Information Discovery by Analysts

Naveen D. Daniel[a]
Sangmook Lee[b]
Lalitha Naveen[c]

This version: December, 2015

Abstract

Our contribution is to provide *direct* evidence that analysts engage in costly discovery of private information, and investors value this discovery. The innovation in our paper is to read over 3,700 analyst reports from *Investext* and explicitly identify whether the report contains discovery or interpretation. Analysts discover new information by talking to management sources (through personal meetings, investor meetings, and conference calls) or non-management sources (such as surveys or channel checks, and industry contacts). We find that information discovery is prevalent in 17% of the reports. For reports containing discovery, the average cumulative abnormal returns (over the three-day window surrounding the report issuance) are statistically and economically significant (5.9% for upgrades and –8.6% for downgrades). The cumulative abnormal returns are higher for reports containing discovery relative to those containing interpretation. We find that economic determinants predict whether a report will contain discovery. Discovery from management sources is more likely for reports in the period prior to Regulation FD and for reports by optimistic analysts. Discovery from non-management sources is more likely for reports written in the period following Regulation FD, for those written by All-Star analysts, for firms that have high information asymmetry, and firms where the competition among analysts is higher.

Keywords: Analysts, Information Discovery, Information Interpretation, Analyst Reports

[a]*LeBow College of Business, Drexel University, Philadelphia, PA., 19104, USA; nav@drexel.edu*
[b]*School of Graduate Professional Studies, Penn State Great Valley, Malvern, PA., 19355, USA; sxl65@psu.edu*
[c]*Fox School of Business, Temple University, Philadelphia, PA., 19122, USA; lnaveen@temple.edu*

We are extremely grateful to Sudipta Basu, David Becher, Tara Bhandari, Larry Brown, Michael Clement, Greg Nini, Jennifer Juergens, Daehyun Kim, Oleg Rytchkov, Ralph Walkling, and seminar participants at Drexel University, Temple University, University of Texas Accounting Brownbag, the 2015 Conference on Convergence of Financial and Managerial Accounting Research Conference, the 2015 Financial Management Association meeting, and the 10th Annual Conference on Asia-Pacific Financial Markets for helpful discussions on the paper. We are grateful to Jonathan Clarke for providing data on the All-Star ranking of analysts.

Information Discovery by Analysts

A large literature in finance and accounting documents that sell-side analysts provide value to investors through their research reports.[1] Specifically, analyst upgrades (to earnings, price targets, recommendations) result in positive abnormal returns while downgrades result in negative abnormal returns. The literature identifies two main ways in which analysts provide value. First, analysts engage in *information discovery*, where they generate new signals regarding firm fundamentals by talking to the management of the firm, its competitors, suppliers etc. Second, analysts engage in *information interpretation*, where they quantify the value implication of information events that affect the firm, such as earnings releases or other industry or macro news. In information discovery, the analyst generates private or proprietary information, while in information interpretation, the analyst reacts to public information. For brevity, we will henceforth refer to these roles as 'discovery' and 'interpretation.'

We contribute to this literature by providing *direct* evidence on the discovery role of analysts by employing a novel research design. We read over 3,700 research reports to classify whether the report contains discovery, interpretation, or both. In contrast, prior studies *assume* the report to have either discovery or interpretation based on the date of the report in relation to some news events.

In particular, the classification schemes adopted by prior research (Ivkovic and Jegadeesh (2004), Asquith, Mikhail, and Au (2005), Chen, Cheng, and Lo (2010), Livnet and Zhang (2012)) follow a similar pattern. These papers first identify a set of events (usually earnings) and then assume that reports issued within a window surrounding the event date contain analyst interpretation, while all other reports contain discovery. The papers differ in the set of events and

[1] See Michealy and Womack (2005), Ramnath et al. (2008) and Bradshaw (2011) for recent reviews of this literature.

the event windows they consider. For example, Ivkovic and Jegadeesh (2004) consider earnings releases as the only event that analysts respond to and assume that all reports issued in weeks (+1, +6) relative to the earnings release date (excluding days 0 and 1) contain interpretation. Thus all reports issued in weeks (–6, –1) are assumed to contain discovery.[2] This is likely to lead to error in classification because (i) analysts engage in discovery not just in the weeks prior to the earnings release, but also in the weeks after earnings release, and (ii) analysts react to many events other than earnings.

Asquith et al. identify 10 other events and consider all reports that are issued on days (–4, +4) surrounding these events to be interpretive in nature. This research design could also lead to misclassification because, by definition, reports issued on days (–4, –1) relative to an event cannot be in response to that event. Further, even though Asquith et al. read reports like we do, their focus is on coding the "strength of arguments" made by analysts to justify their recommendations. Additionally, they consider only reports issued by All-Star analysts, and are thus likely to overstate the pervasiveness of discovery.[3]

Using our data, we find that the misclassification in prior papers is severe. For example, using the Ivkovic and Jegadeesh (2004) definition, 80% of the reports assumed by them as containing discovery do not, in fact, contain discovery. On the flip side, 16% of the reports assumed by them as containing interpretation contain discovery. Overall, as per our analysis, 17% of the reports contain discovery.

We address two broad research questions. Our first question is how do markets react to

[2] Chen, Cheng, and Lo (2010) follow a similar classification scheme, though their main results assume that reports in days (+2,+6) contain interpretation, while those in days (-6, -2) contain discovery.

[3] Livnat and Zhang (2012), similar to Asquith et al., consider a large set of events including 10K, 10Q, and 8K filings, but do not read the reports to identify correctly which report contains discovery.

reports containing discovery by analysts? We test several hypotheses related to the value of discovery. First, if discovery is valuable, then for reports with discovery, the market reaction to upgrades of recommendations, price targets, or EPS will be positive, and the market reaction to downgrades will be negative. Second, if discovery is more valuable than interpretation, investors will react more strongly to reports containing discovery relative to other reports. That is, the market reaction to upgrades will be more positive and that for downgrades will be more negative for reports containing discovery, relative to other reports. This is because investors will have greater confidence in the views expressed by the analyst if these views are backed by new information. Prior literature has found mixed evidence on the value of discovery and on the relative importance of discovery versus interpretation, possibly because of the shortcomings in the identification schemes used. By directly reading and classifying reports as discovery or interpretation, we avoid the limitations inherent in the prior classification methodologies, and, as such, our results should be more precise.

Our third hypothesis is that the market reaction to discovery will be stronger if the discovery stems from a personal meeting with management rather than from other management sources (investor/analyst meetings and conference calls) or non-management sources (surveys, channel checks, and industry contacts). Prior literature has not examined this prediction. This hypothesis is based on the idea that management sources in general will be more knowledgeable, and therefore more reliable, compared to non-management sources. Further, even within management sources, analysts are more likely to discover unique information during their personal meetings with management, rather than during conference calls or analyst days where there are multiple analysts competing for management time.

If the data validates our hypotheses, implying that information discovery by analysts create

value, the question arises as to why not all analysts engage in discovery. We argue that this is unlikely because information discovery requires significant costs in terms of time, effort, and resources. These costs vary predictably with broker, analyst, and firm characteristics. This leads to our second research question, namely, what economic determinants predict whether a report contains discovery. This has not been explored in prior work because, as per the classification scheme used in previous papers, the only predictor of interpretation (and hence discovery) is the event date. Section I develops specific hypotheses predicting the effect of regulation (specifically Reg FD), firm, analyst, and broker characteristics on discovery.

