Discrimination (cont.). Neighborhood Effects

Urban Economics

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Discrimination: Two theories

- The two workhorse models of discrimination in the economics literature give drastically different answers, particularly with respect to the societal consequences.
  1. Taste based
  2. Statistical Discrimination

Ewens et al. paper

- Test: taste based vs statistical discrimination
- Use vacancy listings on Craigslist.org, across 34 U.S. cities,
- They send inquiry e-mails to 14,000 landlords.
- E-mails have information about the applicants: positive, negative, and no signals beyond race.
  - In the no-signal inquiry, landlords receive e-mails with racial-sounding names as the only signal.
  - In the positive information inquiry, the fictional applicant informs the landlord that she is a nonsmoker with a respectable job.
  - In the negative information inquiry, the applicant tells the landlord she has a below-average credit rating and smokes.

Ewens et al. model set up

- A landlord seeks to maximize the expected utility
- The expected utility derived from each applicant depends on the stream of future rental income (tenant quality) from renting the apartment successfully. Summarized by θ
- Although the rent is preannounced, θ may still vary as a result of default, lease renewal, and so on.
- Hence, the landlord forms a predicted quality $\hat{\theta}_i$ (a random variable) for each applicant and maximizes the expected utility $E[U(\hat{\theta}_i)]$

Ewens et al. model set up

- Four-stage process of matching potential tenants to apartments:
  1. **Inquiry**: An applicant with quality θ selects publicly posted rental units to send cost less inquiries with signal x to landlords.
  2. **Screening**: Given signals $X_T = \{x_1, \ldots, x_T\}$ received from T independent applicants, the landlord forms a set of predicted qualities $\Theta_T = \{\hat{\theta}_1, \ldots, \hat{\theta}_T\}$ and responds to n applicants.
  3. **Interview**: Interviews, which include credit and reference checking, reveal the true quality θ and these have costs.
  4. **Decision**: The candidate with the highest true quality θ is offered the apartment.

Ewens et al. model Statistical Discrimination

- Statistical Discrimination: Utility is **not** race dependent, but is (forecasted) quality dependent

$$E[U(\hat{\theta}_r)] = E[U(\hat{\theta}_{-r})] \tag{1}$$

- when

$$\tilde{\theta}_r = \tilde{\theta}_{-r} \tag{2}$$

Ewens et al. model Statistical Discrimination

- Statistical Discrimination:

$$x_r = \theta_r + \epsilon_r \tag{3}$$

  - $E(\theta_r) = \mu_r$
  - $V(\theta_r) = \sigma_\theta^2$
  - $E(\epsilon_r|\theta_r) = 0$
  - $V(\epsilon_r|\theta_r) = \sigma_{\epsilon,r}^2$

Ewens et al. Statistical Discrimination

- Landlord forecasted $\hat{\theta}$ for each race r:

$$\hat{\theta}_r = \hat{\mu}_r^L + \hat{\gamma}_r x_r \tag{4}$$

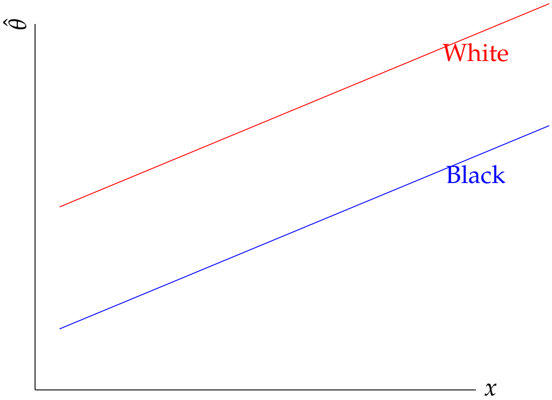
- were

$$\hat{\gamma}_r = \frac{cov(\theta_r, x_r)}{var(x_r)} \tag{5}$$

$$\hat{\mu}_r^L = \bar{\theta}_r - \hat{\gamma}_r \bar{x}_r \tag{6}$$

Ewens et al. Statistical Discrimination

- Landlord forecasting regression for each race r:



