

# SUPPLY- AND DEMAND-SIDE EFFECTS IN PERFORMANCE APPRAISALS: THE ROLE OF GENDER AND RACE\*

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## **Abstract:**

Performance reviews in firms are common but controversial. Managers' subjective appraisals of their employees' performance and employees' self-evaluations might be affected by demographic characteristics, interact with each other as self-evaluations are typically shared with managers before they decide ("anchoring"), and these supply-side and demand-side dynamics may contribute to gender or race differences in performance ratings. Analyzing the data of a multi-national financial services firm, we find that supply-side effects were mostly driven by gender: women (particularly, women of color) gave themselves lower self-ratings. Demand-side effects were shaped by gender and race: holding self-evaluations constant, managers lowered the ratings of female and White employees less, reversing the gender gap in ratings induced by the supply side for Whites but introducing a race gap. The race-based demand-side effects were particularly pronounced in the US, negatively affecting Black, Asian and Latinx employees. Counterfactual simulations suggest that 22-28% of Black employees' ratings would have to be increased for this race gap to disappear. Finally, we evaluate a potential intervention. In 2016, a quasi-exogenous shock led to self-evaluations not being shared with managers before they appraised employees. While this disruption of supply-side influences led to "de-anchoring" with lower average manager ratings, it generally did not change any gender or race dynamics, as these were mostly shaped by demand-side factors. A possible exception were employees of color hired in 2016: when managers were not anchored by self-ratings (and were unaffected by previous years), the race gap disappeared for women (but not for men) of color.

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## I. INTRODUCTION

Annual performance reviews are common. They are part of organizations' efforts towards merit-based performance management systems that measure, incentivize and reward employees' contributions to the organization. In a 2014 survey conducted by the Society of Human Resource Management, 97 percent of organizations reported conducting formal performance appraisals (Society of Human Resource Management, 2014). Often, performance appraisals are directly linked to compensation, promotion, work allocation and termination decisions (Castilla 2008, 2015; Dobbin et al. 2015).

Performance reviews are controversial. Performance is rarely measurable objectively in complex work environments. Subjective performance appraisals that rely on evaluations made by managers—i.e., the demand side—are prone to various evaluation biases, including those based on demographic characteristics (Bertrand and Mullainathan 2004; Castilla 2008, 2015; Wynn et al. 2018; Kessler, Low & Sullivan, 2019). Such biases are of concern to firms as they can lead to organizational inefficiency and social inequity, disadvantaging people who do not conform with prevalent stereotypes and advantaging those who look the part but might not be the highest performers (Bohnet 2016).

In addition to these demand-side dynamics, the supply side—i.e., the employees themselves—might also contribute to differences in final performance scores through their self-evaluations. In many performance appraisal systems, employees' self-evaluations are shared with managers before they make up their minds. Final performance scores assigned by managers are likely due to some true indication of performance, supply-side factors affecting employee self-

evaluations that in turn may also influence or “anchor” manager ratings,<sup>1</sup> and demand-side factors impacting manager assessments. Disentangling the causes of differences in final performance scores—to the extent possible given that all evaluations are subjective—helps diagnose potential problems and inform how they might be addressed.

Working with a multi-national financial services firm headquartered in the United States, we explore the determinants of performance ratings with a special focus on the two dimensions in employee demographic characteristics available to us, gender and race. We start by focusing on the complete dataset for all countries in which the firm operates and employ a binary definition of race comparing Whites and “people of color”. To analyze race at a more granular level, including interactions between gender and different racial groups, we then take a closer look at the firm’s home market, the United States, where we have the most complete race self-categorization data and which comprises about half of the workforce.

Understanding whether gender or race differences in final performance scores are mostly driven by supply-side or by demand-side effects helps inform policy and predict the expected impact of a policy change on various groups’ final performance scores. We evaluate such a change in policy, taking advantage of a quasi-exogenous shock to this firm’s performance appraisal process normally employed (we refer to this as “standard years”). In 2016 (the “non-standard year”), without the employees’ or managers’ prior knowledge, the firm experienced a time crunch due to factors unrelated to the process at hand and was unable to share self-

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<sup>1</sup> In particular, in ambiguous situations, experts ranging from real estate agents to legal professionals have been shown to be influenced by (often irrelevant) information provided to them—an “anchor”—before they made an expert judgment (Tversky and Kahneman 1974, for a review, Furnham and Boo 2011). Anchoring effects have also been found in hypothetical performance assessments in the laboratory where subjects were informed of another person’s self-assessment (Shore, Adams and Tashchian 1998; Klimoski and Inks 1990) or an example rating before evaluating the other person’s performance (Thorsteinson et al., 2008).

evaluations with managers before they appraised their employees. We take as evidence for demand-side driven gender and race effects if they persist even in the non-standard year 2016 when managers could not be directly anchored by the supply-side. In contrast, we would expect that any supply-side driven differences disappear in the non-standard year. Thus, we expect the 2016 quasi-exogenous shock to most strongly affect the final performance scores of employees most impacted by their self-ratings.

Our results can be summarized as follows. We find persistent race and intersectionality effects in final performance scores in standard years: employees of color were evaluated more negatively than White employees, and the race gap is more pronounced for women than for men.<sup>2</sup> Both the supply- and the demand-side contributed to these outcomes. While women, and even more so, women of color, started out by giving themselves lower self-ratings,<sup>3</sup> managers changed this gender dynamic and added a race effect: they lowered all female and all White employees' ratings less than those of their respective counterparts.<sup>4</sup> The managers' actions

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<sup>2</sup> Earlier research, in particular in sociology and psychology, has documented consistent race differences in performance evaluations with employees of color being evaluated less favorably than White employees (e.g., Roth et al. 2003; McKay and McDaniel 2006 for meta-analyses). The evidence is more mixed for gender. A meta-analysis of the impact of gender on performance appraisals found a small gender gap in performance evaluations favoring men but large variations across studies with men, women or neither being evaluated more favorably (Joshi et al. 2015). See also DeNishi and Murphy (2017) for a review.

<sup>3</sup> The literature suggests consistent supply-side effects in domains that might affect self-assessments in performance appraisals for gender. Women tend to be less self-confident (Barber and Odean 2001), less willing to take risk (Croson and Gneezy 2009, Buser, Niederle, and Oosterbeek 2014), less likely to negotiate (Babcock and Laschever 2003), less likely to compete (Niederle and Vesterlund 2007), less likely to self-promote or ask for a promotion (Bosquet et al. 2019; Exley and Kessler 2019; Hospido et al. 2019) and more affected by self-stereotyping than men (Coffman 2014). Many of these behavioral patterns have been described as responses to environments that punish women for counter-stereotypical behaviors, often referred to as "social backlash" (Bowles et al. 2007). There is no similar stream of evidence describing the presence of such supply-side driven differences for race although Phelan and Rudman (2010) provide some evidence that Black people reduce their public self-appraisal when they perform particular well on a task, in anticipation of potential social backlash.

<sup>4</sup> Demand-side driven effects are well documented. Evaluators might assess people's performance differently due to taste-based or statistical discrimination based on accurate or biased beliefs about performance differences across groups (Arrow 1973, Phelps 1972; Bohren et al. 2019; Coffman, Exley & Niederle, 2021). Race-based discrimination has been extensively documented in the labor market and in many other domains (e.g.,

benefitted White female employees most: despite their lower self-evaluations, they ended up with the highest final performance scores. Managers' actions hurt male employees of color most: despite their higher self-evaluations, they ended up in the group with the lowest final performance scores. Based on managers' actions summarized thus far, one might have expected women of color to be rated more positively than their male counterparts; however, in reality, they ended up with equally low final ratings as men of color because—in addition to the demand-side induced beneficial gender and harmful race effects—they were hurt by having given themselves the lowest self-ratings.

Given that gender and race dynamics were heavily driven by the demand side in standard years, we expect the 2016 quasi-exogenous shock—the “non-standard” year—to have little impact overall, with one exception: it might make the supply-side induced gender gaps, most pronounced for people of color, irrelevant. In the non-standard year, all employees' average performance scores were lower, suggesting that some “de-anchoring” from self-ratings took place, but overall gender and race dynamics remained mostly the same. In addition to the gaps in final scores being heavily driven by demand-side effects, it was at least in theory possible that managers could have accessed previous years' ratings in all years, including in 2016. While we

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Bertrand and Mullainathan 2004; Pager and Pedulla 2015; Quilian et al. 2017; Arnold et al. 2020). In sports, for example, the referees' racial bias affected the likelihood that personal fouls were called in basketball and how pitches were evaluated in baseball (Price and Wolfers 2010; Parsons et al. 2011). Pitchers adjusted to these incentives in the United States, as did minority cashiers in grocery stores with biased managers in France (Glover et al. 2017). Gender-based discrimination has also been studied widely. For example, Goldin and Rouse (2000) showed that female musicians were discriminated against in orchestra auditions when evaluators knew their gender, Moss-Racusin et al. (2012) that science faculty evaluated male applicants for a lab manager positions more highly than otherwise identical female applicants, Bohnet et al. (2016) that high-performing women and men were overlooked for counter-stereotypical tasks when evaluated separately, and Quadlin (2018) that employers used gendered standards for job applicants looking for competence in men and likability in women. For a review, see Bertrand and Duflo (2017).

have no data on how many managers in fact consulted prior ratings, we find some evidence that they might have in particular done so in 2016: the “shadow of the past”—i.e. their own past evaluation of the employee—was correlated more with their current year’s rating of the employee in the non-standard year than in standard years.

