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Do sell-side analysts react too pessimistically to bad news for minority-led firms? Evidence from target price valuations<sup>☆</sup>Kathy Rupar<sup>a</sup>, Sean Wang<sup>b,\*</sup>, Hayoung Yoon<sup>b</sup><sup>a</sup> Scheller School of Business, Georgia Institute of Technology, 800 W. Peachtree St., Atlanta, GA 30308, USA<sup>b</sup> Edwin L. Cox School of Business, Southern Methodist University, 6214 Bishop Blvd, Dallas, TX 75275, USA

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## ABSTRACT

We find that the adverse impact of bad news on analysts' valuations is 57% larger when the CEO is Non-White, resulting in more pessimistic valuations for Non-White CEOs relative to their White counterparts. Non-White CEO firms are more likely to surpass analysts' valuation targets in the subsequent 12 months, suggesting that this racial gap lacks economic justification. To provide further evidence of a racial bias: (1) we triangulate our empirical findings with corroborating evidence from a controlled experiment and (2) we provide evidence that analysts' valuation disparities towards Non-White CEO firms become larger when race relations are worse. Increases in CEO familiarity attenuate these disparities, suggesting the bias we document appears to be subconscious. Our findings suggest that resources allocated towards educating a firm's stakeholders about the potential impact of implicit racial biases and increasing self-awareness may be impactful in promoting equality within capital markets.

## 1. Introduction

A large body of economic literature focuses on documenting racial discrimination and related biases.<sup>1</sup> These studies are important because they contribute to our understanding of why certain race and gender-related disparities exist across labor markets.<sup>2</sup> For example, it is a well-documented empirical fact that minority groups are underrepresented among firm CEOs. As of 2019, only 7% of Fortune 500 CEOs are Non-White despite such Non-Whites comprising 23% of the participating labor force.<sup>3</sup> One potential

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<sup>1</sup> A partial non-exhaustive list of such literature includes discrimination in higher education bonds (Dougal et al., 2019), consumer and business loans (Butler et al., 2021; Howell et al., 2021), housing (Ewens et al., 2014), labor markets (Bertrand and Mullainathan, 2004; Egan et al., 2019), and among fund managers (Kumar et al., 2015).

<sup>2</sup> Ewens (2023) suggests that the sizeable gap with regards to the prevalence of minority entrepreneurs is a result of disparate access to early-stage lending (Blanchflower et al., 2003), i.e., blacks have higher loan denial rates and as a result often do not even attempt to apply for loans (Fairlie et al., 2022).

<sup>3</sup> <https://www.bls.gov/opub/reports/race-and-ethnicity/2019/>, <https://www.shrm.org/executive/resources/articles/pages/evolving-executive-dei-diversity-suite.aspx>

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explanation for this observed racial gap is that firms may believe that minority CEOs could be subjected to negative stereotypes from other stakeholders regarding their leadership skills, and that such stereotypes could impact the economic future of the firm.<sup>4</sup> Consequently, firms anticipating biased judgments from stakeholders could choose to avoid the appointment of minority CEOs to circumvent such perceptions.<sup>5</sup> Given the importance of examining how stakeholders' perceptions may be affected by race, we examine the impact of CEO race on the judgments of an important stakeholder group for a firm's economic prosperity: financial analysts.

Our investigation examines whether analyst target prices are more pessimistic for Non-White CEOs when making judgments after the revelation of bad earnings news. Our setting is motivated by several factors. First, the CEO's goal is to maximize shareholder value, and it has been well-established that earnings news has a first-order impact on the firm's valuation.<sup>6</sup> Second, because valuations are derived from economic beliefs about the firm's fundamentals, valuation judgments following earnings news should be unimpacted by the CEO's race, unless analysts' judgments possess race-related implicit or explicit biases. Third, the examination of negative news allows us to test whether any such disparities are consistent with a well-established psychological bias known as the ultimate attribution error, where a prejudiced agent assumes that the cause of a negative event is "genetically predetermined" for the prejudiced group (Pettigrew, 1979). Fourth, this setting allows us to accurately measure not only the ex-ante pessimism across CEO race but also the ex-post outcome bias by comparing the firm's realized stock price to the analyst's projected stock price. Measuring both ex-ante and ex-post effects adheres to Becker's (1957; 1993) guidelines for conducting studies on discrimination and is particularly important because CEOs are not randomly assigned to firms. For example, research finds evidence of promotion related disparities against minorities (Benson et al., 2022; Lai and Babcock, 2013). If such disparities influence CEO hiring decisions, then minority CEOs could be of higher quality biasing us against finding results. However, if valuation judgments are unduly pessimistic against non-white CEOs (even after adjustments for quality differences), such biases will be revealed by the firm's stock price over the subsequent year. Finally, while labor market studies often face difficulties in obtaining data with regards to the outcome bias, our setting is advantageous in that potential disparities in judgments can be accurately measured by stock prices formed by well-functioning capital markets. In summary, we argue that our analyst-based setting acts as a suitable laboratory for studying broader theories about how key stakeholders perceive Non-White CEOs.

We investigate our research question for S&P 1500 firms from 2005–2019, and use CEO photos to classify their race as White or Non-White.<sup>7</sup> Our sample includes 97,624 analyst target price forecasts issued after negative earnings surprises, 5% of which pertain to Non-White CEOs. We find a stronger attribution of bad earnings news towards Non-White CEOs than White CEOs when analysts make judgments about the firm's market value. The mean firm in our sample has an implied return of 10.8%. A one standard deviation increase in bad news decreases the implied return for Non-White CEO-led firms by 3.6%, while White CEO-led firms experience a 2.3% decrease in implied return. Analyses of the ex-post valuation bias confirm that Non-White CEO firms are significantly more likely to exceed their target valuations over the subsequent year, i.e., analysts' pessimism against firms led by Non-White CEOs is economically unjustified.

Our results are consistent with attribution theory which speaks to how observers explain others' actions. Specifically, we find analysts' valuations appear to reflect the "ultimate attribution error" which most often arises following negative behavior (such as the disclosure of poor performance). The "error" occurs when individuals ascribe the reason behind one's negative behavior strictly to their internal characteristics (Pettigrew, 1979). In this case, our analyses support the conjecture that analysts' judgments are affected by previously documented racial stereotypes that find Non-Whites to be inferior business leaders, thus overweighting the impact of negative economic news on the firm's valuation when the CEO is Non-White.

To improve our causal inferences, we employ a two-pronged approach. The first prong triangulates evidence from our empirical setting with a controlled experiment. We elicit valuation judgments from participants who are randomly assigned to view a photo representing a White CEO or a Non-White CEO. All participants receive identical information pertaining to a hypothetical firm, encompassing details about its leadership, summary financial performance, and news regarding a missed EPS target by the firm. Subsequently, participants provide estimates of the firm's future value over a 12-month horizon. We establish several prerequisites requiring participants to have similar characteristics to sell-side analysts to better align our experiment with our archival sample of I/B/E/S reporting analysts. Our experimental results corroborate the findings obtained from our empirical investigation. Specifically, participants who resemble the demographics of our analyst sample exhibit a tendency to assign lower future values to firms led by Non-White CEOs.

The second prong leans upon research documenting that race related biases are moderated by social norms regarding the acceptability of discrimination (Barr et al., 2018; Williams, 2021). That is, if the CEO's race is the underlying mechanism behind our results, the bias we document should increase during periods of higher racial tension. To exploit this strategy, we use two different proxies for shifts in racial tension: (1) the Presidential Election of Donald Trump and (2) annual counts of racially biased

<sup>4</sup> Throughout the text, we use the terms "minority" and "Non-White" interchangeably. In our study, the minority we refer to is a race-related one, and does not imply biases related to other minorities, e.g. female CEOs, LGBTQ+ individuals, or persons with disabilities.

<sup>5</sup> Almazan et al. (2009) conjecture that stakeholder perceptions can impact a firm's economic prosperity as these parties derive economic benefits from being associated with successful firms. Similarly, Brown and Matsa (2016) find that prospective employees make judgments about the firms' financial condition, and that increases in perceived distress result in lower quality job applicants, reducing the firm's quality of organizational capital.

<sup>6</sup> Graham et al. (2005) document that executives understand that earnings news directly impacts how market participants make judgments regarding the firm's valuation, with Brav and Lehavy (2003) noting that target valuations are "analysts' most concise and explicit opinion about the firm".

<sup>7</sup> As further described in Section 4, our White category includes Caucasian CEOs. Our Non-White category includes the following races: East Asian, South Asian, Hispanic, Middle Eastern, and Black.

hate crimes against Non-Whites reported to the FBI. We find that when race relations are worse, valuation pessimism increases for Non-White CEO-led firms. Notably, while the laboratory experiment and Difference-in-Differences (DiD) analyses employ orthogonal methodologies, both lead us to the same inference: the observed disparities in valuation are linked to CEO race.

To further check the robustness of our results, we examine the sensitivity of our empirical findings to pre-processing the sample with propensity score and entropy balancing techniques. We also examine whether (1) our inferences change with alternate measures of the biased outcome variable, *Beat*, (2) analyst pessimism occurs for subsequent price target revisions, and (3) whether the timing of the target price disclosure impacts the magnitude of the bias. Overall, inferences remain unchanged.

Finally, we design a series of tests to examine whether the bias we document appears to be more closely aligned with an implicit or explicit bias. We find that increased experience in valuing the same CEO's firm attenuates the ultimate attribution error. We also examine valuations following the revelation of good news and find no evidence of judgment disparities, suggesting that pessimism is triggered by negative information consistent with the Non-White CEO leadership stereotype. Overall, our findings suggest that the disparity we document may reflect a subconscious bias and that resources allocated towards education around racial stereotypes may help reduce this bias.

In summary, we contribute first and foremost by documenting a racial disparity in how a key stakeholder views the firm's future outlook. Specifically, we find that analysts assign economically unjustified pessimistic valuations to firms led by Non-White CEOs following the revelation of negative news. Such pessimism towards these CEOs is moderated by changes in racial tension in society which suggests that efforts to ameliorate these tensions can also attenuate the bias. While our investigation focuses on analysts, it does not preclude the possibility that similar biases could exist for other stakeholders (e.g., customers' attribution of a product recall or auditors' attribution of a financial restatement) where outcomes are not as easily observable as in our setting. Further, we believe that the importance of our findings extends beyond any observable impact to financial markets. For example, hiring committees who understand that such biased judgments may be unjustly attributed to Non-White CEOs may nonetheless avoid the hiring of such CEOs altogether. However, our results do not necessarily generalize to other settings or stereotypes such as gender, age or disability, opening potential avenues for related research in these areas. Second, our findings complement a growing literature that examines culture and diversity in financial markets (Brochet et al., 2016; Ellahie et al., 2017; Brochet et al., 2019; Merkle et al., 2020; Pan et al., 2020). We are the first to our knowledge to empirically document racial disparities among investment banking sell-side analysts. Finally, we contribute to a large literature that documents various biases and incentives impacting the accuracy of financial analyst outputs (Womack, 1996; Ke and Yu, 2006; Mayew, 2008; Brown et al., 2015). Our results suggest this may be a bias analysts are not aware of and one that reduces the accuracy of valuations for minority-led firms.

