Pessimism toward Diverse Boards: Evidence of Implicit Bias of Analysts?

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Abstract

We investigate the impact of racial and gender diversity of corporate boards on sell-side analyst recommendations. Using a sample of S&P 1500 firms during 1996-2016, we find that the existence of "non-traditional" board members is associated with lower analyst recommendations and a lower percentage of "buy" ratings on a firm's stock. To address endogeneity concerns, we use an instrumental variable related to a firm's board connectedness to non-traditional members and a diff-in-diff analysis of the new addition of "non-traditional" directors to a firm's board. The examination of return-on-assets does not yield a reduction associated with the addition of minority or female directors. Analysts do not adjust their forecasts of earnings downward, although they downgrade their stock recommendations following the addition of new "non-traditional" board members. In addition, we examine market reaction to the addition of new "non-traditional" directors. There is no robust evidence of a negative market reaction. Our findings provide evidence that analysts may exhibit implicit bias against racial and gender diversity of boards of directors.

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1. Introduction

Bias in analyst earnings forecasts and stock recommendations, due to self-selection and conflicts of interests, is well-documented in the accounting and finance literature (Dowden, 1989; De Bondt, Thaler, & H., 1990; Malmendier & Shanthikumar, 2014).[1] In this paper, we examine a form of analyst bias possibly due to racial and gender bias, as opposed to commonly-explored, rational drivers of bias such as self-selection and conflict of interests.

We document relative pessimism in analysts' recommendations of firms with racial and gender diversity among their board of directors, compared to firms which lack such diversity. We find that the presence of a "non-traditional" (Female, African American or Hispanic) board director is associated with a reduction of analyst median recommendation by 15% of one standard deviation. The existence of a non-traditional director is also associated with a reduction of four percentage points in the proportion of "buy" recommendations on the firm's stock, also corresponding to a reduction of 15% of one standard deviation. To address endogeneity concerns, we use an instrumental variable related to a firm's board connectedness to non-traditional members, and we utilize a difference-in-differences analysis of firms which add a non-traditional director and control firms which do not add a non-traditional director to their board. The negative relation between board diversity and analyst recommendation remains robust.

Without a direct measure of racial and gender bias for each analyst in our study, we cannot demonstrate a direct association between such bias and analyst ratings. However, we attempt to

[1]McNichols and O'Brien (1997) suggest that analysts tend to choose to provide forecasts and recommendations for stocks about which they have favorable expectations, i.e., the so-called selection bias. Conflict of interests can stem from a desire to maintain good relations with management, generate trading volumes, or support investment banking activity. Analyst bias has been shown to increase in the context of greater uncertainty (Ackert & Athanassakos, 1997), and decrease with analyst competition (Merkley, Michaely, & Pacelli, 2017).

eliminate other possible causes of analyst pessimism about a diverse board of directors. We control for firm profitability in our analyses to rule out the conjecture that analysts are pessimistic about diverse-management firms because they are less profitable. We also control for unobservable firm characteristics by including firm fixed effects in the regressions. We show that there is no association between other types of board diversity (such as variation in age and expertise) and analyst pessimism, suggesting that analysts are not pessimistic about diversity in general. Furthermore, our examination of return-on-assets (ROA) does not yield a reduction associated with the addition of minority or female directors. Analysts do not adjust their forecasts of earnings downward, although they downgrade their stock recommendations following the addition of new "non-traditional" board members. In addition, we examine market reaction to the addition of new "non-traditional" directors. Although there is some evidence of negative reaction within the three-day window around the dates of new director appointments, the reaction is short-lived.

Racial and gender biases have been shown to be pervasive (Nosek & Smyth, 2007) and causally predictive of discriminatory behavior (Greenwald & Krieger, 2006). Since we have controlled for many other possible causes of analyst pessimism, bias related to race and gender emerges as a potential cause of the disparate outcomes. Biases motivated by attitudes and stereotypes that we have about certain social categories, such as age, race, gender, and religion, are called explicit bias if they are consciously accessible through introspection. By contrast, implicit biases are attitudes and stereotypes which function outside an individual's awareness or intentional control (Blair, 2002; Greenwald & Krieger, 2006; Dovidio, 2003). Studies have shown that implicit racial and gender biases are widely held (Nosek & Smyth, 2007; Lane, Kang, & Banaji, 2007; Greenwald & Krieger, 2006). For instance, in a study based on over 2.5 million participants, 68% of participants demonstrate an implicit preference for white people while 14% presented a pro-Black preference (Nosek & Smyth, 2007). The same study also shows the presence of gender-science stereotype (associating women with humanities rather than sciences) and gender-career

stereotype (associating women with family rather than career) in 72% and 76% of the sample, respectively.

Most importantly, implicit bias has been shown to be predictive of certain types of real-world behavior (Greenwald & Poehlman, 2009; Krieger & Fisk, 2010), and may be responsible for disparate outcomes in health care (Sabin & Greenwald, 2012), education (NAACP Legal Defense Fund, 2017), housing (US Supreme Court, 2015), law-enforcement (Glaser & Knowles, 2008), employment (Goldin & Rouse, 2000), job-performance evaluations (Merrit, 2007), and in the courtroom (Kang & Bennett, 2012).[2] Studies have shown that workers prefer male managers over female managers (Simon & Landis, 1989), and male managers are not convinced women make effective managers (Bowen, Swim, & Jacobs, 2000).

It is well known that analysts consider the quality of the executives and board of directors when making stock recommendations. Based on an in-depth review of analyst reports, Previts, Brickler, and Robinson (1994) find that analysts extensively consider non-financial information and commonly address the quality of management, and it is common to see references to specific key personnel in analyst reports. Breton and Taffler (2001) document that non-financial information and factors are the most significant drivers of analyst judgment, in particular, the analysis of corporate management and strategy. Given the evidence of pervasive existence of implicit bias in gender and race, it is not difficult to imagine equity analysts are also subject to such biases.

Our analysis generates results suggesting that analysts, in issuing stock recommendations, seem to exhibit bias against companies with more diverse board in terms of gender and race. Our paper contributes to management and finance literature as our study is the first to link board

[2] For example, in a sample of 86 pediatricians, Sabin and Greenwald (2012) show that as physicians' pro-White bias increases, the frequency of prescribing pain medication for African American patients declines, but not for White patients. In the study by Glaser and Knowles (2008), an implicit stereotypic association of Blacks (vs. Whites) with weapons is positively correlated with the tendency to "shoot" armed Black men faster than armed White men ("Shooter Bias") in a computer simulation.

diversity with stock recommendations by security analysts. We also contribute to the psychology literature on implicit social cognition in that we demonstrate the impact of demographic biases may stretch beyond well-documented arenas, such as health care, housing, education, and criminal justice, into financial markets.

In Section 2 we describe data sources, information collection, and empirical methodology. Section 3 reports the main results and addresses endogeneity concerns. Section 4 discuss the sources of analyst pessimism toward firms with diverse boards, and Section 5 concludes.

2 Data Sources, Information Collection, and Empirical Methodology

We build our sample by combining several databases. We obtain director data through ISS, analyst recommendations through I/B/E/S, financial information through Compustat, and stock returns through CRSP. The sample spans 1996-2016 and contains 19,196 firm-year observations at the intersection of all databases.

