Costs and Benefits of Acquiring Information: How Hedge Fund Managers Trade on the Freedom of Information Act

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Abstract

Using the Freedom of Information Act, hedge funds request and receive records from the Food and Drug Administration about new product approvals, factory inspections, and complaints. We use these requests to empirically test implications of theories about investors acquiring information for trading purposes. Consistent with theory, we find evidence that the magnitude of hedge fund trades is negatively related to the funds' processing costs of acquired information and positively related to benefits derived from trading. Our findings hold when using a large set of Schedule 13F quarterly changes in holdings and also when using a smaller set of transaction data.

1. Introduction

In this paper, we use a unique data set to examine the costs and benefits of information acquisition by investing firms. There are many models and assumptions behind information acquisition theories. We begin with the notion that investors have a constrained capacity in the amount of information they can process. Because of this constraint, investors choose to specialize in gathering information about certain assets or economic factors (Sims, 2003; Peng, 2005). Van Nieuwerburgh and Veldkamp (2009) predict that when choosing what to learn, investors specialize in learning about firms in which they already have an information advantage; that is, they predict investors' profits will be higher if they gather new information about firms in which they have prior information advantages.

Van Nieuwerburgh and Veldkamp (2009) use their model to explain the home bias in holdings for investing funds. But, their model has implications about costs and benefits of information acquisition by hedge funds. First, consistent with earlier models (e.g., Grossman and Stiglitz, 1980), it predicts that hedge funds will trade on acquired information if they believe there is a profit to be gained from trading. Second, their model predicts that processing costs of acquiring new information about a firm (1) varies across hedge funds and (2) is negatively related to the information advantage about the firm that the hedge fund has.

Testing these implications, however, are empirically challenging, because it is difficult to discern the timing of new information acquisition by investors and its connected trading strategies. It is also difficult to measure differences in prior information, information acquisition costs and benefits among individual investors. This paper somewhat overcomes these challenges by examining the trading behavior of investment funds receiving information under the Freedom of Information Act (FOIA) from the Food and Drug Administration (FDA) between January 1999 and December 2013.

Under this Act, individuals, including investment companies and their employees, may ask for a copy of any record that the FDA holds pertaining to the requested firm. The records that the FDA maintains include reports on its factory inspections, FDA warning letters issued to firms under its jurisdiction, complaints to the FDA by consumers, doctors, and hospitals, and FDA

approvals of the sale of new drugs and medical devices. Principally, these records are private with two key exceptions. The first exception is that any individual may request any FDA record(s) for any firm. If the FDA has the record(s), it will (within certain legal limitations) mail the record to the individual. The second exception is that 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).

The FOIA also allows individuals (researchers) 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 requested, and the outcomes of these requests. We also asked the FDA for the request and FDA outcome dates. The FDA acted on our query by sending us information on over 170,000 individual requests between 1999 and 2013; of these requests, over 1,200 were by investing firms, primarily those that can be classified as hedge funds.[1] Thus, we are able to identify the type and approximate date of receipt of information requested by hedge funds. Using two distinct databases, Schedule 13F quarterly holdings and a transactions database, we are able to discern trading patterns around the receipt of this information.

Our study produces several interesting findings about how hedge funds use the FOIA to manage their trading portfolios.

As a first pass we find that the acquisition of some, but not all types, of records by the hedge fund is associated with significant abnormal stock returns beginning five days after the FDA mails out the requested information. In general, we find that the sign of the abnormal returns reflects the direction of an ex-ante assessment of whether the record contains good or bad news about the firm. These findings are consistent with the requested records containing news about the firms' future cash flows, and with the notion that investors can use this information to manage their portfolios.

[1] Throughout the paper, we use investment fund and hedge fund interchangeably. Note, however, there are a few mutual funds in our data sample.

However, when we examine trading patterns associated with each type of record, we find no clear evidence that any type of record primarily triggers hedge funds to buy or sell upon receipt of the record type. Instead, we find a blend of buys/sells/no trading action associated with each record type. This finding suggests that the information processing costs and perceived benefits of receiving this information vary substantively across hedge funds and across FDA records. Put differently, the data set we examine offers us a rich setting to discern trading patterns and abnormal returns to hedge funds associated with the acquisition and processing of complex information.

We do find that hedge funds often trade on receipt of this information. Of the 906 FOIA requests on publicly-traded companies that we were able to track hedge funds' holdings, 42% are associated with trading activity by the requesting hedge fund in the quarter of receipt of information. Further, the changes in stock holdings appear to be economically significant – the median change in holdings for the hedge fund requesting the FDA record is 265,100 shares when the hedge fund is a net buyer of the stock, and -297,400 shares when the hedge fund is a net seller. These numbers contrast sharply with the zero median shares bought or sold by hedge funds not requesting the FDA records.

Quarterly data, however, does not allow us to make inferences about when the hedge fund trades with respect to the receipt of the FDA record. For example, it is plausible that a hedge fund trades prior to requesting or receiving the record and uses the FOIA record to validate its prior trade. To address this timing issue, we use transaction data for a subset of hedge funds with available data to monitor the trading activity surrounding the receipt of the requested records. Using this data, we find evidence that when hedge fund trade, they have net purchases, on average, of 119,700 shares [$18.9 million] over trading days (+5, +15), and net sales, on average, of 183,200 shares [$29.5 million] over the same time period, where day 0 is the mailing date by the FDA to the hedge fund. Thus, using both quarterly and daily trading data, our findings are consistent with hedge funds using the receipt of these records to manage their investing portfolios.

We also find evidence consistent with the hypotheses implicit in Sims (2003), Peng (2005) and Van Nieuwerburgh and Veldkamp (2009) about information acquisition by investors with capacity constraints. A key theoretical finding in Peng (2005) and Van Nieuwerburgh and Veldkamp (2009) is that an investor's processing costs are negatively related to the investor's prior information advantage about the target firm. Using a different paradigm, Boot and Thakor (2001) propose that new complementary information is more informative to investors than new substitutive information. Based on these papers, we create different empirical proxies for a hedge fund's prior knowledge about the FOIA request firm. These proxies include previous ownership of the requested firm's shares, length of ownership, the fraction of the hedge fund's portfolio invested in the same industry as the requested firm, and whether the hedge fund received FDA records from a FOIA request within the previous year. Our results are strongly consistent with there being a positive association between trade size and these proxies for information advantage, which, in turn, are negatively related to of a hedge fund's processing cost.

We also find strong evidence in support of hedge funds trading on requested FDA records when the economic benefits of these trades are more profitable. Using abnormal stock returns on the target firm's equity following the hedge fund's receipt of the FDA records as our measure of economic benefits, we find a significantly positive association between net stock purchases and abnormal returns. We find a similar significantly negative association between net stock sales and the same period's abnormal returns. Thus, the direction and magnitude of hedge fund trading on the receipt of the FDA records are consistent with the hedge fund employing a more profitable trading strategy vis-à-vis the average investor (Van Nieuwerburgh and Veldkamp, 2009).

We also acknowledge the possibility that trading activity may be due to other public disclosures around the FDA record receipt date, for example, earnings announcements or public disclosure of the news contained in the FDA records by the target firm. We control for a myriad of information released or known around the FOIA receipt date and still find significant correlations between trading activity, processing costs, and benefits of trading. We also control

for economic factors, such as the stock's liquidity, the number of analysts following the target firm, and the target firm's profitability.

Finally, we examine the proposition that hedge funds are more likely to seek new information about firms in which they have an information advantage. Consistent with this prediction, we find that the likelihood of a hedge fund making a FOIA request on a particular firm in its portfolio is positively related to its prior knowledge about that firm

Our research contributes to several streams of economic and financial literatures. In their seminal paper on information acquisition, Grossman and Stiglitz (1980) describe some economic conditions in which some traders choose to be informed and others uninformed. In their model, costs are exogenous to investors and do not vary among investors. Several theory papers, for example, Sims (2003), Peng (2005), Peng and Xiong (2006) and Van Nieuwerburgh and Veldkamp (2009) introduce conditions that result in processing costs of new information being endogenous and variable across investors. Our paper empirically tests some of these implications by using datasets that provide dates of information acquisition and trading activity for large hedge funds.