The remainder of our paper is structured as follows. Section 2 briefly motivates the research setting. Section 3 discusses the empirical design. Section 4 presents details regarding sample construction. Section 5 presents sample statistics and the main results from panel regressions. Section 6 addresses causal inference by conducting a randomized experiment, and examining how variation in racial sentiment impacts our main findings regarding analyst pessimism. Section 7 examines the robustness of our empirical findings. Section 8 conducts a series of analyses to shed light on the nature of the bias. Section 9 concludes and discusses opportunities for future research.

## 2. Research setting

Valuations fundamentally reflect the discounted values of all future cash flows and thus capture beliefs around all valuation inputs (e.g. profitability, growth, and cost of capital). Because CEO race should not impact objective valuations, we argue that the valuation judgments of sell-side analysts provide an opportune setting to examine potential racial bias. Analysts continuously process and acquire new information, frequently updating their valuations of the firm in the form of 12-month future price targets. If analysts systematically depress these valuations as a result of a race-related bias, such outcome biases can be readily observed in empirical data, as ex-post stock prices will more often exceed targets.

The CEO is the highest-ranking executive assuming leadership of a firm. CEOs also play a public relations role as the "face" of the company to external stakeholders (Men, 2012). On earnings calls, CEOs have salient presence with 93% actively involved (Dzielinski et al., 2017), making their race visible to analysts. Psychology and sociology research documents a stereotype of non-whites having inferior leadership abilities compared to whites.<sup>8</sup> If analysts internalize this stereotype, negative earnings news may prompt them to attribute poor performance to non-white CEOs' perceived inferior leadership. We investigate analyst valuations after earnings misses, when bad news could exacerbate biases. Attributing negative outcomes more strongly to non-white CEOs' presumed inferior leadership would manifest in more pessimistic valuations, consistent with the "ultimate attribution error" bias (Allport, 1954; Pettigrew, 1979). In summary, our setting takes advantage of an event where CEO race is salient to examine whether leadership stereotypes may skew analyst judgments after bad earnings news.

<sup>8</sup> A partial list of this literature includes: Dixon and Rosenbaum (2004), Carton and Rosette (2011), Burriss et al. (2013), Rosette et al. (2008), Gündemir et al. (2014).

### 3. Empirical design

Our empirical tests examine two different dependent variables. The first, captured via the analysts' target price, is whether analysts perceive bad earnings news more pessimistically when making valuation judgments if the CEO is Non-White. This variable allows us to examine the economic magnitude of analysts' ex-ante pessimism that is related to a unit of bad news. However, an important limitation to making inferences based solely on this ex-ante judgment measure is that the differential judgment across the two groups could reflect economic differences that would rationally result in the difference in judgment.<sup>9</sup> Therefore, to address Becker's (1957; 1993) concerns about inferences which could be confounded by non-random selection, our second dependent variable captures the ex-post outcomes of these judgments and assesses whether any ex-ante pessimism embedded in analysts' valuations is unwarranted (or economically rational). Accordingly, we draw conclusions about whether analysts' judgments are unduly pessimistic by examining the likelihood that the firm's ex-post stock prices exceed the analysts' target valuation. Simply put, if analysts' target prices are systematically set too low for Non-White CEO firms, then Non-White CEO firms will be more likely to exceed the target valuation than White CEO firms.

To examine the impact of bad earnings news on analysts' valuations, we limit the sample to each analyst's initial target price report following the earnings announcement date when calculating our first dependent variable. We calculate each analyst's annualized implied return (*Target*) by using the pre-earnings announcement stock price and the analysts' projected target price for the firm 12 months from the report date (see Appendix A for a detailed equation).<sup>10</sup> Following Asquith et al. (2005), our second and primary dependent variable (*Beat*) is a binary measure that equals one if the stock price exceeds the target price within 12 months from the report date.

The independent variable which is the main focus of our empirical investigation is the impact of the interaction of CEO race (*Non-White*) and negative earnings news (*Bad News*) on both of our dependent variables. *Non-White* is a binary variable that takes a value of one if the CEO's race is classified as Non-White, and zero if White. *Bad News* is the analyst-based earnings surprise (SUE) calculated following Livnat and Mendenhall (2006) and multiplied by minus one, so that more positive values of *Bad News* represent larger earnings misses.<sup>11</sup>

Eq. (1) below represents our baseline regression model, where  $i$ ,  $j$ ,  $k$ , and  $t$  denote firm, analyst, date and year-quarter, respectively. When our dependent variable  $Y$  is *Target*,  $\beta_3$ , the interaction coefficient on *Non-White*  $\times$  *Bad News* represents the incremental effect of negative earnings news on the implied return derived from the analyst's target valuation when the CEO is Non-White. When our dependent variable  $Y$  is *Beat*,  $\beta_3$  represents the incremental effect of negative earnings news on the likelihood of subsequently beating the target when the CEO is Non-White. We summarize the timeline of observing analysts' target price pessimism and ex-post justification in a schematic shown in Illustration (a) (Appendix B).

$$Y_{ijk} = \beta_1 Non-White_{it} + \beta_2 Bad\ News_{it} + \beta_3 Non-White_{it} \times Bad\ News_{it} + \gamma X_{it} + \delta X_{it} \times Bad\ News_{it} + Analyst\ FE + Year\ FE + \epsilon_{ijk} \quad (1)$$

$\beta_3$  represents the differential response to bad news for Non-White CEO firms. When  $Y$  is *Target*, a negative  $\beta_3$  indicates greater pessimism. When  $Y$  is *Beat*, a positive  $\beta_3$  reveals that such ex-ante pessimism was unjustified ex-post. Thus  $\beta_3$  for *Beat* is critical — an insignificant coefficient for *Target* but positive coefficient for *Beat* would imply an absence of observable ex-ante pessimism yet still biased low valuations. Such a scenario could occur if racial discrimination was present at the CEO hiring stage, resulting in the average Non-White CEO being of higher quality and thereby economically justifying a higher target valuation. Thus, if analysts set *Target* to be equivalent across Non-White and White, *Target* would be downwardly biased for *Non-White*, resulting in a higher probability of *Beat*. Table 1 presents some examples of various joint interpretations of *Target* and *Beat*.

We use a vector of controls ( $X$ ) that proxy for a firm's future growth, risk, profitability, information environment, and CEO characteristics, all of which we define in Appendix A. To address the concern that the relation between *Bad News* and  $Y$  potentially differs depending on firm characteristics, and that those relations may correlate with *Non-White*  $\times$  *Bad News*, we interact the full vector of controls in  $X$  with *Bad News*. We also include analyst fixed effects, which creates within-analyst comparisons of target price pessimism and allows us to rule out the possibility that systematically pessimistic analysts may somehow endogenously match to Non-White CEOs. Other potentially unobservable time-varying effects on *Target* and *Beat* are removed by the inclusion of year fixed effects.  $t$ -statistics are based on two-way clustered standard errors by analyst and year-month.

<sup>9</sup> Ex-ante pessimism may rationally depend on minority group membership if for example (1) a firm is less valuable when led by a Non-White CEO if customers are not willing to pay as much for the firm's goods or services when the CEO is Non-White or (2) hiring discrimination results in Non-White CEOs being matched to worse firms.

<sup>10</sup> Our choice of pre-earnings announcement stock price in the price target calculation is non-standard and different from prior studies where the pre-target announcement stock price is used. In Section 7.2 we explain the reasoning behind our choice, and demonstrate the robustness of our findings to using the prior day's price.

<sup>11</sup> SUE is calculated as the actual EPS before extraordinary items as reported by I/B/E/S less the most recent I/B/E/S consensus EPS forecast prior to the announcement date, scaled by stock price at the end of quarter.

**Table 1**  
Examples of coefficient interpretations.

Target	Beat	Joint interpretation of <i>Non-White</i> × <i>Bad News</i> coefficient
(-)	(+)	Ex-ante analyst valuations are lower for Non-White CEOs than for White CEOs, are pessimistically biased, and <b>at least some portion of this pessimism is not economically justified</b> . Non-Whites are more likely to exceed the target.
(-)	(0)	Ex-ante analyst valuations are lower for Non-White CEOs than for White CEOs, and <b>these lower valuations are economically justified</b> . Non-Whites are equally likely to exceed the target.
(0)	(+)	Ex-ante analyst valuations are equivalent for Non-White CEOs and White CEOs, however, Non-White valuations are still too pessimistic relative to White valuations. Non-Whites are more likely to exceed the target.

This table presents various interpretations of coefficients for *Target* and *Beat*.

**Table 2**  
Sample selection.

Criteria	N
Analysts' first target price forecasts issued after earning announcements between 2005 and 2019 with non-missing Execucomp, Compustat and CRSP data	569,108
Keep negative earnings surprises	143,878
Eliminate firms in utility (SIC 4000-4999) and financial (SIC 6000-6999) industries	(45,279)
Eliminate observations with stock price less than \$1	(184)
Eliminate singleton values from the main regression model estimation	(791)
Final sample observations (analyst-firm-date)	97,624
Number of analysts	4,025
Number of firms	1,787
Firms with only white CEOs	1,600
Firms with only non-white CEOs	74
Number of CEOs	3,180
White CEOs	2,979
Non-white CEOs	201

This table presents the sample selection procedure.

#### 4. Sample construction

We obtained CEO names for S&P 1500 companies from the Execucomp database, yielding 5631 distinct CEO-firm pairs. We used Amazon Mechanical Turk workers to collect and categorize CEOs' photographs into White and Non-White classifications.<sup>12</sup> Each CEO photo was retrieved and categorized by three Turk workers allowing us to use consensus among the three as one measure of response quality. Turk workers had consensus agreement on the CEO's race in 5133 instances, and we manually verified observations for the remaining 498 CEOs. Table 2 presents our sample construction procedure. To link earnings announcements with subsequent analyst target price reports, we merged CEO race data with firm-quarter information spanning fiscal years 2005 to 2019. Focusing only on firm-quarters in which the firm failed to meet the prevailing analysts' consensus EPS forecast, we obtain an initial sample of 143,878 analyst-firm-target price report observations. We eliminate firms in utility and financial industries,<sup>13</sup> as well as observations with a stock price less than \$1. After omitting singleton observations, our final sample covers 97,624 target prices from 4025 analysts, with 4901 for non-white CEO firms and 92,723 for white CEO firms. Our sample comprises 1787 unique firms, 90% of which had only white CEOs throughout the entire firm history. Of the 3180 unique CEOs, 6% are non-white and 94% are white.

