Do Analysts Use the Freedom of Information Act to Improve Stock Recommendations and Forecast Accuracy?

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Abstract

A small number of sell-side analysts use the Freedom of Information Act to request records from the Food and Drug Administration (FDA) on covered stocks. These records are non-public to the extent that firms are not required to share them with investors or analysts. Using a difference-in-differences methodology, we find that buy recommendations and upgrades earn higher stock returns over the year following the receipt of FDA records. We also find that receipt of FDA records improves earnings and revenue accuracy for two-year ahead forecasts. We control for analyst skill and for the same information set across all analysts. Our findings are consistent with a subset of analysts utilizing non-public information channels to gain value-relevant information about their covered firms.

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1. INTRODUCTION

The quality of analysts' forecasts and stock recommendations can be attributable to two components, effort and skill. Effort includes information collection and time spent on interpreting the information. Skill is the analyst's ability to accurately process the mosaic of gathered information.

Many studies have tried to disentangle these two components by examining market reactions to analysts' reports prior to and after the release of public information, for example, earnings announcements and 8-K filings (e.g., Francis, Schipper, and Vincent, 2002; Ivković and Jegadeesh, 2004; Chen, Cheng and Lo, 2010; Livnat and Zhang, 2012). These papers conclude that investors benefit both from analysts' interpretation of public disclosures and from their searches of private information on covered firms. However, none of these studies identify the form or receipt date of the non-public information, providing only "prima facie evidence" (Ivković and Jegadeesh, 2004) that analysts have access to non-public information.

In this study, we identify a source of non-public information used by some analysts prior to providing stock recommendations and earnings/revenue forecasts. The source is the Food and Drug Administration's (FDA) records about covered healthcare stocks. The mechanism analysts use to receive these records is Freedom of Information Act (FOIA) requests to the FDA for desired records. If analysts are skilled at accurately encompassing this data into their stock recommendations and forecasts, then their skills should be most evident after the receipt of these records. Further, if the records provide useful information to the requesting

analysts, then they should outperform analysts covering the same stock who do not request these records.

Under the FOIA, individuals, including analysts, may ask the FDA for a copy of any record(s) the agency holds pertaining to the requested firm. These records include reports on factory inspections, FDA warning letters, post marketing complaints about products by consumers, hospitals, or doctors, and FDA approvals, conditional approvals, or denials of the sale of new drugs and medical devices. These reports are non-public, in that firms are not required to share them with investors, analysts, or other individuals. The FDA, with discretion, places some of these records on its website. However, the timing and choice of which records to post are completely within the FDA's discretion, and are sporadic at best (Mullins and Weaver, 2013; Bruser and McLean, 2014). Thus, individuals can request records not posted on the Internet, not announced by the firm, nor disclosed in a regulatory filing.

The FOIA also allows individuals to ask for data about who made these requests. Using this Act, we asked the FDA to send us information about the identity of the requesters, which documents they asked for, the outcomes of their requests, and the mailing dates of the records to the analysts. The FDA acted on our requests by sending us information on over 180,000 individual requests between 1999 and 2014; of these requests, we identify almost 900 made by sell-side analysts pertaining to stocks they are covering.

There are several properties of this data that make our study unique. First, a FOIA request has to be initiated by the analyst; that is, the analyst has to proactively ask for any and all information from the FDA. Thus, unlike other studies that infer an acquisition of non-public information by the analyst (e.g., Malloy, 2005; Chen, et al., 2010; Livnat and

Zhang, 2012; Huang, Lehavy, Zang and Zheng, 2014), we know for certain that the analyst requested and received this information. Second, because we know the mailing date of the records by the FDA, we are able to determine approximately when the analyst receives the requested documents, thus allowing us to examine correlations between receipt of non-public information and forecasts or stock recommendations. Third, most of the requested records are not produced by actions taken by the covered firm, but instead are generated by FDA factory inspections, consumer complaints, or FDA warning letters. Therefore, unlike studies examining associations between analysts' output variables and firm-generated data (e.g., management forecasts, conference calls, financial reports, SEC filings), we are able to connect the gathering of outside information to analysts' forecasts and recommendations. Further, unlike financial reports or conference calls, the timing of these records are random, thus minimizing an "expectation" model by the analyst of the disclosed information. Fourth, the information in the records often is highly technical, requiring an expertise on the part of the analyst to interpret its impact on future equity value. As Klein and Li (2015) demonstrate, contrary to a simple rule of buying ex ante "good news" records and selling ex ante "bad news" records, hedge funds display a blend of buys/sells/no trades for stocks immediately after the receipt of requested FDA records. This complexity allows us to test whether analyst expertise, as displayed by education or experience, is related to the analysts' skill to better interpret the information found in these records. This approach differs from previous studies that try to measure differences in analysts' processing costs through the firm's number of segments (e.g., Frankel, Kothari and Weber, 2006; Chen, et al., 2010).

Our empirical results can be summarized as follows. First, we find that only a small percentage of healthcare analysts use the FOIA to request records of covered stocks from the

FDA. This finding most likely stems from our observation that FDA records contain highly technical information, thus requiring specialized expertise in interpreting their value-relevance. Next, the receipt of FDA records results in analysts issuing new stock recommendations or updating earnings (revenue) forecasts in less than 50% of our cases. This finding implies that the acquisition of non-public information in this context is just one piece of information used by the analyst. It is also consistent with Soltes (2014), who finds that private interactions between management and analysts generally do not result in analysts updating their earnings forecasts in a timely manner.

Our output results are consistent with analysts using the requested records to accurately update their stock recommendations and forecasts of future earnings and revenue. Using a difference-in-differences empirical methodology, we control for the requesting analysts' skill and also for information available to other analysts covering the same firms. When examining buy (strong buy) recommendations or upgrades, we find significantly higher monthly stock returns (up to a year) for stock recommendations made by analysts in possession of FDA records vis-à-vis the same analyst prior to receipt of the records, and vis-à-vis other non-requesting analysts with similar recommendations over the same period. In contrast, we find no evidence that the receipt of FDA records results in differential subsequent stock returns for analysts' sell recommendations or downgrades. This finding holds when comparing stock returns across time for the same analyst or across a sample of control analysts over the same time period. In tandem, our results suggest that receipt of FDA records is incrementally more important for predicting increases vs. decreases in firm value. All stock return findings hold after controlling for factors related to stock returns, the covered

firm's information environment, and other factors shown in the literature to be related to analyst skills.

We also find evidence consistent with the receipt of FDA records informing analysts about future earnings and revenue. Requesting analysts have smaller two-year ahead earnings and revenue forecast errors after receipt of FDA records when compared to analysts not requesting these records. Similarly, the two-year ahead forecast accuracy for the requesting analyst improves after record receipt. Interestingly, we find no difference in forecast errors for the current fiscal year-end, suggesting that the information contained in the requested records inform analysts of longer-term earnings and revenue. These results may be related to the time lag between a firm receiving and FDA document and its ability to successfully market new products or to remediate deficiencies found in its factory inspection or warning letters.

Finally, we present evidence that analysts with medical or scientific expertise, i.e., those with medical degrees or Ph.D.'s in the sciences, are better at formulating their buy recommendations or earning/revenue forecasts than analysts without these degrees. In contrast, having an MBA degree or being designated a "Star Analyst" by Institutional Investor has little to no differential effect. Thus we tie the analysts' skill in processing highly technical non-public information with the analysts' prior education.

By using a direct source of outside information, i.e., FOIA requests of FDA records, we are able to expand the literature on how analysts search for non-public information. The seeking of this information is consistent with Brown, Call, Clement and Sharp's (2015) survey paper, which shows that analysts frequently use non-financial data when evaluating equity value and future earnings/revenue. It is also consistent with Bradshaw (2004), who

concludes that analysts use "heuristic" valuation models instead of present value models when formulating their buy recommendations.

By identifying the source and the timing of the receipt of FDA records, we are able to discern whether analysts find this data value-relevant. In this respect, our paper adds to Soltes (2014), who pinpoints the timing of analysts' private interactions with the senior management of a large NYSE-traded firm. Similar to his study, we find that analysts' use of privately gathered information is nuanced, as demonstrated by the twin facts that only a few analysts seek FDA records and that updated stock recommendations follow the receipt of the records in less than half of the time. In contrast to his study, which finds no tangible effects on the analysts' forecasting abilities, our results are consistent with FDA records providing value-relevant information to analysts when making buy recommendations, upgrading their recommendations, or forecasting long-term earnings and revenue.

Like all research studies, this paper has its limitations. Its main limitation is that, although we can observe the timing and the source of the non-public information, we cannot unambiguously map the direct link from FDA records to the analysts' outputs. First, we do not know the full extent of each analyst's information set about his/her covered firm prior to the receipt of the requested records. Second, unlike financial data, FDA records contain "soft" information about the firm. Further, based on our reading of several records, the information contained in FDA records is highly specialized (see Appendix), making it difficult to use a textual (Li, 2010) or thematic content (Huang, et al., 2014) analysis to parse out the value-relevant pieces.[1] Third, our reading of several analyst reports subsequent to the

[1] We do not have the actual records received by the analysts. Our data contain only which records were requested, not the actual records themselves. The excerpts in the Appendix are from the FDA website, which intermittently provides some (but not all) warning letters and Form 483s. See the next section for a discussion of FDA record types.

receipt of these FDA records reveals little insights into how they use these records; perhaps this reflects analysts' wishes to not reveal their non-public source of information. Despite these caveats, our study opens a new window into how the search for non-public information improves an analysts' ability to value their covered firms.

2. FOOD AND DRUG ADMINISTRATION AND FREEDOM OF INFORMATION ACT

2.1 General Discussion

The Food and Drug Administration (FDA) is an agency within the U.S. Department of Health and Human Services. Since its creation in 1906, the U.S. Courts and Congress have expanded and contracted the scope of its oversight. Today, the FDA has three main roles: (1) oversight of the process leading up to the marketing of new products, particularly drugs and medical devices, (2) post-marketing surveillance and monitoring of products, and (3) factory inspections.

These functions derive from legislation and court decisions. In 1938, the Federal Food, Drug, and Cosmetic (FD&C) Act of 1938 gave the FDA the authority to conduct factory inspections on food and drug companies, and extended its oversight (including inspections) to cosmetics and therapeutic devices. The 1953 Factory Inspection Amendment required the FDA to give manufacturers written reports of conditions observed during inspections and analyses of factory samples. In 1962, the Kefauver-Harris Amendments required pharmaceutical companies to "prove" to the FDA the effectiveness of their products before marketing them. The U.S. Supreme Court upheld this amendment in 1973; the Court's decision also gave the FDA the right to assert its control over the marketing of products through regulation instead of relying on litigation. Several laws were passed to precipitate the

process leading up to the marketing of new drugs, for example, the 1983 Orphan Drug Act and the 1997 Food and Drug Administration Modernization Act.

The Freedom of Information Act (FOIA) is a federal law giving any individual the right to access federal agency records. One such agency is the FDA. The FOIA was originally enacted on July 4, 1966, but it did not become effective until July 4, 1967. The U.S. Congress amended the Act several times, e.g., in 1974, 1976, and 1986 and in 1996; these amendments, in general, established guidelines to the federal agencies intended to increase public access to their records. One such guideline is the number of days in which the agency must process FOIA requests, which in 1996 was set at 20 working days (or more if necessary).

The process behind obtaining record(s) from the FDA under the FOIA is straightforward. An individual makes a written request to the agency asking for specific record(s). After receiving the request, the agency sends a letter acknowledging the request with an assigned tracking number. We call the date of this letter the "request date." The agency responds to the request within 20 working days; if the agency requires more time to respond, it will send a letter to the requester with an approximate timetable to completion. The agency's response either will be to send the requested material, or to deny (fully or partially) the request.[2]

2.2 FDA Records Provided Under FOIA

[2] Under the FOIA, there are nine stated exemptions to the presumption of mandatory disclosure. These exemptions protect the agencies and individuals against disclosures concerning breaches of national security, individual privacy, trade secrets, financial confidentiality, internal memoranda or letters that are privileged in civil litigation, confidential sources to law enforcement agencies, documents that are related to financial institution regulation, and, geological information.

