

In-Group Bias in Financial Markets*

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Abstract – This paper investigates in-group bias in financial markets. Specifically, we argue that equity analysts may have less favorable opinions about firms that are not headed by CEOs of their own “group”. We define groups based on gender, ethnicity and political attitudes. Examining analysts’ earnings forecasts, we find that male analysts have lower assessments of firms headed by female CEOs than of firms headed by male CEOs. Results are very similar if in-groups are defined based on ethnicity or political attitudes: Earnings forecasts of domestic analysts are lower for firms headed by foreign CEOs and earnings forecasts of Republican analysts are lower for firms headed by Democrat CEOs. As a result, earnings surprises of firms headed by female, foreign, or Democrat CEOs are systematically upward biased. Overall, our results provide robust evidence for in-group bias in financial markets.

Keywords: Ingroup bias; analyst forecasts.

JEL classification: G02, G14, G24.

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Abstract – This paper investigates in-group bias in financial markets. Specifically, we argue that equity analysts may have less favorable opinions about firms that are not headed by CEOs of their own “group”. We define groups based on gender, ethnicity and political attitudes. Examining analysts’ earnings forecasts, we find that male analysts have lower assessments of firms headed by female CEOs than of firms headed by male CEOs. Results are very similar if in-groups are defined based on ethnicity or political attitudes: Earnings forecasts of domestic analysts are lower for firms headed by foreign CEOs and earnings forecasts of Republican analysts are lower for firms headed by Democratic CEOs. As a result, earnings surprises of firms headed by female, foreign, or Democrat CEOs are systematically upward biased. Overall, our results provide robust evidence for in-group bias in financial markets.

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Americans are more likely to marry someone of a different faith than someone who supports a different political party.

The Economist, April 10th 2013.

1 Introduction

Research in social psychology suggests that group membership has a strong influence on individuals' perceptions about other peoples' abilities and skills. People systematically adopt favorable opinions about members of their own group and might be indifferent or have lower opinions about members who are outside of their group (e.g., [Tajfel \(1982\)](#), [Hewstone et al. \(2002\)](#)). This form of in-group favoritism has serious social consequences and appears to be the primary driver of social biases such as prejudice, stereotyping, and discrimination.

In this paper, we examine whether group-based social biases are able to survive the competitive forces in financial markets and have considerable economic consequences. Specifically, for three different demographic dimensions, we investigate whether in-group bias influences forecasts of sell-side equity analysts and eventually earnings surprises and announcement returns. We conjecture that analysts may have more favorable opinions about CEOs that are of their own "type".

First, studying gender related in-group bias, we examine whether male (female) analysts have systematically lower earnings estimates for firms headed by female (male) CEOs. Next, we study in-group bias among foreign and domestic analysts and CEOs. Last, we analyze whether in-group bias is also prevalent for analysts' and CEOs' political orientation. We find supporting evidence that equity analysts display in-group bias for all three demographic dimensions.

Specifically, our results indicate that firms headed by female CEOs obtain systematically lower earnings forecasts which results in more positive and less negative earnings surprises for these firms. Refining the analysis to male analysts only (which are the dominant group of analysts), results show that indeed the male consensus forecasts for firms with female CEOs are lower than their consensus forecasts for firms with male CEOs. When we examine the forecast bias in a multivariate setting using different firm specific control variables, the gender related in-group bias remains. We also find that relative to male analysts, female analysts have less disagreement about the earnings of firms headed by female CEOs.

Because a large (over 80%) proportion of analysts are male, these consensus characteristics imply that analysts are typically positively (negatively) surprised when the earnings of female-headed (male-headed) firms are announced. Examining the reaction of the stock market following the earnings announcements, we find that following earnings announcements from female-headed firms, the market responds more strongly to earnings announcements of firms headed by female CEOs.

Our results also indicate that firms headed by foreign CEOs and firms headed by democrat CEOs obtain systematically lower earnings forecasts. Again, this is due to the fact that most analysts are domestic and republican and this group of analysts systematically underestimates CEOs that do not belong to their in-group. As a result, earnings surprises are systematically upward biased for foreign CEOs and democrat CEOs. These results are also reflected in analysts' buy and sell recommendations, with systematically more buy than sell recommendations for stocks of firms headed by CEOs belonging to their in-group.

We contribute to several strands of the literature. Within the economics of discrimination, our approach provides a useful way for distinguishing among alternative explanations of majority-minority disparities. One typical explanation of these disparities is that demo-

graphic characteristics such as gender, ethnicity or political orientation are simply a marker for other characteristics unobservable to the econometricians. This “statistical discrimination” leads to systematically different treatment of individuals with otherwise similar observable characteristics (Cornell and Welch 1996). Evidence for this type of discrimination has been provided in labor market studies by, e.g., Becker 1957, and Bertrand and Mullainathan 2004. These papers argue that if individuals differ in ways that are unobservably different (to either the statistician or potentially the employer), observable characteristics such as demographic differences may yield different expectations about their ability.

As pointed out by Becker 1957, an alternative explanation for the differences we observe is “taste-based” discrimination. Taste based discrimination is based on prejudice and has been shown to impact consumers’ choices regarding products sold by or associated with individuals of other races (e.g., Nardinelli and Simon 1990, Ouellet 2007), referees’ decisions in sporting events (Price and Wolfers 2010), and even courtroom decisions (Abrams et al. 2012). In our paper, we find systematic differences in analysts’ forecasts that reflect whether the demographic characteristics of the analyst match those of the CEO.

Regarding the impact of biases on financial markets, Grinblatt and Keloharju 2001 show that Finnish investors exhibit stronger preference for stocks of companies that publish annual reports in their native language or have CEOs who share their cultural origins. Morse and Shive 2011 show that patriotic investors are more likely to invest in domestic stocks. Niessen-Ruenzi and Ruenzi 2016 show that mutual fund investors prefer female managed funds, while Kumar et al. 2015 provide the first evidence for race based discrimination among mutual fund investors. We contribute to this literature by showing that there is in-group favoritism among equity analysts, resulting in systematically biased earnings forecasts for firms headed

by female, foreign, or democrat CEOs, respectively. Thus, analysts are another important source of in-group bias in financial markets.

The rest of the paper is organized as follows. Section 2 provides a review on the related literature. Section 3 provides a summary of the various data sources used in the empirical analysis. Section 4 presents the main empirical results on the in-group bias among equity analysts. Section 5 provides the results of market reaction to the in-group bias among analysts. Section 6 concludes the paper.

2 Related Literature

In-group bias is one of the main aspects of human behavior. Individuals are more likely to help an in-group member compared to those of other groups. The biased behavior towards the in-group members can range from prejudice, stereotyping, discrimination and injustice to severe actions of ethnic cleansing and genocide (Crisp and Hewstone 2001). There are many studies that support the in-group bias using laboratory experiments (Brewer 1976; Kramer (1984); Balliet et al. (2014); see Castano et al. 2002 for a review). The experimental studies provide evidence that individuals, on average, tend to show both higher level of help (Chen and Li (2009)) and lower level of punishment (Mussweiler and Ockenfels 2013) for the in-group members.

There are five theories in the Psychology literature that explain the rationale for the in-group bias. The first theory is the Social Identity Theory (SIT), proposed by Tajfel and Turner (1971). This theory argues that a successful intergroup bias provides a positive social identity for the in-group members that can also satisfy the need for a positive self-esteem. Specifically, Tajfel and Turner (1975) argue that because part of individuals' self-esteem

derives from the groups to which they belong, they are motivated to establish a positive differentiation between the in-group and the out-group. Many laboratory and empirical studies provide evidence for the SIT. In a meta-analysis study, [Aberson et al. \(2002\)](#) argue that high self-esteem individuals provide more in-group bias compared to low-self-esteem individuals.

The second theory is the Optimal Distinctiveness Theory (ODT) proposed by [Brewer \(1991\)](#). Brewer argues that social identity involves a compromise between the need for assimilation and the need for differentiation. Based on this theory, in-group bias forms by the need to affirm the satisfaction from identification with an optimally distinct group ([Leonardelli and Brewer \(2001\)](#)) and the need for intergroup differentiation ([Brewer \(1991\)](#)). Motivated by this argument, [Leonardelli and Brewer \(2001\)](#) show that members of distinct minority groups show greater in-group identification and satisfaction with their group.

The third theory is the Subjective Uncertainty Reduction Theory (SURT) proposed by [Hogg and Abrams \(1993\)](#). SURT argues that in-group bias forms based on the need to reduce subjective uncertainty. The fourth theory that explains in-group bias is the Terror Management Theory (TMT) proposed by [Solomon et al. \(1991\)](#). TMT argues that individuals have a need for self-preservation, and that this need is intensified by their awareness of the inevitability of their death. Based on this theory, people evaluate in-group members positively because similar others are assumed to validate their cultural worldview. Many studies provide evidence for the TMT including [Florian and Mikulincer \(1998\)](#) and [Greenberg et al. \(1990\)](#).