#### 5. Baseline results and discussion

##### 5.1. Sample statistics and balance diagnostics

Table 3a provides descriptive statistics for the full sample as well as by White and Non-White subgroups. The observations are at the analyst-firm-date level. The average *Target* implies a 10.8% annualized return from pre-earnings announcement stock price to 12 months post the target report. When comparing the means of *Target* between the Non-White and White subgroups, analysts'

<sup>12</sup> To avoid inconsistencies in what race Turk workers considered as White, we asked them to classify the race of each photo into one of six categories (East Asian, South Asian, Black, Caucasian, Hispanic, and Middle Eastern). Our choice of the five Non-white races was informed by data indicating that between 2004 and 2021 the most represented non-white U.S. CEOs were (1) Asian/Indian, (2) Hispanic, and (3) Black (Crist Kolder Associates, 2021). Further, we separate out Middle Eastern CEOs from White CEOs in our study. We then categorize Caucasian as White, and all other races as Non-White.

<sup>13</sup> Prior literature shows executives in financial and utility industries have limited control over performance due to regulatory constraints on investing in specialized capital. Following established research (Chava and Purnanandam, 2010; Shivdasani and Yermack, 1999; Kim and Lu, 2011), we exclude these industries when analyzing CEO impact.

**Table 3a**  
Summary statistics.

	Full (N = 97,624)			White (N = 92,723)			Non-White (N = 4,901)		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Target	0.108	0.109	0.216	0.109	0.110	0.216	0.098	0.093	0.211
Beat	0.639	1.000	0.480	0.638	1.000	0.480	0.660	1.000	0.474
Bad News	-0.004	-0.001	0.006	-0.004	-0.002	0.006	-0.004	-0.001	0.006
Log Market Cap	8.248	8.132	1.553	8.256	8.144	1.544	8.091	7.906	1.705
MTB	2.037	1.629	1.310	2.029	1.618	1.309	2.197	1.771	1.307
Book Leverage	0.256	0.238	0.194	0.257	0.239	0.193	0.234	0.199	0.211
Abnormal Returns	-0.028	-0.031	0.171	-0.028	-0.031	0.171	-0.033	-0.032	0.172
ROA	0.012	0.014	0.028	0.012	0.014	0.028	0.014	0.016	0.030
Return Volatility	0.025	0.022	0.013	0.025	0.022	0.013	0.025	0.022	0.013
ROA Volatility	0.022	0.014	0.022	0.022	0.014	0.022	0.022	0.015	0.022
Sales Growth	0.030	0.019	0.180	0.030	0.019	0.180	0.032	0.019	0.180
Log Analyst Following	2.626	2.708	0.582	2.630	2.708	0.580	2.567	2.708	0.612
Inst. Ownership	0.617	0.779	0.389	0.619	0.781	0.389	0.578	0.736	0.388
Male	0.965	1.000	0.185	0.966	1.000	0.182	0.942	1.000	0.233
Log Tenure	1.591	1.609	0.831	1.594	1.609	0.833	1.520	1.609	0.795
Overconfidence	0.580	1.000	0.494	0.581	1.000	0.493	0.557	1.000	0.497

This table presents descriptive statistics for the full sample and the White and Non-White subsamples. See [Appendix A](#) for variable definitions.

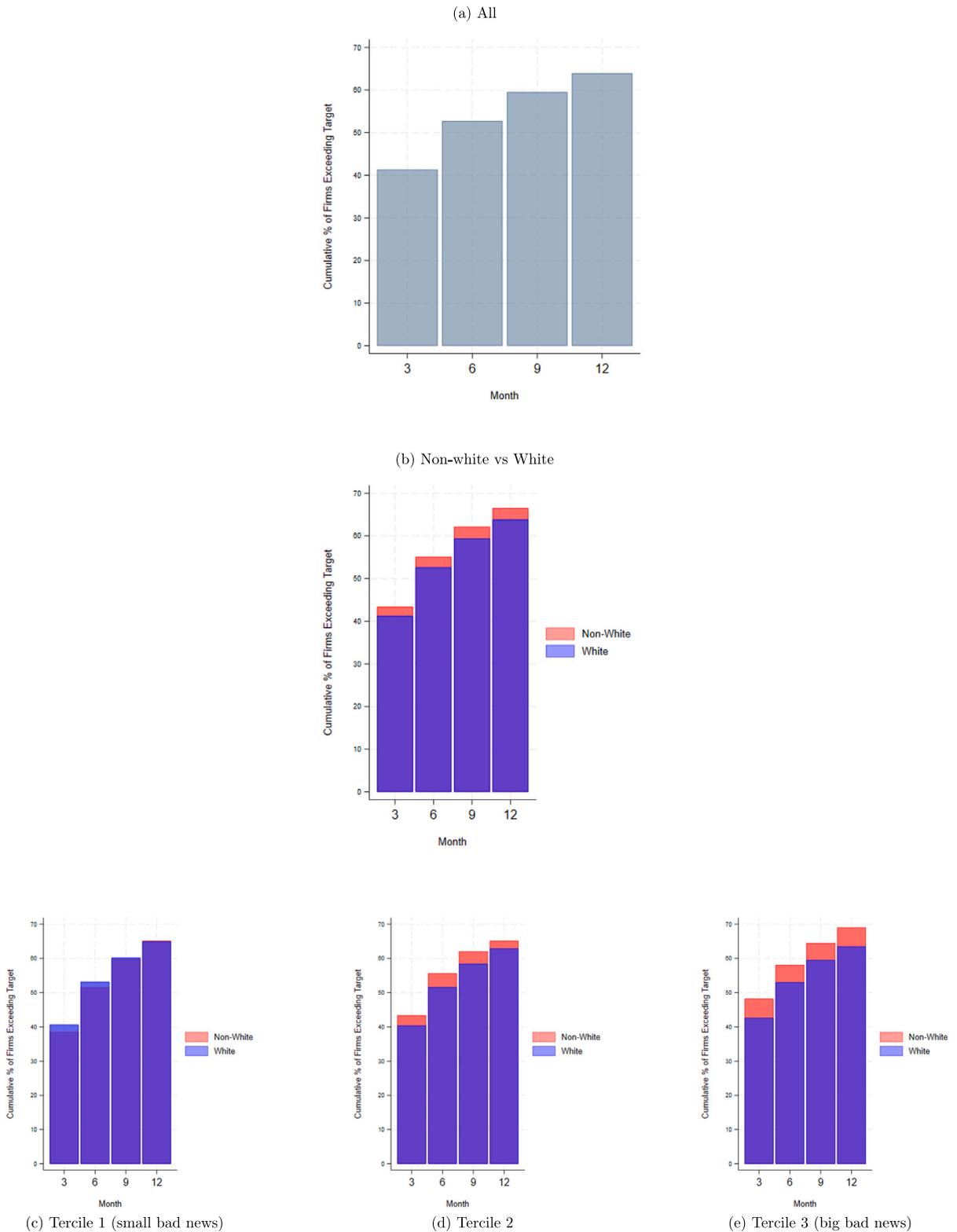
**Table 3b**  
Summary statistics - Diagnostic analysis per Rubin (2001).

	(1)	(2)	(3)	(4)	(5)	(6)
	Std Mean Diff	Prereq. (a):  Std Mean Diff  < 0.5 for P-Score;  Std Mean Diff  < 0.25 for covariates	Variance Ratio (VR)*	Prereq. (b): VR* < 1.25	Variance Ratio* of Covariate Residuals (VRCR)	Prereq. (c) VRCR < 1.25
P-Score	0.2741	Y	1.1279	Y		
Bad News	0.0178	Y	1.0328	Y	1.0000	Y
Log Market Cap	0.0968	Y	1.2197	Y	1.0001	Y
MTB	0.1289	Y	1.0044	Y	1.0153	Y
Book Leverage	0.1110	Y	1.1921	Y	1.0139	Y
Abnormal Returns	0.0314	Y	1.0072	Y	1.0069	Y
ROA	0.0539	Y	1.1701	Y	1.0016	Y
Return Volatility	0.0164	Y	1.0217	Y	1.0366	Y
ROA Volatility	0.0169	Y	1.0216	Y	1.0006	Y
Sales Growth	0.0110	Y	1.0018	Y	1.0000	Y
Log Analyst Following	0.1023	Y	1.1140	Y	1.0017	Y
Inst. Ownership	0.1051	Y	1.0056	Y	1.0019	Y
Male	0.0233	Y			1.0124	Y
Log Tenure	0.0938	Y	1.0966	Y	1.0013	Y
Over-confidence	0.0241	Y			1.0119	Y
Avg. of all covariates	0.0595	Y	1.0740	Y	1.0074	Y

This table presents covariate balance statistics between the Non-White and White subsamples, and results from analyzing Rubin (2001)'s three prerequisites for regression analysis. Columns (1), (3), and (5) are absolute standardized mean difference, variance ratio (VR), and variance ratio of covariate residuals (VRCR), respectively. Columns (2), (4), and (6) indicate whether each prerequisite is satisfied ("Y") or not ("N"). \* Variance ratio takes the higher variance as numerator, such that all VRs are at least 1. See [Appendix A](#) for variable definitions.

valuations suggest lower implied returns for Non-White CEOs (9.8% vs. 10.9%). Conversely, the mean value of *Beat* shows that the overall likelihood of stock price surpassing the target is 64% over a 12-month period, and that Non-White CEO firms are 2.2 percentage points more likely to meet targets within a year. [Fig. 1](#) further illustrates ex-post outcome bias over the subsequent year. Panel (a) shows the increase in the proportion of firms exceeding targets over 3-month intervals, ranging from 41% to 64%. Panel (b) reveals a disparity across subgroups in exceeding the target, with Non-White consistently having higher likelihoods of reaching the target across each 3-month horizon. Panels (c) to (e) display results by *Bad News* terciles. These illustrations show that the difference in outperformance between Non-White and White CEOs is moderated by bad news severity and is most pronounced in the largest bad news tercile (panel [e]). These findings suggest analysts' target valuations are systematically pessimistic for Non-White CEOs, with the extent varying by negative news magnitude. With regards to differences across the two groups, we find that Non-White and White samples have similar characteristics. The degree of distributional overlap between the two samples is high, with the average covariate's probability density function matching 93% of the area under the curve (untabulated).

Despite similar sample covariates, we nonetheless address the non-random assignment of CEOs to firms, recognizing the potential influence of differences between firms led by Non-White and White CEOs on how analysts interpret bad news. To address these concerns and ensure the reliability of our regression analyses, we adhere to Rubin's (2001) recommendations, where we assess the



**Fig. 1.** Cumulative % of firms exceeding target price. These figures plot the cumulative percentage of firms exceeding the target price by the end of the third-, sixth-, ninth-, and twelfth- month, following analysts' target price issuance. Panel (a) plots the entire sample. Panel (b) plots the Non-White and White subsamples. Panels (c) to (e) plot the Non-White and White subsamples, by bad news terciles. The bad news terciles are constructed over the full sample. Red (blue) bars represent Non-White (White).