In order to rule out the impact of previous years’ ratings, we take a closer look at employees during their first year of employment in the firm, the “newcomers,” for whom there are no past evaluations. Comparable to our complete sample, most manager ratings assigned to newcomers were lower in the non-standard than in the standard year—with one exception: women of color. Without the self-ratings present as anchors, women of color were evaluated more positively than men of color. The latter group was hurt most by employers neither having their high self-evaluations nor the higher ratings from previous years available and ended up with worse manager ratings than any other group.

While our analysis first focuses on the global gender and race dynamics, race data is missing for many countries. To examine race effects more thoroughly, we focus on the United States where race data is fully available at a relatively granular level. Indeed, a heterogeneity analysis suggests that our race findings are heavily driven by the US: the difference between manager and self-ratings was larger for all employee groups of color—including Asian, Black, Latinx and others—than for the White employee group, suggesting persistent demand-side effects in standard years. The pattern does not change in the non-standard year. Not sharing self-evaluations, a supply-side intervention, had no impact in the US, as differences in final performance scores were heavily driven by demand-side effects. We employ counterfactual simulations to study the magnitude of these effects in the US. By bootstrapping the US data, we identify how many employees of color would have to receive a higher manager rating for the gap

between White employees and Asian, Black and Latinx employees to close. We estimate that between 22% and 28% of Black employees would have to receive a boost in manager ratings for the race gap to close, while fewer than 10-12% of Asian, Latinx and other employees would need to see their manager rating increase.

Our paper contributes to the literature on performance management by evaluating a quasi-exogenous shock that could have affected gender and race gaps in performance appraisals. We suggest that differentiating between supply-side and demand-side driven gaps can help inform the expected effectiveness of a given process and thus, ultimately, policy design. The design in question—whether or not self-evaluations were shared with managers before they made their minds up—had little effect in this firm as the most persistent gap—i.e. the race gap—in final performance scores was heavily driven by managers, the demand side, and very little by employees themselves, the supply side. Disrupting the potential impact of the supply-side did, however, matter overall, lowering all employees' final scores. The correlation between employees' and managers' ratings was not only due to intrinsic agreement but, at least to some degree, managers were anchored by their employees' self-ratings.

In addition, our paper contributes to a growing literature on gender and race dynamics in the labor market. In contrast to most of the work thus far focusing on job applications, recruitment and hiring, we take a closer look at processes taking place within the firm that have been linked to career advancement and pay - performance appraisals. The persistent gaps in performance appraisals between White people and people of color, in particular Black people in the US, might contribute to the low representation of Black employees in positions of leadership: in 2020, 0.6 percent of Fortune 500 CEOs were Black (and 1.8 percent Latinx and 7.0 percent Asian) and about 7.6 percent of the CEOs were women (Benveniste 2020; Davis 2020; Garcia

2020). Our results also suggest better understanding intersectionality effects between gender and race is warranted (Beal 1969; Rosette and Livingston 2012; Crenshaw 2017).

The remainder of our paper is organized as follows. We first provide some context about the field site of our study. Then, we present the results for all countries, followed by a closer look at the United States, and then conclude with a discussion.

## II. FIELD CONTEXT

### *II.A. Firm context and sample*

We study the performance data of a global financial services company over four years, from 2015-2018. The firm is headquartered in the United States and has offices in over 20 countries worldwide. Over this time period 60% of the employees identified as male, 42.9% as White, 31.6% as a person of color and 25.5% did not disclose their race<sup>5</sup> (Table I).

Insert Table I

### *II.B. The performance appraisal system*

In this firm, performance is evaluated on a categorical scale with five choices, from “needing improvement” (which we code as “1” in our data) to “significantly outperforming” (coded as “5”).<sup>6</sup> In assigning ratings to their employees, managers were encouraged to distribute

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<sup>5</sup> Disclosure rates of race varied substantially by region, varying from more than 97% disclosed in the Americas to 59% disclosed in EMEA (Europe-Middle East-Africa) to 45% disclosed in APAC (Asia-Pacific), reflecting variations in legal requirements or cultural norms related to identification by and the disclosure of race.

<sup>6</sup> The guidance provided to managers gives an overview of what is expected for each category. The highest rating is reserved for employees who significantly exceed high expectations and set new standards for the firm. The next highest rating is reserved for employees who have exceeded expectations and outperformed their peers, while

the ratings such that only 5% of employees received the highest (5) and lowest (1) scores each. Managers were set targets of about 25% of employees receiving a score of 4, 45% receiving a score of 3, and 20% receiving a score of 2. Figure I shows that, in aggregate, managers generally produced a distribution of ratings that fit this pattern (blue bars). In contrast, on average, employees (red bars) were more optimistic about their own performance than their managers.

Insert Figure I

### *II.C. Standard years and non-standard year*

In most years, the “standard years,” employees submitted their self-ratings before managers evaluated their employees. We include data for three of those years, 2015, 2017 and 2018 during which the performance evaluation process stayed the same. While all other aspects of the process remained the same, in 2016, which we refer to as the “non-standard year”, the firm was unable to share employees’ self-evaluations with managers beforehand. In our interviews with the firm, managers referred to a time crunch due to other factors, not allowing them to follow standard procedure, and assured us that this was not an intentional move. We examine performance scores by employees and managers during and before/after this quasi-shock over the four years where the other features of the process remained unchanged, from 2015-2018.

## **III. RESULTS: ALL COUNTRIES**

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the middle rating is for employees who meet or occasionally exceed expectations. The bottom two ratings are for employees who meet most but not all expectations, or fail to meet those expectations and are unlikely to improve.

We start by examining our complete data set for all countries, employing binary definitions of gender and race. We discuss our data by first focusing on “standard years” where self-evaluations were shared with managers before they assessed the employees and then turning to the “non-standard year” where they were not.

### *III.A. Standard Years*

In Table II, we present summary statistics of self-ratings and manager ratings, split by employees’ gender and race and their interaction for all countries across the standard years, 2015, 2017 and 2018.

Insert Table II

Table III examines manager ratings by demographic group in standard years. In order to introduce the notion and regression structure for the remainder of the paper, Columns 1 and 2 show the estimates for the following simple ordinary least squares (OLS) models, respectively:

$$m_{ijlgt} = \beta_0 + \beta_1 f_i + \varepsilon_j \quad (1)$$

$$m_{ijlgt} = \beta_0 + \beta_1 r_i + \varepsilon_j \quad (2)$$

The dependent variable,  $m_{ijlgt}$ , is an ordinal rating of employee  $i$  by manager  $j$  in job level  $l$  in geographic region  $g$  in year  $t$ . The manager rating ranges from 1 to 5, where a higher number indicates the manager’s impression of a better performance of the employee. The dummy variables,  $f_i$  and  $r_i$ , indicate the gender and race of employee  $i$ , respectively:  $f_i$  is 1 if the employee is female and 0 otherwise, and  $r_i$  is 1 if the employee is a person of color (i.e. any self-selected category other than “White”) and 0 otherwise. There are five job-levels ( $l$ ):

administrative assistant, junior level, middle management, junior senior management and senior management. There are three geographic regions ( $g$ ): the Americas, APAC (Asia-Pacific), and EMEA (Europe, Middle East, Africa). Robust standard errors ( $\varepsilon_j$ ) are clustered at the manager level.

When only examining gender or race, respectively, we see that female employees received significantly lower ratings than male employees (Table III, Column 1) and employees of color received significantly lower ratings than White employees (Column 2). However, once we account for gender and race together, the gender gap disappears while the magnitude of the race gap remains relatively unchanged (Column 3). In Column 4, we include interaction effects (i.e., being a woman of color): while the gender gap remains not significant for White women, a significant interaction emerges: the race gap is even larger for women than for men.

To ensure robustness of these findings, we add several fixed effects. Manager ( $\theta_j$ ), geographic region ( $\theta_g$ ), job level ( $\theta_l$ ) and year ( $\theta_t$ ) fixed effects are included, as rating standards may differ by individual managers, across geographic regions, between job levels and across years. Equation (3) presents the full model:

$$m_{ijlgt} = \beta_0 + \beta_1 f_i + \beta_2 r_i + \beta_3 f_i r_i + \theta_j + \theta_g + \theta_l + \theta_t + \varepsilon_j \quad (3)$$

Table III presents several fixed-effects estimates in Columns 5-8. Once we control for iteratively more variables, including manager fixed effects (Column 5), regional fixed effects (Column 6), job-level fixed effects (Column 7) and year fixed effects (Column 8), the gender gap among White employees reverses with White women being evaluated more favorably than White men. The gender-race interaction remains significant across specifications: the race gap is larger for female than for male employees. Across the fixed-effects models, all effect sizes remain relatively similar.

Table A.1 in the Appendix replicates our analysis interacting employee demographics with manager demographics, finding consistent race effects independent of the manager's race and some nuances in the gender dynamics with female managers assigning lower ratings than male managers, in particular to male employees.

Insert Table III

Manager ratings may be related to supply-side and/or to demand-side factors. We first focus on the supply-side and examine the relationship between gender and race and employees' self-ratings in Table IV repeating the same analyses as above with self-ratings on the left-hand side of the regression.

Female employees gave themselves significantly lower ratings than male employees (Column 1) as did employees of color compared with their White counterparts (Column 2). When we account for gender and race simultaneously, we see the same pattern (Column 3); however, once we control for the interaction between gender and race, we find that the apparent race gap in self-ratings was driven entirely by women of color (Column 4). There is no significant difference in self-ratings between White men and men of color. These findings remain relatively constant, once managerial, regional, job-level and year fixed effects are accounted for (Columns 5-8).