Ewens et al. Statistical Discrimination

- Two types of signals
  1. A negative signal $-\tilde{x}^{-} < 0$
  2. A positive signal $\tilde{x}^{+} > 0$
- The mean difference between black and white applicants sending
  - A positive signal is

$$E(\hat{\theta}_B|\tilde{x}^{+}) - E(\hat{\theta}_W|\tilde{x}^{+}) = \hat{\mu}^L_B - \hat{\mu}^L_W - (\hat{\gamma}_B - \hat{\gamma}_W)\,\tilde{x}^{+} \tag{7}$$

  - Negative signal

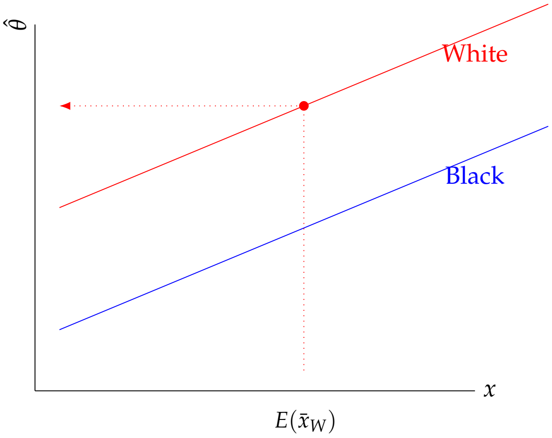
$$E(\hat{\theta}_B|-\tilde{x}^{-}) - E(\hat{\theta}_W|-\tilde{x}^{-}) = \hat{\mu}^L_B - \hat{\mu}^L_W + (\hat{\gamma}_W - \hat{\gamma}_B)\,\tilde{x}^{-} \tag{8}$$

  - The difference

$$E(\hat{\theta}_B - \hat{\theta}_W|-\tilde{x}^{-}) - E(\hat{\theta}_B - \hat{\theta}_W|\tilde{x}^{+}) = (\hat{\gamma}_W - \hat{\gamma}_B)\left(\tilde{x}^{+} + \tilde{x}^{-}\right) \tag{9}$$

Ewens et al. model Statistical Discrimination

- Suppose that $E(\bar{x}_W) > E(\bar{x}_B)$



Ewens et al. model Statistical Discrimination

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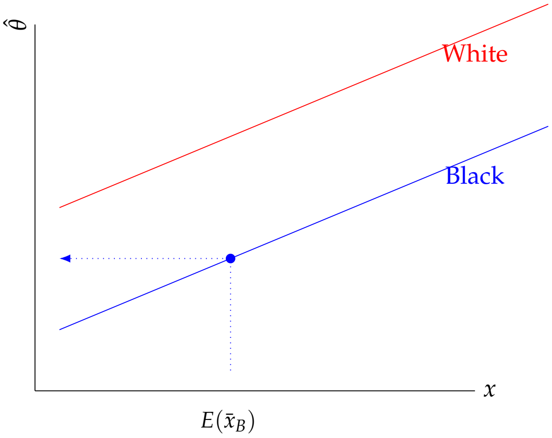

Ewens et al. model Statistical Discrimination

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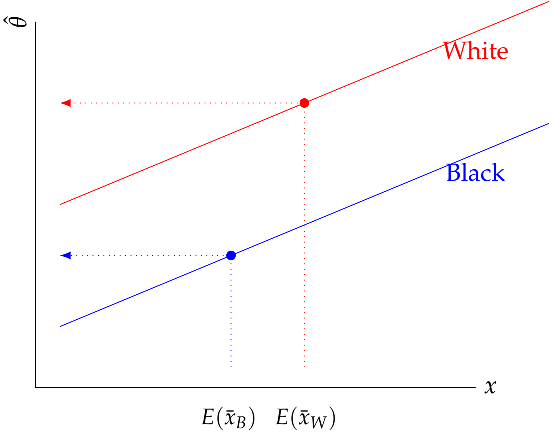
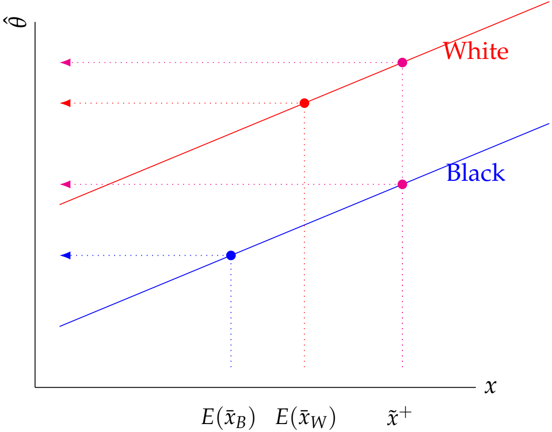


