Reverse Discrimination: Evidence from an Online Labor Market

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Outline

Motivation and Introduction

Model

Experiment Design

Data and Results

Estimation

Learnings

New Design

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Motivation

- Prejudice or bias is widespread in labor market interactions. (Neumark, 2018; Bertrand & Duflo, 2017)
  - The most common form of bias studied is of the employer-to-employee kind.
  - Employee may respond to discrimination by employer. (Glover, Pallais and Pariente, 2017)
  - The evidence on the bias from employee-to-employer is non-existent (to our knowledge).

This Paper

- Do workers exhibit bias when providing effort to the employers?
- What is the nature of bias; taste or statistical?
  - Taste: Animus from a worker towards the employer's group. (Becker)
  - Statistical: Beliefs or stereotypes towards the employer's group. (Arrow and Phelps)
- Why?
  - What if bias from employer to employee is partially driven by expectations of bias from the employee.
  - Policy implications.
- Environment
  - Online labor market: one shot interactions

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Model (without Statistical Discrimination)

- Assuming risk neutrality, a worker $i \in \{B, W\}$ solves the following problem when working for an employer $j \in \{B, W\}$ where B and W denote the black or white race of an agent;

$$\underbrace{max}_{e_{ij} \geq 0} U_{ij} = \underbrace{max}_{e_{ij} \geq 0} (F + (s_{ij} + p_j)e_{ij} - c(e_{ij}))$$

- Solving **??** leads to following solution (when interior);

$$e_{ij}^{\star} = c'^{-1} \left(\underbrace{s_i + \Delta s_{ij}}_{s_{ij}} + p_j \right)$$

- Two forms of cost function
  - Power Cost Function

$$c(e) = \frac{ke^{1+\gamma}}{1+\gamma}$$

  - Exponential Cost Function

$$c(e) = \frac{kexp^{\gamma e}}{\gamma}$$

Baseline Treatments

- An employer j selects a piece rate p_j for worker i,
- Worker i observes the p_j and then choose effort e_{ij} by maximizing **??**
- Worker do no observe the identity of the employer which implies that for any worker i, $s_{iW} = s_{iB} = s_i$.
- The equilibrium effort $e_i^\star$ in this treatment will be given as;

$$e_i^\star = c'^{-1}(s_i + p_j) \text{ for } i \in \{B, W\}$$

Race Salient Treatments

- Just like baseline except that workers observe the race of the employer.

$$e_{ij}^{RS} = c'^{-1}\left(\left(\underbrace{s_i + \Delta s_{ij}^{p_j}}_{s_{ij}}\right) + p_j\right)$$

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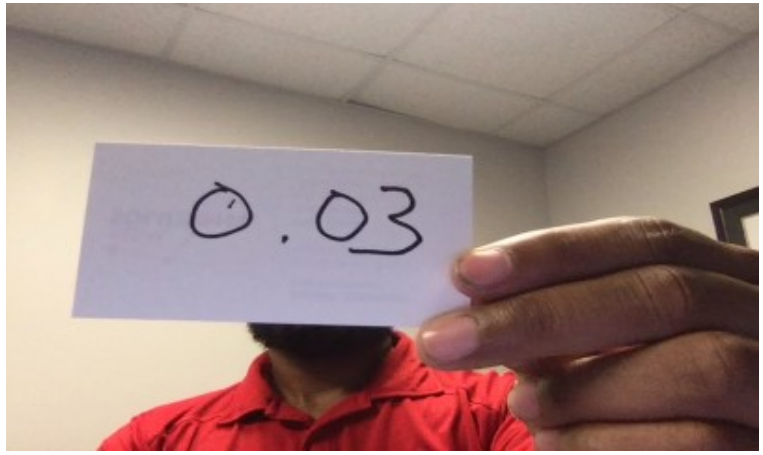
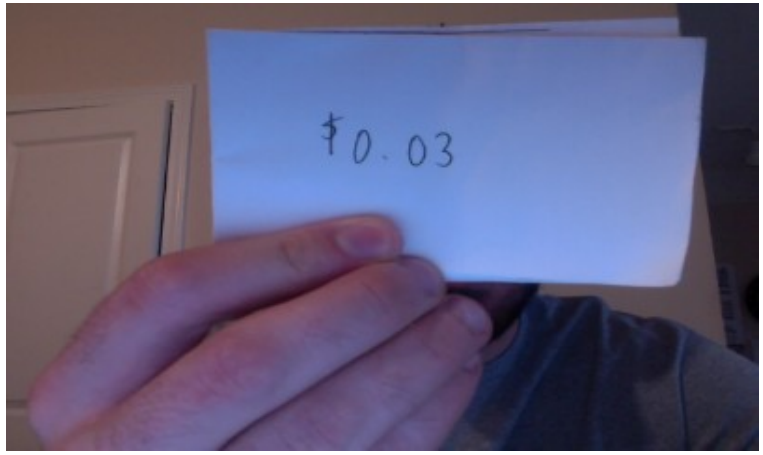
Experiment Design