Figure 1 describes the FDA drug approval process. For most drugs, the process begins with preclinical animal testing. If the tests are satisfactory to the firm, it will submit an Investigational New Drug (IND) application to the FDA asking the FDA to allow it to move forward with human testing. There are three phases of human trials. In Phase I, the drug is tested on 20-80 people; if the drug doesn't prove to be toxic, the firm moves on to Phase II.[3] In Phase II, the drug is tested on a few hundred people; different doses are administered and the viability of the drug is measured. If the drug passes a viability measure, the firm moves on to Phase III. In Phase III, the firm conducts a large-scale, randomized clinical trial to determine the drug's effectiveness and safety.

If the firm is satisfied with its Phase III results, it files an NDA or BLA with the FDA. Either application asks for the FDA's approval to begin marketing the new drug. Most times, the FDA considers the application within house, but sometimes (around 20% of the time, Lurie and Zieve, 2006), it will refer the application to an outside advisory committee. In all, the application process takes 6 months for a significantly different type of drug and 12 months for an incrementally different drug. After making its decision, the FDA sends the firm an approval recommendation (REC). The REC can either be a rejection, a conditional approval or non-approval (subject to further modifications, sometimes referred to as a Phase IV), or an approval, which allows the firm to begin marketing the drug.[4]

Under the FOIA, the FDA generally will send REC records to individual requesters. However, the FDA has repeatedly denied FOIA requests for IND applications, NDAs, and BLAs under the confidentiality exemption provided by the FOIA. Further, the FDA will not

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[3] In an 8-K filing dated December 5, 2006, Pfizer disclosed that it would discontinue the development of a drug due to high levels of toxicity in its Phase I trials.

[4] The FDA decision process is threefold. First, the FDA evaluates the results of the Phase I-III trials. Second, the FDA examines the drug labeling information about dosage, usage, and side effects. Third, the FDA inspects the facilities where the drug will be produced.

respond to FOIA requests as to whether firms have filed an IND application, an NDA, or a BLA. Thus, in general, analysts and others have no access to drug applications prior to the FDA's decision. One exception is when the FDA sends an NDA or BLA to an advisory committee. Under the Federal Advisory Committee Act (FACA), advisory committee meetings are open to public comment. To facilitate these comments, FACA requires the FDA to place the NDA or BLA on its website 24 hours prior to any scheduled meeting.

As Figure 1 illustrates, after the marketing of a new drug, the FDA has an elaborate post-marketing surveillance system. Specifically, it maintains four databases of "adverse events," based on either mandatory or voluntary reports by the firm, consumers, doctors, hospitals, or other individuals. These databases are described in Table 1, and include records on drugs (FAERS), medical devices (MDR), food, dietary supplements, and cosmetics (CAERS), and vaccines (VAERS). These records are available under FOIA requests. Second, the FDA issues Warning Letters (WL) to manufacturers about "significant" violations of FDA regulations, for example, a mislabeling of an ingredient in a drug or food supplement, or its inability to correct factory inspection violations.

Figure 2 describes the factory inspection process and the records generated by these inspections (McDuffee, 2011). Under the FD&C Act, registered domestic drug factories shall be inspected by the FDA at least once every two years. Notice is not required. An inspector arrives, presents his credentials, and a Form 482, a general form of what the inspector can and cannot examine. After the inspection, the FDA will issue either an Establishment Inspection Report (EIR) if the inspection produces no violations or a Form 483, a list of violations. A firm has a right to remediate the violations or appeal to the FDA; often there will be correspondences between the firm and the FDA about either process.

When the FDA determines that the inspection is concluded, it will issue an EIR. In all cases, the EIR contains information about the inspection, the Form 483, and all correspondences. Each of these documents is available under FOIA requests.

An important caveat to the two processes described is that the timeframe for any firm to ameliorate factory inspection violations or concerns expressed in the REC about bringing a new drug to market can vary significantly. We have read many 8-K filings surrounding the request and receipt dates of analysts' requests. In these filings (most often surrounding earnings announcements), firms sometimes provide a brief update about correcting Form 483 violations or dealing with REC concerns in their 8-K filings. Oftentimes, these updates span over long time periods, sometimes as long as several years. Part of our research, then, is whether analyst filter out this information when requesting the original FDA documents when making their subsequent stock recommendations and revenues/earnings forecasts.

3. DATA: SAMPLE SELECTION AND SUMMARY STATISTICS

On January 29, 2014, February 11, 2014, March 21, 2014, and June 10, 2015, respectively, we filed FOIA requests the FDA. The information we requested was a list of all FOIA requests by outsiders to the FDA between January 1 1999 and December 31 2014. The FDA responded to our inquiries by giving us pdf files containing 182,149 individual requests. The information provided to us are (i) requester's identity (both person and company, if applicable); (ii) date of request; (iii) outcome date; (iv) subject of request (i.e., name of pharmaceutical company); (v) outcome of the request (e.g., sent, withdrawn, denied); and (vi) and a short description of which agency records were requested [5]

[5] To better understand the dates provided by the FDA, we submitted a second and third request to the FDA including the dates of our request. What we call the request date, the FDA calls the "record date"; what we call

We use this file by the FDA to identify possible sell-side analysts. We key in on the terms "Requester–Person" and "Requester-Company." Requester-person is the requesting analyst; Requester-Company is the analyst's brokerage firm.

We use the I/B/E/S database to match the last name of the Requester-Person to its list of sell-side analysts. I/B/E/S provides a numeric identifier, the analyst's last name, the initial of his/her first name, and a code corresponding to the analyst's brokerage firm. Next, we match the code to the I/B/E/S broker translation file to identify the name of the brokerage house or the research institute. We then manually check the FDA file to see if the Requester-Company coincides with the I/B/E/S identified brokerage firm. If the two match, we include it in our sample of sell-side analysts. If they do not match, the analyst is removed from our sample. We initially identify 221 analysts from 76 brokerage firms from the FDA file. We are able to match 199 analysts from 62 brokerage houses to the I/B/E/S sample.

We also require data on the analyst's portfolio of covered stocks, the number of years the analyst has worked as an analyst, his/her education background, and whether the analyst is a "Star Analyst," as designated by *Institutional Investor*. The analyst's portfolio and years worked are from I/B/E/S. The October issues of *Institutional Investor* designate which analysts are "star analysts" for that year. Our main source of education background is LinkedIn. Most sell-side analysts have public LinkedIn profile pages containing this information. We search for an analyst's full name in LinkedIn. In cases with multiple profiles, we read the person's work experience and manually match it with his/her brokerage employer from our FDA database. In cases when LinkedIn doesn't feature the analyst, we search Bloomberg, company websites, and Zoominfo.com, the latter being a search engine

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the outcome date, the FDA calls the "close date." In both requests, the FDA's record and close dates align with our request and outcome dates. We use our terminology for the sake of clarity.

that collects biographical data using publicly available information. From these sources, we collect their undergraduate and postgraduate degrees.

Table 2, Panel A contains a list of FOIA individual requests to the FDA for all requesters. Each individual request represents a single requester, who may have asked for one or more FDA records. As the panel shows, sell-side analysts made 873 individual requests, with 528 of these requests having the required data for our study.

The annual number of analyst requests range from three (1999) to 155 (2013), with an overall temporal increase. However, the vast majority of requests, 181,276, were made by other entities, including hedge funds (Klein and Li, 2015), insurance companies, public and private companies, hospitals, doctors, law firms, consulting firms and individuals. Unlike the analysts' requests, there is no overall temporal increase in the number of requests; instead we see a surge of requests in 2002-2006, followed by a tapering down to approximately 9,500 yearly requests beginning in 2007.

Table 2, Panel B presents the identity and frequency of requests for all brokerage firms with 20 or more requests over our time period. Our final sample excludes Fauvus Institutional Research (a private firm run by Elliot Fauvus), Cowen and Company, and Collins, Stewart LLC because we are unable to match these brokerage houses to the I/B/E/S database.

To calibrate the degree to which analysts use the FOIA to request records from the FDA about their covered firms, we use the I/B/E/S database to count the total number of analysts (FOIA requesters and non-requesters) covering each requested stock. From I/B/E/S, we count 924 unique analysts. Thus, the 199 FOIA requesters included in our sample represent 21.5% of I/B/E/S analysts. This percentage is lower than the 46.20% (50.28%) of analysts in

the Brown et al. (2015) analyst survey who find "primary research" on earnings forecasts (stock recommendations) very useful. However, their survey response includes all analysts, of which only 7.9% cover health care stocks, and their primary research category includes multiple types of primary research, for example channel checks and surveys Brown, 2014, Table 1). As such, it is difficult to ascertain if the percentage of FOIA requesters in our sample is similar or different from the Brown et al. (2015) survey results.

Table 3, Panel A presents a breakdown of the types of records analysts request, with many analysts requesting more than one FDA record-type, e.g., an analyst may request an EIR and a Form 483 on the same date. For our final sample of analysts, 226 out of 655 total requests are for a Form 483, a list of factory inspection violations. Other possibly adverse information documents requested are EIRs (54), post market surveillance complaints (127), and warning letters (57). As for potentially positive news, there are 65 requests for approval recommendation documents. A comparison to the type of records requested by hedge funds (Klein and Li, 2015) reveals that analysts ask for a greater percentage of complaints and approval recommendations.

Panel B has the outcomes of these requests. The FDA can either send all or some of the requested documents ("Sent" or "Partial Denial") or can deny the release of the document(s) to the requester ("Denial" or "Other Reason"). According to the FDA website, a denial is given when one of the 9 stated exemptions to mandatory disclosure (see footnote 1) exists, and "Other Reason" is a denial on different grounds, for example, the filer does not to pay the filing fee. Sometimes the requester withdraws the request ("Withdrawn") or the FDA sends a response that "No Record" exists. As the panel shows, 393 requests (385+8) were either fully or partially granted, which accounts for 74.4% of the total individual requests.

The other 25.6% consists of requests in which the analyst received no information. To compare this with the full FDA population, we gather the percentage of requests processed, grants (partial or full) and denials from the FDA website for all processed requests over our time period. Full or partial grants, as a percentage of all processed requests, are 74%, a number that is highly consistent with our sample.

Panel C contains summary statistics on the number of calendar days between the receipt of the request by the FDA (the request date) and the mailing of the information by the FDA to the analyst (the outcome date). For all requests, the median time between request and action by the FDA is 20 calendar days, which is fewer than the 20 business days mandated by the FOIA. However, there is a large dispersion in the timing between request date and the outcome date – the 75th percentile of the outcome date occurs 54 days after the initial request. For those records actually sent by the FDA, the median (75th percentile) calendar days are 18 (44) days.

4. STOCK RETURNS TO SELL-SIDE ANALYST STOCK RECOMMENDATIONS

One of the analysts' main jobs is to provide timely stock recommendations to investors (Schipper, 1991). Yet, the decision processes behind these recommendations remain a black box (Ramnath, Rock and Shane, 2006; Bradshaw, 2011). In this section, we test the hypothesis that recommendations issued after the receipt of the FDA records outperform recommendations issued without these records. We compare both (1) before and after stock returns for the same analyst and (2) stock returns between analysts with and without FDA.