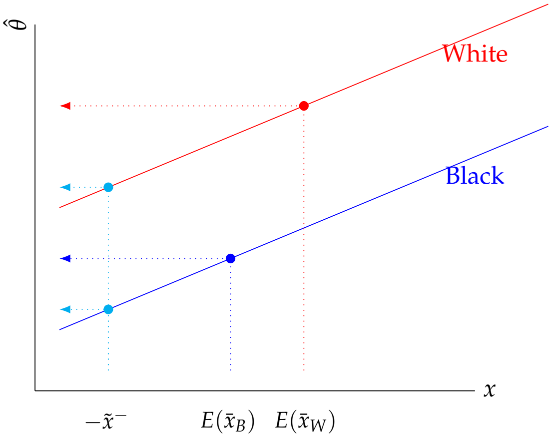
Ewens et al. model Statistical Discrimination

- Suppose that $E(\bar{x_W}) > E(\bar{x}_B)$ and a surprise positive signal $\tilde{x}^+ > E(\bar{x}_W)$



Ewens et al. model Statistical Discrimination

- Suppose that $E(\bar{x_W}) > E(\bar{x}_B)$ and a surprise negative signal $-\tilde{x}^- < E(\bar{x}_B)$



Ewens et al. model Statistical Discrimination

$\gamma_W > \gamma_B$

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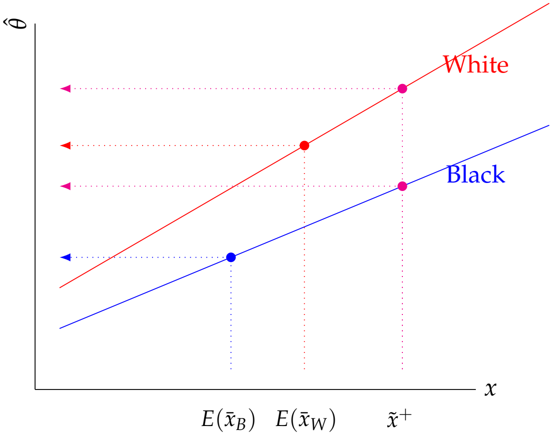

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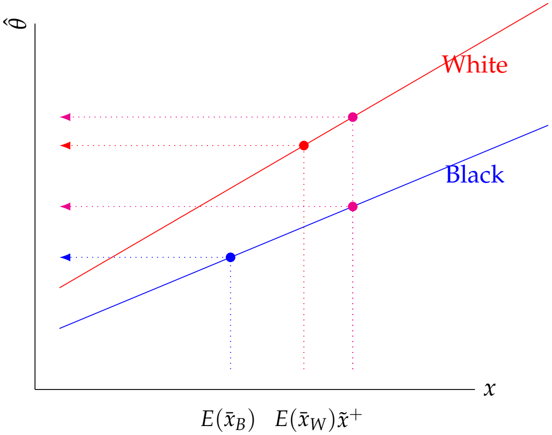

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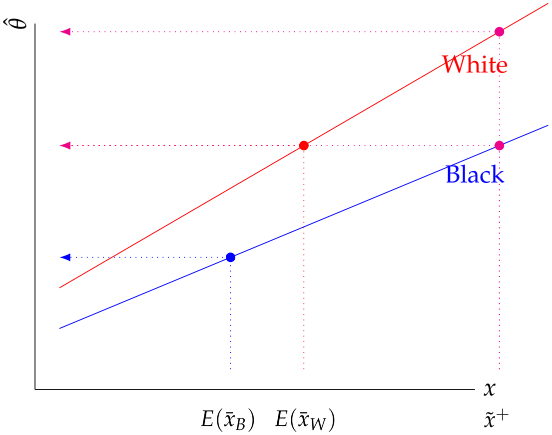

