

# **Evidence of Management Discrimination Among Analysts During Earnings Conference Calls**

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## Abstract

I investigate whether managers discriminate among analysts during earnings conference calls based on how favorably the analyst views the firm. Lawmakers and the SEC are currently considering a push for legal reform to eliminate this type of discrimination despite the absence of systematic empirical evidence regarding the existence or extent of such discrimination. Using a large sample of earnings conference call transcripts, representing 19,677 firm-quarters and 146,708 analyst-firm-quarter observations between 2002 and 2004, I find that the probability of an analyst being allowed to participate (i.e. to ask a question) during a conference call is increasing in the analyst's view of the firm. In particular, the odds of an analyst with a strong buy recommendation participating on a conference call are more than double those of an analyst with a strong sell recommendation. Such differential analyst treatment is more (less) pronounced when managers have higher (lower) incentives to maintain high stock prices, and when analysts are more (less) reliant on management for information. Additionally, discrimination appears to exist even among those analysts allowed to ask questions during the conference call. Conditional on participating, the order of analyst appearance on the conference call is an increasing function of the analyst's view of the firm. Combined these findings validate prior anecdotal and survey evidence suggesting that managers discriminate among analysts and documents that such discrimination is statistically and economically significant.

## **1. Introduction**

This study investigates whether managers discriminate among analysts by allowing conference call participation based on how favorably the analyst views the firm. Under Regulation FD, managers cannot privately disseminate material information to particular analysts. However, managers retain the flexibility to publicly provide information to analysts of their choosing. Concerned that managers use this flexibility to pressure analysts into positively biased research by accepting (thwarting) conference-call questions from favorable (unfavorable) analysts, the SEC is considering a push for legal reform (Cox 2005). However, the SEC's concerns are based primarily on anecdotal and survey evidence of managerial discrimination. Anecdotes may not indicate a systematic problem and analyst survey results may be biased because analysts have incentives to push for laws that reduce information search costs. This study seeks to provide direct empirical evidence on whether, and to what extent, discrimination exists during conference calls.

I use a new and extensive dataset of conference call transcripts between 2002 and 2004 to directly measure various aspects of analyst participation during conference calls. Transcripts indicate which analysts asked questions during the conference call, when they asked the questions relative to other conference call participants, and how long managers interacted with each analyst. I use I/B/E/S to identify a population of analysts who would likely seek conference call participation and to measure analyst characteristics, including the analyst's view of the firm. Using data from these two sources, I model analyst conference call participation as a function of the favorableness of the analyst's view of the firm and other analyst characteristics.

I find that the probability of an analyst asking a question during a firm's earnings conference call increases with the favorableness of the analyst's stock recommendation for the firm. After controlling for other factors, the odds of analysts with strong buy recommendations for a firm (i.e. favorable analysts) asking a conference call question are more than double those of analysts with strong sell recommendations (i.e. unfavorable analysts). This provides strong evidence to support claims that firms discriminate by rewarding (punishing) analysts with favorable (unfavorable) views of the firm. The differential treatment of favorable analysts relative to unfavorable analysts is higher when managers' incentives to maintain high stock prices are higher and when analysts must rely heavily on management-provided information. Additionally, discrimination exists even among analysts who participate on the call. Favorable analysts are allowed to ask their questions before unfavorable analysts, consistent with managers manipulating the question queue in a discriminatory fashion.

This study adds to the empirical literature in a number of ways. First, I directly measure a specific type of management discrimination. Recent studies (Ke and Yu 2005, Huang et al. 2005, Chen and Matsumoto 2005) have used analyst earnings forecast accuracy as an indirect proxy for management discrimination because management discrimination is generally unobservable. By design, studies using indirect proxies cannot distinguish between the absence of discrimination and failed discrimination attempts, nor can they provide insight as to the discrimination method managers use.

Second, I add to a management discrimination literature that has reached mixed conclusions. Using analyst earnings forecast accuracy to proxy for differential managerial access, Ke and Yu (2005) provide evidence that managers provide better information

access to favorable analysts compared to unfavorable analysts. They interpret their evidence as consistent with discrimination. In contrast, Huang et al. (2005) find that unfavorable (favorable) analysts actually issue more (less) accurate future earnings forecasts, inconsistent with managerial discrimination. I provide direct evidence consistent with Ke and Yu's (2005) conclusion regarding the existence of discrimination.

Third, I focus exclusively on the post Regulation FD period, which increases the applicability of my findings to current debates on management discrimination. Extant research tests the discrimination hypothesis prior to the passage of Regulation FD. Because Regulation FD removed private communications of material information from management's discrimination toolkit, the generalizability of extant results to current regulatory regimes is unclear. One exception is Chen and Matsumoto (2005), who conclude that managers discriminated before, but not after, the passage of Regulation FD. Their lack of evidence post Regulation FD is inconsistent with growing anecdotal claims that discrimination still exists (Lowengard 2006, Morgenson 2005, SIA 2005, Cox 2005, Davis 2004, Kelly 2003, Solomon and Frank 2003).

This study proceeds as follows. Section 2 reviews the literature and develops the discrimination hypotheses. Section 3 outlines the sample selection, variable measurement and research design for testing whether managers differentially allow conference call participation based on the favorableness of the analyst's view of the firm. Section 4 presents the empirical results regarding differential conference call participation, and Section 5 assesses whether the results vary with managerial incentives and analyst reliance on management-provided information. Section 6 investigates discrimination among those analysts who do participate on the conference call, and Section 7 concludes.

## 2. Literature Review and Hypothesis Development

The discrimination hypothesis posits that more (less) managerial access will be provided to analysts when their views of the firm are favorable (unfavorable).

Discrimination results from both a manager's desire for high stock prices and an analyst's need for manager-provided firm-specific information. By allowing differential analyst access, managers make it more costly for unfavorable analysts to gather information and compete with more favorable analysts. Unfavorable analysts are then forced to either drop coverage or improve their view of the firm in order to obtain the information necessary to effectively provide information intermediary services. From the manager's point of view, the expected effect of discrimination should be more favorable analyst views of the firm persisting in the market.

If discrimination ultimately biases analyst research in the manager's favor and forces unfavorable analysts from the market, investors relying on available sell-side analyst research could be misled. The SEC, in the interest of protecting investors from biased information, has recently voiced concerns that manager discrimination is a serious problem that may require legislative action (Cox 2005).<sup>1</sup>

Anecdotal evidence outlines how managers might discriminate, including not inviting unfavorable analysts to meetings where material information will be communicated (Siconolfi 1995), not returning their phone calls (Angwin and Peers 2001), and not allowing them to ask questions during conference calls (Kelly 2003). Regulation FD, passed in 2000, was meant to curb the differential treatment of analysts by preventing managers from privately disclosing material information to certain analysts and not others.

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<sup>1</sup> The SEC has taken other measures in recent years to remove pressures analysts face to bias their research, including the global settlement with ten of the nation's top investment firms in 2003 as well as Regulation Analyst Certification in 2003.

Despite Regulation FD's mandate for prompt public disclosure of material information, many still disclaim a level playing field for analysts (Morgenson 2005, SIA 2005).

Constituents assert the problem is not that material information is being privately disclosed, but that the public disclosure of such information suits only specific analysts.<sup>2</sup>

Evidence of specific discriminatory actions by managers has remained largely anecdotal because discrimination itself is generally unobservable (Francis et al. 2004). As a result, the empirical literature has focused on investigating the existence of managerial discrimination indirectly; this has generated mixed results. Francis and Philbrick (1993) provide evidence consistent with analysts fearing retribution for unfavorable stock recommendations by showing that such analysts compensate by issuing optimistic earnings forecasts. Using the assumption higher earnings forecasts help cultivate relationships with management, Huang et al. (2005) examine changes in earnings forecast accuracy for analysts who issue boldly favorable (unfavorable) annual earnings forecasts. They find that boldly favorable (unfavorable) analysts experience deterioration (improvement) in future earnings forecast accuracy and interpret their results as inconsistent with the discrimination hypothesis. Ke and Yu (2005) suggest that managers prefer forecasts that help them beat consensus estimates and investigate analysts who issue annual "walk-down" forecasts or pessimistic quarterly earnings forecasts.<sup>3</sup> They find that such analysts

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<sup>2</sup> With respect to the analyst's role of assessing market value and issuing stock recommendations, information provided by management to one analyst may not be beneficial to another analyst to the extent that analysts use different valuation models for assessing firm value (Demirakos et al, 2004). Analysts also perform other functions, such as providing valuation model inputs to institutional investors, that can hinge critically on management provided information. Personal discussions with sell-side analysts suggest that they provide niche services to institutional clients by building reputations as knowledge experts in areas such as derivatives, revenue recognition, supply chains, etc. Manager provided information is critical to an analyst maintaining their niche expertise and reputation with institutional investor clients.

<sup>3</sup> Walk-down forecasts are those annual earnings forecasts that are optimistic early in the year and pessimistic immediately prior to the earnings announcement (Richardson et al. 2004).

have more accurate future earnings forecasts compared to other analysts, and interpret their results as consistent with the discrimination hypothesis.<sup>4</sup>

Each of the aforementioned studies looks for evidence of managerial discrimination prior to the passage of Regulation FD, which limits the generalizability of the results to the current regulatory regime. Chen and Matsumoto (2005) begin to fill this void by investigating changes in analyst relative earnings forecast accuracy for analysts who downgrade versus upgrade the firm's stock both pre and post Regulation FD. They show that downgrading analysts have relatively poorer one-quarter-ahead earnings forecast accuracy compared with upgrading analysts, but only in the pre-FD era. Their results are therefore consistent with Regulation FD curbing discrimination, at least with respect to manager provided information about one-quarter-ahead earnings. However, their use of earnings forecast accuracy changes as indirect discrimination proxies make it difficult to distinguish between failed attempts at discrimination and the absence of discrimination post-FD.<sup>5</sup> Further, their lack of discriminatory evidence post-FD is contrary to growing outcry from analysts and regulators that discrimination persists (Lowengard 2006, Morgenson 2005, SIA 2005, Cox 2005, Davis 2004, Kelly 2003, Solomon and Frank 2003).

This study builds on prior literature by utilizing a dataset of earnings conference call transcripts to investigate one specific type of managerial discrimination: differential

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<sup>4</sup> Whether managers prefer optimistic or pessimistic earnings forecasts is an unresolved empirical question. The results from Huang et al. (2005) and Ke and Yu (2005) imply that managers prefer, and reward analysts for, earnings forecasts that ultimately allow them to beat the consensus forecast. However, Francis et al. (2004) show that, on average, firms report earnings *below* consensus for much of the sample time period covered in both Huang et al. (2005) and Ke and Yu (2005). Such an outcome is consistent with managers preferring optimistic forecasts, as modeled in Lim (2001).

<sup>5</sup> For example, analysts may have searched harder post-FD for idiosyncratic information and covered fewer firms more intently as brokerage houses cut back research budgets (Mohanram and Sunder 2003). Differential effort in the post-FD period by analysts could potentially be enough to offset the effects of discrimination.

conference call participation. Investigating this specific type of discrimination is important for a number of reasons. First, management discrimination in the form of differential analyst access to management during the conference call is measurable, which allows for more direct and powerful tests of the discrimination hypothesis. Second, the availability of conference call transcripts has come about largely as a result of Regulation FD. As such, results based on conference call data are relevant to the current regulatory environment. Third, and most importantly, the SEC has targeted this specific type of discrimination for potential legislation (Cox 2005). However, the SEC's concerns are based on anecdotes and analyst surveys. Anecdotes are not evidence of a systematic problem. Analyst survey evidence is potentially biased because analysts have incentives to claim that managers discriminate because regulatory intervention could reduce their information search costs. Systematic empirical evidence on whether managers discriminate among analysts through conference call participation could be an important input to the legislative process.