For the appointments of new directors, we need to collect the announcement dates of such appointments. Due to the vast size of the announcements, it is extremely time consuming. We randomly choose a subset of the new director appointments, and we conduct Google search by firm name and director name to identify the earliest date that the announcement is made public.

2.1 Identifying Director Ethnicity

Our sample consists of director-level data for the universe of S&P 1500 companies from the Institutional Shareholder Services (ISS, formerly known as RiskMetrics and IRRC before that), during 1996-2016. From this database, we retrieve variables related to individual directors (e.g., name, ethnicity, gender, age, tenure, committee memberships, stock ownership, primary employer and title, independence classification, number of other public company board memberships, etc.). In 2006, roughly midway through our sample period, IRRC ceased data collection procedures due to methodological changes. In 2007, RiskMetrics began retrieving data using different

methodology than IRRC. Since companies are not required to collect and report director ethnicity data, both the IRRC and ISS (RiskMetrics) databases contain less than complete ethnicity data. For instance, roughly 53% of all director-firm-year observations within the IRRC database (1996-2006) are labeled with unknown ethnicity; the ISS database (2007-2016) contained 19% such observations with unknown ethnicity. At the unique director level, a full 78% of the combined databases (38,318 unique directors, 1996-2016) are of unknown ethnicity. Furthermore, ISS and IRRC databases often list erroneous ethnicity data (e.g., many "African Americans" are labeled as "Asian" and vice-versa).

Compiling a complete and accurate list of director ethnicity is an extensive process. First, since the ISS database contains more complete ethnicity data than the IRRC database, we use ISS data to backfill ethnicity information into the IRRC database. Second, we search ethnically and racially oriented magazine publications or websites for lists of African American and Hispanic corporate directors. Third, based on US census data, we use a name popularity ranking for Caucasian, Hispanic, and Asian (including China, Japan, India, etc.) peoples living in the US. If a director's ethnicity is still unclear, we perform a Google search for images and social connections which might imply the director's ethnicity. Appendix A.1 lists the steps described above.

As shown in Appendix A.2, this hand-collection of director ethnicity data decreases the percentage of unique directors with unknown ethnicities to 33% from 78%. Among the ISS (IRRC) director-firm-year observations, observations with unknown ethnicity dropped to 3% (21%) from 19% (53%).

2.2 Analyst Recommendations

We obtain analyst recommendations from I/B/E/S. Each month, I/B/E/S publishes both Detail and Summary recommendations. Detail recommendations are analyst-by-analyst recommendations for a security. I/B/E/S maps each analyst's recommendation onto an integer scale ranging from 1 to 5, corresponding to "Strong Buy", "Buy", "Hold", "Sell", and "Strong

Sell", respectively. For ease of exposition, we reverse its scale so that 5 denotes "Strong Buy", 4 denotes "Buy", 3 denotes "Hold", 2 denotes "Sell", and 1 denotes "Strong Sell". I/B/E/S summary recommendations aggregate the detail level data to compute, among other statistics, the median recommendation on a stock and the percentage of analysts with a buy recommendation on a stock as of the Thursday before the third Friday of the month.

2.3 Summary Statistics

Our primary measures of analyst opinion are median stock recommendation and the percent of analysts with a buy rating on the firm's stock. Existence of diversity on the board of directors is captured by a dummy variable which takes the value 1 if there exists at least one "non-traditional" (African American, Hispanic, Female) member on the board of directors. Other variables in our analysis consist of information at the firm level (return on assets, market cap, leverage, firm age, etc.), the board level (board size, board independence, etc.), and the CEO level (CEO/chairman duality). The variable definitions are contained in Appendix A.3.

Table 1 reports summary statistics of the variables. On average, about 54% of analyst recommendations are buy ratings ("Strong buy" or "Buy"). The average median recommendation on a stock is 3.62, which falls between "Hold' and "Buy" on the inverted I/B/E/S scale. There exists a non-traditional director (female, African American or Hispanic/Latino) on 70% of the boards: there exists a female board member on 66% of boards; and an African American or Hispanic/Latino member on 38% of boards. Boards in our sample have around 10 members on average. Often in our sample, the CEO is also the board chairman (63%). Independent directors comprise 64% of an average firm's board members.

Insert Table 1

2.4 Addressing Endogeneity Concerns

Concerns with endogeneity inevitably arise in our analysis; the link between the existence of a non-traditional director and analyst recommendation is likely endogenous due to omitted

unobservable firm and board characteristics. Omitted variables that affect both the selection of non-traditional directors and analyst recommendation can result in spurious relationships between board diversity and analyst recommendation. Reverse causality is also possible, i.e., firms with better (worse) analyst recommendations are more likely to hire non-traditional directors, leading to a positive (negative) association between analyst recommendation and board diversity; or firms with better analyst ratings may attract more (fewer) non-traditional directors, resulting in a positive (negative) relation.

We address the endogeneity issues via three approaches: (1) we control for firm fixed effects to address the concern that omitted time-invariant firm characteristics are driving the results, (2) we conduct a diff-in-diffs analysis, in which we observe the change in analyst ratings after the addition of a non-traditional director and compare this change with that of firms which add a traditional director, and (3) we use instrument variable regressions, with the instrumental variable as the fraction of traditional board members who serve on outside boards with non-traditional members. The instrument is motivated by Adams and Ferreira (2009), who define the share of male directors with board connections to female directors as an instrument for the share of female directors on a board. Similarly, we hypothesize that the share of "traditional" board members connected to non-traditional board members through outside board memberships is a valid instrument for existence of non-traditional directors.

3 Empirical Results

3.1 Univariate Analysis

We start our investigation of the relationship between board diversity and analyst recommendation with a correlation analysis. Appendix A.4 reports the pairwise Pearson correlation coefficients of the variables. First, we observe a negative correlation between the existence of non-traditional directors on the board and analyst recommendation, i.e., the existence of a female, African American, or Hispanic board member is associated with lower median analyst

recommendation and a smaller percentage of buy ratings. However, the existence of non-traditional directors is positively correlated with a firm's return on assets and earnings per share. Larger firms and older firms are more likely to have non-traditional board members, as are firms with larger boards and firms with busier board members.

In Table 2, we conduct a univariate analysis to examine the negative association between the existence of non-traditional directors and analyst recommendation. All analyst recommendations are averaged over firm-year observations for which there exists a female, African American or Hispanic board member, and also averaged over observations for which there is no such board member. This table presents the difference in these averaged analyst ratings between the two groups.

Insert Table 2

Recommendations for firm-years with non-traditional board members are about 0.08 points lower than recommendations for firm-years without non-traditional board members. This reduction is 9% of the average standard deviation of analyst recommendations across firms (0.881).