Insert Table IV

To isolate demand-driven gender and race differences in manager scores, we control for self-ratings. Table V shows that manager ratings are consistently correlated with self-ratings. However, gender and race effects remain important, suggesting significant demand-side effects on manager ratings. Controlling for self-ratings, managers lowered female employees' ratings less (Column 1) and employees of color's ratings more than those of their respective counterparts (Column 2). This pattern holds when controlling for both gender and race (Column 3), the interaction of gender and race (Column 4), and managerial, regional, job-level and year fixed effects (Columns 5-8).<sup>7</sup>

Insert Table V

Figure II illustrates these relationships graphically, plotting the marginal effects of gender and race, controlling for all fixed-effects in Column 8 in Table III (self-ratings) and Table IV (manager ratings). Average self-ratings are depicted in red triangles and average manager ratings in blue circles. Figure II shows that managers lowered all employees' ratings compared to their self-ratings. They lowered female employees' ratings less than male employees' ratings and employees of color's ratings more than White employees' ratings, thus, reversing the supply-side induced gender gap in final ratings for White employees and closing it for employees of color.

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<sup>7</sup> Tables A.2 to A.4 in the Appendix take a closer look at heterogeneity and replicate the analyses in Table V for various sub-groups. Table A.2 suggests that the demand-side driven race gap was mostly due White managers, and Table A.3 that the gender and race dynamics were heavily driven by junior employees, our biggest sub-group. Table A.4 suggests that the race dynamics were most pronounced in the Americas, a topic we will explore in more detail below.

Managers also introduced a race gap for all, with all employees of color ending up with lower scores than their White counterparts.

Insert Figure II

### *III.B. The Non-standard Year*

In 2016, the firm experienced a quasi-exogenous shock, whereby managers had to provide their ratings before having the opportunity to view employees' self-ratings. While not an experiment, balancing tests of our samples in the two time periods of interest (Table A.5 in the Appendix) do not suggest dramatic differences in the composition of employees in standard years as compared to the non-standard year, giving us some confidence that the company did not experience any other relevant exogenous shocks that could explain our findings. Specifically, self-ratings in the standard and the non-standard years did not differ on average, suggesting that employees were indeed unaware of the change and also did not change their own behavior in other unexpected ways (even if doing so would not actually have been observed by their manager before they made up their minds). Nonetheless, as it was not a randomized controlled trial, general time trends or unobserved characteristics might still affect our results.

In Table VI, we examine whether manager ratings differed in the non-standard year. As managers did not have self-evaluations available in 2016, we do not include self-ratings. Column 1 confirms that managers assigned lower ratings to employees in the non-standard than in standard years. The non-standard year did not have differential gender or race effects, independent of the controls we add (Columns 2-6), suggesting consistent demand-side effects. Even when managers did not have employee self-evaluations available in 2016, they assigned

higher ratings to White female employees than White male employees, and lower ratings to all employees of color, with the race gap being most pronounced for women.

Insert Table VI

Figure III illustrates estimated manager and self-ratings for standard and non-standard years graphically, controlling for the fixed effects in Column 6 of Table VI. Self-ratings are depicted in red triangles and manager ratings in blue circles, showing that managers assigned lower ratings across all groups in the non-standard year where self-ratings were not available to them. Otherwise, the gender and race dynamics in the non-standard year are very similar to the standard years, leaving White women with higher final scores than White men and all employees of color being evaluated more negatively than White employees.

Insert Figure III

Given that managers' ratings were significantly lower in the non-standard year, we conjecture that self-ratings might have had some influence on managers' ratings in standard years. To investigate this further, we control for self-ratings in Table VII (even though managers in 2016 could not "see" self-ratings, their own ratings might still correlate with the employee's self-rating) and take into account that most managers and employees have a history (including of self-ratings in previous years potentially having influenced manager ratings in previous years). While our data does not allow us to make causal inferences due to this inherent endogeneity over time, we expect manager ratings to be less correlated with employee self-ratings and more

correlated with their own manager rating from the previous year in the non-standard than in the standard years. Residual correlations between self-ratings and manager ratings in the non-standard year may be due to intrinsic agreement between the employee and the manager. It cannot, however, be a result of this year's self-rating influencing the manager rating.

The raw correlation coefficients between manager and self-ratings are  $r_s = 0.46$  in standard years and  $r_{ns} = 0.41$  in the non-standard year. In contrast, manager ratings appear less correlated with their previous year's own rating in standard years ( $r_s = 0.38$ ) than in the non-standard year ( $r_{ns} = 0.43$ ). Table VII examines these relationships more precisely.

#### Insert Table VII

Table VII shows that manager ratings are correlated with self-ratings (Column 1) but, as shown by the negative interaction between the non-standard year and self-rating, that relationship is less pronounced in the non-standard than in standard years (Column 2). Manager ratings are also correlated with last year's manager ratings (Column 3) but that relationship—as shown by the positive interaction of non-standard year and lagged manager rating—is more pronounced in the non-standard than in standard years (Column 4). These dynamics hold when considered simultaneously (Column 5). While managers indeed seemed to rely more on past ratings in the year where self-evaluations were not available to them, the overall pattern of performance ratings by gender and race did not change (across Columns 1-5): holding self-ratings constant, managers assigned women higher and people of color lower ratings than their relevant counterparts in all years.

Overall, these results suggest that manager ratings were heavily influenced by demand-side factors and history. Not having access to employees' self-evaluations in one year did not change their evaluations of their employees in fundamental ways. That said, not being directly anchored by employee self-evaluations seems to have led managers to assign somewhat lower ratings in the non-standard year overall but this "de-anchoring" did not have differential gender or race effects for most employees. Given that managers more heavily relied on the previous year's ratings in the non-standard year, that year's ratings were also affected by the "shadow of the past."

In addition to demand-side effects, our data further suggest that managers were also influenced by supply-side factors during standard years: Manager ratings were more closely related to employees' self-ratings in years where the latter were available to them, which may have contributed to higher manager ratings. Still, manager ratings and self-ratings were related in all years, whether the latter were known to managers or not, suggesting either intrinsic agreement on how an employee should be rated or on a convergence of views over time.

To examine the potential impact of the non-standard year on performance ratings without the "shadow of the past," we take a closer look at employees' ratings during their first year of employment in the company, the "newcomers." Specifically, we conduct subgroup analyses on newcomers for the standard year and the non-standard year (Table A.6 in the Appendix). While we find a persistent race gap for all newcomers in standard years, the race gap disappears for women in the non-standard year. Only men of color but not women of color were rated more negatively than their respective White counterparts when managers did not have self-evaluations available. As in standard years, men of color were harmed by both demand-side induced race and gender effects, while women of color were harmed by the race effect but benefitted from the

gender dynamics. In contrast to standard years, the additional disadvantage women of color experienced due to their lower self-evaluations was removed by the supply-side policy intervention.

While directionally consistent, we do not have sufficient power to statistically document this effect for women of color among newcomers in a fully-specified triple interaction (the coefficient on female x people of color x non-standard year is positive but n.s. with  $p=0.14$ ). We thus take the newcomer results only as suggestive evidence that managers might assign higher ratings to women of color when not anchored by their self-evaluations. Figure IV illustrates the effects for newcomers graphically.

Insert Figure IV

#### **IV. RESULTS: UNITED STATES**

Our analysis so far has included the entire dataset across all countries and years. Our global results suggest persistent supply-side effects for gender and demand-side effects for race. However, race requires further attention for at least two reasons. First, employing a binary definition of race—while necessary in a global context where race categories are not the same across countries—is not satisfactory, and second, race data is incomplete in most countries in our dataset. The reasons for why race data is missing in some countries vary, including differences in legal requirements or, conversely, restrictions to collect race data from employees, as well as cultural norms where people are not used to defining themselves based on race or prefer not disclosing race, potentially introducing selection effects. The only country in our dataset with almost perfectly complete data on race is the United States. In addition to having an unbiased

sample available in the US, we can also analyze various race categories separately, moving beyond a binary definition of race.

In Table VIII, we show how our main findings break down when looking at the US and other countries separately. While many dynamics seem to apply across geographies—with female employees being “lifted up” by managers even though they evaluated themselves more harshly than male employees—the demand-side driven race dynamics appear much more pronounced in the US, especially when looking at final manager ratings. We now dissect the US effects further and also run counter-factual simulations to better understand the resulting effect sizes.

Insert Table VIII

#### *IV.A. Standard Years in the US*

Table IX presents average self- and manager-ratings for the five racial groups we can distinguish in the US, Asian, Black, Latinx, Other and White Americans. Asian, Black and Latinx employees appear to give themselves lower self-ratings and receive lower manager ratings than White employees in standard years, 2015, 2017 and 2018. (Table A.7 shows average ratings for all possible gender and race combinations.)

Insert Table IX

Table X examines manager ratings by demographic group in standard years accounting for manager, job-level, and year fixed effects. While all employees of color received lower

ratings than their White counterparts, the effect is most pronounced for Black employees who received the most negative ratings independent of our specification.

Insert Table X

Turning to the supply-side, in Table XI, we examine the relationship between gender and the various race categories and employees' self-ratings, repeating the analyses conducted for manager ratings. Women, and in particular, Asian American women, and Black employees gave themselves lower ratings.

Insert Table XI

As we did in the global analysis, to isolate demand-side driven differences in manager ratings, we next control for self-ratings. Table XII shows that managers ratings are consistently correlated with self-ratings. However, gender and race dynamics remain important. Controlling for self-ratings, managers assigned female employees higher ratings and all employee groups of color lower ratings, independent of our specification.