If SEC concerns are warranted because managers do discriminate among analysts during earnings conference calls, then the following hypothesis obtains:

*H1: The probability that an analyst is allowed to participate on a conference call is increasing in the favorableness of the analyst's view of the firm.*

The discrimination hypothesis is premised on managerial preferences for high stock prices. Therefore, the extent to which a manager discriminates among analysts should vary systematically with the manager's incentives to maintain a high stock price. This leads to the following hypothesis:

*H2: The extent of discrimination among analysts is higher (lower) for managers with higher (lower) incentives for high stock prices.*

Another underpinning of the discrimination hypothesis is that analysts rely on management for information. In situations where an analyst has alternative sources of information, such as general media coverage or information transfer from other firms, suppliers, and customers, they may not need much information from management. Discrimination against unfavorable analysts who do not rely heavily on management provided information will likely have little effect on changing an unfavorable analyst's view of the firm. As a result, discrimination should be more pronounced in situations where analysts need to rely more heavily on management.<sup>6</sup> Stated formally:

*H3: The extent of discrimination among analysts is higher (lower) when analysts rely more (less) heavily on management for information.*

### **3. Sample selection, research design and variable measurement**

#### ***Sample***

The empirical analysis utilizes quarterly earnings conference call transcript data obtained from the Thomson Financial StreetEvents database. StreetEvents is a calendar data service that allows subscribers to track upcoming information events of publicly traded firms, including earnings conference calls, shareholder meetings, IPO lockout expirations and other corporate events. Additionally, the database maintains a history of information events, including verbatim earnings conference call transcripts, shareholder meeting transcripts, press releases, and SEC filings.

Sample transcripts fall between January 2002 and December 2004.<sup>7</sup> All firm-quarter observations occur subsequent to the passage of Regulation FD in 2000, which

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<sup>6</sup> Analysts who need to rely little on management should still seek participation on the conference call. Accessing information directly from management should always minimize information search costs relative to other substitute information sources, even if other information sources are not prohibitively costly.

<sup>7</sup> The earliest transcripts available on StreetEvents are from 2001, however the year is sparsely populated.

provides a strong setting for testing the discrimination hypothesis. Analysts have few substitutes for obtaining *material* private information from managers outside of the conference call. The proscriptions of Regulation FD require prompt documentation and dissemination of material information privately conveyed to analysts, which becomes cost prohibitive as the number of analysts grows, making the conference call venue more cost effective for managers.<sup>8</sup> Consequently, under Regulation FD all interested parties can listen to the public dissemination of material information during the conference call, but managers still retain flexibility over who is allowed to ask questions. Managers differentially allow analysts to ask questions by either selectively providing analysts with the question call-in phone number or by simply passing over particular analysts in the question queue.

I identify an initial sample of 27,642 quarterly earnings conference call transcripts that have related coverage in I/B/E/S for the same fiscal quarter end. I use I/B/E/S to identify a population of analysts potentially interested in participating on a firm's quarterly earnings conference call. From this initial sample I require each analyst-firm-quarter observation to have both an outstanding earnings estimate and an outstanding stock recommendation. Outstanding earnings forecasts must be issued during the year preceding the fiscal quarter end date to help ensure the analyst is actively covering the company. I also require each analyst to have attributes measurable over the most recently completed calendar year end. These attributes, discussed more completely below, capture an analysts' experience, effort and ability relative to other analysts following the firm. The cumulative effect of these requirements results in a final sample of 19,677 earnings conference call

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<sup>8</sup> SIA (2001) provide survey evidence consistent with this notion. Surveyed sell-side analysts reported fewer one-on-one discussions with management after the implementation of Regulation FD. Brown et al (2005) documents a dramatic increase in earnings conference calls since Regulation FD.

transcripts and 146,708 analyst-firm-quarter observations. These observations represent 2,874 unique firms and 4,251 unique analysts from 402 unique brokerage houses.

The filtering procedures remove analyst observations with severely stale earnings forecasts, firms followed by fewer than two analysts during the prior calendar year, and analysts who were not on I/B/E/S during the prior calendar year. Compared with the initial sample, the final sample is comprised of analysts who follow the firm more intently, who are competing against other analysts for managerial access, and who have had more time to establish relationships with company management. This resulting set of analysts should have a strong desire to participate on the firms' conference calls.<sup>9</sup>

I then use the I/B/E/S broker translation files to obtain each analyst's name and brokerage-house affiliation. Using the analysts' name and affiliation from I/B/E/S, I search for the corresponding name and affiliation of the analyst in the related conference call transcript. I identify I/B/E/S analyst  $i$  covering firm  $j$  at quarter  $t$  as "participating" if he/she asks a question on the earnings conference call of firm  $j$  at quarter  $t$ . From the conference call transcript, I also obtain the names and titles of the corporate participants, the names and affiliations of all non-corporate participants (a subset of which are the I/B/E/S analysts), the order in which each non-corporate participant appears on the conference call, the number of words spoken during the briefing portion and question-and-answer portion of the conference call, the number of words spoken during the entire

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<sup>9</sup> The ideal sample would be the set of analysts who attempted to ask a question during the conference call, regardless of whether management actually allowed the question to be asked. Unfortunately, this is unobservable. Even if such a set of analysts was obtainable, it is unclear whether analysts with unfavorable views, anticipating management's actions, would even attempt to ask a question on the call. Analysts not attempting to ask question for fear of management discrimination is precisely the behavior the SEC and legislators are interested in preventing.

conference call, and the number of words exchanged between each non-corporate participant and management.

Table 1 provides descriptive statistics for the sample. Panel A shows that there is some growth in the number of firm-quarter and analyst-firm-quarter observations over time, consistent with the StreetEvents database gaining popularity.<sup>10</sup> Panel B shows the concentration of observations across industries. There is some clustering in the computer and financial industries, which make up 19 percent (22 percent) and 11 percent (12 percent) of the sample firm-quarters (analyst-firm-quarters). No other industry makes up more than 10 percent of the sample. Panel C shows that 54 percent (44 percent) of firm-quarter observations come from the NYSE (NASDAQ) stock exchanges.

### ***Research design and variable measurement for testing H1***

Testing the discrimination hypothesis involves modeling the probability that analyst  $i$  following firm  $j$  at quarter  $t$  participates on the earnings conference call by asking a question. I therefore estimate the following logistic regression model:

$$\begin{aligned}
 OnCall_{i,j,t} = & \beta_0 + \beta_1 SBuy_{i,j,t} + \beta_2 Buy_{i,j,t} + \beta_3 Sell_{i,j,t} + \beta_4 SSell_{i,j,t} \\
 & + \beta_5 Open_{i,j,t} + \beta_6 NumAnalyst_{i,j,t} + \beta_7 AllStar_{i,j,t} \\
 & + \beta_8 PriorAcc_{i,j,t} + \beta_9 FirmExp_{i,j,t} + \beta_{10} GenExp_{i,j,t} + \beta_{11} Inds_{i,j,t} \\
 & + \beta_{12} ForFreq_{i,j,t} + \beta_{13} BrokerSize_{i,j,t} + \beta_{14} Companies_{i,j,t} \\
 & + \beta_{15} PriorOnCall_{i,j,t} + \beta_{16} RecHorizon_{i,j,t} + v_{i,j,t}
 \end{aligned} \tag{1}$$

The dependent variable, *OnCall*, is an indicator variable for conference call participation that equals 1 if the analyst asks a question on the conference call and zero otherwise. The first four independent variables use stock recommendation levels to proxy

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<sup>10</sup> Coverage of a firm by StreetEvents is driven by subscriber demand. Therefore, relative to all public firms, the sample firms are of interest to the individual and institutional investors that subscribe to StreetEvents. Results from analyzing this sample may not generalize to other firms where investor interest is not high. However, this sample suits the research question nicely since regulators are likely to be less concerned with discrimination in situations where there is little interest in the stock.

for how favorably the analyst views the firm. The use of stock recommendations is consistent with SEC and anecdotal claims that cite unfavorable stock recommendation levels as reasons for management discrimination (Cox 2005, Solomon and Frank 2003).

*Sbuy, Buy, Sell and SSell* are indicator variables that identify when the analyst's most recent stock recommendation level prior to the conference call is strong buy, buy, sell and strong sell, respectively.<sup>11</sup> If H1 is true and managers allow conference call participation as an increasing function of the analyst's view of the firm, then strong buy recommendation analysts should be more likely than buy recommendation analysts to ask questions; buy recommendation analysts should be more likely to participate than hold recommendation analysts, and so on. Equation (1) models the impact of the analyst's recommendation incremental to the base case of a hold recommendation, resulting in the following predictions:  $\beta_1 > \beta_2 > 0$  and  $0 > \beta_3 > \beta_4$ .

The discussion thus far only considers the analyst's view of the firm. However, a well-specified model should include other factors that potentially constrain analysts' participation. I consider two factors. First, conference calls are costly to the manager in the sense that they take time away from their day to day managing of the firm. As such, conference calls cannot reasonably be expected to answer every question of every analyst. Managers generally preset the amount of time they will allow for the entire conference call and also select the amount of time they will devote to answering analyst questions. The variable *Open* proxies for the time allotted for answering analyst questions during the

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<sup>11</sup> I use indicator variables at each I/B/E/S recommendation level to allow for discrimination within firms and across firms. Discrimination within firms represents the situation where a manager faces analysts with disperse recommendations and chooses the more favorable analysts for participation. Discrimination across firms represents the situation where a manager faces analysts with the same recommendations on the firm (i.e. no dispersion in analyst forecasts). Discrimination in this setting would imply that the manager facing analysts with unanimously unfavorable views would allow less participation from analysts following the firm than the manager facing analysts with unanimously favorable views of the firm.

conference call and is measured as the ratio of the time spent on the conference call answering questions to the total length of the conference call. Higher values of *Open* mean more chance for an individual analyst to speak with management, which leads to the prediction that  $\beta_5 > 0$ . Additionally, if there is a fixed supply of time for questions, the more analysts there are covering the firm, the less likely it is that any individual analyst will ask a question. This implies a negative relation between the probability of participation and the number of I/B/E/S analysts, *NumAnalyst*, covering the firm ( $\beta_6 < 0$ ).

In addition to participation constraints, an individual analyst's quality should increase both the analyst's desire to participate and the manager's decision to allow such participation.<sup>12</sup> I define analyst quality as a combination of an analyst's ability, experience and effort. Prior research shows that these characteristics determine forecast accuracy (Clement 1999) and the extent that the analyst will search for private information that results in bold earnings forecasts (Clement and Tse 2005). I assume these same characteristics proxy for analyst quality in providing information-intermediary services to the market.

To capture the firm-specific variation in analyst characteristics, which should influence management's selection of participating analysts, I scale each of the continuous characteristic variables to range from 0 to 1 using a transformation that preserves the relative distances among each characteristic's measures for firm  $j$  in quarter  $t$ .<sup>13</sup> Doing

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<sup>12</sup> Poor-quality analysts may expose their quality type on the conference call if they ask a question, and therefore may avoid speaking publicly out of concern for their own careers. Of course, the market could infer their quality type to some extent by noting their non-participation, but the poor-quality analyst is unlikely to facilitate the revelation process by directly exposing themselves. Likewise, managers acting in the best interest of the shareholders would not want to waste time with poor quality analysts, whose questions could potentially confuse investors or take time away from answering more pertinent questions.

<sup>13</sup> For example, if a manager is interested in entertaining questions from the most experienced analyst, he will choose the most experienced analyst from the group of analysts that follow the firm. The experience level of

so also allows for ease of comparison of regression coefficients across analyst characteristics and straightforward use of the odds ratio for interpreting logistic regression results. The relative measures of the analyst characteristics take the form

$$Characteristic_{i,j,t} = \frac{Characteristic\_raw_{i,j,t} - \min(Characteristic\_raw_{j,t})}{\max(Characteristic\_raw_{j,t}) - \min(Characteristic\_raw_{j,t})},$$

where high  $Characteristic_{i,j,t}$  values indicate that analyst  $i$  scores high on that characteristic relative to other analysts who follow firm  $j$  in quarter  $t$ .