3.2 Multivariate Analysis

In Table 3, we estimate an OLS model in which the dependent variable is the percentage of buy recommendations at the end of a fiscal year and the variable of interest is the dummy indicator for existence of non-traditional directors (Column 1). Also in this table, we regress the median analyst recommendation at the end of a fiscal year on the existence of non-traditional directors (Column 2). Each specification in Table 3 defines non-traditional directors as female, African American, or Hispanic. We include as controls other board characteristics which might influence analyst recommendations: CEO/Chair duality, board size, share of independent directors, and the average number of outside board memberships held by board members. We also control for profitability-related and other accounting measures which may impact analyst recommendation: previous 12-month buy-and-hold stock return, earnings per share, return on assets, capital

expenditures, R&D, leverage, and market-to-book. All specifications include firm and year fixed effects. Standard errors are clustered at the firm-level.

Insert Table 3

In Column 1, we observe a significant and negative relation between the existence of a non-traditional director on the board and the percentage of buy recommendations. The existence of a non-traditional director is associated with a 3.0 percentage point reduction in the percent of analysts which hold "buy" recommendations on the firm's stock. Given that the standard deviation of buy proportion is 28.3, the reduction of 3.0 percentage points corresponds to 11% of one standard deviation.

In Column 2, we find a significant and negative relation between the existence of non-traditional directors and the median analyst recommendation. Existence of a non-traditional director is associated with a 0.069 point reduction in analyst recommendation. Given that the standard deviation of median recommendation is only 0.67, the reduction of 0.069 corresponds to 10% of one standard deviation.

3.3 The difference-in-differences approach

The possibility of reverse causality should be discussed. For example, firms may choose to hire non-traditional directors when the analyst ratings are down. We address this concern by designing a difference-in-differences analysis: we compare the change in analyst recommendations for firms which add a non-traditional director to the board vs. matched firms which add traditional directors. Firms are matched by propensity score, i.e., the likelihood of selecting a non-traditional director, based on firm characteristics such as firm size, board size, CEO/Chairman duality, prior 12-month stock return, share of independent directors, etc. The results of the propensity score estimation are reported in Appendix A.5.

Appendix A.5 estimates a logit model of a firm's decision to add a non-traditional director to the board. The sample is the collection of all firm-years from 1996-2016 in which a new director

is elected according to the ISS/IRRC database and for which relevant accounting data is available in COMPUSTAT. The dependent variable takes the value of one if the new director elected is Female (F), African American (AA), or Hispanic (H); and zero otherwise.

The results of Appendix A.5 show that non-traditional directors are more likely to be elected to firms which are large, have busy boards, and spend less on capital expenditures and R&D. In addition, having a large board is associated with a higher likelihood of electing a firm's first non-traditional director, suggesting firms consisting of all traditional members are more likely to begin diversifying if the board is large. Notably, firms electing non-traditional directors have strong stock returns leading up to the director's election. Return on assets (ROA) in the past year for such firms is not significantly different from firms electing traditional directors. The "*glass cliff"* phenomenon – the trend that firms elect non-traditional directors during precarious times (Ryan & Haslam, 2005) – does not seem to exist in our sample, and thus does not explain analyst pessimism among such firms.

Propensity scores estimated via Appendix A.5 are used to match treatment and control firms using a nearest-neighbor matching (with replacement) algorithm. Treated firms (those electing a non-traditional director) are matched to control firms (those electing a traditional director) if the absolute value of the difference in propensity score is the smallest. In a separate and untabluated analysis, treatment firms are defined as firms electing their first non-traditional director. These firms are matched to control firms with no non-traditional board membership. Appendix A.6 presents results of t-tests to determine if there are significant differences in covariate means for the treatment and control groups. Panel A of Appendix A.6 shows insignificance in all covariates except one. We conclude that the quality of the results of the matching algorithm is satisfactory.

Table 4 reports the difference in analyst recommendations as of one year before and one year after a director joins a firm's board. Table 4 shows this difference for firms which add a non-traditional director ("treatment" firms) and for matched firms which add a traditional director

("control" firms). For both treatment and control firms, mean and median recommendations decrease in the year after a firm adds a new director, however, the deterioration of ratings is more dramatic for firms adding non-traditional directors. For example, firms adding a white male director suffer a 0.004 decrease in mean recommendation in the subsequent year, while the mean recommendation for firms adding a non-traditional director drops by 0.082, a 0.078 greater reduction in the mean recommendation in firms adding non-traditional directors relative to firms adding white males. The difference in these mean rating reductions is significant at the 1% level. The percentage of analysts with a "buy" rating on the stock drops by 0.005 percentage points for firms adding white male directors, but drops by .040 percentage points for firms adding non-traditional directors, so that firms adding female directors suffer an additional .035 percentage point reduction in the number of analysts with positive ratings (significant at the 1% level).

Insert Table 4

Table 5 examines the similar diff-in-diffs design using OLS regressions. The sample consists of all recommendations occurring in the six months before and after a firm elects a new director. The variables of interest are (1) a dummy variable which takes the value of one if the recommendation is associated with a firm which has added a non-traditional director & zero otherwise, (2) a dummy variable which takes the value of one if the recommendation is recorded after the addition & zero otherwise, and (3) their interaction. Corroborating the results of Table 4, Table 5 shows that analyst recommendations worsen after the addition of a new director, and the deterioration of these recommendations is more dramatic for firms adding non-traditional directors. In particular, across all fixed-effects specifications, addition of a non-traditional director results in an additional 0.03-0.04 point reduction in analyst recommendations relative to the addition of a white male director. The percentage of analysts recommending a "buy" drops after the addition of a new director, in particular after adding a non-traditional director, though the latter is not significant across firm and industry fixed effects.

Insert Table 5

3.4 Instrumental Variable Regressions

We further address the endogeneity concern by utilizing instrument variable regressions. Burke and Mattis (2000) suggest that the lack of necessary professional network experience and "social capital" (defined as "the network of social connections that exist between people and their shared values and norms of behavior, which enable and encourage mutually advantageous social cooperation") helps to explain the relatively few numbers of female directors. Medland (2004) asserts that the most important impediment to female directorship is that the informal social network linking directors consists primarily of men. Such assertions suggest that women should be more likely to sit on boards with men whose social network includes women. On this basis, Adams and Ferreira (2009) define an instrument for female directorship as the fraction of male directors who sit on other boards with female directors. For our analysis of racially and gender diverse boards, we expand this definition to include all non-traditional directors. Studies indicate that African Americans suffer a social capital deficit in work environments relative to whites, which contributes to unequal career trajectories (Parks-Yancy, 2006; Dreher & Cox, 1996). Since lack of inclusion in important social networks likely hinders African American advancement to c-suite positions, we expect African American directors to be more likely to sit on boards with whites who have connected themselves socially to African Americans. Thus, we expand the definition of Adams and Ferreira (2009) and define the instrument as the fraction of traditional directors which serve on outside boards with non-traditional directors. We expect the variable to correlate with existence of non-traditional board members, satisfying the first condition to be a valid instrument.

The second condition of a valid instrument is that it is not directly correlated with analyst recommendations except through the board diversity, i.e., the inclusion of non-traditional directors. One might argue that the fraction of traditional directors with connections to non-traditional directors on outside boards is a measure of a firm's external networking, and thus might be correlated with firm performance (and thus analyst recommendations) through enhanced access to

information and resources. Also, the proposed variable is likely correlated with board busyness, and might thus be correlated with analyst recommendations. To control for this possibility, we include a variable in the regression which controls for connectedness and busyness of the board: the average number of board memberships. We also note that if non-traditional connections of traditional board members are correlated with firm performance (and thus analyst recommendations) through increased social capital, then the correlation would be positive, not the negative relation. To further control a firm's time-invariant social capital that may influence its analyst ratings, we include firm fixed effects.