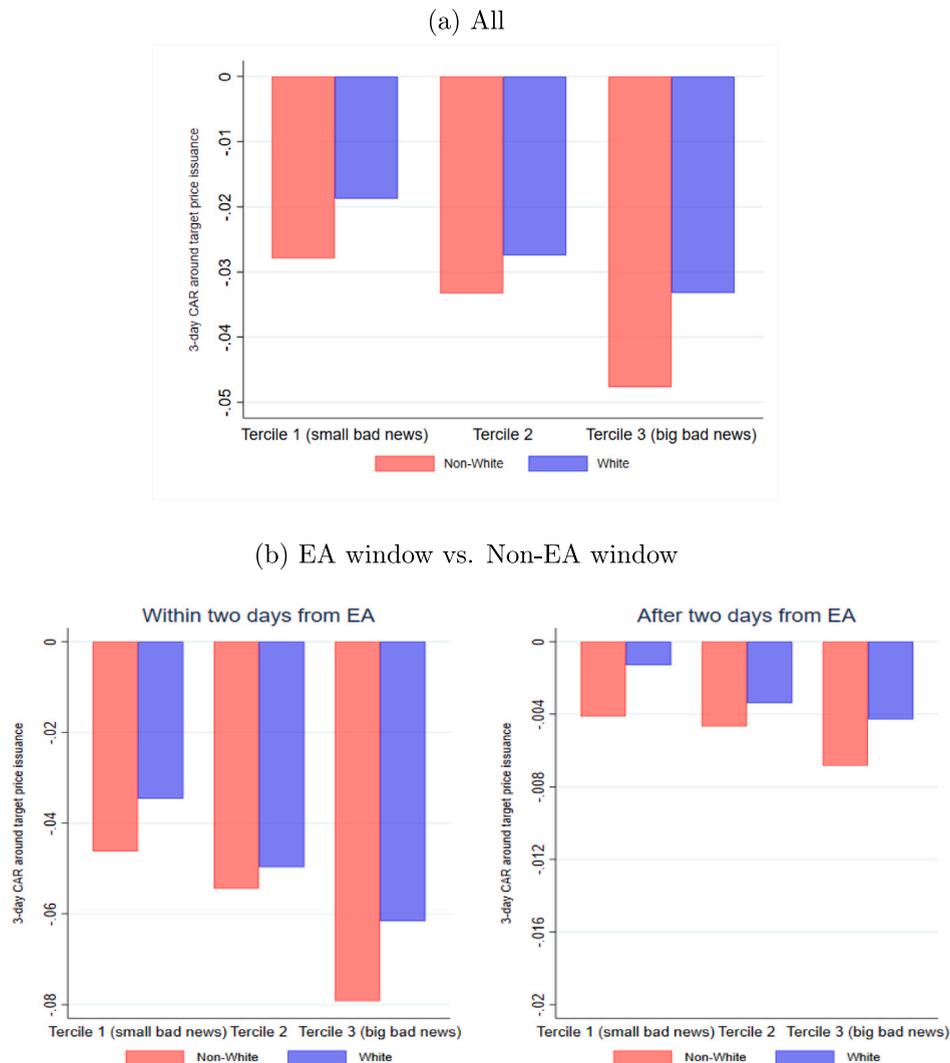


Fig. 2. Market reaction around target price issuance.

These figures plot 3-day cumulative market-adjusted returns around analysts' target price issuance. Panel (a) plots all target prices. Panel (b) plots target prices issued within two days from the earnings announcement (left) and target prices issued after two days from the earnings announcement (right). Red (blue) bars represent Non-White (White). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

magnitude of differences in propensity scores and covariates between the two groups. This assessment helps determine whether our regression analyses can yield trustworthy results or if it is necessary to employ methods such as covariate matching or entropy balancing prior to conducting our analyses. Rubin outlines three basic distributional conditions that must simultaneously obtain for regression analysis to be trustworthy. The conditions are reprinted here as follows:

- The difference in the means of the propensity scores must be small (e.g., the means must be less than half a standard deviation apart).
- The ratio of the variances of the propensity score in the two groups must be close to one (e.g., 1/2 or 2 are far too extreme).
- The ratio of the variances of the residuals of the covariates after adjusting for the propensity score must be close to one (e.g., 1/2 or 2 are far too extreme).<sup>14</sup>

The original, unprocessed sample meets all three prerequisites outlined by Rubin (2001), indicating sufficient balance between the CEO groups. Specifically, following these guidelines, we compute the propensity score using the binary variable *Non-White* as

<sup>14</sup> We follow Rubin's instructions to regress each of the original covariates on the estimated propensity score and take the residual for each observation, then calculate the ratio of the variances.

the dependent variable regressed on the full vector of control variables used in our baseline model. We then assess distributional differences between the White and Non-White samples in Table 3b. The standardized mean difference (SMDs) of propensity scores between the two samples is 0.274, which is below the suggested threshold of 0.5. For all covariates, SMDs remain below the recommended threshold of 0.25, often approaching the more conservative threshold of 0.1 as proposed by Stuart et al. (2013). Notably, three performance metrics — *Bad News*, *Abnormal Returns*, and *Sales Growth* — exhibit particularly close alignment, with SMDs of 0.018, 0.031, and 0.011, respectively, allaying concerns that Non-White CEOs could be assigned to underperforming firms. The average SMD for all covariates, at 0.060, is below the 0.10 cutoff as suggested by McMullin and Schonberger (2022). Column (3) shows a Variance Ratio of propensity score close to one (1.128), within the [0.8, 1.25] boundary. Columns (5) and (6) indicate that the ratio of residuals' covariate variances after propensity score adjustment nearly matches the prescribed threshold of one (average = 1.007). In summary, balance diagnostics indicate that regressions should yield accurate inferences without requiring the application of entropy balancing or propensity score matching techniques.

## 5.2. Analyst pessimism, CEO race, and Bad News

Table 4 displays results from Eq. (1) in columns (1) and (2). All non-binary variables have been standardized to have a mean of zero and a standard deviation of one. The regression coefficient on *Non-White* × *Bad News* represents the incremental effect of bad earnings news for firms with Non-White CEOs. This coefficient for *Target*, displayed in column (1), is  $-0.013$  ( $p < 0.05$ ). This indicates that when the CEO is Non-White, analysts' valuation judgments are more sensitive to bad news. Economically, firms led by Non-White CEOs are subject to re-valuations that are 57% more sensitive to bad earnings news. The mean firm in our sample has an implied return of 10.8%. A one standard deviation increase in bad news lowers the implied return for Non-White CEO-led firms by 3.6%, while White CEO-led firms experience a 2.3% decrease in implied return.

Column (2) tabulates results when the dependent variable is *Beat*. The coefficient on *Bad News* is insignificant, suggesting that analysts' target valuations are unbiased following the revelation of bad earnings news when the CEO is white. Conversely, the coefficient on *Non-White* × *Bad News* is 0.027, positive and significant ( $p < 0.01$ ), indicating that the likelihood of Non-White CEO firms exceeding the target is higher for larger levels of bad news. Non-White CEO-led firms are 2.7 percentage points more likely to exceed the target for one standard deviation increase in bad news, relative to White CEO-led firms. Results for *Beat* suggest that analysts' valuations display excessive pessimism towards Non-White CEO-led firms and this is not economically justified based on ex-post stock prices. This finding is corroborated by results for *Target* which show that analysts' ex-ante valuation judgments are more sensitive to bad news when the CEO is Non-White, resulting in overly pessimistic valuations. Taken together, evidence is consistent with analysts displaying an attribution bias of bad news towards Non-White CEOs when making valuation judgments.

In light of our empirical findings, which reveal that analysts assign pessimistic valuations to firms with Non-White CEOs following bad earnings news and considering the pivotal role analysts play in disseminating information to other stakeholders, we investigate the impact of our main result on a crucial stakeholder group: the firm's shareholders. Specifically, we examine whether these pessimistic sentiments lead to lower stock returns for the Non-White subgroup on the date of the target price announcement. In untabulated analyses, we find that the mean of 3-day cumulative abnormal returns (CAR) around target price issuance is  $-3.64\%$  ( $-2.65\%$ ) for Non-White (White) CEOs ( $p < 0.01$ ).<sup>15</sup> Fig. 2(a) illustrates these reactions by *Bad News* tercile and verifies that returns are more negative for larger magnitudes of bad news, and that the market reacts more negatively to these analyst reports for Non-White CEOs ( $p < 0.01$  for all three terciles). Fig. 2(b) shows that the more negative reaction for Non-White is largest when the valuation is released shortly after (within a two day period of) the earnings announcement, but that these differential reactions continue to persist even for valuations that come later in the quarter.<sup>16</sup> While it is beyond the scope of this study to examine the potential impact of bias on all parties who rely on analysts' judgments, we nonetheless offer preliminary insights that align with the notion that analysts' pessimistic judgments may have repercussions on various stakeholders beyond the financial analysts themselves.

We also briefly discuss the prevalence and frequency of the biased valuations faced by Non-White CEOs from financial analysts. Untabulated, we find that over one-third of the analysts in our sample of negative earnings announcements have issued valuations for at least one Non-White CEO-led firm during their career in our sample period. Furthermore, nearly half of the firms led by Non-White CEOs miss earnings expectations in at least one financial quarter per year, prompting an average of 5.6 valuation estimates by analysts in the following quarter. While Non-Whites are a minority among CEOs, we find that leaders from underrepresented backgrounds confront potential bias from analysts throughout their tenure.

<sup>15</sup> We also examined 6-month CARs following the 3-day CAR after the target price issuance and found Non-White (White) CEO firms have longer horizon returns of 1.47% (0.33%), with significant differences ( $p < 0.01$ ). Such results suggest that, over time, the market tends to correct the initial negative reaction observed in Non-White CEO firms following target price issuances.

<sup>16</sup> Many firms have analyst targets issued around earnings announcements. Untabulated, we split firms into those with versus without target prices within two days of the earnings announcement date. For firms without concurrent targets, earnings announcement returns show no significant difference between White and Non-White CEO firms ( $-3.2\%$  vs  $-3.3\%$ ,  $p = 0.882$ ). However, when targets are issued, returns are more negative for Non-White CEOs ( $-4.4\%$  vs  $-5.5\%$ ,  $p < 0.01$ ). Results are consistent with markets reacting to analysts' disparate valuation judgments.