If managers choose the high quality analysts and high quality analysts have a higher propensity to attempt to participate, then analysts who are research all-stars (*AllStar*), analysts who were relatively more accurate in predicting the firm's prior quarter earnings (*PriorAcc*), analysts with relatively more general (*GenExp*) and firm specific experience (*FirmExp*), analysts who provide relatively more forecasts of earnings (*ForFreq*) and analysts with relatively more resources available to them (*BrokerSize*) should all have a higher probability of being on the call.<sup>14</sup> These predictions should manifest as  $\beta_7 > 0$ ,  $\beta_8 > 0$ ,  $\beta_9 > 0$ ,  $\beta_{10} > 0$ ,  $\beta_{12} > 0$  and  $\beta_{13} > 0$ . On the contrary, analysts who cover relatively more industries (*Inds*) and firms (*Companies*) develop less expertise and have less time to expend with respect to any particular firm. These analysts should be less likely to participate on the call, which would yield  $\beta_{11} < 0$  and  $\beta_{14} < 0$ .

The relationship an individual analyst has with firm management should also influence the probability of participation on the conference call. I proxy for this unobservable relationship by identifying whether the analyst has participated on a firm's

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that analyst relative to the entire cross-section of analysts is less likely to influence the manager's participation choices.

<sup>14</sup> See Appendix 1 for more complete variable descriptions.

conference call in the past (*OnCallPrior*) and expect  $\beta_{15} > 0$ . Finally, McNichols and O'Brien (1997) suggest that analysts are likely to lose interest in stocks for which they hold unfavorable views. If interest in a stock is correlated with the level of the stock recommendation, failure to control for such interest could yield spurious inferences regarding discrimination. To the extent interest is not controlled for via the analyst quality variables, I include the period of time since the analyst made his/her stock recommendation (*RecHorizon*). I assume that the more stale the recommendation, the higher the probability the analyst has dropped coverage and will not be seeking participation on the conference call. This implies  $\beta_{16} < 0$ .

To summarize, equation (1) models the determinants of conference call participation. Evidence on discrimination as posited in H1 is assessed by comparing the coefficients on stock recommendation levels, while controlling for other determinants of conference call participation.

#### **4. Results for H1**

##### ***Descriptive and Univariate Results***

Table 2 Panel A provides general descriptive statistics at the firm level. The average firm has total assets of \$11.4 billion, a market capitalization of \$6.0 billion, a market to book ratio of 3.6 and a median quarterly return on assets of about 1 percent. Institutions hold an average of 58.8 percent of the firm's outstanding stock and managerial stock option wealth changes by an average of \$519,000 for a 1 percent change in stock price. There is substantial variation in each of the measures, consistent with the sample representing of a broad cross-section of firms, managers, and institutional influence.

Turning to conference call characteristics, the median number of corporate participants (*CorpCount*) is 3, which are typically the CFO, CEO and Director of Investor Relations. At the median, managers take questions from 9 non-corporate participants (*NonCorpCount*).<sup>15</sup> The number of I/B/E/S analysts covering the firm (*NumAnalyst*) ranges from 3 to 10 between the first and third quintiles, with 6 analysts covering the firm at the median. Three I/B/E/S analysts (*IBESonCall*) participate on the median conference call, with an interquartile range from 2 to 6. Eighty-eight percent of all conference calls have at least one I/B/E/S analyst participating (*IBESonCallDum*). Conference calls last an average of 52 minutes, and vary from about 40 minutes to just over an hour at the first and third quartiles. On average, 55 percent of the call dedicated to the answering questions from analysts (*Open*).

The average stock recommendation of the I/B/E/S analysts following the firm (*MarketRec*) is 2.42, compared with 2.32 for the I/B/E/S analysts who are actually allowed to participate on the conference call (*OnCallRec*). Since I/B/E/S codes strong buy recommendations at 1 and strong sell at 5, larger average recommendation values are less favorable. Thus, consistent with the managerial discrimination, the average stock recommendation of the analysts participating on the call are more favorable than the underlying market recommendation of all analysts ( $t = 26.77, p < .001$ ).

The first two columns of Table 3 provide descriptive evidence on the pooled sample of analysts. On average, 38 percent of analysts participate on a conference call (*OnCall*), and 58 percent of analysts participated on a prior conference call (*OnCallPrior*). The most common stock recommendation is hold, followed by buy, strong buy, sell and

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<sup>15</sup> Non-corporate participants include I/B/E/S analysts who cover the firm, other I/B/E/S analysts who do not cover the firm directly, non-I/B/E/S sell-side analysts, bankers, institutional investors, and occasionally individual investors.

strong sell. The distribution of stock recommendation levels is consistent with other research (Chen and Matsumoto 2005, Barber et al. 2005).

The remaining columns of Table 3 group analysts by whether they participated on the conference call or not. The H1 posits that managers will allow analysts with more favorable recommendations on the call. Consistent with this notion, analysts who participate on the call have statistically higher (lower) percentages of buy and strong buy (sell and strong sell) recommendations. Participating analysts are generally of higher quality. In particular, participating analysts are statistically more often all-star analysts (*AllStar* = 22 percent vs 15 percent), have better relative prior forecasting accuracy (*PriorAcc* 0.71 vs 0.69), have relatively more firm-specific experience (*FirmExp* = 0.48 vs 0.45), make relatively more frequent forecasts (*ForFreq* = 0.44 vs 0.41), and are employed by relatively larger brokerage houses (*BrokerSize* = 0.36 vs. 0.33). Additionally, participating analysts have issued their recommendations more recently (*RecHorizon* = 274 vs. 313) and have been on prior conference calls more frequently (*PriorOnCall* = 81 percent vs. 45 percent).

Combined, the univariate comparisons in Table 3 are consistent with the H1 and the related predicted differences with respect to analyst characteristics. However, the univariate differences across stock recommendations and control variables are not particularly large. To better assess economic significance and lend credence to the univariate evidence, I turn to the multiple logistic regression analysis.

### ***Multivariate Results***

Table 4 Panel A provides the regression results, and shows the model has reasonable fit with a pseudo  $R^2$  of 14.9 percent and 70.0% correct classification rate.<sup>16</sup> Consistent with the concerns of the SEC and analysts, the probability than an analyst participates on the conference call is increasing in the stock recommendation. The coefficient estimates on the stock recommendations represent the incremental probability of conference call participation relative to a hold recommendation. Both *SBuy* (0.500,  $p < .001$ ) and *Buy* (0.356,  $p < .001$ ) are significantly positive, with strong buy recommendations increasing the probability of participation more than buy recommendations (difference = 0.144,  $p < .001$ ). Similarly, *SSell* (-0.274,  $p < .001$ ) and *Sell* (-0.174,  $p < .001$ ) are significantly negative, with strong sell recommendations decreasing the probability of participation more than sell recommendations (difference = 0.100,  $p = 0.060$ ). Using odds ratios to interpret the difference between strong sell and strong buy recommendations, an analyst with a strong buy recommendation has participation odds more than twice ( $e^{(\beta_1 - \beta_4)} = e^{(0.500 + 0.274)} = 2.17$ ) those of an analyst with a strong sell recommendation.<sup>17</sup>

To provide more intuition for the economic magnitude of this effect, Panel B of Table 4 plots the marginal probability effects of stock recommendations for two types of analysts. The first type of analyst (Type 1) has sample average characteristics on all

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<sup>16</sup> The calculation of correctly classified observations assumes each analyst has an equal probability of participating versus not participating. Using the sample average of a 38.1 percent chance of participation yields a correct classification percentage of 68.6 percent. Additionally, the area under the receiver operator characteristic (ROC) curve for the estimation of model (1) is .753, suggesting reasonable predictive power.

<sup>17</sup> Measuring stock recommendations relative to other analysts following the firm, as opposed to including indicator variables for stock recommendation levels, yields similar inferences to those reported in table 4. In particular, the most favorable analyst on the firm has participation odds 1.58 times higher than the least favorable analyst.

continuous variables, was not an all-star analyst ( $AllStar=0$ ), and participated on a previous conference call of the firm ( $OnCallPrior=1$ ). The predicted participation probability for a Type 1 analyst with a strong sell recommendation is 39 percent, and jumps 19 percentage points to 58 percent for holding a strong buy recommendation. The upward slope of the graph shows the probability of participation is increasing in the stock recommendation of the analyst. The largest change in predicted probability results when stock recommendations change from hold to buy compared to changes in any other adjacent levels.

A second type of analyst (Type 2) is exactly the same as the first type, but is an all-star analyst ( $AllStar=1$ ). The pattern is similar to the first type of analyst, however the Type 2 analyst is rewarded for all-star status by having a higher predicted participation probability of about 10 percent across all stock recommendation levels. A strong sell recommendation yields a predicted participation probability of 49 percent, which is 19 percent lower than the 68 percent probability for a strong buy recommendation.

All other regression coefficients are statistically significant in the predicted direction except the coefficient on *GenExp*, which is significantly negative, suggesting that analysts with relatively more general experience have a lower probability of participating on the conference call. Perhaps analysts with lots of general experience need less direct information from management or have established reputations that do not benefit at the margin from sparring with management during the conference call.

As expected, an analyst has a better chance of getting on the conference call when firms dedicate more time to answering analyst questions ( $Open=2.131$ ,  $p<.001$ ) and when there are fewer analysts competing for management's time ( $NumAnalyst=-0.031$ ,  $p<.001$ ).

The participation odds are more than five times higher for analysts who previously participated on a conference call compared to those who did not, suggesting that a prior relationship with management is very important in obtaining access to the call. With respect to analyst quality, the most accurate analyst has 1.321 times ( $p < .001$ ) higher participation odds than the least accurate analyst. More firm experience, more forecast frequency, working for a larger brokerage house and covering fewer companies all increase the odds of being on the conference call. These results are consistent with both firms allowing the highest quality analysts to participate on the conference call and with low quality analysts not seeking participation.

### ***Sensitivity Tests***

*Differences model for correlated omitted variables.* Equation (1) potentially suffers from unknown or unmeasurable correlated omitted variables. To the extent such variables are constant over time, estimating a differences version of equation (1) by fiscal quarter helps alleviate the correlated omitted variables problem. To estimate a differences model, I identify the subsample of consecutive quarterly conference calls so that current and prior conference call participation can be measured for each analyst. I then require the analyst to make a recommendation change or reiteration during the period between the current and prior quarter conference call. This sampling procedure yields a total of 16,535 analyst-firm-quarter observations, comprised of 7,501 analysts who did participate on the prior period conference call ( $OnCall_{i,j,t-1}=1$ ), and 9,034 who did not participate on the prior period conference call ( $OnCall_{i,j,t-1}=0$ ). I then estimate the following model in order to assess how recommendation changes in the form of upgrades and downgrades impact the probability of an analyst participating on the conference call:

$$OnCall^s = \beta_0^s + \sum_{m=1}^{10} \beta_m^s Upgrades + \sum_{n=1}^{20} \beta_n^s Downgrades + \beta_{21}^s NumAnalyst + \beta_{22}^s Open + \varepsilon^s \quad (1a)$$

where  $s$  is either the ( $OnCall_{i,j,t-1}=0$ ) sample or the ( $OnCall_{i,j,t-1}=1$ ) sample, *Upgrades* are indicator variables for each of the ten potential types of upgrades (i.e. *SSell* to *Sell*, *Sell* to *Hold*, etc.), *Downgrades* are indicator variables for each potential type of downgrade, *NumAnalyst* and *Open* are as previously defined, and analyst-firm-quarter subscripts are omitted for brevity. Analyst characteristic variables are not included because they are not expected to change from quarter to quarter, yielding differences of zero. No explicit control is included for the staleness of recommendation (which proxies for analyst interest in the stock) because both recommendation changes and reiterations must occur within the approximate three month period between consecutive quarterly earnings conference calls.

If upgrades (downgrades) are pleasing (displeasing) to managers, then upgrades (downgrades) should increase (decrease) the participation probability. Since recommendation reiterations (i.e. confirmed no-change recommendations) are the base case, discrimination would imply positive (negative) coefficients on  $\beta_1$  ( $\beta_{11}$ ) through  $\beta_{10}$  ( $\beta_{20}$ ). As before, time and participation constraints should yield negative (positive) coefficients on *NumAnalyst* (*Open*).