Table 6 presents the results of a two-stage least squares regression, in which we instrument the existence of non-traditional board members by the fraction of traditional board members which are connected to non-traditional directors through outside boards. Column 1 shows that our instrument is indeed correlated with the existence of non-traditional board members. The relationship is significant at less than the 1% level. The second stage results confirm the main observation of Table 3 and Table 4: racial and gender diversity on the board of directors is related to greater pessimism in analyst ratings. All second-stage coefficients of the instrumented variable are negative. All coefficients of the instrumented variable are significant, and at less than the 1% level in the industry fixed-effect specification. Table 6 suggests that the negative relationship between the existence of non-traditional directors and analyst ratings is robust when we control for endogeneity.

Insert Table 6

3.5 Industrial Differentials

In our regressions so far, we control for firm fixed effects. It is possible that analysts' pessimism toward board diversity can vary across different industries. We split our sample firms by Fama-French 10-industry classification and repeat the main analysis for each of the ten industries. We find that the negative relation between race & gender diversity and stock

recommendation is more severe in the industries of high tech and manufacturing than in other industries.

4 The Potential Sources of Analyst Pessimism

In this section, we consider possible sources of analyst pessimism toward diverse board. First, we examine whether firm performance decreases following addition of a non-traditional director. Second, we check if analysts are also pessimistic toward firms whose boards are diverse in other dimensions, such as age, education, busyness, etc. Third, we ask if analysts are also pessimistic in terms of their earnings forecast. Last, we study whether the market have negative reactions toward firms with a diverse board as well.

4.1 Profitability

We consider the possibility that pessimism in analyst ratings of firms with non-traditional managers could be related to profitability. A negative association between firm performance and existence of racial and gender diversity in board directors will explain analyst pessimism in stock recommendation toward gender and racially diverse firms. The evidence provided in the current literature is mixed. Adams and Ferreira (2009) find no relationship between gender composition of the board and ROA, and a negative relationship between gender composition and the logarithm of Tobin's Q. Carter and D'Souza (2010) find no relation between gender and ethnic board diversity and Tobin's Q. Erhardt (2003) demonstrates a positive association between ROA and gender and ethnic board diversity.

Insert Table 7

While we control for ROA in the main results of Tables 3 and 4, we explicitly test the relationship between firm ROA and existence of a non-traditional board member in Table 7. We find no evidence that the existence of racially non-traditional directors is related negatively to ROA. We conclude that there is no relationship between existence of racially non-traditional directors and firm performance.

4.2 Diversity Index

Pessimism in analyst ratings of firms with non-traditional board members may reflect analysts' view of diversity more broadly. If analysts view board diversity as a negative characteristic, then the results of this study regarding racial and gender diversity merely demonstrate a specific case of this view and may not reflect discrimination or bias against race or gender per se. We define a diversity index similar to that by Bernile, Bhagwat, and Yonker (2018), but we exclude components of the index which measure racial and gender diversity. The diversity index is defined as the sum of standard deviation of board members' age, the Herfindahl-Hirschman index for board members' education level, and the average number of board memberships among board members, where each element of the sum is normalized across all firms by year. We then test whether analyst summary recommendations are more pessimistic for more diverse firms. The results are reported in Appendix A.7. We find no evidence that analysts are sensitive in a pessimistic way to other types of diversity such as age, education, and experience. The coefficients of the diversity index variable are not statistically significant. This result suggests that pessimism in analyst ratings derives not from diversity broadly, but from racial and gender diversity specifically.

4.3 Earnings Forecasts by Analysts

Issuing earnings forecasts is one of the most important tasks of an analyst. Different from stock recommendations that consist of at most five categories, earnings forecasts are detailed and continuous numbers that analyst need to estimate and justify in their report. If analysts truly believe that a stock should be downgraded in anticipation of future deteriorating performance, we expect that the earnings forecasts for the stock should be affected as well. We repeat the diff-in-diffs analysis using earnings forecasts, and we find that there are no significant differences in the change in earnings forecasts between adding a non-traditional director and adding a traditional director.

4.4 Market reaction to the addition of new directors

We hand collect the announcement dates of a random subset of announcement dates for the appointment of new directors. We use the event study approach to compute market reaction within short windows surrounding the announcement dates. Within the three-day window, (-1, +1), the market has negative reaction to the news of adding non-traditional directors, especially women and African Americans. However, the negative reaction is fleeting and short-lived. The five-day, (-2, +2), and other longer windows do not show significant and negative reactions from investors. Furthermore, when we regress the cumulative abnormal return within the three-day window, CAR (-1, +1) onto explanatory variables including year and firm fixed effects, the indicator of whether a non-traditional director is not statistically significant. Therefore, we have no robust evidence that the market treats the addition of a female or minority director as negative news. We cannot infer that analysts' pessimism is consistent with or justified by the market expectation.

The analysis above of the four possible sources for analyst pessimism toward a board diverse in race and ethics does not provide evidence that any of the four sources can explain the analysts' bias against the existence of gender or racial diversity on the board. Overall, our analysis points to the suggestion that analysts may hold implicit bias toward certain group of directors.

5 Conclusions

In this study, we provide evidence of a negative relationship between the existence of non-traditional board members (defined as female, African American, or Hispanic) and analyst ratings of stocks. The existence of "non-traditional" board members is associated with lower stock recommendations and a lower percentage of "buy" ratings by analysts. The relation holds in two-stage least squares instrumental variable regressions with the instrument defined as the share of "traditional" board members who serve on outside boards with non-traditional directors. Furthermore, by way of the difference-in-differences analysis, we show that after the addition of a board member, analyst ratings decline, particularly for firms adding non-traditional directors. We

propose that racial and gender bias, the attitudes and stereotypes about certain social groups, is a driver of analyst pessimism related to firms with a diverse board. We are unable to directly measure racial and gender bias of individual analysts, however, we eliminate race-neutral explanations such as pessimism related to general diversity and profitability.

We acknowledge there can be other possible channels for the analyst pessimism we have documented. Perhaps the addition of a non-traditional director signals a certain type of strategic shift which analysts may have reason to view negatively. Also, firms which add non-traditional directors may do so in response to pressure from institutional investors[3] (Walsh, Pico, & Leitch, 2019), and it is unclear how responsiveness to investor demands might be viewed among equity analysts. Such explanations for the relationship between the existence of non-traditional directors and analyst pessimism should be investigated before racial and gender bias can be accepted as the most likely cause. However, we find that although analysts downgrade the stock recommendation when a new non-traditional director is added, they do not adjust earnings forecasts downward. Our study provides an additional context in which analyst bias might be present outside of the well-known conflict of interests and self-selection issues. Further examination of the relationship between racial/gender diversity and analyst bias is needed.

[3] See, for example, Blackrock 2018 Proxy Voting Guidelines for US Securities, in which new proxy voting guidelines include an expectation to see at least two female directors on every board. Blackrock wrote to the nearly 300 companies in the Russell 1000 with fewer than two female directors asking them to explain their board diversity efforts.

