The Black-White Recognition Gap in Award Nominations*

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There is evidence showing racial bias in firms' hiring decisions, but less is known about bias in career recognition. We construct a dataset from the second largest US police department to estimate the Black-white gap in award nominations. Leveraging institutional features, we find white supervisors are less likely to nominate Black officers conditional on work performance. This appears to be driven by supervisor bias in advocacy decisions rather than statistical discrimination. Given the reliance on subjective evaluations for promotions in many organizations, our findings have important implications for the Black-white promotion gap and the lack of diversity in upper-management positions.

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1 Introduction

Most organizations have promotion processes that are based on subjective evaluations of an employee's work performance. This may foster an environment where, due to the importance of having advocates and connections, racial or gender disparities can arise in career outcomes. This advocacy gap may explain why male workers are promoted faster if they are assigned to male managers vs. female managers (Cullen and Perez-Truglia, 2020) and why Black employees are less likely than their white colleagues to report receiving support for advancement at work (McKinsey & Company, 2021).

While the economics literature on racial discrimination in the labor market has largely focused on firms' hiring and interviewing decisions,[1] less is known about racial bias in career recognition. Given that a majority of managers are white and connections can engender career opportunities, are managers are not advocating equally for their Black and white colleagues?

This question is challenging to answer empirically because (1) it requires data on workers' performance, which are often hard to measure and difficult to collect due to its proprietary nature, (2) it requires data on subjective evaluations, which are also typically proprietary, and (3) supervisor-supervisee relationships are often endogenously formed, making it challenging to identify a causal estimate of the racial gap in promotions. For example, if higher performing white workers and/or lower performing Black workers sort to white managers, then we would see a racial gap in promotions even in the absence of racial bias.

We overcome these challenges by constructing a panel dataset of Chicago Police Department (CPD) officers, the second largest police department in the US, that contains detailed personnel information on arrests, use of force, misconduct, and supervisor assignments between 2009 and 2015. Using supervisor nominations for departmental awards as our outcome measure, we examine whether there is a racial gap in career recognition. In

[1] See, for example, Neumark (2018), Table 3.

the CPD, awards are used in important career decisions, such as merit promotions.[2] Importantly, award nominations are *subjective* evaluations of an officer's work performance in that a supervisor singularly decides whether or not to nominate an officer based on the officer's performance.

To protect against endogenously formed supervisor-supervisee relationships, we leverage the fact that officers are assigned to a new supervisor every January. Importantly, supervisor assignment is not a function of officer performance and is plausibly as-good-as-random conditional on officer district and year.

We first establish that white supervisors are 28 to 40 percent less likely to nominate Black officers relative to other officers, conditional on the number and type of arrest. This result is robust to the inclusion of alternative work performance measures, such as complaints and use of force filings. We also find that the Black-white nomination gap is negatively correlated with measures of supervisor prejudice, further mitigating concerns that the nomination gap may arise from racial differences in performance quality.

We then ask whether the racial nomination gap exists because of a racial learning gap or a racial advocacy gap. In our setting, supervisors do not necessarily observe the officer's day-to-day activities, making it costly for them to learn about the officer's work performance. As a result, work-related evaluations—like the decision to nominate an officer for an award—require effort. If the cost of acquiring information differs by race, then a racial gap in career recognition and progression may arise. Although our application focuses on law enforcement, this organizational structure (autonomous workers operating within a hierarchical organization) is common across all industries.

To examine whether the racial nomination gap can be explained by a learning gap, we leverage another institutional feature: supervisors are required to conduct annual evaluations of their assigned officers. Although there may be little interaction between officers and supervisors on a daily basis—and, thus, why information acquisition is costly—we

[2]Merit promotions, which rely on a variety of officer qualifications, allow officers to move up the promotion list even if their examination score did not place them at the top of the list.

assume that supervisors are motivated to gather information and learn about an officer's work record for the annual evaluation. Further, officer evaluations are randomly assigned across the calendar quarter, which allows us to disentangle any seasonal trends in nomination decisions from the effect of information gathering. This analysis provides some insight into the source of the racial disparity. If the Black-white nomination gap is a result of statistical discrimination, then we would expect the gap to shrink around the time of the evaluation as supervisors learn more about Black officers' work records.

We find that white supervisors are more likely to nominate both white and Black officers in the evaluation quarter relative to the baseline quarter, suggesting that the racial nomination gap at least partially reflects statistical discrimination. However, the negative Black-white nomination gap remains constant across all quarters, suggesting that white supervisors are not choosing to advocate for white and Black officers equally. For example, although both officers receive relatively more nominations in the evaluation quarter, the pattern for Black officers reverts to and even goes below their baseline nomination likelihood after the evaluation. White officers, in contrast, continue to receive relatively more nominations after their evaluation, suggesting longer lasting bonds between white supervisors and white officers.

Although we cannot definitively determine the source of discrimination due to a lack of data on beliefs and preferences, our collective findings suggest that supervisor bias in advocacy decisions, rather than statistical discrimination, is driving the racial nomination gap. This has significant implications because subjective evaluations are important inputs for promotions in most organizations and a racial advocacy gap can have amplifying effects in a setting where supervisors are not randomly assigned. For example, we find that supervisors who are the most likely to nominate officers for awards are also the least likely to nominate Black officers relative to white officers. Similarly, the Black-white nomination gap more than doubles when we expand the sample to all sergeants as opposed to assigned supervisors (Appendix Table A8).