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The final theory that explains the in-group bias is the Social Dominance Theory (SDT) proposed by [Sidanius and Pratto \(1999\)](#). Based on this theory, society contains ideologies

¹Related to this theory, [Weisel and Böhm \(2015\)](#) motivate their paper by a story about an old man who was a lifelong fan of the local football club. When his doctor told him he was about to die he canceled his season ticket, and became a fan of another club, his old club's worst and most hated rival. When asked "why to change clubs just before you die?" he replied "better one of them dying than one of us".

that promote or attenuate intergroup hierarchies. As a result, individuals with a high social dominance orientation, have a strong desire to promote intergroup hierarchies and for their in-groups to dominate their out-groups. This theory is the main explanation in many studies that find a higher level of in-group bias among men compared to women (Sidanius et al. (2000))

In addition to the above theories, there are studies that argue in-group bias has evolutionary/genetic roots. De Dreu et al. (2011) argue that the bias works on an implicit level and that it is regulated by the hormone Oxytocin, suggesting deep biological roots. Similarly, Luo et al. (2015) provide evidence for the genetic associations with racial in-group bias in brain activity.

Whether one should see the in-group bias as a positive or negative behavior is still open to question. On the one hand, there are studies that argue that due to the familiarity to the in-group members, the bias may result in a better evaluation. For example, Fisman et al. (2012) note that, in India, having an in-group match (based on religion and caste) between a loan officer and the borrower increase the performance of the loan, presumably because the loan officer can evaluate better the information that can be extracted from an in-group member. On the other hand, there are studies that argue that aside from the “in-group love” side of the bias, there is another side to be considered which is the “out-group hate”. The desire to harm the out-group members, directly or indirectly, can harm the overall social gain. Given the importance of this bias and its effects on the overall system, studies in the field are warranted. In this paper, we take the first step in the understanding the in-group bias among an important group of agents in the financial market, equity analysts.

As outlined earlier, in-group bias can be measured implicitly and/or explicitly. In the former way, bias is measured using individuals’ beliefs (Dovidio et al. (2001)) while in the

latter way, bias is measured using the actual evaluation of individuals regarding the in-group (out-group) members (Hewstone et al. (2002)). In the current study, we use the explicit measure, mainly because accessing analyst's belief about CEOs is not possible. To do so, we compare analysts' forecast earnings of in-group (out-group) CEOs based on three main demographic dimensions: gender, ethnicity and political affiliations.

The in-group bias among men and women has been shown in many studies. Using a series of laboratory experiments, Bourhis (1993) shows that both men and women discriminated against out-group (opposite sex) members, and that dominant groups (men) discriminated more than subordinate or powerless groups (women). In a different setting, Lindeman and Sundvik (1995) find that men favored in-group members on the masculine dimensions and women favored in-group members on the feminine dimension. Also, it has been shown that men are more likely to associate the female gender with negative traits like incompetence, weakness, and coldness and subordinate roles (See Rudman and Goodwin (2004) for a review).

Racial/ethnic in-group bias in attitude has been widely documented among individuals. Analyzing Israeli small claim courts, Shayo and Zussman (2011) find that a claim is more likely to be accepted if it is assigned to a judge from the same ethnicity as the plaintiff. Gazal-Ayal and Kenan (2010) also find in-group bias in Israeli Arab and Jewish judges' decisions in criminal cases. The bias also has been reported by Price and Wolfers 2010 in their analysis of racial bias in refereeing decisions in the NBA². Related to racial bias, there are studies that relate a part of documented "home-bias" by investors' patriotism. For example, Morse

²It should be noted that there are studies that find negative racial bias among individuals. For instance, Depew et al. (2016) show that all else the same, black (white) juveniles who are randomly assigned to black (white) judges are more likely to get incarcerated (as opposed to being placed on probation), and they receive longer sentences. The negative racial bias has also been shown in (Mendoza et al. 2014).

and Shive (2011) show that, controlling for the standard home bias explanations, investors in more patriotic countries hold more domestic equities in their portfolios.

The in-group bias has been shown to also affect different political parties. Studies have focused on various traits among U.S. political groups such as how pleasant it would be to spend an evening with an in-group or out-group member (Kelly (1998)) or the attribution of an in-group or out-group politician’s decision to an ulterior motive (Munro (2010)). Eriksson and Funcke (2012) show both Republicans and Democrats exhibited strong in-group bias. Specifically, members of different political affiliations tend to regard the average member of their political in-group as warmer, and more competent.

3 Data and Summary Statistics

We use data from multiple sources. This section provides a brief summary of all datasets. In the appendix we provide detailed definitions of all variables used in the empirical analysis.

3.1 Analyst Data

We collected data on three demographic characteristics of analysts: gender, ethnicity and political orientation. In what follows, we explain how we obtained information on each of these dimensions. We used Institutional Brokers Estimate System from Thomson Financial (I/B/E/S), over 1992 to 2013, to get analysts’ quarterly earnings forecasts. To obtain information on analysts’ gender, we merged I/B/E/S with data from Kumar 2010. We obtain gender information for 7,935 analysts out of which 1264 (15.9%) are female analysts.

Analyst ethnicity is obtained from Amazon Mechanical Turk (AMT), similar to the procedure described in [Kumar et al. 2015](#). Specifically, a list of all analyst names included in I/B/E/S over our sample period is uploaded on the AMT platform. Then, a random sample of U.S. AMT workers are asked to indicate whether an analyst’s name sounds foreign by answering “Yes” , “No”, or “Unsure”. Based on the survey responses, a dummy variable is defined which is set to one for names that have been identified as foreign by more than 75% of AMT workers, and zero otherwise.³ We obtained ethnicity information for 11,320 analysts out of which 1662 (14.7%) were identified as foreign.

Finally, we obtained analysts’ political orientation from [Jiang et al. 2015](#). Using analysts’ financial contributions to Republican and Democrat-affiliated senate, house, presidential candidates and party committees in political campaigns, [Jiang et al. 2015](#) identify political orientation of analysts over the 1991 to 2008 period. Using their data, we define an analyst as a Republican or Democrat if more than 75% of his/her financial contributions go to the Republican or Democrat party, respectively.⁴ We obtained political orientation for 599 analysts from which 288 (48.1%) are identified as Republican and 246 (41.1%) are identified as Democrat.

3.2 CEO and Company Data

As in the analyst data section, we collected data on three demographic characteristics of CEOs: gender, ethnicity and political orientation. We used ExecuComp as the main database to obtain information on CEOs’ gender. Information on CEO gender is available for 3,286 CEOs, out of which 154 (4.7%) are female.

³In unreported results, we restrict the sample to analysts that have been identified as foreign or domestic by 100% of survey respondents. This restriction does not affect the main results.

⁴Raising this cutoff to 100%, does not affect our main results.

CEO ethnicity is again obtained from Amazon Mechanical Turk (AMT), similar to the procedure described in [Kumar et al. 2015](#) and in the analyst data section. A list of all CEO names included in ExecuComp is uploaded on the AMT platform and a random sample of U.S. AMT workers are asked to indicate whether each of these names sounds foreign by answering “Yes” , “No”, or “Unsure”. Based on the survey responses, we define a dummy variable which is set to one for names that have been identified as foreign by at least 75% of survey respondents, and zero otherwise. In our sample of ExecuComp firms from 1992 to 2013, we obtained ethnicity information for 3,001 CEOs, out of which 214 (7.1%) are identified as foreign CEOs.

Finally, we obtained CEOs’ political orientation from [Hutton et al. 2015](#). Using CEOs’ financial contributions to Republican and Democrat-affiliated senate, house, presidential candidates and party committees in political campaigns, [Hutton et al. 2015](#) identify political orientation of managers over the 1991 to 2008 period by providing an index, *REP*. This index ranges from zero to one, where one indicates that the CEO supports the Republican Party, and zero indicates all other cases (i.e. managers, who have either very weak Democratic political preferences, do not make political contributions at all or choose to contribute in ways that are not recorded by the FEC). Therefore, to get a cleaner identification of Democrat CEOs, we excluded all observations with zero index values from the sample. As a result, in this paper, we define a CEO as a Republican if more than 75% of his/her financial contributions go to Republican parties.⁵ Then, after excluding CEOs index values equal to zero, we identify those CEOs as Democrat who allocates more than 75% of their financial contributions to Democrat parties. We obtained political orientation for 2,404 CEOs out of which 737 (30.7%) are identified as Republican and 87 (3.6%) are identified as Democrat.

⁵Changing this cutoff to 100% does not change the results.

All other information on companies as listed in the appendix are obtained from the Center for Research on Security Prices (CRSP) database and the Annual CRSP-COMPUSTAT Merged (CCM) database. Following the literature, in all of the analyses, we excluded companies belong to financial service industry (SIC codes of 6000-6999), companies belong to utility industry as well as government entities (SIC codes of 4900-4999 and SIC codes greater or equal to 9000). Furthermore, our analyses are restricted to companies with the share code equal to 10 and 11 [Hutton et al. \(2015\)](#).