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Appendix:

Table A.1 Ethnicity Data Collection Process

Panel A describes our process of compiling a complete and more accurate list of director ethnicity data, after first checking whether ethnicity data for a given director could be found in the ISS or IRRC databases. For directors with no known ethnicity in ISS or IRRC databases, we search ethnic/racial oriented magazine publications or websites for lists of Black and Hispanic corporate directors. If a director's name could not be found among these lists, we use US census-based name popularity rankings for Caucasian, Hispanic, and Asian peoples living in the US. If a director's ethnicity is still unclear, we perform a Google search for images and social connections which might imply the director's ethnicity.

	Eric Pardo	*Enrique Pardo*
1. Ethnicity available through ISS or IRRC?	No	No
2. Director listed in a minority publication?	No	No
3. Popularity ranking of last name	Pardo more popular among Hispanics than Whites	
4. First name check	Ambiguous Ethnicity	Likely Hispanic
5. Google search?	A. Yes. Images and social connections imply Eric Pardo is likely Hispanic. B. Yes. No ethnicity implication	No
6. Ethnicity assignment	A. Ethnicity label = Hispanic B. Ethnicity label = Unknown	Ethnicity label = Hispanic

Table A.2 Results of Ethnicity Data Collection. This table reports the results of our data collection procedure. The IRRC databases contains director data from 1996 to 2006; the ISS database contains director data from 2007-2016. 'Before' columns describe the distribution of director ethnicities prior to our data collection process. 'After' columns describe the results of the ethnicity collection process.

All Director-Firm-Year Observations, IRRC, 1996-2006				
	Before		*After*	
Ethnicity	Frequency	Percent	Frequency	Percent
Asian	297	0.18%	2,752	1.65%
African American	5,102	3.07%	6,231	3.75%
Hispanic	1,201	0.72%	2,673	1.61%
Caucasian	71,333	42.87%	120,269	72.29%
Unknown	88,442	53.16%	34,450	20.71%
Total	166,375	100.00%	166,375	100.00%

All Director-Firm-Year Observations, ISS, 2007-2016				
	Before		After	
Ethnicity	Frequency	Percent	Frequency	Percent
Asian	3,289	2.36%	4,409	3.17%
African American	5,538	3.98%	6,442	4.63%
Hispanic	2,225	1.60%	3,308	2.38%
Caucasian	102,199	73.49%	121,007	87.01%
Unknown	25,822	18.57%	3,907	2.81%
Total	139,073	100.00%	139,073	100.00%

All Unique Directors, 1996-2016 (IRRC & ISS)				
	Before		After	
Ethnicity	Frequency	Percent	Frequency	Percent
Asian	332	0.87%	992	2.59%
African American	358	0.93%	857	2.24%
Hispanic	184	0.48%	590	1.54%
Caucasian	7,634	19.92%	23,173	60.46%
Unknown	29,821	77.80%	12,717	33.18%
Total	38,329	100.00%	38,329	100.00%

Table A.3 Variable Definitions

Control Variables		
Variable	*Computation/Source (COMPUSTAT/CRSP notation)*	*Description*
Average Number of Board Memberships	ISS	Average number of outside board memberships among board members in the given firm-year
Board Size	ISS	Number of board members in given firm-year
Capital Expenditures	(CAPX - SPPIV)/AT	(Capital expenditure - Sale of Property Plant and Equipment)/Assets
CEO Duality	ISS	Dummy variable indicating CEO also serves as board chairman in given firm-year
Diversity Index	$AGE_{std,\ norm}$ + $EDUCATION_{HHI,norm}$ + $NUM\_BOARDS_{avg,\ norm}$	$AGE_{std,\ norm}$ is the standard deviation of board members' age, normalized across all firms in the given year $EDUCATION_{HHI,normal}$ is $\sum 1 - p_i^2$, normalized across all firms in the given year, where *i* is varies between "advanced degree" (medical, law, or academic) and "none", and p_i is the proportion of such educated members on the board $NUM\_BOARDS_{avg,\ normal}$ is the average number of outside boards memberships across board members in a given firm-year, normalized across all firms in the given year
Earnings Per Share	NI*1000/SHROUT	Net Income (Loss)/Number of Shares Outstanding
Share of Independent Directors	ISS	Number of Independent Directors/Board Size
Leverage	LT/AT	Total Liabilities/Total Assets
Ln (Market Cap)	Ln (ABS(PRC) * SHROUT * 1000)	Natural log of (Stock Price * Number of Shares Outstanding (in thousands)*1000)
MTB	MAR_CAP/CEQ	Market Equity/Book Equity
Previous 12-month stock return	$\prod_{1}^{12}(1 + r_i) - 1$ where r_i is stock return in month *i*	12-month stock return prior to shareholder meeting in which board member is elected

Research and Development Expense	XRD/AT	Research and Development Expenditure to Assets
Return on Assets	NI/AT	Net Income (Loss)/Total Assets
Analyst Recommendations		
Variable	*IBES Source*	*Description/Notes*
Recommendation	Detail (analyst-by-analyst) Estimates File	We reverse IBES standardized stock recommendation so that '1' = Strong Buy; '2' = Buy; '3' = Hold; '4' = Sell; '5' = Strong Sell
Buy Percent	Consensus Estimates File	Percent of analysts with '1' or '2' recommendation, provided by IBES,
Buy Percent	Detail (analyst-by-analyst) Estimates File	Percent of analysts with '1' or '2' recommendation
Median Estimate	Consensus Estimates File	The median estimate from all analysts for a given issue and time period, reported by IBES
Median Estimate	Detail (analyst-by-analyst) Estimates File	The median estimate from all analysts for a given issue and time period
Mean Estimate	Detail (analyst-by-analyst) Estimates File	The mean estimate from all analysts for a given issue and time period
Mean EPS	Historical Earnings Estimates File	Analyst projections about future earnings, forecast period ending 1 year forward (FPI = 1)

Table A.3 – continued

Instruments	
Variable	*Computation*
Fraction of traditional directors with links to:	
Female, African American, or Hispanic Directors	(# of white male directors who serve on outside boards with F, AA or H directors)/(# white male directors)
Female directors	(# of male directors who serve on outside boards with female directors)/(# of male directors)
African American or Hispanic Directors	(# of white directors who serve on outside boards with AA or H directors)/(# of white directors)

Table A.4 Correlation Analysis

This table reports pair-wise Pearson correlations for a subset of dependent and explanatory variables. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