**Table 4**  
Analyst target price pessimism.

	(1) Target	(2) Beat
Non-White	-0.000 (-0.03)	0.004 (0.36)
Bad News	-0.023*** (-3.49)	-0.010 (-0.69)
Non-White × Bad News	-0.013** (-2.27)	0.027*** (2.99)
Log Market Cap	0.012*** (4.37)	-0.024*** (-3.96)
Log Market Cap × Bad News	0.006** (2.00)	0.000 (0.06)
MTB	-0.007*** (-3.66)	0.006 (1.25)
MTB × Bad News	-0.001 (-0.43)	-0.011** (-2.39)
Book Leverage	0.006*** (3.14)	0.004 (1.23)
Book Leverage × Bad News	-0.001 (-0.97)	-0.005* (-1.92)
Abnormal Returns	-0.018*** (-10.49)	0.011*** (3.43)
Abnormal Returns × Bad News	0.003* (1.79)	-0.005*** (-2.92)
ROA	-0.007*** (-3.81)	0.008** (2.01)
ROA × Bad News	-0.000 (-0.03)	0.001 (0.35)
Return Volatility	0.013*** (3.96)	0.043*** (5.30)
Return Volatility × Bad News	0.004*** (2.66)	0.007*** (3.57)
ROA Volatility	0.006*** (3.93)	-0.010*** (-2.80)
ROA Volatility × Bad News	0.006*** (4.28)	-0.002 (-0.74)
Sales Growth	0.006*** (4.46)	-0.006* (-1.96)
Sales Growth × Bad News	0.003*** (2.71)	-0.003 (-1.50)
Log Analyst Following	-0.017*** (-9.21)	0.008 (1.64)
Log Analyst Following × Bad News	-0.008*** (-3.75)	0.004 (1.27)
Inst. Ownership	-0.001 (-0.59)	0.024*** (5.86)
Inst. Ownership × Bad News	0.000 (0.08)	0.005** (2.17)
Male	0.022*** (3.39)	-0.021 (-1.41)
Male × Bad News	0.005 (0.83)	-0.004 (-0.28)
Log Tenure	0.002 (1.59)	0.006** (2.33)
Log Tenure × Bad News	-0.002 (-1.15)	-0.006** (-2.00)
Overconfidence	0.004 (1.46)	0.004 (0.59)
Overconfidence × Bad News	0.010*** (2.67)	0.008 (1.33)

(continued on next page)

Table 4 (continued).

Year FE	Yes	Yes
Analyst FE	Yes	Yes
Adj-R <sup>2</sup>	0.186	0.125
N	97 624	97 624

This table presents results from analyzing analyst target price pessimism following the disclosure of negative earnings news. *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See Appendix A for variable definitions.

## 6. Identification

Results from Table 4 are consistent with unjustified analyst pessimism toward Non-White CEO firms when assessing the impact of bad news on the firm's valuation. This section seeks to clarify our causal inferences by explicitly linking race to these disparities through two orthogonal approaches. First, we construct a randomized experiment that parallels our empirical setting. Our experiment assuages concerns about non-random selection and other confounds by randomly assigning participants to conditions where the CEO's race is manipulated while other variables remain constant. Second, we assume the CEO's race is the primary driver of the observed disparities and test the empirical implications of Pettigrew's (1979) theory that racial attribution biases amplify with greater societal racial tension. Specifically, we exploit plausibly exogenous measures of time-series variation in racial bias and shocks to racial awareness. We expect that changes in overall racial sentiment are associated with changes in analysts' racial attitudes but are not associated with changes in analysts' perceptions about other firm/CEO-specific factors that might affect their valuation judgments.

### 6.1. Experiment

We triangulate our main findings with a randomized controlled experiment that closely mirrors our archival setting, and predict that Non-White CEOs will receive a lower valuation following bad earnings news. Our experimental design addresses potential differences between the White and Non-White CEO samples by holding all information constant across the two groups, except for the race of the CEO's photo. We recruit participants through the CloudResearch Connect platform. CloudResearch Connect is an online crowd-sourcing platform that is specifically tailored to academic research and that prior work validates to offer high quality participants (Hauser et al., 2022). As we realize that CloudResearch Connect participants are not sell-side analysts, we set specific recruiting requirements to try to minimize potential differences between the two groups.<sup>17</sup> Specifically, we require that all participants are white males between the ages of 30 and 100. Additionally, we require that all participants reside within the U.S. and have some experience investing in individual stocks.<sup>18</sup> We manipulate the race of the CEO via a photo (White male vs. Non-White male) and randomly assign participants to each condition. Non-white CEOs in our study comprise the following categories: East Asian, South Asian, Middle Eastern, Hispanic, or Black (see Appendix C for examples of all photos presented in the study).

Three hundred and sixty six participants first read background information about a hypothetical company, Radko Inc., its leadership, and summary financial performance.<sup>19</sup> Participants are randomly assigned to each of our White and Non-white conditions as follows: 181 participants view one of the two photos representing a White CEO, 185 participants view one of the 10 photos representing a Non-White CEO (where an average of 35 participants are randomly assigned to view a photo of one of the five Non-white categories). Except for the photo, all other information is held constant across all conditions. Next, participants receive a press release indicating that Radko Inc. reported EPS \$0.13 below analyst expectations. All participants then provide their estimates of the firm's future stock price over the next 12 months. To capture any additional perceptions participants may have in response to the CEO photos, we also ask them to rate the CEO's competence, trustworthiness, likeability, attractiveness, and perceived age (Willis and Todorov, 2006; Graham et al., 2017).

Table 5 column (1) indicates a significant and negative effect of future firm valuation for Non-White CEOs. Similarly, column (3) indicates a significant and negative effect for Non-White CEOs when we limit our sample to the more experienced participants (those selecting "Often" or "Very Often" to the question asking about their frequency of investing in individual stocks). Columns (2) and (4)

<sup>17</sup> While CloudResearch Connect participants tend to be heterogeneous, the sample of sell-side analysts reporting to I/B/E/S is not. For example, Kumar (2010) and Francis et al. (2020) find that these analysts are overwhelmingly male (85%–90%), and have many years of experience. Our own data indicates that the majority of analysts are also White (87%). Additionally, we hand-collect a random sample of 50 LinkedIn resumes of analysts reporting to I/B/E/S during 2012–2013 (the midpoint of the time-series in our sample). We verify that this sample is dominated by males, and that their average age is above 30 (based on college graduation year or first date of employment).

<sup>18</sup> Specifically, all participants responded to the following question: How often do you buy or sell publicly traded individual stocks? Those who answer "Sometimes", "Often", or "Very Often" complete our study. Participants respond to this question when they first register for a CloudResearch Connect account and then confirm their responses at the start of our study.

<sup>19</sup> Four hundred and two participants complete our study (201 participants per condition). Thirty six of these participants incorrectly respond to an attention check question presented prior to our manipulation of CEO race. We exclude these participants from our final sample, however inferences remain the same if we include them.

**Table 5**  
Valuation estimates from an online experiment.

	Full sample		Experienced sample	
	(1)	(2)	(3)	(4)
Non-White	-0.324 <sup>++</sup> (-1.65)	-0.325 <sup>+</sup> (-1.64)	-0.485 <sup>++</sup> (-1.68)	-0.603 <sup>++</sup> (-2.06)
Attractiveness		0.079 <sup>*</sup> (1.83)		0.140 <sup>**</sup> (2.22)
Competence		0.082 <sup>**</sup> (2.20)		-0.038 (-0.62)
Trustworthiness		0.010 (0.23)		0.021 (0.32)
Likability		-0.062 (-1.36)		0.015 (0.20)
Perceived Age		-0.023 (-0.16)		0.222 (1.03)
Intercept	4.254 <sup>***</sup> (30.37)	0.437 (0.15)	4.058 <sup>***</sup> (20.55)	-5.545 (-1.20)
Adj-R <sup>2</sup>	0.005	0.019	0.011	0.026
N	366	366	161	161

This table presents results from analyzing valuation estimate responses from a randomized controlled experiment. The dependent variable is *Future Value Estimate*. Full sample comprises all survey participants. Experienced subsample comprises survey participants that responded that they “often” or “very often” invest in individual stocks. Statistical significance at the 10%, 5%, and 1% levels for two-tailed tests is indicated by \*, \*\*, and \*\*\*, and for one-tailed tests for Non-White by +, ++, and +++ where a directional prediction has been made. See [Appendix A](#) for variable definitions.

show that these results are robust to controlling for perceptions of CEO attractiveness, competence, trustworthiness, likability, and age. Consistent with [Graham et al. \(2017\)](#), *Competence* and *Attractiveness* are also significantly correlated with perceptions of CEO performance, indicating that our participants are aware of the CEO photo when making the valuation judgment and that the photo influences the participant’s valuation opinion in accordance with prior research. Overall, the results from our controlled experiment triangulate our archival findings, with participants assigning a lower valuation estimate to firms led by Non-White CEOs following bad earnings news.

## 6.2. Racial tension and valuation disparities

[Pettigrew \(1979\)](#) posits that racial attribution biases are more pronounced in environments with heightened racial tension. Similarly, recent economic research, such as [Barr et al. \(2018\)](#), indicates that discriminatory behavior is influenced by societal norms linked to race. In this section, we explore whether the disparity between White and Non-White CEO-led firms identified in our main analyses varies over time, as anticipated by prior literature. Assuming that the connection between racial sentiment and analysts’ target valuation pessimism is primarily rooted in racial bias rather than other economic mechanisms, these tests help further identify the effect of race.

Drawing on prior literature that highlights shifts in the acceptability of racism in social norms coinciding with the election of the 45th US President, Donald Trump ([Crandall et al., 2018](#); [Burszty et al., 2020](#); [Grosjean et al., 2022](#)),<sup>20</sup> we utilize November 8, 2016, the election date, as an indicator of a structural break in racial sentiment.<sup>21</sup> This date also marks the transition from the first Non-White President back to a White President. Previous research underscores that disconfirming exemplars can mitigate implicit biases stemming from stereotypes, like the notion of minorities as inferior leaders ([O’Sullivan and Durso, 1984](#); [Hewstone, 1989](#); [Plant et al., 2009](#); [Columb and Plant, 2011](#); [Goldman and Mutz, 2014](#)). If the post-Trump period reflects a regime shift in the societal acceptability of racial bias, and if analyst pessimism is linked to racial bias, it follows that we expect to observe greater pessimism among analysts towards Non-White CEO firms in the post-Trump period.

We re-estimate Eq. (1) for four years before and after the 2016 US presidential election. Results are presented in [Table 6](#). In the four years following the election, interaction term coefficients stand at  $-0.029$  (*Target*) and  $0.068$  (*Beat*), both statistically significant ( $p < 0.05$ ,  $p < 0.01$ , respectively). In the four years before the election, interaction term coefficients are  $0.007$  and  $0.004$ , statistically insignificant. These results suggest that valuations per unit of bad news show no significant difference between White and Non-White CEO groups, suggesting that valuations for Non-White CEO-led firms were economically justified. The differences in the coefficients

<sup>20</sup> [Crandall et al. \(2018\)](#) and [Burszty et al. \(2020\)](#) show via revealed preference experiments that Trump’s victory altered the acceptability of social norms that increased feelings of xenophobia while [Grosjean et al. \(2022\)](#) find evidence of racial bias from police using event studies in the immediate 30 days following a Trump rally for the county in which it was held.

<sup>21</sup> Illustration (b) ([Appendix B](#)) displays a Google Trends search for “White Nationalism”, revealing substantial spikes in the search score during the election month of November 2016 and four subsequent shocks in the subsequent four years. The average search score in this period is more than five times greater than the preceding four years (Pre = 5.12, Post = 26.5), with the difference significant ( $p < 0.01$ ).