The results are presented in Table 5. Across both analyst subsamples, all statistically significant coefficients are as expected, consistent with managers rewarding (punishing) analysts who upgrade (downgrade).<sup>18</sup> However, there are two key exceptions.

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<sup>18</sup> Using indicator variables for each type of upgrade and downgrade results in sparse population for some recommendation change combinations. As a result, insignificant results on some recommendation change combinations in Table 5 could result from low power. To provide further support for the overall assertion that positive (negative) recommendation changes result in more (less) conference call access, I calculate a continuous recommendation change variable for each observation as  $Recommendation_{i,j,t} - Recommendation_{i,j,t-1}$  where *Recommendation* equals 5 for strong buy, 4 for buy, 3 for hold, 2 for sell and 1 for strong sell. Thus, upgrades have positive values and downgrades have negative values. I then replace all

First, among the set of analysts who did not participate on the prior conference call, upgrades from *SSell* to *Hold* decrease the analysts' participation probability relative to a reiterating analyst. In fact, only upgrades the ultimately result in recommendation levels above *Hold* please management enough to warrant statistically significant increased conference call access.

Second, across both subsets of analysts, downgrades from *SBuy* to *Buy* increase the analyst's participation probability relative to a reiterating analyst. Thus, downgrading analysts can retain preferential conference call access so long as the ultimate recommendation level remains above a *Hold*. The apparent importance of the *Hold* recommendation level as a threshold for both upgrade and downgrade importance is consistent with Panel B of Table 4. There, the largest participation probability increases (decreases) obtain when analyst recommendation levels move above (down to) the *Hold* recommendation.

Combined, these results generally suggest that managers discriminate based on recommendation changes, but also that all upgrades (downgrades) are not equally pleasing (displeasing) to managers. These findings are inconsistent with Chen and Matsumoto's (2005) conclusions that managers do not discriminate based on analyst upgrades and downgrades in the post-FD period.

*Insufficient control for analyst interest in the firm.* In Panel A of Table 4, the variable *RecHorizon* is significantly negative (-.001,  $p < .001$ ) as expected, suggesting that

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upgrade and downgrade indicator variables equation (1a) with the continuous recommendation change measure. I obtain positive and significant recommendation change coefficients in both subsamples, consistent with managerial discrimination.

the more stale the recommendation, the less likely an analyst is to participate.<sup>19</sup>

*RecHorizon* attempts to control for analyst interest in the stock, which is important to the extent that interest is correlated with stock recommendations (McNichols and O'Brien 1997). To provide further assurance that lack of interest in the stock does not drive the main discrimination results, I re-estimate equation (1) using only the 98,174 analyst-firm-quarter observations where an earnings forecast was issued subsequent to the conference call. This increases the likelihood that the analyst was interested in the stock at the most recent conference call. Results (not reported) are consistent with Table 4. The probability of participating remains increasing in the stock recommendation, and strong buy recommendation analysts have participation odds double those of the strong sell recommendation analysts.<sup>20</sup>

*Lack of independence across observations.* The observations used to estimate equation (1) in Table 4 come from a pooled cross-section where individual observations are not independent. The standard errors used for test statistics are robustly estimated and are clustered by firm, under the assumption that firm characteristics and managerial actions will impact analyst participation. Thus, the standard errors allow for a lack of independence across analysts covering a given firm, and assume independence across groups of analysts by firm. Despite the firm clustering, the pooled cross-section still contains multiple observations of the same firm, which violates the independence assumption. To address this potential problem, I re-estimate equation (1) using the Fama MacBeth (1973) procedure. I estimate Equation (1) separately by calendar-quarter thereby

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<sup>19</sup> Similar results obtain when I use the staleness of the analyst's outstanding quarterly earnings forecast instead of stock recommendation.

<sup>20</sup> If discrimination results in unfavorable analysts dropping coverage after the conference call, this sampling procedure would result in lower variation in the outstanding recommendations at the time of the conference call, which biases against finding support for the discrimination hypothesis.

ensuring that only one firm is represented in the cross section. Then, I average the coefficients and generate a t-statistic from the individual calendar quarter coefficients. Results (not reported) are very similar to those reported in Table 4 in significance and magnitude, with the exception *BrokerSize*, which is positive but insignificant at conventional levels. Additionally, the coefficients on *SBuy*, *Buy*, *Sell*, and *SSell* are of the predicted sign (statistically significant) in 12 (12), 12 (12), 10 (6), and 11 (7) of the quarterly regressions, respectively. These results suggest the results in Table 4 are not driven by any individual fiscal quarter.

Another potential lack of independence results from having multiple observations of the same analyst in the cross section and over time. To assess whether this possibility affects any inferences, I re-estimate equation (1) again using the Fama MacBeth (1973) procedure and randomly select one observation for each analyst in the calendar quarter cross section. This estimation procedure results in calendar quarter samples with unique firm-analyst combinations, removing independence concerns at both the firm and analyst level. Results (not reported) are consistent with those presented in Table 4, except that the coefficient on *GenExp*, *FirmExp* and *BrokerSize* are insignificant. The model has similar average explanatory power and the strong buy recommendation analysts retain participation odds more than double those of the strong sell recommendation analysts.

*Managerial preferences for pessimistic earnings forecasts.* Ke and Yu (2005) provide results consistent with managers rewarding analysts who provide pessimistic forecasts prior to the earnings announcement. If pessimistic analysts tend to have unfavorable forecasts, the previous results could be driven by the failure to account for the pessimism in analyst earnings forecasts. To assess whether forecast pessimism is a

correlated omitted variable, I follow Ke and Yu (2005) and add to equation (1) a variable that equals 1 if the analyst's most recent outstanding quarterly earnings forecast is below the consensus forecast, and zero otherwise. Results (not reported) show that adding this variable has a negligible effect on the magnitude and significance of the coefficients reported in Table 4 and inferences remain unchanged. However, the pessimism logit coefficient is positive and significant (0.139,  $p < .001$ ), implying that pessimistic analysts are more likely to participate on conference calls compared to other analysts. These results are consistent with Ke and Yu (2005), although the effects of forecast pessimism on the odds of participating are an order of magnitude lower than the effects of strong buy or strong sell recommendations.

## **5. Effect of managerial incentives and analyst reliance on management on discrimination extent**

### ***Research Design and Variable Development for H2 and H3***

The previous section provides evidence consistent with the existence of managerial discrimination among analysts. Equation (1) provides evidence on the average extent of discrimination by assessing the difference between the coefficients on *SBuy* and *SSell*. If discrimination truly results from managerial actions, the extent of managerial discrimination should vary in predictable ways. In particular, as stated in H2 (H3), managers should discriminate more when they have the higher incentives for high stock prices (when analysts rely heavily on them for information).

To assess the impact of managerial incentives (analyst reliance) on the extent of discrimination, I re-estimate equation (1) separately by quintile of managerial incentives (analyst reliance). Doing so allows the coefficients in equation (1) to vary across levels of

managerial incentives (analyst reliance). To statistically assess whether the extent of discrimination differs between the lowest and highest quintile of managerial incentives (analyst reliance), I estimate the following unrestricted version of equation (1):

$$OnCall = \sum_{q=Low}^{High} \left( \beta_0^q + \beta_1^q SBuy + \beta_2^q Buy + \beta_3^q Sell + \beta_4^q SSell + \sum_{n=5}^{16} \bar{x}^q \right) + \nu \quad (2)$$

where  $q$  is the incentive quintile of the manager (analyst reliance quintile of the analyst) and  $\bar{x}$  is the vector of non-stock recommendation level variables and analyst-firm-quarter subscripts are omitted for brevity.

If managers discriminate between *SBuy* and *SSell* analysts more (less) when they have high (low) incentives to maintain high stock prices then H2 predicts

$(\beta_1^{Low} - \beta_4^{Low}) < (\beta_1^{High} - \beta_4^{High})$ . The differential treatment of analysts could be driven by either rewarding *SBuy* analysts, in which case  $(\beta_1^{Low} < \beta_1^{High})$ , and/or retaliation against *SSell* analysts, in which case  $(\beta_4^{Low} > \beta_4^{High})$ . Similarly, if managers discriminate more (less) when analyst reliance is high (low), then H3 also predicts

$(\beta_1^{Low} - \beta_4^{Low}) < (\beta_1^{High} - \beta_4^{High})$  driven by  $(\beta_1^{Low} < \beta_1^{High})$  and/or  $(\beta_4^{Low} > \beta_4^{High})$ .

I operationalize managerial incentives for high stock prices when testing H2 through CEO option wealth sensitivities to stock prices. Prior literature suggests managers with high option wealth sensitivities to stock prices take actions to increase accruals in an attempt to maintain high stock prices (Cheng and Warfield, 2005). If discrimination among analysts is another mechanism to keep stock prices high, the discrimination should be more pronounced when managers have higher option wealth sensitivity to stock prices. I measure option wealth sensitivity via Execucomp as the change in the CEO's option wealth sensitivity for a 1 percent change in stock price (Core and Guay, 2002).

I proxy for analyst reliance on management using the extent of institutional holdings. Institutional investors rely on sell-side analysts to provide unique firm-specific information, and survey evidence shows that institutions highly value a sell-side analyst's ability to access company management (Johnson, 2005). Institutions reward analysts that provide them key valuation inputs with commission generating order flow. Since managers understand the pressure analysts face to please institutional clients, managers should discriminate more when institutional holdings are high.<sup>21</sup> I measure institutional holdings (*InstHold*) as of the most recent calendar quarter prior to the firm's fiscal quarter end.

### ***Results for H2 and H3***

Panel A of Table 6 reports the results with respect to H2 on managerial incentives. Panel A shows that the difference between *Sbuy* and *SSell* for managers with the highest wealth sensitivity is greater than the difference for managers with the lowest wealth sensitivity (difference = 0.405,  $p = 0.044$ ). The graph shows that the increase in discrimination is driven primarily by managers preventing questions from strong sell analysts as opposed to catering differentially to strong buy analysts. In particular, the difference between strong sell analysts in the high and low incentive conditions is statistically different than zero (difference = -0.423,  $p = 0.027$ ). The treatment of strong buy analysts is roughly constant across the high and low incentive conditions, and the difference is not statistically significant (difference = -0.019,  $p = 0.830$ ).

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<sup>21</sup> The indirect effects of institutions on a manager's propensity to discriminate are unclear. If institutions act as monitors and view discrimination as a sign of deeper managerial problems detrimental to firm value, they may act as a deterrent to discrimination. On the other hand, if institutions are on average short-sale constrained, they have incentives to keep the stock prices of their holdings high just like managers do. In such a case they would welcome discrimination.

Panel B of Table 6 reports the results with respect to H3 regarding analyst reliance on management for information. Panel B shows that the difference between *Sbuy* and *SSell* for analysts who rely most heavily on management is greater than the difference for analysts that rely least on management for information (difference = 0.288,  $p = 0.061$ ). The graph shows that the increase in discrimination is driven primarily through catering more heavily to strong buy analysts (difference = 0.189,  $p = 0.003$ ). Retaliation against strong sell analysts plays some role in the overall discrimination difference (difference = -0.099), but the differential treatment of strong sell analysts across conditions is not statistically significant ( $p = 0.291$ ).

Together, the H2 and H3 results confirm the earlier conclusion that managers discriminate by showing that discrimination varies in predictable ways with respect to managerial incentives for high stock prices and the analyst's need to rely on management for information.<sup>22</sup> Interestingly, in both panels of Table 6, discrimination still exists even when incentives and management reliance are low.

## **6. Discrimination conditional on participating on the conference call**

Previous sections have attempted to rule out the competing hypothesis that discriminatory evidence obtains from a failure to control for analyst interest in the stock. To completely rule out this possibility, this section investigates the treatment of analysts who have been allowed call participation, which ensures an analyst's interest in the stock at the time of the conference call. If managers discriminate based on analyst stock recommendations, evidence should exist even among those analysts participating on the

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<sup>22</sup> For the alternative hypothesis that analyst interest in the stock drives the observed empirical results, it would have to be the case that unfavorable analysts lose interest more when CEOs have high option wealth sensitivities and when institutional holdings are high. It unclear why this would be the case.

conference call. Such differential analyst treatment might include pushing unfavorable analysts further down the question queue or speaking to the favorable (unfavorable) analyst more (less) during the conference call.