4.1 Methodology and Descriptive Statistics

To assess abnormal stock performance, we employ a standard calendar time portfolio approach (Fama, 1998; Lyon, Barber and Tsai, 1999; Cohen, Frazzini, and Malloy, 2010). We construct four distinct analyst recommendation portfolios: (1) a BUY portfolio of stocks that the analyst upgrades to Buy or Strong Buy from the previous recommendation, or initiates coverage with a Buy or Strong Buy rating, or reiterates a Buy or Strong Buy recommendation, all after receipt of each covered firm's FOIA FDA records, (2) an UPGRADE portfolio of stocks to Buy or Strong Buy from the prior recommendation after receiving each firm's FOIA FDA records, (3) a SELL portfolio of stocks that the analyst downgrades to Hold, Underperform, or Sell from its prior recommendation, or initiates coverage with a Hold, Underperform, or Sell recommendation, or reiterates a Hold, Underperform or Sell recommendation, after receipt of FOIA FDA records, and (4) a DOWNGRADE portfolio of stocks that the analyst downgrades to a Hold, Underperform, or Sell from its prior recommendation following the receipt of the firm's FOIA FDA records. For each portfolio, recommendations are taken from the I/B/E/S numeric recommendation code, which assigns recommendations on a scale of 1 through 5, representing Strong Buy, Buy, Hold, Underperform, and Sell. A stock is included in each portfolio only if a recommendation appears within 12 months after receipt of FDA records.

Table 4, Panel A presents the number of buys/upgrades, holds/sells/downgrades and no changes in recommendation for our sample of analyst requests. As the table shows, the receipt of FDA records is associated with a subsequent recommendation initiation, reaffirment, or change in recommendation 45% of the time. Specifically, the percentage of buys/upgrades is 24% and the percentage of holds/sells/downgrades in 21%. These percentages are similar to hedge fund managers trading in the quarter of receipt of FOIA

FDA records (Klein and Li, 2015). They are also consistent with Soltes (2014) observation that only 43% of private interactions between firm management and analysts are followed by a new analyst report within a week of the interaction.

We construct daily return portfolios. Figure 3 demonstrates the time line both preceding and following the receipt of FDA records on day t_0. Using the BUY portfolio as an example, we designate day t_1 as the day in which the analyst upgrades, initiates or reiterates a Buy or Strong Buy recommendation after receiving FDA records. Consistent with Cohen et al. (2010), we skip day t_1 and begin accruing returns on day t_1+1. We keep the stock in the portfolio only until the analyst downgrades it (day t_2) or until the end of one year after the receipt of FDA records (day t_0 + 1 year), whichever is shorter. If no new recommendation is issued over the year following day t_0, we do not include that stock in the portfolio. If more than one FOIA analyst covers the stock, we keep the duplicate stock in the portfolio and treat them as distinct stocks (Cohen, et al., 2010). We use a similar portfolio approach for the UPGRADE, SELL, and DOWNGRADE portfolios.

Portfolio returns are equally-weighted calendar time portfolios, in which raw returns are calculated on a daily basis and averaged across analysts. We designate these returns as "FOIA Analysts Post-Receipt Date" returns. Our approach follows the direction of the recommendation and mimics the holding period implied by the timing of the recommendation revision.

We use a similar approach to calculate raw stock returns prior to the receipt of the FDA records. For a stock to be included in a specific portfolio, for example, the BUY portfolio, the same analyst must give a Buy or Strong Buy recommendation on the same stock within one year prior to day t_0. As shown in Figure 3, we designate this new recommendation as day

t_{-2} To be included in the BUY portfolio, for example, we include only those days in which the analyst maintains that specific recommendation. If the analyst issues an opposite recommendation on day t_{-1}, the stock is dropped from the portfolio; or we drop the stock on day t_0. By using this approach, we keep both the direction of the recommendation and the mimicking of the holding period similar to the post-receipt date returns. We call these returns "FOIA Analysts Pre-Receipt Date" returns.

Using three sequential filters, we construct a control sample of analysts not requesting nor receiving FDA records. First, we select all I/B/E/S analysts covering the same stock as the FOIA requesting analyst. Next, we keep only those analysts issuing at least one stock recommendation within one year before and within one year after day t_0. Finally, as Clement (1999) shows, an important factor in determining analyst forecasting ability is the resources available to the analyst. Following Clement (1999), we retain only those analysts whose brokerage houses employ [-10,+10] analysts as the FOIA analyst's brokerage firm at time t_0. These filters produce a control sample of 292 analysts.

Using the same methodology as the FOIA analysts, we create calendar time one-year "Pre-Receipt Date" and "Post-Receipt Date" stock returns for the control group. For example, for the control sample BUY portfolio, we include only those analysts with buy or strong buy recommendations in both time periods, and only for the trading days in which these recommendations are valid. Similar to the FOIA portfolio, we drop the stock from the portfolio on the day after a downgrade occurs. The pre-receipt and post-receipt time line for each control analyst is the same as shown in Figure 3, except that days t_{-2} through t_2 correspond to the control analyst's recommendation days and not to the FOIA analyst's dates.

4.2 Stock Returns

Table 4, Panel B presents calendar time portfolio monthly stock returns. Post-Receipt Date BUY portfolios for FOIA analysts, earn, on average, 2.71% per month raw returns, whereas BUY portfolios from analysts not requesting or receiving FDA records earn 1.27% Post-Receipt Date monthly raw returns. The difference between these two returns is 1.44% (t-statistic = 2.92), which translates into a yearly return of 17.28%. Since each portfolio is predicated on the analyst providing a Buy/Strong Buy recommendation, the primary difference between the two portfolios is the receipt of information.

The last three rows of Panel B report stock returns for the UPGRADE portfolios. The difference in the Post-Receipt Date monthly returns between the FOIA and non-FOIA analysts is even greater than that reported for the BUY portfolio. The difference in monthly returns is 1.98% (t-statistic = 2.59; annual return = 23.76%).

One possible explanation for these findings is that FOIA analysts are better analysts, in general, as compared to control analysts. However, when examining monthly market returns for the year prior to day t_0, we find no significant difference in returns between FOIA and control analysts [difference = -0.23%, t-statistic = -0.43 for BUYS; difference = -0.95%, t-statistic = -1.10 for UPGRADES]. Over this time period, neither group possesses FDA records; thus our post-receipt results are consistent with records providing value-relevant information to the FOIA analyst. In later tests, we demonstrate that these monthly returns are not driven by differences in the analysts' experience, stocks covered, or being designated a Star Analyst.

We also present differences in returns across time – that is from before and after day t_0. For the FOIA analyst, both time periods are predicated on the analyst issuing or reiterating a Buy or Strong Buy recommendation over the time period, thus allowing us to evaluate the impact of receiving FDA records on stock performance. For the control analyst, both time periods are predicated on there being a Buy or Strong Buy recommendation; however, the control analyst does not request nor receive FDA records.

In the one-year period prior to receiving FDA records, FOIA analysts' BUY portfolios earn, on average, 0.61% monthly raw returns. This monthly raw return is 2.10% lower (t-statistic = 2.73) than the 2.71% monthly raw return for Buys issued after the receipt of the FDA records. The difference in returns is consistent with FDA records providing new information about the analysts' covered firms. In contrast, we see a marginal difference in pre-receipt date and post-receipt date monthly raw returns for the group of control analysts. The difference in monthly raw returns for this group of analysts is 0.42% (t-statistic = 1.86).

For UPGRADES only, we observe similar improvements in monthly stock returns for FOIA analysts after receiving their requested FDA records. In contrast, we see a deterioration in raw returns for the sample of control analysts.

Overall, our calendar time portfolio tests on buy recommendations or upgrades reveal an economically and statistically significant channel of information gathered by sell-side research analysts. Whether examining across time, or across analysts, our findings are consistent with the receipt of FDA records enabling analysts to produce recommendations that are more consistent with future stock returns.

The last three columns in Panel B present calendar time portfolio monthly raw returns for SELLS and for DOWNGRADES. For both portfolios, we cannot reject the hypotheses of

no difference in post-receipt raw returns between requesting FOIA Analysts and the sample of control analysts. Nor do we see evidence of differences in returns earned by stocks downgraded before or after the receipt of FDA records by the requesting analyst.

4.3 Multivariate Analyses

To examine whether our results are driven or affected by other factors, we employ a difference-in-differences regression methodology with daily raw stock returns (Ret) as the dependent variable. For the portfolio of BUYS or SELLS, we estimate the following regression:

$$\begin{aligned}\text{Ret} = \alpha &+ \beta_1 \text{ FOIA Analyst} + \beta_2 \text{ Post} + \beta_3 \text{ FOIA Analyst x Post} + \beta_4 \text{ Firm Size} + \beta_5 \text{ B/M} \\ &+ \beta_6 \text{ Momentum} + \beta_7 \text{ Analyst Experience} + \beta_8 \text{ No. of Stocks Covered} \\ &+ \beta_9 \text{ PhD/MD Degree} + \beta_{10} \text{ MBA Degree} + \beta_{11} \text{ Star Analyst} \\ &+ \beta_{12} \text{ Std. Dev. Past Forecasts} + \beta_{13} \text{ Institutional Ownership} + \text{FE} + \varepsilon_i. \qquad (1)\end{aligned}$$

FOIA Analyst is equal to 1 if the analyst receives FDA records, and zero otherwise. *Post* is 1 if the recommendation is made after the FDA receipt date, and zero otherwise. The interaction between FOIA Analyst and Post tests whether stock returns after receipt of the FDA records are different for analysts with and without FDA records.

We control for equity risk. *Firm Size* and *B/M* are Fama-French risk factors for firm size (ln of market capitalization) and the book-to-market ratio. *Momentum* is the Carhart (1997) momentum risk factor, measured as the firm's raw return over the prior 12 months.

We control for analyst ability. Prior research, for example, Stickel (1992), Clement (1999), Malloy (2005), and DeFranco and Zhao (2009) provide evidence that differences in analyst performance are related to the number of years the analyst has been employed as an

analyst (*Analyst Experience)*, the number of stocks covered by the analyst (*No. Of Stocks Covered*), and whether the analyst is a "Star Analyst" (*Star Analyst*). New to this study, we include the educational background of the analyst as possible differentiating characteristics. Because these analysts cover firms in the healthcare industries, we consider both advanced degrees in business (*MBA*) and advanced degrees in biology, chemistry, other sciences, and medicine (*PhD /MD Degree*) as useful advanced degrees.

We control for the firm's information environment with *S.D. of Past Forecasts* (Barron, Kim, Lim, and Stevens, 1998), defined as the standard deviation of the last EPS short-term forecasts reported on I/B/E/S and *Institutional Ownership* (El-Gazzar, 1998), the percentage of shares owned by institutional investors, as reported on Thomson-Reuters. In general, larger standard deviations (institutional ownership) are consistent with the firm being more (less) opaque in its information environment. FE represents fixed effects – we include fixed effects for the month, the covered firm, and the analyst.

Table 5, Panel A contains descriptive statistics of the covered firms' characteristics. The average firm has a market capitalization of $27.96 billion. Consistent with these firms being in the healthcare industry, the book-to-market ratio is 0.59, implying that the market prices them as high growth firms.

Table 5, Panel B contains descriptive statistics of FOIA and control analyst characteristics. FOIA analysts, on average, have 7.10 years of direct analyst experience and cover 8.30 stocks. Testing for differences between FOIA and control sample analysts yields no significant differences. In contrast, there is a statistical difference in the percentage of analysts designated Star Analysts by Institutional Investor magazine; 16.7% of the FOIA

analysts achieve this designation, compared to 11.4% of the control sample (t-statistic = 2.54).

In terms of educational background, as expected, many FOIA and control analysts have MBA degrees. The T-statistic for the difference in percentage yields no differences between groups. Consistent with healthcare analysts requiring expertise in science or medicine, we find that many FOIA and control analysts possess advanced degrees in the sciences or in medicine. For the FOIA analysts, 8.5% have a medical degree and 19.5% have a Ph.D. in the sciences.

Table 6 has the regression results for BUYS. Consistent with the univariate results presented in Table 4, stock returns are positively related to the receipt of FDA records by requesting analysts (FOIA Analyst x Post is significantly positive in all specifications). The 0.02 coefficient is equivalent to the portfolio earning, on average, 2% per month. The coefficients on Post and FOIA Analyst are insignificantly different from zero, suggesting that returns prior to receipt of the FDA records, and by the control analysts are not significantly different from zero.