Our paper relates to the literature on social networks in the workplace. Prior research has documented the importance of homophily in the workplace. Physicians prefer to refer patients to specialists of the same gender (Sarsons, 2019; Zeltzer, 2020). Market traders are more likely to follow the trades of own-race colleagues (Levine et al., 2014). Similarly, we find that white CPD supervisors are more likely to nominate white officers over Black officers. This is consistent with studies that find the importance of own-race or own-sex matching with supervisors for career outcomes (Cullen and Perez-Truglia, 2020; Giuliano et al., 2009, 2011).

Our paper is also consistent with studies that find that minorities are less likely to be acknowledged for their work (Hengel, 2019; Lamont, 2018; Levine et al., 2021; Sarsons, 2021).[3] We find that white supervisors are less likely to advocate for Black officers, leading to a racial disparity in award nominations. A racial attention gap has been empirically documented in various settings, including the labor market and the rental market (Bartoš et al., 2016; Levine et al., 2021). More broadly, our paper contributes to the literature that establishes the existence of bias among managers and work colleagues (Bertrand and Mullainathan, 2004; Egan et al., 2022; Glover et al., 2017; Sarsons, 2019).

With respect to law enforcement, our study adds to the growing research on racial bias in policing.[4] Rather than focusing on racial bias in officer-civilian interactions, we examine racial bias within police departments. Our findings suggest that racial issues in policing are not just an issue between the police and the public, but also within departments and, thus, that simply hiring minority officers may be limited in its efficacy.

[3]Hengel (2019) and Sarsons (2019) find that female minorities are less likely to be acknowledged for their work, while the others focus on racial minorities.

[4]See, for example, Ajilore and Shirey (2017); Antonovics and Knight (2009); Anwar and Fang (2006); Bacher-Hicks and de la Campa (2020); Close and Mason (2006); Goncalves and Mello (2021); Hoekstra and Sloan (2022); Horrace and Rohlin (2016); Knowles et al. (2001); Mason (2007); Nix et al. (2017); Rim et al. (2020); Weisburst (2022); West (2018).

2 Background

2.1 Basic Facts about CPD's Structure

After passing a written exam, all Chicago Police Department candidates are placed on an eligibility list according to a randomly assigned lottery number and called off in lottery order to enroll in police academy. Upon graduation, police officers begin their career in one of the 25 geographic districts spanning the city of Chicago. These initial assignments are generally outside the officer's control, with the exception of a small number of officers who received academic and other distinctions in the Academy (Police Accountability Task Force, 2016).

The most common rank in the CPD is that of *Police Officer*. This is distinct from that of a detective or a specialized officer. Police officers generally work in one of the 25 geographic districts (each of which corresponds to a unit), where they patrol, respond to 911 calls, and perform proactive policing activities. They are supervised on a day-to-day basis by sergeants who are working the same shift, defined as a unique combination of day, watch time, and unit. Sergeants' daily responsibilities include participating in roll call, supervising criminal investigations (e.g., protecting the scene, establishing the perimeter), and ensuring officers carry out their responsibilities.[5]

Sergeants are also tasked with conducting performance evaluations of a specific group of police officers, who are assigned annually. This supervisory relationship is the focus of this paper, as opposed to the sergeant on duty. For example, say Police Officer A is assigned to work a shift with Sergeant S. Further, suppose Sergeant S was not assigned in January to conduct Officer A's annual evaluation. Sergeant S, who is Officer A's *sergeant on duty*, conducts roll call and supervises criminal investigations but is not considered to be Officer A's *supervisor*.

[5]Employee Resource E05-05, Section III.A., available at http://directives.chicagopolice.org and CPD Sergeant Written Assessment Study Briefing 2013, Appendix A, available at https://www.chicago.gov/content/dam/city/depts/dhr/general/CPD_Sergeant_Assessment_Study_Briefing_2013.pdf.

All CPD officers work on a rotational schedule, where their off-days are rotated each week; a typical duty cycle is four days on, and two days off. Police officers and their supervisors typically serve the same district and watch time but, because of the rotational schedule, do not generally work together every day.[6] This system and other features of the CPD make it costly for supervisors to learn about their officers' work performance. Indeed, a 2017 DOJ report found this system "prevents supervisors from establishing mentoring relationships with officers and providing guidance" (U.S. Department of Justice, 2017, p. 108). Even if officers were consistently assigned to work with the same sergeant, sergeants are required to "spend too much time doing non-supervisory tasks at the expense of providing officers supervision" (U.S. Department of Justice, 2017, p. 107). Supervisors have the ability to monitor and track officers' performance-related information in an electronic database. However, conversations with CPD command staff revealed that CPD supervisors "do not understand how the [this database] works or how to use the information it presents" (U.S. Department of Justice, 2017, p. 112).

2.2 CPD Awards Nomination Process

The Chicago Police Department distributes department awards to recognize the accomplishments, performance, and service of its department members. In addition to highlighting officers' accomplishments, awards are used in important decisions related to career advancement, such as performance evaluations and merit promotions.[7]

There are 33 departmental awards, which range in their competitiveness. Most awards require a nomination process. Nominations may originate from any higher-ranking officer, including one's supervisor. Nearly 90 percent of nominations for police officers are from

[6] According to shift-assignment data, 62 percent of officer shifts between 2010 and 2019 were not with the officer's annually assigned supervisor.

[7] For information on performance evaluations, see Chicago Police Department, Career Development Directive, Employee Resource E05-01, Section IV.H., available at http://directives.chicagopolice.org. For information on merit promotions, see Section III.E.2, Employee Resource E05-05, available at http://directives.chicagopolice.org.

sergeants. Of all nominations, 38.5 percent originate from an officer's assigned supervisor.

