 'sentencing disparities'
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2. Consider what controls you need to use
   - some factors traditionally controlled for are mediators
   - others will have a dual role as both confounders and mediators

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3. Model sequentially using different sets of controls
   - reporting bounds rather than point estimates

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2. Consider what controls you need to use
   - some factors traditionally controlled for are mediators
   - others will have a dual role as both confounders and mediators
3. Model sequentially using different sets of controls
   - reporting bounds rather than point estimates
4. Employ sensitivity analysis
   - when missing key confounders
   - when other key assumptions are questionable

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What Is your Estimand?

- How do we define 'disparities'?
  - Overall disparities: Differences in sentence severity associated to non-legal factors (normally a demographic characteristic)
  - Unwarranted disparities: Overall disparities that are not explained by case characteristics
  - Discrimination: Unwarranted disparities that are not explained by other non-legal factors

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- Do we focus on direct discrimination only, or consider indirect paths too?
  - Direct discrimination relates to judicial decisions only
  - Indirect discrimination could take the form of other criminal justice disparities, or even socio-economic disparities

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- Do we focus on direct discrimination only, or consider indirect paths too?
  - Direct discrimination relates to judicial decisions only
  - Indirect discrimination could take the form of other criminal justice disparities, or even socio-economic disparities
- The set of controls should be tailored to the definition of disparities
  - I posit that most researchers look for direct judicial discrimination

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To Be Controlled or Not?

Table 1: What should be controlled for to identify direct ethnic discrimination in sentencing?

Type of variable	Examples	Control?

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To Be Controlled or Not?

Table 1: What should be controlled for to identify direct ethnic discrimination in sentencing?

Type of variable	Examples	Control?
Non-judicially defined case characteristics	Offence type, offender plead guilty, use of a weapon, etc.	✓

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Type of variable	Examples	Control?
Non-judicially defined case characteristics	Offence type, offender plead guilty, use of a weapon, etc.	✓
Judicial decisions	Bail, level of culpability, departure from the guidelines, etc.	X

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Judicial decisions	Bail, level of culpability, departure from the guidelines, etc.	X
Judicially defined case characteristics	Remorse, lack of maturity, good character, etc.	X/✓

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To Be Controlled or Not?

Table 1: What should be controlled for to identify direct ethnic discrimination in sentencing?

Type of variable	Examples	Control?
Non-judicially defined case characteristics	Offence type, offender plead guilty, use of a weapon, etc.	✓
Judicial decisions	Bail, level of culpability, departure from the guidelines, etc.	X
Judicially defined case characteristics	Remorse, lack of maturity, good character, etc.	X/✓
Non-legal factors	Other offender characteristics, judge or court characteristics	✓

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Sensitivity Analysis

- Ideally we should use sensitivity analysis to consider the impact of unobserved case characteristics
  - 'E-value' (VanderWeele & Ding, 2017)
  - 'Robustness value' (Cinelli & Hazlett, 2020)
- Not always straightforward
  - I do not think case characteristics (even those objectively defined) are strictly confounders
  - and what about when we have both unobserved aggravators and mitigators?

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  - I do not think case characteristics (even those objectively defined) are strictly confounders
  - and what about when we have both unobserved aggravators and mitigators?
- We should also contemplate other questionable assumptions
  - misclassified ethnicity
  - missing data not at random

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Gender Disparities

- A sample of 2,116 shoplifting offenders sentenced in the magistrates' court
- The odds of receiving a custodial sentence are 37% to 65% higher for men compared to women
  - after controlling for different sets of sentencing guidelines factors

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- A sample of 2,116 shoplifting offenders sentenced in the magistrates' court
- The odds of receiving a custodial sentence are 37% to 65% higher for men compared to women
  - after controlling for different sets of sentencing guidelines factors
- I control for practically all relevant case characteristics
  - the only exception I can think is assistance with prosecution
  - however, I do not control for many non-legal factors: e.g. legal defence, demeanour in court, ethnicity, nationality or social class

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  - the only exception I can think is assistance with prosecution
  - however, I do not control for many non-legal factors: e.g. legal defence, demeanour in court, ethnicity, nationality or social class
- According to the E-value:
  - An $OR = 1.37$ would be equal to one in the presence of an unobserved confounder at least 83% more prevalent in male than female offenders, that increases the probability of receiving a custodial sentence by at least 83%
  - we can conclude there is clear evidence of unwarranted disparities, most likely direct discrimination