	Buy Percentage	*Median Recommendation*	*Existence of F, AA, H*	*Existence of Female*	*Existence of AA, H*	*Board size*	*CEO duality*	*Ln(Market Cap)*
Buy Percentage	1.00	0.85***	-0.13***	-0.12***	-0.08***	-0.11***	0.01	0.05***
Median Recommendation	0.85***	1.00	-0.13***	-0.12***	-0.10***	-0.11***	0.01	-0.01
Existence of F, AA, H	-0.13***	-0.13***	1.00	0.90***	0.51***	0.44***	0.07***	0.34***
Existence of Female	-0.12***	-0.12***	0.90***	1.00	0.38***	0.45***	0.08***	0.34***
Existence of AA, H	-0.08***	-0.10***	0.51***	0.38***	1.00	0.44***	0.10***	0.40***
Board size	-0.11***	-0.11***	0.44***	0.45***	0.44***	1.00	0.11***	0.46***
CEO duality	0.01	0.01	0.07***	0.08***	0.10***	0.11***	1.00	0.16***
Ln(Market Cap)	0.05***	-0.01	0.34***	0.34***	0.40***	0.46***	0.16***	1.00
Capital Expenditures	0.12***	0.11***	-0.10***	-0.09***	-0.08***	-0.14***	0.01	0.01
Book Leverage	0.04***	0.03***	0.09***	0.08***	0.12***	0.13***	0.02**	0.07***
R&D Expense	0.08***	0.05***	-0.16***	-0.15***	-0.17***	-0.25***	-0.11***	-0.05***
Independent Board Share	-0.15***	-0.15***	0.29***	0.28***	0.27***	0.21***	0.05***	0.25***
Num Boards	0.01*	-0.02***	0.31***	0.31***	0.40***	0.37***	0.16***	0.45***
Previous 12-month Return	-0.01	-0.01	-0.01	0.00	0.01	-0.01	0.03***	-0.03***
Earnings per Share	0.00	-0.01	0.14***	0.14***	0.17***	0.19***	0.11***	0.33***
Return on Assets	0.03***	0.02***	0.07***	0.08***	0.06***	0.04***	0.09***	0.27***
Firm Age	-0.13***	-0.12***	0.26***	0.25***	0.32***	0.34***	0.14***	0.36***

Table A.4—Correlation Analysis, continued.

	Capital Expenditures	*Book Leverage*	*R&D Expense*	*Independent Board Share*	*Num Boards*	*Previous 12-month Return*	*Earnings per Share*	*Return on Assets*	*Firm Age*
Buy Percentage	0.12***	0.04***	0.08***	-0.15***	0.01*	-0.01	0.00	0.03***	-0.13***
Median Recommendation	0.11***	0.03***	0.05***	-0.15***	-0.02***	-0.01	-0.01	0.02***	-0.12***
Existence of F, AA, H	-0.10***	0.09***	-0.16***	0.29***	0.31***	-0.01	0.14***	0.07***	0.26***
Existence of Female	-0.09***	0.08***	-0.15***	0.28***	0.31***	0.00	0.14***	0.08***	0.25***
Existence of AA, H	-0.08***	0.12***	-0.17***	0.27***	0.40***	0.01	0.17***	0.06***	0.32***
Board size	-0.14***	0.13***	-0.25***	0.21***	0.37***	-0.01	0.19***	0.04***	0.34***
CEO/Chairman duality	0.01	0.02**	-0.11***	0.05***	0.16***	0.03***	0.11***	0.09***	0.14***
Ln(Market Cap)	0.01	0.07***	-0.05***	0.25***	0.45***	-0.03***	0.33***	0.27***	0.36***
Capital Expenditures	1.00	0.08***	-0.04***	-0.11***	-0.01	-0.04***	0.01	0.09***	-0.04***
Book Leverage	0.08***	1.00	-0.21***	0.00	0.18***	-0.04***	-0.07***	-0.18***	0.10***
R&D Expense	-0.04***	-0.21***	1.00	0.00	-0.05***	0.01	-0.20***	-0.19***	-0.11***
Independent Board Share	-0.11***	0.00	0.00	1.00	0.23***	0.00	0.11***	0.04***	0.27***
Num Boards	-0.01	0.18***	-0.05***	0.23***	1.00	-0.01	0.12***	0.04***	0.35***
Previous 12-month Return	-0.04***	-0.04***	0.01	0.00	-0.01	1.00	0.11***	0.12***	0.00
Earnings per Share	0.01	-0.07***	-0.20***	0.11***	0.12***	0.11***	1.00	0.59***	0.17***
Return on Assets	0.09***	-0.18***	-0.19***	0.04***	0.04***	0.12***	0.59***	1.00	0.10***
Firm Age	-0.04***	0.10***	-0.11***	0.27***	0.35***	0.00	0.17***	0.10***	1.00

Table A.5 Results of Propensity Score Estimation by Logit Model

The following table estimates a logit model of a firm's decision to elect a non-traditional director to the board. The sample is the collection of all firm-years from 1996-2016 in which a new director is elected according to the ISS/IRRC database and for which accounting data is available in COMPUSTAT. The dependent variable takes the value '1' if the new director elected is "Ntrad" (i.e., non-traditional defined as Female, African American, or Hispanic) and '0' otherwise. Accounting data reflects the most recent fiscal year which ended prior to the election of the director. The italicized values are p-values corresponding to the Wald Chi-Square test statistic for coefficients produced by maximum likelihood estimation. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

	Any Addition of Ntrad Director	*First Addition of Ntrad Director*
	(1)	(2)
Board Size	0.005	0.068*
	0.725	0.058
CEO Chair	-0.007	0.055
	0.922	0.696
Ln (Market Cap)	0.197***	0.253***
	0.000	0.000
Capital Expenditure	-1.633**	-2.152*
	0.012	0.086
Leverage	0.186	-0.372
	0.353	0.392
RAD	-3.790***	-1.086
	0.000	0.494
Share of Independent Directors	0.018	0.472
	0.929	0.257
Avg Num of Board Memberships	0.120*	0.456**
	0.083	0.021
Previous 12-month stock return	0.154*	0.357**
	0.056	0.015
EPS	-0.007	-0.004
	0.601	0.892
ROA	0.300	-0.428
	0.553	0.663
Firm Age	0.002	0.008*
	0.259	0.099
Intercept	-2.618***	-4.312***
	0.000	0.000
N	5706	1283
p-value	0.000	0.000
Pseudo R-Square	5.25%	6.87%

Table A.6 Propensity Score Matching Quality

The table below presents results of t-tests to determine if there are significant differences in covariate means for control and treatment groups under the nearest neighbor (with replacement) matching algorithm. All firm-year observations in the sample elected a director; propensity scores are derived using logit estimation, in which the dependent variable takes the value '1' if the new director selected is Female, AA, or H and '0' otherwise. Standard errors are presented below coefficients. Treatment firms (those electing a non-traditional director) are matched to control firms (those electing a traditional director) if the absolute value of the difference in propensity score is minimized among all firms electing a traditional director in that year. In the lower panel, treatment and control firms are restricted to firms with boards with all traditional members.