To test our hypotheses, we assemble our data as follows. Since one of our hypotheses relates to the effect of Reg FD on discovery, we choose 1999 as our pre-Reg FD period (Reg FD was passed in October 2000). We expect that analysts will require some time to establish new non-management sources of information following Reg FD. Additionally, other regulatory events that impacted the analyst industry (such as NASD 2711, NYSE 472, the Sarbanes-Oxley Act, and the Global Research Settlement) were enacted in 2002. We therefore choose 2003 as our post-Reg FD period. We start with all firms on I/B/E/S covered by the same broker-analyst pair in both Jan 1999 and Dec 2003. We then group firms into 10 deciles each year based on the level of information asymmetry. We find 229 stocks that fall into the same information asymmetry decile in both years. For this sample of stocks, we download from *Investext* all the reports issued by those analysts who remained with the same broker as of January 1999 and December 2003. By ensuring that the broker-analyst pair and the information asymmetry remain the same across the two time periods, our research design helps isolate the effect of regulatory changes on how analysts discover information. Our final sample consists of 3,757 reports. Section II provides more details on data construction.

We read each report and classify whether the report contains discovery, interpretation, or both. We also identify whether the discovery is based on management or non-management sources. The management sources we identify are personal meetings, conference calls, and investor meetings. Analysts also talk to non-management sources to generate new information. We identify the following non-management sources: survey of customers, discussions with executives in the supply chain (or 'channel checks'), and industry contacts.[4] Table I provides several examples of reports that have information generated by the analyst using management as well as non-management sources. We estimate the market reaction to analyst reports using the cumulative abnormal returns (CARs) over the window (–1,+1) relative to the release of the analyst report.

Our main findings are generally consistent with our hypotheses. First, for reports containing discovery, the mean CAR is +5.9% for recommendation upgrades and –8.6% for recommendation downgrades. Second, relative to reports containing interpretation, reports containing discovery exhibit CARs that are 3.9 percentage points higher for upgrades and 2.2 percentage points lower for downgrades. Thus, reports containing discovery elicit a stronger market reaction compared to reports containing interpretation. We do not find, however, that the market reaction to discovery is stronger if the source of the new information is a personal meeting with the management relative to other sources of discovery. Our results are robust if we consider revisions to price targets and revisions to EPS forecasts rather than revisions to recommendations.

In terms of the economic determinants of information discovery, we again find results generally consistent with our hypotheses. First, we find that information discovery from personal

[4] For example, in an April 2012 report on Apple, Canaccord Genuity noted that "Our monthly channel checks indicated strong sales trends for the iPhone 4S at all three U.S. carriers and strong overall iPhone sales in international markets, with particular strength driven by the iPhone 4S launch at China Telecom (NYSE: CHA) and Unicom (NYSE: CHU)."

meetings is more likely in the pre-Reg FD period, if the analyst is optimistic about the firm, and is less likely if the analyst is busy. Second, we find that information discovery from non-management sources is more likely if the analyst is an All-Star Analyst, has more experience covering that firm, if the firm has greater information asymmetry, and if there is more competition among analysts covering that firm.

Our contribution is to provide *direct* evidence that analysts engage in costly discovery of private information, and investors value this discovery. Our paper answers Bradshaw's (2011) call for academics to perform rigorous "content analysis" of analyst reports to shed light on what analysts actually do in terms of adding value.

I. Hypotheses Development

In this section, we develop our hypotheses.

A. Hypotheses on Market Reaction to Discovery

If information discovery by analysts is important to investors, we would expect this to be reflected in positive market reaction to reports containing discovery. Specifically, we have three predictions regarding the strength of market reaction to reports containing discovery. (i) For reports containing discovery, the market reaction to upgrades will be positive and the market reaction to downgrades will be negative. (ii) If investors value discovery more than interpretation, we expect that reports containing discovery will have a more positive market reaction for upgrades and a more negative reaction for downgrades. (iii) We expect that the market reaction to reports containing discovery based on personal meetings with the management will be stronger relative to reports containing discovery from other sources. The Introduction develops the rationale for our hypotheses, and we do not duplicate this here.

B. Hypotheses on Economic Determinants of Discovery

Acquiring information is costly to the analyst in terms of effort, time, and resources. The benefit, however, is that the analyst can obtain more precise signals regarding firms' financials. We separately examine discovery from management sources and that from non-management sources. We do this because access to management is extremely important to analysts in terms of their ability to make reliable forecasts (Chen and Matsumoto, 2006, Brown et al., 2015). Information generated from management sources—from personal meetings in particular—is presumably more reliable, and therefore, more valuable than information generated from non-management sources. We examine the effect of regulation (pre- versus post-Reg FD), broker, firm, and analyst characteristics on discovery from management and non-management sources.

First, in terms of regulation, we expect that discovery from management sources is more likely in the pre-Reg FD period because firms were free to give price-sensitive information to their favored analysts.

Second, in terms of broker characteristics, we expect reports from more prestigious brokers to contain discovery. Prestigious brokers may demand higher quality of reports, and hence analysts working for such brokers may have more incentives to engage in information discovery from both management as well as non-management sources. Also, prestigious brokers may have more resources to organize events such as investor conferences, conduct surveys, and do channel checks, thus facilitating discovery. Thus, we predict that analysts from prestigious brokers will have more discovery from management sources. It is not clear, however, whether these analysts will have more or less discovery from non-management sources due to a countervailing effect. Prestigious brokers employ many analysts who cover a majority of the firms and industries. Thus, these analysts could tap into the expertise of their colleagues who themselves engage in discovery

in the firms they cover. For example, a steel analyst could use the information discovery by the iron-ore mining (upstream to steel) analyst and the engineering & construction analyst (downstream to steel) at the same brokerage, and thus does not have to engage in such discovery himself.

Third, in terms of analyst characteristics, we expect that optimistic analysts, All-Star analysts, and experienced analysts will more likely engage in discovery, while busy analysts will be less likely to engage in discovery. Analysts who are optimistic in their forecasts for a firm will more likely receive favorable treatment from that firm's management (Francis and Philbrick (1993), Chen and Matsumoto (2006)). Hence, reports from such analysts will more likely contain discovery from management sources. Optimism, however, should not have any effect on discovery from non-management sources. We expect All-Star analysts to engage in discovery from non-management sources rather than management sources. This is because while investors value All-Star analysts for their accuracy, firm management values optimism rather than accuracy. Thus, All-Star analysts need not have a comparative advantage over non-All-Star analysts with regard to management sources. Moreover, All-Star analysts are more likely to command greater resources from their employers (Brown et al., 2015) and hence are able to engage in greater discovery from non-management sources.

We expect experienced analysts—those with greater firm-specific and industry-specific knowledge—will have developed the network of contacts necessary to engage in discovery from both management and non-management sources. On the other hand, experienced analysts might believe they know everything there is to know about the firm and hence may not engage in costly discovery. Thus, it is not clear what the net impact would be. We expect busy analysts will not have the time required to engage in time-consuming surveys and channel checks and hence will

be less likely to discover new information from non-management sources. Regardless of busyness, however, we expect that analysts will be willing to talk to management every chance they get due to the high quality of information they can get from the management.

In terms of firm characteristics, we expect analysts to engage in discovery in firms with greater information asymmetry and in firms where there is greater competition among analysts to attract brokerage business. In firms with greater information asymmetry, an analyst could step in and provide better signals of firm fundamentals to the investors by engaging in discovery. Similarly, when there is more competition to stand out (i.e., when more analysts cover a firm), an analyst may be more likely to engage in discovery to differentiate his report from that of other analysts.