Our paper also contributes to the literature on semi-strong efficient markets. Under this theory, stock prices quickly incorporate all new publicly available information. FOIA requests to the FDA are relatively inexpensive and accessible to all investors. Yet, we find that only a few hedge funds request and trade on this seemingly publicly available information. An explanation consistent with this phenomenon is that FDA records are complex to interpret, resulting in substantive processing costs to investors requesting this information. Our paper provides evidence on how differences in processing costs across investors for publicly available information affect trading in semi-strong efficient markets.

This study contributes to the literature on how hedge funds acquire and process information. Ivashina and Sun (2011) and Massoud, Nandy, Saunders and Song (2011) provide evidence that hedge funds trade on non-public information obtained from being part of loan syndications. Klein, Saunders, and Wong (2014) link hedge fund trading to upcoming changes in analysts' recommendations. In these studies, the acquired information is limited to those with private

access to information, whereas in our study, the information is available to all who request it. In a similar vein to our study, Rogers, Skinner and Zechman (2014) and Jackson, Jiang, and Mitts (2015) examine trading patterns for investors who legally subscribe to services that allow them to gain access to Form 4, Form 13D, and Form 8K filings within 90 seconds of the SEC posting them on Edgar. Both papers find that investors trade actively within minutes of receiving the early filings. Our paper is similar to these papers in that the acquisition of the information is available to all investors. It differs from their papers, however, in that the receipt of FDA records appears to require more substantive processing costs than the receipt of SEC filings.[2]

Our paper contributes to the role that regulation plays in financial markets. There is a great deal of controversy about costs and benefits of federal and state regulation, with advocates on both sides pleading for more or less regulation. As estimated by the Competitive Enterprise Institute (Crews, 2014), the annual direct and indirect costs of federal regulation are $1.76 trillion. Although our study does not address all costs and benefits of federal regulation, it presents some support to the view that the FOIA provides economic benefits to investors by providing them with complex, value-relevant information about FDA regulatory behavior. Our findings also speak to whether the FDA should post all of their reports on their website in a timely fashion. On the one hand, our results are consistent with hedge funds exploiting the FOIA to receive value-relevant information that is not universally known to the market. On the other hand, our findings are consistent with the requested information being relatively complex to process, thereby minimizing its value-relevance to those who do not have the sophistication to assimilate the data into profitable trades.

2. Theoretical Background

Grossman and Stiglitz (1980) assume that information acquisition costs are exogenous and do not vary among investors. Primarily, there are two types of information acquisition costs –

[2] Gargano, Rossi, and Wermers (2015) have a working paper using FOIA requests by investment firms for FDA records. However, their paper is very different from this study in terms of data, questions asked, and research design. Where appropriate, we describe some of the differences between papers.

direct costs and processing costs. Direct costs of obtaining publicly available information are relatively low; for example, Google searches, news stories (Veldkamp, 2006) and records requested under the FOIA have inexpensive fixed costs and require minimal exertion from investors. Consistent with Grossman and Stiglitz (1980), these costs are relatively fixed, that is, the price of buying the Wall Street Journal or fees for obtaining information under the FOIA do not vary substantially across investors.

Processing costs of publicly available information, however, may vary substantively across investors.

Under an assumption of constrained capacity, investors cannot process an unlimited amount of information. This constraint contributes to variations in investors' processing costs in two important ways. First, if investors have different levels of constrained capacities, i.e., different capabilities to absorb information, then they will have inherently different abilities to correctly assess new information. Second, since investors cannot pay attention to all available information, each individual investor will choose which asset or factor to learn more about. Sims (2003) calls this choice rational inattention.

Thus, processing costs are endogenous to investors through variations in ability and available resources. In support of this conjecture, Blankespoor, Miller and White (2013) find evidence consistent with more sophisticated investors being able to garner greater benefits from the SEC mandating a new computer search technology in 2009 for reading financial statement data than less sophisticated investors. They attribute their results to sophisticated investors having "superior resources and abilities" in using the new technologies. Note that the technologies are available to all investors.[3]

[3] In a similar vein, Hirshleifer and Teoh (2003) derive a limited attention hypothesis for investors. Under their hypothesis, some investors with constrained capacities have limited abilities to see through firms' pro forma earnings disclosures. This limited attention results in many investors making incorrect or no adjustments to a firm's pro forma earnings, resulting in misevaluation, long-run abnormal returns, and strategic disclosure decisions by firms. The empirical results in their paper support this view.

Using these insights into the ramifications of constrained capacity, several theory papers explore the role that information acquisition has on the learning process of investors (e.g., Sims, 2003; Peng, 2005; Van Nieuwerburgh and Veldkamp, 2009).

Using a standard notation, an investor's dollar holdings in any investment, q, is:

$$q = 1/\rho\ (\Sigma)^{-1}\ (\mu - pr) \qquad (1),$$

where ρ is the investor's absolute risk aversion, μ is the investor's expected payoff from the investment, p is the price of the investment, r is the risk free rate, Σ is the uncertainty about the investment's payoff and Σ^{-1} is the precision of the investment's payoff. An assumption underlying (1) is that the expected payoff is normally distributed with a mean of μ and a variance of Σ.

Before an investor acquires information, μ and Σ, respectively, is assumed to be a function of the investor's prior information about the asset and the asset's current price (Grossman and Stiglitz, 1980). After acquiring the information, the investor updates his information, forming posterior beliefs described by the distribution N(μ and Σ). Thus, μ and Σ^{-1} are now functions of the investor's prior information, stock price, and new information.

A key implication of these papers is that lower information processing costs systematically increase belief precision, Σ^{-1}, but do not systematically increase or decrease the posterior mean, μ (Veldkamp, 2011). A second implication is that an investor with an initial information advantage about an asset, measured as the precision of the investor's prior information, will invest more in that asset and will be more likely to seek out new information about that asset. Van Nieuwerburgh and Veldkamp (2009) use this insight to explain home biases in investing. Dasgupta and Mondria (2014) use it to explain patterns of trades across countries. A third implication is that the more precise an investor's prior information is about the asset's value, the lower is the processing cost of acquiring new information to that investor. That is, in determining the posterior estimate of Σ^{-1}, there is a positive interactive effect between the investor's prior information about the asset and the new information obtained.

These papers allow us to make predictions about the association between a hedge fund's processing costs of its receipt of FDA records and how it trades on this information.

Prediction 1: Trading activity by hedge funds upon receipt of FDA records is negatively related to the hedge fund's processing costs.

Prediction 2: The processing costs to a hedge fund receiving the FDA records are negatively related to the hedge fund's prior knowledge about the value of the target company's value.

Because information processing raises the precision of beliefs, Σ^{-1}, and because the expected risk premium, $\mu - pr$, is positive, equation (1) predicts that an increase in precision (Σ^{-1}) will increase q. Thus, even if μ does not change, a receipt of new information that increases precision will result in the hedge fund increasing its holdings in the target firm's securities. However, the receipt of information could also change the numerator through a revision of the signal, μ. If μ increases, the combination of an increase in the numerator and a decrease in the denominator results in the hedge fund purchasing more shares of the target firm. If μ decreases, there will be trade-off between the reduction in the numerator and the reduction in the denominator. Depending on the magnitude of the downward revision in μ, the hedge fund could increase, decrease, or stand pat on its holdings of q. The goal of this paper is not to predict the hedge fund's directional trades. Instead, we observe the trade and then make predictions about the trade's future profitability.

If we assume the receipt of new information either decreases or keeps the precision of the new signal the same, then selling the security after the receipt of FDA records is consistent with the hedge fund substantively revising downward its signal of the value of the target firm's stock, μ. This leads to the following prediction:

Prediction 3: The amount of shares sold of the target firm's stock after the receipt of FDA records is negatively related to its subsequent risk-adjusted abnormal return.