Consistent with the Fama-French 3-factor model, the coefficients on Firm Size are significantly negative, and the coefficient on B/M is significantly positive. The risk factor, Momentum, is significantly negative, consistent with Lewellen (2002), who finds a negative autocorrelation in returns when using 12-month lagged returns. Thus, the sample of firms followed by these analysts display risk-return patterns similar to those described in the broad financial literature. We also find that stock returns are negatively related to the standard deviation of past forecasts, consistent with firms with more opaque information environments being more risky, and hence earning lower stock returns.

Consistent with Clement (1999), analyst ability is negatively related to the number of stocks each analyst covers. A new finding in this study is that expertise, as measured by a PhD/MD Degree, translates into an analyst's buy recommendations earning higher stock returns. The insignificant coefficient on MBA Degree suggests that the analysis of FDA records for value-relevant information requires an expertise other than a business or financial background. The other variables, Analyst Experience, Star Analyst, and Institutional Ownership have coefficients insignificantly different from zero.

Regression results for SELLS are presented in Table 7. Similar to analyst buy recommendations, stock returns are significantly related to Firm Size, Momentum, and S.D. of Past Forecasts. Beyond these findings, however, there are no similarities between stock returns associated with sell and buy recommendations. The coefficient on the interactive term, FOIA Analyst x Post, is insignificantly different from zero in each of the six regressions, consistent with the receipt of FDA records having no incremental information on future stock returns. Nor do we find evidence that an analyst's expertise, as represented by the variable PhD/MD Degree, to be related to stock returns for sell recommendations.

The asymmetric findings for BUYS and SELLS are consistent with Cohen et al. (2010), who examine the impact that educational ties between analysts and senior corporate officers have on stock returns following buy and sell recommendations. Cohen et al. (2010) find significantly positive returns on portfolios of buy recommendations, but no significant returns following sell recommendations. Ivoković and Jagadeesh (2004) find a similar asymmetric finding for upgrades and downgrades made by analysts in the week prior to a firm's earnings announcement.

5. FORECAST ACCURACY OF SELL-SIDE ANALYSTS

As summarized by recent survey papers, (e.g., Bradshaw, 2011), the lion's share of empirical research on the role of analysts in the capital markets focuses on earnings forecasts. We add to this literature by examining analysts' earnings accuracy both before and after the receipt of FDA records. We also examine revenue accuracy, an area of inquiry that has received less attention.

We test the hypotheses that FDA records improve the requesting analyst's ability to forecast future earnings per share (EPS) and revenue. We compare (1) before and after forecast errors for the requesting analyst and (2) forecast errors between analysts with and without FDA records.

5.1 Methodology

Analyst earnings forecast accuracy is defined as the absolute value of the earnings forecast error:

$$\text{Earnings Accuracy}_{t-n} = |\text{Forecast EPS}_{t-n} - \text{EPS}_t|/\text{Price}_{t-n} \quad (2).$$

EPS_t is the firm's realized annual basic EPS at the end of its fiscal year t, Forecast EPS_{t-n} is the analyst's forecast on day t-n of EPS_t, and $Price_{t-n}$ is the stock price on day t-n (see DeFranco, Kothari and Verdi, 2011; Malloy, 2005).

Figure 4 shows the time line for the pre-receipt date and post-receipt date analyst's forecasts. For a given fiscal year, we collect the first analyst forecast provided to I/B/E/S after the receipt of FDA records by the FOIA analyst. This forecast is made on day t-n, where n represents the number of days between the forecast day and fiscal year-end. This is the post-receipt date forecast. We also collect the latest forecast by the same analyst for EPS_t

prior to the receipt of the FDA records. This forecast is made on day t-n-m, where m is the number of days between this forecast and the post-receipt date forecast. This is the pre-receipt date forecast. For this forecast error, Price in equation (2) is taken on day t-n-m.

Analyst revenue forecast accuracy is defined as the absolute value of the RPS forecast error:

$$\text{Revenue Accuracy}_{t-n} = \left|\text{Forecast Revenue}_{t-n} - \text{Revenue}_{t}\right| / (\text{Price}_{t-n} * \text{Shrs}_{t-n}) \quad (3),$$

where Revenue_t is the realized annual revenue (or sales) of the firm at the end of fiscal year t, $\text{Forecast Revenue}_{t-n}$ is the analyst's forecast of Revenue_t on day t-n, Price_{t-n} is the stock price on day t-n, and Shrs_{t-n} is the outstanding shares – basic on day t-n (e.g., see Ertimur, Livnat and Martikainen, 2012). Equation (3) presents revenue accuracy in terms of revenue per share (RPS). Post-receipt and pre-receipt forecasts errors are calculated according to the timeline shown in Figure 4, with day t-n and day t-n-m now representing the days in which the analyst provides forecasts of Revenue_t.

We collect data on two forecasting windows: EPS and Revenue for current fiscal-year end (one-year ahead forecasts), and EPS and Revenue for the subsequent fiscal-year-end (two-year ahead forecasts).

5.2 Forecast Accuracy

Table 8 contains the forecast accuracy for EPS and Revenue. Panel A has one-year ahead forecast errors and Panel B presents two-year ahead forecast errors.

When examining the one-year ahead forecast errors in Panel A, we cannot reject the hypothesis that receipt of FDA records by requesting analysts does not improve their forecasting accuracy. For the FOIA analysts, the difference between post-receipt date and

pre-receipt date is -0.14% (t = -1.41) for earnings accuracy, and -0.02% (t = -0.09) for revenue accuracy. Comparisons between FOIA analysts and their matched sample of control analysts produce a zero percent difference (t = -0.03) in earnings accuracy, and 0.30% difference (t = 2.96) in revenue accuracy. The difference in earnings accuracy is not statistically different from zero. The difference in revenue accuracy is statistically different at the 0.01 level, but it supports the view that FOIA analysts are worse (not better) at predicting this year's revenue than those analysts without the FDA records.

Examination of the two-year ahead forecast errors in Panel B paints a different picture. For the longer-term earnings forecasts, the difference in post-receipt date earnings accuracy between FOIA analysts and the control sample is -0.74% (t-statistic = -2.33). No significant difference in earnings accuracy is observed in the pre-receipt date, consistent with the view that FOIA analysts are not better forecasters than their peers when both groups have similar (e.g., no FDA records) information. When calculating two-year revenue accuracy, control analysts have lower prediction errors than FOIA analysts prior to the receipt date (difference = 1.53%; t-statistic = 4.17), but this disadvantage disappears after the receipt of FDA records by the FOIA requesting analysts.

5.3 Multivariate Analyses

To examine whether our results are driven or affected by other factors, we employ a difference-in-differences regression methodology with Earnings Accuracy (Revenue Accuracy) as the dependent variable. For each measure, we estimate the following regression:

$$\text{Earnings Accuracy (Revenue Accuracy)} = \alpha + \beta_1 \text{ FOIA Analyst} + \beta_2 \text{ Post}$$
$$+ \beta_3 \text{ FOIA Analyst x Post} + \beta_4 \text{ Firm Size} + \beta_5 \text{ B/M} + \beta_6 \text{ Analyst Experience}$$
$$+ \beta_7 \text{ No. of Stocks Covered} + \beta_8 \text{ Distance} + \beta_9 \text{ PhD/MD Degree}$$
$$+ \beta_0 \text{ MBA Degree} + \beta_{12} \text{ Star Analyst} + \beta_{13} \text{ S. D. Past Forecasts}$$
$$+ \beta_{14} \text{ Institutional Ownership} + \beta_{15} \text{ No. of News Articles} + \text{FE} + \varepsilon_i. \quad (4).$$

The interaction between FOIA Analyst and Post tests whether earnings or revenue accuracy after receipt of the FDA records is different for analysts with and without FDA records.

Firm Size and B/M are the Fama-French risk factors for firm size and the book-to-market ratio. So (2013) finds these variables to be significant in explaining earnings accuracy. *Distance* is the number of days between the forecast day and fiscal year-end. *No. of News Articles* is the number of newspaper articles between the analyst's pre-receipt date and post-receipt date forecasts, as collected from Factiva. Distance controls for information that may have come out between the forecast date and fiscal-year end (e.g., Malloy, 2005); No. of News Articles controls for information that may have come out between the pre-receipt date and post-receipt date forecasts. See Table 5 for summary statistics on these variables. The other variables are defined as before.

Table 9 presents summary statistics on the regressions on two-year earnings accuracy. The coefficient on FOIA Analyst x Post is significantly negative in all specifications, supporting the view that analysts with FDA records are better forecasters of longer-term EPS than analysts without these records. This finding is consistent with the univariate results reported in Table 8. The coefficient on FOIA Analyst is insignificantly different from zero, suggesting that the difference in forecasting ability is not due to the FOIA analyst's overall

skill vis-à-vis the control analyst's overall skill. The insignificant coefficient on Post suggests that the time period per se is not related to the difference in forecast accuracy.

The coefficients on Firm Size and B/M are significantly positive, suggesting that forecast accuracy is negatively related to firm risk (So, 2013). Similar to our previous findings on buy recommendations, analysts with PhD degrees in science or MD degrees in medicine are better able to predict EPS. Having an MBA degree also is beneficial in terms of earnings accuracy. The coefficients on No. of Firms Covered (column 5 only), Distance, S.D of Past Forecasts, and No. of News Articles are significantly different from zero. All other control variables are insignificantly different from zero.

Table 10 presents summary statistics for the regressions on two-year ahead revenue accuracy. Unlike the univariate results reported in Table 8, the coefficient on FOIA Analyst x Post is significantly negative in all specifications, suggesting that receipt of FDA records improves analysts' forecasting ability of revenue. Consistent with the earnings accuracy regressions, revenue accuracy is positively related to Firm Size, Distance, and S.D. of Past Forecasts. Similarly, the coefficients on PhD/MD, No. of Stocks Covered, and No. of News Articles are significantly negative. The coefficients on the remaining variables are insignificantly different from zero.

Table 11 presents the regression results on one-year ahead earnings accuracy (Panel A) and one-year ahead revenue accuracy (Panel B). The coefficients on FOIA Request x Post are insignificantly different from zero in all specifications, accepting the null hypothesis that FDA records do not improve short-term forecasts.

Taken in tandem, the regression results are consistent with FDA records providing requesting analysts information about assessing longer-term earnings and revenue. They also are consistent with the records not helping the analysts assess short-term earnings.

6. CONCLUDING REMARKS

In this study, we use a setting in which we are able to determine a conduit of non-public information that analysts seek. Specifically, using the Freedom of Information Act, we are able to observe requests and receipt of FDA records by analysts. Further, we are able to determine within a few days, the date in which the analyst received the requested records.

Using this data, we present evidence that requesting analysts are better able to forecast longer-run, i.e., two-year ahead EPS and Revenue, after receipt of the FDA records. We also find that buy recommendations issued by analysts after receipt of FDA records perform better in the subsequent year than (1) buy recommendations issued by the requesting analyst prior to receiving the records and (2) peer analysts without these records.

In contrast, we find no differential forecasting abilities for shorter-term, i.e., one year, EPS and Revenue; nor do we find evidence that possessing FDA records helps analysts in making their hold or sell recommendations.

Our study contributes to the literature on how analysts search for and process non-public information when formulating their outputs, the latter being represented by forecasts and stock recommendations.

APPENDIX

Some Excerpts from FDA Records

Warning Letter for Signal Medical Corporation – sent via UPS from the Detroit FDA office on December 15, 2014 (from FDA website)

These are the first two paragraphs of a 9 paragraph warning letter.

Dear Dr. Serafin:

During an inspection of your firm located in Marysville, Michigan on July 32, 2014 through August 11, 201, investigators from the United States Food and Drug Administration (FDA) determined that your firm is a manufacturer of Class II MicroSeal Total Hip Acetabular Systems. Under section 201(h) of the Federal Food, Drug and Cosmetic Act (the Act) 21 U.S.C. Section 321(h), these products are devices because they are intended for use in the diagnosis of disease or other conditions or in the cure, mitigation, treatment, or prevention of disease, or to affect the structure or any function of the body.