II. Data and Methodology

A. Sample selection

We first identify the set of stocks covered by at least one analyst who covered it in the 1st quarter of 1999 and in the 4th quarter of 2003. We remove analysts coded as anonymous by I/B/E/S since it is not possible to track their forecast revisions. We identify 3,616 unique firm-analyst pairs, which exist in both periods using the unique stock and analyst identifiers. There are 1,511 unique firms and 749 unique analysts. Each year, we sort these 1,511 unique firms into 10 deciles, based on their level of information asymmetry, measured using dispersion of EPS forecasts.[5] We then choose firms that belong to the same decile in both years. This leaves us with 582 unique

[5] Dispersion of EPS for a firm is the standard deviation of EPS forecasts divided by the absolute value of the mean EPS forecast of all analysts following that firm. I/B/E/S provides mean and standard deviation of annual EPS forecasts for multiple fiscal years as well as quarterly and semi-annual EPS forecasts. As in Garfinkel (2009), we use annual EPS forecasts for the current fiscal year because these tend to be more accurate than EPS forecasts for later years. In addition, I/B/E/S provides mean and standard deviation of EPS forecasts for the current fiscal year at a monthly frequency; we use the annual EPS forecasts as of January for 1999 and October for 2003 to compute the dispersion of EPS.

firm-analyst pairs, consisting of 229 unique firms and 357 unique analysts. For these firm-analyst pairs identified using I/B/E/S, we download from *Investext* all analyst reports published through the entire year, both in 1999 and in 2003. We download all reports issued by the analyst to ensure that we get an accurate sense for the frequency of discovery, and interpretation for each firm covered.

B. Data Matching between I/B/E/S and *Investext*

There are two differences between *Investext* and I/B/E/S databases: (i) the source of reports and (ii) the reports that are included. According to I/B/E/S representatives, I/B/E/S captures estimate information from *Investext* as well as from direct feeds from brokers. Thus, the coverage of brokers is larger in I/B/E/S compared to *Investext*. Even though *Investext* provides the most recent investment research reports authored by top analysts from more than 800 brokerage houses, investment banks, and consulting firms worldwide, some brokers do not contribute their analyst reports to *Investext* whereas they provide them to I/B/E/S. In such cases, we cannot locate reports written by analysts who belong to such brokers. Because of this difference, the actual number of firm-analyst pairs we can identify from *Investext* (=365) is different from the firm-analyst pairs we initially identify from I/B/E/S (=582).

Both databases also employ different internal policies in terms of keeping data in their database. I/B/E/S kept track of 17 measures (such as EPS, Revenue etc.) in 1999 and 22 measures in 2003. If a report does not contain a revision to any of these measures tracked by I/B/E/S, then I/B/E/S does not keep that report as a separate record. It retains the original record for that report, but updates the review date (REVDATS) for all the I/B/E/S measures to make them current. If an analyst report contains at least one change in the I/B/E/S measures, only then does I/B/E/S enter a new record in its database, but with a new announcement date (ANNDATS). In contrast, *Investext*

keeps all the reports issued by analysts regardless of whether or not the analysts revised their measures. Thus, for these 365 analyst-firm pairs, we are able to download 3,757 reports from Investext. Overall, we download 3,757 reports from 241 analysts issued on 176 firms from *Investext*.[6]

C. Classification of Reason for Release of New Report

After downloading the reports from *Investext* as described above, we read each report and manually code the reasons behind the release of the report. Then we classify the justifications used by analysts into two categories: Discovery and Interpretation. We classify a report as having "Discovery" if it contains private information generated by the analyst by talking to the firm's management (either in personal meetings or in the context of conference calls or investor meetings) or non-management sources (supply chain or to other industry sources). We classify a report as containing "Interpretation" by the analyst if the report is in response to public corporate events such as earnings release/guidance, press/8-K release, financing through equity or debt issuance, management turnover, macro/industry updates. We exclude 224 reports where the analyst does not engage in either discovery or interpretation.

Table I provides excerpts from the analyst reports as examples for each type of information source. For example, the analyst report may state that "we recently met with top management of HSY." We would classify these as personal meetings. In addition, the analyst may also interact with management during conference calls and investor meetings. For example, the analyst might note that "we attended Progressive's Investor Day in Cleveland yesterday." Similarly, examples

[6] We do not download analyst reports from *Investext* that are issued in the form of Morning Meeting Notes (MMN) because MMNs are mostly duplicates to full research reports that follow shortly. The MMN collection began as a subset of content from First Call Notes contributors. MMNs were geared toward real-time research users and were meant to provide a quick update of the analyst's opinion, typically followed by estimates changes or a full research report. Back in the early to mid-1990's, MMNs had very high value content. Over time, brokers moved onto full research reports and began to discontinue their MMNs as they were costly and duplicative. By 2007, the volume of MMNs had dwindled so much that *Investext* decided that MMNs were no longer a viable offering.

for non-management sources are as follows: “our channel checks indicate that unit demand remains strong and customer inventories are low” and “our industry sources indicate that used aircraft values may have stabilized somewhat after large declines.” Finally, an example of interpretation is as follows: “the recently released annual AF&PA capacity survey points to a solid outlook for uncoated free sheet in the United States.”

III. Results

A. Prevalence of New Information in Analyst Reports

We first document the prevalence of discovery in analyst reports. Table II presents the results. We find that 17% of reports contain information discovery, while 89% contain information interpretation. The total of discovery plus interpretation is more than 100% because these are not mutually exclusive. Discovery is largely from management sources: of the reports containing discovery, 78% (=498/639) are due to management sources.

Examining discovery across the pre- and post-Reg FD periods reveals that analysts issued 847 more reports (=2,200–1,353) in the post-Reg FD period, but this is almost entirely due to increase in interpretive reports by 825 (=2,083–1,258). The number of discovery reports increases from 274 to 365. We compare the number of reports across the two periods rather than the percentage of reports that constitute discovery and interpretation, because there were far more interpretive reports made in the post-Reg FD period and interpretive reports might require less effort. For example, Amazon announced the launch of a smartphone on the afternoon of 6/19/2014 and analysts issued reports by the same evening in response to this news. Clearly, such interpretive reports would take less time relative to reports containing discovery, which involve surveys and channel checks. Another reason we can focus on the number of reports (rather than

the percentage) is that we only examine reports by the same analyst covering the same firm in both years. Thus, we are able to infer that, in the post-Reg FD world, the analyst has more than doubled his efforts to obtain information from non-management sources (94 vs. 47). This may be because preferential information from management might have been curtailed post-Reg FD. We see that the analyst is less dependent on personal meetings with management (64 vs. 88) in the post-Reg FD period. It also seems that management responded to the regulation by participating in investor meeting and hosting conference calls (207 vs. 139). Overall, there seems to be some substitution away from personal meetings towards non-management sources of discovery.

B. Announcement Returns

Table IV presents the OLS regression results of announcement returns to the release of the analyst report. We estimate the market model over the window [–300, –46] using the CRSP equal-weighted market return as the benchmark. The cumulative abnormal return (CAR) over the event window [–1,1] is our proxy for announcement return.

We estimate the following regression to test our first two hypotheses:

$$CAR = b_0 + b_1\ Up + b_2\ Down + b_3\ Up\times Discovery + b_4\ Down\times Discovery + b_5\ Discovery + Controls + \varepsilon$$

The *Up* and *Down* indicator variables are defined differently depending on the specification. *Up* dummy equals 1 if the report contains an upgrade in recommendation (Column 1), upgrade in Price Target (Column 2), or upgrade in EPS (Column 3), and equals 0 otherwise. *Down* dummy equals 1 if the report contains a downgrade in recommendation (Column 1), downgrade in Price Target (Column 2), or downgrade in EPS (Column 3), and equals 0 otherwise. *Discovery* equals 1 if the report contains new information obtained either from management or from non-management sources, and equals 0 otherwise.