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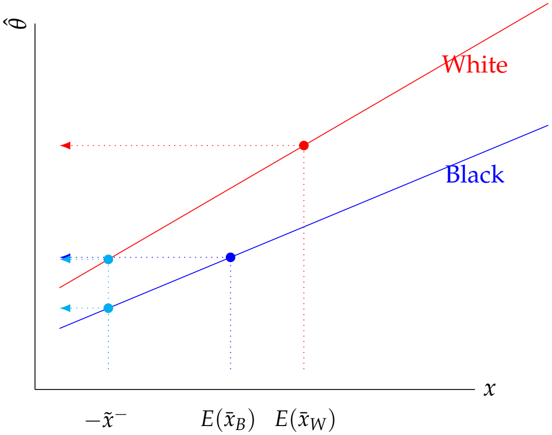

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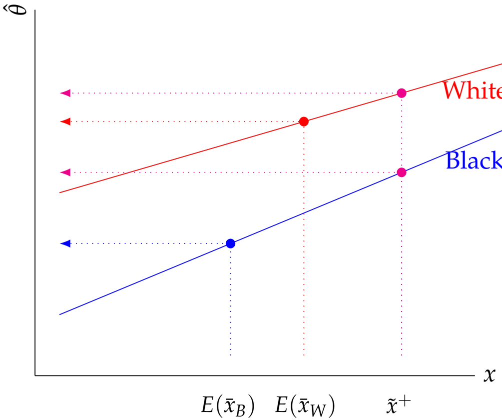

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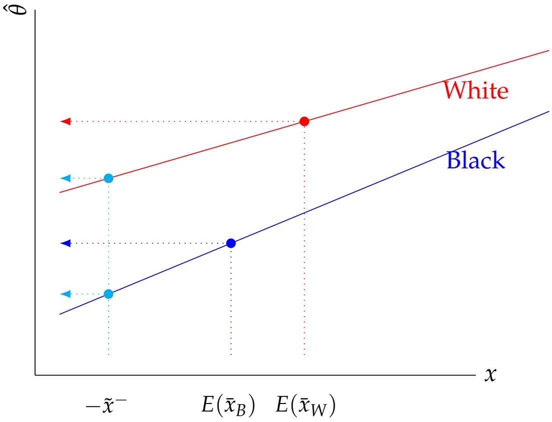


Ewens et al. model Taste Based Discrimination

- Taste Based Discrimination
  - Let a prejudiced landlord predict applicant quality based on a race-independent signal:

$$\hat{\theta}_i = \hat{\mu}^L + \hat{\gamma} x_i \tag{10}$$

  - Now their utility is race dependent.
    - Assume that the landlord exhibits out-group prejudice such that a prejudice parameter, k, discounts the utility derived from an out-group applicant so that

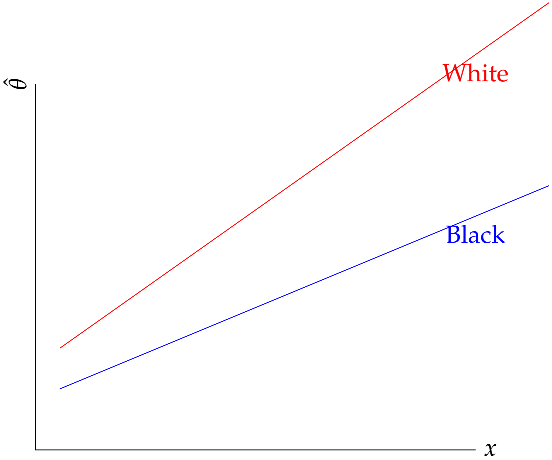
$$E[U(\tilde{\theta}_r)] > E[U(\tilde{\theta}_{-r})] \tag{11}$$