Insert Table XII

As the persistent race effects in the US were mostly driven by the demand-side, not sharing self-evaluations did not have any impact in the US, including for newcomers (analysis not shown).

#### *IV.B. Race Simulations for the US*

To better illustrate the magnitude of the effect sizes we observe for race in the United States, we conduct a number of counterfactual simulations. We run bootstrapped simulations, drawing from the original data, with the goal of identifying how many employees of color would have to receive a more positive manager rating for us to no longer observe differences between demographic subgroups. These simulations enable us to study the magnitude of the observed effects, which is useful for policy and decision-makers. We only draw from observations in standard years where self-ratings were observable to managers.

We estimate a model that includes dummy variables for gender, all racial categories and a number of fixed effects:

$$m_{ijlgt} = \beta_0 + \beta_1 f_i + \beta_2 r_{A,i} + \beta_3 r_{B,i} + \beta_4 r_{L,i} + \beta_4 r_{O,i} + \theta_j + \theta_g + \theta_l + \theta_t + \varepsilon_j \quad (4)$$

where  $r_{A,i}$  is 1 if the employee is Asian;  $r_{B,i}$  is 1 if the employee is Black;  $r_{L,i}$  is 1 if the employee is Latinx;  $r_{O,i}$  is 1 if the employee is in the “Other” category; all other variables are as defined above for Eqs. (1-3). We chose not to include the interaction terms between gender and racial categories because the policy-relevant counterfactual does not require intersectionality: as Table IX shows, men and women of color (including Asian, Black, Latinx and “Other” employees) are experiencing lower manager ratings than White employees regardless of their gender. As such, we explore how many employees of each racial category—regardless of their gender—would

need to experience a higher rating, so that the average rating of that group is indistinguishable from White employees.

In the first set of simulations, we increase the manager rating of a randomly selected subset of Black employees. We focus on Black employees because the race gap in manager ratings is most pronounced for them (see Table X). We conduct 100 iterations for each fraction of the subset: in each iteration, we draw a subset of Black employees without replacement, increasing the manager rating by one unit (unless the employees had already received the highest manager rating<sup>8</sup>), estimate Eq. (4) and save the regression coefficients and standard errors associated with  $r_{B,i}$ . After all iterations, we calculate the mean coefficient  $\hat{\beta}_3$ , the mean standard error, as well as the associated t-statistic and  $p$ -value. This process is repeated for differently sized fractions of Black employees to identify above which threshold there exists no difference in ratings between White employees and Black employees.

### Insert Table XIII

Table XIII shows that approximately 22% of Black employees in the United States would need to experience a higher manager rating than they currently receive, in order for there to be no significant difference between the managers' ratings of White employees and Black employees ( $p > 0.5$ ). Furthermore, beyond non-significance, we also explore at what point the coefficient is

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<sup>8</sup> For a small fraction of employees of color (who have the highest manager rating prior to the simulation change) the manager rating will not be altered, although they are technically "treated". Excluding employees with a rating of 5 from this procedure does not affect our results or the conclusions we can draw (results not shown).

closely estimated at 0 (i.e. virtually no difference between the two groups), which would require a subset of at least 28% of Black employees to be affected by higher manager ratings.

In additional simulations, we repeat the same process with Asian, Latinx and employees who self-selected into the “Other” racial category. In the Appendix, Tables A.8–A.10 show that 4-7% Asian, 4-11% Latinx and 3-12% “Other” employees would need to experience an increase in their manager rating for there to be no difference to White employees.

## V. DISCUSSION AND CONCLUSION

We examine gender and race dynamics in performance appraisals in a multi-national financial services firm headquartered in the United States. Gender or race differences in final performance scores may be due to supply-side effects with employees with certain demographic characteristics giving themselves different self-evaluations, demand-side effects with managers assigning different scores to employees with certain demographic characteristics and their interplay. As in most performance appraisal systems, employee self-evaluations are shared with managers before managers assign performance ratings, which may lead to anchoring.

Differentiating between supply- and demand-side effects helps inform policy design in case a firm wishes to address observed differences in final performance scores. Performance reviews appear prone to allegations of bias, and some fear that remote work, prevalent for many during the Covid-19 pandemic, might have exacerbated bias in talent reviews (Mackenzie et al. 2019; Lanik 2020). News reports suggest that some companies have taken action. For example, Amazon announced in April 2021 that it would “inspect any statistically significant demographic differences in Q1 2021 performance ratings ... to identify root causes and, as necessary,

implement action plans” (Galetti 2021) Clearly, different interventions are called for depending on the causes of the observed differences.

In the firm we examined here, a particularly striking demographic pattern emerging from the data is a demand-side driven race gap in final performance scores. Managers introduced a race gap not present in self-evaluations, with the manager-employee gap in ratings being largest for people of color, in particular in the US where about a quarter of Black employees would have to receive better scores for the race gap to be closed. The race gaps are significant but smaller for Latinx and Asian employees in the US. In contrast, self-evaluations were mostly shaped by gender: women (in particular, women of color) gave themselves lower self-ratings than their male counterparts but, perhaps just as strikingly, managers reversed the gender gap in final performance scores for Whites and closed it for employees of color.

As the race gap and the changes in the gender gaps in final performance scores were mostly driven by the demand side, a quasi-exogenous shock to this firm’s appraisal process disrupting anchoring did not have much impact on the race and gender dynamics. However, when managers did not have access to self-evaluations in one year, everyone’s ratings were lowered on average, suggesting some “de-anchoring” took place. Preliminary evidence suggests that the one group that appears to have benefited from the process change was women of color in their first year: when managers were neither anchored by these employees’ lower self-evaluations (nor by their previous year’s lower evaluations as those did not exist for newcomers), women of color ended up with performance scores that were slightly higher than those of their male counterparts and on par with those of other employees.

Subjective performance appraisals similar to the ones analyzed in this firm are common in most firms as objective performance data is rarely available for complex jobs. While neither

the firm nor we can assess to what degree differences in final performance ratings are due to true underlying differences in performance or to self- or manager bias, systematic differences based on demographic characteristics are of concern as these performance scores are typically used to inform compensation and promotion decisions and thus could induce systemic inequities.

Our paper contributes to the on-going debate about how such inequities could be addressed, suggesting that differentiating between supply- and demand-side driven differences in final outcomes could be useful in informing policy. If the supply-side was heavily affected by demographic characteristics, e.g., through self-stereotyping or expectations of social backlash, and then anchored the demand side, interventions aimed at employees or at disabling anchoring would be particularly fruitful; if alternatively, the demand side was mostly responsible for the gender and race differences in final performance scores, then interventions focused on managers would be called for.

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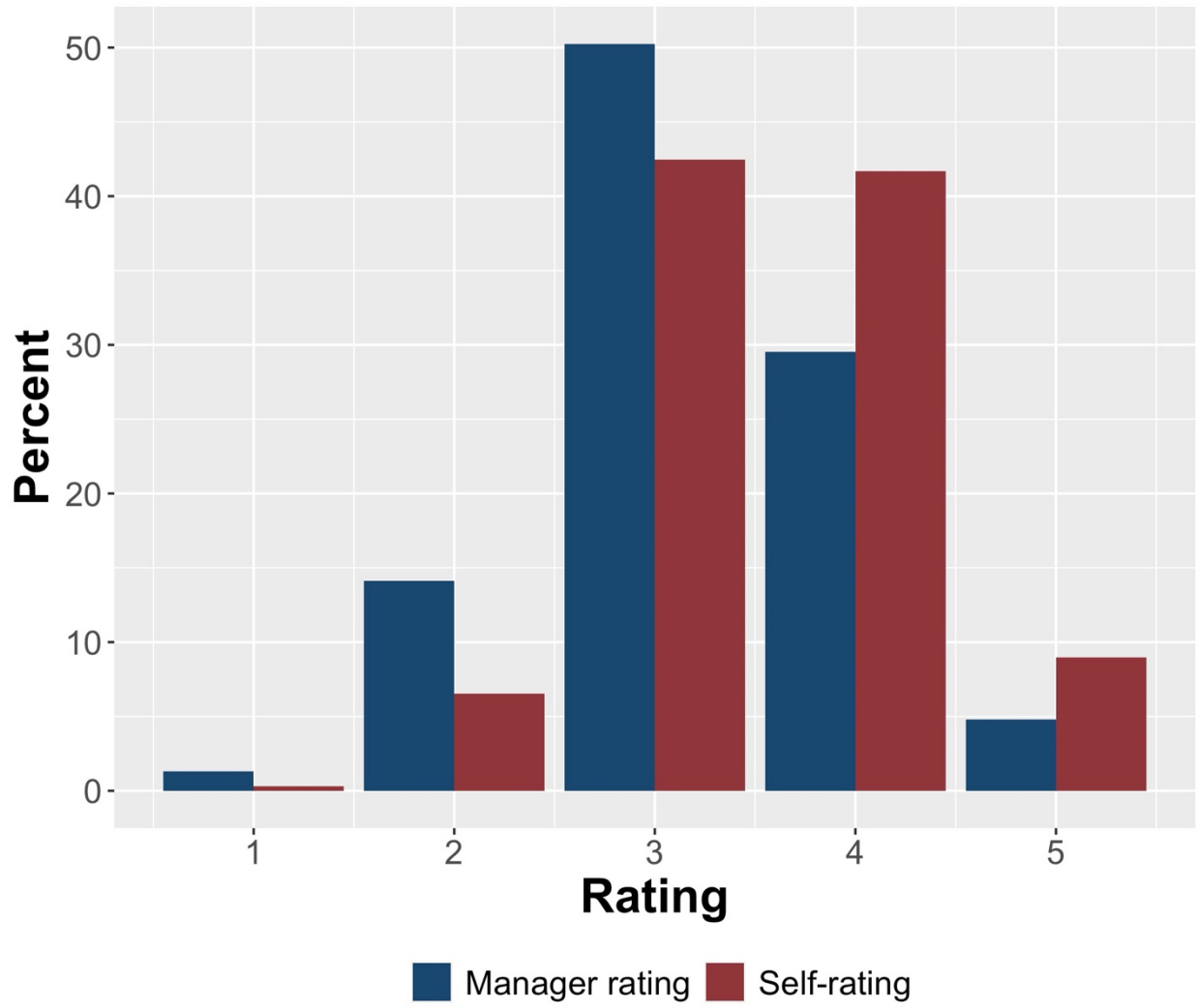


FIGURE I.