If we make the same assumption about the effect new information has on precision, then buying the security after the receipt of FDA records is consistent with either an increase in μ or a trade-off between a large increase in precision and a smaller decrease in μ. In either case, this leads to the following prediction:

Prediction 4: In general, the amount of target shares purchased by a hedge fund after the receipt of FDA records is positively related to its subsequent risk-adjusted abnormal stock return.

Finally, the rational inattention theory has implications for when hedge funds would seek additional information about a firm. Recall that the theory predicts that investors are more likely to seek new information about firms they know more about. This leads to the following prediction:

Prediction 5: A hedge fund is more likely to make FOIA requests to the FDA about firms in which the hedge fund has greater prior information advantages.

3. Freedom of Information Act and the Food and Drug Administration

3.1 Freedom of Information 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 Food and Drug Administration (FDA). The FOIA was originally enacted on July 4, 1966, but it did not become effective until July 4, 1967. The Act has been amended 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. The 1974 amendment established a ten working day deadline for processing all direct requests. In 1996, this deadline was extended to 20 working days (or even more if necessary).

The process behind obtaining record(s) under the FOIA is straightforward. An individual makes a written request to the agency describing the desired document(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 "record 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 will be either to send the requested material, or to deny (fully or partially) the request.[4] We call the response date the "close date." The agency's decision letter and enclosed records will be mailed out on the close date – hence the requester will receive the information one to two days after the close date.

3.2 The Food and Drug Administration

The Food and Drug Administration (FDA) is an agency within the U.S. Department of Health and Human Services. It was created by the 1906 Pure Food and Drugs Act, primarily in response to Upton Sinclair's novel "The Jungle," which detailed unsanitary conditions in the meatpacking plants of Chicago. Today, the agency has a budget of $4.4 billion and employs over 14,000 people (see www.fda.gov).

Since its creation in 1906, the U.S. Courts and Congress have expanded and contracted the scope of the FDA's oversight. Germane to our study, 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. In 1953, the 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. In 1973, the U.S. Supreme Court upheld the 1962 amendment and added that the FDA can assert its control over the marketing of

[4] 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, 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.

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.

Thus, the FDA is mandated to both protect the public health through inspections and regulations, and to advance the public health by helping to speed up product innovations.

3.3 Data Collection and Summary Statistics: FOIA Requests for FDA Records

The data used in this study were obtained through an FOIA requests filed by us to the FDA in January, February and March 2014. The information we requested was a list of all FOIA requests by outsiders to the FDA between January 1999 and December 2013. The FDA responded to our inquiry within the 20 working day window by giving us information about 171,621 individual requests. The information provided to us are (i) requester's identity (both person and company, if applicable); (ii) date of request (record date); (iii) close date; (iv) subject of request (i.e., name of pharmaceutical company); (v) status of the request (e.g., sent, withdrawn, denied); and (vi) and a short description of which agency records were requested.

Table 1 contains the FDA's description of the types of records it maintains. As Table 1 shows, FDA documents and databases fall under four classifications. Establishment Inspection Reports (EIR) and Forms 483 relate to factory inspections conducted by the FDA. The process surrounding all factory inspections ends with an EIR, which contains a description of the inspection, any violations reported, the firm's response(s) to the violations, and subsequent actions taken by the firm. A Form 483 is issued to the firm's management at the conclusion of an inspection when an FDA investigator determines there are violation(s) of the FD&C Act. The Form is shared with the company in a face-to-face meeting between the inspector(s) and the company's management. Next, FAERS, MDR, CAERS, and VAERS are databases maintained by the FDA of complaints submitted by patients, doctors, or consumers of adverse events relating to drugs, medical devices, foods, dietary supplements, cosmetics or vaccines. Third, Warning Letters (WL) are letters sent to manufacturers about "significant" violations of FDA regulations, for example, a mislabeling of an ingredient in a drug or food supplement. In

general, the first three classes of records contain adverse information about the company, although we note that a factory EIR may contain a 'clean bill of health' for the inspected factory. The fourth classification of FDA documents is an Approval Recommendation (REC), which is an approval letter sent to a company in response to a New Drug Application or a Biologic License Application. These documents generally contain good news for the company as they grant the company the go ahead to sell and market a new drug or product.

Table 2, Panel A presents a list of FOIA individual requests to the FDA from 1999 through 2013. Each individual request represents a single requester, who may have asked for one or more FDA records. As the panel shows, investment firms, primarily hedge funds and a few large growth-oriented mutual funds, made 1,234 individual requests. These requests were initiated either by the fund itself or an employee of the fund. Both identifiers are interpreted by us as being from an investment firm, and are included in our investment company sample.[5]

The annual number of requesters range from three (1999) to 217 (2013), with an overall temporal increase. However, the vast majority of requests, 170,387, were made by other entities, including insurance companies, public and private companies, hospitals, doctors, law firms, consulting firms and individuals. Unlike the investors' 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 9,000 yearly requests beginning in 2007.

Our sample consists of 217 different investment firms, of which 212 are hedge funds. Table 2, Panel B presents the identity of and the frequency of requests by the 12 investment firms with the largest number of requests between 1999 and 2013. Of these firms, all but one, Janus Capital Group, can be classified as a hedge fund or a private investment firm.[6] HealthCor Partners Management and Oracle Investment Management specialize in holding healthcare and

[5] We use many sources to identify investment firms and their employees. These include fund websites and LinkedIn, the latter being very useful in identifying where and when employees worked for an individual hedge fund. Most likely, there are more than 1,234 direct or indirect investment firm FOIA requests to the FDA. We may have missed some hedge fund employees, and consequently their requests. Nor do we exclude the possibility that non-hedge fund requesters may act as conduits between the FDA and hedge fund investors.

[6] UBS Global Asset Management is part of UBS, which has both hedge funds and mutual funds.

biotechnology equities; the other funds invest in a broader spectrum of industries. SAC Capital Advisors, Bridger Management, and Millennium Management made the most requests, with 191, 165, and 80 individual requests, respectively, for FDA records.

In Table 2, Panel C, we present the industries of the FOIA requests. We have GIC Industry Codes for 1,011 of the 1,234 requests. As expected, 985 (97%) of the requests are for firms in the healthcare, biotechnology, or pharmaceutical industries. However, the FDA has jurisdiction over other industries, such as, beverage companies. Our sample, for example, has requests about Coca-Cola and Pepsi.

Table 3, Panel A presents the types of FDA documents requested by investing firms. We note that funds often make multiple record requests, e.g., a fund may request an EIR and a Form 483 on the same request date. The most frequently requested document is the Form 483, a list of factory inspection violations. For our sample of investment firms, 519 (out of 1,234 individual FOIA requests) asked for this report. Other possibly adverse information documents requested are EIRs (209), consumer or user complaints (343), and warning letters (200). As for potentially positive news, there are 147 requests for Approval Recommendation documents.

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"). According to the FDA website, a denial is given when one of the 9 stated exemptions to mandatory disclosure (see footnote 4) 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. In the former case, generally, if the fund receives no information within a year, it formally withdraws its request. In the latter case, the FDA's response to the inquiry is that the requested records do not exist. As the panel shows, 849 requests (812 + 37) were either fully or partially granted, which accounts for 69% of the total individual requests. The other 31% consists of requests in which the investor 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 from 1999 through 2013. Full or partial grants

as a percentage of all processed requests is 74%, a number that is consistent with the sample of investment fund requests only.

Panel C contains summary statistics on the number of calendar days between the initial request received by the FDA (the record date) and the mailing of the information by the FDA to the investing firm (the close date). For all requests, the median time between request and action by the FDA is 33 calendar days, which approximates the 20 business days mandated by the FOIA. However, there is a large dispersion in the timing between request receipt and FDA action – the 75th percentile of the FDA's close date occurs 121 days after the initial request. For those records actually sent by the FDA, the median (75th percentile) calendar days are 30 (89) days.

Based on Panels B and C, we choose to use the close date as our "day 0" in analyzing abnormal returns and trading behavior of investment firms vis-a-vis their use of the FOIA in obtaining FDA records. This approach differs from Gargano, et al. (2015), who do their analysis around the record (request) date only.