  - when

$$\tilde{\theta}_r = \tilde{\theta}_{-r} \tag{12}$$

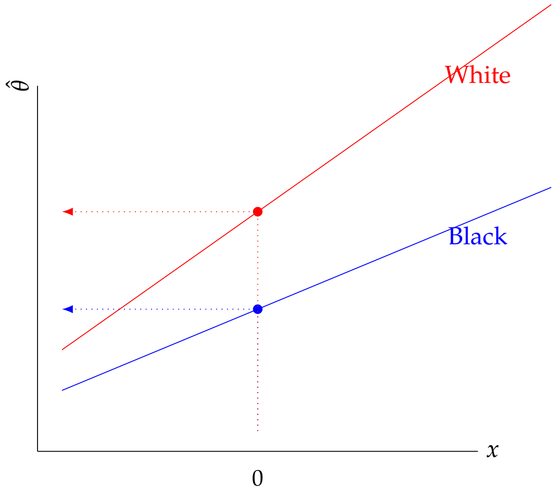
Ewens et al. model Taste Based Discrimination

- For example $E[U(\tilde{\theta}_{-r})] = \left(\hat{\mu}^L + \hat{\gamma}x_i\right)k$



Ewens et al. model Taste Based Discrimination

- For example $E[U(\tilde{\theta}_{-r})] = (\hat{\mu}^L + \hat{\gamma} x_i)\, k$



Ewens et al. model Taste Based Discrimination

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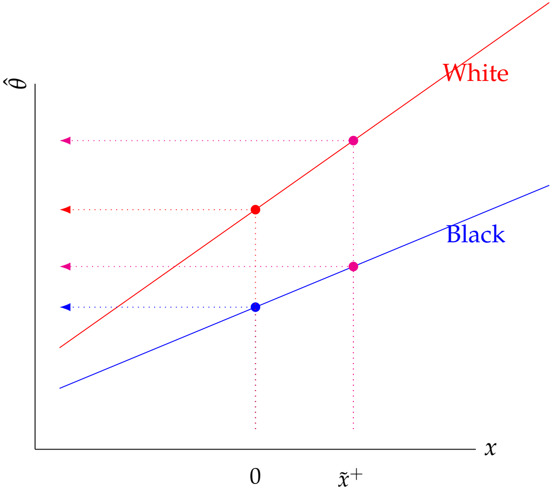

Ewens et al. model Taste Based Discrimination

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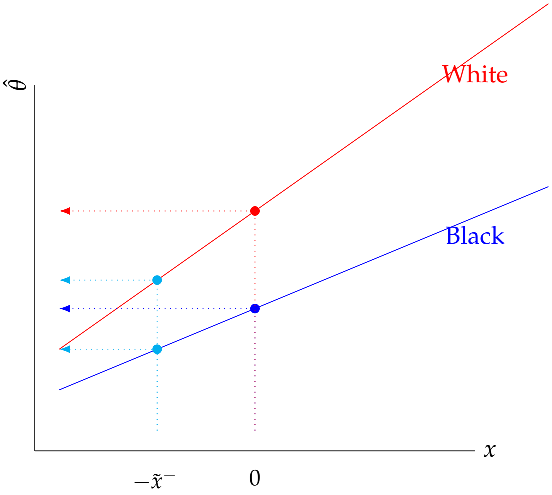

Ewens et al. results

- H1 Stat: On average, a white applicant is more likely to receive a positive response than a black applicant in the no-signal base case
- H1 Taste: On average, a white applicant is more likely to receive a positive response than a black applicant in the no-signal base case.

$$R_i = \alpha_W + \alpha_B B_i + u_i$$

Ewens et al. results

TABLE 6.—DIFFERENTIAL TREATMENT BY RACE AND INFORMATIONAL SIGNALS

	(1)	(2)	(3)	(4)
Black	−0.093***			
	(0.015)			
Positive Information				
Positive Information × Black				
Negative Information				
Negative Information × Black				
% Black				
Black × %Black				
Positive Information × %Black				
Positive Information × Black × %Black				
Negative Information × %Black				
Negative Information × Black × %Black				
Constant	0.581***			
	(0.012)			
Omitted category	White Baseline			
Observations	4,226			
R^2	0.009			