Panel A. Treatment firms elect a non-traditional director

	Female, AA, H			
Variable	Control	Treatment	Diff	T
Board Size	11.4599	11.5458	-0.0859	-0.96
	0.064	0.063	0.090	
CEO Duality	0.7490	0.7429	0.0061	0.41
	0.010	0.011	0.015	
Ln (Mar Cap)	8.3291	8.4095	-0.0804	-1.40
	0.040	0.041	0.057	
Capital Expenditure	0.0472	0.0470	0.0002	-0.03
	0.001	0.001	0.002	
Book Leverage	0.2400	0.2390	0.0010	0.31
	0.004	0.004	0.005	
Independent Board Share	0.6433	0.6477	-0.0044	-0.85
	0.004	0.004	0.005	
Avg Num Boards	1.6184	1.6406	-0.0222	-1.29
	0.012	0.012	0.017	
Previous 12-month return	0.0413	0.0357	0.0056	0.46
	0.009	0.009	0.012	
EPS	2.3347	2.2348	0.0999	1.07
	0.065	0.066	0.093	
ROA	0.0534	0.0495	0.0039*	1.70
	0.002	0.002	0.002	
Firm age	36.8021	36.9084	-0.1063	-0.16
	0.479	0.488	0.684	

Table A.6 - continued
Panel B. Treatment firms elect *first* non-traditional director

	First Female, AA, H			
Variable	Control	Treatment	Diff	T
Board Size	9.3734	9.4906	-0.1172	-0.75
	0.112	0.108	0.556	
CEO Duality	0.6591	0.6604	-0.0013	-0.03
	0.027	0.027	0.038	
Ln (Market Cap)	7.0195	7.0934	-0.0739	-0.75
	0.066	0.074	0.099	
Capital Expenditure	0.0582	0.0535	0.0047	1.05
	0.003	0.003	0.004	
Book Leverage	0.2068	0.2075	-0.0007	-0.05
	0.009	0.010	0.014	
R&D	0.0273	0.0284	-0.0011	-0.32
	0.003	0.003	0.004	
Independent Board Share	0.5638	0.5620	0.0018	0.14
	0.009	0.009	0.013	
Avg Num Boards	1.2968	1.3078	-0.0110	-0.38
	0.021	0.021	0.029	
Previous 12-month return	0.0207	0.0708	-0.0501	-1.42
	0.024	0.026	0.035	
EPS	1.8513	1.7735	0.0778	0.37
	0.162	0.137	0.211	
ROA	0.0506	0.0451	0.0055	0.83
	0.004	0.005	0.007	
Firm age	26.0260	27.2264	-1.2004	-1.09
	0.733	0.820	1.100	

Table A.7 OLS Regression of Summary Analyst Recommendations on a Diversity Index

This table reports the results of OLS regression, where the main effect variable is a diversity index which excludes gender and racial diversity. The diversity index is defined as the sum of (1) standard deviation of board members' age, (2) Herfindahl-Hirschman index for board members' education level; and (3) the average number of board memberships among board members; where each element of the sum is normalized across all firms by year. The dependent variable in columns (1) is the percentage of analysts with a "buy" rating on the stock at the end of the board's service year. The dependent variable in columns (2) is the median stock recommendation at the end of the board's service year. All standard errors are clustered at the firm level. All continuous variables are winsorized at the 1st and 99th percentiles. The sample consists of firms-year observations with no female, African American or Hispanic representation which are present in ISS, I/B/E/S and Execucomp databases from 1996-2016. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	Buy Percentage	*Median Recommendation*
	(1)	(2)
Diversity index	1.207	0.022
	(1.47)	(1.06)
Board size	-0.59	0.005
	(-0.91)	(0.31)
CEO duality	1.012	0.053
	(0.43)	(0.93)
Ln (Market cap)	7.477***	0.141***
	(4.85)	(3.76)
Capital Expenditure	60.263***	1.077***
	(3.94)	(2.92)
R&D	-41.914	-0.512
	(-0.94)	(-0.54)
Share of Independent Directors	-4.246	-0.068
	(-0.58)	(-0.42)
Avg Number of Board Memberships	2.349	-0.053
	(0.60)	(-0.66)
Previous 12m stock return	-4.589***	-0.111***
	(-3.28)	(-3.39)
EPS	0.433	0.011
	(1.12)	(1.11)
ROA	26.853***	0.606***
	(2.76)	(2.55)
Firm Age	-0.046	-0.004
	(-0.15)	(-0.53)
MTB	6.027***	0.139***
	(3.38)	(3.44)
Firm FE	Y	Y
Year FE	Y	Y
N	4,940	4,940
R-Square	0.373	0.29

Table 1 Summary Statistics

This table presents summary statistics for the sample which consists of 2,582 firms present in ISS, I/B/E/S, Compustat and CRSP databases during 1996-2016. We reverse the I/B/E/S standardized stock recommendations so that 1 is "strong sell" and 5 is "strong buy". Continuous variables are winsorized at the 1st and 99th percentiles.

Variable	*N*	*Mean*	*Std. Dev.*	*Min*	*Median*	*Max*
Analyst recommendations						
Buy Percent	19196	54.24	28.27	0	54.55	100
Median Recommendation	19196	3.62	0.67	1	4	5
Existence on board of. . .						
Female, African American, or Hispanic	19196	0.70	0.46	0	1	1
Female	19196	0.66	0.47	0	1	1
African American or Hispanic	19196	0.38	0.49	0	0	1
Control variables						
Board size	19196	10.28	2.56	6	10	19
CEO/Chairman duality	19196	0.63	0.48	0	1	1
Ln(Market Cap)	19196	7.62	1.55	4.25	7.43	11.82
Capital Expenditures	19196	0.05	0.05	0.00	0.03	0.29
Book Leverage	19196	0.21	0.17	0.00	0.19	0.77
R&D Expense	19196	0.03	0.05	0.00	0.00	0.24
Share of Independent Directors	19196	0.64	0.15	0.16	0.67	0.86
Average Number of Board Memberships	19196	1.38	0.44	0.83	1.29	2.92
Previous 12-month Buy and Hold Return	19196	0.03	0.41	-0.81	-0.01	1.69
Earnings per Share	19196	1.65	2.75	-8.05	1.43	13.26
Return on Assets	19196	0.04	0.09	-0.46	0.05	0.25
Firm Age	19196	23.69	18.25	2	18	83
Instruments						
Fraction of traditional directors with links to. . .						
Female, African American, or Hispanic Directors	19196	0.08	0.14	0.00	0.00	0.89
Female directors	19196	0.08	0.13	0.00	0.00	0.56
African American or Hispanic directors	19196	0.06	0.12	0.00	0.00	0.82

Table 2 Univariate Analysis of Difference in Mean Analyst Ratings

Analyst ratings within the I/B/E/S Detail Estimate File are averaged over observations for which there exist a female, African American, or Hispanic board member, and are also averaged over observations for which there is no such board member. This table reports the difference in these averaged analyst ratings for the two groups. We reverse the I/B/E/S standardized stock recommendations so that 1 is "Strong sell" and 5 is "Strong buy".