DISTRIBUTION OF RATINGS IN STANDARD YEARS



FIGURE II.

ESTIMATED SELF-RATINGS AND MANAGER RATINGS BY RACE AND GENDER

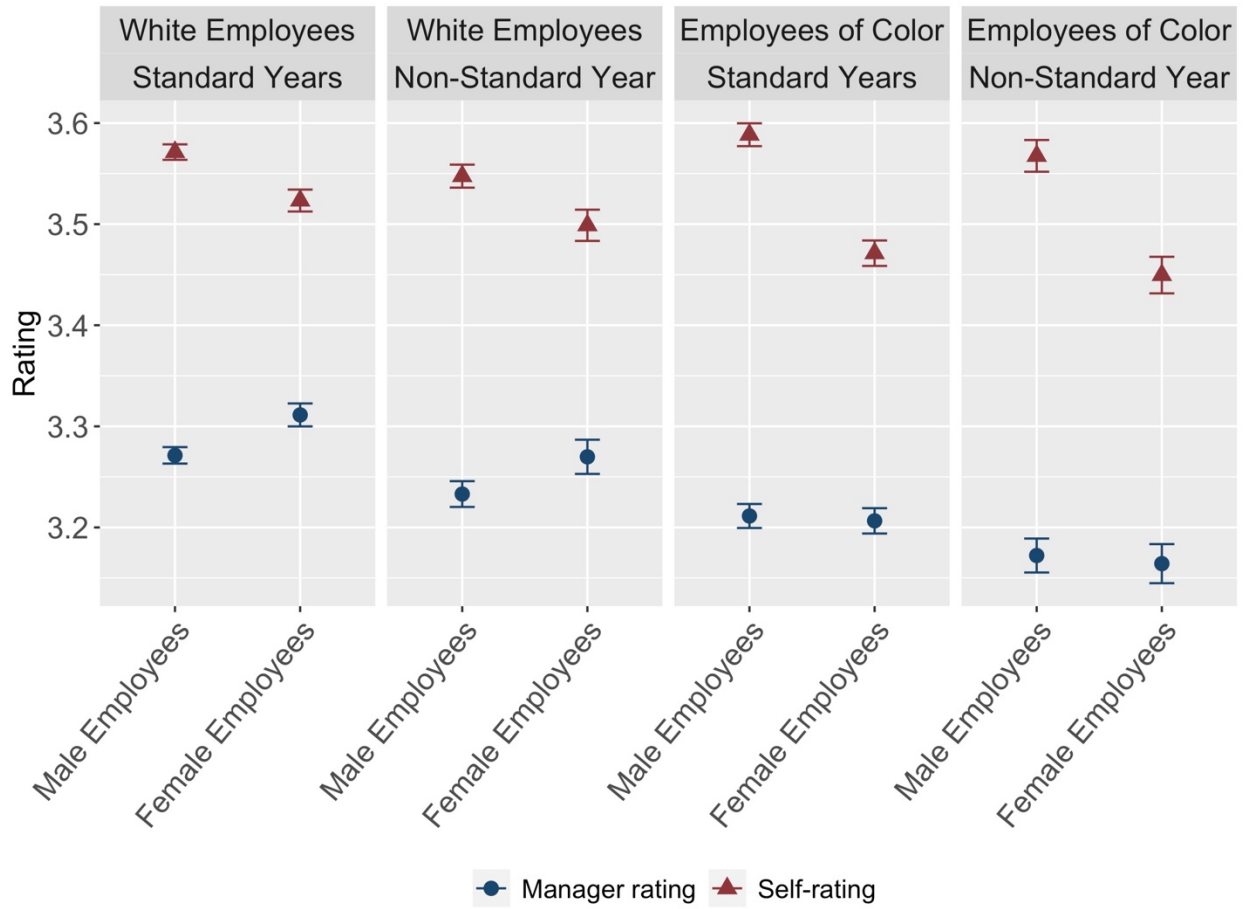


FIGURE III.

ESTIMATED MANAGER AND SELF-RATINGS IN STANDARD AND NON-STANDARD YEARS, BY GENDER AND RACE



FIGURE IV.

NEWCOMERS: ESTIMATED MANAGER AND SELF-RATINGS IN STANDARD AND NON-STANDARD YEARS, BY GENDER AND RACE

TABLE I

UNIQUE EMPLOYEE DATA: DISTRIBUTION BY GENDER AND RACE IN ALL COUNTRIES (IN %)

	<i>Male</i>	<i>Female</i>
<i>All Employees</i>	59.8%	40.2%
<i>White Employees</i>	45.3%	39.4%
<i>Employees of Color</i>	29.4%	34.8%
<i>Global: Did not disclose race</i>	25.3%	25.8%
	100%	100%
<i>US: White</i>	32.9%	52.7%
<i>US: Black</i>	21.4%	6.1%
<i>US: Latinx</i>	18.4%	5.4%
<i>US: Asian</i>	24.3%	29.0%
<i>US: Other races</i>	1.4%	3.1%
<i>US: Did not disclose race</i>	1.4%	3.8%
	100%	100%

*Notes.* This table is a cumulative summary of unique employee demographics across all four years (only including employees with non-missing manager ratings and self-ratings, which corresponds to 96% of the sample).

TABLE II

AVERAGE SELF- AND MANAGER RATINGS BY DEMOGRAPHIC GROUP IN ALL COUNTRIES IN  
STANDARD YEARS

	All	Gender		Race		Gender-Race Interaction			
		Men	Women	Whites	People of color	White Men	White Women	Men of color	Women of color
Self-ratings	3.52 (0.76)	3.58 (0.76)	3.44 (0.75)	3.57 (0.74)	3.51 (0.77)	3.59 (0.75)	3.52 (0.73)	3.57 (0.78)	3.42 (0.76)
Manager ratings	3.22 (0.79)	3.24 (0.80)	3.20 (0.78)	3.28 (0.79)	3.20 (0.79)	3.27 (0.80)	3.30 (0.78)	3.22 (0.80)	3.17 (0.77)
Observations	38,022	23,347	14,674	17,103	11,823	10,976	6,127	6,812	5,010

*Notes.* Self-ratings refer to the self-evaluation that each employee has to fill out and share with their manager before the manager decides on their rating of the employee. The self-ratings row shows the average self-rating by each subgroup with standard deviations in parentheses. The manager ratings row shows the average rating that the corresponding subgroup receives from their managers (regardless of the managers' gender or race). The final row shows the total number of observations for each subgroup. We are missing data on race for 9,096 observations.

TABLE III

## MANAGER RATINGS IN ALL COUNTRIES IN STANDARD YEARS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manager	Manager	Manager	Manager	Manager	Manager	Manager	Manager
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Female	-0.031** (0.009)		-0.009 (0.011)	0.022 (0.014)	0.043** (0.016)	0.043** (0.016)	0.048** (0.016)	0.043** (0.016)
People of Color		-0.082*** (0.011)	-0.082*** (0.011)	-0.053*** (0.014)	-0.052** (0.017)	-0.057*** (0.017)	-0.063*** (0.017)	-0.068*** (0.017)
Female*People of Color				-0.073*** (0.021)	-0.063** (0.024)	-0.060* (0.024)	-0.056* (0.024)	-0.055* (0.024)
Constant	3.235*** (0.007)	3.282*** (0.008)	3.286*** (0.009)	3.275*** (0.010)	3.268*** (0.008)	3.270*** (0.008)	3.269*** (0.008)	3.273*** (0.008)
Manager FE	N	N	N	N	Y	Y	Y	Y
Region FE	N	N	N	N	N	Y	Y	Y
Job-level FE	N	N	N	N	N	Y	Y	Y
Year FE	N	N	N	N	N	N	N	Y
Observations	38,021	28,926	28,925	28,925	27,910	27,910	27,910	27,910
R-squared	0.000	0.003	0.003	0.003	0.216	0.216	0.221	0.225

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE IV

## SUPPLY-SIDE EFFECTS: SELF-RATINGS IN ALL COUNTRIES IN STANDARD YEARS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Self-rating	Self-rating	Self-rating	Self-rating	Self-rating	Self-rating	Self-rating	Self-rating
Female	-0.136*** (0.009)		-0.104*** (0.011)	-0.075*** (0.014)	-0.052*** (0.015)	-0.052*** (0.015)	-0.041** (0.015)	-0.044** (0.015)
People of Color		-0.059*** (0.011)	-0.053*** (0.011)	-0.025 (0.014)	0.017 (0.017)	0.022 (0.017)	0.021 (0.017)	0.019 (0.017)
Female*People of Color				-0.068** (0.021)	-0.072** (0.024)	-0.075** (0.024)	-0.072** (0.024)	-0.071** (0.024)
Constant	3.577*** (0.007)	3.567*** (0.008)	3.604*** (0.008)	3.594*** (0.009)	3.571*** (0.008)	3.569*** (0.008)	3.565*** (0.008)	3.567*** (0.008)
Manager FE	N	N	N	N	Y	Y	Y	Y
Region FE	N	N	N	N	N	Y	Y	Y
Job-level FE	N	N	N	N	N	Y	Y	Y
Year FE	N	N	N	N	N	N	N	Y
Observations	38,021	28,926	28,925	28,925	27,910	27,910	27,910	27,910
R-squared	0.008	0.001	0.006	0.006	0.241	0.242	0.246	0.249