**Table 6**  
Analyst pessimism and racial sentiment.

	Pre-Trump		Post-Trump		Low-FBI hate crime		Med-FBI hate crime		High-FBI hate crime	
	(1) Target	(2) Beat	(3) Target	(4) Beat	(5) Target	(6) Beat	(7) Target	(8) Beat	(9) Target	(10) Beat
Non-White × Bad News	0.007 (0.82)	0.004 (0.22)	-0.029** (-2.55)	0.068*** (3.56)	0.010 (1.05)	-0.022 (-1.42)	-0.021** (-2.29)	0.027* (1.91)	-0.018** (-2.00)	0.065*** (4.31)
(3)-(1) p-value			0.013							
(4)-(2)				0.011						
(9)-(5)									0.026	
(10)-(6)										<0.001
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bad News × Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Analyst FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R <sup>2</sup>	0.181	0.130	0.254	0.179	0.194	0.155	0.210	0.126	0.230	0.155
N	31 220	31 220	21 965	21 965	37 413	37 413	27 673	27 673	31 547	31 547

This table presents results from analyzing the relation between analyst target price pessimism and time-series proxies of racial sentiment. Racial tension is measured using two measures. Columns 1 to 4 present results from analyzing analyst pessimism surrounding the election of the 45th President of the USA, Donald J. Trump, in November 2016. Post-Trump is the four years after November 8, 2016, and Pre-Trump is the four years before. Columns 5 to 10 measure racial tension using the FBI data that counts the number of incidents where racial bias crimes were reported against non-white people. We split the sample into terciles, where, “Low-”, “Med-”, and “High-” are the first, second, and third terciles, representing low, medium, and high racial tension, respectively. *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See Appendix A for variable definitions.

**Table 7**  
Matched samples - re-estimation of baseline regression.

	Baseline		PSM 1:1		PSM 3:1		PSM IPTW		Entropy Balanced	
	(1) Target	(2) Beat	(3) Target	(4) Beat	(5) Target	(6) Beat	(7) Target	(8) Beat	(9) Target	(10) Beat
Non-White × Bad News	-0.013** (-2.27)	0.027*** (2.99)	-0.018** (-2.42)	0.044*** (4.06)	-0.013** (-2.15)	0.040*** (3.99)	-0.013*** (-2.47)	0.028*** (3.04)	-0.013** (-2.53)	0.043*** (4.89)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bad News × Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Analyst FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R <sup>2</sup>	0.186	0.125	0.233	0.148	0.194	0.130	0.184	0.125	0.290	0.205
N	97 624	97 624	9016	9016	18 824	18 824	97 624	97 624	97 624	97 624

This table presents results from re-estimating the main regression using the four matched samples (columns 3 - 10). Baseline regression results from Table 4 are presented for reference (columns 1 - 2). *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See Appendix A for variable definitions.

between the two periods are significant at 5%. These findings indicate analyst valuation pessimism toward Non-White CEO firms was significantly higher in the Post-Trump period. The lack of additional pessimism in the pre-Trump period may be attributed to Obama’s initiatives aimed at enhancing diversity and inclusion in the workforce, consistent with findings from Goldman and Mutz (2014).<sup>22,23</sup>

Our next test utilizes the Federal Bureau of Investigation Hate Crimes Statistics over the full time-series of our sample to construct a measure of negative racial sentiment, where higher levels indicate heightened racial tension. Specifically, we measure racial tension as the number of racial bias crimes against Non-Whites reported each year to the FBI. We predict that higher levels of racial bias crimes will be positively associated with the racial bias we observe in analysts’ valuations. We split the panel into three subsamples, based on whether they were in the first (low), second (med) or third (high) terciles with regards to hate crime incidents. Table 6 columns (5) to (10) report the results of these analyses. Results have similar inferences to the Pre-/Post-Trump analyses with the coefficient on *Beat* monotonically increasing in both magnitude and significance across the three terciles. In columns (5) and (6), the low racial tension subsample, we do not find any evidence of valuation pessimism, with the coefficients being 0.010 and -0.022 and statistically insignificant. In columns (9) and (10), the high racial tension subsample, the coefficients are -0.018 and 0.065 ( $p < 0.05$ ,  $p < 0.01$  respectively). The differences in the coefficients between the low and the high subsamples are statistically significant ( $p < 0.05$  for *Target* and  $p < 0.01$  for *Beat*). Collectively, results suggest that our main findings regarding analyst pessimism towards Non-White CEOs vary predictably with the degree of racial tension and provide further evidence that the disparities we observe are driven by race.

<sup>22</sup> For example, in August 2011, President Barack Obama signed an Executive Order (EO) titled “Establishing a Coordinated Government-Wide Initiative to Promote Diversity and Inclusion in the Federal Workforce. <https://obamawhitehouse.archives.gov/issues/civil-rights/empowerment>.

<sup>23</sup> <https://www.govexec.com/management/2016/11/obama-seeks-cement-agency-diversity-efforts-trump-takes-office/133441/>

**Table 8**  
Alternate pessimism measures.

	(1)	(2)	(3)	(4)	(5)
	Alt target	Beat%	Maxprice%	Beat3M	Beat6M
Non-White × Bad News	-0.016*** (-2.90)	0.026*** (3.34)	0.049*** (2.95)	0.027*** (2.70)	0.028*** (2.79)
Controls	Yes	Yes	Yes	Yes	Yes
Bad News × Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Analyst FE	Yes	Yes	Yes	Yes	Yes
Adj-R <sup>2</sup>	0.221	0.126	0.183	0.107	0.110
N	97 624	97 624	97 624	97 624	97 624

This table presents results from re-estimating the main regression using alternate measures of *Target* and *Beat*. *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, \*\*\*. See Appendix A for variable definitions.

Section 6.2 demonstrates that the initial findings concerning analysts' pessimism are moderated by fluctuations in social norms regarding the acceptability and frequency of racist behavior, aligning with racial attribution bias theories and prior economic studies. When coupled with results from our controlled and randomized experiment in Section 6.1, we find analysts' heightened sensitivity to bad earnings news when making valuation judgments about Non-White CEO firms to be consistent with race-related biases.

## 7. Robustness

### 7.1. Propensity score matching and entropy balancing

While diagnostic tests from Section 5.1 indicate that differences between the White and Non-White samples follow guidelines allowing for inference from regression analyses, we present baseline regressions using covariate balancing and weighting methods for robustness. We create matched samples with 1:1 and 3:1 propensity score matching to nearest neighbor, and weighted samples using inverse propensity score weighting and entropy balancing. The propensity score model uses *Non-White* as the dependent variable, regressed on the remaining covariates. For inverse propensity score weighting, we use the same model to assign weights based on the inverse probability of *Non-White* status, creating a pseudo-cohort with independent treatment assignment. In the entropy balancing technique, we weight observations to match the mean, variance, and skewness across White and Non-White subgroups for all covariates.

Table 7 tabulates the *Non-White* × *Bad News* coefficient from estimating Eq. (1) using the four covariate balancing techniques, and for convenience re-tabulates the results from the original sample. Overall, across 10 regressions and 5 samples, statistical inferences on *Non-White* × *Bad News* remain unchanged for both *Target* and *Beat*. Neither statistical nor economic significance are attenuated in any of the pre-processed samples. These results, in conjunction with the findings and discussion of sample diagnostics in Table 3b, address concerns that our findings of analysts' pessimism towards Non-White CEOs could stem from substantial differences between the White and Non-White groups.

### 7.2. Alternate measures of *Target* and *Beat*

Our *Target* calculation uses the pre-earnings announcement price as the scalar to ensure that the *Bad News* date (and hence the impact of *Bad News*) is captured within the window of the implied return calculation. Moreover, using the pre-earnings announcement price helps avoid potential confounding effects of other analysts' reports issued immediately after the EA.<sup>24</sup> Our findings are robust to using the pre-target announcement price. Table 8 column 1 shows results from replicating the baseline regression after re-calculating *Target* using the pre-target announcement price as the scalar.

Next, we examine the sensitivity of our findings to alternate measures of the outcome bias variable, *Beat*. We re-estimate the baseline regression using four additional proxies for ex-post analyst target price pessimism: *Beat%*, the percentage of target price achieved from the pre-earnings benchmark; *Maxprice%*, the ratio of maximum stock price within twelve months to the target price; and *Beat3M* and *Beat6M*, indicators for whether the stock price exceeds the target within three and six months. Table 8 columns 2 through 5 show that our results are robust to these alternate pessimism measures.

<sup>24</sup> For example, if Analyst A releases a biased report on day  $EA + 1$ , and the stock price responds negatively, then Analyst A's stock price effect will be included in the lagged price for Analyst B who releases on day  $EA + 2$ .

**Table 9**  
Analysts' subsequent target price revisions.

	(1) % Days exceed	(2) Max return
Non-White × Bad News	0.019* (1.68)	0.031*** (2.73)
Controls	Yes	Yes
Bad News × Controls	Yes	Yes
Year FE	Yes	Yes
Analyst FE	Yes	Yes
Adj-R <sup>2</sup>	0.151	0.184
N	44 426	44 426

This table presents results from analyzing analysts' subsequent target price revisions. The sample consists of upward target price revisions. The dependent variables are the number of days the stock price exceeded the analyst's initial target price, as a percentage of days between the analyst's initial target issuance and the subsequent upward target price revision (column 1), and the maximum price achieved before the upward revision scaled by the initial target price (column 2). *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See [Appendix A](#) for variable definitions.

**Table 10**  
Short window analysis.

	Within two days from EA		After two days from EA	
	(1) Target	(2) Beat	(3) Target	(4) Beat
Non-White × Bad News	-0.017** (-2.27)	0.035*** (3.12)	-0.010 (-1.35)	0.022* (1.68)
(3)-(1) p-value			0.429	
(4)-(2)				0.382
Controls	Yes	Yes	Yes	Yes
Bad News × Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Analyst FE	Yes	Yes	Yes	Yes
Adj-R <sup>2</sup>	0.225	0.118	0.166	0.131
N	50 172	50 172	46 560	46 560

This table presents results from re-estimating the main regression for target price forecasts that are issued within two days (columns 1 and 2) and those that are issued after two days (columns 3 and 4) from the earnings announcement. *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See [Appendix A](#) for variable definitions.

### 7.3. Subsequent revision of Target

We also investigate whether analysts are more reluctant to update initial valuations following an earnings miss, focusing on upward adjustments. If analysts have greater internal attribution of bad news to Non-White CEOs, we expect analysts may take longer and require higher returns before revising the prior valuation. Thus, we examine the impact of *Non-White × Bad News* on: (1) the number of days the stock price surpasses the initial target before revision, and (2) the maximum stock price achieved relative to the initial target before revision. Results in [Table 9](#) show that when Non-White CEO firms report larger earnings misses, they must demonstrate prolonged improved performance before analysts update initial assessments. These results are consistent with greater internal attribution of bad news to Non-White CEOs.