4. Abnormal Returns Associated with the Release of FDA Records to Hedge Funds

We begin by examining average stock price reactions surrounding the close date for each record type sent to hedge funds. We consider this analysis to be descriptive because it is not linked to the trading behavior of the hedge fund on receipt of the FDA record. Nevertheless, we believe it is informative to see what the stock price behavior is around the close date.

Daily abnormal returns (ARs) are calculated for each stock using the Fama-French three-factor model (market, size and book-to-market adjusted). Model parameters are estimated over a 75-day window ending 30 trading days before the close date; we require at least 50 valid observations for the estimation. Abnormal returns are winsorized at the 1% levels. Cumulative abnormal returns (CARs) are the sum of the average daily ARs across stocks. We begin accumulating the returns 30 trading days prior to the close date and ending 45 days after the close date. The broad time frame is meant to capture public leakage of information vis-à-vis the proactive acquisition of information through the FOIA. The 30-day window prior to the close date also captures most of the time between the record and close date (see Table 3, panel C).

Figures 1A through 1D contain the CARs for four ex ante bad news events – a company's receipt of an EIR, a Form 483, a Warning Letter, or a Complaint, the latter encompassing all FAERS, MDR, CAERS, and VAERS reports. Figure 1E contains the CARS for the one ex ante good news event – a company's receipt of a REC. Figure 1F contains the CARS for all other requests – called "Other" which primarily is comprised of company responses and letters to the FDA related to the receipt of an EIR, Form 483 or a warning letter. Under each figure, we present the CARs for days (-30, 0) and days (+5, +45). The (+5, +45) period gives hedge funds time to (1) receive the mailed (day 0) records, (2) process their contents, and (3) trade in such a way that their private information is incorporated into prices gradually (Kyle, 1985; 1989)

On average, an EIR [figure 1A], a Form 483 [figure 1B], and "Other" [figure 1F] has significantly negative CARS accrued over trading days (+5, +45). The CARs range from -2.16% for Other to -8.80% for EIRs. For REC, the CAR is 2.83 [figure 1E]. Thus, there is evidence that FDA factory inspections and approvals of new drugs and medical devices, on average, carry value-relevant information about the target companies.

The CARs over days (30, 0) are significantly negative for Warning Letters [figure 1C], Complaints [figure 1D], and is significantly positive for RECs [figure 1E]. Thus, it appears that other information about these firms is coming out in the period prior to the hedge fund's receipt of the FDA records.

In summary, the descriptive statistics of average abnormal returns are consistent with FDA records containing value relevant information.

5. Acquisition Costs of FDA Records

Information acquisition theory predicts that an investor's decision to be informed is negatively associated with the investor's information acquisition costs. These costs can be divided into direct and indirect processing costs. Private information, generally, has substantive direct acquisition costs. In contrast, publicly available information has lower direct costs of acquisition. Consistent with this observation, the direct dollar cost of any investor filing a FOIA

request to the FDA is trivial, and does not vary much across FOIA requests. According to the FDA website, the current charges for an FOIA request to the FDA are:

- **Search and review charges:** $23.00, $46.00 and $83.00 depending on the grade level of the FDA employee filling the request.
- **Duplication:** $ .10 per page for standard-size paper or actual cost per page for odd-size paper, with no charge for the first 100 pages of duplication.
- **Certifications:** $10 each.
- **Computer Charges:** actual cost for time involved.
- **Electronic Forms/Formats**: actual cost for form/format requested.

However, the processing costs of reading, interpreting, and assessing the future cash flow implication of the information may vary substantively across investors and records.

We cannot observe hedge funds' processing costs. We can, however, provide anecdotal and empirical evidence that disclosures contained in the FDA filings require specialized knowledge with respect to updating prior beliefs about the target firm's stock value. Anecdotally, there is evidence that hedge fund managers hire outside consultants, for example medical doctors, to interpret clinical trial for drugs being developed by pharmaceutical firms (Armstrong, 2012). Brokerage houses often hire doctors or people with Ph.D.'s in the sciences as supply side analysts for healthcare and biotechnology firms. For example, the PiperJaffray website identifies an MD and two Ph.D.'s as the analyst team covering drug discovery and biopharmaceutical companies. Thus, anecdotally, hedge funds and brokerage houses use medical and/or science experts to assess links between stock valuation and new information for healthcare firms.

More directly, we can use the trading behavior of hedge funds around the receipt of FDA records as a means to assess the complexity of using the information in these records to update the target firm's valuation. Recall that we have six types of requested records – EIR, Form 483, Complaints, Warning Letters, REC, and Other. If the evaluation of these records were relatively simple, then we would expect similar trading patterns by the funds upon receipt of each record. For example, a Form 483 is a record of the list of concerns or violations that the FDA sends to a firm after a factory inspection. If this form almost always conveys bad news about the firm, then we would expect to see a preponderance of sales and few purchases of the company's stock in

the period after receipt of the Form 483. On the other hand, if the contents of the Form 483 are more nuanced, then the hedge fund must expend resources to analyze the information in a Form 483 to determine its valuation implications. The expected output of these analyses should result in a heterogeneous set of trading patterns – that is, Form 483s would not be dominated by equity sales, but would result in a full array of purchases, sales, and no changes in equity positions.

We calculate net purchases, net sales and no change in holdings in the quarter of the investment fund's receipt (close date) of all FDA records. We obtain fund holdings from the Thomson-Reuters 13F database. Under the Securities and Exchange Act of 1934, investment firms controlling at least $100 million of U.S. equities are required to report their U.S. equity holdings within 45 days of calendar quarter ending March 31, June 30, September 30 and December 31. We therefore have a dollar and share amount of individual equity holdings for each fund on a per quarter basis. If the fund's total number of shares in the target firm increases in the quarter surrounding the close date, we call that a net purchase. If the number of shares in the target firm decreases over the quarter, we call that a net sale. If the number of shares in the target firm remains the same, we call that a no change in holdings. The latter category can include the fund having no investment in the company's stock at either quarter-end.

Table 4 contains a breakdown of net purchases, net sales, and no changes in holdings for each category of FDA record. As the table shows, there is a wide variation in trading patterns for almost all types of FDA records. Using the example of the receipt of a Form 483 from above, we find that of the 433 Form 483 records received by the funds in our sample, 106 resulted in a fund purchasing the firm's security during the quarter, 109 were associated with a net sale of the firm's security, and 218 resulted in no change in the hedge fund's portfolio. We interpret these trading patterns as evidence that the information contained in a Form 483 is complex, and is indicative of substantive processing costs of using this form to evaluate its valuation effects.[7]

[7] It is primarily for this reason that we do not engage in text analysis of the FDA records.

Examination of the trading patterns of the other FDA record categories reveals similar heterogeneous trading patterns for EIRs, Complaints, Warning Letters and Other records. The only category of FDA record that appears to be more one-sided is RECs, which are the records of approvals for firms to market new drugs or medical instruments. For these records, hedge funds increase their holdings 40 times but decrease their holdings only 6 times. We do note, however, that there is some dispersion in interpreting these records, as we find 70 no change in holdings.

Table 4 also has the mean and median number of shares traded in the quarter of the close date. For all record-types, the median number of shares traded is zero; the mean values range from slight net sales (EIR, Form 483, Warning Letter, Other) to a slight net purchase (Complaints). Only REC shows a more one-sided trading pattern, with an average increase of 83,700 shares in the quarter surrounding the close date. We note, however, that the left (5% percentile) and right (95% percentile) tails for all records reveal that hedge funds sometimes trade heavily in stocks over the quarter of receiving an FDA record. We explore this phenomenon more fully in Sections 7 and 8.

In summary, the trading patterns surrounding the close date of an investment fund receiving an FDA record support the view that the processing costs of utilizing these records for investment decisions are, on average, non-trivial. Thus, we propose that FDA data obtained by investment firms under the FOIA provide a good setting for examining cross-sectional variations in the acquisition of information by investing firms.

6. Research Design

6.1 Empirical Proxies

We require proxies for processing costs, prior information and benefits of information acquisition. Admittedly, there are no inscrutable proxies available. We also want to control for other publicly available information that may influence hedge fund trades in the target firm.