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE V

## DEMAND-SIDE EFFECTS: MANAGER RATINGS CONTROLLING FOR SELF-RATINGS IN ALL

## COUNTRIES IN STANDARD YEARS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manager	Manager	Manager	Manager	Manager	Manager	Manager	Manager
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Female	0.034*** (0.008)		0.040*** (0.010)	0.057*** (0.013)	0.067*** (0.015)	0.067*** (0.015)	0.067*** (0.015)	0.063*** (0.015)
People of Color		-0.055*** (0.010)	-0.057*** (0.010)	-0.041** (0.013)	-0.060*** (0.015)	-0.068*** (0.015)	-0.073*** (0.015)	-0.076*** (0.015)
Female*People of Color				-0.040* (0.019)	-0.029 (0.022)	-0.025 (0.022)	-0.023 (0.022)	-0.021 (0.022)
Self-rating	0.478*** (0.006)	0.471*** (0.007)	0.472*** (0.007)	0.472*** (0.007)	0.470*** (0.007)	0.471*** (0.007)	0.468*** (0.007)	0.466*** (0.007)
Constant	1.526*** (0.021)	1.604*** (0.023)	1.584*** (0.024)	1.579*** (0.024)	1.590*** (0.027)	1.589*** (0.027)	1.602*** (0.027)	1.611*** (0.027)
Manager FE	N	N	N	N	Y	Y	Y	Y
Region FE	N	N	N	N	N	Y	Y	Y
Job-level FE	N	N	N	N	N	Y	Y	Y
Year FE	N	N	N	N	N	N	N	Y
Observations	38,021	28,926	28,925	28,925	27,910	27,910	27,910	27,910
R-squared	0.208	0.204	0.205	0.205	0.368	0.369	0.371	0.373

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE VI.

## MANAGER RATINGS IN ALL COUNTRIES IN STANDARD AND NON-STANDARD YEARS

	(1)	(2)	(3)	(4)	(5)	(6)
	Manager	Manager	Manager	Manager	Manager	Manager
	Rating	Rating	Rating	Rating	Rating	Rating
Female	0.021 (0.014)	0.019 (0.014)	0.021 (0.014)	0.035* (0.015)	0.035* (0.015)	0.040** (0.016)
People of Color	-0.054*** (0.014)	-0.054*** (0.014)	-0.056*** (0.014)	-0.047** (0.017)	-0.052** (0.017)	-0.060*** (0.017)
Female*People of Color	-0.067** (0.020)	-0.067** (0.020)	-0.067** (0.020)	-0.051* (0.023)	-0.049* (0.023)	-0.045* (0.023)
Non-Standard Year	-0.030** (0.009)	-0.033** (0.011)	-0.032** (0.012)	-0.032* (0.013)	-0.031* (0.013)	-0.038** (0.013)
Non-Standard Year*Female		0.008 (0.018)		-0.003 (0.018)	-0.004 (0.018)	-0.003 (0.018)
Non-Standard Year*People of Color			0.005 (0.018)	-0.005 (0.018)	-0.005 (0.018)	-0.001 (0.018)
Constant	3.304*** (0.014)	3.275*** (0.009)	3.275*** (0.009)	3.268*** (0.008)	3.269*** (0.008)	3.271*** (0.008)
Manager FE	N	N	N	Y	Y	Y
Region FE	N	N	N	N	Y	Y
Job-level FE	N	N	N	N	N	Y
Observations	37,813	37,813	37,813	36,952	36,943	36,943
R-squared	0.003	0.003	0.003	0.204	0.204	0.210

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE VII.

MANAGER RATINGS IN ALL COUNTRIES IN STANDARD AND NON-STANDARD YEARS WITH SELF-  
RATINGS AND LAGGED MANAGER RATINGS

VARIABLES	(1) Manager Rating	(2) Manager Rating	(3) Manager Rating	(4) Manager Rating	(5) Manager Rating
Female	0.061*** (0.014)	0.061*** (0.014)	0.042** (0.014)	0.042** (0.014)	0.053*** (0.014)
People of Color	-0.068*** (0.014)	-0.069*** (0.014)	-0.034* (0.016)	-0.034* (0.016)	-0.051*** (0.015)
Female*People of Color	-0.013 (0.020)	-0.013 (0.020)	-0.029 (0.022)	-0.029 (0.022)	-0.003 (0.021)
Self-Ratings	0.459*** (0.007)	0.466*** (0.007)			0.410*** (0.008)
Non-Standard Year	-0.029*** (0.009)	0.072 (0.044)	0.024* (0.010)	-0.201*** (0.045)	-0.003 (0.055)
Non-Standard Year*Self-Rating		-0.029* (0.012)			-0.058*** (0.013)
Lagged Manager Rating			0.320*** (0.006)	0.306*** (0.007)	0.227*** (0.006)
Non-Standard Year*Lagged Manager Rating				0.068*** (0.013)	0.071*** (0.013)
Constant	1.632*** (0.025)	1.609*** (0.026)	2.241*** (0.023)	2.291*** (0.025)	1.081*** (0.032)
Manager FE	Y	Y	Y	Y	Y
Job-level FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Observations	36,943	36,943	28,864	28,864	28,864
R-squared	0.354	0.355	0.311	0.312	0.407

*Notes.* Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE VIII.

## MANAGER AND SELF-RATINGS IN THE UNITED STATES AND OTHER COUNTRIES IN STANDARD

## YEARS

VARIABLES	Other countries			USA		
	(1) Manager Rating	(2) Self- Rating	(3) Manager Rating	(4) Manager Rating	(5) Self- Rating	(6) Manager Rating
Female	0.033 (0.034)	-0.074* (0.031)	0.071* (0.029)	0.043* (0.019)	-0.037* (0.018)	0.060*** (0.018)
People of Color	-0.004 (0.035)	0.055 (0.034)	-0.032 (0.030)	-0.089*** (0.021)	0.001 (0.020)	-0.090*** (0.018)
Female*People of Color	-0.084 (0.046)	-0.096* (0.043)	-0.036 (0.040)	-0.041 (0.030)	-0.055 (0.029)	-0.017 (0.027)
Self-Rating			0.506*** (0.013)			0.448*** (0.009)
Constant	3.248*** (0.019)	3.479*** (0.018)	1.488*** (0.047)	3.279*** (0.009)	3.610*** (0.009)	1.664*** (0.034)
Manager FE	Y	Y	Y	Y	Y	Y
Job-level FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	8,800	8,800	8,800	18,749	18,749	18,749
R-squared	0.284	0.322	0.446	0.226	0.238	0.362

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE IX

AVERAGE SELF- AND MANAGER RATINGS BY DEMOGRAPHIC GROUP IN THE UNITED STATES IN  
STANDARD YEARS

		Gender		Race				
	All employees	Men	Women	White	Black	Latinx	Asian	Other
Self-ratings	3.59 (0.75)	3.62 (0.76)	3.53 (0.74)	3.61 (0.74)	3.41 (0.82)	3.57 (0.78)	3.56 (0.75)	3.61 (0.80)
Manager ratings	3.25 (0.75)	3.25 (0.80)	3.25 (0.78)	3.29 (0.80)	2.99 (0.77)	3.16 (0.78)	3.23 (0.78)	3.19 (0.80)
Observations	19,977	12,321	7,656	12,258	861	849	4,906	491

*Notes.* The self-ratings row shows the average self-rating by each subgroup with standard deviations in parentheses. The manager ratings row shows the average rating that the corresponding subgroup receives from their managers (regardless of the managers' gender or race). The final row shows the total sample size for each subgroup.

TABLE X

## MANAGER RATINGS IN THE UNITED STATES IN STANDARD YEARS

	(1)	(2)	(3)	(4)
	Manager	Manager	Manager	Manager
	Rating	Rating	Rating	Rating
Female	0.001 (0.011)		0.005 (0.011)	0.036 (0.019)
Asian		-0.062*** (0.018)	-0.063*** (0.018)	-0.054* (0.023)
Black		-0.279*** (0.033)	-0.280*** (0.033)	-0.278*** (0.049)
Latinx		-0.097** (0.034)	-0.097** (0.034)	-0.080 (0.048)
Other		-0.120** (0.042)	-0.121** (0.042)	-0.065 (0.055)
Female*Asian				-0.028 (0.033)
Female*Black				-0.011 (0.065)
Female*Latinx				-0.043 (0.067)
Female*Other				-0.135 (0.082)
Constant	3.226*** (0.004)	3.259*** (0.011)	3.257*** (0.012)	3.248*** (0.013)
Manager FE	Y	Y	Y	Y
Job-level FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	37,091	37,091	37,091	37,091
R-squared	0.208	0.210	0.210	0.211

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE XI

## SUPPLY-SIDE EFFECTS: SELF-RATINGS IN THE UNITED STATES IN STANDARD YEARS

VARIABLES	(1) Self-Rating	(2) Self-Rating	(3) Self-Rating	(4) Self-Rating
Female	-0.091*** (0.010)		-0.092*** (0.010)	-0.034 (0.018)
Asian		-0.019 (0.018)	-0.008 (0.018)	0.019 (0.022)
Black		-0.136*** (0.036)	-0.130*** (0.037)	-0.180*** (0.053)
Latinx		0.021 (0.033)	0.023 (0.033)	0.029 (0.045)
Other		0.037 (0.043)	0.042 (0.043)	0.103 (0.057)
Female*Asian				-0.076* (0.031)
Female*Black				0.084 (0.074)
Female*Latinx				-0.023 (0.067)
Female*Other				-0.152 (0.088)
Constant	3.562*** (0.004)	3.571*** (0.011)	3.606*** (0.012)	3.588*** (0.012)
Manager FE	Y	Y	Y	Y
Job-level FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	37,091	37,091	37,091	37,091
R-squared	0.237	0.236	0.238	0.239

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE XII.