### ***Question Queue Discrimination***

Managers can discriminate among analysts by explicitly allowing (denying) favorable (unfavorable) analyst participation. A more subtle way to discriminate is for the manager to rank the queue of analysts attempting to ask a question in order from most favorable to least favorable and then take questions until the allotted conference call time expires. Queue ordering in this manner increases (decreases) the probability that enough time will remain to hear a question from the favorable (unfavorable) analyst.

To investigate whether managers manipulate the question queue as a method of discrimination, I estimate the following linear regression:

$$\begin{aligned}
 Queue|OnCall_{i,j,t} = & \beta_0 + \beta_1 SBuy_{i,j,t} + \beta_2 Buy_{i,j,t} + \beta_3 Sell_{i,j,t} + \beta_4 SSell_{i,j,t} \\
 & + \beta_5 AllStar_{i,j,t} + \beta_6 PriorAcc_{i,j,t} + \beta_7 FirmExp_{i,j,t} \\
 & + \beta_8 GenExp_{i,j,t} + \beta_9 Inds_{i,j,t} + \beta_{10} ForFreq_{i,j,t} + \beta_{11} BrokerSize_{i,j,t} \\
 & + \beta_{12} Companies_{i,j,t} + \beta_{13} PriorOnCall_{i,j,t} + \nu_{i,t}
 \end{aligned} \tag{2}$$

where:

*Queue|OnCall* The order of the analyst's first appearance on the conference call relative to all non-corporate conference call participants. Relative order is calculated as (Total number of non-corporate conference call participants - position of analyst on conference call)/(Total number of non-corporate conference call participants - 1). The last non-corporate participant to ask a question has a value of 0, while the first non-corporate participant to ask a question has a value of 1.

and all other variables are as previously defined. Equation (2) is identical to equation (1), with the following exceptions. This model does not consider participation constraints (*Open* and *NumAnalysts*) because the sample analysts here are, by definition, participating on the call. Additionally, *RecHorizon* is not included in the model because it is meant to

capture the unobservable interest the analyst has in the stock. Since the analyst participates on the conference call in this subsample, interest is ensured.

The discrimination hypothesis predictions are identical to equation (1):  $\beta_1 > 0$ ,  $\beta_2 > 0$ ,  $\beta_1 > \beta_2$ ,  $\beta_3 < 0$ ,  $\beta_4 < 0$ ,  $\beta_3 > \beta_4$ . The results in Table 7 provide evidence of discrimination by managerial manipulation of the question queue. In particular, the coefficients on *SBuy* (0.044,  $p < .001$ ) and *Buy* (0.046,  $p < .001$ ) are significantly positive, suggesting that strong buy and buy recommendation analysts are dealt with by management before analysts with hold recommendations. The opposite is true for *SSell* (-0.024,  $p < .001$ ) and *Sell* analysts (-0.017,  $p = .038$ ), who are statistically lower in the question queue than hold analysts. The difference between strong buy (strong sell) and buy (sell) recommendation analysts is not significant, but the overall tenor of the results points to discrimination increasing in the analysts favorableness toward the firm.<sup>23</sup>

### ***Duration of Manager/Analyst Interaction***

If managers cater to the informational needs of favorable analysts more so than unfavorable analysts, then they should spend more conference call time with the former. I assume that the time spent with an analyst sufficiently proxies for the extent of private information transfer from the manager to the analyst, and investigate whether the amount of time spent on the call varies with the analyst's view of the firm. I estimate the following linear regression:

$$\begin{aligned} Time|OnCall_{i,j,t} = & \beta_0 + \beta_1 SBuy_{i,j,t} + \beta_2 Buy_{i,j,t} + \beta_3 Sell_{i,j,t} + \beta_4 SSell_{i,j,t} + \beta_5 UP_{i,j,t} \quad (3) \\ & + \beta_6 DN_{i,j,t} + \beta_7 AllStar_{i,j,t} + \beta_8 PriorAcc_{i,j,t} + \beta_9 FirmExp_{i,j,t} \\ & + \beta_{10} GenExp_{i,j,t} + \beta_{11} Inds_{i,j,t} + \beta_{12} ForFreq_{i,j,t} + \beta_{13} BrokerSize_{i,j,t} \\ & + \beta_{14} Companies_{i,j,t} + \beta_{15} PriorOnCall_{i,j,t} + v_{i,t} \end{aligned}$$

where:

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<sup>23</sup> Inferences are unchanged if equation (2) is estimated using the Fama MacBeth (1973) procedure.

*Time|OnCall* The number of minutes managers spend answering questions of the analyst, measured as the number of words spoken to the analyst divided by 150, where 150 is the word count per minute conversion

and all other variables are as previously defined. Equation (3) is identical to equation (2) expect for the change in the dependent variable. Consistent with the discrimination hypothesis in previous sections, I expect  $\beta_1 > 0$ ,  $\beta_2 > 0$ ,  $\beta_1 > \beta_2$ ,  $\beta_3 < 0$ ,  $\beta_4 < 0$ , and  $\beta_3 > \beta_4$ . Table 8 provides the estimation of equation (3).

The results in Table 8 suggest that analysts with strong buy and buy recommendations are allotted more conference call time than hold analysts. In particular, the coefficients on *SBuy* (0.174,  $p < .001$ ) and *Buy* (0.114,  $p < .001$ ) are significantly positive. Sell analysts are not treated significantly differently than the base case hold analyst, but, contrary to predictions, strong sell analysts are spoken to more than the hold analysts (0.135,  $p = 0.06$ ). In fact, the difference in time managers spend with strong sell analysts and strong buy analysts is not statistically significant. Combined, these results are consistent with both managers catering to favorable analysts, and once making the decision to speak with an extremely unfavorable analyst, to debate heavily with them.<sup>24</sup>

## 7. Conclusion

This study provides compelling direct evidence that managers discriminate among analysts during earnings conference calls. Using a large dataset of earnings conference call transcripts from 2002 to 2004, I find that the probability of an analyst being allowed to ask a question during an earnings conference call is increasing in the favorableness of the analyst's view of the firm. After controlling for other factors, the odds of an analyst with a strong buy recommendation participating on the conference call are more than twice as high as an analyst with a strong sell recommendation. The extent of discrimination is more

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<sup>24</sup> Inferences are identical when estimating equation (3) using the Fama MacBeth (1973) procedure.

(less) pronounced when managers have higher (lower) incentives to maintain high stock prices, and when analysts are more (less) reliant on management as an information source. I also show that, even among the analysts allowed to participate on the conference call, discrimination persists. In particular, the order in which managers accept questions from analysts is increasing in the favorableness of the analyst's stock recommendation.

Detecting managerial discrimination through conference call participation requires careful controls for an analyst's propensity to seek participation. Thus, the inferences drawn here are only as valid as the effectiveness of such controls. However, the results consistently provide evidence of managerial discrimination across a number of control specifications.

By measuring discrimination directly using earnings conference call transcripts, I add to the empirical literature on discrimination, where results are mixed perhaps because of reliance on indirect discrimination proxies. My results validate prior anecdotal and survey evidence suggesting that managers discriminate among analysts, and provide evidence on a specific type of discrimination that is currently of concern to legislators (Cox 2005).

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## APPENDIX 1: VARIABLE DEFINITIONS

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### ***Firm Level Variables***

<i>Assets - Total (\$MM)</i>	Total assets at fiscal quarter end (data14 from CRSP/Compustat quarterly merged database)
<i>Market Value of Equity (\$MM)</i>	Market value of equity at fiscal quarter end (data14*data61 from CRSP/Compustat quarterly merged database)
<i>Market to Book Ratio</i>	Market value of equity to book value of equity at fiscal quarter end (data14*data61/data60 from CRSP/Compustat quarterly merged database)
<i>Return on Assets</i>	Return on Assets at fiscal quarter end (data25/data44 from CRSP/Compustat quarterly merged database)
<i>CorpCount</i>	Total number of corporate participants on the call per the transcript
<i>NonCorpCount</i>	Total number of non-corporate participants on the call per the transcript
<i>NumAnalyst</i>	Number of sample analysts providing earnings forecasts and recommendations on I/B/E/S for the current fiscal quarter end
<i>IBESonCall</i>	Number of I/B/E/S analysts providing earnings estimates and recommendations for the current fiscal quarter that participate on the conference call
<i>IBESonCallDum</i>	Equals 1 if there is at least one IBES analyst covering the firm at quarter end who participates on the conference call, 0 otherwise
<i>Length of Conference Call (min)</i>	Length of conference call in minutes (where minutes is derived from total word count of transcript at 150 words per minute)
<i>Length of Q&amp;A (min)</i>	Length of question and answer portion of the call, in minutes
<i>Open</i>	Openness of the conference call measured as the ratio of time spent on the question and answer portion of the call divided by the total time of the conference call
<i>MarketEst</i>	The consensus mean earnings per share calculated using all sample analysts who provided earnings estimates for the current fiscal quarter end
<i>OnCallEst</i>	Mean earnings estimate of the sample analysts who participated on the conference call
<i>Actual</i>	Actual reported earnings per share per I/B/E/S
<i>MarketFE</i>	The raw forecast error for all sample analysts covering the firm on I/B/E/S (Actual - MarketEst)
<i>OnCallFE</i>	The raw forecast error for those sample analysts participating on the conference call (Actual - OnCallEst)
<i>MarketRec</i>	The consensus mean stock recommendation using all sample analysts who provided earnings estimates for the current fiscal quarter end
<i>OnCallRec</i>	Mean stock recommendation of the sample analysts who participated on the conference call
<i>CEO option wealth sensitivity (\$MM)</i>	Change in CEO wealth from option holdings, in Millions, to a 1 percent change in stock price, calculated as the derivative of total option holdings at most recent fiscal year end with respect to price (Core and Guay, 2002). Total option holdings are calculated as the sum of exercisable and unexercisable options outstanding per Execucomp at most recent fiscal year end. Option inputs to calculate Black Scholes option values are as follows: Time to maturity is assumed to be 7.5 years. Volatility is measured over the period from the midpoint of the most recent fiscal year end through 5 years prior to that date. Dividend yield is the average dividend yield over the most recent 3 years. Strike and exercise prices equal the exercise price of current year option grants.
<i>InstHold</i>	Percentage of institutional holdings as of the most recent calendar quarter prior to the current fiscal quarter end per 13(f) filing

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**Appendix 1: Variable Definitions (continued)**

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**Analyst Level Variables**

<i>OnCall</i>	Analyst participation on the conference call measured as 1 if the analyst asked a question during the conference call and 0 otherwise
<i>Sbuy</i>	Strong buy recommendation measured as 1 if I/B/E/S most recent outstanding stock recommendation prior to the conference call is a strong buy, 0 otherwise
<i>Buy</i>	Buy recommendation measured as 1 if I/B/E/S most recent outstanding stock recommendation prior to the conference call is a buy, 0 otherwise
<i>Hold</i>	Hold recommendation measured as 1 if I/B/E/S most recent outstanding stock recommendation prior to the conference call is a hold, 0 otherwise
<i>Sell</i>	Sell recommendation measured as 1 if I/B/E/S most recent outstanding stock recommendation prior to the conference call is a sell, 0 otherwise
<i>Ssell</i>	Strong sell recommendation measured as 1 if I/B/E/S most recent outstanding stock recommendation prior to the conference call is a strong sell, 0 otherwise
<i>AllStar</i>	All Star research analyst measured as 1 if the analyst made any of the Institutional Investor Research All-American teams as of the most recent prior year, 0 otherwise
<i>PriorAcc</i>	Prior earnings forecast accuracy, measured as the relative absolute forecast error of the analyst's prior quarter earnings forecast. Relative absolute forecast error is calculated as the prior quarter absolute forecast error for analyst <i>i</i> following firm <i>j</i> in quarter <i>t</i> minus the smallest forecast error by any analyst following firm <i>j</i> in quarter <i>t</i> , with this difference scaled by the range in the prior quarter absolute forecast error for all analysts following firm <i>j</i> in quarter <i>t</i> .
<i>FirmExp_Raw</i>	Number of years the analyst has been following the firm, measured as the difference between the conference call date and the date of the analyst's first earnings estimate for the firm on I/B/E/S, scaled by 365
<i>FirmExp</i>	Firm experience measured as the relative time the analyst has covered the firm, where firm coverage is measured as the number of days between the conference call date and the analyst's first earnings forecast estimate date on I/B/E/S for the firm. Relative firm experience is calculated as the firm experience for analyst <i>i</i> following firm <i>j</i> in quarter <i>t</i> minus the smallest firm experience by any analyst following firm <i>j</i> in quarter <i>t</i> , with this difference scaled by the range in the firm experience for all analysts following firm <i>j</i> in quarter <i>t</i> .
<i>GenExp_Raw</i>	Number of years the analyst has been on I/B/E/S measured as the difference between the conference call date and the date of the analyst's first earnings estimate on I/B/E/S, scaled by 365
<i>GenExp</i>	General experience measured as the relative time the analyst has been on I/B/E/S where time on I/B/E/S is measured as the number of days between the conference call date and the analyst's first earnings forecast estimate date on I/B/E/S for any firm. Relative general experience is calculated as the general experience for analyst <i>i</i> following firm <i>j</i> in quarter <i>t</i> minus the smallest general experience by any analyst following firm <i>j</i> in quarter <i>t</i> , with this difference scaled by the range in the general experience for all analysts following firm <i>j</i> in quarter <i>t</i> .