3.3 Summary Statistics

Table 1 reports the average number of CEOs and analysts with a certain demographic characteristic as well as the average number of quarterly earnings announcements per year. Results in column (1) show that there are clear minorities among CEOs in terms of all three demographic characteristics. While there are on average 1,672 male CEOs per year in our sample, there are on average only 37 female CEOs (2.2%) per year in our sample. Similarly, there are on average 1,443 domestic CEOs per year in our sample, while there are only 63 (14%) foreign CEOs. The majority of CEOs in our sample is Republican (88%), while only 12% of CEOs are Democrat.

A similar pattern emerges if we compare demographic characteristics of analysts in column (2). There are less female, foreign and democratic analysts in our sample than male, domestic and republican analysts. Thus, for our main analysis on in-group bias, it is important to note that there is always a dominant group of CEOs and analysts for each of the demographic characteristics that we investigate; the majority of earnings announcements in our sample is provided by male, domestic and republican CEOs (column (3)).

In Table 2, we provide summary statistics for all firm characteristics used in our analysis. In Panel A, we compare firm characteristics of female and male CEOs. While mean comparisons suggest that female CEOs manage larger firms, in terms of medians, we find that firms headed by female CEOs are smaller. With respect to stock prices, female CEOs manage firms with significantly lower stock prices. On other dimensions, there are no significant differences between firms managed by female or male CEOs.

In Panel B, we compare firm characteristics of foreign and domestic CEOs. We observe that the minority group, i.e. foreign CEOs, is in charge of significantly smaller firms with significantly lower stock prices. Again, there is no significant difference in book-to-market ratios and price-to-earnings ratios between firms headed by foreign or domestic CEOs.

Finally, in Panel C, we compare firm characteristics of democrat and republican CEOs. Democratic CEOs manage significantly larger firms with higher stock prices, but significantly lower book-to-market ratios. We do not find a significant difference in price-to-earnings ratios between firms headed by democratic or republican CEOs.

4 In-group Bias in Analysts' Opinions

We start by investigating whether analysts systematically underestimate CEOs who do not belong to their own in-group. If in-group bias exists among analysts, we should find that forecasts of quarterly earnings are systematically too low when the firm is headed by a CEO belonging to the out-group from an analyst's point of view. We define three types of in-groups according to observable demographic characteristics and investigate whether analysts' earnings forecasts are systematically too low when the firm is headed by a CEO of a different gender, ethnicity, or political orientation. Under the null hypothesis that analysts

are making efficient forecasts, their forecast errors should be unpredictable. Thus, a finding that CEO gender, ethnicity or political orientation helps predict a forecast error is direct evidence of an inefficient forecast.

Our approach shares many features of the “market test for discrimination” initially posed by [Ayres and Waldfoegel 1994](#), and subsequently by [Szymanski 2000](#). The nature of this test is to essentially check whether the evaluator’s behavior is optimal, in the sense of maximizing a non-discriminatory objective function. If the researcher is confident that s/he has isolated the objective function, then the first order condition usually yields some very clear orthogonality conditions, which forms the statistical null. For instance, [Szymanski 2000](#) is interested in analyzing racial bias among soccer managers, who choose players to maximize the number of wins by their team, given the team’s payroll. If this is the team’s true objective function, then team payroll should serve as a sufficient statistic for the team’s resources, and no other factor should help explain a team’s outcomes. But if the manager also prefers to hire white players (or systematically overestimates the ability of whites relative to blacks), then the racial composition of the playing squad has explanatory power over and above the team’s payroll.

The same logic applies to our setting: if analysts are motivated to produce accurate estimates of quarterly earnings, then their forecast should be a sufficient statistic for that quarter’s outcome, and no other available information should help explain announced earnings. Of course, there are both observable and unobservable differences between firms headed by CEOs with different demographic characteristics. But the observable information, plus the demographic characteristics of the CEO, are both in the analyst’s information set, and hence the logic still remains that any relevant differences should be embedded in an efficient

earnings estimate, and hence forecast errors should be orthogonal to CEOs' demographic characteristics such as gender, ethnicity, or political orientation.

4.1 Biased Consensus Earnings Forecasts

We start by investigating the magnitudes of earnings surprises computed using different consensus measures. Results are reported in Table 3. In Panel A, we examine whether analysts consensus earnings forecasts produce systematically different earnings surprises if a CEO's gender is different from the analyst's gender. When we define median forecast consensus using the forecasts of all analysts, the realized earnings of female headed firms surprise the market positively more frequently because the consensus levels are lower. In particular, firms with female CEOs have a positive mean earnings surprise (earnings $>$ consensus) of 0.29 basis points, while firms with male CEOs have a positive mean earnings surprise of only 0.24 basis points, and the difference of 0.05 basis points is statistically significant at the 1% level. This result is additionally interesting because it has been shown that analysts are more likely to benefit from overestimated forecasts (i.e. when forecast is greater than the actual earnings) (Hong and Kubik (2003)), therefore when an analyst issue a forecast low enough, he is more likely to signal his belief about the company. In addition, firms with female CEOs disappoint (earnings $<$ consensus) analysts less frequently: The mean absolute negative earnings surprise for female headed firms is 0.51, while it amounts to 0.57 for male headed firms. The difference of -0.05 is again statistically significant at the 1% level.

A similar pattern emerges, if we compute analysts' forecasts errors as the difference between an analyst's earnings forecast and the firm's actual earnings, scaled by the firm's stock price two days before the analyst's forecast date. We observe that positive forecast errors are significantly lower for female headed firms (0.46) compared to male headed firms

(0.53), while the reverse pattern holds for negative forecast errors. Both differences are again significant at the 1% level. Finally, there is less forecast dispersion among analysts for female headed firms, compared to male headed firms.

The asymmetric pattern in surprises for female and male headed firms is amplified when we measure surprise relative to the consensus of only male analysts, which is the dominant group of all analysts (see Table 1). When we compute the consensus using the forecasts of male analysts only, the consensus is even lower for firms headed by female CEOs. In particular, we find that the mean earnings surprise of firms with female CEOs is 0.32, while it amounts to only 0.25 for firms with male CEOs. The difference of 0.07 is significant at the 1% level. Furthermore, relative to male headed firms, female headed firms disappoint male analysts less frequently (0.54 vs. 0.57), with the difference again being significant at the 10% level. Similarly, positive forecast errors (i.e., analysts overestimating actual earnings) are significantly lower, while absolute negative forecast errors (i.e., analysts underestimating actual earnings) are significantly larger if the dominant group of only male analysts is considered.

Overall, the evidence in Panel A indicates that analysts are sensitive to CEO gender and exhibit a systematic gender-induced bias in their earnings estimates. Specifically, there is a tendency among analysts to underestimate female CEOs more and overestimate them less compared to male CEOs.

In Panel B of Table 3, we examine another dimension of observable demographic characteristics that might induce in-group bias among analysts. Specifically, we examine whether analysts consensus earnings forecasts produce systematically different earnings surprises conditional on the ethnicity of a firm's CEO. Results show a very similar pattern to what we find for CEO gender. Analysts are significantly more likely to underestimate earnings of firms headed by foreign CEOs compared to firms headed by domestic CEOs. We find that posi-

tive earnings surprises are significantly higher for firms with foreign CEOs, while (absolute) negative earnings surprises are significantly lower for firms with foreign CEOs. Furthermore, analysts produce significantly lower positive and higher (absolute) negative forecast errors regarding actual earnings of firms with foreign CEOs compared to firms with domestic CEOs. Results are very similar if we condition on forecasts of analysts belonging to the dominant group, *i.e.*, domestic analysts.

These results support the view that there is a tendency among analysts to underestimate CEOs belonging to the out-group (*i.e.*, foreign CEOs) and overestimate them less compared to CEOs belonging to the in-group (*i.e.*, domestic CEOs).

Finally, in Panel C of Table 3, we examine whether analysts consensus earnings forecasts produce systematically different earnings surprises conditional on the political orientation of a firm's CEO. Note that, while it is quite easy to classify CEOs' gender based on their first names, our classification of CEOs' ethnicity and political orientation is much more noisy, because it relies on more imperfect proxies such as surveys and political contributions. In addition, in terms of political orientation, republican analysts only slightly dominate democratic analysts (see Table 1), which makes it harder to find an overall impact if all analysts are considered. Nevertheless, results in Panel C are fairly consistent with what we find in Panels A and B, particularly if we condition on republican analysts only (the dominant group for this demographic dimension). We observe that republican analysts are significantly more likely to underestimate earnings of firms headed by democrat CEOs compared to firms headed by republican CEOs. Specifically, we find that positive earnings surprises based on republican analysts' consensus forecasts are significantly higher for firms with democrat CEOs, while (absolute) negative earnings surprises are significantly lower for firms with democrat CEOs. Furthermore, republican analysts produce significantly lower positive and

higher (absolute) negative forecast errors regarding actual earnings of firms with democrat CEOs compared to firms with republican CEOs.