See definitions of variables in the notes to tables 2 and 3. Robust standard errors clustered by neighborhood reported in parentheses. Columns 1–4 correspond to hypotheses 1 and 1A, 2 and 2A, 3 and 3A, and 4 and 4A, respectively. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Ewens et al. results

- H2 Stat: On average, the positive response gap between white and black applicants is larger with a positive signal sent than with a negative signal sent.
- H2 Taste: On average, the response gap between white and black applicants when a positive signal is sent is larger than the response gap between white and black applicants when a negative signal is sent.

$$R_i = \alpha_{PW} + \alpha_{PB} B_i + \alpha_{NW} N_i + \alpha_{NB} (N_i \times B_i) + u_i \tag{13}$$

Ewens et al. results

TABLE 6.—DIFFERENTIAL TREATMENT BY RACE AND INFORMATIONAL SIGNALS

	(1)	(2)	(3)	(4)
Black	−0.093***	−0.092***		
	(0.015)	(0.012)		
Positive Information				
Positive Information × Black				
Negative Information		−0.377***		
		(0.013)		
Negative Information × Black		0.044**		
		(0.018)		
% Black				
Black × %Black				
Positive Information × %Black				
Positive Information × Black × %Black				
Negative Information × %Black				
Negative Information × Black × %Black				
Constant	0.581***	0.619***		
	(0.012)	(0.009)		
Omitted category	White	White		
	Baseline	Positive information		
Observations	4,226	10,011		
R^2	0.009	0.128		

See definitions of variables in the notes to tables 2 and 3. Robust standard errors clustered by neighborhood reported in parentheses. Columns 1–4 correspond to hypotheses 1 and 1A, 2 and 2A, 3 and 3A, and 4 and 4A, respectively. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Ewens et al. results

- H3 Stat: On average, negative information will shrink the racial gap observed in the base case, but positive information will have an ambiguous effect on the racial gap observed in the base case.
- H3 Taste: On average, negative information will unambiguously narrow the racial gap observed in the no-signal base case, but positive information will unambiguously widen the racial gap observed in the base case.

$$R_i = \beta_W + \beta_B B_i + \beta_P P_i + \beta_{PB}(P_i \times B_i) + \beta_{NW} N_i + \beta_{NB}(N_i \times B_i) + u_i \tag{14}$$

Ewens et al. results

Table 6.—Differential Treatment by Race and Informational Signals

	(1)	(2)	(3)	(4)
Black	−0.093***	−0.092***	−0.093***	
	(0.015)	(0.012)	(0.015)	
Positive Information			0.039***	
			(0.013)	
Positive Information × Black			0.001	
			(0.019)	
Negative Information		−0.377***	−0.338***	
		(0.013)	(0.016)	
Negative Information × Black		0.044**	0.045**	
		(0.018)	(0.020)	
% Black				
Black × %Black				
Positive Information × %Black				
Positive Information × Black × %Black				
Negative Information × %Black				
Negative Information × Black × %Black				
Constant	0.581***	0.619***	0.581***	
	(0.012)	(0.009)	(0.012)	
Omitted category	White	White	White	
	Baseline	Positive information	Baseline	
Observations	4,226	10,011	14,237	
R^2	0.009	0.128	0.100	

See definitions of variables in the notes to tables 2 and 3. Robust standard errors clustered by neighborhood reported in parentheses. Columns 1–4 correspond to hypotheses 1 and 1A, 2 and 2A, 3 and 3A, and 4 and 4A, respectively. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Ewens et al. results

- H4 Stat: Positive treatment should shrink the racial gap in positive responses relatively more in predominantly black neighborhoods. Conversely, negative treatment will shrink the racial gap in predominantly white neighborhoods, but not necessarily in predominantly black neighborhoods.
- H4 Taste: As the share of black residents in a neighborhood S_B increases, the response gap between white and black applicants in the base case decreases. In a majority black neighborhood, a surprising positive signal will unambiguously benefit a black applicant relatively more than a white applicant, while a surprising negative signal will unambiguously hurt a black applicant relatively more than a white applicant.