**Appendix 1: Variable Definitions (continued)**

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<i>Inds_Raw</i>	Then number of two digit SIC code industries followed by the analyst during the most recently completed calendar year prior to the conference call date
<i>Inds</i>	Industry coverage measured as the relative number of industries covered by the analyst over the most recently completed calendar year prior to the conference call date. Relative industry coverage is calculated as the industry coverage of analyst i following firm j in quarter t minus the smallest industry coverage by any analyst following firm j in quarter t, with this difference scaled by the range in industry coverage for all analysts following firm j in quarter t.
<i>ForFreq_Raw</i>	Then number of quarterly earnings forecasts made for the firm during the most recently completed calendar year
<i>ForFreq</i>	Forecast frequency measured as the relative number of quarterly earnings forecasts issued by the analyst for the firm over the most recently completed calendar year prior to the conference call date. Relative forecast frequency is calculated as the forecast frequency for analyst i following firm j in quarter t minus the lowest forecast frequency by any analyst following firm j in quarter t, with this difference scaled by the range in the forecast frequency for all analysts following firm j in quarter t.
<i>BrokerSize_Raw</i>	The number of analysts employed by the brokerage house employing the analyst as of the most recently completed calendar year prior to the conference call date
<i>BrokerSize</i>	Broker size measured as the relative number of analysts employed by the brokerage firm employing the analyst during the most recent calendar year prior to the conference call date. Relative broker size is calculated as the broker size for analyst i following firm j in quarter t minus the smallest broker size of any analyst following firm j in quarter t, with this difference scaled by the range in broker size for all analysts following firm j in quarter t.
<i>Companies_Raw</i>	Number of companies covered by the analyst during the most recently completed calendar year prior to the conference call date
<i>Companies</i>	Company coverage measured as the relative number of companies followed by the analyst over the most recently completed calendar year prior to the conference call date. Relative company coverage is calculated as the company coverage of analyst i following firm j in quarter t minus the lowest company coverage by any analyst following firm j in quarter t, with this difference scaled by the range in company coverage for all analysts following firm j in quarter t.
<i>OnCallPrior</i>	Prior conference call participation measured as 1 if the analyst was identified as asking a question on any of the firm's prior conference calls in the sample, and 0 otherwise.
<i>RecHorizon</i>	Forecast horizon measured as the number of days between the conference call date and the date of the analysts most recent stock recommendation
<i>Queue OnCall</i>	The order of the analyst's first appearance on the conference call relative to all non-corporate conference call participants. Relative order is calculated as (Total number of non-corporate conference call participants - position of analyst on conference call)/(Total number of non-corporate conference call participants - 1). The last non-corporate participant to ask a question has a value of 0, while the first non-corporate participant to ask a question has a value of 1.
<i>Time OnCall</i>	The number of minutes managers spend answering questions of the analyst, measured as the number of words spoken to the analyst divided by 150, where 150 is the word count per minute conversion

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**TABLE 1**  
**Sample Characteristics**

*Panel A: Distribution of firm-quarters and analyst-firm-quarters by calendar quarter*

Calendar Quarter of Fiscal Quarter End	Firm-Quarter Observations	%	Analyst-Firm-Quarter Observations	%
2002-Q1	556	3	3,211	2
2002-Q2	1,133	6	8,570	6
2002-Q3	1,282	7	9,269	6
2002-Q4	1,646	8	14,270	10
2003-Q1	1,323	7	7,264	5
2003-Q2	1,750	9	12,712	9
2003-Q3	1,885	10	13,463	9
2003-Q4	2,046	10	17,157	12
2004-Q1	1,692	9	9,160	6
2004-Q2	2,072	11	16,042	11
2004-Q3	2,075	11	16,135	11
2004-Q4	2,217	11	19,455	13
Total	19,677	100%	146,708	100%

*Table 1 (continued)*

**Panel B: Distribution of firm-quarters and analyst-firm-quarters by industry<sup>a</sup>**

<b>Industry</b>	<b>Firm-Quarter Observations</b>	<b>%</b>	<b>Analyst-Firm-Quarter Observations</b>	<b>%</b>
Chemicals	460	2	2,852	2
Computers	3,678	19	32,238	22
Extractive	844	4	8,668	6
Financial	2,127	11	18,067	12
Food	369	2	2,531	2
Insurance/RealEstate	356	2	1,176	1
Manf:ElectricalEqpt	791	4	5,426	4
Manf:Instruments	1,181	6	7,362	5
Manf:Machinery	667	3	4,845	3
Manf:Metal	361	2	1,954	1
Manf:Misc.	128	1	801	1
Manf:Rubber/glass/etc	233	1	1,027	1
Manf:TransportEqpt	381	2	2,748	2
Mining/Construction	418	2	2,499	2
Pharmaceuticals	83	0	506	0
Retail:Misc.	1,103	6	7,847	5
Retail:Restaurant	1,231	6	10,251	7
Retail:Wholesale	277	1	2,497	2
Services	470	2	2,556	2
Textiles/Print/Publish	1,852	9	12,916	9
Transportation	847	4	5,165	4
Utilities	1,155	6	9,253	6
Not Assigned	665	3	3,523	2
<b>Total</b>	<b>19,677</b>	<b>100%</b>	<b>146,708</b>	<b>100%</b>

**Panel C: Distribution of firm-quarters by stock exchange**

<b>Stock exchange</b>	<b>Firm-Quarter Observations</b>	<b>%</b>
NYSE	10,767	54
NASDAQ	8,608	44
AMEX	142	1
Non AMEX, NYSE, NASDAQ	160	1
<b>Total</b>	<b>19,677</b>	<b>100%</b>

<sup>a</sup> Industry definitions are obtained from Barth et al. (2005).

**TABLE 2**  
**Firm level descriptive statistics for 19,677 Conference Call Transcripts**

<b>Variable<sup>a</sup></b>	<b>N</b>	<b>Mean</b>	<b>Q1</b>	<b>Median</b>	<b>Q3</b>	<b>Std Dev</b>
<b><i>Firm and CEO Characteristics</i></b>						
<i>Assets - Total (\$MM)</i>	19,677	11,409.192	377.295	1,212.513	4,489.444	59,411.654
<i>Market Value of Equity (\$MM)</i>	19,482	6,077.712	473.318	1,187.188	3,663.366	20,884.771
<i>Market to Book Ratio</i>	19,476	3.585	1.474	2.183	3.444	73.350
<i>Return on Assets</i>	19,668	0.002	0.001	0.009	0.020	0.060
<i>CEO option wealth sensitivity (\$MM)</i>	11,252	0.519	0.070	0.182	0.462	1.604
<i>InstHold</i>	19,677	0.588	0.413	0.657	0.818	0.296
<b><i>Conference Call Characteristics</i></b>						
<i>CorpCount</i>	19,677	3.411	3.000	3.000	4.000	1.389
<i>NonCorpCount</i>	19,677	8.799	6.000	9.000	11.000	4.284
<i>NumAnalyst</i>	19,677	7.456	3.000	6.000	10.000	5.840
<i>IBESonCall</i>	19,677	3.859	2.000	3.000	6.000	3.025
<i>IBESonCallDum</i>	19,677	0.881	1.000	1.000	1.000	0.324
<i>Length of Conference Call (min)</i>	19,677	52.381	40.753	52.387	62.893	17.239
<i>Length of Q&amp;A (min)</i>	19,677	29.475	19.687	29.760	39.160	15.310
<i>Open</i>	19,677	0.551	0.472	0.587	0.682	0.204
<i>MarketRec</i>	19,677	2.419	2.067	2.400	2.750	0.499
<i>OnCallRec</i>	17,334	2.324	2.000	2.333	2.800	0.654
<i>MarketEst</i>	19,677	0.273	0.060	0.230	0.440	0.404
<i>OnCallEst</i>	17,334	0.276	0.060	0.230	0.450	0.417
<i>Actual</i>	19,672	0.273	0.050	0.230	0.460	0.470
<i>MarketFE</i>	19,672	0.000	-0.020	0.010	0.030	0.198
<i>OnCallFE</i>	17,331	0.008	-0.010	0.010	0.030	0.191

<sup>a</sup> See Appendix 1 for variable definitions.

**TABLE 3**  
**Descriptive and univariate analysis of analyst conference call participation**

Variable <sup>a</sup>	Full Sample		OnCall = 0 (N=90,846)		OnCall = 1 (N=55,862)		Mean		Median	
	Mean	Median	Mean	Median	Mean	Median	Difference		Difference	
<i>Analyst View of the firm</i>										
OnCall	0.381	0.000	0.000	0.000	1.000	1.000	N/A		N/A	
Sbuy	0.199	0.000	0.181	0.000	0.227	0.000	-0.046	***	N/A	
Buy	0.264	0.000	0.248	0.000	0.290	0.000	-0.042	***	N/A	
Hold	0.450	0.000	0.475	0.000	0.408	0.000	0.067	***	N/A	
Sell	0.068	0.000	0.074	0.000	0.059	0.000	0.015	***	N/A	
Ssell	0.019	0.000	0.022	0.000	0.016	0.000	0.006	***	N/A	
<i>Time and Competition Constraints</i>										
Open	0.561	0.597	0.531	0.575	0.610	0.625	-0.079	***	-0.051	***
NumAnalyst	12.029	11.000	12.568	11.000	11.153	10.000	1.414	***	1.000	***
<i>Analyst Characteristics</i>										
AllStar	0.177	0.000	0.151	0.000	0.220	0.000	-0.069	***	N/A	
PriorAcc	0.697	0.800	0.688	0.800	0.711	0.819	-0.023	***	-0.019	***
FirmExp_Raw	3.374	2.282	3.270	2.236	3.544	2.416	-0.274	***	-0.181	***
FirmExp	0.462	0.377	0.450	0.357	0.480	0.409	-0.030	***	-0.052	***
GenExp_Raw	7.479	5.847	7.429	5.808	7.562	5.907	-0.133	***	-0.099	***
GenExp	0.386	0.295	0.383	0.291	0.391	0.301	-0.008	***	-0.010	***
Inds_Raw	3.297	3.000	3.252	3.000	3.370	3.000	-0.118	***	0.000	***
Inds	0.389	0.333	0.389	0.333	0.389	0.333	0.000		0.000	
ForFreq_Raw	15.483	13.000	15.282	12.000	15.811	13.000	-0.529	***	-1.000	***
ForFreq	0.423	0.360	0.410	0.343	0.444	0.389	-0.034	***	-0.046	***
BrokerSize_Raw	91.916	60.000	88.207	59.000	97.948	67.000	-9.741	***	-8.000	***
BrokerSize	0.338	0.237	0.326	0.215	0.358	0.274	-0.032	***	-0.059	***
Companies_Raw	15.817	15.000	15.953	15.000	15.598	15.000	0.355	***	0.000	***
Companies	0.472	0.440	0.469	0.435	0.477	0.450	-0.008	***	-0.015	***
OnCallPrior	0.584	1.000	0.446	0.000	0.807	1.000	-0.361	***	N/A	
RecHorizon	297.942	247.000	312.873	269.000	273.662	212.000	39.211	***	57.000	***
Queue OnCall	N/A	N/A	N/A	N/A	0.501	0.500	N/A		N/A	
Time OnCall	N/A	N/A	N/A	N/A	2.606	2.253	N/A		N/A	

\*, \*\*, \*\*\* Significant at the 0.10, 0.05 and 0.01 level for t-test of means and wilcoxon test of medians for continuous variables, and chi-square test of equal proportions for indicator variables.