## DEMAND-SIDE EFFECTS: MANAGER RATINGS IN THE UNITED STATES CONTROLLING FOR SELF-

## RATINGS IN STANDARD YEARS

VARIABLES	(1) Manager Rating	(2) Manager Rating	(3) Manager Rating	(4) Manager Rating
Female	0.043*** (0.010)		0.048*** (0.010)	0.052** (0.017)
Asian		-0.053*** (0.016)	-0.059*** (0.016)	-0.063** (0.020)
Black		-0.216*** (0.030)	-0.218*** (0.030)	-0.194*** (0.043)
Latinx		-0.107*** (0.031)	-0.108*** (0.031)	-0.094* (0.044)
Other		-0.138*** (0.037)	-0.141*** (0.037)	-0.113* (0.050)
Female*Asian				0.007 (0.031)
Female*Black				-0.050 (0.057)
Female*Latinx				-0.032 (0.061)
Female*Other				-0.063 (0.076)
Self-ratings	0.472*** (0.006)	0.470*** (0.006)	0.472*** (0.006)	0.472*** (0.006)
Constant	1.543*** (0.023)	1.579*** (0.025)	1.556*** (0.026)	1.555*** (0.026)
Manager FE	Y	Y	Y	Y
Job-level FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	37,091	37,091	37,091	37,091
R-squared	0.363	0.365	0.365	0.365

Notes. Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE XIII.

COUNTERFACTUAL SIMULATION VARYING MANAGER RATINGS OF BLACK EMPLOYEES IN THE  
UNITED STATES IN STANDARD YEARS

Fraction of Black employees whose manager rating gets increased	Number of Black employees whose manager rating gets increased	Black employee	
		$\hat{\beta}_3$ (SE)	t-statistic <i>p</i> -value
0.20	172	-0.083 (0.035)	<i>t</i> = -2.314 <i>p</i> = 0.021
0.21	181	-0.072 (0.036)	<i>t</i> = -2.002 <i>p</i> = 0.045
<b>0.22</b>	<b>189</b>	<b>-0.063</b> <b>(0.036)</b>	<b><i>t</i> = -1.779</b> <b><i>p</i> = 0.075</b>
0.23	198	-0.053 (0.036)	<i>t</i> = -1.481 <i>p</i> = 0.139
0.24	207	-0.043 (0.036)	<i>t</i> = -1.190 <i>p</i> = 0.234
0.25	215	-0.034 (0.036)	<i>t</i> = -0.933 <i>p</i> = 0.351
0.26	224	-0.024 (0.036)	<i>t</i> = -0.663 <i>p</i> = 0.507
0.27	232	-0.014 (0.036)	<i>t</i> = -0.392 <i>p</i> = 0.695
<b>0.28</b>	<b>241</b>	<b>-0.004</b> <b>(0.036)</b>	<b><i>t</i> = -0.117</b> <b><i>p</i> = 0.907</b>
0.29	250	0.006 (0.036)	<i>t</i> = 0.180 <i>p</i> = 0.858

**APPENDIX: Supply- and Demand-Side Effects in Performance Appraisals: The Role of  
Gender and Race**

TABLE A.1.

MANAGER RATINGS CONTROLLING FOR MANAGER GENDER AND RACE FOR ALL COUNTRIES IN  
STANDARD YEARS

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating
Female Employee	-0.005 (0.010)		-0.023* (0.011)		-0.004 (0.013)	0.012 (0.011)	-0.004 (0.013)
Female Manager	-0.046*** (0.012)		-0.074*** (0.015)		-0.081*** (0.018)		-0.081*** (0.018)
Female Manager*Female Employee			0.061** (0.021)		0.070** (0.024)		0.070** (0.024)
Employee of Color		-0.074*** (0.012)		-0.074*** (0.015)	-0.079*** (0.012)	-0.075*** (0.015)	-0.077*** (0.015)
Manager of Color		-0.014 (0.010)		-0.014 (0.019)		-0.014 (0.019)	-0.010 (0.019)
Manager of Color*Employee of Color				0.003 (0.025)		0.003 (0.025)	0.001 (0.025)
Constant	3.239*** (0.007)	3.299*** (0.016)	3.245*** (0.007)	3.285*** (0.009)	3.296*** (0.010)	3.281*** (0.010)	3.300*** (0.011)
Manager FE	N	N	N	N	N	N	N
Job-level FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
Observations	37,900	28,925	37,900	28,925	28,839	28,925	28,839
R-squared	0.013	0.012	0.014	0.012	0.014	0.013	0.014

Robust standard errors clustered at the manager level in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

TABLE A.2.

## DEMAND-SIDE EFFECTS BY MANAGER CHARACTERISTICS FOR ALL COUNTRIES IN STANDARD

## YEARS

	Male Manager		Female Manager		White Managers		Managers of Color	
	(1)	(2)	(3)	(4)	(7)	(8)	(5)	(6)
	Manager	Manager	Manager	Manager	Manager	Manager	Manager	Manager
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Female	0.019	0.046*	0.084**	0.090***	0.035	0.061***	0.018	0.013
	(0.020)	(0.018)	(0.029)	(0.026)	(0.018)	(0.016)	(0.040)	(0.037)
People of color	-0.054**	-0.063***	-0.113**	-0.122***	-0.106***	-0.104***	-0.018	-0.041
	(0.019)	(0.017)	(0.038)	(0.034)	(0.021)	(0.019)	(0.034)	(0.031)
Female*People of color	-0.033	-0.002	-0.065	-0.029	-0.016	-0.004	-0.051	0.017
	(0.029)	(0.026)	(0.047)	(0.043)	(0.030)	(0.028)	(0.050)	(0.046)
Self-rating		0.458***		0.486***		0.468***		0.450***
		(0.008)		(0.015)		(0.009)		(0.014)
Constant	3.290***	1.648***	3.227***	1.514***	3.287***	1.605***	3.247***	1.663***
	(0.009)	(0.031)	(0.018)	(0.056)	(0.008)	(0.034)	(0.021)	(0.054)
Manager FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Job-level FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	20,084	20,084	7,742	7,742	18,174	18,174	7,153	7,153
R-squared	0.219	0.366	0.237	0.390	0.214	0.365	0.230	0.369

TABLE A.3.

## DEMAND-SIDE EFFECTS BY JOB LEVEL FOR ALL COUNTRIES IN STANDARD YEARS

	Administrative Assistant		Junior Level		Middle Management		Junior Senior Management		Senior Management	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating
Female	0.295 (0.280)	0.134 (0.278)	0.052 (0.028)	0.093*** (0.025)	0.031 (0.034)	0.052 (0.030)	-0.016 (0.039)	0.005 (0.036)	0.133* (0.058)	0.102 (0.056)
People of color	-0.229 (0.397)	-0.344 (0.391)	-0.143*** (0.028)	-0.129*** (0.025)	-0.016 (0.035)	-0.042 (0.030)	-0.010 (0.045)	-0.024 (0.039)	0.102 (0.064)	0.068 (0.057)
Female*People of color	0.170 (0.414)	0.241 (0.423)	-0.051 (0.039)	-0.030 (0.039)	-0.056 (0.054)	-0.005 (0.049)	0.011 (0.070)	0.007 (0.067)	0.068 (0.122)	-0.058 (0.119)
Self-rating		0.263*** (0.053)		0.448*** (0.012)		0.477*** (0.016)		0.487*** (0.019)		0.469*** (0.026)
Constant	2.983*** (0.269)	2.249*** (0.310)	3.228*** (0.015)	1.643*** (0.043)	3.295*** (0.016)	1.578*** (0.059)	3.351*** (0.015)	1.580*** (0.069)	3.268*** (0.017)	1.616*** (0.092)
Manager FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	722	722	11,458	11,458	6,798	6,798	4,726	4,726	2,164	2,164
R-squared	0.623	0.653	0.310	0.441	0.323	0.456	0.280	0.416	0.243	0.375

TABLE A.4.

## DEMAND-SIDE EFFECTS BY REGION FOR ALL COUNTRIES IN STANDARD YEARS

	Americas		EMEA		Asia-Pacific	
	(1)	(2)	(3)	(4)	(5)	(6)
	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating
Female	0.054**	0.070***	0.035	0.083**	-0.217	-0.078
	(0.020)	(0.018)	(0.036)	(0.031)	(0.115)	(0.127)
People of color	-0.081***	-0.085***	0.065	0.005	-0.107	-0.099
	(0.020)	(0.019)	(0.045)	(0.039)	(0.082)	(0.077)
Female*People of color	-0.054	-0.025	-0.203**	-0.136*	0.209	0.145
	(0.030)	(0.028)	(0.062)	(0.058)	(0.119)	(0.130)
Self-rating		0.448***		0.524***		0.468***
		(0.009)		(0.016)		(0.024)
Constant	3.279***	1.666***	3.230***	1.411***	3.352***	1.704***
	(0.009)	(0.034)	(0.017)	(0.056)	(0.077)	(0.108)
Manager FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Job-level FE	Y	Y	Y	Y	Y	Y
Observations	19,498	18,806	5,798	5,597	3,125	3,060
R-squared	0.227	0.365	0.283	0.449	0.311	0.452

TABLE A.5.