Our first hypothesis is that for reports containing discovery, CARs will be positive for upgrades and negative for upgrades. For upgrades containing discovery, the CAR is given by (b_0 + b_1 + b_3 + b_5 +$\sum \hat{b}\,\overline{Control}$) and for downgrades containing discovery, the CAR is given by (b_0 + b_2 + b_4 + b_5 +$\sum \hat{b}\,\overline{Control}$). The panel at the bottom of the table gives these results. Column 1 shows that the predicted CARs to upgrades is 5.9% and to downgrades is –8.6%, which are statistically and economically significant.

Our second hypothesis is that if the market views reports containing discovery to be more valuable than reports containing interpretation, then the market reaction to such reports should be stronger. The difference in CAR between discovery and interpretation is given by (b_3 + b_5) for upgrades and (b_4 + b_5) for downgrades. As can be seen from the Table (bottom panel), the CARs to reports containing discovery are stronger than the CARs to reports containing interpretation: 3.9 percentage points more positive for upgrades and 2.2 percentage points more negative for downgrades. The differences are economically significant but statistically significant only for upgrades (and not for downgrades), consistent with hypothesis 2.

In Column 2, we examine CARs to upgrades and downgrades to Price Targets rather than upgrades and downgrades to recommendations. In Column 3 we examine CARs to upgrades and downgrades to EPS. In both cases, we find results consistent with our expectations. In contrast to specification 1, we find that the incremental CARs to discovery versus interpretation are also statistically significant.

In Panel B, we replace *Up* and *Down* indicator variables with the continuous variable ("Change in Measure"). Specifically, we estimate the following regression:

$$CAR = b_0 + b_1\,\text{Discovery} + b_2\,\text{Change in Measure} + b_3\,\text{Change in Measure}\times\text{Discovery} + \text{Controls} + \varepsilon$$

The *Change in Measure* corresponds to the change in recommendation level in Column 1, the change in price target in Column 2, and the change in EPS in Column 3. The changes are relative to the measures indicated in the prior report by the same analyst for the same firm. Because the specification includes continuous variables (rather than dummy variables as in the earlier specification), we test our hypotheses for a one standard deviation change in the measure. For reports containing discovery, the predicted CAR for a one standard deviation increase in the measure is given by: $b_0 + b_1 + (b_2 + b_3)\times$Standard Deviation of the Measure$+\sum \hat{b}\,\overline{Control}$. As per hypothesis 1, this should be positive. We find this to be 1.1% (see bottom of Panel B). Moreover, as per hypothesis 2, reports containing discovery will be more valuable than reports containing interpretation (that is, $b_1 + b_3\times$Standard Deviation of the Measure should be positive). We find this number to be 0.6% (see bottom of Panel B). Both numbers are statistically significant.

Column 2 reports the results for CARs to changes to price targets rather than changes to recommendations, and Column 3 reports the results for CARs to changes to EPS. Again, the results are qualitatively similar to those in Column 1.

Overall, the results in Table IV strongly support hypotheses 1 and 2. Investors value discovery both in absolute terms and relative to interpretation.

C. Is Discovery from Personal Meetings with Management More Valued?

As per hypothesis 3, we expect that CARs to reports containing discovery will be higher if the source of discovery is management. Even within management sources, analysts are more likely to discover unique information during their personal meetings with management, rather than during conference calls or analyst days where there are multiple analysts competing for management time. We therefore repeat the regressions in Table IV, but we separate out the

discovery from personal meetings and discovery from all other sources. We estimate the following regression:

$$\begin{aligned} CAR = {} & b_0 + b_1\, Up + b_2\, Down \\ & + b_3\, Up{\times}Discovery\_Personal\ Meetings + b_4\, Up{\times}Discovery\_Other\ Sources \\ & + b_5\, Down{\times}Discovery\_Personal\ Meetings + b_6\, Down{\times}Discovery\_Other\ Sources \\ & + b_7\, Discovery\_Personal\ Meetings + b_8\, Discovery\_Other\ Sources + Controls + \varepsilon \end{aligned}$$

Discovery_Personal Meetings represents discovery from personal meetings, and equals 1 if the report contains discovery based on personal meetings with management, and equals 0 otherwise. *Discovery_Other Sources* represents discovery from sources other than personal meetings, and equals 0 otherwise. The predicted CAR for an upgrade report containing discovery from personal meetings is given by $b_0 + b_1 + b_3 + b_7 + \sum \hat{b}\, \overline{Control}$. The predicted CAR for an upgrade report containing discovery from other sources is $b_0 + b_1 + b_4 + b_8 + \sum \hat{b}\, \overline{Control}$. Similarly, for downgrade reports, the CARs corresponding to discovery from personal meetings and that from other sources are given by $b_0 + b_2 + b_5 + b_7 + \sum \hat{b}\, \overline{Control}$ and $b_0 + b_2 + b_6 + b_8 + \sum \hat{b}\, \overline{Control}$ respectively. For upgrades containing discovery, the difference between CARs for discovery from personal meetings and discovery from other sources is given by $(b_3 + b_7) – (b_4 + b_8)$. Finally, for downgrades containing discovery, the difference between CARs for discovery from personal meetings and discovery from other sources is given by $(b_5 + b_7) – (b_6 + b_8)$.

Table V presents the results. The bottom panel of the table presents the tests of our hypotheses. Consistent with our hypothesis, we find that the predicted CARs for reports containing an upgrade based on discovery from personal meetings are significantly positive (8.1%, $p < 0.05$). Similarly, the predicted CARs for reports containing downgrades based on discovery from personal meetings are significantly negative (–8.2%, $p < 0.01$). We find no evidence that discovery from personal meetings has a bigger impact on CARs relative to discovery from other sources. Thus, we do not find results consistent with hypothesis 3.

Overall, the results to this point show that investors value discovery by analysts, and that reports containing discovery is more valuable than reports containing information interpretation.

D. Economic Determinants of Information Discovery

Our second line of enquiry examines the effects of regulation, and the characteristics of brokers, analysts, and firms that are associated with reports containing discovery. Section II describes our hypotheses, which we test here.

D. 1. Dependent Variables

As stated earlier, we identify personal meetings with management, investor meetings, and conference calls as potential sources of information from management. Incremental discovery by the analyst, however, is unlikely to be the same across all three sources. Solomon and Soltes (2012) point to survey evidence suggesting that 97% of CEOs of publicly traded firms meet privately with investors. Using data on all personal meetings between top management and investors for one NYSE firm, they find that private meetings with management help investors make informed trading decisions. Soltes (2014) finds that while the majority of private interactions occur over the phone, a non-trivial fraction occur at conference calls and office meetings. Similarly, Brown et al. (2015) find that such one-on-one personal meetings with the management are highly sought after. Participating in investor meetings and conference calls, on the other hand, confers fewer advantages to the analyst. For example, Mayew et al. (2012) find that even analysts who ask questions to management during conference calls receive no information advantage. Additionally, Green et al. (2013) argue that only analysts associated with brokers who host the investor meeting get an informational advantage. Thus, for our base-case analysis, we use only personal meetings as a source of information from management. We define an indicator variable *Personal Meetings*, which equals 1 if the report mentions a personal meeting with the management

and equals 0 otherwise. We then estimate logistic regressions using *Personal Meetings* as the dependent variable. We also consider an alternative dependent variable, *Management*, which equals 1 if the report mentions any interaction with the management and equals 0 otherwise. We expect all our results to be stronger with *Personal Meetings* rather than with *Management*.

To test our hypothesis regarding information discovery using non-management sources, we define an indicator variable *Non-Management*, which equals 1 if the report mentions discovery through non-management sources (such as surveys, channel checks, industry contacts), and equals 0 otherwise. Finally, we also use the indicator variable *Discovery*, defined earlier.