Taken together, based on three different demographic dimensions (gender, ethnicity and political orientation), we find strong evidence of in-group bias among analysts.

4.2 Earnings Surprise Panel Regression Estimates

To investigate whether results from the previous section also hold in a multivariate framework, we run panel regression estimates with quarterly positive earnings surprises or quarterly negative earnings surprises, respectively, as the dependent variable. Earnings surprises are defined as $(\text{Actual Earnings} - \text{Consensus Forecast})/\text{Stock Price}$ and included in absolute values if they are negative. The actual earnings per share are obtained from I/B/E/S, the consensus earnings forecast is the median of the most recent earnings forecast of analysts covering the stock, and stock price is the price two days prior to the earnings announcement date.

Various papers have documented that firm size is an important determinant of analyst coverage and thus may predict earnings surprises ([Bhushan 1989](#); [Brennan and Hughes 1991](#)). They find that larger firms have greater analyst coverage and firm specific information is thus more likely to be reflected in stock prices quickly. Therefore, we include firm size as a control variable in our regressions. We also control for the stock's monthly turnover rate, since [Jegadeesh et al. 2004](#) show that stocks that receive higher recommendations (as well as more favorable recommendation revisions) tend to have high trading volume. Finally, we follow [Michel and Pandes 2012](#) and include a firm's book-to-market ratio as well as an

indicator for whether it is listed on NASDAQ. All regressions are estimated with industry and year fixed effects. Results are presented in Table 4.

In Panel A, the main independent variable is Female CEO, indicating whether a firm is headed by a female CEO. Even when we control for other firm characteristics, we find that positive earnings surprises are significantly larger for female-headed firms, while negative earnings surprises are significantly smaller for female-headed firms than for male-headed firms. The magnitude of positive earnings surprises is even stronger when we compute the earnings consensus using the forecasts of only male analysts, which is the dominant group in terms of gender. Thus, male analysts underestimate female CEOs, and expect lower earnings from firms headed by female CEOs, i.e. CEOs that do not belong to their in-group.

Regarding in-group bias defined based on ethnicity, results in Panel B again confirm our earlier findings and show that there are significantly larger positive earnings surprises for firms headed by foreign CEOs compared with firms headed by domestic CEOs. This result holds no matter whether we look at consensus forecasts of all analysts or those of domestic analysts, the dominant group along this demographic dimension, respectively. At the same time, negative earnings surprises are significantly smaller for firms headed by foreign CEOs compared with firms headed by domestic CEOs. Similar to the gender dimension, analysts seem to underestimate CEOs that do not belong to their in-group, i.e. domestic analysts systematically underestimate foreign CEOs.

Finally, regression results in Panel C show a similar effect for in-groups defined along the political orientation dimension. While we find a positive impact of CEOs' political orientation on positive earnings surprises, it is not statistically significant at conventional levels. However, negative earnings surprises are significantly smaller for firms headed by democratic CEOs

compared with firms headed by republican CEO. The magnitude of the effect becomes larger if we condition on consensus forecasts of republican analysts only.

Taken together, univariate as well as multivariate results on earnings surprises, provide strong support for the existence of in-group bias on financial markets. When forecasting earnings, analysts seem to systematically underestimate earnings of firms headed by CEOs who do not belong to their own in-group. Our results do not depend on one particular definition of in-groups. Rather, they hold for various demographic dimensions such as gender, ethnicity, and political orientation.

4.3 Analysts' Biased Recommendations

Jegadeesh et al. (2004) highlight the information contained in analysts' recommendation. Elton et al. (1986), p. 699 note that analysts' recommendations are "a clear and unequivocal course of action rather than producing an estimate of a number, the interpretation of which is up to the user." Motivated by this, in the next step, we examine whether analysts also issue biased stock recommendations if the CEO does not belong their own in-group. Results are reported in Table 5.

In Panel A, we investigate whether the gender of a CEO matters for whether analysts issue buy, sell, or hold recommendations for a firm's stock. We find that like the earnings forecasts, analysts' stock recommendations and recommendation changes exhibit a gender-induced bias. For firms with female CEOs, there are fewer buy and strong buy recommendations and a greater proportion of sell recommendations. Specifically, analysts issue 3.24% fewer buy and strong buy recommendations and 2.13% more sell and strong sell recommendations for female headed firms, compared with male headed firms. These differences are statistically

significant and become even more pronounced if we restrict the sample to recommendations by male analysts (which is the majority of analysts in our sample). We find that male analysts issue 4.21% fewer buy and strong buy recommendations and 2.5% more sell and strong sell recommendations for female headed firms, compared with male headed firms. These results again support the view that (male) analysts tend to be more pessimistic towards firms with female CEOs and more optimistic towards firms with male CEOs and that there is a strong in-group bias on financial markets.

In Panel B, we look at stock recommendations for firms headed by foreign or domestic CEOs, respectively. We find that there are significantly less buy and strong buy recommendations for stocks of firms headed by foreign CEOs, compared to firms headed by domestic CEOs. At the same time, there are significantly more sell and strong sell recommendations for these firms. A more refined view that only considers domestic analysts leads to even stronger results.

Finally, Panel C presents results of stock recommendations for firms headed by democrat or republican CEOs, respectively. While we observe a similar pattern in terms of buy and sell recommendations as in Panels A and B, particularly if we condition on domestic analysts only, the differences are not statistically significant on conventional levels.

4.4 Analysts' Forecast Dispersion

Our previous results provide evidence for in-group bias on financial markets. Analysts systematically underestimate earnings of firms headed by CEOs who do not belong to their own in-group. This result holds for various demographic characteristics of CEOs that are easily observable and thus likely to trigger an in-group bias effect. In this section, we ex-

amine whether there is also a systematic difference in forecast dispersion among analysts that belong to the same in-group and have to predict earnings of CEOs belonging to the out-group. We expect to find that there is less disagreement (that is, forecast dispersion is lower) among analysts belonging to the same in-group as the CEO.

We compute the ratio of the forecast dispersion among female and male analysts, the ratio of the forecast dispersion among foreign and domestic analysts, and the ratio of the forecast dispersion among Democrat and Republican analysts, respectively, and use these ratios as dependent variables in a set of multivariate regressions. We include the same control variables as before. Results are reported in Table 6.

In column (1), we find a significantly negative coefficient on the female CEO dummy variable, which indicates that there is less disagreement among female analysts relative to male analysts with respect to firms headed by female CEOs. Thus, in-group bias induces male analysts not only to provide lower estimates of earnings, but also results in greater dispersion in their opinions about the abilities of female CEOs. The coefficient remains negative but not statistically significant anymore if we add industry fixed effects to the regression (column (2)).

A similar result is obtained for firms headed by foreign CEOs (columns (3) and (4)). We find that the foreign CEO dummy variable is negative and statistically significant, indicating that there is less forecast dispersion among foreign analysts relative to domestic analysts for firms headed by foreign CEOs. While the coefficient becomes larger in economic terms if industry fixed effects are included (column (4)), statistical significance drops to the 10% level.

Finally, we perform the same analysis for firms headed by democratic CEOs (columns (5) and (6)). Consistent with the view that there is less forecast dispersion among democratic

analysts relative to republican analysts for firms with democratic CEOs, we find a negative coefficient on the democratic CEO dummy variable. However, the results are not statistically significant at conventional levels.

5 In-group Bias and Announcement Period Market Reaction

In this section we test whether stock market participants also exhibit in-group bias. For this analysis, it is important to again differentiate between in-groups and out-groups. To find an overall effect, we need to make assumptions about which is the dominant group trading stocks on the U.S. capital market. Most likely, male investors are dominant groups on this market, however, it is less clear which political orientation/ethnicity group dominates among stock market investors. This section only focuses on the demographic dimension of gender, since we do not have as strong in-group classifications for ethnicity and political orientation.

If, similar to analysts, stock market investors also exhibit in-group bias, they should be able to more accurately predict earnings of firms headed by CEOs belonging to their own in-group. Specifically, if the market is dominated by male investors, stock price reactions to earnings announcements of firms headed by female CEOs should be stronger (in absolute terms) than those to earnings announcements of firms headed by male CEOs.

To test this conjecture, we compute cumulative abnormal returns (CARs)⁶ of female and male headed companies around the earning announcements for different event windows. First, daily abnormal returns are computed as in [Baker et al. 2009](#). Second, these returns

⁶Results are robust to standardized CAR.

are aggregated to CARs from $t-1$ to $t+1$, $t-2$ to $t+2$, and $t-1$ to $t+2$, respectively, where $t=0$ is a companies' earnings announcement date.