BALANCE CHECK: STANDARD VERSUS NON-STANDARD YEARS FOR ALL COUNTRIES

Sample characteristic	Standard years	Non-standard year	p-value
% Female	38.6%	37.6%	0.05
% People of Color	40.9%	39.7%	0.06
Self-rating	3.52	3.52	0.24

TABLE A.6.  
MANAGER RATINGS OF NEWCOMERS IN ALL COUNTRIES

PANEL A: STANDARD YEARS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating
Female	-0.011 (0.019)		-0.001 (0.023)	0.010 (0.034)	0.055 (0.038)	0.054 (0.038)	0.044 (0.038)	0.043 (0.038)
People of color		-0.124*** (0.024)	-0.124*** (0.024)	-0.114*** (0.031)	-0.101** (0.039)	-0.098* (0.039)	-0.099* (0.039)	-0.103** (0.039)
Female*POC				-0.022 (0.042)	-0.034 (0.052)	-0.033 (0.053)	-0.039 (0.052)	-0.039 (0.052)
Constant	2.836*** (0.015)	2.919*** (0.022)	2.919*** (0.024)	2.915*** (0.027)	2.902*** (0.021)	2.901*** (0.021)	2.907*** (0.021)	2.909*** (0.021)
Observations	7,162	5,080	5,079	5,079	3,493	3,493	3,493	3,493
Manager FE	N	N	N	N	Y	Y	Y	Y
Region FE	N	N	N	N	N	Y	Y	Y
Job-level FE	N	N	N	N	N	N	Y	Y
Year-level FE	N	N	N	N	N	N	N	Y
R-squared	0.000	0.007	0.007	0.007	0.523	0.523	0.530	0.531

PANEL B: NON-STANDARD YEARS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating	Manager Rating
Female	0.059 (0.034)		0.100* (0.040)	0.073 (0.056)	-0.099 (0.083)	-0.104 (0.085)	-0.095 (0.091)	-0.095 (0.091)
People of color		-0.060 (0.042)	-0.064 (0.041)	-0.092 (0.055)	-0.235* (0.094)	-0.215* (0.101)	-0.200* (0.100)	-0.200* (0.100)
Female*POC				0.058 (0.083)	0.332* (0.138)	0.315* (0.142)	0.298* (0.147)	0.298* (0.147)
Constant	2.712*** (0.025)	2.824*** (0.033)	2.778*** (0.036)	2.790*** (0.041)	2.902*** (0.048)	2.908*** (0.051)	2.901*** (0.053)	2.901*** (0.053)
Observations	2,121	1,532	1,532	1,532	798	787	787	787
Manager FE	N	N	N	N	Y	Y	Y	Y
Region FE	N	N	N	N	N	Y	Y	Y
Job-level FE	N	N	N	N	N	N	Y	Y
Year-level FE	N	N	N	N	N	N	N	Y
R-squared	0.001	0.002	0.006	0.006	0.555	0.555	0.559	0.559

TABLE A.7.

AVERAGE SELF- AND MANAGER RATINGS BY GENDER X RACE INTERACTION IN THE UNITED STATES IN STANDARD YEARS

	White Men	White Women	Black Men	Black Women	Latinx Men	Latinx Women	Asian Men	Asian Women	Other Men	Other Women
Self-ratings	3.62 (0.74)	3.58 (0.72)	3.42 (0.82)	3.41 (0.83)	3.59 (0.78)	3.55 (0.77)	3.62 (0.77)	3.48 (0.72)	3.70 (0.81)	3.51 (0.78)
Manager ratings	3.28 (0.80)	3.32 (0.78)	2.97 (0.81)	3.00 (0.73)	3.13 (0.78)	3.20 (0.78)	3.26 (0.79)	3.21 (0.77)	3.22 (0.83)	3.14 (0.77)
Observations	8,032	4,226	404	457	445	404	2,825	2,081	271	220

*Notes.* Self-ratings refer to the self-evaluation that each employee has to fill out and share with their manager before the manager decides on their rating of the employee. The self-ratings row shows the average self-rating by each subgroup on the left with standard deviations in parentheses. The manager ratings row shows the average rating that the corresponding subgroup receives from their managers (regardless of the managers' gender or ethnicity). The final row shows the total sample size for each subgroup

TABLE A.8.

COUNTERFACTUAL SIMULATION VARYING MANAGER RATINGS OF ASIAN EMPLOYEES IN THE  
UNITED STATES IN STANDARD YEARS

Fraction of Asian employees whose manager rating gets increased	Number of Asian employees whose manager rating gets increased	Asian employee	
		$\hat{\beta}_3$ (SE)	t-statistic <i>p</i> -value
0.01	49	-0.059 (0.019)	<i>t</i> = -3.173 <i>p</i> = 0.002
0.02	98	-0.050 (0.019)	<i>t</i> = -2.655 <i>p</i> = 0.008
0.03	147	-0.040 (0.019)	<i>t</i> = -2.157 <i>p</i> = 0.031
<b>0.04</b>	<b>196</b>	<b>-0.031</b> <b>(0.019)</b>	<b><i>t</i> = -1.626</b> <b><i>p</i> = 0.104</b>
0.05	245	-0.21 (0.019)	<i>t</i> = -1.103 <i>p</i> = 0.270
0.06	294	-0.12 (0.019)	<i>t</i> = -0.612 <i>p</i> = 0.540
<b>0.07</b>	<b>343</b>	<b>-0.002</b> <b>(0.019)</b>	<b><i>t</i> = -0.114</b> <b><i>p</i> = 0.909</b>
0.08	392	0.007 (0.019)	<i>t</i> = 0.364 <i>p</i> = 0.716

TABLE A.9.

COUNTERFACTUAL SIMULATION VARYING MANAGER RATINGS OF LATINX EMPLOYEES IN THE  
UNITED STATES IN STANDARD YEARS

Fraction of Latinx employees whose manager rating gets increased	Number of Latinx employees whose manager rating gets increased	Latinx employee	
		$\hat{\beta}_3$ (SE)	t-statistic <i>p</i> -value
0.01	8	-0.093 (0.035)	<i>t</i> = -2.656 <i>p</i> = 0.008
0.02	17	-0.083 (0.035)	<i>t</i> = -2.358 <i>p</i> = 0.018
0.03	25	-0.074 (0.035)	<i>t</i> = -2.090 <i>p</i> = 0.037
<b>0.04</b>	<b>34</b>	<b>-0.064</b> <b>(0.036)</b>	<b><i>t</i> = -1.802</b> <b><i>p</i> = 0.072</b>
0.05	42	-0.055 (0.036)	<i>t</i> = -1.542 <i>p</i> = 0.123
0.06	51	-0.045 (0.036)	<i>t</i> = -1.266 <i>p</i> = 0.206
0.07	59	-0.036 (0.036)	<i>t</i> = -0.992 <i>p</i> = 0.321
0.08	68	-0.026 (0.036)	<i>t</i> = -0.713 <i>p</i> = 0.476
0.09	76	-0.016 (0.036)	<i>t</i> = -0.455 <i>p</i> = 0.649
0.10	85	-0.006 (0.036)	<i>t</i> = -0.158 <i>p</i> = 0.875
<b>0.11</b>	<b>93</b>	<b>0.003</b> <b>(0.036)</b>	<b><i>t</i> = 0.082</b> <b><i>p</i> = 0.934</b>

TABLE A.10.

COUNTERFACTUAL SIMULATION VARYING MANAGER RATINGS OF “OTHER” EMPLOYEES IN THE  
UNITED STATES IN STANDARD YEARS

Fraction of “Other” employees whose manager rating gets increased	Number of “Other” employees whose manager rating gets increased	Employee with self-selected “Other” racial category	
		$\hat{\beta}_3$ (SE)	t-statistic <i>p</i> -value
0.01	5	-0.101 (0.043)	<i>t</i> = -2.348 <i>p</i> = 0.019
0.02	10	-0.092 (0.043)	<i>t</i> = -2.107 <i>p</i> = 0.035
<b>0.03</b>	<b>15</b>	<b>-0.082</b> <b>(0.044)</b>	<b><i>t</i> = -1.877</b> <b><i>p</i> = 0.061</b>
0.04	20	-0.072 (0.044)	<i>t</i> = -1.640 <i>p</i> = 0.101
0.05	25	-0.062 (0.044)	<i>t</i> = -1.418 <i>p</i> = 0.156
0.06	29	-0.054 (0.044)	<i>t</i> = -1.230 <i>p</i> = 0.219
0.07	34	-0.045 (0.044)	<i>t</i> = -1.025 <i>p</i> = 0.306
0.08	39	-0.035 (0.044)	<i>t</i> = -0.789 <i>p</i> = 0.430
0.09	44	-0.026 (0.045)	<i>t</i> = -0.573 <i>p</i> = 0.567
0.10	49	-0.015 (0.045)	<i>t</i> = -0.345 <i>p</i> = 0.730
0.11	54	-0.006 (0.045)	<i>t</i> = -0.139 <i>p</i> = 0.889
<b>0.12</b>	<b>59</b>	<b>0.003</b> <b>(0.045)</b>	<b><i>t</i> = 0.077</b> <b><i>p</i> = 0.939</b>