D. 2. Independent Variables

To test our hypothesis about the impact of Reg FD, we form an indicator variable, *Pre-Reg FD*, which equals 1 if the year is 1999, and equals 0 if the year is 2003. To test our hypothesis relating to broker characteristics, we use an indicator variable, *Prestigious Broker*, which equals 1 if an analyst for one of the top-10 rated brokerage houses (as rated by institutional investors, Hong and Kubik, 2003) issues a report.

To test the hypotheses relating to analyst characteristics, we define the following variables. (i) *Firm-specific Optimism*: this captures how frequently the analyst's forecast is above the consensus. First, we assign the value 1 when an analyst's recommendation is above the most recent consensus recommendation and 0 otherwise. We then average this variable across all recommendations made on an individual firm by the analyst in the two years prior to the sample year. (ii) *All Star Analyst*: this equals 1 if the analyst is an All-Star analyst as rated by Institutional Investor, and equals 0 otherwise (see Clarke et al. (2007) for details on this variable). (iii) *Years covering Firm* and *Years covering Industry*: these two variables capture analyst experience in

covering the firm and the industry to which the firm belongs. (iv) *Number of Firms Covered* and *Number of Industries Covered*: these two variables capture analyst busyness.

To test the hypotheses relating to firm characteristics, we define the following variables. (i) *Information Asymmetry*: this is an indicator variable that equals 1 if the firm covered by the analyst report is above median in terms of dispersion of annual EPS forecasts. (ii) *Analyst Following*: this is the number of annual earnings forecasts used by IBES to calculate monthly earnings consensus.

D. 3. Logistic Results

Table VI presents the logistic results. The table also presents the predicted sign for each of the variables based on our hypotheses. We do not have any unique predictions for the determinants of *Discovery*. Because *Discovery* is the sum of *Management* and *Non-Management*, we give the predicted sign only when the determinants have the same predicted effect on both *Management* and *Non-Management*. For example, the predicted effect of information asymmetry is positive for both *Management* and *Non-Management*, and therefore, the predicted effect on *Discovery* would have to be positive. We, nevertheless, present the results for *Discovery* for the sake of completeness.

For column 1, the dependent variable is *Personal Meetings*. Because our hypotheses are based on whether there will be discovery in a report relative to interpretation, we exclude from the regressions observations where there is discovery from sources other than personal meetings with the management.

The results are generally consistent with our expectations. The coefficient on *Pre-Reg FD* is significantly positive, implying that, pre-Reg FD, analysts were more likely to meet with management to obtain information. We find the coefficient on *Firm-specific Optimism* is

significantly positive implying that analysts who give optimistic forecasts are more likely to engage in discovery through personal meetings with management. This is consistent with several studies (for example: Chen and Matsumoto (2006)) that show that management favors optimistic analysts. Indeed the Brown et al. (2015) survey of analysts state that a big concern for analysts is being "frozen out" by the management. We find that analyst experience (proxied by *Years Covering the Firm* and *Years Covering the Industry*) is unrelated to information discovery. While experience helps build networks that can aid discovery, it could also mean that the analyst has greater knowledge of the firms he is covering and hence has less need to talk to management to obtain information. Given our results, it appears that these two countervailing effects cancel each other out. Analyst competition (proxied by *Analyst Following*) and *Information Asymmetry* are not significantly related to discovery.

In Column 2, we use *Management* as the dependent variable. Therefore, we exclude from the regressions observations where there is discovery from sources other than management. As expected, results are weaker. We do not find any effect of Reg FD on discovery from management sources. The analyst's industry experience is negatively related to discovery, which is consistent with the idea that the analyst expertise attenuates the dependence on management.

In Column 3, we use *Non-Management* as the dependent variable. We, therefore, exclude observations where there is discovery from management sources. We find that the coefficient on *Pre-Reg FD* is significantly negative, implying that analysts relied less on non-management sources of information prior to the passage of the regulation. This is consistent with the analysts switching to non-management sources post-regulation given restrictions imposed by the regulation on firm management.

We find the coefficient on *Prestigious Broker* is significantly negative, implying that analysts associated with prestigious brokers are less likely to engage in discovery from non-management sources. This is consistent with such analysts acquiring information about the firms and industries they cover from their colleagues who follow related firms in the supply chain. These analysts, therefore, do not have to do external surveys or channel checks because they get the relevant information in-house. We find that, consistent with our hypothesis, All-Star analysts are more likely to discover new information by talking to non-management sources. This could be because they are able to obtain greater resources from their employer given their status.

Contrary to our prediction, we do not find that busy analysts (i.e., analysts who follow a large number of firms and industries) are less likely to engage in discovery from non-management sources. Self-selection could explain this counterintuitive result, wherein only analysts who can handle the workload take on the responsibility of covering more firms and industries.

We find that discovery from non-management sources increases with the number of years the analyst has spent covering the firm, but decreases with the number of years the analyst has spent covering the industry. While the latter result is consistent with what we find for management sources, the former is somewhat puzzling.

Consistent with our expectations, analyst following is positively related to discovery from non-management sources. It seems that analysts try to stay above the competition by generating new information. Lastly, consistent with our expectations, discovery from non-management sources is more likely in firms with greater information asymmetry. Thus, analysts try to bridge the information gap between management and investors by collecting information from non-management sources.

In Column 4, we present the results for discovery, which includes discovery from all sources. As mentioned earlier, we have no expectation for total discovery, and present the results here only for the sake of completeness.

Conclusion

A large literature on the role of equity analysts finds that analyst reports are valued by capital market participants. The vast majority of previous studies conclude that analysts add value through information discovery and through interpretation of public information. But the classification schemes used in prior studies typically assume that reports contain discovery or interpretation based on the date of the report relative to certain events. For example, most of these studies typically assume that reports within a certain time frame (for example, within a week) following certain events (for example, earnings releases) contain interpretation while all other reports contain discovery. In contrast we make no such assumptions. Instead, we read the contents of over 3,700 analyst reports to classify which reports have discovery and which have interpretation. This unique research design allows us to contribute to the analyst literature by providing direct evidence on the value of the discovery role.

We have three main findings. First, we find that about 17% of reports contain new information generated by the analysts. About 13% of all reports contain information discovery from management sources (such as personal meetings or conversations with management, conference calls, and analyst meetings) and about 4% contain information discovery from non-management sources (such as surveys, channel checks, talking to industry contacts).

Second, the market reaction to discovery is strongly positive for upgrades (of recommendation levels, target prices, and EPS) and strongly negative for downgrades. Further, this reaction is stronger for reports containing discovery than for reports containing interpretation.

Third, in terms of economic determinants, we find that information discovery from personal meetings with management is more likely for reports issued in the pre-Reg FD period and for analysts that are more optimistic about the firm (those that have a record of issuing more favorable recommendations about the firm). Information discovery from non-management sources is less likely for reports in the pre-Reg FD period and for reports by analysts that are employed by more prestigious brokers. It is more likely for reports by All-Star analysts, when the analyst has more years covering the firm, when the firm has higher information asymmetry and when there is more competition among analysts.

Our findings have implications for several strands of research that deal with the role of equity analysts. Specifically, in terms of consequences to investors, we expect that post-revision drift will be higher for reports that contain more information discovery. If an analyst includes new information, then other analysts covering the same stock will, in all likelihood, attempt to verify this information, which generates more reports confirming the original analyst's discovery. This in turn will cause a drift in stock price post-revision. In terms of consequences to analysts, we expect that analysts that engage in more discovery will make bolder, more timely, more accurate, and more influential forecasts. Additionally, we expect that analysts who that engage in more discovery are more likely to exhibit persistent skill, more likely to move up the career ladder to a better-reputation broker, and more likely to become an All-Star analyst.