Officers may be nominated for a single award per incident, and nominations must be submitted within 45 days of the incident. An "incident" is not technically defined, but 85 percent of all nominations are related to a reported crime. There is no restriction on the number of times an officer may be nominated, as long as the nominations are for different incidents. Supervisors are also not restricted in the number of award nominations they are allowed to submit. Our analysis focuses on nominations by assigned supervisors as opposed to all sergeants to leverage the supervisor quasi-random assignment in order to recover a plausibly causal estimate of the Black-white nomination gap.

Nominations for department awards are forwarded to a higher-ranking officer or board for review and a final decision. Because the final decision depends on external reviewers, we focus our analysis on award *nominations*, which are singularly the nominator's decision. As we are interested in whether white supervisors advocate for Black officers and white officers equally, our outcome variable should capture the supervisor's desire or intent to nominate an officer regardless of the final award status.

3 Data

Administrative records and information on sworn Chicago Police Department members were obtained by Freedom of Information Act requests through a collaboration with Invisible Institute. In order to connect different datasets, officers were first identified within a dataset using the available unique characteristics, such as name, appointed date, birth year, and race, and then matched with identified officers in different datasets. The resulting merged data include officer demographics, unit assignment, rank, tenure, assigned supervisor, awards, arrests, complaints, and use of force. See Appendix A for a data appendix.

To identify active officers, we require that officers receive a salary from DHR and have a

district (unit) assignment. We focus on years 2009 to 2015 to maximize overlap across the different datasets. We further restrict our sample to officers at the *Police Officer* rank who are always assigned to a geographic district and officer-supervisor assignments that lasted for 12 months. Our final analysis dataset has 6,518 Police Officers and 1,284 supervisors.

In terms of the outcome variable, we consider nominations for 18 awards that require a supervisor's nomination and are open to all Department members. Appendix Table A1 provides a description of these awards. The vast majority of awards are Honorable Mention Certificate Awards, which are relatively broad in scope and often relate to a single incident (e.g., arrest).

Table 1 provides descriptive statistics of police officers in the analysis sample. Most officers are male and white, but Blacks and Hispanics are also well-represented. In fact, these three racial groups make up nearly 97 percent of our sample. The average CPD officer in our sample joined the force in 2000 at age 30. At the start of the analysis dataset (year 2009), the average officer had been on the force for nine years.

Relative to police officers, the racial makeup of supervisors in the analysis sample is more homogeneous. About 81 percent of supervisors are male, and 70 percent are white. Blacks and Hispanics each make up around 14 to 15 percent of supervisors. At the start of the analysis dataset, the average supervisor had worked for 17 years or eight years longer than the average police officer. The average supervisor has 7.3 officers to evaluate every year, and the median number is seven. The 25th percentile is three officers, and the 90th percentile is 14 officers.

Table 2 presents summary statistics on various work measures. The average officer has a 2.5 percent chance of being nominated in a given month, which equates to about a 30 percent chance of being nominated in a given year. White and Hispanic officers have slightly higher than average likelihoods at 3 percent and 3.2 percent, respectively, while the likelihood for Black officers is half the sample average (1.3 percent). The Black-white difference is statistically significant at the 1 percent level. The statistics on award

Table 1: Summary Statistics

	Police Officers	Supervisors
Male	73.7%	80.8%
Race		
White	46.4%	69.6%
Black	26.8%	14.8%
Hispanic	23.2%	13.9%
Asian	3.1%	1.6%
Native American	0.4%	0.1%
Birthyear	1970.3	1965.3
Start Year	2000.0	1992.2
Observations	6,518	1,284

Source: CPD analysis sample.
Notes: "Police Officers" are entry-level officers. "Supervisors" are sergeants who are officially assigned to conduct a police officer's annual evaluation.

receipt are very similar to those for award nominations because most nominations (about 71 percent) are approved.

The average officer receives about 0.04 complaints in a given month, equating to about 1 complaint every two years. This statistic is similar across race. The average officer files about 0.05 use of force reports (TRR filings) a month, equating to about 1.2 filings every two years. Black officers, however, file about half as many reports as white and Hispanic officers.

The average officer makes 1.8 arrests every month. White and Hispanic officers are slightly over this average at 2 and 2.2 arrests, respectively, while Black officers are below this average at 1.2 arrests. The Black-white difference equates to 10 fewer arrests a year ($p < 0.01$). This difference is driven by arrests for non-index crimes, which make up around 65 percent of all arrests.[8]

[8]Although the data reveal a racial disparity in number of arrests, we caution the reader from jumping to the conclusion that Black officers are less *productive* than white and Hispanic officers. Arrests are not a comprehensive measure of policing quality and may even be a biased measure (Owens et al., 2018). Studies show that increasing the number of Black and female officers can reduce crime victimization and increase reports of domestic violence (Harvey and Mattia, 2022; Miller and Segal, 2019). These outcome measures, which are important measures of social welfare, are not captured by arrests nor would they appear on an officer's record. Relatedly, others have shown that Black officers make fewer discretionary

Table 2: Racial Differences in Work Measures

	All Officers	White Officers	Black Officers	Hispanic Officers	B-W Difference (p-value)	H-W Difference (p-value)
Nominated	2.5%	3.0%	1.3%	3.2%	-1.7 (0.000)	0.2 (0.016)
Won	2.3%	2.8%	1.1%	2.9%	-1.6 (0.000)	0.2 (0.051)
Complaints	0.04	0.04	0.04	0.04	0.00 (0.964)	0.00 (0.075)
TRR filings	0.05	0.05	0.03	0.06	-0.02 (0.000)	0.00 (0.039)
Total Arrests	1.82	2.04	1.19	2.16	-0.85 (0.000)	0.12 (0.000)
Violent	0.37	0.37	0.31	0.42	-0.06 (0.000)	0.05 (0.000)
Property	0.27	0.29	0.20	0.30	-0.09 (0.000)	0.01 (0.017)
Non-Index	1.19	1.38	0.68	1.44	-0.69 (0.000)	0.07 (0.000)
Observations	250,872	111,876	70,572	59,148		

Source: CPD analysis sample.
Notes: This table lists monthly summary statistics for 6,518 police officers in our analysis sample. The sample is at the officer-month level. Non-index arrests include arrests for non-property and non-violent crimes. B-W Difference reports the percentage-point difference between Black officers and white officers. H-W Difference reports the percentage-point difference between Hispanic officers and white officers. p-values are the p-value from a t-test of a difference in means.