- Recruitment of Subjects
  - Amazon's Mechanical Turk
- Task
  - Button-Pressing task as in DellaVigna and Pope (2018)
- Experiment Flow
  - Assignment posted on M-Turk for a screen-er survey.
  - Qualified subjects invited to initiate the experiment.
  - Randomly assigned to the treatment group and to the role of employer or worker.
  - Employer given 10 cents for every 100 points scored by the worker. Decides how to split these 10 cents before worker start working on the task.
  - Worker observes the piece rate and then work on the task for up-to 10 minutes.

Revealing Race





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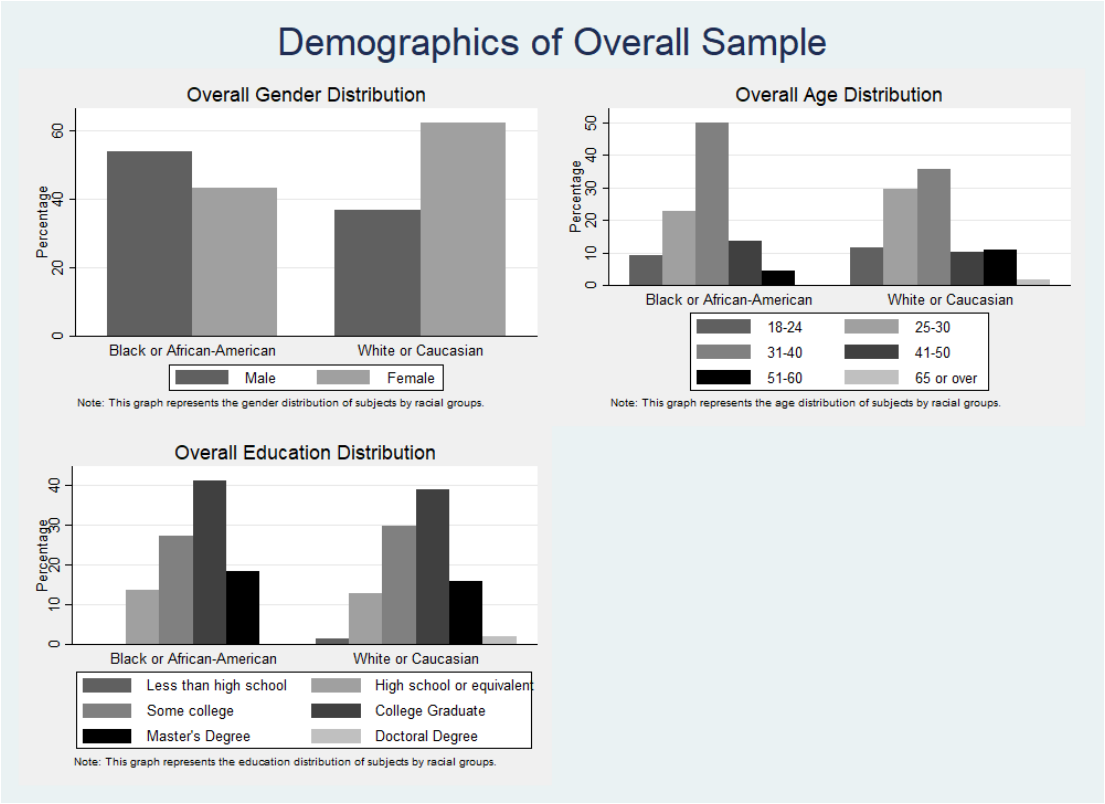
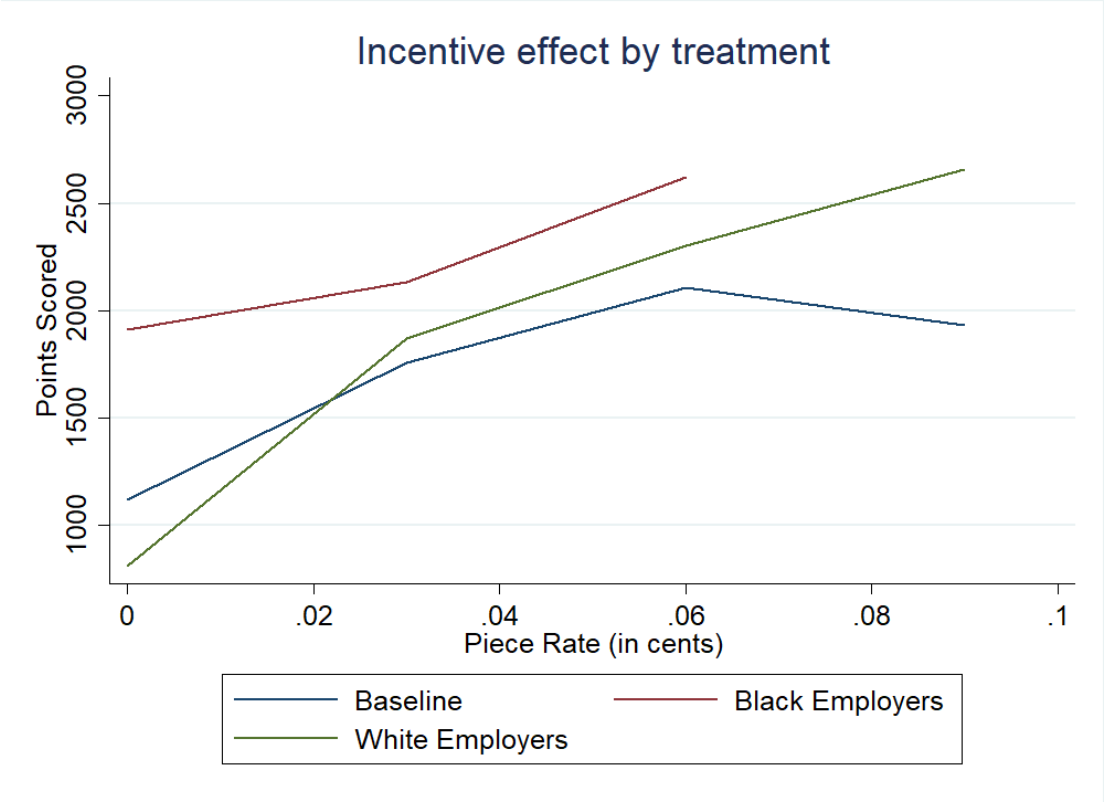
Data Collection