References

Asquith, P., M. Mikhail, and A.Au. 2005. Information content of equity analyst reports. *Journal of Financial Economics* 75, 245-282.

Bradshaw, M., 2011. Analysts' Forecasts: What Do We Know After Decades of Work? Working Paper, Boston College.

Brown, L., A. Call, M. Clement, and N. Y. Sharp, 2015. Inside the "Black Box" of Sell-Side Financial Analysts. *Journal of Accounting Research* 53, 1-47.

Bushee, B., M. Jung, and G. Miller, 2013. Do Investors Benefit from Selective Access to Management? Working paper, Wharton Business School.

Chen, S., and D. Matsumoto, 2006. Favorable versus Unfavorable Recommendations: The Impact on Analyst' Access to Management-Provided Information. *Journal of Accounting Research* 40, 657–89.

Chen, X., Cheng, Q., & Lo, K. (2010). On the relationship between analyst reports and corporate disclosures: Exploring the roles of information discovery and interpretation. *Journal of Accounting and Economics*, 49, 206–226.

Clarke, J., A. Khorana, A. Patel, and R. Rau, 2007. The impact of all-star analyst job changes on their coverage choices and investment banking deal flow. *Journal of Financial Economics* 84, 713-737.

Francis, J., and D. Philbrick, 1993. Analysts' decisions as products of a multi-task environment. *Journal of Accounting Research* 31, 216-230.

Garfinkel, J., 2009. Measuring Investors' Opinion Divergence, *Journal of Accounting Research* 47, 1317-1348.

Green, C., R. Jame, S. Markov, and M. Subasi, 2013. Access to management and informativeness of analyst research. Working paper, Emory University.

Hong, H., and J. Kubik. 2003. Analyzing the analysts: Career concerns and biased earnings forecasts. *The Journal of Finance* 58 (1): 313-351.

Ivkovic, Zoran and Narasimhan Jegadeesh, 2004. The timing and value of forecast and recommendation revisions, *Journal of Financial Economics* 73, 433-463.

Jegadeesh, Narasimhan, Joonghyuk Kim, Susan D. Krische, and Charles M. C. Lee, 2004. Analyzing the analysts: When do recommendations add value?, *Journal of Finance* 59, 1083-1124.

Livnat, J., Zhang, Y., 2012. Information interpretation or information discovery: Which role of analysts do investors value more? *Review of Accounting Studies* 17, 612-641.

Mayew, W., 2008. Evidence of Management Discrimination Among Analysts during Earnings Conference Calls. *Journal of Accounting Research* 46, 627-659.

Michaely, R., and K. Womack, 2005. Market Efficiency and Biases in Brokerage Recommendations, in *Advances in Behavioral Finance II*, eds Richard H. Thaler, Princeton University Press.

Ramnath, S., S. Rock, and P. Shane. 2008. The Financial analyst forecasting literature: A taxonomy with suggestions for further research. *International Journal of Forecasting* 24, 34-75.

Soltes, 2014. Private Interaction Between Firm Management and Sell-Side Analysts. *Journal of Accounting Research* 52, 245-272.

Solomon and Soltes, 2012. "What Are We Meeting For? The Consequences of Private Meetings with Investors." Journal of Law & Economics (forthcoming).

Table I. Examples of Reports

The table provides examples of our classification scheme. We read each report manually, and classify the report as follows. The report contains *Discovery* if the analyst refers in the report to new information that he or she has generated through management or non-management sources. Discovery through management sources is when the analyst (i) attends a personal meeting with the management (*Personal Meeting*), (ii) participates in an "investor conference" or "analyst meeting" or an "investor day" (*Investor Meeting*), or (iii) participates in a conference call (*Conference Call*). Discovery through non-management sources is when the analyst (i) conducts surveys of industry participants to gauge product quality or demand (*Survey*), or (ii) obtains a better assessment of the firm's fundamentals by talking to suppliers or customers (*Channel Checks*), or (iii) gets information about macro conditions and the prospects for the firm and its competitors by talking to industry experts (*Industry Contacts*). For each category, we provide an illustrative example from our sample analyst reports. The report contains *Interpretation* if the analyst indicates that the report is written based on some publically announced news event that affects the firm (e.g., earnings release, financing activities, M&A, management turnover, etc).

I. Discovery	
1. Management Sources	A. Personal Meeting • We recently met with top management of HSY. • In meeting with senior management, 1Q03 trends appear to be tracking in-line with our expectations. B. Investor/Analyst Meetings • Today we are attending Motorola Analyst Day in Chicago. • Liberty Media's analyst day reinforced our belief that over the next 6–12 months, Liberty will transform itself from a holding to an operating company. • We attended Progressive's Investor Day in Cleveland yesterday. C. Conference Calls • In a recent conference call with investors and analysts, Aracruz management announced its intention to present a feasibility study to the Board of Directors this August. • During the conference call, CMS indicated it anticipated 500 MW of peak. • Post earnings, Motorola held a conference call to discuss its Q1/03 results.
2. Non-Management Sources	A. Surveys • Based on our internal room rate surveys, we believe that upside in the first quarter can exceed $0.30. • Based on results of our 2004 Health Benefit Survey, customers do not perceive CIGNA as bad, leading us to revise upward our estimate of enrollment loss in 2004 in late September 2003. • Our recent survey confirmed the view the service levels have improved, but it may take time for the improvements to translate to membership gains. B. Channel Checks • Our channel checks indicate that unit demand remains strong and customer inventories are low. • Based on our channel checks, we believe that recent demand trends have been solid and we expect Xilinx to at least meet expectations, with the potential for a positive revenue and EPS surprise. • Channel checks at Sprint PCS stores in three major metropolitan revealed a slightly different launch strategy than that employed just four months ago. C. Industry Contacts/Sources • Our industry sources indicate that used aircraft values may have stabilized somewhat after large declines; • Several manufacturers we've talked to recently have noted that business picked up significantly in March, but while business is still up from the depressed levels of early 1999, it has not continued to accelerate in the second quarter. • This is inconsistent with feedbacks from brokers and consultants.
II. Interpretation	• Yesterday's announcement by auto parts maker Gentex outlining its intention to produce automotive lighting products with high-brightness LEDs is further proof of the rapidly expanding demand for white light conversion LEDs. • Mid-day 11/19 AMC and Loews Cineplex confirmed they are in talks about a potential merger. • The recently released annual AF&PA capacity survey points to a solid outlook for uncoated free sheet in the United States

Table II. Incidence of Discovery and News Interpretation in Analyst Reports

The table reports the number and frequency of analyst reports that contain information related to each source of value that analysts can generate (i.e., *Discovery* or *Interpretation*). If the report contains *Discovery*, we identify whether it is from *Management* sources or from *Non-Management* sources. Within management sources, we identify whether the discovery is based on a personal meeting with management or from other management sources such as investor meetings or conference calls. The total number of reports is not the same as summation of report in each source (I+II) of value because some reports are classified to multiple sources. For example, if an analyst indicates in the report that he or she had an opportunity to personally meet with management after the firm's M&A announcement, then the report is classified as having *Discovery* as well as *Interpretation*. The report is also classified as having discovery through a *Management* source, specifically, from a *Personal Meeting*. Examples of each of these categories is provided in Table I.