Figure 1 displays the variation in the unconditional CARs for female and male headed companies over different time intervals. Visual inspection shows that, conditional on experiencing positive earnings surprises (that is, positive news), both female and male headed companies stocks experience positive abnormal returns. However, this abnormal return is higher for female-headed companies (i.e., it is 1% for female CEOs on average, and 0.6% for male CEOs on average). Moreover, conditional on experiencing negative earnings surprises, both female and male headed companies stock experience negative abnormal returns, again with female headed companies experiencing a stronger effect (i.e., -0.6% for female CEOs, and -0.4% for male CEOs). The difference between female and male headed unconditional CAR are all statistically significant at least at the 5% level.

Figure 1 also shows that abnormal returns (both when there are positive earnings surprises and when there are negative surprises) tend to decline 10 days after the announcement date and pick up again closer to the next announcement date.

Next, we run OLS regressions where CARs are included as the dependent variable. As main independent variables, we include either positive or negative earnings surprises which are then interacted with a female CEO dummy variable. We use the same set of control variables as in our previous regressions.

Table 7 shows results for the CAR reaction to positive earnings surprises. As expected, results indicate that the market responds more strongly to positive earnings surprises of firms with female CEOs. The interaction of the positive earnings surprise variable and the female CEO dummy is positive and significant at the 1% level. Furthermore, the result is robust for different event windows. It suggests that stock market investors indeed underestimate

female CEOs, leading to a stronger stock market reaction to positive earnings surprises for firms headed by female CEOs.

Table 8 shows the CAR reaction to (absolute) negative earnings surprises. Again, we observe that stock market investors respond more strongly to negative earnings surprises of firms headed by female CEOs. The interaction terms of the negative earnings surprise variable and the female CEO dummy is positive and statistically significant for all event windows. Overall, these results show that stock market participants also exhibit in-group bias along the gender dimension, i.e., they are biased towards female CEOs. Also consistent with the previous literature, the stronger market reaction to negative earnings surprises of firms headed by female CEOs in Table 8 provides evidence that when there is negative news, the market punishes female CEOs more than male CEOs.

6 Summary and Conclusion

In-group bias is one of the main aspects of human behavior. It is well documented that individuals systematically adopt favorable opinions about the in-group members compared to out-group ones. This bias can have considerable social consequences as it can be one of the primary drivers of social biases such as discrimination. In this paper, we examine whether such bias can survive in a competitive environment such as financial markets. To do so, we study the characteristics of equity analysts' earnings forecasts to understand how they evaluate in-group (out-group) CEOs. Under the null hypothesis that analysts are making efficient forecasts, their forecasts errors should be unpredictable. Thus, a finding that CEO's characteristic helps to predict a forecast error is a direct evidence of an inefficient forecast.

Based on three distinct demographic characteristics (gender, ethnicity, and political orientation), we show robust evidence that equity analysts exhibit in-group bias. All three groups of market participants persistently favor CEOs of their own “type”. Specifically, we show that male analysts provide lower earnings estimates and worse stock recommendations for firms with female CEOs, domestic analysts provide lower earnings estimates and worse stock recommendations for firms with foreign CEOs, and Republican analysts provide lower earnings estimates and worse stock recommendations for firms with Democratic CEOs. Furthermore, we find that analysts’ forecast dispersion is lower for firms headed by CEOs belonging to their in-group.

Next, we examine whether market participants also exhibit in-group bias. To do so, we study the cumulative abnormal return of female and male headed companies for different windows of time. Our results indicate that the market responds more strongly to positive and negative earnings surprise of female headed companies, supporting the in-group bias hypothesis among market participants.

Collectively, our results contribute to several strands of the literature. We add to the economic of discrimination by providing a useful way to distinguish among alternative explanations of majority-minority disparities. Specifically, our results support the statistical discrimination that individuals are more likely to have different treatment with otherwise similar observable characteristics. Our results also add to the literature on the impact of biases on financial markets by showing that there is ingroup-favoritism among equity analysts for firms headed by female, foreign or Democrat CEOs. Overall, our findings can improve our understanding of analysts’ behavior and stock market reaction to analyst forecasts. Future research could examine how the observed bias may affect analysts’ job and whether such behavior also exists among other groups in the market such as CEOs.

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Table 1: Average Number of Observations by year

This table reports the average number of unique CEOs, average number of unique equity analysts, and the average number of quarterly earnings announcements per year in three dimensions: gender (male/female), ethnicity(foreign/domestic) and political orientation(Republican/Democrat). Analysts and earnings announcement data are from I/B/E/S. CEO gender data are from Executive Compensation. CEOs and analysts ethnicity data are from [Kumar et al. \(2015\)](#). CEOs political orientation data are from [Hutton et al. \(2015\)](#). Analysts political orientation data are from [Jiang et al. \(2015\)](#). The sample period is from 1992 to 2013 for gender and ethnicity. The sample period is from 1992 to 2008 for political orientation.

	CEOs	Analysts	Earnings Announcements
	(1)	(2)	(3)
Female	37	375	120
Male	1,672	2,291	5,156
Foreign	63	434	195
Domestic	1,443	2,947	4,278
Democrat	40	124	84
Republican	293	158	564

Table 2: Firm Characteristics by Gender, Ethnicity and Political Orientation

This table presents summary statistics for characteristics of firms headed by female and male CEOs (Panel A), foreigner and national CEOs (Panel B) and Democrat and Republican CEOs (Panel C). Companies belong to financial service industry (SIC codes of 6000-6999), companies belong to utility industry as well as government entities (SIC codes of 4900-4999 and SIC codes greater or equal to 9000) have been excluded. Analyses are based on companies with share code equal to 10 and 11. Analysts and earnings announcement data are from I/B/E/S. CEO gender data are from Executive Compensation. CEOs and analysts ethnicity data are from Kumar et al. (2015). CEOs political orientation data are from Hutton et al. (2015). Analysts political orientation data are from Jiang et al. (2015). The sample period is from 1992 to 2013 in Panel A and B. The sample period is from 1992 to 2008 in Panel C.

Panel A: Firm characteristics by gender										
	Female CEOs				Male CEOs				Mean Difference	<i>t-stat</i>
	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl		
Firm Size (million \$)	4520	373	930	3070	4470	465	1250	3870	50	2.52
Stock Price	27.23	11.73	23.19	37.42	31.02	15.77	26.60	41.19	-3.79	-75.81
Book to Market	0.55	0.24	0.45	0.70	0.51	0.25	0.43	0.67	0.05	0.78
Price to Earnings	20.31	9.79	16.90	24.73	18.81	10.38	16.63	25.08	1.50	0.26

Panel B: Firm characteristics by ethnicity										
	Foreign CEOs				Domestic CEOs				Mean Difference	<i>t-stat</i>
	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl		
Firm Size (million \$)	4480	432	1080	3350	5320	463	1240	3830	-840	-33.93
Stock Price	28.25	13.13	23.00	37.31	31.44	16.27	27.00	41.43	-3.19	-82.27
Book to Market	0.48	0.26	0.43	0.65	0.52	0.26	0.44	0.67	-0.04	-1.42
Price to Earnings	18.63	8.26	17.70	28.22	18.82	10.73	16.67	24.95	-0.19	-0.04

Panel C: Firm characteristics by political orientation										
	Democrat CEOs				Republican CEOs				Mean Difference	<i>t-stat</i>
	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl		
Firm Size (million \$)	11100	1000	3070	8580	5090	491	1210	3490	6010	140.51
Stock Price	37.35	22.63	32.75	48.56	31.54	16.63	27.20	42.13	5.80	101.94
Book to Market	0.42	0.22	0.37	0.57	0.49	0.25	0.41	0.64	-0.07	-1.95
Price to Earnings	17.10	11.43	17.90	25.76	21.94	10.90	17.37	25.29	-4.84	-0.61

Table 3: In-group bias among Analysts

In this table, earnings surprises are computed relative to analysts' consensus earnings forecasts obtained from I/B/E/S. Actual earnings per share are also from I/B/E/S. The consensus earnings forecast is the median of the most recent earnings forecast (since the previous earnings announcement date) of analysts covering the stock. Earnings surprises are computed relative to the median of all analyst forecasts, and relative to the median of the dominant group of analysts. Analyst Forecast Error is equal to (Analyst Forecast - Actual Earnings)/Price, where Price is the stock price two days before the forecast date. Forecast Dispersion is the standard deviation of analysts' most recent forecasts. All continuous variables are winsorized at 1% level except for negative (positive) earnings surprise (forecast error). All numbers in the tables have been multiplied by 100 for the ease of readability. In Panel A, we report quarterly earnings surprise statistics for female- and male-headed firms. The dominant group is male analysts and the sample period is from 1992 to 2013. Panel B (Panel C) reports the same statistics for firms with foreign (democratic) and domestic (republican) CEO. The dominant groups are domestic and republican analysts, respectively. In Panel B, the sample period is from 1992 to 2013. In Panel C, the sample period is from 1992 to 2008.