<sup>a</sup> See Appendix 1 for variable definitions.

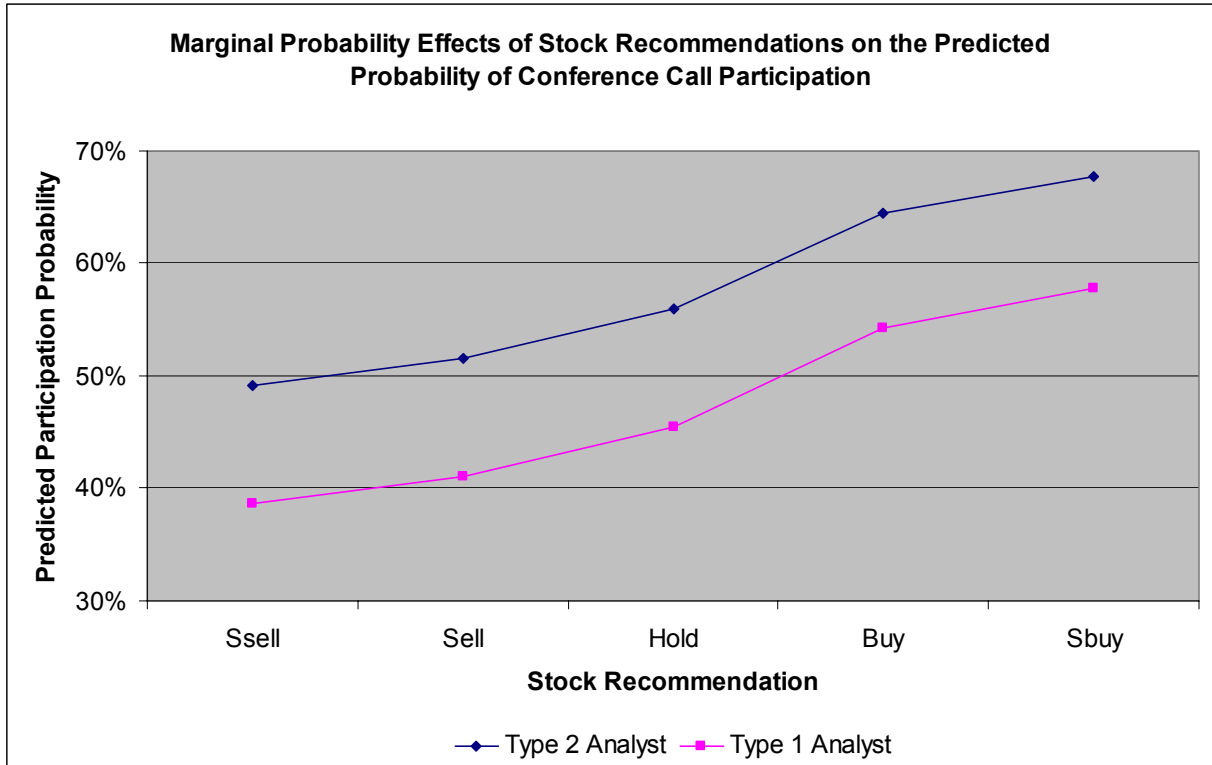
**TABLE 4**  
**Logistic regression investigating the association between conference call participation and the favorableness of the analyst's view of the firm**

**Panel A: Model Estimation**

$$\begin{aligned}
 OnCall_{i,j,t} = & \beta_0 + \beta_1 SBuy_{i,j,t} + \beta_2 Buy_{i,j,t} + \beta_3 Sell_{i,j,t} + \beta_4 SSell_{i,j,t} \\
 & + \beta_5 Open_{i,j,t} + \beta_6 NumAnalyst_{i,j,t} + \beta_7 AllStar_{i,j,t} \\
 & + \beta_8 PriorAcc_{i,j,t} + \beta_9 FirmExp_{i,j,t} + \beta_{10} GenExp_{i,j,t} + \beta_{11} Inds_{i,j,t} \\
 & + \beta_{12} ForFreq_{i,j,t} + \beta_{13} BrokerSize_{i,j,t} + \beta_{14} Companies_{i,j,t} \\
 & + \beta_{15} PriorOnCall_{i,j,t} + \beta_{16} RecHorizon_{i,j,t} + v_{i,j,t}
 \end{aligned} \tag{1}$$

Variable <sup>a</sup>	Predicted Sign	Coefficients	Odds Ratio	$\chi^2$ statistic <sup>c</sup>
<i>Intercept</i>	?	-2.569 ***		2,464.80
<b><i>Analyst view of the firm</i></b>				
<i>Sbuy</i>	+ and > $\beta_2$	0.500 ***	1.649	564.91
<i>Buy</i>	+	0.356 ***	1.428	346.87
<i>Sell</i>	-	-0.174 ***	0.840	27.03
<i>Ssell</i>	- and < $\beta_4$	-0.274 ***	0.760	23.54
<b><i>Time and Competition Constraints</i></b>				
<i>Open</i>	+	2.131 ***	8.425	1,071.39
<i>NumAnalyst</i>	-	-0.031 ***	0.970	394.99
<b><i>Analyst quality</i></b>				
<i>AllStar</i>	+	0.423 ***	1.527	306.48
<i>PriorAcc</i>	+	0.279 ***	1.321	157.18
<i>FirmExp</i>	+	0.071 ***	1.074	6.19
<i>GenExp</i>	+	-0.088 ***	0.916	9.01
<i>Inds</i>	-	-0.073 ***	0.929	8.04
<i>ForFreq</i>	+	0.115 ***	1.122	24.42
<i>BrokerSize</i>	+	0.069 ***	1.071	6.20
<i>Companies</i>	-	-0.045 *	0.956	2.41
<i>OnCallPrior</i>	+	1.628 ***	5.093	7,580.25
<i>RecHorizon</i>	-	-0.001 ***	0.999	692.17
Sample Size <sup>b</sup>		146,708		
Pseudo R <sup>2</sup>		14.9%		
Percent correctly predicted		70.0%		
<b>Tests</b>				
	$\chi^2$ statistic <sup>c</sup>	<i>Prob</i> ( $\chi^2$ )		
Wald goodness-of-fit <sup>d</sup>	10,332	<.001		
$\beta_1 = \beta_2$	42.25	<.001		
$\beta_3 = \beta_4$	2.42	0.060		

**Panel B: Marginal Probability Effect Plots<sup>c</sup>**



\*\*\*, \*\*, \* Significant at .01, .05 and .10 level, respectively, in two-tailed test (one-tailed when predicted).

<sup>a</sup> See Appendix 1 for variable definitions.

<sup>b</sup> The sample includes 146,708 analyst-firm-quarter observations.

<sup>c</sup> Robust standard errors are estimated using the Huber (1967)-White(1980) procedure, with firm level clustering (Rogers 1993) for lack of independence of analyst observations by firm.

<sup>d</sup> Wald goodness of fit test is utilized in place of a likelihood ratio test because of clustered maximum likelihood estimates.

<sup>e</sup> Predicted probabilities are calculated as  $e^{(x'\hat{\beta})} / (1 + e^{(x'\hat{\beta})})$ , where  $\hat{\beta}$  is the vector of fitted values from equation (1) reported in Panel A and  $x'$  is the vector of values equal to the sample mean (see Table 2, Panel B) for all continuous variables, and 1 for *PriorOnCall*. Remaining values for stock recommendations and all-star status take on values of 1 or 0 depending on their respective location in the graph.

**TABLE 5**  
**Logistic regression investigating the association between the probability of conference call participation and changes in stock recommendations**

$$OnCall^s = \beta_0^s + \sum_{m=1}^{10} \beta_m^s Upgrades + \sum_{n=1}^{20} \beta_n^s Downgrades + \beta_{21}^s NumAnalyst + \beta_{22}^s Open + \varepsilon^s \quad (1a)$$

where  $s$  = the  $OnCall_{i,j,t-1}=1$  or the  $OnCall_{i,j,t-1}=0$  sample

Recommendaiton Level Change <sup>b</sup>	Variable <sup>a</sup>	Predicted Sign	Sample: <i>OnCall<sub>i,j,t-1</sub> = 1</i>			Sample: <i>OnCall<sub>i,j,t-1</sub> = 0</i>		
			Coefficients	$\chi^2$ statistic <sup>c</sup>		Coefficients	$\chi^2$ statistic <sup>c</sup>	
	<i>Intercept</i>	?	-0.813	***	57.64	-1.400	***	173.75
<b>Upgrades</b>								
1	<i>SSell to Sell</i>	+	N/A <sup>e</sup>		N/A <sup>e</sup>	-0.408		0.60
1	<i>Sell to Hold</i>	+	-0.181		1.80	-0.117		0.99
1	<i>Hold to Buy</i>	+	0.233	***	5.93	0.134	*	2.50
1	<i>Buy to SBuy</i>	+	0.243	**	3.22	0.116		0.87
2	<i>SSell to Hold</i>	+	-0.137		0.51	-0.562	***	10.75
2	<i>Sell to Buy</i>	+	-0.277		0.85	0.098		0.12
2	<i>Hold to SBuy</i>	+	0.218	**	4.59	-0.021		0.05
3	<i>SSell to Buy</i>	+	0.041		0.00	N/A <sup>f</sup>		N/A <sup>f</sup>
3	<i>Sell to SBuy</i>	+	0.169		0.05	-0.564		0.52
4	<i>SSell to SBuy</i>	+	N/A <sup>e</sup>		N/A <sup>e</sup>	N/A <sup>e</sup>		N/A <sup>e</sup>
<b>Downgrades</b>								
1	<i>SBuy to Buy</i>	-	0.232	**	4.13	0.174	*	2.86
1	<i>Buy to Hold</i>	-	-0.012		0.02	-0.168	**	5.06
1	<i>Hold to Sell</i>	-	-0.243	**	4.31	-0.315	***	9.53
1	<i>Sell to SSell</i>	-	0.113		0.07	-0.393		1.02
2	<i>SBuy to Hold</i>	-	-0.060		0.41	-0.079		0.84
2	<i>Buy to Sell</i>	-	-0.236		0.85	-0.669	***	7.03
2	<i>Hold to SSell</i>	-	-0.152		0.71	-0.028		0.03
3	<i>SBuy to Sell</i>	-	N/A <sup>e</sup>		N/A <sup>e</sup>	-0.973	*	2.18
3	<i>Buy to SSell</i>	-	-1.380		0.89	0.460		0.36
4	<i>SBuy to SSell</i>	-	0.635		0.89	0.891		2.66
<b>Control Variables</b>								
	<i>NumAnalyst</i>	-	-0.013	***	11.75	-0.033	***	95.41
	<i>Open</i>	+	2.702	***	311.29	1.921	***	161.02
	Sample Size <sup>d</sup>		7,501			9,034		
	Pseudo R <sup>2</sup>		5.0%			3.7%		
	Percent correctly predicted		68.9%			68.5%		

**Notes to Table 5:**

\*, \*\*, \*\*\* Significant at the 0.10, 0.05 and 0.01 level (one tailed for signed predictions).

<sup>a</sup> Upgrades and downgrades are indicator variables for recommendation changes occurring during between consecutive quarterly earnings conference call. See Appendix 1 for variable definitions.