The MicroSeal Total Hip Acetabular System is adulterated under section 501(f)(1)(B) of the Act 21 U.S.C. Section 351(f)(1)(B), because your firm does not have an approved application for premarket approval (PMA) in effect pursuant to section 515(a) of the Act, 21 U.S.C. 360j(g) for the device as described and marketed. Specifically, the MicroSeal Total Hip Acetabular System includes a "hood feature" integrated with a liner that was not cleared in K955271 and K971718. The liners are identified as MicroSeal "Anatomic" (10^0 and 20^0 hood angle) liner and the MicroSeal "Stable" liner. There are also additional sizes of the MicroSeal Acetabular Liners offered for sale since the initial submission was cleared. The inner diameter sizes of the liner offered in the submission was 22mm, 26mm and 28mm. Currently your firm also manufactures liners with an inner diameter of 32mm.

Form 483 to NuVision Pharmacy, Inc. – issued on April 17, 2013 for factory inspections conducted between March 18, 2013 and April 16, 2013. (from FDA website)

The Form 483 is 11 pages long and contains 12 distinct "observations." Each observation has many parts and sub-parts.

Two examples taken from 2 different observations:

Observation 1

B. Your firm's procedures designed to prevent microbial contamination of injectable drug products have not been established. For example:

a. Your firm performs aseptic filing of injectable drug products Sermorelin/GHRP-6 and HVG 5K Lyophilized 5000 units Powder in an ISO 5 hood, the sterile [redacted] products in partially stoppered vials are transferred out of the ISO 5 work area uncovered and exposed to an ISO 7 conditions prior to being placed in the lyophilizer. In addition, the lyophilizer is not sterilized prior to processing injectable drub products. For example, the following lots of injectable drug product were lyophilized and distributed by your firm:

- Sermorelin/GHRP-6; Lot N10172012@11
- HCG 5K Lyophilized 5000 Powder; Lot N01292013@15

……

Observation 4

Aseptic processing areas are deficient regarding the system for monitoring environmental conditions.

Specifically,
a. Testing for viable and non-viable particulate air monitoring is not performed in the ISO 5 and ISO 7 work areas on each day of injectable drug product production. Currently monitoring is only conducted every [redacted] by a third-party contractor under static conditions. The most recent testing for viable air monitoring was on 1/4/2013. During the August 2012 certification, an action level excursion of 18 CFI and 1 CFU of fungus was reported in the ISO 7 gowning room. The report indicates the 18 CFU excursion exceeded the recommended action level; no investigation was conducted.

REFERENCES

Barron, O.E., Kim, O., Lim, S.C., Stevens, D.E. 1998. Using analysts' forecasts to measure properties of analysts' information environment. *The Accounting Review* 73, 421-433.

Bradshaw, M.T. 2004. How do analysts use their earnings forecasts in generating stock recommendations? *The Accounting Review* 79(1), 25-50.

Bradshaw, M.T. 2011. Analysts' Forecasts: What Do We Know After Decades of Work? Working Paper, Boston College.

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

Bruser, D., McLean, J. 2014. Canadians kept in dark about defective drugs. *Toronto Star*, September 11, 2014.

Carhart, M.M. 1997. On persistence in mutual fund performance. *The Journal of Finance* 52(1), 57-82.

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 & Economics 49, 206-226.*

Clement, M.B. 1999. Analyst forecast accuracy: Do ability, resources, and portfolio complexity matter? *Journal of Accounting & Economics* 27, 285-303.

Cohen, L., Frazzini, A., Malloy, C. 2010. Sell-side school ties. *The Journal of Finance* 55(4), 1409-1437.

De Franco, G., Kothari, S.P., Verdi, R. 2011. The benefits of financial statement comparability. *Journal of Accounting Research* 49, 895-931.

DeFranco, G. and Zhou, Y. 2009. The performance of analysts with a CFA designation: The role of human-capital and signaling theories. *The Accounting Review* 84(2), 383-404.

El-Gazzar, S.M. 1998. Predisclosure information and institutional ownership: A cross-sectional examination of market revaluations during earnings announcement periods. *The Accounting Review* 73(1), 119-129.

Ertimur, Y., Livnat, J., Martikainen, M. 2003. Differential market reactions to revenue and expense surprises. *Review of Accounting Studies* 8, 185-211.

Fama, E.F., 1998. Market efficiency, long-term returns, and behavioral finance. *The Journal of Finance* 49, 283-306.

Francis, J., Schipper, J. Vincent, L. 2002. Earnings announcements and competing information. *Journal of Accounting & Economics* 33, 313-342.

Frankel, R., Kothari, S.P., Weber, J. 2009. Determinants of the informativeness of analyst research. *Journal of Accounting & Economics* 41, 29-54.

Huang, A., Lehavy, R., Zang, A., Zheng, R. 2014. Thematic analysis of analyst information discovery and information interpretation roles. Working paper. HKUST University of Michigan, Hong Kong University of Science and Technology, HKUST.

Ivković, Z. and Jegadeesh, N. 2004. The timing and value of forecast and recommendation revisions. *Journal of Financial Economics* 73, 433-463.

Klein, A., and Li. T. 2015. Acquiring and Tracing on Complex Information: How Hedge Funds Use the Freedom of Information Act. Working Paper, New York University and Warwick Business School.

Lewellen, J. 2002. Momentum and autocorrelation in stock returns. *The Review of Financial Studies* 15(2), 533-563.

Li, F. 2010. Textual analysis of corporate disclosures: A survey of the literature. *Journal of Accounting Literature* 29, 143-165.

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

Lurie, P. and Zieve, A. 2006. Sometimes the silence can be like the thunder: Access to pharmaceutical data at the FDA. *Law & Contemporary Problems* 69(3), 85-97.

Lyon, J.D., Barber, B.M., Tsai, C. 1999. Improved methods for tests of long-run abnormal returns. *The Journal of Finance* 54(1), 165-201.

Malloy, C.J. 2005. The geography of equity analysis. *The Journal of Finance* 60(2), 719-755.

McDuffee, 2011. B. Tips on preparing for an FDA inspection. *Quality Digest Magazine*. www.qualitydigest.com.

Mullins, B., Weaver, C. 2013. Open-government laws fuel hedge-fund profits. *Wall Street Journal*, September 23, 2013.

Ramnath, S., Rock, S., Shane, P.B. 2006. Financial analysts forecasts and stock recommendations: A review of the research. *Foundations and Trends in Finance* 2, 311-421.

Schipper, K. 1991. Analysts' forecasts. *Accounting Horizons* 5(4), 105-131

So, E.C. 2013. A new approach to predicting analyst forecast errors: Do investors overweight analyst forecasts? *Journal of Financial Economics* 108, 615-640.

Soltes, E. 2014. Private interaction between firm management and sell-side analysts. *Journal of Accounting Research* 52(1), 245-272.

Stickel, S.E. 1992. Reputation and performance among security analysts. *The Journal of Finance* 47(5), 1811-1836.