### 7.4. Timing of target issuance relative to earnings announcement

In our sample, the majority (52%) of our target price revisions occur within two days of the earnings announcement date. For robustness, we split the sample into two subsamples: target valuations which are issued within a short window following the earnings announcement (within the two-day period) versus those farther from earnings announcement date (the remainder of the sample). [Table 10](#), shows that while the coefficient on *Non-White × Bad News* for *Beat* is positive and significant in both samples ( $p < 0.01$  for

**Table 11a**  
Analyst experience.

	Early target reports		Later target reports	
	(1) Target	(2) Beat	(3) Target	(4) Beat
Non-White × Bad News	-0.023*** (-2.95)	0.041*** (3.38)	-0.004 (-0.52)	0.013 (1.14)
(3)-(1) p-value			0.046	
(4)-(2)				0.052
Controls	Yes	Yes	Yes	Yes
Bad News × Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Analyst FE	Yes	Yes	Yes	Yes
Adj-R <sup>2</sup>	0.184	0.122	0.195	0.145
N	56 644	56 644	38 643	38 643

This table presents results from re-estimating the main regression after splitting the sample into target price forecasts issued early (later) in the analyst's career. A target report is considered early if it is one of the first (second) half of the analyst's all target reports issued for that firm. *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See [Appendix A](#) for variable definitions.

**Table 11b**  
EPS forecasts.

	(1) First revision	(2) AFE
Non-White × Bad News	-0.000 (-0.53)	0.000 (0.33)
Controls	Yes	Yes
Bad News × Controls	Yes	Yes
Year FE	Yes	Yes
Analyst FE	Yes	Yes
Adj-R <sup>2</sup>	0.199	0.062
N	110 635	164 087

This table presents results from analyzing a sample of analysts' earnings per share forecasts issued following the disclosure of negative earnings news. Revision is calculated as the first quarterly forecast following the bad earnings news, less the last forecast prior to the bad earnings news. AFE, analyst forecast error, is calculated as actual earnings less the last forecast issued after the bad news earnings announcement and before the next earnings announcement. All dependent variables are scaled by the beginning of the quarter stock price. *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See [Appendix A](#) for variable definitions.

the within two days sample, and  $p < 0.10$  for the remainder of the sample), analysts' valuations appear to be more pessimistic in the short-window subsample. The coefficient for *Target* is negative and significant in the short-window ( $p < 0.05$ ), and not statistically significant for targets issued farther away from the earnings announcement. These results suggest that analysts' pessimism about bad earnings news is more pronounced when valuations are updated immediately after the earnings announcement date - i.e., when they are most salient and the main source of new information.

In summary, Section 7 documents the robustness of our main finding that analysts' valuations of Non-White CEO firms are excessively pessimistic, moderated by bad earnings news. Our findings are unaffected by propensity score matching, entropy balancing, alternate outcome bias measures, and alternate analyses of subsequent target revisions. The greater pessimism for timely reports underscores bad earnings news as the key driver of analysts' bias.

## 8. Valuation pessimism: An implicit or explicit bias?

In the realm of social psychology, biases are often categorized as either implicit or explicit. Explicit biases are consciously recognized attitudes, such as overt racial animosity. Conversely, implicit biases are unconscious attitudes that operate unintentionally beyond awareness ([Dovidio and Gaertner, 1986](#)). Although directly discerning between implicit and explicit biases in our context is impossible as it necessitates the use of specialized measures like the [Greenwald et al.'s \(1998\)](#) Implicit Association Test and

**Table 11c**  
Analyst target prices after good news.

	(1) Target	(2) Beat
Non-White × Good News	-0.004 (-1.06)	0.003 (0.54)
Controls	Yes	Yes
Good News × Controls	Yes	Yes
Year FE	Yes	Yes
Analyst FE	Yes	Yes
Adj-R <sup>2</sup>	0.172	0.103
N	286 147	286 147

This table presents results from re-estimating the main regression using a sample of target price forecasts issued following the disclosure of positive earnings news. *t*-statistics based on heteroskedasticity robust standard errors double clustered by analyst and year-month are in parentheses. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, and \*\*\*. See Appendix A for variable definitions.

self-reported surveys or face-to-face interviews, we conduct a series of empirical analyses to examine whether the bias aligns more closely with implicit or explicit dimensions. Specifically, we investigate how the analyst pessimism we observe is influenced by:

- (1) Analysts' familiarity with the firm's CEO
- (2) An environment where ex-post bias is salient and well-publicized, incentivizing correction
- (3) Positive earnings news that contradicts presumed attitudes about a stereotype

### 8.1. Analyst experience

We conduct analyses to examine whether analysts' disparities toward all non-white CEOs may attenuate over time, consistent with analysts learning from prior experience and reducing their biases. To do so, we require that an analyst issues at least two target price reports for the same firm-CEO and split the full sample into subsamples where the early (later) sample refers to the first (second) half of each analyst's target price reports for the firm. To the extent that there are an odd number of target price reports, we include the middle report in the early sample. In Table 11a, we report that *Target* and *Beat* are statistically significant ( $p < 0.01$ ) in the earlier target report sample, but insignificant in the later target sample, and the differences in these coefficients across the two subsamples are statistically significant ( $p < 0.05$  for *Target*,  $p < 0.1$  for *Beat*). These findings suggest that as analysts gain experience, their biases against Non-White CEOs are attenuated.<sup>25</sup>

### 8.2. Analysts' EPS forecasts

Unlike analysts' target price valuations, earnings per share (EPS) forecasts offer a clear benchmark—the firm's actual EPS. This transparency supports post-event accuracy assessment and peer comparison. Analysts are particularly attentive to forecast errors on earnings announcement days, fostering an environment for learning and bias correction, particularly when bias is implicit. Furthermore, the incentive for bias correction is significant, with accurate EPS forecasters often receiving recognition and rewards from reputable sources like the Wall Street Journal and third-party providers like Refinitiv StarMine. Previous research (Mikhail et al., 1999; Hong and Kubik, 2003) highlights favorable career outcomes for analysts delivering precise EPS forecasts. In summary, we argue that the analyst valuation bias we document will be attenuated in an environment such as EPS forecasting where outcomes are more salient (relative to target price errors) and analysts are encouraged to learn from their prior errors.

Thus, we modify Eq. (1) to focus on whether analysts' earnings forecasts are excessively pessimistic following bad earnings news. We create two variables - a variable that captures ex-ante pessimism, and analyst forecast error. *Revision* is calculated as the revision following bad earnings news, i.e., the change in the upcoming quarterly EPS forecast less the last forecast prior to *Bad News*. *AFE*, analyst forecast error, is calculated as the firm's actual earnings less the analyst's last earnings forecast prior to the next earnings announcement. All variables are scaled by the firm's beginning of quarter stock price. Table 11b tabulates results. The coefficients on the variable of interest *Non-White × Bad News* are not statistically different from zero, and the magnitudes of the coefficients are near zero in both specifications. These results suggest that the observed analyst pessimism for valuation judgments does not manifest in other contexts where analysts can easily observe their prior errors and are highly incentivized to correct their biases.

<sup>25</sup> Inferences remain unchanged if we remove black CEOs from the test, suggesting that the results are not driven by the heightened racial awareness for black CEOs during the BLM period.

### 8.3. Good news

Finally, we re-estimate our baseline regressions from Eq. (1) with a sample of good news, i.e., positive earnings announcements. The rationale is straightforward: explicit biases, if present, should persist even in the face of positive news. Conversely, implicit biases, should be more pronounced when firms release news that aligns with the presumed racial bias regarding the Non-White subgroup. This alignment acts as a priming mechanism that could influence analysts' judgment. In Table 11c, we report that the interaction coefficients for *Non-White* × *Good News* is insignificant for both *Target* and *Beat*. Specifically, when firms report positive earnings news, analysts' valuations for White and Non-White CEOs are comparable with both subgroups being equally likely to surpass their valuation targets. Results appear to be inconsistent with the notion of an explicit bias, as the valuation pessimism we document appears contingent on analysts being primed by information (i.e., adverse earnings news) that corresponds to their implicit beliefs about the Non-White subgroup.<sup>26,27</sup>

In summary, Section 8 documents three takeaways. (1) Valuations for Non-White become unbiased as analysts' gain experience and familiarity with the firm's CEO, suggesting that analysts may be able to learn from their mistakes after observing the outcome bias. (2) In settings where analysts errors are highly salient, incentivizing analysts to more easily learn from their biases, judgments for Non-White become unbiased. (3) When potential negative stereotypes about Non-White are not primed by bad earnings news, target price valuations are unbiased. Taken together, these results suggest that the analyst pessimism we document is more likely to be an implicit or unconscious bias rather than an explicit prejudice.<sup>28</sup> While it is impossible to make definitive conclusions regarding the nature of analysts' valuation pessimism, our empirical findings suggest that valuation pessimism we document may be an implicit bias.

## 9. Conclusion and suggestions for future study

We document evidence that financial analysts exhibit attribution bias against non-white CEOs when making valuation judgments following negative earnings surprises. Specifically, analysts attribute bad news more strongly to Non-White CEOs, resulting in excessively pessimistic valuations for their firms. Consequently, Non-White CEO firms are more likely to exceed targets over the next year. The outcome bias we observe is consistent with such pessimism against Non-White CEOs being economically unjustified and suggestive of a racial attribution bias.

To bolster causal inferences between race and valuation pessimism, we conduct a randomized controlled experiment that aligns closely with our empirical setting. Experimental results corroborate our archival findings — participants provide lower valuations for Non-White CEO-led firms after a negative earnings surprise. Additional archival analyses document that this bias is amplified during times of heightened racial tension and attenuated with awareness of one's biases, implying a subconscious bias and suggesting that efforts spent towards education around racial stereotypes may be effective in mitigating these judgment errors.

While it seems evident that inequitable attribution biases directed towards specific demographic groups or cohorts could significantly influence the career outcomes of the individuals in the affected group, e.g., the Non-White CEOs, we argue that the impacts of such attribution bias could also manifest in potential deleterious outcomes that involve other parties. For example, other stakeholders' decisions (potential joint venture partners, debtholders) may be impacted by analysts' opinions, potentially resulting in disparities in how corporate alliances are formed or how violations of debt covenants are renegotiated. In a different vein, it is also conceivable that Non-White CEOs, cognizant of these latent biases, could be more prone to making myopic managerial decisions to avoid unjustified negative perceptions. Finally, we note that our setting is in the United States, where many firms have adopted DEI-related KPIs. Similar studies in international settings could examine the generalizability of our results and provide further perspectives regarding the nature of how such biases differ across different cultures. We advocate for future research and believe such studies could provide valuable insights for both practitioners and academics.

<sup>26</sup> Numerous psychological studies document priming as a means of activating automatic processes or subconscious judgments, see Devine (1989) for a partial review of such literature.

<sup>27</sup> Relatedly, untabulated results suggest that priming analysts with information that counters their implicit beliefs, as exemplified by the Black Lives Matter movement (BLM) may also be effective. BLM was created to amplify awareness about systemic racism against black people following the July 2013 Trayvon Martin trial. We find that in the pre-BLM period (two years before July 6, 2013), Black CEOs have valuations which are subjected to analysts' pessimism. Following the advent of BLM (two year after July 6, 2013), however, analysts appear less pessimistic against Black CEOs.