<sup>b</sup> Recommendation level changes represents the magnitude of the upgrade or downgrade as the number of recommendation levels between the prior and current recommendation change.

<sup>c</sup> Robust standard errors are estimated using the Huber (1967)-White(1980) procedure, with firm level clustering (Rogers 1993) for lack of independence of analyst observations by firm.

<sup>d</sup> The sample consists of the subset of all analyst-firm-quarter observations where analyst participation was measurable on both the current and prior quarter earnings conference call, and where the analyst made a recommendation change or reiteration between the two conference calls. The  $OnCall_{i,j,t-1}=0$  sample examines changes in participation probabilities for those analysts who did not previously participate on the conference call. The  $OnCall_{i,j,t-1}=1$  sample examines changes in participation probabilities for those analysts who did previously participate on the conference call.

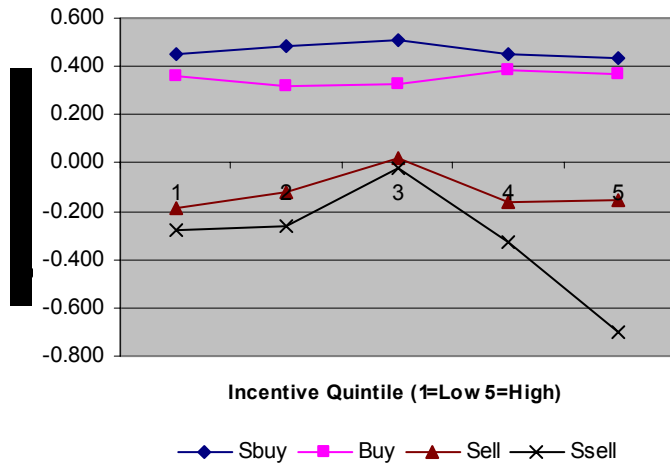
<sup>e</sup> Represents 17 upgrade and downgrade observations that were not included in the model because the upgrade or downgrade combination predicted participation perfectly.

<sup>f</sup> This upgrade combination does not exist in the sample.

TABLE 6

Effect of Managerial Incentives to Maintain High Stock Prices and Analyst Reliance on Management on Discrimination Extent

Panel A: Managerial Incentives measured via CEO Option Wealth Sensitivity to Stock Prices



Median CEO Option Wealth Sensitivity (\$MM) by Quintile<sup>a</sup>

Q1 (Low Incentive): 0.03  
 Q2: 0.13  
 Q3: 0.28  
 Q4: 0.57  
 Q5 (High Incentive): 1.69

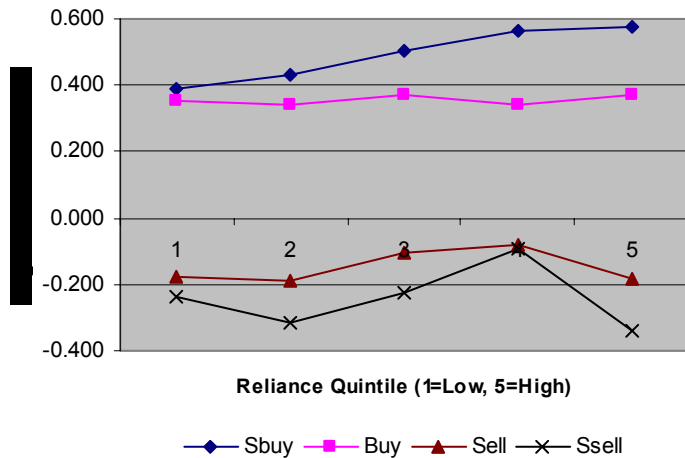
Regression Coefficients By Quintile<sup>b</sup>

	<i>Sbuy</i>	<i>Buy</i>	<i>Sell</i>	<i>Ssell</i>
Q1 (Low Incentive): 0.03	0.450	0.363	-0.184	-0.275
Q2: 0.13	0.481	0.315	-0.120	-0.260
Q3: 0.28	0.506	0.324	0.018	-0.018
Q4: 0.57	0.455	0.382	-0.161	-0.329
Q5 (High Incentive): 1.69	0.431	0.366	-0.155	-0.698

$\chi^2$ Test <sup>c</sup> :	Predicted Sign	Coefficient Difference	P-Value
$Sbuy^{Q5} - Sbuy^{Q1}$	(+)	-0.019	0.830
$Ssell^{Q5} - Ssell^{Q1}$	(-)	-0.423	0.027 **
$(Sbuy^{Q5} - Ssell^{Q5}) - (Sbuy^{Q1} - Ssell^{Q1})$	(+)	0.405	0.044 **

Panel B: Analyst Reliance on Management measured via Institutional Holdings



Median InstHold By Quintile<sup>a</sup>

Q1 (Lowest Reliance): 0.40  
 Q2: 0.60  
 Q3: 0.71  
 Q4: 0.82  
 Q5 (Highest Reliance): 0.93

Regression Coefficients By Range<sup>b</sup>

	<i>Sbuy</i>	<i>Buy</i>	<i>Sell</i>	<i>Ssell</i>
Q1 (Lowest Reliance): 0.40	0.388	0.355	-0.175	-0.240
Q2: 0.60	0.429	0.342	-0.188	-0.314
Q3: 0.71	0.503	0.373	-0.104	-0.226
Q4: 0.82	0.565	0.344	-0.079	-0.092
Q5 (Highest Reliance): 0.93	0.577	0.370	-0.183	-0.338

$\chi^2$ Test <sup>c</sup> :	Predicted Sign	Coefficient Difference	P-Value
$Sbuy^{Q5} - Sbuy^{Q1}$	(+)	0.189	0.003 ***
$Ssell^{Q5} - Ssell^{Q1}$	(-)	-0.099	0.291
$(Sbuy^{Q5} - Ssell^{Q5}) - (Sbuy^{Q1} - Ssell^{Q1})$	(+)	0.288	0.061 *

\*, \*\*, \*\*\* Significant at the 0.10, 0.05 and 0.01 level (one tailed for signed predictions). Robust standard errors are estimated using the Huber (1967)-White(1980) procedure, with firm level clustering (Rogers 1993) for lack of independence of analyst observations by firm.

<sup>a</sup> See Appendix 1 for variable definitions

<sup>b</sup> Regression coefficients are obtained by running logistic regressions of equation (1) in Table 4 separately over samples pooled by incentive quintiles.

<sup>c</sup> Tests of coefficients between highest and lowest reliance quintiles are obtained by estimating the logistic regression specified as

$$OnCall = \sum_{q=Low}^{High} \left( \beta_0^q + \beta_1^q SBuy + \beta_2^q Buy + \beta_3^q Sell + \beta_4^q SSell + \sum_{n=5}^{16} \bar{x}^q \right) + \nu$$

where  $q$  is the incentive quintile of the manager or managerial reliance quintile of the analyst and  $\bar{x}$

is the vector of non-stock recommendation level variables in equation (1).

TABLE 7

Ordinary least squares regression investigating the association between the relative queue position of the analyst on the call and the analyst's view of the firm

$$Queue|OnCall_{i,j,t} = \beta_0 + \beta_1 SBuy_{i,j,t} + \beta_2 Buy_{i,j,t} + \beta_3 Sell_{i,j,t} + \beta_4 SSell_{i,j,t} + \beta_5 AllStar_{i,j,t} + \beta_6 PriorAcc_{i,j,t} + \beta_7 FirmExp_{i,j,t} + \beta_8 GenExp_{i,j,t} + \beta_9 Inds_{i,j,t} + \beta_{10} ForFreq_{i,j,t} + \beta_{11} BrokerSize_{i,j,t} + \beta_{12} Companies_{i,j,t} + \beta_{13} PriorOnCall_{i,j,t} + v_{i,t} \quad (2)$$

Variable <sup>a</sup>	Predicted Sign	Coefficients	t-statistics <sup>c</sup>
<i>Intercept</i>	?	0.373 ***	73.56
<b>Analyst view of the firm</b>			
<i>Sbuy</i>	+ and > $\beta_2$	0.044 ***	13.81
<i>Buy</i>	+	0.046 ***	15.62
<i>Sell</i>	-	-0.024 ***	-4.43
<i>Ssell</i>	- and < $\beta_3$	-0.017 **	-1.78
<b>Analyst quality</b>			
<i>AllStar</i>	+	0.049 ***	15.49
<i>PriorAcc</i>	+	0.004	1.03
<i>FirmExp</i>	+	0.033 ***	8.33
<i>GenExp</i>	+	-0.030 ***	-6.80
<i>Inds</i>	-	-0.003	-0.78
<i>ForFreq</i>	+	0.006 **	1.67
<i>BrokerSize</i>	+	0.094 ***	23.47
<i>Companies</i>	-	0.039 ***	8.47
<i>OnCallPrior</i>	+	0.043 ***	14.21
Sample Size <sup>b</sup>		55,489	
Adjusted R <sup>2</sup>		3.7%	
<b>Tests</b>	<b>F-statistic</b>	<b>Prob(F)</b>	
$\beta_1 = \beta_2$	0.23	0.633	
$\beta_4 = \beta_5$	0.30	0.583	

\*\*\*, \*\*, \* Significant at .01, .05 and .10 level, respectively, in two-tailed test (one-tailed when predicted).

<sup>a</sup> See Appendix 1 for variable definitions.

<sup>b</sup> The sample includes the subset of 146,708 analyst-firm-quarter observations who participated on the conference call.

<sup>c</sup> t-statistics are calculated using the Newey-West procedure to correct for heteroskedasticity and serial correlation.

TABLE 8

Ordinary least squares regression investigating the association between the time managers spend with the analyst on the conference call and the analyst's view of the firm

$$Time|OnCall_{i,j,t} = \beta_0 + \beta_1 SBuy_{i,j,t} + \beta_2 Buy_{i,j,t} + \beta_3 Sell_{i,j,t} + \beta_4 SSell_{i,j,t} + \beta_5 AllStar_{i,j,t} + \beta_6 PriorAcc_{i,j,t} + \beta_7 FirmExp_{i,j,t} + \beta_8 GenExp_{i,j,t} + \beta_9 Inds_{i,j,t} + \beta_{10} ForFreq_{i,j,t} + \beta_{11} BrokerSize_{i,j,t} + \beta_{12} Companies_{i,j,t} + \beta_{13} PriorOnCall_{i,j,t} + v_{i,t} \quad (3)$$

Variable <sup>a</sup>	Predicted Sign	Coefficients	t-statistics <sup>c</sup>
<i>Intercept</i>	?	2.006 ***	56.11
<b>Analyst view of the firm</b>			
<i>Sbuy</i>	+ and > $\beta_2$	0.174 ***	7.52
<i>Buy</i>	+	0.114 ***	5.66
<i>Sell</i>	-	-0.041	-1.20
<i>Ssell</i>	- and < $\beta_3$	0.135 *	1.87
<b>Analyst quality</b>			
<i>AllStar</i>	+	-0.093 ***	-4.40
<i>PriorAcc</i>	+	-0.181 ***	-6.70
<i>FirmExp</i>	+	0.263 ***	9.22
<i>GenExp</i>	+	0.055 *	1.65
<i>Inds</i>	-	0.134 ***	4.71
<i>ForFreq</i>	+	0.224 ***	6.75
<i>BrokerSize</i>	+	0.422 ***	13.90
<i>Companies</i>	-	-0.009	-0.21
<i>OnCallPrior</i>	+	0.276 ***	13.06
Sample Size <sup>b</sup>		52,060	
Adjusted R <sup>2</sup>		1.7%	
<b>Tests</b>		<b>F-statistic</b>	
$\beta_1 = \beta_2$		5.73 ***	
$\beta_4 = \beta_5$		5.09 **	

\*\*\*, \*\*, \* Significant at .01, .05 and .10 level, respectively, in two-tailed test (one-tailed when predicted).

<sup>a</sup> See Appendix 1 for variable definitions.

<sup>b</sup> The sample includes the subset of 146,708 analyst-firm-quarter observations who participated on the conference call.

<sup>c</sup> t-statistics are calculated using the Newey-West procedure to correct for heteroskedasticity and serial correlation.