202 subjects (37 Blacks and 165 Whites)



Results


Incentive effect by treatment
Points Scored
1000
1500
2000
2500
3000
0
.02
.04
.06
.08
.1
Piece Rate (in cents)
Baseline
Black Employers
White Employers

Effort choices by treatment

	(1) Baseline		(2) Black Employer		(3) White Employer	
	N	Mean (s.e)	N	Mean (s.e)	N	Mean (s.e)
0.00	8	1125.13	6	1912.83	3	812.00
		(440.38)		(171.27)		(757.64)
0.03	17	1750.82	1	2133.00	13	1868.38
		(166.49)		(.)		(258.51)
0.06	23	2111.65	4	2623.25	17	2303.59
		(115.72)		(425.20)		(96.29)
0.09	6	1926.00			3	2654.00
		(263.22)				(338.22)
Total	54	1831.28	11	2191.18	36	2051.33
		(107.73)		(196.90)		(138.85)

OLS regression results for effort

	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
Piece Rate	18.94***	18.66***	18.88**	17.62*
	(0.000)	(0.000)	(0.004)	(0.016)
Baseline	-0.15	0.12	0.12	0.09
	(0.474)	(0.619)	(0.625)	(0.744)
Race Salient × Black Employer		0.80*	0.80*	0.69
		(0.036)	(0.037)	(0.111)
Fair			-0.02	0.07
			(0.953)	(0.825)
Constant	6.59***	6.41***	6.41***	6.59***
	(0.000)	(0.000)	(0.000)	(0.000)
Fixed Effects	No	No	No	Yes
Observations	101	101	101	99

p-values in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Effort choices by worker's group

	(1) White-White		(2) Black-White		(3) White-Black		(4) Black-Black	
	N	Mean (s.e)	N	Mean (s.e)	N	Mean (s.e)	N	Mean (s.e)
0.00	2	1163.50	1	109.00	5	1881.40	1	2070.00
		(1162.50)		(.)		(206.20)		(.)
0.03	12	1824.50	1	2395.00	1	2133.00		
		(276.95)		(.)		(.)		
0.06	15	2320.73	2	2175.00	4	2623.25		
		(105.64)		(265.00)		(425.20)		
0.09	3	2654.00						
		(338.22)						
Total	32	2093.56	4	1713.50	10	2203.30	1	2070.00
		(142.60)		(548.12)		(217.27)		(.)