6.1.1 Costs and Benefits of Information Acquisition

The learning under capacity constraint literature predicts that processing costs are negatively related to a hedge fund's prior information advantage (Van Nieuwerburgh and Veldkamp, 2009). Using a different paradigm, Boot and Thakor (2001) theoretically show that prior and new information are most beneficial to investors if they complement rather than substitute for each other.

Based on these studies, we propose four measures of processing costs, all based on the premise that prior knowledge about the target firm, its industry, or previous receipt of FDA report(s) reduces the fund's processing costs of interpreting new FDA reports.

We propose that investing firms with large and/or long-term equity stakes in the target company have lower processing costs than other investing firms. *Prior Ownership* is the log of the number of shares that the investing firm has in the company in the quarter prior to receiving the FDA report. *Long-term investor* is equal to one if the firm has an equity position in the company for at least a full year prior to its receipt of the FDA report (quarters t-5 through t-1), and zero otherwise. We predict a positive association between trading activity and these two variables.

We propose that hedge funds with a larger portion of their assets invested in health-related stocks have lower processing costs of interpreting an FDA record about a healthcare firm than funds with more diversified portfolios. *Fraction of Health-related Stocks in Portfolio* is equal to the dollar value of the fund's portfolio invested in quarter t-1 in health-related stocks (companies with GIC codes beginning with 35) divided by their total investments at the end of quarter t-1. We predict a positive association between trading activity and the fraction of ownership variable. Data for all three variables are from the Thomson-Reuters database.

We predict that hedge funds that received FDA records on the target firm within a year prior to receiving the new records have lower processing costs of interpreting new FDA records. *FOIA Request within Prior Year* is a dummy variable equal to one if the hedge fund requested and received at least one FDA record within the prior year, and zero otherwise.

We take a market-oriented view to the benefits associated with trading. We measure economic benefits of trading as the cumulative abnormal return (*CAR*) that the hedge fund would

earn by purchasing the stock or avoid by selling the stock in a timely manner after receipt of the FDA records. We predict a positive (negative) association between net purchases (net sales) and subsequent abnormal stock returns. Table 5 contains summary statistics of these variables.

6.1.2 Other information

We recognize that other value relevant information about the target firm may come out around the hedge fund's receipt of its FDA records. Further, target firms may disclose some of the information in the FDA records prior to or after a hedge fund's close date. Accordingly, we create measures for a target firm's publicly available information.

Grossman and Stiglitz (1980) use the current stock price as a summary statistic for a firm's other publicly available information. In this vein, we use the target firm's CAR from thirty days prior to and up to the record date as a proxy for information about the target firm's equity value prior to requesting information. We also use the target firm's CAR from the record date to the close date to capture new information about the target firm over the time period between these two dates.

We download from Factiva new stories about each target firm for days (-30, record date) and days (+5, 45). From these downloads, we create general and specific publicly available information metrics. As general measures, *#News Stories* is the count of individual news stories about the target firm (Ahern and Sosyura, 2014).[8] Using text analysis, we create two specific measures over the same time period. *#FDA News Stories* is the count of individual news stories containing the phrases "FDA" or "Food & Drug Administration."[9] *#Drug News Stories* is the

[8] We also use data text analysis to determine if each story conveys positive or negative news about the firm. Using the Loughran and McDonald Financial Sentiment Dictionaries, we count the number of negative (positive) words in each news story and create two equal to the number of negative (positive) words in each story divided by the total number of words in the article. Our results and inferences with these variables are similar to those with #News Stories, and therefore, are not shown.

[9] Examination of a subset of new stories reveals that these stories contain different references to the FDA. Based on our reading of these stories, we search for the following phrases: FDA, Food and Drug Administration, Food & Drug Administration U.S. Regulator(s), US Regulator(s), U.S. government regulator(s), US government regulator(s), U.S. Health regulator(s), US Health regulator(s), U.S. health regulatory staff, US health regulatory staff.

count of individual news stories containing phrases related to drug applications or the approval process by the FDA.[10] Finally, from the I/B/E/S database, we create dummy variables indicating if the target firm released an earnings announcement either before or after the request and/or close date. Table 5 contains summary statistics of these variables.

6.2 Control Samples

In some of our analyses, we wish to compare hedge funds receiving FDA reports with other sophisticated investors. We created two control samples of investors: Other hedge firms and Growth-oriented mutual funds. We choose these categories of investing firms because they, most likely, are closest in manager ability and trading style as our sample of hedge fund requesters.

The Thomson-Reuters database is the source for "other hedge funds." Specifically, we obtain 13F filings for all investment firms that are categorized as 4 or 5 in the Thomson-Reuters database. These investment firms primarily are hedge funds or similar types of investing firms. The Thomson-Reuters database is also the source for "growth-oriented mutual funds." Specifically, we obtain from the Thomson-Reuters database holdings all mutual funds with investment objective code equal to 2, the database's indicator for growth-oriented mutual funds. We then aggregate individual funds' holdings at the fund manager level.

To control for fund size, i.e., the amount of invested assets under management, we divide all groups into quintiles based on fund size over the quarter ending prior to day 0. We select those hedge funds and growth-oriented mutual funds that are in the same fund size quintile as the requesting hedge fund. We therefore control for investment style, fund size, and quarter in which the hedge fund makes its trades.

7. Empirical Results: Univariate Tests

[10] Based on our readings of a subset of news stories, we search for the following phrases: new drug application(s), NDA, drug application(s), FDA approval, FDA drug reviewers, FDA advisory committee(s), FDA clearance.

7.1 Trading Activity around the Receipt of FDA Records

We examine trading activity by hedge funds around the receipt of FDA records. We segment hedge funds into net buyers, net sellers, and no changes in holdings by calculating changes in holdings over the quarter surrounding day 0. In section 7.1.1 and 7.1.2, we report the changes in share holdings for each group. In section 7.1.3, we present evidence on short selling around day 0 for target firms.

7.1.1 Trading on Receipt of FDA Records: Changes in Quarterly Holdings

Table 6, Panel A (column 1) has the distribution of changes in holdings surrounding the receipt of FDA records. Of the 903 record receipts with 13F filings, 206 (23%) are associated with a hedge fund increasing its holdings in the firm, 174 (19%) are associated with a hedge fund reducing its holdings, and 523 (58%) have no change in holdings. Thus, 42% of the record receipts are accompanied by the investment fund trading in the quarter of receipt. Further, the number of shares traded appears to be substantial. For net buyers, the mean (median) number of shares acquired is 989,000 (265,100) shares. For net sellers, the mean (median) number of shares sold is 636,200 (297,400). Thus, there appears to be substantive and frequent trading around the receipt of FDA records.

To obtain an idea of the magnitude of these trades, we compare them to quarterly changes in holdings on other stocks by the same hedge fund in the same quarter. Column (2) presents the distribution of the trades for non-targeted health-related stocks. Column (3) has the distribution of trades for non-targeted non-health-related stocks. As expected, hedge funds are active traders in all securities. However, large, significant differences in trading activity exist, on average, between trades on the target firm vis-à-vis trades on other holdings. When hedge funds are net buyers of the target firm's shares, they purchase, on average, 66,700 of other health-related stocks, and 44,300 shares of non-health-related stocks. This compares to a mean purchase of 989,000 shares for the target firm. When hedge funds are net sellers, they sell, on average, 636,200 shares of the target's stock; this contrasts to average net purchases of 24,300 shares for other health-related stocks and 10,400 shares for all other stocks. Examining no change in

holdings for the targeted firm's stock against trades for other stocks in their portfolios yields similar disparities in trading activity. T-statistics and z-statistics for differences in means and medians between column (1) and column (2) or (3), respectively, are significant at the 0.01 level.

These results have with two important implications. First, they confirm that FDA records yield value-relevant information about the target firm. Second, the information appears to be company-specific, as we see no significant spillover effect for the hedge fund trading on other health-related stocks when receiving FDA records on the target firm.