In Table 3, we examine which factors best predict award nominations. Column 1 reports the Pearson's correlation coefficient between various work measures and the number of nominations. Arrests have the strongest correlation at 0.162. Columns 2 through 4 report estimates from a regression of lagged monthly work measures on award nominations.

The top row reports the adjusted R-squared of the regression, and the rows below report coefficient estimates and standard errors for officer work measures. Use of force, complaints, unit assignments, and time fixed effects explain very little of the variation in nominations ($\bar{R}^2 = 0.005$). When we include arrests, however, the adjusted R-squared increases five-fold to 0.028.

In the most comprehensive specification (column 4), the number of arrests has the largest weight and is statistically significantly at the 1 percent level. Tenure is also statistically significant, but the magnitude is trivial. Officer complaints is similar in magnitude to arrests but weakly significant at 10 percent. Further, the coefficient on complaints is positive, suggesting that nominations are likely made based on superficial knowledge of

stops and use force less often than their white colleagues (Ba et al., 2021; Hoekstra and Sloan, 2022).

Table 3: Associations between Work Measures and Award Nominations

	Correlations	Outcome Variable: Number of Nominations		
	(1)	(2)	(3)	(4)
Adjusted R-squared		**0.005**	**0.028**	**0.028**
TRR Filings	0.0341	0.0267***	-0.0110	-0.0118*
		(0.00724)	(0.00689)	(0.00691)
Strong Force Ratio	0.0316	0.0150*	0.0104	0.0100
		(0.00809)	(0.00804)	(0.00803)
Complaints	0.0290	0.0346***	0.0116*	0.0114*
		(0.00711)	(0.00659)	(0.00659)
Total Arrests	0.1619		0.0158***	0.0154***
			(0.000954)	(0.000972)
Officer Tenure	-0.064			-0.000805***
				(0.000150)
Observations	242,185	242,185	242,185	242,185
Year FE		Yes	Yes	Yes
Month FE		Yes	Yes	Yes
Unit FE		Yes	Yes	Yes

Source: CPD analysis sample.
Notes: This table reports estimates for lagged monthly work measures on the number of award nominations received by the officer's supervisor. All work measures except for tenure and unit are lagged by one month. Standard errors clustered by officer are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

an officer's arrest activity rather than a thorough review of the incident. In summary, these results facilitate our empirical strategy of conditioning on arrests when estimating the Black-white nomination gap.

4 Empirical Strategy

We exploit two institutional features of the Chicago Police Department to estimate plausibly causal estimates of the Black-white recognition gap. First, we use the assignment to a new supervisor at the start of a calendar year to avoid the problem of endogeneously formed relationships and to approximate random assignment of an officer's race to a supervisor. Although the vast majority of supervisor assignments last one year (78 percent), we may be concerned that some assignments may have been arranged outside of the dis-

passionate assignment system. Since our outcome variable is supervisor nominations, this would result in omitted variable bias if, for example, certain white officers were more likely to bypass the dispassionate assignment system and chose their supervisors. Therefore, we restrict our analysis sample to all supervisor-officer assignments that last one year.[9]

In Appendix Table A2, we test whether officers of different races assigned to white supervisors have similar observable characteristics. We consider a wide variety of work measures, such as violent-crime arrests, property-crime arrests, non-index-crime arrests, complaints, TRR filings, and use of strong force, as well as officer race, birth year, tenure, unit, and year fixed effects. Because assignments are conducted at the department level, we consider all patrol officers assigned to a supervisor. However, we find similar results when we restrict the sample to the analysis sample. We exclude units in years where there were only white supervisors because there is no variation in those unit-years.[10] To adjust for multiple hypothesis testing, we calculate sharpened False Discovery Rate (FDR) q-values (Anderson, 2008; Benjamini et al., 2006). Overall, prior-year work performance does not appear to predict supervisor race for both white or Black officers. The p-values on a joint F-test are 0.294 and 0.535 for white officers and Black officers, respectively. Moreover, R^2 is low at 0.091, with 78 percent of the variation coming from unit and year fixed effects.

We also attempt to test for personality traits, such as penchant for aggressive behavior, by looking at the officer's rate of strong-force use. Again, we do not see any statistically significant differences between white and Black officers assigned to white supervisors. Of course, we cannot test whether all unobservable traits are similar between white and Black officers. However, this analysis along with what we know about the administrative processes at CPD (i.e., a strong reliance on seniority) suggest that supervisor assignments

[9] In Appendix Tables A3 and A4, we redo the analysis to include all supervisor assignments. We find that officers in a longer-term supervisor relationship are more likely to be nominated, lending support to our hypothesis that these relationships may have been endogenously formed.

[10] There are only nine unit-years where this is true. There are no units that had only Black supervisors in any given year.

do not take work measures into account.

Second, we exploit the randomized timing of an officer's annual evaluation to examine how knowledge of an officer's work performance may influence a supervisor's nomination likelihood. All supervisors are required to conduct annual evaluations of their assigned officers during the quarter prior to the quarter in which the officer joined the department. Because start dates are determined by a lottery number, the evaluation quarter is also essentially randomly assigned across officers. In Appendix Figure A1, we test whether the evaluation quarter is equally distributed across officer race and find that it is (p-value = 0.516).