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Structural Estimation

- We use the minimum-distance estimator employing the three moments (average effort corresponding to three piece rates (0, 3 and 9 cents) in baseline treatment) and thus three parameters (γ, s and k) are exactly identified.
- The standard errors are derived via a bootstrap with 1000 draws.
- Implied effort is calculated using estimated parameters.
- For the race salient parameters, the baseline parameters are taken as given and we use the average effort for Black employers and White Employer (subsuming piece rate and worker's race) from the race salient treatments to calculate $\Delta s_{.W}$ and $\Delta s_{.B}$.
- Standard errors are calculated by taking a bootstrap sample of 1000 draws and recalculating these parameters for each draw.

Estimates of behavioral parameters

	(1) Minimum distance estimator
Baseline Parameters	
Curvature γ of cost of effort function	19.63 (15.6)
Level k of cost of effort function	0.00 (1.5e+31)
Intrinsic motivation s (cents per point)	0.00 (4.5e+36)
Race Salient Parameters	
Taste parameter towards Black employer $\Delta s\_.B$	1.32 (16.6)
Taste parameter towards White employer $\Delta s\_.W$	0.36 (1.02)
Implied effort at 6-cents (using baseline parameters)	1872
N	741

standard errors in parenthesis

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Learning from this pilot

- It is not clear whether the difference in effort would be driven by taste bias towards the employer, the reciprocity towards the employer or the combination of both.
- There is considerable ambiguity in the way race was revealed.
- The current experiment design lead to disproportional number of observations in each treatment cell.
- We probably don't need to hire as many employers as we did for this experiment.
- Since it is not easy to recruit blacks on M-Turk, we may way to restrict only to white workers.

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Revised Model

$$\underbrace{max}_{e_{ij} \geq 0} U_{ij} = \underbrace{max}_{e_{ij} \geq 0} \left(F + (s_i + p)e_{ij} - c(e_{ij}) + \underbrace{\alpha_{ij}}_{\alpha_i + d_{ij}} (v - p)\, e_{ij} \right)$$

- Solving leads to following solution (when interior);

$$e_{ij}^{\star} = c'^{-1} \left(s_i + p + \alpha_{ij}(v - p) \right)$$

- Two forms of cost function
  - Power Cost Function

$$c(e) = \frac{k e^{1+\gamma}}{1 + \gamma}$$

  - Exponential Cost Function

$$c(e) = \frac{k exp^{\gamma e}}{\gamma}$$

Baseline Treatments

- Employer's identity is not revealed to worker ensuring $d_{ij} = 0$, i.e. there is no taste/distaste towards the employer's identity because the identity is not revealed,
- Employer do not earn anything from worker's effort ensuring $\alpha_{ij} = 0$. This implies that the effort in this treatment is given as;

$$e_{ij}^{\star} = c'^{-1}(s_i + p)$$

This gives us three treatments;

1. Baseline - p_1 cents
2. Baseline - p_2 cents
3. Baseline - p_3 cents
4. Baseline - p_4 cents (just to test the model)

Altruistic Treatment

- In this treatment, we once again do not reveal the identity of the employer (i.e. $d_{ij} = 0 \implies \alpha_{ij} = \alpha_i$) however workers know the return to the employer v. This implies the effort in this treatment (at 0 piece rate) is given as;

$$e_{ij}^{\star} = c'^{-1}\left(s_i + \alpha_i(v)\right)$$

Altruistic Treatment with Employer Identity

- In this treatment, we reveal the identity of the employer hence allowing for $d_{ij} \neq 0$ and workers know the return to the employer (v). This implies the effort in this treatment (at 0 piece rate) is given as;

$$e_{ij}^{\star} = c'^{-1}\left(s_i + (\alpha_i + d_{ij})(v)\right)$$

This gives us two treatments;

1. Altruistic Treatment with Black Employer
2. Altruistic Treatment with White Employer

Experiment Design

- Recruitment of Employers
- Recruitment of Workers
- Sample Size (200 x 7)
- Task
- Race Revelation

Thank You!