Year	Total		1999 Pre-Reg FD	2003 Post-Reg FD
I. Discovery	**639**	**17.0%**	**274**	**365**
1. Management	**498**	**13.3%**	**227**	**271**
A. Personal Meetings	152	4.1%	88	64
B. Investor Meetings/Conference Calls	346	9.2%	139	207
2. Non-Management	**141**	**3.8%**	**47**	**94**
II. Interpretation	**3,343**	**89.0%**	**1,258**	**2,083**
Total	**3,567**		**1,353**	**2,200**

Table III. Descriptive Statistics of Key Variables

Panel A presents descriptive statistics for our key variables of interest and for the control variables used our regression analysis. *Discovery* equals 1 if an analyst report contains new information obtained either from management or from non-management sources (i.e., survey of customer, channel checks or industry contacts/sources), and equals 0 otherwise. *Personal Meetings* equals 1 if an analyst report contains new information obtained from personal meetings with managements, and equals 0 otherwise. *Non-Management* equals 1 if an analyst report contains new information obtained from non-management sources, and equals 0 otherwise. *All Star Analyst* equals 0 if the analyst is not an All Star analyst at the time of the report, and takes values ranging from 1 (for runner up) to 4 (first all-star) if the analyst is an All Star. *Years Covering a Firm* represents the number of years since an analyst began covering a firm. *Years Covering an Industry* represents the number of years since an analyst began covering the firm's industry. *Number of Firms (Industries) Covered* is the number of firms (industries) an analyst follows. This is based on earnings forecasts, target prices, or recommendations made by the analyst as obtained from I/B/E/S in each sample year. *Prestigious Broker* equals 1 if a report is issued by an analyst who works for the top 10 rated brokerage houses by institutional investors (Hong and Kubik, 2003) at the time of report. *Firm-specific Optimism* represents how optimistic a given analyst is for a given firm. We first form an indicator variable that equals 1 if the analyst recommendation on a given firm is above the most recent consensus recommendation, and equals 0 otherwise. We then average this indicator variable across all recommendation made by the analyst on the firm during the two years prior to each sample year. *Information Asymmetry* equals 1 if a report was issued to a firm which belongs to upper five dispersion groups in terms of dispersion of annual EPS forecasts. Dispersion of each firm is obtained by dividing the standard deviation of annual EPS forecasts by the absolute value of mean annual EPS forecasts of all analysts following each firm. *Pre-Reg FD* equals 1 if an analyst report is issued in 1999, and equals 0 otherwise. *Analysts Following* is the number of annual earnings forecasts used by IBES to calculate monthly earnings consensus. All continuous variables are winsorized at upper and lower 1% to control for extreme values. Panel B reports the correlation among the variables. ***, **, and * represent significance at 1%, 5%, and 10% levels respectively.

Panel A. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
New Information	0.17	0.38	0	1.00
Personal Meetings	0.04	0.20	0	1.00
Non-Management	0.04	0.20	0	1.00
All-Star Analyst	1.08	1.47	0	4.00
Years Covering a Firm	5.91	4.35	0	19.83
Years Covering an Industry	8.99	5.11	0.33	21.58
Number of Firms Covered	19.05	10.05	5.00	66.00
Number of Industries Covered	3.99	2.22	1.00	10.00
Prestigious Broker (Dummy)	0.49	0.50	0	1.00
Firm-specific optimism	0.42	0.41	0	1.00
Information Asymmetry (Dummy)	0.57	0.50	0	1.00
Pre-Reg FD (Dummy)	0.38	0.49	0	1.00
Analysts Following	14.93	7.84	1.00	35.00

Panel B. Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	New Information	1												
(2)	Personal Meetings	0.46***	1											
(3)	Non-Management	0.44***	-0.01	1										
(4)	All-Star Analyst	0.03**	-0.01	0.03**	1									
(5)	Years Covering a Firm	-0.03*	-0.06***	-0.01	0.19***	1								
(6)	Years Covering an Industry	-0.08***	-0.07***	-0.07***	0.20***	0.65***	1							
(7)	Number of Firms Covered	-0.04**	-0.01	-0.06***	0.15***	-0.01	0.08***	1						
(8)	Number of Industries Covered	-0.02	-0.01	-0.01	0.05**	0.05***	0.01	0.17***	1					
(9)	Prestigious Broker (Dummy)	0.02	-0.01	-0.00	0.54***	0.28***	0.24***	-0.06***	-0.14***	1				
(10)	Firm-specific optimism	0.01	0.04**	0.02	-0.10***	0.03	-0.01	-0.07***	-0.00	-0.12***	1			
(11)	Information Asymmetry (Dummy)	-0.00	-0.03*	0.05**	-0.07***	-0.10***	0.02	-0.14***	-0.05***	-0.02	0.01	1		
(12)	Pre Reg-FD (Dummy)	0.05**	0.09***	-0.02	-0.15***	-0.34***	-0.35***	0.09***	0.15***	-0.32***	0.16***	-0.02	1	
(13)	Analysts Following	0.08***	-0.00	0.03*	0.01	0.11***	0.03	-0.22***	-0.30***	0.09***	-0.05**	0.07***	0.07***	1

Table IV. Stock Market Reaction to Information Discovery

Panel A reports the OLS regression results where the dependent variable is the cumulative abnormal return (CAR) around the release of the analyst report. The announcement return is given by CAR over the window [-1,1], where day 0 is the day of the report. CARs are obtained from Eventus, and are based on returns from a market model with CRSP equal-weighted market return as the benchmark. We exclude analyst reports released in the [-2,+2] window surrounding the firms' quarterly earnings announcements. The *Up* and *Down* indicator variables are defined differently depending on the specification. *Up* equals 1 if the report contains an upgrade in recommendation (Column 1), in Price Target (Column 2), or in EPS (Column 3). *Down* equals 1 if the report contains a downgrade in recommendation (Column 1), in Price Target (Column 2), or in EPS (Column 3). *Discovery* equals 1 if an analyst report contains new information obtained either from management or from non-management sources. In Panel B, we replace *Up* and *Down* indicator variables with the change in recommendation (or price target or EPS, depending on the specification) compared to the corresponding measures in the prior report by the same analyst. b_0, b_1, etc. are the coefficients of the regressions from the corresponding tables, $\sum \hat{\beta}\ \overline{Control}$ is a summation of the regression coefficients multiplied by mean value of each control variable used in the regressions, and σ_m is the standard deviation of the relevant change in measure (standard deviation of recommendation level, price target, and EPS respectively). For the definitions of control variables used here, please refer to table III. Robust t-statistics are in parentheses. ***, **, and * represent significance at 1%, 5%, and 10% levels respectively.

Panel A

		Recommendation	Price Target	EPS
		(1)	(2)	(3)
Intercept	b_0	-0.178	-0.110	0.108
		(-0.5)	(-0.3)	(0.3)
Up (Dummy)	b_1	2.374***	1.272***	0.672**
		(3.1)	(3.2)	(2.1)
Down (Dummy)	b_2	-5.913***	-2.842***	-2.591***
		(-4.1)	(-3.8)	(-6.6)
Up × Discovery	b_3	3.960***	2.826***	2.838***
		(2.6)	(3.3)	(3.2)
Down × Discovery	b_4	-2.187	-3.547*	-1.392*
		(-1.0)	(-1.9)	(-1.7)
Discovery	b_5	-0.026	-0.048	-0.102
		(-0.1)	(-0.2)	(-0.4)
All-Star Analyst		-0.006	0.018	0.011
		(-0.1)	(0.2)	(0.1)
Years Covering a Firm		0.016	0.012	-0.008
		(0.5)	(0.4)	(-0.3)
Years Covering an Industry		-0.014	-0.017	0.003
		(-0.5)	(-0.6)	(0.1)
Number of Firms Covered		-0.011	-0.009	-0.007
		(-1.1)	(-0.9)	(-0.7)
Number of Industries Covered		-0.011	-0.044	-0.028
		(-0.2)	(-0.8)	(-0.5)
Prestigious Broker (Dummy)		0.010	-0.006	0.051
		(0.0)	(-0.0)	(0.2)
Observations		2,257	2,257	2,257
R-square		0.048	0.047	0.061
Tests of Hypothesis 1				
Upgrades: CARs to Discovery ($b_0 + b_1 + b_3 + b_5 + \sum \hat{\beta}\overline{Control}$)		5.9***	3.5***	3.3***
Downgrades: CARs to Discovery ($b_0 + b_2 + b_4 + b_5 + \sum \hat{\beta}\overline{Control}$)		-8.6***	-7.0***	-4.2***
Tests of Hypothesis 2				
Upgrades: CARs to Discovery Minus CARs to Interpretation ($b_3 + b_5$)		3.9***	2.8***	2.7***
Downgrades: CARs to Discovery Minus CARs to Interpretation ($b_4 + b_5$)		-2.2	-3.6**	-1.5*