Figure 1

FDA Drug Approval Process

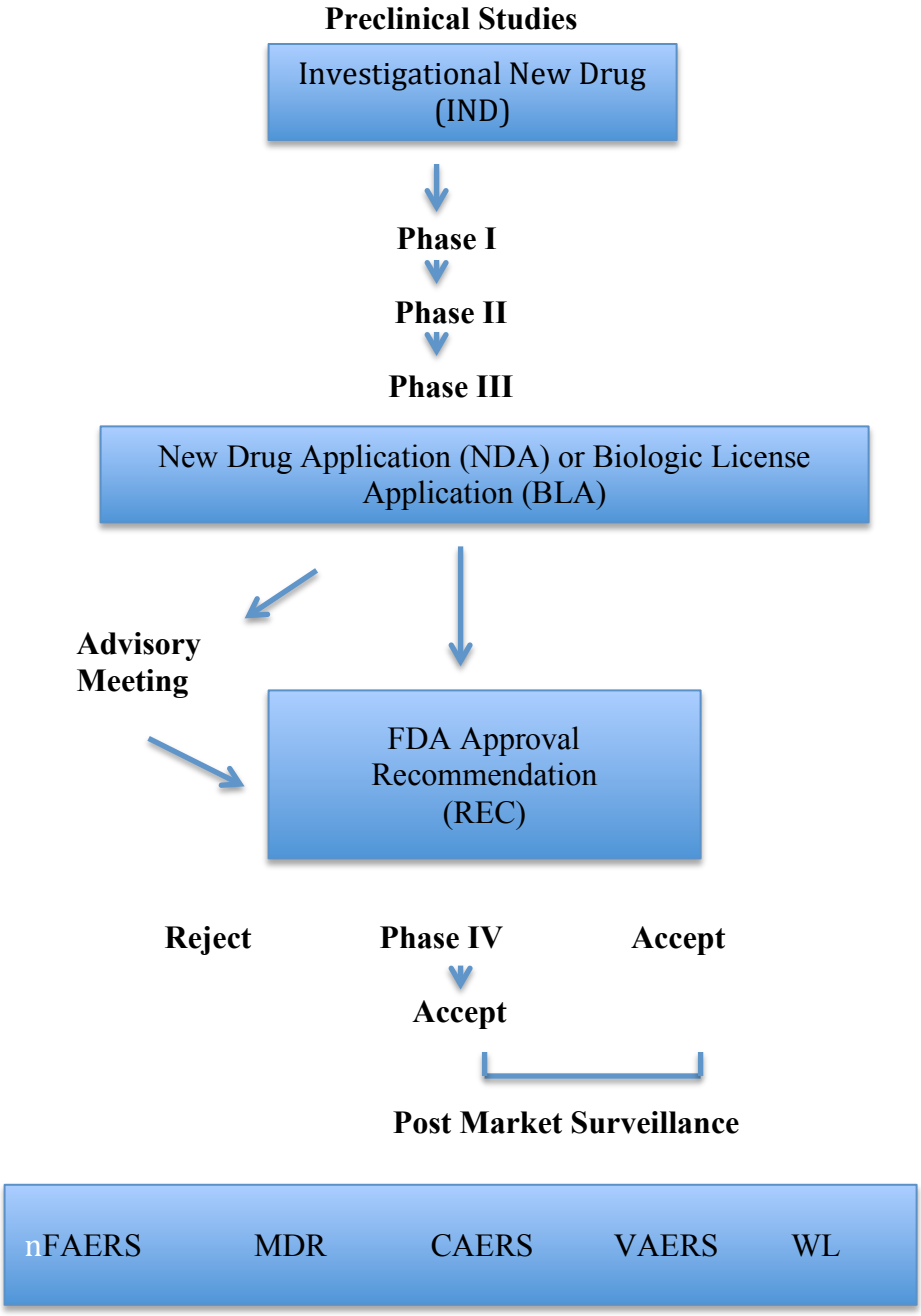

Figure 2

Factory Inspection Process

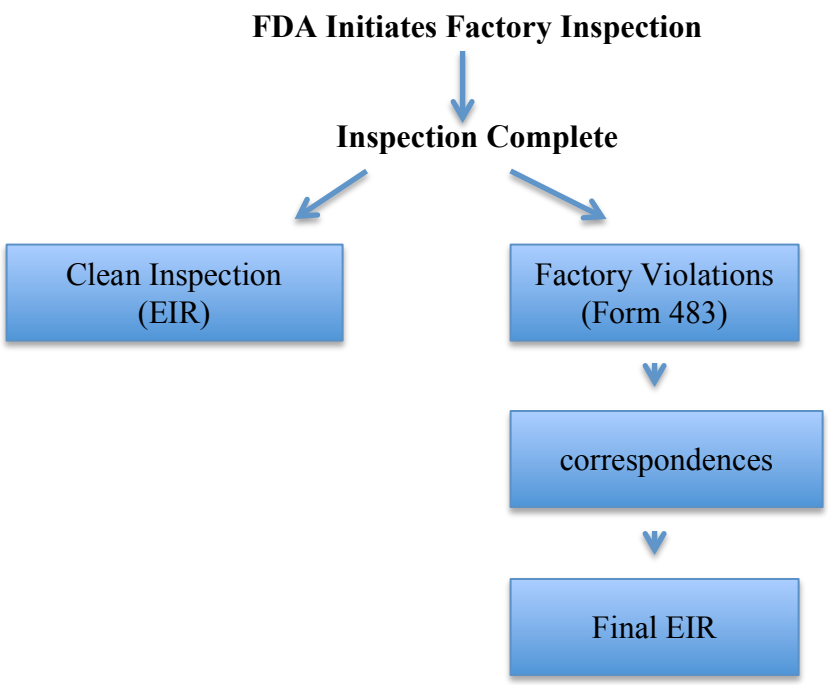

Figure 3

Time Frames for Accruing Raw Stock Returns

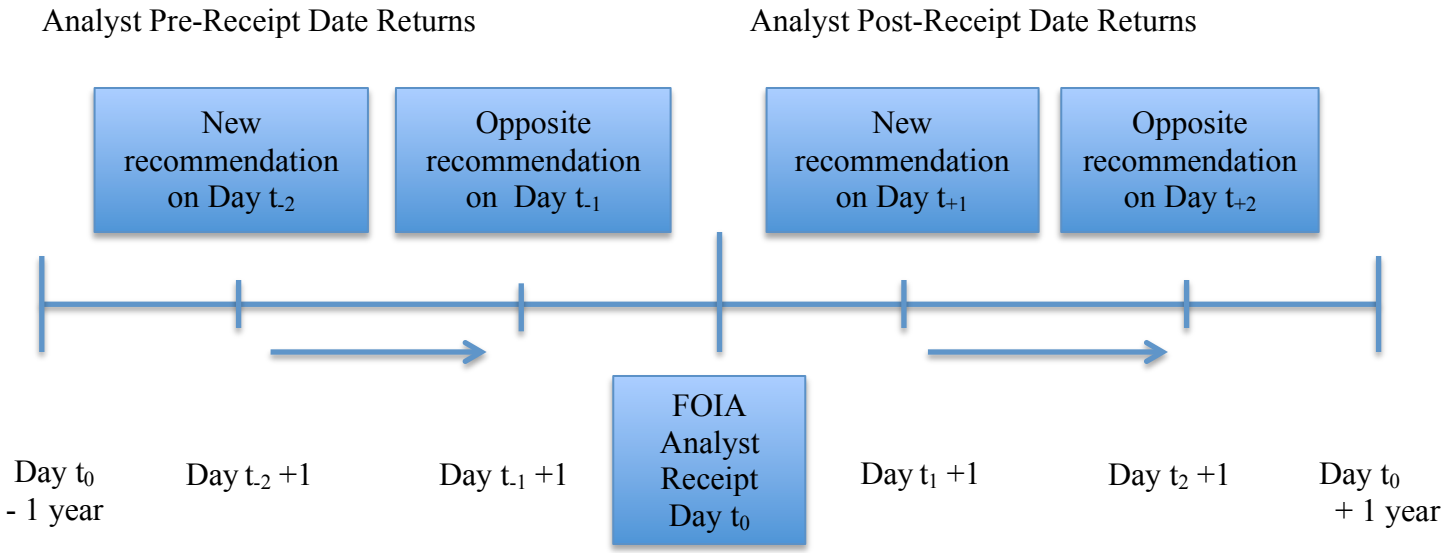

Figure 4

Time Frames for Evaluating Forecast Accuracy

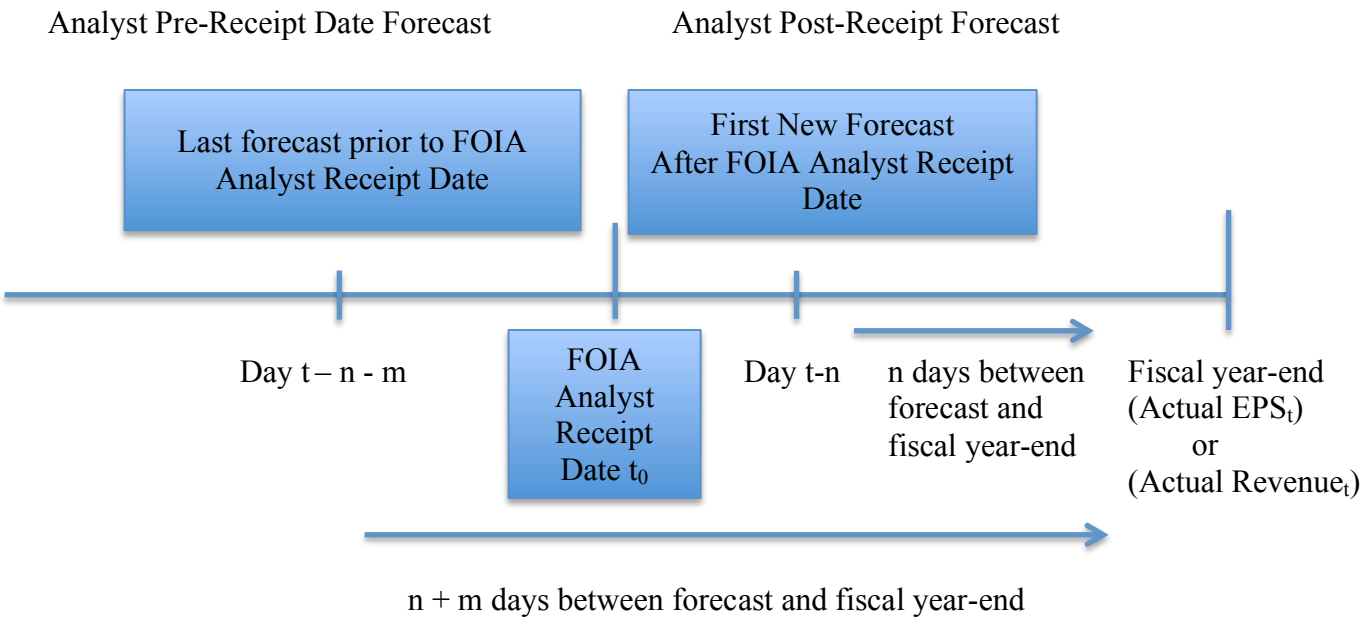

Table 1
FDA Record Types

This table presents a brief description of each of the FDA records requested by sell-side analysts.

Factory Inspections	
Establishment Inspection Report (EIR)	Upon completion of an inspection, an EIR is written which details inspectional findings.
Form 483	A Form 483 is issued to firm management at the conclusion of an inspection when an investigator has observed any conditions that may constitute violations of the Food Drug and Cosmetic (FD&C) Act and related Acts.
Post-market Surveillance Databases	
FDA Adverse Event Reporting System (FAERS)	FAERS is a database that contains information on adverse event (adverse drug reactions or ADR) and medication error reports submitted to FDA. It supports FDA's post-market safety surveillance program for all approved drugs and therapeutic biologics.
Medical Device Reporting (MDR)	MDR is FDA's post-market surveillance tool to monitor device performance, detect potential device-related safety issues, and contribute to benefit-risk assessments of these products. Both mandatory and voluntary reports are included.
Center for Food Safety and Applied Nutrition (CFSAN) Adverse Event Reporting System (CAERS)	CAERS collects reports about adverse health events and product complaints related to CFSAN-regulated products, including conventional foods, dietary supplements and cosmetics. Reports are mandatory and voluntary for dietary supplements, and are voluntary for all other products.
Vaccine Adverse Event Reporting System (VAERS)	The purpose of VAERS is to detect possible signals of adverse events associated with vaccines. Reports are voluntary only.
Warning Letter (WL)	When FDA finds that a manufacturer has significantly violated FDA regulations, it notifies the manufacturer in the form of a Warning Letter.
Approval Recommendation (REC)	Approval recommendations (RECs) refer to New Drug Application (NDA) and Biologic License Application (BLA) approvals. The NDA application is the vehicle through which drug sponsors formally propose that FDA approve a new pharmaceutical for sale and marketing in the U.S. BLA is a request for permission to introduce, or deliver for introduction, a biologic product into interstate commerce.
Other	Includes company responses to FDA reports, correspondence, meeting minutes, alert, safety review and Notices of Inspection (Form 482).

Table 2
FOIA Requests to the FDA

This table presents the frequency of sell-side analysts' Freedom of Information Act (FOIA) requests to the Food and Drug Administration (FDA). Panel A presents number of requests by year. *Analysts* are requests sent by sell-side analysts. *Analysts in Final Sample* are analysts matched with the I/B/E/S database. *Other* includes public and private companies, hospitals, doctors, law firms, consulting firms and individuals. *Year* is the year the request was made. Panel B ranks the brokerage house or research firm by the number of FOIA requests.

Panel A: FOIA Requests by Year

Year	Analysts	Analysts in Final Sample	Other	Total
1999	3	0	3,637	3,640
2000	6	4	3,963	3,969
2001	7	3	4,540	4,547
2002	45	24	19,629	19,674
2003	17	9	16,586	16,603
2004	19	12	19,959	19,978
2005	32	24	17,458	17,490
2006	37	23	18,394	18,431
2007	31	15	10,946	10,977
2008	31	18	8,942	8,973
2009	70	47	9,980	10,050
2010	73	57	9,330	9,403
2011	102	77	9,341	9,443
2012	133	68	8,783	8,916
2013	155	77	9,830	9,985
2014	112	70	9,958	10,070
Total	**873**	**528**	**181,276**	**182,149**

Panel B: Most Frequent Analyst Requests (over 20 requests)

Brokerage House	No. of Requests	Rank	No. of Requests in Final Sample
Fauvus Institutional Research	87	1	0
RBC Capital Markets	61	2	54
Jefferies & Co	57	3	45
Wells Fargo Securities	57	3	49
Merrill Lynch	34	5	32
Leerink Swan & Co	32	6	21
Cowen and Company	32	6	0
Morgan Stanley	29	8	21
Northcoast Research	29	8	19
Robert W Baird & Co	28	10	18
Collins Stewart LLC	25	11	0
Sanford Bernstein & Co	23	12	17
Citigroup	23	12	15
Deutsche Bank	22	14	18
JP Morgan	21	15	16
UBS	20	16	11
Stifel Nicolaus & Co	20	16	12

Table 3
FDA Record Types

This table presents descriptive data on the type of FDA records analysts request under the FOIA (Panel A), the outcomes of these requests (Panel B), and the calendar days between requesting (request date) and receiving (receipt date) these records (Panel C). For Panel A, see Table 1 for a description of each FDA report type. *Post Market Surveillance Database* is a combination of FAERS, MDR, CAERS, and VAERS. For Panels B and C, *Sent* is when the FDA grants FOIA information to the investment company requester, *Partial Sent* is when at least one, but not all, of the requested records is sent, *Denial* is when no record is sent, *No Record* is when the FDA's response is that the requested record does not exist, *Withdrawn* involves cases in which the requester voluntarily withdraws its FOIA request, and *Other Reasons* refer to cases where the request is closed due to other reasons and no information is released to the requester. A single FOIA request may cover multiple categories. *Year* is the year of the request date.