Panel A: Gender	Female CEOs				Male CEOs					
All Analysts	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl	Female -Male	t-stat
Positive Earnings Surprise	0.29	0.03	0.11	0.30	0.24	0.03	0.09	0.25	0.05	8.24
(Absolute) Negative Earnings Surprise	0.51	0.08	0.28	0.73	0.57	0.05	0.18	0.56	-0.05	-3.53
Positive Forecast Error	0.46	0.04	0.22	0.69	0.53	0.03	0.15	0.53	-0.07	-4.79
(Absolute) Negative Forecast Error	0.36	0.06	0.15	0.37	0.29	0.05	0.12	0.31	0.07	10.18
Forecast Disp.	4.93	1.28	2.66	5.67	5.38	1.21	2.74	6.02		
Male Analysts	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl	Female -Male	t-stat
Positive Earnings Surprise	0.32	0.04	0.12	0.32	0.25	0.03	0.10	0.26	0.07	11.07
(Absolute) Negative Earnings Surprise	0.54	0.08	0.29	0.78	0.57	0.05	0.18	0.57	-0.03	-1.70
Positive Forecast Error	0.49	0.05	0.23	0.72	0.53	0.03	0.16	0.54	-0.04	-2.64
(Absolute) Negative Forecast Error	0.39	0.06	0.16	0.40	0.30	0.05	0.12	0.31	0.09	12.10
Forecast Disp.	5.17	1.29	2.79	5.96	5.44	1.21	2.77	6.08		

Table 3: In-group bias among Analysts (cont'd)

Panel B: Ethnicity										
	Foreign CEOs				Domestic CEOs					
All Analysts	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl	<i>Foreign-domestic</i>	<i>t-stat</i>
Positive Earnings Surprise	0.27	0.04	0.12	0.30	0.19	0.03	0.08	0.21	0.08	27.61
(Absolute) Negative Earnings Surprise	0.58	0.06	0.23	0.77	0.70	0.04	0.16	0.56	-0.12	-5.39
Positive Forecast Error	0.59	0.04	0.23	0.79	0.72	0.03	0.15	0.56	-0.13	-5.79
(Absolute) Negative Forecast Error	0.26	0.06	0.15	0.38	0.25	0.04	0.11	0.27	0.02	4.77
Forecast Disp.	6.91	2.04	4.14	8.19	6.41	1.62	3.58	7.68		
Domestic Analysts	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl	<i>Foreign-domestic</i>	<i>t</i>
Positive Earnings Surprise	0.26	0.04	0.11	0.30	0.19	0.03	0.08	0.21	0.07	23.97
(Absolute) Negative Earnings Surprise	0.60	0.07	0.25	0.79	0.69	0.04	0.16	0.55	-0.09	-3.66
Positive Forecast Error	0.59	0.04	0.23	0.81	0.71	0.03	0.15	0.55	-0.12	-4.58
(Absolute) Negative Forecast Error	0.32	0.06	0.15	0.37	0.24	0.04	0.11	0.27	0.08	22.17
Forecast Disp.	6.73	1.83	3.97	7.99	6.29	1.55	3.47	7.52		
Panel C: Political Orientation										
	Democrat CEOs				Republican CEOs					
All Analysts	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl	<i>Democrat-Republican</i>	<i>t-stat</i>
Positive Earnings Surprise	0.32	0.02	0.07	0.27	0.34	0.03	0.09	0.28	-0.02	-1.01
(Absolute) Negative Earnings Surprise	0.78	0.03	0.16	0.69	0.96	0.05	0.24	0.97	-0.17	-2.74
Positive Forecast Error	0.58	0.02	0.10	0.45	0.79	0.03	0.17	0.69	-0.21	-3.86
(Absolute) Negative Forecast Error	0.26	0.03	0.08	0.24	0.30	0.04	0.10	0.27	-0.04	-2.31
Forecast Disp.	20.25	1.15	4.24	20.78	15.96	0.71	2.52	14.50		
Republican Analysts	Mean	25th Pctl	Median	75th Pctl	Mean	25th Pctl	Median	75th Pctl	<i>Democrat-Republican</i>	<i>t-stat</i>
Positive Earnings Surprise	0.32	0.03	0.08	0.31	0.23	0.03	0.11	0.32	0.09	5.45
(Absolute) Negative Earnings Surprise	0.59	0.04	0.17	0.54	0.86	0.06	0.24	0.85	-0.27	-3.18
Positive Forecast Error	0.41	0.02	0.11	0.43	0.76	0.03	0.18	0.63	-0.35	-4.42
(Absolute) Negative Forecast Error	0.29	0.04	0.10	0.31	0.22	0.04	0.11	0.30	0.07	4.86
Forecast Disp.	21.61	1.39	5.20	21.21	18.70	0.94	3.79	20.01		

Table 4: In-group bias among Analysts - Regression Estimates

This table presents pooled OLS regression estimates, where the quarterly positive earnings surprise or quarterly negative earnings surprise is the dependent variable. Firm Size, Book-to-Market Ratio, Monthly Turnover and NASDAQ dummy are included as control variables and defined in detail in the Appendix. Earnings surprise is defined as the absolute of (Actual Earnings - Consensus Forecast)/Price. All continuous measures are standardized. The sample period is from 1992 to 2013 in Panel A and B. The sample period is from 1992 to 2008 in Panel C. *t*-statistics are reported in parentheses below the coefficient estimates. Regressions are estimated with robust standard errors. In each panel, earnings surprise is computed relative to two consensus measures: (i) consensus of all analysts and (ii) consensus of male analysts in Panel A, (iii) consensus of domestic analysts in Panel B, and (iv) consensus of Republican analysts in Panel C. In Panel A, Female CEO is a dummy variable indicating that a firm is headed by a female CEO. in Panel B, Foreign CEO is a dummy variable indicating that a firm is headed by a foreign CEO according to the classification described in section 3. In Panel C, Democrat CEO is a dummy variable indicating that a firm is headed by a democrat CEO according to the classification described in section 3.

Panel A: Gender	All Consensus		Male Consensus	
	Positive Surprise	(Absolute) Negative Surprise	Positive Surprise	(Absolute) Negative Surprise
Female CEO	0.154 (7.27)	-0.036 (-4.38)	0.209 (8.56)	-0.027 (-3.28)
Firm Size	-0.150 (-54.39)	-0.062 (-18.58)	-0.151 (-50.97)	-0.060 (-16.03)
Book to market ratio	0.124 (16.71)	0.062 (4.69)	0.121 (15.74)	0.052 (3.69)
Monthly Turnover	0.025 (7.71)	0.051 (8.56)	0.028 (8.13)	0.052 (7.86)
NASDAQ dummy	0.043 (4.29)	-0.0140 (-1.09)	0.038 (3.63)	-0.013 (-0.94)
Constant	0.058 (13.33)	0.007 (1.28)	0.055 (11.81)	0.006 (0.98)
Year+Industry FE	Yes	Yes	Yes	Yes
Observations	224,398	177,574	198,751	157,972
Adj. R ²	0.305	0.276	0.301	0.279

Table 4: In-group bias among Analysts - Regression Estimates (cont'd)

Panel B: Ethnicity		All Consensus		Domestic Consensus	
	Positive Surprise	(Absolute) Negative Surprise	Positive Surprise	(Absolute) Negative Surprise	
Foreign CEO	0.231 (12.58)	-0.069 (-5.20)	0.171 (8.78)	-0.046 (-2.78)	
Firm Size	-0.111 (-39.74)	-0.142 (-43.00)	-0.123 (-41.19)	-0.138 (-39.70)	
Book-to-market ratio	0.184 (15.25)	0.206 (19.94)	0.154 (12.28)	0.220 (24.09)	
Monthly Turnover	0.093 (11.61)	0.085 (9.82)	0.093 (11.16)	0.092 (9.09)	
NASDAQ dummy	-0.179 (-9.89)	-0.149 (-6.95)	-0.238 (-12.32)	-0.115 (-4.68)	
Constant	0.147 (23.80)	0.054 (7.32)	0.173 (26.95)	0.044 (5.39)	
Year+Industry FE	Yes	Yes	Yes	Yes	
Observations	139,836	113,268	123,647	100,069	
Adj. R ²	0.475	0.520	0.481	0.504	

Panel C: Political Orientation		All consensus		Republican Consensus	
	Positive Surprise	(Absolute) Negative Surprise	Positive Surprise	(Absolute) Negative Surprise	
Democrat CEO	0.069 (1.14)	-0.229 (-2.99)	0.169 (1.28)	-0.298 (-2.24)	
Firm Size	-0.084 (-8.02)	-0.106 (-9.82)	-0.058 (-4.65)	-0.098 (-6.02)	
Book to market ratio	0.125 (2.13)	-0.036 (-1.65)	0.0884 (1.57)	-0.0471 (-1.74)	
Monthly Turnover	0.062 (2.39)	0.081 (3.15)	0.122 (3.09)	0.045 (1.75)	
NASDAQ dummy	-0.083 (-1.32)	0.179 (2.65)	0.024 (0.31)	-0.087 (-0.71)	
Constant	0.148 (7.38)	0.046 (2.34)	0.071 (2.54)	0.100 (2.61)	
Year+Industry FE	Yes	Yes	Yes	Yes	
Observations	12,603	11,867	6,274	5,589	
Adj. R ²	0.220	0.410	0.204	0.362	

Table 5: In-group Bias and Analysts' Recommendations

This table presents analyst recommendations firms with female and male CEOs (Panel A), foreign and domestic CEOs (Panel B), and republican and democrat CEOs (Panel C), respectively. Recommendations have been categorized based on strong buy/ buy, strong sell/ sell and hold. Column (1) shows the number of analysts who made a positive forecast error and also recommended strong buy or buy. Column (2) shows the number of analysts who made a negative forecast error and also recommended strong sell or sell. The sample period is from 1992 to 2013.