7.1.2 Trading on Receipt of FDA Records: Transaction Data

The problem with using Schedule 13F data is that we do not know when in the quarter a hedge fund's trades are executed. We, therefore, cannot make inferences on whether a hedge fund trades prior to or after the receipt of an FOIA record. To overcome this liability, we use transaction data to determine a more precise connection between the close date and hedge fund trading activity. ANcerno maintains a database of all trading activity by its clients. Because the data are limited to its clients, the database contains only a subset of the hedge funds that file Schedule 13Fs. For our sample, we are able to match 38 of the 217 funds to the transactions database. These funds have relatively smaller fund sizes than the full sample. Nevertheless, the advantage of using this limited sample is that it allows us to ascertain trading patterns surrounding receipt of FOIA records.

Table 6, Panel B, column (1) contains the average number of shares traded by the hedge funds surrounding the close date. We present several time periods, ranging from days (-30, 0) to (+30, +45) to get a picture of when these funds trade vis-à-vis the receipt of the FDA record(s). For each time period, we aggregate all buys and sells and report net purchases and net sales for each trading window.

Several interesting patterns emerge. First, we see, on average, statistically significant net purchases and net sales following the close date. For days (+5, +15), the net purchases, on average, are 119,700 shares; the net sales are -183,200 shares. When comparing these trades to the quarterly trades shown in Panel A, they are on par with median net sales (297,400), but are

lower than median net purchases (265,000). In dollar terms [untabulated], hedge funds have average net purchases of $18.9 million and average net sales of $29.5 million. These findings are consistent with hedge funds finding the information in the FDA records to be value relevant.

Second, we see significant net purchases over days (-30, 0), the period that approximates the time period between the record and close dates, but no significant net sales over that window. The average net purchases are 469,000 shares [$77.3 million - untabulated]; the average net sales are 40,200 shares [$7.9 million - untabulated]. These findings suggest that positive, but not negative, value relevant information about the requested companies is revealed to (or gathered by) the hedge funds prior to the receipt of the FDA records.

Further, consistent with the quarterly findings in Panel A, we find inconsequential trading around the close date for the group of funds that were deemed to have no quarterly change in holdings. We believe this is an important finding in that it validates a consistency in trading activity between the smaller transactions trading database and the larger Form 13F database.

In columns (2) and (3), we present trading activity for the same hedge fund over the same time frames for other health-related stocks and all other stocks, respectively. Consistent with the quarterly data, we find significant differences in trading activity between stocks with and without FOIA information. Over days (+5, +15), mean and median net purchases are significantly different from each other at the 0.05 level. (We do note, however, that the largest differences in trading activity occur prior to the receipt of the FDA records). For net sales, the differences in trading between stocks with and without FDA information are more stark, with significant differences in trading persisting through days (+30, +45).

In summary, Table 6 is consistent with hedge funds sometimes using information in the FDA records to make substantive trades based on that information.

7.1.3 Shorting Interests of Firms in Which Hedge Fund is a Net Seller

It is possible that hedge funds receiving a negative signal from FDA records about the value of a firm may choose to short sell its stock. This could occur if they do not have any shares to sell, or it could be in conjunction with them selling their positions. We do not have data on

hedge fund short selling. However, Markit/Data Explorer contains daily data on shares borrowed and the supply of shares that can be borrowed for individual firms. Following previous studies (e.g., Massoud, Nandy, Saunders, and Song, 2011), we assume that market-wide short selling is correlated with short selling activity for hedge funds with new information.

Figure 2 presents daily average short interest utilization from days (-30, +45) for stocks in which the hedge fund is a net buyer, net seller, or has no a change in position over the quarter surrounding the close date. Short interest utilization is defined as the number of shares borrowed divided by the supply of shares that can be borrowed. According to Markit/Data Explorer, 85%-90% of borrowed shares are used for shorting purposes.

The graphs are consistent with hedge funds short selling stocks in which they receive a negative signal. When examining short interest utilization, we see a drop in short selling when funds are net buyers, an increase in short selling beginning in day 5 and then again around day 20 when funds are net sellers, and no change in short selling when hedge funds do not change their positions. We thereby conclude that the short selling data are consistent with hedge funds obtaining value relevant information about stocks on receipt of FDA records.

7.2 Alternative Explanation: Hedge Funds Trade on Other Publicly Available Information

The results thus far are consistent with hedge funds using FDA records to update their posterior distributions on the mean and precision of the target firm's equity value. However, the findings are also consistent with other or similar information coming out about the target firm, which causes the hedge fund to make their directional trades. To examine this alternative explanation, we compare trading activities of hedge funds receiving FDA records with non-requesting investing firms. The two comparison groups are non-requesting hedge funds and non-requesting growth-oriented mutual funds (see section 6.2). If trading activity in the target firm is related to the receipt of FDA records, then we should observe differences in trades. If the information is available to all traders, then the trading activity will not be different across investing firms.

Table 7 has the trading results. Panel A shows changes in quarterly holdings around the close date. Panel B uses transactions data. In both panels, there are significant differences between hedge funds receiving FDA records and those funds without these records. [11]

In Panel A, net buyers increase average holdings by 989,000; in contrast, non-requesting hedge funds and mutual funds, increase holdings by 200 and 9,100 shares respectively. Net sellers decrease average holdings by 636,200, compared to an increase (decrease) of 55,700 and 18,600 shares for the non-requesting hedge funds and mutual funds. Testing for differences in the means and medians trades between FOIA requesters and each control group yields significant t- and z-statistics (p-values < 0.01).

In Panel B, there are similar differences between requesting hedge funds and non-requesting investing firms. For net buyers, requesting funds buy significantly more shares before and immediately after receipt of the FDA records. For net sellers, requesting hedge funds sell significantly more shares through day +45.

In summary, the results are consistent with FDA records sometimes containing value relevant information.

7.3 Abnormal Returns Surrounding the Close Date

Figure 3 presents CARs for net buyers (figure 3A), net sellers (figure 3B) and No Change in Holdings (figure 3C). [12] For the 206 net buyers, there is a significantly positive CAR over days (-30,0), but an insignificant CAR over days (+5, +45). The returns are consistent with the net purchase trading patterns we observe in Table 6, Panel B – that is, whereas there are significant

[11] For quarterly data, we also "level the playing field" by comparing net buyers with other matched net buyers, net sellers with other net sellers, and no change in holdings with other investment companies, the latter being other funds with median zero changes in holdings. The results, untabulated, are consistent with those shown in Panel A.

[12] Gargano, et al. (2015) also calculates abnormal stock returns by the investing firm's trading pattern. However, their methodology differs from ours in several ways. First, they consider all requests, whereas we only use requests in which the FDA sent at least one record to the investor, thus insuring that the hedge fund received at least one FDA record. Second, they measure their change in holdings and returns over the full quarter after the original request was made, whereas we measure the change in holdings and daily abnormal returns around the close date. Third, they use Form 13F data only, whereas we analyze both Form 13F data and transactions data. Perhaps because of these methodological differences, the two papers have conflicting inferences from the data.

net purchases after the close date, a large portion of the total net purchases occur in the thirty trading days prior to the close date. We also examine the subgroup of hedge funds in which the individual hedge fund was the first to receive the FDA record; that is, many times, there are multiple requests under the FOIA to the FDA for records of the same target company. For the 151 first requesters, we find similar results. The CAR for days (-30, 0) is significantly positive, whereas the CAR for days (+5, +45) is insignificantly different from zero.

A different trading pattern appears when the hedge fund is a net seller over the quarter surrounding the close date. For the 174 net sellers, the CAR over days (-30, 0) is -1.08% (t-statistic = -0.29). In contrast, the CAR for days (+5, +45) is -1.91% (t-statistic = -2.05). First requesters show similar abnormal return patterns. If hedge funds sell their shares on or soon after the receipt of an FDA record, then our results are consistent with hedge funds avoiding negative returns on their portfolios through the information obtained through the FOIA.

Figure 3C presents the CARS for the 486 investing firms that do not change their holdings in the quarter of the close date. The CARS are similar to net sellers – insignificant CARs prior to the close date but significantly negative CARs in days (+5, +45). When examining the holdings of the hedge funds, we find that 461 of the 486 close dates involve hedge funds going from zero-to-zero holdings.[13] In total, our results are consistent with hedge funds using the FOIA FDA records as input in making its portfolio decisions.