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	Model 1	
	OR	95% CI
Intercept	0.30	(0.25, 0.37)
Offender: male	**1.51**	(1.22, 1.86)
Offender: age band		
Culpability: level of planning		
Culpability: use of force		
Culpability: role of offender		
Culpability: sophisticated offence		
Culpability: banning order		
Culpability: coerced		
Culpability: mental disorder		
Culpability: category		
Harm: value of goods stolen		
Harm: emotional distress		
Harm: injury to victim		
Harm: effect on business		
Harm: category		
Aggravating: previous convictions		
Aggravating: conceal evidence		
Aggravating: failure to comply		
Aggravating: offender on bail		
Aggravating: offences into consideration		
Aggravating: harm to the community		
Aggravating: professional offending		
Aggravating: stealing goods to order		
Mitigating: lack of maturity		
Mitigating: good character		
Mitigating: financial hardship		
Mitigating: steps to address addiction		
Mitigating: mental disorder		
Mitigating: remorse		
Mitigating: return of stolen property		
Mitigating: serious medical condition		
Mitigating: primary carer		
Guilty plea: first opportunity		

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	Model 1		Model 2	
	OR	95% CI	OR	95% CI
Intercept	0.30	(0.25, 0.37)	0.04	(0.02, 0.11)
Offender: male	**1.51**	(1.22, 1.86)	**1.65**	(1.31, 2.07)
Offender: age band			1.01	(0.92, 1.12)
Culpability: level of planning			1.44	(1.18, 1.76)
Culpability: use of force			1.47	(0.96, 2.24)
Culpability: role of offender			1.11	(0.96, 1.28)
Culpability: sophisticated offence			1.33	(0.63, 2.83)
Culpability: banning order			1.60	(0.57, 4.46)
Culpability: coerced			0.61	(0.24, 1.55)
Culpability: mental disorder				
Culpability: category				
Harm: value of goods stolen			1.27	(1.18, 1.36)
Harm: emotional distress			0.72	(0.29, 1.72)
Harm: injury to victim			4.96	(1.51, 16.25)
Harm: effect on business			1.12	(0.91, 1.38)
Harm: category				
Aggravating: previous convictions				
Aggravating: conceal evidence			1.04	(0.71, 1.53)
Aggravating: failure to comply				
Aggravating: offender on bail				
Aggravating: offences into consideration			2.16	(1.64, 2.85)
Aggravating: harm to the community			6.21	(2.33, 16.48)
Aggravating: professional offending			2.57	(1.57, 4.22)
Aggravating: stealing goods to order			1.33	(0.76, 2.33)
Mitigating: lack of maturity				
Mitigating: good character				
Mitigating: financial hardship			0.53	(0.36, 0.78)
Mitigating: steps to address addiction			0.64	(0.46, 0.89)
Mitigating: mental disorder			0.52	(0.33, 0.83)
Mitigating: remorse				
Mitigating: return of stolen property			0.28	(0.10, 0.75)
Mitigating: serious medical condition			1.05	(0.56, 1.96)
Mitigating: primary carer			0.11	(0.03, 0.50)
Guilty plea: first opportunity			0.87	(0.51, 1.50)

	Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	0.30	(0.25, 0.37)	0.04	(0.02, 0.11)	0.01	(<0.01, 0.04)
Offender: male	**1.51**	(1.22, 1.86)	**1.65**	(1.31, 2.07)	**1.37**	(1.02, 1.83)
Offender: age band			1.01	(0.92, 1.12)	0.93	(0.81, 1.06)
Culpability: level of planning			1.44	(1.18, 1.76)	1.01	(0.77, 1.31)
Culpability: use of force			1.47	(0.96, 2.24)	0.97	(0.60, 1.57)
Culpability: role of offender			1.11	(0.96, 1.28)	0.94	(0.79, 1.13)
Culpability: sophisticated offence			1.33	(0.63, 2.83)	3.45	(1.38, 8.59)
Culpability: banning order			1.60	(0.57, 4.46)	0.56	(0.15, 2.14)
Culpability: coerced			0.61	(0.24, 1.55)	0.80	(0.29, 2.22)
Culpability: mental disorder					0.43	(0.20, 0.90)
Culpability: category					2.15	(1.74, 2.66)
Harm: value of goods stolen			1.27	(1.18, 1.36)	1.15	(1.04, 1.27)
Harm: emotional distress			0.72	(0.29, 1.72)	1.10	(0.39, 3.08)
Harm: injury to victim			4.96	(1.51, 16.25)	4.97	(1.16, 21.29)
Harm: effect on business			1.12	(0.91, 1.38)	0.93	(0.71, 1.21)
Harm: category					1.60	(1.21, 2.12)
Aggravating: previous convictions					1.08	(1.06, 1.11)
Aggravating: conceal evidence			1.04	(0.71, 1.53)	1.16	(0.72, 1.85)
Aggravating: failure to comply					5.05	(3.65, 7.00)
Aggravating: offender on bail					4.31	(3.16, 5,89)
Aggravating: offences into consideration			2.16	(1.64, 2.85)	1.27	(0.90, 1.80)
Aggravating: harm to the community			6.21	(2.33, 16.48)	4.11	(1.37, 12.37)
Aggravating: professional offending			2.57	(1.57, 4.22)	1.62	(0.90, 2.92)
Aggravating: stealing goods to order			1.33	(0.76, 2.33)	1.15	(0.57, 2.31)
Mitigating: lack of maturity					0.58	(0.23, 1.47)
Mitigating: good character					0.80	(0.21, 3.03)
Mitigating: financial hardship			0.53	(0.36, 0.78)	0.67	(0.42, 1.06)
Mitigating: steps to address addiction			0.64	(0.46, 0.89)	0.47	(0.31, 0.70)
Mitigating: mental disorder			0.52	(0.33, 0.83)	0.75	(0.40, 1.40)
Mitigating: remorse					0.71	(0.48, 1.07)
Mitigating: return of stolen property			0.28	(0.10, 0.75)	0.43	(0.14, 1.29)
Mitigating: serious medical condition			1.05	(0.56, 1.96)	0.79	(0.36, 1.73)
Mitigating: primary carer			0.11	(0.03, 0.50)	0.15	(0.03, 0.83)
Guilty plea: first opportunity			0.87	(0.51, 1.50)	0.86	(0.39, 1.88)

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Ethnic Disparities

- A sample of 8,730 drug offenders sentenced in the Crown Court
- The odds of receiving a custodial sentence are 42% higher for ethnic minority compared to White offenders

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- The odds of receiving a custodial sentence are 42% higher for ethnic minority compared to White offenders
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  - offence type, guilty plea, previous convictions, age and gender

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  - offence type, guilty plea, previous convictions, age and gender
- However, we can only find one objectively defined case characteristic that could explain that result

Case characteristic	Post-treatment	Favours	Prevalence in Whites	Prevalence in Blacks
Aggravating: high purity	Pre	Blacks	0.11	0.07
Mitigating: addicted to the same drug	Pre	Whites	0.18	0.11
Mitigating: genuine remorse	Post	Whites	0.28	0.19
Mitigating: determination to rehabilitate	Post	Whites	0.15	0.09
Mitigating: lack of maturity	Post	Blacks	0.07	0.13

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- Clear evidence of unwarranted disparities, hard not to conclude direct discrimination

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Conclusion

- When modelling disparities in sentencing, we should stop trying to control for everything
  - many factors are defined by the judge
  - we might be explaining away the effect we seek to estimate

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- When modelling disparities in sentencing, we should stop trying to control for everything
  - many factors are defined by the judge
  - we might be explaining away the effect we seek to estimate
- I suggest a 4-step modelling framework:
  1. Define disparities
  2. Consider what controls are needed
  3. Model sequentially, report bounded estimates
  4. Employ sensitivity analysis

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  - we might be explaining away the effect we seek to estimate
- I suggest a 4-step modelling framework:
  1. Define disparities
  2. Consider what controls are needed
  3. Model sequentially, report bounded estimates
  4. Employ sensitivity analysis
- There is evidence of gender and ethnic discrimination in sentencing in England and Wales
  - although the latter appears limited to drug offenders and not across all ethnic minority groups