Because new supervisors are assigned at the same time every year, it is important for the evaluation period to differ across officers. This allows us to disentangle any seasonal trends from the true estimate of information gathering.[11] The randomized timing of the annual evaluation in combination with the annual supervisor re-assignment allows us to estimate plausibly causal estimates of the Black-white nomination gap and to examine how the gap may evolve as supervisors learn more information about their officers due to the annual evaluation.

[11] For example, nomination likelihoods may be highest in the summer, when relatively more crimes are being committed, and lowest in the winter, when relatively fewer crimes are being committed.

5 Results

5.1 Black-White Gap by Arrest Record

This section examines whether white supervisors are equally likely to nominate Black and white officers conditional on their arrest record. We estimate the following model:

$$\begin{aligned} Nom_{ijt} = \beta_0 &+ \left(\sum_{c=2}^{3} \mathbb{1}\{Arrests_{i,t-1} = c\} \times \beta_1^c \right) + \left(B_i \times \sum_{c=2}^{3} \mathbb{1}\{Arrests_{i,t-1} = c\} \times \beta_2^c \right) \\ &+ \left(H_i \times \sum_{c=2}^{3} \mathbb{1}\{Arrests_{i,t-1} = c\} \times \beta_3^c \right) + \left(A_i \times \sum_{c=2}^{3} \mathbb{1}\{Arrests_{i,t-1} = c\} \times \beta_4^c \right) \\ &+ \left(N_i \times \sum_{c=2}^{3} \mathbb{1}\{Arrests_{i,t-1} = c\} \times \beta_5^c \right) + X'_{ijt}\alpha + \tau_t + \varepsilon_{ijt} \end{aligned} \tag{1}$$

where Nom_{ijt} is equal to 1 if officer i was nominated for an award by supervisor j in month t and equal to 0 if not. $Arrests_{i,t-1}$ is the number of arrests officer i made last month grouped into three bins denoted by c: zero to one arrests; two to three arrests; and four or more arrests. We lag arrests by one month because nominations must be submitted within 45 days of an incident.[12] The reference category is zero to one arrests last month. B_i is a binary indicator variable equal to 1 if the officer is Black, H_i if Hispanic, A_i if Asian, and N_i if Native American. White officers are the reference group. X_{ijt} is a vector of officer and supervisor characteristics: officer race, birth year, tenure, unit, and supervisor fixed effects. τ_t contains year and month fixed effects. Standard errors are clustered at the supervisor level. We then calculate sharpened FDR q-values to adjust for multiple hypothesis testing.

The parameters of interest are β_1^c, which tell us how the nomination likelihood changes as the number of arrests last month increases, and β_2^c, which tell us how the Black-white nomination difference changes by the number of arrests. Table 4 reports their estimates.

There are increasing returns to having more arrests, with a marked increase for those

[12]The median number of days between the nomination and the incident date is 26 days.

with four or more arrests last month. Relative to having zero or one arrest last month, having four or more arrests increases the likelihood of a nomination by 4.6 percentage points ($p < 0.01$) for white officers. This is a three-fold increase from the baseline nomination likelihood of 1.3 percent.

Table 4: Impact of Lagged Arrests on Nomination Likelihood by Crime-Type

	Outcome Variable: Nominated		
Arrests for:	All Crimes	Index Crimes	Non-Index Crimes
	(1)	(2)	(3)
Two to three arrests last month	0.0146***	0.0122***	0.0201***
	(0.00171)	(0.00244)	(0.00259)
	[0.001]	[0.001]	[0.001]
Four or more arrests last month	0.0457***	0.0286***	0.0571***
	(0.00388)	(0.00601)	(0.00576)
	[0.001]	[0.001]	[0.001]
Interactions with Black Officer			
Two to three arrests last month	-0.00727***	-0.00598*	-0.00873**
	(0.00247)	(0.00336)	(0.00423)
	[0.003]	[0.061]	[0.055]
Four or more arrests last month	-0.0177***	-0.0256***	-0.0160*
	(0.00530)	(0.00709)	(0.00881)
	[0.002]	[0.001]	[0.076]
Interactions with Hispanic Officer			
Two to three arrests last month	0.000838	-0.00249	0.00134
	(0.00319)	(0.00377)	(0.00441)
	[0.153]	[0.205]	[0.149]
Four or more arrests last month	-0.0121**	-0.00695	-0.0134
	(0.00552)	(0.00884)	(0.00832)
	[0.012]	[0.205]	[0.085]
Observations	176,552	176,552	176,552
Mean Pr(Nom) for Reference Group	0.013	0.027	0.016
Black-White Nomination Gap in Reference Group	-0.005	-0.010	-0.006

Source: CPD analysis sample.
Notes: This table reports estimates for the impact of an officer's lagged arrest record on the probability of nomination by white supervisors. All estimates include supervisor, unit, month, and year fixed effects, and control for officer birth year and tenure. Standard errors clustered by supervisor are in parentheses. Sharpened False Discovery Rate q-values to adjust for multiple hypothesis testing are in square brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The Black-white gap among officers with zero to one arrest is -0.54 percentage points ($p < 0.01$). This gap widens by 1.77 percentage points ($p < 0.01$) for officers with four or more arrests. It is informative to interpret this disparity in the context of racial differences

in work performance. For example, Black officers with four or more monthly arrests are at the 98th percentile of their distribution, while white officers are at the 92nd percentile of their distribution. Yet, white supervisors are 39 percent ($= -0.0177/0.0457$) less likely to nominate Black officers relative to white officers.