Panel B

		Measure = Recommendation	Price Target	EPS
		(1)	(2)	(3)
Intercept	b_0	-0.253	-0.284	-0.067
		(-0.7)	(-0.8)	(-0.2)
Discovery	b_1	0.054	-0.164	0.258
		(0.2)	(-0.6)	(1.0)
Change in Measure	b_2	4.038***	0.087***	1.650***
		(4.7)	(4.1)	(4.4)
Change in Measure × Discovery	b_3	2.127*	0.235***	1.067
		(1.8)	(4.0)	(1.0)
All-Star Analyst		0.010	0.038	-0.023
		(0.1)	(0.5)	(-0.3)
Years Covering a Firm		0.014	0.009	-0.000
		(0.4)	(0.3)	(-0.0)
Years Covering an Industry		-0.014	-0.014	-0.013
		(-0.5)	(-0.5)	(-0.4)
Number of Firms Covered		-0.012	-0.008	-0.010
		(-1.2)	(-0.9)	(-1.0)
Number of Industries Covered		-0.014	-0.033	-0.018
		(-0.3)	(-0.6)	(-0.4)
Prestigious Broker (Dummy)		-0.007	-0.108	0.039
		(-0.0)	(-0.4)	(0.1)
Observations		2,257	2,257	2,257
R-square		0.052	0.048	0.045
Tests of Hypothesis 1				
CARs to Discovery: $(b_0 + b_1) + (b_2 + b_3)\sigma_m + \sum \hat{\beta} \overline{Control}$		1.1**	1.7***	1.5**
Tests of Hypothesis 2				
CARs to Discovery Minus CARs to Interpretation $b_1 + b_3\ \sigma_m$		0.6*	1.7***	0.9

Table V. Stock Market Reaction to Information Discovery: Personal Meetings versus Other Sources

The table reports the OLS regression results where we replicate table IV, but this time we separate out discovery from personal meetings and discovery from other discovery sources. b_0, b_1, etc. are the coefficients of the regressions from the corresponding tables, and $\sum \hat{\beta}\overline{Control}$ is a summation of the regression coefficients multiplied by mean value of each control variable used in the regressions. For the definitions of variables used here, please refer to table III. Robust t-statistics are in parentheses. ***, **, and * represent significance at 1%, 5%, and 10% levels respectively.

		Recommendation	Price Target	EPS
		(1)	(2)	(3)
Intercept	b_0	-0.192	-0.105	0.108
		(-0.5)	(-0.3)	(0.3)
Up (Dummy)	b_1	2.374***	1.272***	0.670**
		(3.1)	(3.2)	(2.1)
Down (Dummy)	b_2	-5.914***	-2.842***	-2.592***
		(-4.1)	(-3.8)	(-6.6)
Up × Discovery (Personal Meetings)	b_3	6.461*	1.373	1.713
		(1.9)	(0.9)	(1.0)
Up × Discovery (Other Sources)	b_4	3.108**	3.112***	3.099***
		(2.1)	(3.3)	(3.1)
Down × Discovery (Personal Meetings)	b_5	-1.564	-2.407	-0.874
		(-1.1)	(-1.2)	(-0.7)
Down × Discovery (Other Sources)	b_6	-2.342	-3.767*	-1.583
		(-1.0)	(-1.8)	(-1.4)
Discovery (Personal Meetings)	b_7	-0.282	0.031	-0.073
		(-0.7)	(0.1)	(-0.1)
Discovery (Other Sources)	b_8	0.079	-0.083	-0.115
		(0.3)	(-0.3)	(-0.4)
Control Variables (as in Table IV)		Yes	Yes	Yes
Observations		2,257	2,257	2,257
R-square		0.049	0.047	0.062
Tests of Hypothesis 3				
Upgrades: CARs to Discovery (Personal Meeting) ($b_0 + b_1 + b_3 + b_7 + \sum \hat{\beta}\overline{Control}$)		8.1**	2.2	2.2
Downgrades: CARs to Discovery (Personal Meeting) ($b_0 + b_2 + b_5 + b_7 + \sum \hat{\beta}\overline{Control}$)		-8.2***	-5.7***	-3.6***
Upgrades: CARs to Discovery (Personal Meetings) – CARs to Discovery (Other Sources) ($b_3 + b_7$) – ($b_4 + b_8$)		3.0	-1.6	-1.3
Downgrades: CARs to Discovery (Personal Meetings) – CARs to Discovery (Other Sources) ($b_5 + b_7$) – ($b_6 + b_8$)		0.4	1.5	0.8

Table VI. Break-up of New Information into Different Sources of Information

The table reports logistic regression results. The dependent variable is *Personal Meetings* in column 1, *Management* in column 2, *Non-Management* in column 3, and *Discovery* in column 4. These variables as well as control variables are defined in earlier tables. Robust z-statistics is in parentheses. ***, **, and * represent significance at 1%, 5%, and 10% levels respectively.

	Predicted Sign	Personal Meetings	Predicted Sign	Management	Predicted Sign	Non-Management	Predicted Sign	Discovery
		(1)		(2)		(3)		(4)
Pre Reg-FD	+	0.776***	+	0.219	NA	-0.589*	NA	0.061
		(3.6)		(1.6)		(-1.9)		(0.5)
Prestigious Broker	+	0.448	+	0.156	+/-	-0.604**	NA	0.009
		(1.6)		(1.1)		(-2.4)		(0.1)
Firm-specific Optimism	+	0.403*	+	0.002	NA	0.306	NA	0.109
		(1.7)		(0.0)		(1.1)		(0.8)
All Star Analyst	NA	-0.020	NA	0.073	+	0.272***	NA	0.113***
		(-0.2)		(1.6)		(3.6)		(2.7)
Number of Firms Covered	NA	0.009	NA	0.004	-	-0.008	NA	0.002
		(0.8)		(0.6)		(-0.7)		(0.4)
Number of Industries Covered	NA	-0.089*	NA	-0.006	-	0.008	NA	-0.002
		(-1.9)		(-0.2)		(0.2)		(-0.1)
Years Covering the Firm	+/-	-0.013	+/-	0.017	+/-	0.097**	+/-	0.030*
		(-0.4)		(0.9)		(2.1)		(1.8)
Years Covering the Industry	+/-	-0.021	+/-	-0.031*	+/-	-0.141***	+/-	-0.047***
		(-0.7)		(-1.9)		(-3.8)		(-3.2)
Analysts Following	+	-0.007	+	0.024***	+	0.022*	+	0.024***
		(-0.6)		(3.1)		(1.7)		(3.5)
Information Asymmetry	+	-0.030	+	-0.043	+	0.906***	+	0.095
		(-0.2)		(-0.4)		(3.4)		(0.9)
Constant		-3.273***		-2.337***		-3.453***		-2.104***
		(-8.2)		(-9.1)		(-7.1)		(-8.9)
Observations		2,563		2,824		2,553		2,910
Pseudo R-square		0.0295		0.0117		0.0624		0.0139