$$
\begin{aligned}
R_i = {} & \beta_W + \beta_{SW} S_{Bi} + \beta_B B_i + \beta_{SB}(S_{Bi} \times B_i) + \beta_{PW} P_i && (15)\\
& + \beta_{SPW}(S_{Bi} \times P_i) + \beta_{PB}(P_i \times B_i) && (16)\\
& + \beta_{SPB}(S_{Bi} \times P_i \times B_i) + \beta_{NW} N_i + \beta_{SNW}(S_{Bi} \times N_i) && (17)\\
& + \beta_{NB}(N_i \times B_i) + \beta_{SNB}(S_{Bi} \times N_i \times B_i) + u_i && (18)
\end{aligned}
$$

Ewens et al. results

TABLE 6.—DIFFERENTIAL TREATMENT BY RACE AND INFORMATIONAL SIGNALS

	(1)	(2)	(3)	(4)
Black	−0.093***	−0.092***	−0.093***	−0.084***
	(0.015)	(0.012)	(0.015)	(0.019)
Positive Information			0.039***	0.053***
			(0.013)	(0.017)
Positive Information × Black			0.001	−0.032
			(0.019)	(0.025)
Negative Information		−0.377***	−0.338***	−0.347***
		(0.013)	(0.016)	(0.018)
Negative Information × Black		0.044**	0.045**	0.044*
		(0.018)	(0.020)	(0.026)
% Black				0.014
				(0.067)
Black × %Black				−0.077
				(0.099)
Positive Information × %Black				−0.118
				(0.082)
Positive Information × Black × %Black				0.267**
				(0.125)
Negative Information × %Black				0.078
				(0.093)
Negative Information × Black × %Black				0.009
				(0.130)
Constant	0.581***	0.619***	0.581***	0.579***
	(0.012)	(0.009)	(0.012)	(0.014)
Omitted category	White	White	White	White
	Baseline	Positive information	Baseline	Baseline
Observations	4,226	10,011	14,237	14,237
R^2	0.009	0.128	0.100	0.101

See definitions of variables in the notes to tables 2 and 3. Robust standard errors clustered by neighborhood reported in parentheses. Columns 1–4 correspond to hypotheses 1 and 1A, 2 and 2A, 3 and 3A, and 4 and 4A, respectively. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Proposals

- **Due Date** Dec 1 2023 18:00
- A good proposal:
  - Begins with a well-defined topic
  - Motivates and argues for the importance of the topic
  - Demonstrates that the author is well acquainted with the relevant literature
  - Outlines a compelling methodological approach

Proposals

- Introduction
  To write the introduction we will follow *Keith Head's* formula
  1. **Hook***(1 paragraph):* The introduction should begin by motivating the study. Attract the reader's interest by telling them that this paper relates to something interesting.
  2. **Question***(up to 2 paragraphs)* Tell the reader what is the main problem/question motivating the study. The reader should have an idea of a clean research question that you will solve with your proposal.
  3. **Antecedents and Value Added***(up to 3 paragraphs)* : Identify the prior work that is critical for understanding the contribution this paper will make and the contributions you will make. The key mistake to avoid here are discussing papers that are not essential parts of the intellectual narrative leading up to your own paper. The proposal should contain at least three relevant references to literature. At least one of those references must be from a top ten journal publishing original research.

Proposals

- Introduction
- Research Strategy: Model and Inquiry

  Given our focus on experimental designs, to define the model, we have in mind a fixed set of units from which we will conduct our experiment. Under the model, each unit has two latent potential outcomes: a treated potential outcome and an untreated potential outcome. Next, we need to define whether you are interested in the ATE, CATE, or any other inquiry.

  In this section you need to define

  - What is the eligible population for the study?
  - What are the main characteristics of this population?
  - What are the effect sizes reported in the literature?
  - Ethics: different realizations of the data from the same data strategy may differ in their ethical implications. Are there any ethical concerns you should take in consideration before designing your experiments?

Final Proposal

- The final proposal expands on the initial proposal
- **Due Date** Dec 12 2023
- Data and Answer. The data section needs to describe your sampling strategy using sensible numbers.
  - given you sampling strategy how you plan the Assignment to Treatment?
  - and details about the statistical power under this setting (answer those that are relevant for your design)
- Design diagnosis
  - Bias, statistical power, and the root-mean-squared error.