In columns 2 and 3 of Table 4, we sharpen our focus on the type of arrest to address the concern that the racial disparity in nominations may reflect a racial difference in arrests that may be more valued by supervisors. We find a large, negative, and statistically significant Black-white nomination gap for both index-crime arrests and non-index-crime arrests. The existence of a nomination gap even for arrests for more serious crimes, like violent and property crimes, is consistent with our argument that the Black-white nomination gap reflects a racial advocacy gap rather than solely being a result of Black officers vs. white officers making different types of arrests.

We conduct several robustness checks where we include additional measures of officer performance, such as complaints and use of force (Appendix Table A5), and officer fixed effects and both officer and supervisor fixed effects (Appendix Table A6). The patterns are highly similar across the different specifications. We also estimate the Black-white nomination gap by predicted nomination probability, and the takeaway is very similar to our main results: the Black-white nomination gap widens as the predicted nomination probability increases (Appendix Figure A2).

To distinguish whether this behavior is due to in-group bias (favoritism) towards white officers or bias against Black officers, we examine whether white supervisors are also less likely to nominate Hispanic officers, another racial minority in the CPD. The Hispanic-white nomination gap among officers with two or three arrests is not statistically nor economically significant[13], but it becomes statistically significant for officers with four or more arrests. Taken together, the results suggest that white supervisors are less likely to nominate Black officers relative to white or Hispanic officers among those with average arrest

[13]This is true also for the Hispanic-white nomination gap among officers with zero or one arrest last month, which is 0.11 percentage points (p-value = 0.433).

records (recall the average officer makes around two arrests per month), but favor white officers when comparing officers with higher than average arrests.

We explore whether this behavior is driven by homophily in Appendix Table A7. We do not find statistically significant estimates for the Black-white nomination gap among Black and Hispanic supervisors, but it is also difficult to draw definitive conclusions due to the small number of minority supervisors. We would also like to note that a homophily test may be less informative when Black supervisors are themselves a selected group.[14]

We conduct an additional analysis where we explore whether the racial nomination gap may be due to supervisor prejudice. We consider two supervisor-specific measures that may be correlated with supervisor bias. The first is the residualized Black-white gap in TRR filings, which is adjusted for differences in patrol environment. The second measure is the residualized number of complaints (also adjusted for patrol environment), which has been shown to be a strong predictor officer misconduct (Rozema and Schanzenbach, 2019). As another example, Jason Van Dyke, the Chicago police officer who was convicted of murdering 17-year-old Laquan McDonald, had 20 citizen complaints by the time of the shooting—more than 90 percent of other officers. Officers who have never used force or have no complaints are assigned a value of zero.

Neither of these measures, on their own, are perfect measures of individual preferences. But by comparing each of these, which measures interactions with *civilians*, to the Black-white nomination gap, which captures interactions with *colleagues*, we hope to shed some light on implicit preferences.[15]

Table 5 reports the correlations. The estimates are negative, indicating that white supervisors who are less likely to nominate Black officers are also more likely to use force

[14]For example, minorities in white-dominated firms may be selected into leadership roles partly on their willingness to be team players who act to protect the status quo, which may result in unsupportive behavior towards fellow minority colleagues (Cohen and Garcia, 2005; Spencer et al., 2016; Srivastava and Sherman, 2015; Van Maanen, 1975).

[15]The Black-white nomination gap is calculated as $(Nom^b)/(n_i^b \times n_t^b) - (Nom^w)/(n_i^w \times n_t^w)$, where Nom^b is the number of nominations for Black officers, n_i^b is the number of Black supervisees, and n_t^b is the number of months the supervisor had a Black supervisee. Nom^w, n_i^w, and n_t^w are the analogous for white officers/supervisees.

against Black civilians and also have more complaints. Although we cannot definitively state that the Black-white nomination gap is due to supervisor prejudice due to the difficulty in measuring bias, this analysis reveals that supervisor nomination behavior towards their Black colleagues is consistent with their policing behavior towards Black civilians.

Table 5: Black-White Nomination Gap by Measures of Supervisor Prejudice

Outcome Variable:	Use of Force (1)	Complaints (2)
Black-White Nomination Gap	-1.578**	-1.797**
	(0.641)	(0.855)
Constant	-0.598***	-0.173*
	(0.0781)	(0.104)
Observations	868	868

Source: CPD analysis sample.
Notes: This table reports estimates for the Black-white nomination gap on the residualized Black-white use of force gap (column 1) and the residualized number of complaints (column 2). Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5.2 Black-White Gap by Evaluation Quarter

The previous section established that supervisors prefer to nominate white officers over Black officers conditional on the number and type of arrest. In this section, we examine whether the nomination gap can be explained by a learning gap or an advocacy gap. Although there may be little interaction between officers and supervisors on a daily basis—and, thus, why information acquisition is costly—we assume that supervisors are motivated to gather information and learn about an officer's work record for the annual evaluation. We examine whether the racial nomination gap persists when supervisors have more information about their officers.

This analysis can also provide some insight into the source of the racial disparity. If the Black-white nomination gap is a result of statistical discrimination, then we would expect the gap to shrink around the time of the evaluation as supervisors learn more about Black officers' work records.