Panel A: Types of FDA Records Requested by Analysts under the FOIA

Year	Establishment Inspection Report (EIR)	Form 483	Post Market Surveillance Database	Warning Letter (WL)	Approval Recommendation (REC)	Other	Total
1999	0	0	0	0	0	0	0
2000	0	0	0	1	1	4	6
2001	1	1	0	0	2	1	5
2002	3	10	4	5	3	3	28
2003	0	0	2	0	5	2	9
2004	1	1	3	2	2	6	15
2005	0	6	8	1	3	9	27
2006	0	2	7	0	5	6	20
2007	1	2	3	0	5	4	15
2008	1	11	4	2	1	3	22
2009	10	33	0	7	10	16	76
2010	26	37	5	12	7	18	105
2011	1	64	6	14	4	10	99
2012	4	28	12	4	8	21	77
2013	5	20	37	8	6	18	94
2014	1	11	36	1	3	5	57
Total	**54**	**226**	**127**	**57**	**65**	**126**	**655**

Panel B: Outcomes of Requests by Analysts for FDA Records

	Sent	Partial Sent	Denial	No Record	Withdrawn	Other Reason	Pending	Total
1999	0	0	0	0	0	0	0	0
2000	1	0	0	0	3	0	0	4
2001	1	0	1	0	1	0	0	3
2002	18	0	1	1	2	2	0	24
2003	5	0	0	0	3	1	0	9
2004	9	0	0	2	0	1	0	12
2005	16	0	0	2	3	3	0	24
2006	14	0	0	3	2	4	0	23
2007	13	0	0	0	0	2	0	15
2008	16	0	0	2	0	0	0	18
2009	27	5	3	5	5	2	0	47
2010	33	1	2	11	8	2	0	57
2011	53	0	0	18	4	2	0	77
2012	54	0	3	1	5	5	0	68
2013	67	2	3	2	0	1	2	77
2014	58	0	5	5	1	0	1	70
Total	**385**	**8**	**18**	**52**	**37**	**25**	**3**	**528**

Panel C: Calendar Days Between an FOIA Request (Request Date) and an FDA Decision (Outcome Date)

	Mean	Std. Dev.	5% percentile	25% percentile	Median	75% percentile	95% percentile
Sent	75.5	188.5	0	6	18	44	348
Partial Sent	99.2	102.8	13	23	37	168	295
Denial	29.7	29.1	1	7	25	38	120
No Record	68.6	163.7	1	4	11	52	464
Withdrawn	225.1	320.4	0	14	78	334	826
Other Reason	203.2	299.4	0	4	32	347	943
All Requests	91.8	207.1	0	6	20	54	548

Table 4
Analysts' Stock Recommendation Changes

This table describes the direction of stock recommendation changes by analysts after receiving FDA records (Panel A) and average monthly returns earned by portfolios of stocks based on buy or sell recommendations by analysts (Panel B). Panel A presents the number of stock recommendation changes made by analysts within one year of receiving at last one FDA record by record type. See Table 1 for a description of the record types. Panel B shows the average calendar-time monthly returns of stocks based on buy or sell recommendations. *Before receipt date* encompasses all recommendations within one year prior to the receipt of FDA records. *After receipt date* encompasses all recommendations after one year of the receipt of the FDA records. *FOIA Analysts* are those analysts receiving FDA records. *Control Analysts* are a sample of analysts matched by coverage of the same stock, date of coverage, and the number of brokerage house employees.

Panel A: Number of New Recommendations After Receipt of FDA Records

Direction of Recommendation	EIR	Form 483	Complaints	WL	Other	REC	Total/ % of Total
Buys/upgrades	9	43	19	11	24	7	90/24%
Holds/sells/downgrades	6	49	11	5	16	6	78/21%
No changes in recommendation	12	98	31	16	56	26	204/55%
Number of receipt dates	27	190	61	32	96	39	372

Panel B: Monthly Stock Returns Before and After the Receipt Date

		Buy Recommendations			Sell Recommendations		
		Pre-receipt date	Post-receipt date	Difference	Pre-receipt date	Post-receipt date	Difference
Overall	FOIA Analysts	0.61% [1.10]	2.71%*** [5.12]	2.10%*** [2.73]	1.14%** [2.13]	1.86%*** [4.13]	0.72% [1.03]
	Control Analysts	0.84%*** [4.80]	1.27%*** [8.63]	0.42%* [1.86]	1.82%*** [7.10]	2.53%*** [14.36]	0.71%** [2.32]
	Difference	-0.23% [-0.43]	1.44%*** [2.92]		-0.68% [-1.15]	-0.68% [-1.41]	
Only Upgrades /Downgrades	FOIA Analysts	0.80% [0.92]	3.06%*** [3.67]	2.26%* [1.86]	1.48%** [2.26]	2.50%*** [3.45]	1.02% [1.05]
	Control Analysts	1.76%*** [5.85]	1.08%*** [4.64]	-0.68%* [-1.80]	1.92% [5.91]	2.17%*** [7.76]	0.25% [0.56]
	Difference	-0.95% [-1.10]	1.98%** [2.59]		-0.44% [-0.61]	0.34% [0.43]	

Table 5
Summary Statistics

This table presents summary statistics for variables used in the regressions in this paper. Panel A has firm characteristics. Panel B has analyst characteristics. *Firm Size* is the natural log of market capitalization at time t-n. *B/M* is the firm's book-to-market ratio at time t-n. *Momentum* is the firm's raw return over the prior 12 months. *S.D. of Past Forecasts* is the standard deviation of the last EPS short-term forecasts reported on I/B/E/S. *Institutional Ownership* is the percentage of shares owned by institutional investors, as reported on Thomson-Reuters. *Revenue* is the revenue for year t. *EPS* is the earnings per share for year t. *Revenue Accuracy* is the absolute value of the revenue forecast at time t-n minus the actual Revenue reported in time t, all divided by Price times outstanding shares at time t-n. *Earnings Accuracy* is the absolute value of the EPS forecast at time t-n minus the actual EPS reported in time t, all divided by Price at time t-n. *No. of News Articles* is the number of newspaper articles between the analyst's pre-receipt and post-receipt dates, as collected from Factiva. *PhD Degree*, *MD Degree, and MBA Degree* are dummy variables equal to one if the analyst has this degree, respectively, and zero otherwise. *Analyst Experience* is the number of years the analyst has been employed as an analyst. *No. of Stocks Covered* is the number of stocks covered by the analyst. *Star Analyst* is a dummy variable equal to one if the analyst is designated a Star Analyst by Institutional Investor magazine in year t-n, and zero otherwise. *Distance* is the number of days between the forecast and the earnings or revenue announcement.

Panel A: Firm Characteristics

	Average	**Median**	**Std. Dev.**
Firm Size ($billion)	27.96	4.92	51.74
B/M	0.59	0.28	1.76
Momentum (BUY, past 12 month)	39.65%	11.77%	147.76%
Momentum (SELL, past 12 month)	15.22%	2.01%	116.42%
S.D. of Past Forecasts	0.27	0.21	0.27
Institutional Ownership	76.88%	84.68%	22.91%
Revenue ($billion)	9.95	2.22	16.94
EPS	2.06	2.04	2.89
Revenue Accuracy	0.055	0.026	0.010
Earnings Accuracy	0.032	0.010	0.080
No. of News Articles	790	463	1364

Panel B: Analyst Characteristics

	FOIA Analysts		**Diff. with Control Analysts**	
	Average	Std. Dev.	Diff. in Avg.	*t*-stat of Diff.
Analyst Experience (in years)	7.10	4.75	0.14	0.49
No. of Stocks Covered	8.30	4.80	-0.27	-0.80
Star Analyst	16.7%	37.4%	5.3%**	2.54
PhD Degree	19.5%	39.0%	3.6%	1.00
MD Degree	8.5%	28.0%	2.7%	1.11
MBA Degree	47.8%	50.2%	-1.5%	-0.26
Distance (in years)	1.54	0.30	0.00	0.45

Table 6
Regressions on Buy Recommendations

This table presents regression analyses of daily stock returns beginning the day after an analyst issues a buy recommendation. *FOIA Analyst* equals 1 for an analyst who received FOIA records for the stock. Control analysts are matched using brokerage size and coverage. *Post* equals 1 for periods after the receipt date. *Firm Size* is the natural log of lagged market capitalization in millions of dollars. *B/M* is the lagged book-to-market ratio of the company. *Momentum* is the firm's return in the past 12 months. *Analyst Experience* is the number of years the analyst has made recommendations as recorded in I/B/E/S. *No. of Stocks Covered* is the total number of stocks covered by the analyst. *PhD/MD* (*MBA*) equals 1 if the analyst has a PhD or MD (MBA) degree. *Star Analyst* is an indicator equal to 1 if the analyst was voted an all-American star analyst in the October issue of *The Institutional Investor* magazine for the given year. *S.D. of Past Forecast* is the standard deviation of the last EPS forecasts. *Institutional Ownership* is the proportion of shares held by institutional investors as reported by the Thomson Reuters Ownership Database. Returns are winsorized at 0.01%. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

	Dependent Variable: Stock Return					
	(1)	(2)	(3)	(4)	(5)	(6)
FOIA Analyst × Post	0.0200***	0.0195**	0.0201***	0.0195**	0.0208***	0.0202***
	[2.62]	[2.56]	[2.62]	[2.55]	[2.69]	[2.62]
FOIA Analyst	-0.0051	-0.0052	-0.0058	-0.0059	-0.0066	-0.0066
	[-0.88]	[-0.90]	[-0.99]	[-1.01]	[-1.13]	[-1.13]
Post	0.0032	0.0036	0.0035	0.0038	0.0035	0.0038
	[1.34]	[1.48]	[1.44]	[1.57]	[1.44]	[1.56]
Firm Size			-0.0050***	-0.0052***	-0.0056***	-0.0059***
			[-4.31]	[-4.53]	[-4.60]	[-4.88]
B/M			0.0118***	0.0115***	0.0107***	0.0106***
			[3.03]	[2.97]	[2.66]	[2.64]
Momentum			-0.0970***	-0.1027***	-0.1125***	-0.1186***
			[-4.87]	[-5.15]	[-5.39]	[-5.66]
Analyst Experience					-0.0001	-0.0001
					[-0.06]	[-0.01]
No. of Stocks Covered					-0.0006***	-0.0004*
					[-2.86]	[-1.94]
PhD/MD Degree					0.0062**	0.0061**
					[2.16]	[2.12]
MBA Degree					-0.0010	-0.0013
					[-0.39]	[-0.52]
Star Analyst					0.0009	0.0010
					[0.17]	[0.19]
S.D. of Past Forecasts					-0.0122**	-0.0135**
					[-2.01]	[-2.23]
Institutional Ownership					-0.0094	-0.0081
					[-1.36]	[-1.18]
Intercept	0.0091***	0.0459***	0.0494***	0.0887***	0.0667***	0.1040***
	[5.02]	[11.30]	[4.53]	[7.70]	[4.90]	[7.35]
Month FEs	N	Y	N	Y	N	Y
Firm FEs	Y	Y	Y	Y	Y	Y
Analyst FEs	Y	Y	Y	Y	Y	Y
Observations	241048	241048	238041	238041	238041	238041
Adj. R-squared %	0.1	0.2	0.1	0.2	0.1	0.2

Table 7
Regression for Sell Recommendations

This table presents regression analyses on daily stock returns beginning the day after an analyst issues a sell recommendation. All variables are identical to those in Table 6. Returns are winsorized at 0.01%. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