8. Empirical Results: Multivariate Tests

Having shown that FDA records are associated with hedge fund trading activity, we now turn to multivariate tests of whether these trading decisions are related systematically to the processing costs and benefits of obtaining these records. We estimate the following regression:

$$\text{Net Purchases}_{i,j}\ (\text{Sales}_{i,j}) = \beta_0 + \beta_1 \text{Processing Costs}_{i,j} + \beta_2 \text{Benefits}_{i,j} + \beta_3 \text{Other Information}_j + \Sigma\beta_n \text{Control}_n + \varepsilon_{i,j} \quad (2),$$

[13] We do not preclude the possibility that a hedge fund may use the information to short the stock or to purchase or write call or put options.

where Net Purchases$_{i,j}$ (Sales$_{i,j}$) is the natural log of net shares bought (sold) by hedge fund i of firm j over quarter t; Processing Costs$_{i,j}$ are the costs to hedge fund i of processing the FDA record for firm j, as proxied by Prior Ownership, Long-term Investor, Fraction of Health-related Stocks in Portfolio, or FOIA Request in Prior Year; Benefits are the benefits of trading on the stock of firm j by hedge fund i, as proxied by the CAR after the close date; and Other Information$_j$ is other publicly-available information about firm j as proxied by the CAR for firm j's stock, the natural log of the number of news stories about firm j, specific news items about the firm, or whether the firm has an earnings announcement. We include control variables that may influence investor trading. These control variables are firm j's return on assets (ROA), market capitalization (Firm Size), trading liquidity (Amihud Illiquidity), the natural log of the median number of analysts following the firm (#Analysts), and the percentage of firm j's stock held by institutions (Institutional Holdings). Each control variable is measured at the end of quarter t-1. We include yearly and industry fixed effects.

8.1 Net Purchases

Table 8, Panel A has summary statistics for the regression on Net Purchases. Columns (1) through (4) account for other information by using the stock's CARs; Columns (5) through (8) use #News Stories; and columns (9) through (12) use #FDA News Stories or #Drug News Stories. All regressions include Earnings Announcements.

Consistent with the prediction of a negative association between trading activity and processing costs, as proxied by the investing firm's prior information, the coefficients on Prior Ownership, Fraction of Health-related Stocks in Portfolio, and FOIA Request in Prior Year are significantly positive in all of the regressions. The coefficient on Long-term Investor is not statistically different from zero.

Consistent with the prediction of a positive association between the benefits of acquiring information and trading behavior, the coefficient on CAR (+5, +45) is significantly positive in

column (1) through (4). We find (untabulated) similar a significantly positive coefficient if we measure abnormal returns over days (+5, +30).

We find no significant coefficients on FDA-related or drug-related news stories (columns 9-12), and somewhat surprisingly, we find significantly negative coefficients on the number of news stories about the target firm (columns 5-8). These findings suggest that the positive link between hedge fund purchases and the abnormal return found in columns (1) through (4) are not related to the dissemination of these news items over the same time period. The coefficients on Earnings Announcements are also insignificantly different from zero.

To control for other publicly available information prior to the request date, we measure CARs, #News Stories, #FDA News Stories, #Drug News Stories and Earnings Announcements over days (-30, record date). We also measure CARs and tabulate Earnings Announcements for the period spanning the record and close dates.

In columns (1) through (4), we find (generally) statistically significant positive coefficients on CAR (-30, record date), but no significant coefficients on CAR (record date, 0). These findings suggest a time sequence associated with a hedge fund buying on the acquisition of FDA records. That is, a consistent "story" is that positive information comes out about the target firm which results in a price run-up; seeing this, the hedge fund requests FDA records under the FOIA and purchases some (but not all) shares prior to the actual receipt of the records. However, the source of the information captured by the statistically positive coefficients on CAR(-30, record date) is not captured by #News Stories, #FDA News Stories and #Drug News Stories, as the coefficients on these variables are insignificantly different from zero (columns 5-12).

The control variable, Amihud Illiquidity, is significantly related to trading, consistent with more liquid stocks exhibiting larger trades. ROA generally has a significantly negative coefficient, suggesting a negative association between trading and firm profitability. There is weak evidence that trading is related positively to firm size, and related negatively to the number of analysts. The other control variables generally have insignificant coefficients.

8.2 Net Sales

Panel B contains regression results for net sales over quarter t. We set the number of shares sold as a positive number, so the signs of the coefficients can be interpreted as being directly or inversely related to (ln) of the net number of net shares sold.

Consistent with our prediction, net sales are negatively related to a hedge fund's processing costs, as proxied by its prior information advantage. The coefficients on Prior Ownership, Fraction of Health-related Stocks in Portfolio, FOIA Request in Prior Year, and Long-term Investor [columns 3 and 11] are significantly positive.

Consistent with the prediction of a positive association between the benefits of acquiring information and trading behavior, the coefficient on CAR (+5, +45) is significantly negative in column (1) through (4). Using a CAR for days (+5, +30) yields similar significant coefficients (untabulated).

We also find that more news stories over the (+5, +45) window are associated with more net sales, suggesting that negative publicly available news might be moving the target firm's stock downward. However, the coefficients on #FDA News Stories [columns 9-12] are insignificantly different from zero, a finding consistent with the FDA news releases not providing relevant information to the market. The coefficients on #Drug News Stories are significantly negative, consistent with the market reacting to positive news about the target firm's prospects of marketing a new drug.

When examining other information prior to the receipt of the FDA records, the coefficient on CAR (record date, 0) is significantly negative, consistent with hedge funds, on average, selling on bad news in the period between requesting and receiving the records. The significantly positive coefficients on the number of stories prior to the record date may provide a rationale for why these funds would request the information on the specific date.

The control variable, Amihud Illiquidity is statistically negative, supporting the view that net sales are higher in more liquid stocks.

8.3 Alternative Measures of Trading Activity and Other Information

In Table 8, net purchases or net sales are changes in the target firm's shares. In this section, we use two alternative measures. The first measure is the natural log of the absolute value of the change in dollar holdings. This measure is consistent with q in equation (1). The second measure is the absolute value of the change in the percentage of the target stock held in the hedge fund's portfolio. This measure is consistent with Van Nieuwerburgh and Veldkamp's (2009) prediction that investors invest proportionally more in firms in which they learn more about.

We use the same regression analyses as before. Table 9 contains the summary statistics on the coefficients for processing costs and benefits. Panel A measures trading activity in dollar values. Panel B uses the change in portfolio weights. In Panel B, we use %Prior Ownership, the portfolio weight of the target firm prior to the close date quarter as our measure of prior ownership.

In both panels, the inferences about the association between the level of hedge funds trading and processing costs and benefits remain the same. The coefficients on most of the processing costs (prior information advantage) are significantly positive; all of the coefficients on CAR (+5, +45) are significantly positive [Net Purchases] or negative [Net Sales].

We also searched the Factiva news stories for other publicly available information, for example, SEC filings, conference calls, lawsuits, and rollouts into foreign countries. We create dummy variables based on these disclosures and include them in the regression analyses shown in Tables 8 and 9. The coefficients on these variables, in general, are insignificantly different from zero, and the inferences on costs and benefits of information acquisition remain the same.

We also include a variable in the regression analyses representing the time between the record date and the close date, with the view that longer interims might reflect stale or less informative information. The coefficient on this variable is insignificantly different from zero, and its inclusion does not change the other inferences of the regression results.

9. Which Stocks Does a Hedge Fund Target?

In section 2, we predict that investors will seek new information about firms in which they have an information advantage. We test this prediction by estimating a probit regression for

matched stocks within a hedge fund's portfolio over the quarter of the request. If our prediction is correct, then we should see a positive covariate between the hedge fund's target and the prior information advantage that the hedge fund has about this particular company. By using stocks within the hedge fund's portfolio over the same quarter, we control for the hedge fund's investing style. To control for firm size and investment risk, we match each target firm to other fund holdings in the same 10 X 10 market capitalization and book-to-market value grid. We use two potential sets of matched firms – all other stocks in the portfolio and health-related stocks (GIC = 35) stocks only.