We estimate the following model:

$$
\begin{aligned}
Nom_{ijt} = \beta_0 + \sum_{q=-2}^{3} \mathbb{1}\{EQ_{it} = q\} \times \delta^q + \left(B_i \times \sum_{q=-2}^{3} \mathbb{1}\{EQ_{it} = q\} \times \beta_1^q \right) \\
+ \left(H_i \times \sum_{q=-2}^{3} \mathbb{1}\{EQ_{it} = q\} \times \beta_2^q \right) + \left(A_i \times \sum_{q=-2}^{3} \mathbb{1}\{EQ_{it} = q\} \times \beta_3^q \right) \\
+ \left(N_i \times \sum_{q=-2}^{3} \mathbb{1}\{EQ_{it} = q\} \times \beta_4^q \right) + X'_{ijt}\alpha + \tau_t + \varepsilon_{ijt}
\end{aligned} \tag{2}
$$

where Nom_{ijt} is equal to 1 if officer i was nominated for an award by supervisor j in month t and equal to 0 if not. We include a set of binary indicator variables for each quarter relative to the evaluation quarter, which is denoted as $EQ_{it} = 0$. The baseline quarter is $EQ_{it} = -3$ or three quarters prior to the evaluation quarter of officer i. B_i is a binary indicator variable equal to 1 if the officer is Black, H_i if Hispanic, A_i if Asian, and N_i if Native American. White officers are the reference group. X_{ijt} is a vector of officer and supervisor characteristics: officer race, birth year, tenure, unit, lagged arrests, and supervisor fixed effects. τ_t includes year and month fixed effects. Standard errors are clustered at the supervisor level.

The coefficients δ^q tell us how nomination likelihoods for white officers change across quarters. If information gathering is an important mechanism, then we expect it to be enhanced in the quarter that supervisors evaluate their officers, $EQ = 0$. The coefficients β_1^q depict how the Black-white nomination gap evolves relative to $EQ_{it} = -3$. Table 6 reports their estimates.

White officers are more likely to be nominated as they move closer to the evaluation quarter, but the increased likelihood falls afterward. Relative to three quarters before the evaluation, white officers are 1.75 percentage points more likely to be nominated in the quarter before the evaluation and about 2 percentage points more likely to be nominated in the evaluation quarter (both $p < 0.01$). As white officers have a 1.9 percent chance of being nominated in the baseline quarter, this means the nomination likelihood

Table 6: Racial Difference in Nomination Likelihood by Quarter

Estimates for:	Outcome Variable: Nominated White Officer (1)	 Black-White Gap (2)	 Hispanic-White Gap (3)
Quarter relative to three quarters before evaluation			
Two quarters pre-evaluation	0.0116***	-0.00971**	-0.00574
	(0.00308)	(0.00383)	(0.00486)
	[0.001]	[0.012]	[0.098]
One quarter pre-evaluation	0.0175***	-0.0130***	-0.00479
	(0.00322)	(0.00372)	(0.00512)
	[0.001]	[0.003]	[0.132]
Evaluation quarter	0.0207***	-0.0136***	-0.00480
	(0.00368)	(0.00399)	(0.00543)
	[0.001]	[0.003]	[0.132]
One quarter post-evaluation	0.0133***	-0.0139***	-0.00864*
	(0.00383)	(0.00392)	(0.00500)
	[0.003]	[0.001]	[0.041]
Two quarters post-evaluation	0.0111***	-0.0130***	-0.00775
	(0.00415)	(0.00410)	(0.00533)
	[0.009]	[0.003]	[0.066]
Three quarters post-evaluation	0.00689	-0.0123**	-0.0140**
	(0.00481)	(0.00521)	(0.00591)
	[0.066]	[0.017]	[0.017]
Observations		176,552	
Mean Pr(Nom) for Reference Group		0.019	
Black-White Nomination Gap in Reference Quarter		0.004	

Source: CPD analysis sample.
Notes: The table depicts how the quarterly probability of nomination changes relative to three quarters before the officer's evaluation. All estimates include supervisor, unit, month, and year fixed effects, and control for officer birth year, tenure, and lagged arrests. Standard errors clustered by supervisor are in parentheses. Sharpened False Discovery Rate q-values to adjust for multiple hypothesis testing are in square brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

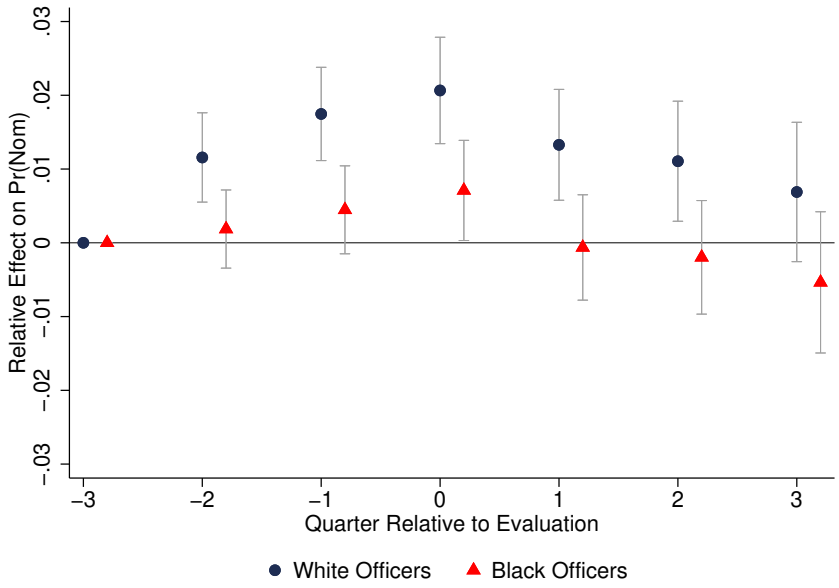
essentially doubles in the evaluation quarter. This peters off but during the six months post-evaluation, white officers are still 1.1 to 1.3 percentage points ($p < 0.01$) more likely to be nominated relative to the baseline quarter.