	N	*Mean Recommendation*	*Std. Dev.*
Recs in firm-years with non-traditional directors	63,829	3.57***	0.951
Recs in firm-years without non-traditional directors	186,532	3.65***	0.952
Difference		-0.077***	0.952

Table 3 OLS Regression of Analyst Summary Recommendations on Existence of Non-Traditional Board Members

This table presents the results of OLS regression, where the main effect variables are the existence of non-traditional members on a firm's BOD. The dependent variable in column (1) is the percent of buy recommendations on the firm's stock as reported by I/B/E/S at the end of the board's service year. The dependent variable in column (2) is the median stock recommendation. We reverse the I/B/E/S standardized stock recommendations scale so that 5 represents "strong buy" and 1 represents "strong sell". Some control variables have been suppressed for space. Ntrad members are defined as female, African American and/or Hispanic. All continuous variables are winsorized at the 1st and 99th percentiles. The sample consists of firms present in ISS, I/B/E/S and Execucomp databases from 1996-2016. Standard errors are clustered at the firm level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	Buy Percentage	*Median Recommendation*
	(1)	(2)
Non-traditional directors	-3.013***	-0.069***
	(-2.86)	(-2.71)
Board size	0.02	0.005
	(0.10)	(0.93)
CEO duality	-0.104	0.026
	(-0.12)	(1.27)
Ln (Market cap)	8.164***	0.167***
	(12.81)	(11.33)
Capital Expenditure	40.533***	1.039***
	(5.02)	(5.28)
Leverage	0.719	0.046
	(0.24)	(0.63)
Share of independent directors	-1.934	-0.097
	(-0.63)	(-1.29)
Number of outside board memberships	-3.921***	-0.091***
	(-3.13)	(-3.01)
Previous 12-month stock return	-0.471	-0.002
	(-0.85)	(-0.14)
Earnings per share	0.390***	0.006*
	(2.64)	(1.80)
Return on assets	3.564	0.203**
	(0.82)	(1.93)
Firm age	-0.111	-0.002
	(-1.03)	(-0.94)
Firm FE	Y	Y
Year FE	Y	Y
N	19,196	19,196
R-Square	0.377	0.314

Table 4 Analyst reaction to the addition of a non-traditional board member

This table shows the difference in analyst recommendations 1 year before and 1 year after the addition of a non-traditional director. Differences in recommendations are also computed for a set of matched firms (control firms) which elect a traditional director. Non-traditional directors are defined as female, African American and/or Hispanic board members. We reverse the standard I/B/E/S stock recommendations scale so that 5 represents "strong buy" and 1 represents "strong sell". The sample consists of firms present in ISS, I/B/E/S and Execucomp databases from 1996-2016. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	Mean Recommendation	*Median Recommendation*	*Buy Percent*
N	1508	1508	1508
Treatment Diff recs after add'n of non-traditional director less recs before	-0.082 (0.014)	-0.075 (0.019)	-0.04 (0.008)
Control Diff recs after add'n of non-traditional director less recs before	-0.004 (0.015)	0.016 (0.019)	-0.005 (0.011)
Diff-in-Diff	**-0.078***** (0.02)	**-0.090***** (0.027)	**-0.035***** (0.011)
T	-3.88	-3.40	-3.22

Table 5 OLS Regressions of Analyst Recommendations on Additions of Non-Traditional Board Members

This table presents the results of OLS regression, where the sample consists of all recommendations occurring in the 6 months before and after a firm elects a new director. The main effect variables are (1) a dummy variable which takes the value '1' if the recommendation is associated with a firm which has nominated a non-traditional director; (2) a dummy variable which takes the value "1" if the recommendation is recorded *after* the nomination and (3) their interaction. The dependent variable in column (1) is the recommendation on the firm's stock, though we reverse the I/B/E/S standardized stock recommendations scale so that "5" represents 'strong buy' and "1" represents 'strong sell'. The dependent variable in column (2) is a dummy variable which takes the value "1" if the recommendation is a "4" or "5" (i.e., a 'buy' recommendation). Non-traditional members are defined as female, African American and/or Hispanic. All continuous variables are winsorized at the 1st and 99th percentiles. The sample consists of firms present in ISS, I/B/E/S and Execucomp databases from 1996-2016. Standard errors are clustered at the firm level. Some controls suppressed for space. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	Recommendation	*Buy Recommendation Dummy*
	(1)	(2)
New non-traditional director	0.027*	0.012
	(1.83)	(1.61)
After new director	-0.025**	-0.013***
	(-2.41)	(-2.49)
New ntrad director* After new director	-0.035**	-0.013
	(-1.92)	(-1.29)
Board size	0.000	0.000
	(-0.05)	-0.11
CEO Duality	-0.023	-0.009
	(-1.02)	(-0.75)
Ln(Market Cap)	0.061***	0.031***
	(4.00)	(3.99)
Share of independent directors.	0.031	0.019
	(0.41)	(0.50)
Number of board memberships	-0.034	-0.017
	(-1.17)	(-1.19)
Prior 12-month stock return	0.240***	0.122***
	(13.55)	(14.29)
Year Dummies	Y	Y
Firm FE	Y	Y
N	59,785	59,785
R-Square	0.093	0.084

Table 6 Two-stage instrument variable regressions of Analyst Summary Recommendations on Existence of Non-Traditional Board Members

Column 1 presents the results of the regression of the existence of non-traditional board members on the instrument *"% Trad linked to Ntrad"*, the percent of non-female, non-African American, non-Hispanic board members who serve on outside boards with women, African Americans or Hispanics. The predicted "Y" values of stage 1 are included in the second-stage regressions in columns 2 and 3. In column 2, the dependent variable is the percent of buy recommendations on the firm's stock as reported by I/B/E/S at the end of the board's service year. The dependent variable in column 3 is the median stock recommendation. We reverse the I/B/E/S standardized stock recommendations scale so that 5 represents "Strong Buy" and 1 represents "Strong Sell". Continuous variables are winsorized at the 1st and 99th percentiles. The sample consists of firms present in ISS, Compustat and I/B/E/S databases from 1996-2016. Some control variables are suppressed for space. Standard errors are clustered at the firm level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	1st Stage	*2nd Stage*	
		Buy Percentage	*Median Recommendation*
	(1)	(2)	(3)
% Trad linked to Ntrad	0.163***		
	(3.32)		
Ntrad_exist (predicted)		-56.026**	-1.784**
		(-2.33)	(-2.15)
Board size	0.038***	2.085**	0.047**
	(11.62)	(2.18)	(2.08)
Ln(Market cap)	0.015*	8.983***	0.176***
	(1.64)	(11.09)	(8.27)
Independent Board Share	0.258***	12.103*	0.171
	(5.25)	(1.67)	(0.96)
Firm FE	Y	Y	Y
Year FE	Y	Y	Y
N	19,051	19,051	19,051
R-square	0.316	-	-

Table 7 OLS Regression of Return on Assets on Existence of Non-Traditional Board Members

This table reports the results of OLS regressions of ROA, where the independent variables of interest are the existence of non-traditional members on a firm's board of directors. The dependent variable is return on assets. Non-traditional members are defined as female, African American and/or Hispanic. All standard errors are clustered at the firm level. All continuous variables are winsorized at the 1st and 99th percentiles. The sample consists of firms present in ISS, I/B/E/S and Execucomp databases from 1996-2016. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	ROA
	(1)
Non-traditional directors	-0.001
	(-0.33)
Board size	0.000
	(-0.11)
CEO duality	0.001
	(0.43)
Ln(Market cap)	0.022***
	(10.26)
Capital Expenditure	0.159***
	(5.08)
Leverage	-0.166***
	(-16.26)
R&D	-0.967***
	(-9.95)
Share of Independent Directors	0.009
	(0.99)
MTB	0.034***
	(14.81)
Number of Board Memberships	-0.006*
	(-1.84)
Firm Age	0.000
	(-0.77)
Firm FE	Y
Ind FE	
Year FE	Y
N	19,196
R-Square	0.558