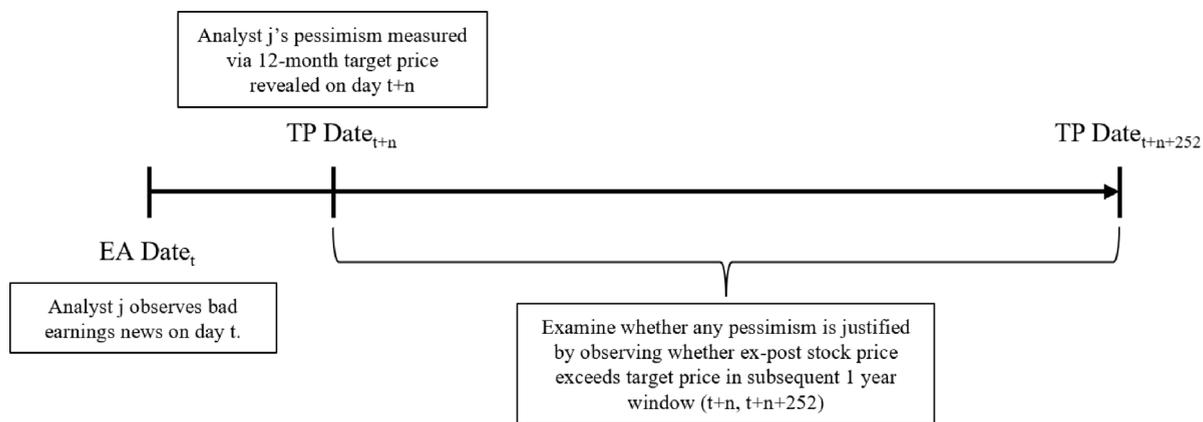
<sup>28</sup> In an untabulated test, we examine if the bias varies across idiosyncratic and industry-wide components of bad news, where industry bad news is measured as the mean of all bad news in the two-digit SIC industry for a given year-quarter, and idiosyncratic bad news as the difference between the firm's bad news and industry bad news. We find that analysts' target price pessimism is not different across the two components. This indicates that analysts are not able to distinguish between the two components, and is consistent with our other findings which suggest the bias appears to be subconscious.

## Appendix A. Variable definitions and data sources

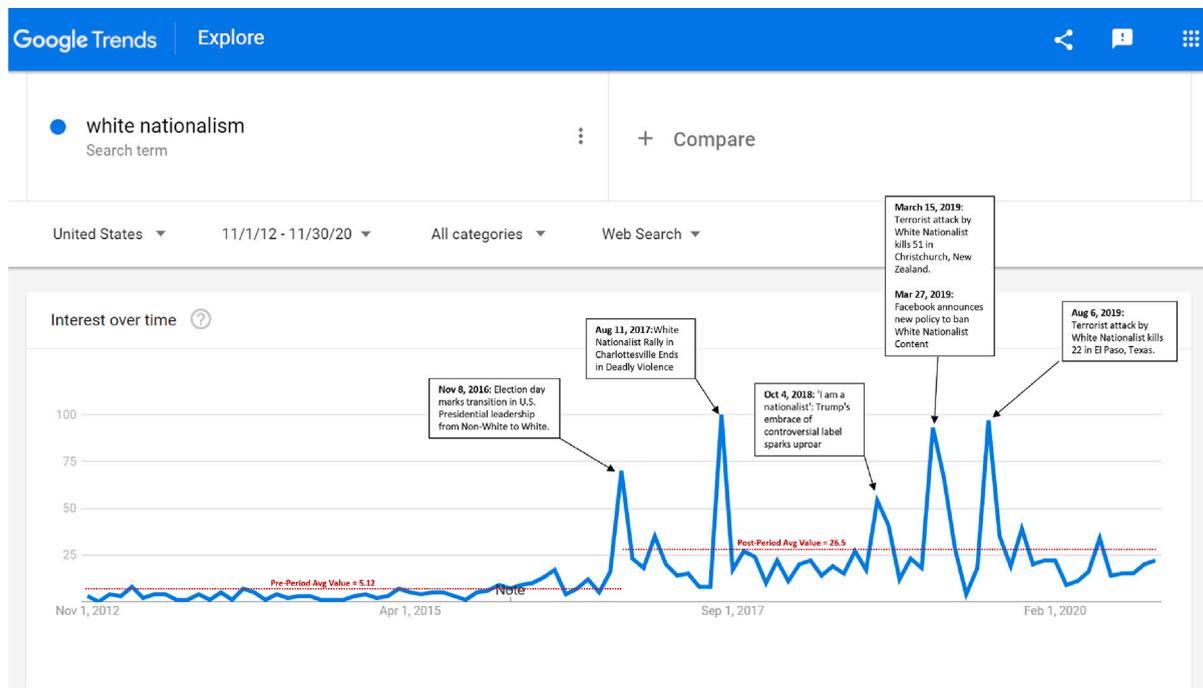
Variable	Definition (data source)
<b>Dependent variables</b>	
Beat	Dummy variable that equals one if the stock price exceeds the target price within twelve months from the target price issuance date, and zero otherwise. (Source: I/B/E/S, CRSP)
Target	Obtained by solving for the annualized implied return, $R$ , based on continuous compounding: $Price_{Forecast12M} = Price_{Pre-EA} \cdot e^{RT}$ $R = \frac{\ln(Price_{Forecast12M}) - \ln(Price_{Pre-EA})}{T}$ (Source: I/B/E/S, CRSP)
Alt Target	Alternative <i>Target</i> calculated by replacing pre-EA price with stock price one day prior to target announcement. (Source: I/B/E/S, CRSP)
Beat%	Percentage the target price is met within twelve months from the issuance date, calculated as the maximum stock price within twelve months minus the stock price at the beginning of the quarter, divided by the target price minus the stock price at the beginning of the quarter. (Source: I/B/E/S, CRSP)
Maxprice%	Ratio of the maximum stock price within twelve months from the target price issuance date to the target price. (Source: I/B/E/S, CRSP)
Beat3M	Dummy variable that equals one if the stock price exceeds the target price within three months from the target price issuance date, and zero otherwise. (Source: I/B/E/S, CRSP)
Beat6M	Dummy variable that equals one if the stock price exceeds the target price within six months from the target price issuance date, and zero otherwise. (Source: I/B/E/S, CRSP)
% Days Exceed	The number of days the stock price exceeded the analyst's initial target price, as a percentage of days between the analyst's initial target issuance and the subsequent upward target price revision. (Source: I/B/E/S, CRSP)
Max Return Revision (EPS forecasts)	The maximum price achieved before the upward revision scaled by the initial target price. (Source: I/B/E/S, CRSP)
AFE (EPS forecasts)	First one quarter ahead quarterly EPS forecast following the earnings announcement less the last forecast prior to the earnings announcement, divided by the stock price at the beginning of the quarter. (Source: I/B/E/S, CRSP)
	Analyst forecast error, calculated as actual earnings less the last EPS forecast issued after the bad news earnings announcement and before the next earnings announcement, divided by the stock price at the beginning of the quarter. (Source: I/B/E/S, CRSP)
<b>Main</b>	
Non-White	Dummy variable that equals one if the CEO's race is identified as non-white, and zero otherwise. (Source: Collected through survey)
Bad News	Negative earnings surprise measured as I/B/E/S actual EPS minus the last consensus EPS forecast, scaled by the share price at the end of the quarter. (Source: I/B/E/S)
<b>Firm and CEO characteristics</b>	
Log Market Cap	Natural logarithm of market capitalization. (Source: Compustat)
MTB	Market-to-book value of assets. (Source: Compustat)
Book Leverage	Total debt divided by total assets. (Source: Compustat)
Abnormal Returns	Buy-and-hold market-adjusted abnormal returns measured over the contemporaneous quarter. (Source: CRSP)
ROA	Return-on-assets, calculated as income before extraordinary items divided by lagged total assets. (Source: Compustat)
Return Volatility	Standard deviation of daily returns over the contemporaneous quarter. (Source: Compustat)
ROA Volatility	Standard deviation of quarterly ROA over the past 20 quarters. (Source: Compustat)
Sales Growth	Quarterly growth of total sales, calculated as sales minus lagged sales, divided by lagged sales. (Source: Compustat)
Log Analyst Following	Natural logarithm of the number of analysts following the firm. (Source: I/B/E/S)
Inst. Ownership	Institutional ownership percentage (Source: Thomson Reuters)
Male	Dummy variable that equals one if the CEO is male, and zero otherwise. (Source: Execucomp)
Log Tenure	Natural logarithm of the CEO's tenure calculated as the difference between a given year and the first year as CEO. (Source: Execucomp)
Overconfidence	Dummy variable that equals one if the CEO, at least twice during his/her tenure at the firm, holds exercisable option portfolios that are greater than 67% in the money at the end of the fiscal year, and zero otherwise (Malmendier and Tate 2005, Campbell et al. 2012). (Source: Execucomp)
<b>CloudResearch Connect experiment variables</b>	
Future Value Estimate	Participant's response to "You forecast Radko's future stock price (12 months from now) to be _ relative to today's \$40 price: 7 item scale ranging from <i>Much Lower</i> to <i>Much Higher</i> "
Non-White	Dummy variable that equals one if participants viewed a Non-White Male Photo representing one of the five races (East Asian, South Asian, Middle Eastern, Hispanic, Black) in the description of the company's CEO, and zero if participants viewed a White Male Photo in the description of the company's CEO.
Attractiveness	7 item scale ranging from <i>Very Unattractive</i> to <i>Very Attractive</i>
Competence	7 item scale ranging from <i>Very Incompetent</i> to <i>Very Competent</i>
Trustworthiness	7 item scale ranging from <i>Very Untrustworthy</i> to <i>Very Trustworthy</i>
Likability	7 item scale ranging from <i>Very Unlikable</i> to <i>Very Likable</i>
Perceived Age	Perceived age of the CEO. 9 item scale ranging from <i>Under 18</i> to <i>85 or older</i>
<b>Racial tension measures</b>	
Pre-/Post-Trump	Post-Trump is the four years after November 8, 2016 (the election of the 45th President of the USA, Donald J. Trump), and Pre-Trump is the four years before.
FBI Hate Crime	A time-series proxy of racial sentiment using the number of incidents where racial bias crimes were reported against non-white people. The data are available at the annual frequency. We calculate the number of total non-white racial bias incidents as total racial bias incidents minus total anti-white bias incidents. (Source: FBI [https://ucr.fbi.gov/hate-crime])

Appendix B. Illustrations

(a) Timeline for variable measurement



(b) Google search trend on "White Nationalism"



### Appendix C. CloudResearch connect experiment

This Appendix presents the photos displayed to participants assigned to either the ‘Non-White CEO’ or ‘White CEO’ conditions. Each participant in these conditions only viewed one photo. Experimental participants in the ‘Non-White CEO’ condition were randomly assigned to view one of the photos (a) through (j) representing the East Asian, South Asian, Middle Eastern, Hispanic, and Black ethnicities. Participants in the ‘White CEO’ condition were randomly assigned to view one of the photos (k) through (l) representing the White race.



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)



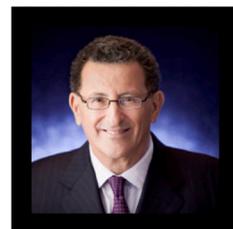
(i)



(j)



(k)



(l)

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