The Black-white nomination gap in the baseline quarter ($EQ = -3$) is 0.4 percentage points and not statistically significant. In all subsequent quarters, however, the gap becomes negative and statistically significant. The nomination patterns for Hispanic officers, by contrast, are similar to those for white officers in the quarters leading up to and including the evaluation quarter. After the evaluation quarter, Hispanic officers are also less likely to be nominated, relative to white officers, but the Hispanic-white difference is about 38 to 65 percent smaller than the Black-white difference, except for in the last

quarter when the difference is slightly larger (14 percent) for Hispanic officers vs. Black officers. Further, the estimates are mostly not statistically significant.

Figure 1 provides some insight into the results. Is the Black-white gap widening because supervisors are acquiring more information about white officers in the evaluation quarter? Or because supervisors are gathering less information about Black officers? To answer this question, we plot the estimates for δ^q separately for white officers and Black officers.

Figure 1: Nomination Likelihood by Relative Quarter and Officer Race



Source: CPD analysis sample.
Notes: This figure depicts how the probability of nomination changes by quarter relative to three quarters before the officer's evaluation, separately for white and Black officers assigned to white supervisors. All estimates include supervisor, unit, month, and year fixed effects, and control for officer birth year, tenure, and lagged arrests. Wings depict 95% confidence intervals using clustered standard errors.

The hump shape suggests that the nomination probability increases as we grow closer to the evaluation quarter then falls afterward. This pattern exists for both white and Black officers, but the increase is smaller for Black officers. Further, although the positive estimates suggest that Black officers are more likely to be nominated in the quarters leading up to their evaluation relative to their baseline, none of these estimates are statistically significant. In the quarter of evaluation, Black officers have a 0.7 percentage point increase

in nomination likelihood ($p < 0.05$) relative to their baseline mean of 0.0094, which represents a 74 percent increase. After the evaluation, however, the estimates become trivially small and lose statistical significance. Contrast this with the estimates for white officers, who are 2.1 percentage points (110 percent) more likely to be nominated in the evaluation quarter relative to their baseline mean of 0.019 and 1.3 percentage points (70 percent) more likely to be nominated in the quarter after the evaluation.

Taken together, these results suggest that, although information gathering may be an important channel in a supervisor's nomination decision (because both white and Black officers experience an increase in nomination likelihood in the evaluation quarter), white supervisors are not choosing to advocate for white and Black officers equally. For example, there is a steady increase in nomination likelihood in the quarters leading up to the evaluation for white officers, which is not present for Black officers. Additionally, white officers experience a sustained increase in nomination likelihood after the evaluation that Black officers do not experience. Put another way, although Black officers are more likely to be nominated in the evaluation quarter relative to the baseline quarter, the Black-white nomination gap remains fairly constant across all quarters.[16] Our preferred interpretation of the results is that though a racial learning gap may exist, it cannot fully explain the racial nomination gap. Instead, we posit that the disparity can be explained by a racial advocacy gap: supervisors are less likely to advocate for (nominate) Black officers relative to white officers, even after learning about their work performance. This theory is also supported by Appendix Figure A3, where we find that the newest supervisors, who likely have the strongest ties to their subordinate officers, have the largest negative Black-white nomination gap.

One potential alternative explanation to bias is that officers may be endogenously reacting to the annual evaluation and changing their arrest behavior a la Glover et al. (2017).[17] In Appendix Figure A4, we plot how arrests evolve by relative quarter and officer race. We

[16] The estimates in column 2 of Table 6 are not statistically significantly different from each other.
[17] Glover et al. (2017) find that minority workers lower their effort levels when assigned to biased managers.

do not see any statistically significant changes in arrest activity by both white and Black officers. As such, it is unlikely that the increase in nomination likelihood for white officers is due to their endogenously increasing their arrest activity around the time of their evaluation.

6 Conclusion

This paper studies whether a Black-white gap in award nominations may arise because white CPD supervisors do not advocate for their Black and white officers equally. First, we find that white supervisors are less likely to nominate Black officers relative to white officers with similar arrest records. To provide stronger evidence on this mechanism, we examine how the Black-white nomination gap changes when the supervisor is required to learn more information about his officers due to the annual evaluation. White supervisors are more likely to nominate both white and Black officers in the evaluation quarter relative to the baseline quarter, suggesting that the Black-white nomination gap at least partially reflects statistical discrimination. However, a constant, negative Black-white nomination gap across all quarters suggests that white supervisors are not choosing to advocate for white and Black officers equally. Collectively, these results suggest that supervisor bias in advocacy decisions, rather than statistical discrimination, is driving the racial nomination gap. Given the reliance on subjective evaluations for promotions in many organizations, these findings have important implications for the lack of diversity in upper-management positions. There are also important policy implications for policing. For example, diversity initiatives may be constrained by the extent to which officer bias carries over to their colleagues. Our paper suggests police departments should also pursue policies that address internal racial bias due to its effect on career advancement.

A nascent literature provides empirical evidence that discrimination can be reversed

(Ayalew et al., 2021; Bohren et al., 2019; Lowe, 2021; Mousa, 2020).[18] A critical component for the reversal is actual engagement with the minority group or a direct confrontation of the inaccurate belief (Hanna et al., 2014; Levine et al., 2021). Therefore, a crucial question for addressing racial bias in the workplace is whether managers pay attention to and advocate for their white and Black employees equally. Our paper provides suggestive evidence that white managers do not, and thus, a racial advocacy gap may lead to a racial gap in career progression.

[18]The extent of this reversal may be limited to the intervention setting. For example, Mousa (2020) randomly assigned Iraq Christians to either an all-Christian soccer team or a team mixed with Muslims and found that treated players changed their behavior on the field but not off the field.

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