	Dependent Variable: Stock Return					
	(1)	(2)	(3)	(4)	(5)	(6)
FOIA Analyst × Post	0.0087	0.0090	0.0048	0.0050	0.0064	0.0064
	[1.09]	[1.12]	[0.59]	[0.62]	[0.79]	[0.80]
FOIA Analyst	-0.0079	-0.0080	-0.0108*	-0.0109*	-0.0105*	-0.0104*
	[-1.27]	[-1.29]	[-1.72]	[-1.75]	[-1.67]	[-1.66]
Post	0.0046	0.0039	0.0059*	0.0052	0.0071**	0.0063*
	[1.39]	[1.17]	[1.76]	[1.55]	[2.10]	[1.88]
Firm Size			-0.0134***	-0.0136***	-0.0139***	-0.0141***
			[-9.63]	[-9.79]	[-8.99]	[-9.11]
B/M			0.0022	0.0021	0.0006	0.0004
			[1.39]	[1.31]	[0.36]	[0.27]
Momentum			-0.3508***	-0.3516***	-0.3646***	-0.3649***
			[-12.01]	[-12.04]	[-12.26]	[-12.27]
Analyst Experience					-0.0001	-0.0001
					[-0.25]	[-0.09]
# Stocks Covered					0.0001	0.0001
					[0.24]	[0.64]
PhD/MD Degree					-0.0016	-0.0021
					[-0.43]	[-0.59]
MBA Degree					-0.0007	-0.0009
					[-0.24]	[-0.28]
Star Analyst					0.0040	0.0036
					[0.79]	[0.71]
S.D. of Past Forecasts					-0.0166*	-0.0153*
					[-1.93]	[-1.77]
Institutional Ownership					-0.0397***	-0.0364***
					[-4.61]	[-4.23]
Intercept	0.0193***	0.0492***	0.1418***	0.1744***	0.1804***	0.2093***
	[7.34]	[9.32]	[10.71]	[12.40]	[10.52]	[11.82]
Month Fes	N	Y	N	Y	N	Y
Firm Fes	Y	Y	Y	Y	Y	Y
Analyst Fes	Y	Y	Y	Y	Y	Y
Observations	231932	231932	230732	230732	230732	230732
Adj. R-squared %	0.1	0.2	0.2	0.3	0.2	0.3

Table 8
Analyst Earnings and Revenue Accuracy

This table presents one-year ahead (Panel A) and two-year ahead (Panel B) Earnings and Revenue Accuracy for analysts with forecasts made either before or after the receipt of FOIA requested FDA records. *Earnings Accuracy* is the absolute value of the EPS forecast at time t-n minus the actual EPS reported in time t, all divided by Price at time t-n. *Revenue Accuracy* is the absolute value of the Revenue forecast at time t-n minus the actual Revenue reported in time t, all divided by Price times Outstanding Shares at time t-n. *FOIA Analyst* equals 1 for an analyst who received FOIA records for the stock. Control analysts are matched using brokerage size and coverage. Earnings accuracy and revenue accuracy are winsorized at 0.2%. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

Panel A: One-year Ahead Accuracy

	Earnings Accuracy			Revenue Accuracy		
	Pre-Receipt date	Post-receipt date	Difference	Pre-receipt date	Post-receipt date	Difference
FOIA Analysts	1.12%***	0.99%***	-0.14%	1.92%***	1.91%***	-0.02%
	[13.91]	[17.53]	[-1.41]	[16.01]	[15.82]	[-0.09]
Control Analysts	1.04%***	0.99%***	-0.05%	1.69%***	1.60%***	-0.09%
	[42.96]	[32.71]	[-1.14]	[41.43]	[40.94]	[-1.50]
Difference	0.09%	-0.00%		0.23%**	0.30%***	
	[1.36]	[-0.03]		[2.21]	[2.96]	

Panel B: Two-Year Ahead Accuracy

	Earnings Accuracy			Revenue Accuracy		
	Pre-receipt date	Post-receipt date	Difference	Pre-receipt date	Post-receipt date	Difference
FOIA Analysts	2.82%***	2.75%***	-0.07%	6.82%***	5.86%***	-0.96%
	[13.32]	[13.05]	[-0.26]	[11.45]	[12.63]	[-1.29]
Control Analysts	3.09%***	3.49%***	0.40%**	5.29%***	5.69%***	0.40%*
	[32.42]	[23.97]	[2.30]	[46.64]	[30.64]	[1.82]
Difference	-0.27%	-0.74%**		1.53%***	0.17%	
	[-1.15]	[-2.33]		[4.17]	[0.38]	

Table 9
Regressions for Two-Year Earnings Accuracy

This table presents summary statistics for regressions on two-year ahead Earnings Accuracy by whether an analyst has received FDA records from a FOIA request. *Two-Year Ahead Earnings Accuracy* = |*Forecast – Actual*|/*Stock Price*, in which *Stock Price* is taken on the forecast date. *Distance* is the number of days between the EPS forecast date and the actual announcement date. *No. of News Articles* is the number of newspaper articles between the analyst's pre-receipt and post-receipt dates, as collected from Factiva. All other variables are identical to those in Table 6. Two-Year Ahead Earnings Accuracy variables are winsorized at 0.2%. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

	Dependent Variable: Two-year Ahead Earnings Accuracy					
	(1)	(2)	(3)	(4)	(5)	(6)
FOIA Analyst × Post	-0.0046**	-0.0050**	-0.0047**	-0.0049**	-0.0064***	-0.0067***
	[-2.02]	[-2.16]	[-2.04]	[-2.15]	[-2.79]	[-2.91]
FOIA Analyst	-0.0004	-0.0000	-0.0003	-0.0001	0.0008	0.0010
	[-0.24]	[-0.02]	[-0.15]	[-0.03]	[0.42]	[0.56]
Post	-0.0007	0.0003	0.0006	0.0007	-0.0002	-0.0002
	[-0.65]	[0.33]	[0.62]	[0.68]	[-0.16]	[-0.14]
Firm Size					0.0147***	0.0146***
					[8.89]	[8.82]
B/M					0.0037***	0.0037***
					[5.30]	[5.29]
Analyst Experience					0.0001	0.0001
					[0.73]	[0.92]
No. of Stocks Covered					-0.0001*	-0.0001
					[-1.72]	[-1.54]
Distance			0.0232***	0.0158***	0.0231***	0.0152***
			[15.82]	[7.32]	[15.82]	[6.99]
PhD/MD Degree					-0.0022*	-0.0022*
					[-1.94]	[-1.91]
MBA Degree					-0.0038***	-0.0037***
					[-3.84]	[-3.73]
Star Analyst					-0.0002	-0.0003
					[-0.13]	[-0.17]
S.D. of Past Forecasts					0.0606***	0.0600***
					[9.80]	[9.67]
Institutional Ownership					-0.0018	0.0004
					[-0.36]	[0.09]
No. of News Articles (in thousands)					-0.0014**	-0.0014***
					[-2.53]	[-2.62]
Intercept	0.0328***	0.0271***	-0.0035	0.0045	-0.2820***	-0.2743***
	[45.91]	[18.59]	[-1.46]	[1.33]	[-18.28]	[-17.54]
Month FEs	N	Y	N	Y	N	Y
Firm FEs	Y	Y	Y	Y	Y	Y
Analyst FEs	Y	Y	Y	Y	Y	Y
Observations	10865	10865	10865	10865	10728	10728
Adj. R-squared %	68.2	68.9	68.9	69.1	70.3	70.4

Table 10
Regressions for Two-Year Ahead Revenue Accuracy

This table presents summary statistics for regressions of two-year ahead Revenue Accuracy by whether an analyst has received FDA records from a FOIA request. *Two-Year Ahead Revenue Accuracy = |Forecast – Actual|/(Stock Price x Shrs)*. All other variables are identical to those in Table 6, 8 and 9. Revenue Accuracy is winsorized at 0.2%. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

	Dependent Variable: Two-year Ahead Revenue Forecast Error					
	(1)	(2)	(3)	(4)	(5)	(6)
FOIA Analyst × Post	-0.0093***	-0.0103***	-0.0102***	-0.0104***	-0.0130***	-0.0131***
	[-2.94]	[-3.31]	[-3.30]	[-3.36]	[-4.13]	[-4.18]
FOIA Analyst	0.0035	0.0040	0.0042*	0.0044*	0.0053**	0.0054**
	[1.35]	[1.57]	[1.66]	[1.73]	[2.03]	[2.10]
Post	-0.0032**	-0.0013	-0.0009	-0.0005	0.0002	0.0005
	[-2.37]	[-0.97]	[-0.65]	[-0.41]	[0.13]	[0.31]
Firm Size					0.0148***	0.0141***
					[6.23]	[5.91]
B/M					-0.0033	-0.0035
					[-0.79]	[-0.83]
Analyst Experience					-0.0001	-0.0001
					[-0.27]	[-0.11]
No. of Stocks Covered					-0.0003***	-0.0003***
					[-3.03]	[-2.82]
Distance			0.0389***	0.0323***	0.0399***	0.0335***
			[20.24]	[11.31]	[20.41]	[11.39]
PhD/MD Degree					-0.0050***	-0.0050***
					[-3.28]	[-3.26]
MBA Degree					-0.0013	-0.0011
					[-0.91]	[-0.81]
Star Analyst					0.0004	0.0003
					[0.22]	[0.16]
S.D. of Past Forecasts					0.0595***	0.0577***
					[7.19]	[6.95]
Institutional Ownership					0.0190***	0.0208***
					[2.83]	[3.08]
No. of News Articles (in thousands)					-0.0016**	-0.0016**
					[-2.01]	[-2.02]
Intercept	0.0568***	0.0534***	-0.0041	0.0083*	-0.1621***	-0.1448***
	[60.01]	[28.45]	[-1.30]	[1.89]	[-7.32]	[-6.43]
Month FEs	N	Y	N	Y	N	Y
Firm FEs	Y	Y	Y	Y	Y	Y
Analyst FEs	Y	Y	Y	Y	Y	Y
Observations	11065	11065	11065	11065	10911	10911
Adj. R-squared %	64.1	65.1	65.4	65.5	65.8	65.9

Table 11
Regressions for One-Year Ahead Forecast Accuracy

This table presents summary statistics for regressions of one-year ahead Earnings Accuracy and one-year ahead Revenue Accuracy by whether an analyst has received FDA records from a FOIA request. All variables are identical to those in Tables 6 and 8. The *Other Controls* are the control variables used in Tables 9 and 10. RPS and EPS Accuracy variables are winsorized at 0.2%. *, ** and *** indicate statistical significance at the10%, 5% and 1% levels, respectively.

	Dependent Variable: One-year Ahead EPS Accuracy					
	(1)	(2)	(3)	(4)	(5)	(6)
FOIA Request × Post	0.0005	0.0002	0.0003	0.0002	-0.0001	-0.0002
	[0.62]	[0.33]	[0.39]	[0.27]	[-0.07]	[-0.21]
FOIA Request	-0.0011*	-0.0009	-0.0009	-0.0008	-0.0006	-0.0005
	[-1.78]	[-1.58]	[-1.51]	[-1.41]	[-1.00]	[-0.87]
Post	-0.0012***	-0.0007**	-0.0008***	-0.0006**	-0.0007**	-0.0005
	[-3.76]	[-2.20]	[-2.68]	[-2.10]	[-1.98]	[-1.48]
Distance			0.0172***	0.0109***	0.0174***	0.0111***
			[36.06]	[14.82]	[36.10]	[14.76]
Other Controls					Y	Y
Month FEs	N	Y	N	Y	N	Y
Firm FEs	Y	Y	Y	Y	Y	Y
Analyst FEs	Y	Y	Y	Y	Y	Y
Observations	12322	12322	12322	12322	12186	12186
Adj. R-squared %	40.3	46.2	46.1	47.2	46.8	47.8

	Dependent Variable: One-year Ahead RPS Accuracy					
	(1)	(2)	(3)	(4)	(5)	(6)
FOIA Request × Post	-0.0002	-0.0008	-0.0006	-0.0008	-0.0010	-0.0012
	[-0.16]	[-0.70]	[-0.52]	[-0.66]	[-0.86]	[-1.03]
FOIA Request	-0.0001	0.0001	0.0005	0.0004	0.0007	0.0007
	[-0.12]	[0.09]	[0.50]	[0.44]	[0.75]	[0.72]
Post	-0.0013**	0.0000	-0.0001	0.0002	0.0007	0.0010*
	[-2.47]	[0.07]	[-0.17]	[0.47]	[1.32]	[1.91]
Distance			0.0332***	0.0248***	0.0331***	0.0245***
			[45.74]	[22.24]	[45.05]	[21.37]
Other Controls					Y	Y
Month FEs	N	Y	N	Y	N	Y
Firm FEs	Y	Y	Y	Y	Y	Y
Analyst FEs	Y	Y	Y	Y	Y	Y
Observations	13149	13149	13149	13149	12996	12996
Adj. R-squared %	34.6	42.5	43.8	44.6	44.0	44.8