Panel A: Gender			
All Analysts	Strong Buy/ Buy (1)	Strong Sell/ Sell (2)	Hold (3)
Female CEOs	37.45%	10.44%	52.12%
<i>Num of Obs</i>	<i>513</i>	<i>143</i>	<i>714</i>
Male CEOs	40.69%	8.31%	51.01%
<i>Num of Obs</i>	<i>24934</i>	<i>5090</i>	<i>31258</i>
Female-Male	-3.24%	2.13%	1.11%
<i>z</i>	-2.42	2.82	0.81
Male Analysts	Strong Buy/ Buy (1)	Strong Sell/ Sell (2)	Hold (3)
Female CEOs	36.68%	10.69%	52.63%
<i>Num of Obs</i>	<i>398</i>	<i>116</i>	<i>571</i>
Male CEOs	40.89%	8.19%	50.92%
<i>Num of Obs</i>	<i>22007</i>	<i>4408</i>	<i>27403</i>
Female-Male	-4.21%	2.50%	1.71%
<i>z</i>	-2.79	2.97	1.11

Table 5: In-group Bias and Analysts' Recommendations (cont'd)

Panel B: Ethnicity			
All Analysts	Strong Buy/ Buy (1)	Strong Sell/ Sell (2)	Hold (3)
Foreign CEOs	38.70%	9.45%	51.85%
<i>Num of Obs</i>	<i>1266</i>	<i>309</i>	<i>1696</i>
Domestic CEOs	41.13%	8.21%	50.66%
<i>Num of Obs</i>	<i>26128</i>	<i>5214</i>	<i>32176</i>
Foreign-Domestic	-2.43%	1.24%	1.19%
<i>z</i>	-2.76	2.51	1.33
Domestic Analysts	Strong Buy/ Buy (1)	Strong Sell/ Sell (2)	Hold (3)
Foreign CEOs	38.82%	9.45%	51.73%
<i>Num of Obs</i>	<i>1052</i>	<i>256</i>	<i>1402</i>
Domestic CEOs	41.43%	8.13%	50.44%
<i>Num of Obs</i>	<i>23427</i>	<i>4598</i>	<i>28527</i>
Foreign-Domestic	-2.61%	1.32%	1.29%
<i>z</i>	-2.69	2.44	1.31
Panel C: Political Orientation			
All Analysts	Strong Buy/ Buy (1)	Strong Sell/ Sell (2)	Hold (3)
Democrat CEOs	42.64%	6.04%	51.32%
<i>Num of Obs</i>	<i>113</i>	<i>16</i>	<i>136</i>
Republican CEOs	42.70%	7.33%	49.97%
<i>Num of Obs</i>	<i>664</i>	<i>114</i>	<i>777</i>
Democrat-Republican	-0.06%	-1.29%	1.35%
<i>z</i>	-0.02	-0.76	0.41
Republican Analysts	Strong Buy/ Buy (1)	Strong Sell/ Sell (2)	Hold (3)
Democrat CEOs	43.00%	8.00%	49.00%
<i>Num of Obs</i>	<i>43</i>	<i>8</i>	<i>49</i>
Republican CEOs	44.99%	6.92%	48.08%
<i>Num of Obs</i>	<i>364</i>	<i>56</i>	<i>389</i>
Democrat-Republican	-1.99%	1.08%	0.92%
<i>z</i>	0.65	0.40	0.17

Table 6: Forecast Dispersion - Multivariate Evidence

This table presents pooled OLS regression estimates, where the ratio of the forecast dispersion of female and male analysts, the ratio of the forecast dispersion of foreign and domestic analysts, and the ratio of the forecast dispersion of Democrat and Republican analysts are the dependent variable, respectively. Analysts' forecast dispersion is computed as the standard deviation of analysts' earnings estimates by each demographic dimension. The Female CEO, Foreign CEO and Democrat CEO dummy variables are included as the main independent variables. Firm Size, Book-to-Market Ratio, Monthly Turnover and NASDAQ dummy are included as control variables and defined in detail in the Appendix. All continuous variables are standardized. *t*-statistics are reported in parentheses below the coefficient estimates.

	Female/Male		Foreign/Domestic		Democrat/Republican	
	(1)	(2)	(3)	(4)	(5)	(6)
Female CEO	-0.009 (-2.39)	-0.008 (-1.03)				
Foreign CEO			-0.030 (-2.33)	-0.053 (-1.78)		
Democrat CEO					-0.131 (-0.91)	-0.040 (-0.19)
Firm Size	-0.003 (-1.52)	-0.007 (-2.02)	-0.008 (-2.11)	-0.007 (-3.21)	0.005 (0.32)	0.036 (1.00)
Book to market ratio	-0.001 (-0.59)	0.012 (2.08)	0.003 (0.96)	0.003 (1.10)	-0.014 (-3.24)	-0.143 (-0.73)
Monthly Turn Over	-0.002 (-2.75)	-0.003 (-1.40)	-0.013 (-2.24)	-0.018 (-2.58)	0.011 (0.44)	0.146 (1.38)
NASDAQ dummy	0.034 (3.40)	0.016 (1.61)	0.031 (2.23)	0.002 (1.99)	-0.103 (-1.52)	0.194 (1.38)
Year FE	Yes	–	Yes	–	Yes	–
Year+Industry FE	No	Yes	No	Yes	No	Yes
Observations	52,122	52,122	71,445	71,445	490	490
Adj. R ²	0.001	0.018	0.001	-0.013	0.963	0.075

Table 7: CAR Reaction to Positive Earnings Surprises

This table shows the abnormal return of firms around the positive earnings announcements. The interaction of female CEO dummy and Positive earnings surprise is the main independent variable. Several firm characteristics (firm size, book-to-market ratio, monthly turnover and NASDAQ dummy) are included as control variables. Earnings surprise is defined as the absolute of (Actual Earnings - Consensus Forecast)/Price. Actual earnings per share are from I/B/E/S. Cumulative Abnormal Return (CAR) has been defined following Baker et al. (2009). Return information is from CRSP. All continuous measures are standardized. *t*-statistics are reported in parentheses below the coefficient estimates.

	CAR[-1,+1]			CAR[-2,+2]			CAR[-1,+2]		
Female Dummy	0.007 (0.45)	0.076 (3.72)	-0.025 (-1.71)	0.004 (0.19)	0.001 (0.10)	0.058 (2.93)			
Positive Earning surprise	0.041 (9.18)	0.038 (8.93)		0.039 (8.18)	0.036 (7.85)	0.040 (8.50)	0.038 (8.22)		
Female CEO × Positive Earning surprise		0.129 (4.88)			0.110 (4.52)		0.110 (4.48)		
Firm Size	0.003 (1.72)	-0.011 (-4.94)	-0.010 (-4.74)	0.002 (1.37)	-0.011 (-4.95)	-0.010 (-4.85)	0.004 (2.18)	-0.009 (-3.94)	-0.008 (-3.78)
Book to market ratio	-0.011 (-1.76)	-0.036 (-5.36)	-0.034 (-5.15)	-0.014 (-2.43)	-0.054 (-7.73)	-0.053 (-7.64)	-0.015 (-2.53)	-0.051 (-7.35)	-0.050 (-7.19)
Monthly Turn Over	-0.018 (-5.66)	0.003 (0.68)	0.003 (0.82)	-0.019 (-6.03)	0.004 (1.11)	0.005 (1.19)	-0.018 (-5.50)	0.004 (1.06)	0.005 (1.18)
NASDAQ dummy	0.031 (4.29)	0.011 (1.13)	0.008 (0.89)	0.025 (3.46)	0.005 (0.54)	0.004 (0.46)	0.031 (4.35)	0.013 (1.36)	0.011 (1.16)
Constant	-0.010 (-3.29)	0.069 (16.67)	0.068 (16.38)	-0.008 (-2.41)	0.064 (15.75)	0.064 (15.73)	-0.010 (-3.27)	0.064 (15.50)	0.063 (15.26)
Year+Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	391,586	220,443	220,443	391,586	220,443	220,443	391,586	220,443	220,443
Adj. R^2	0.090	0.133	0.133	0.088	0.132	0.133	0.088	0.131	0.131

Table 8: CAR Reaction to Negative Earnings Surprises

This table shows the abnormal return of firms around the negative earnings announcements. The interaction of female CEO dummy and negative earnings surprise is the main independent variable. Several firm characteristics (firm size, book-to-market ratio, monthly turnover and NASDAQ dummy) are included as control variables. Earnings surprise is defined as the absolute of (Actual Earnings - Consensus Forecast)/Price. Actual earnings per share are from I/B/E/S. Cumulative Abnormal Return (CAR) has been defined following Baker et al. (2009). Return information is from CRSP. All continuous measures are standardized. *t*-statistics are reported in parentheses below the coefficient estimates.

	CAR[-1,+1]			CAR[-2,+2]			CAR[-1,+2]		
Female Dummy	0.007 (0.45)	-0.032 (-1.49)	-0.025 (-1.71)	-0.035 (-1.64)	0.001 (0.10)	-0.033 (-1.52)			
(Absolute) Negative Earning surprise	0.038 (7.23)	0.034 (6.44)		0.027 (5.27)	0.024 (4.55)		0.033 (6.51)	0.029 (5.65)	
Female CEO × (Absolute) Negative Earning surprise		0.056 (2.28)		0.044 (2.25)		0.052 (2.64)			
Firm Size	0.003 (1.72)	0.019 (5.88)	0.018 (5.73)	0.002 (1.37)	0.020 (6.29)	0.020 (6.13)	0.004 (2.18)	0.017 (5.35)	0.017 (5.20)
Book to market ratio	-0.011 (-1.76)	0.004 (0.59)	0.004 (0.57)	-0.014 (-2.43)	0.009 (1.42)	0.009 (1.39)	-0.015 (-2.53)	0.006 (0.89)	0.006 (0.86)
Monthly Turn Over	-0.018 (-5.66)	-0.048 (-9.24)	-0.048 (-9.30)	-0.019 (-6.03)	-0.051 (-9.78)	-0.051 (-9.83)	-0.018 (-5.50)	-0.047 (-8.96)	-0.048 (-9.02)
NASDAQ dummy	0.031 (4.29)	0.062 (5.04)	0.062 (5.07)	0.025 (3.46)	0.050 (4.09)	0.051 (4.12)	0.031 (4.35)	0.051 (4.19)	0.052 (4.22)
Constant	-0.010 (-3.29)	-0.115 (-22.33)	-0.114 (-22.08)	-0.008 (-2.41)	-0.106 (-20.48)	-0.105 (-20.23)	-0.010 (-3.27)	-0.108 (-20.86)	-0.107 (-20.61)
Year+Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	391,586	170,968	170,968	391,586	170,968	170,968	391,586	170,968	170,968
Adj. R^2	0.090	0.159	0.159	0.088	0.151	0.151	0.088	0.157	0.157

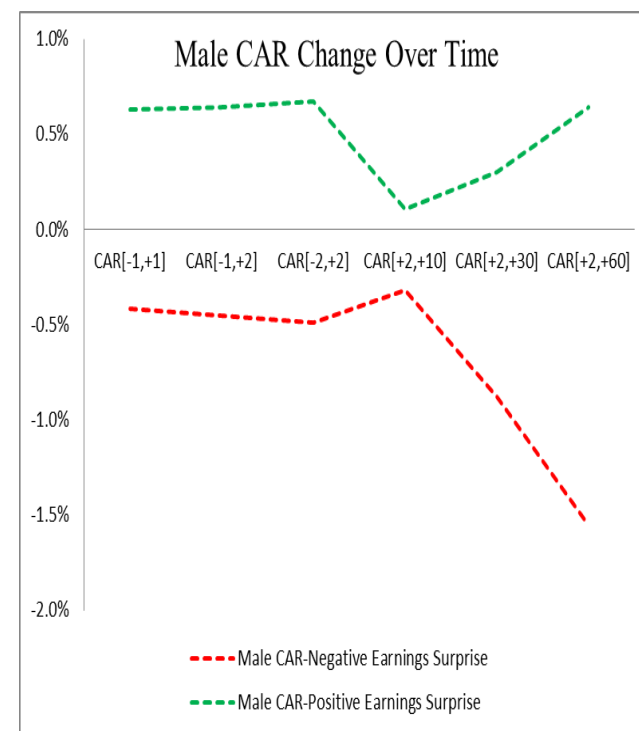
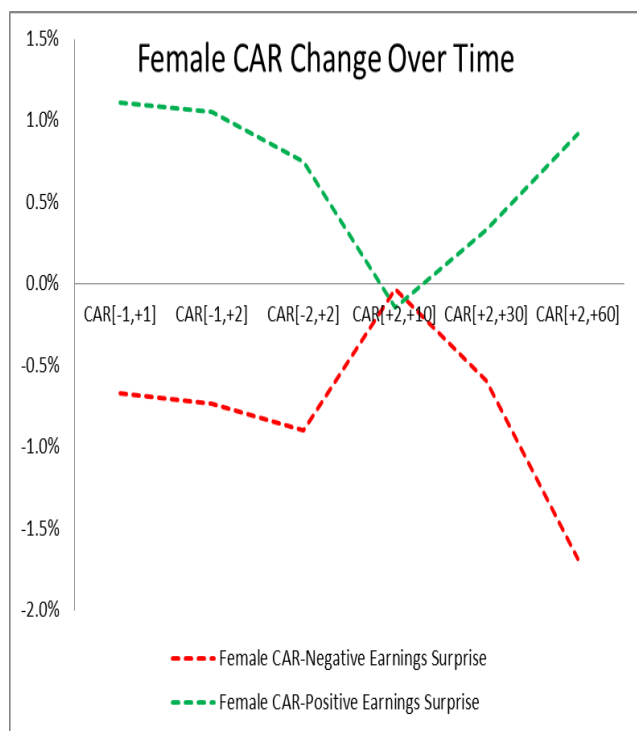


Figure 1: This Figure shows the unconditional abnormal returns (CARs) Change over time for Female and Male-headed CEOs.

Appendix A - Brief definition and sources of main variables

This table briefly defines the main variables used in the empirical analyses. The main data sources are: (i) CRSP: Center for Research on Security Prices, (ii) CCM: Annual CRSP-COMPUSTAT Merged Database, (iii) I/B/E/S: Institutional Brokers Estimate System from Thomson Financial and (iv) ExecuComp: Executive Compensation database from COMPUSTAT.

Variables Name	Description	Source
<i>Firm Size</i>	Stock price \times shares outstanding	CRSP
<i>Book-To-Market Ratio</i>	Ratio of the book-value of equity and the market capitalization of the firm as of the most recent fiscal year-end	CCM
<i>Price-To-Earnings</i>	Stock price divided by the annual earnings	CCM
<i>Monthly Volume Turnover</i>	Shares traded during the month divided by the number of shares outstanding	CRSP
<i>Consensus Forecast</i>	Median quarterly earnings forecast using the most recent analyst forecast since the previous earnings announcement	I/B/E/S
<i>Earnings Surprise</i>	(Actual Earnings - Consensus Forecast)/Price, where Price is the stock price two days before the forecast date.	I/B/E/S, CRSP
<i>Forecast Dispersion</i>	Standard deviation of analysts' most recent forecasts	I/B/E/S
<i>Analyst Forecast Error</i>	(Analyst Forecast - Actual Earnings)/Price, where Price is the stock price two days before the forecast date	I/B/E/S, CRSP
<i>NASDAQ Dummy</i>	Set to one if the stock belongs to NASDAQ index	CRSP
<i>Three-day Return</i>	Stock return during the three-day window, centered on the earnings announcement date.	I/B/E/S, CRSP

Appendix A (cont'd) - Brief definition and sources of main variables

Variables Name	Description	Source
<i>CEO/Analyst Foreign Dummy</i>	Set to one if more than 75% of survey responses identified the CEO/analyst's name as a foreign name, zero values of dummy variable have been considered as a native CEO/analyst	Kumar et al. (2015)
<i>Analyst Republican/Democrat Dummy</i>	Set to one if more than 75% donations of the analyst go to republican (democrat) parties	Jiang et al. (2015)
<i>CEO Republican Dummy</i>	Set to one if 100% of the CEOs donations go to republican parties	Hutton et al. (2015)
<i>CEO Democrat Dummy</i>	Set to one if after excluding unknown CEOs (those with zero ratio of donation to republican parties) denotes to democrat parties more than 75% of the time	Hutton et al. (2015)