Table 10 contains the probit model results. We do not include Fraction of Healthcare-related Stocks in Portfolio as a processing cost variable since it is the same for target and non-target firms. Control variables are from Klein and Zur (2009), who find that hedge fund activism targets are related to firm size, book-to-market ratio, prior-year abnormal stock returns, firm leverage, cash, dividend yield and R&D expenditures. We also control for the number of analysts, institutional holdings, trading liquidity, industry and firm years.

Consistent with our prediction, a hedge fund is more likely to request FDA records if it has a larger stake in the company (Prior Ownership) or has made an FOIA request to the FDA within a year of this request. Thus, there is evidence that the propensity to make an FOIA request is negatively related to the fund's processing costs. In contrast, we find a negative coefficient on Long-term investor, a finding contrary to our prediction. The coefficients on the control variables, Size, B/M, prior year returns, R&D, #Analysts, and Institutional Holdings are significantly different from zero. In summary, we find some evidence consistent with the prediction that hedge funds choose to learn more about firms in which they have information advantages.

10. Summary and Conclusions

We use the receipt by hedge funds of FDA records under the FOIA to examine trading behavior of hedge funds. Relying on theory papers about information acquisition by investors with constrained capacity, we predict that the magnitude of hedge funds trading on these records

is negatively related to the hedge fund's processing costs and positively related to the benefits derived from trading. We further predict that a hedge fund's processing cost is negatively related to the fund's prior information advantage about the target firm's value.

Our empirical results are consistent with these predictions. Using a novel approach, we demonstrate that these records have large processing costs. Using several proxies for prior information advantage to measure an individual hedge fund's processing costs, we find that the magnitude of net purchases or net sales in the target firm is negatively related to these costs. We also present evidence that trading is related to the immediate short-run benefits, as measured by the abnormal stock return over trading days +5 through +45.

Our study contributes to several strands of finance literature. First, it provides a rich setting to test theories of investor's decisions as to when they acquire information. Second, it provides evidence on how hedge funds gather and act upon this (somewhat) private information. Third, it provides insights into how semi-efficient markets incorporate publicly available information when the processing costs of this information is costly. Finally, our study sheds light on some regulatory issues – specifically, are there benefits related to the vast amount of regulation in the United States? And should the FDA and other government agencies be required to post all of their records on their respective websites?

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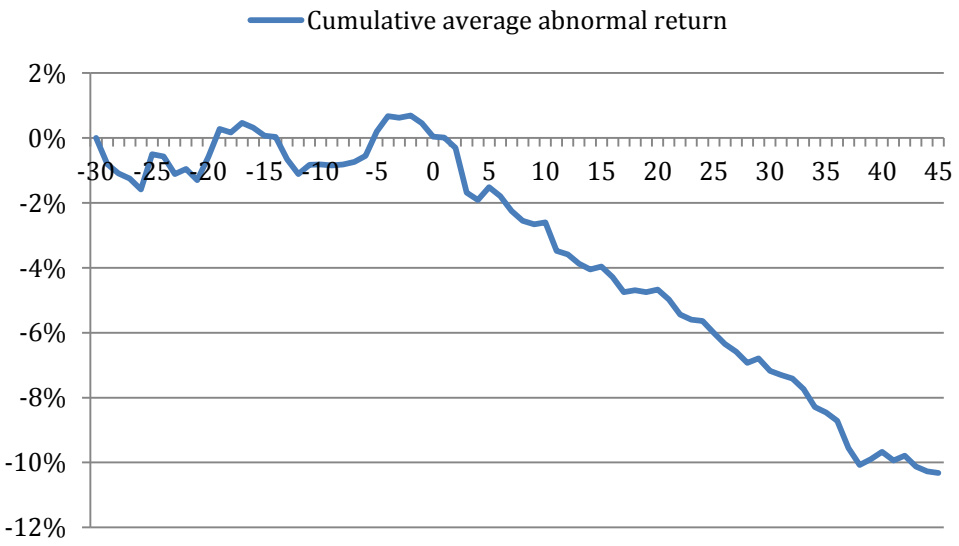
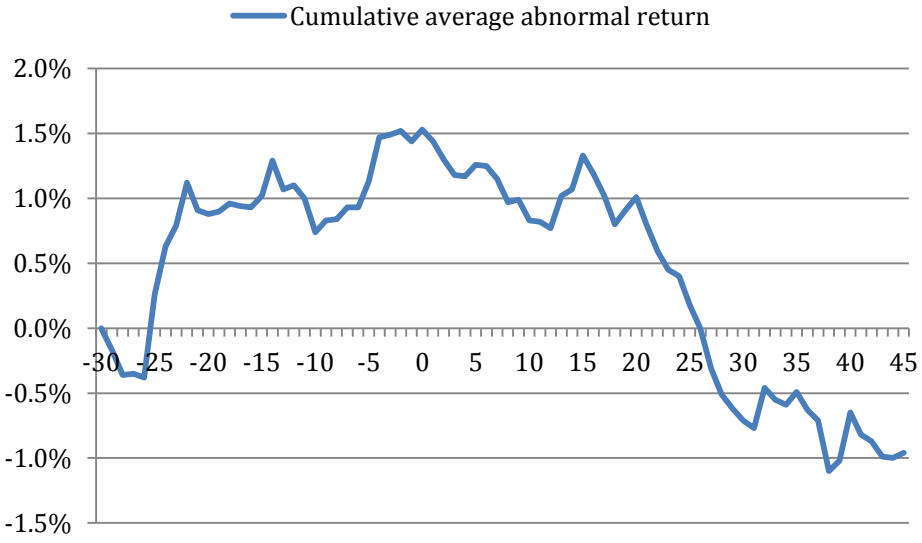
Figure 1
Cumulative Abnormal Returns Surrounding Hedge Fund's Receipt of Different Categories of FDA Records (Close Date)

Figure 1A: EIR (N=172)



CAR (-30, 0) = 0.04% (*t*-statistic = 0.10; p > 0.1; CAR (+5, +45) = -8.80% (*t*-statistic = -3.89; p < 0.01)

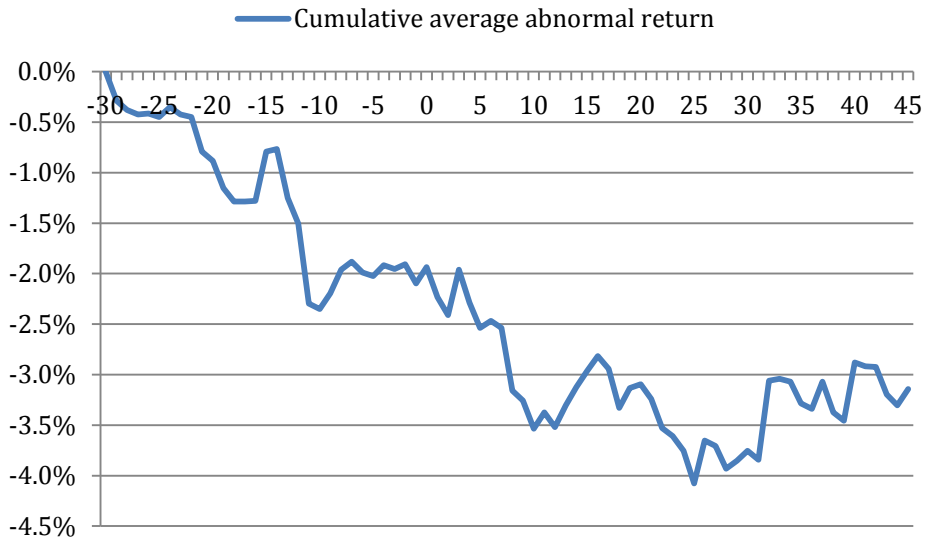
Figure 1B: Form 483 (N=433)



CAR (-30, 0) = 1.53% (*t*-statistic = 1.61; p > 0.10); CAR (+5, +45) = -2.22% (*t*-statistic = -2.30; p < 0.05)

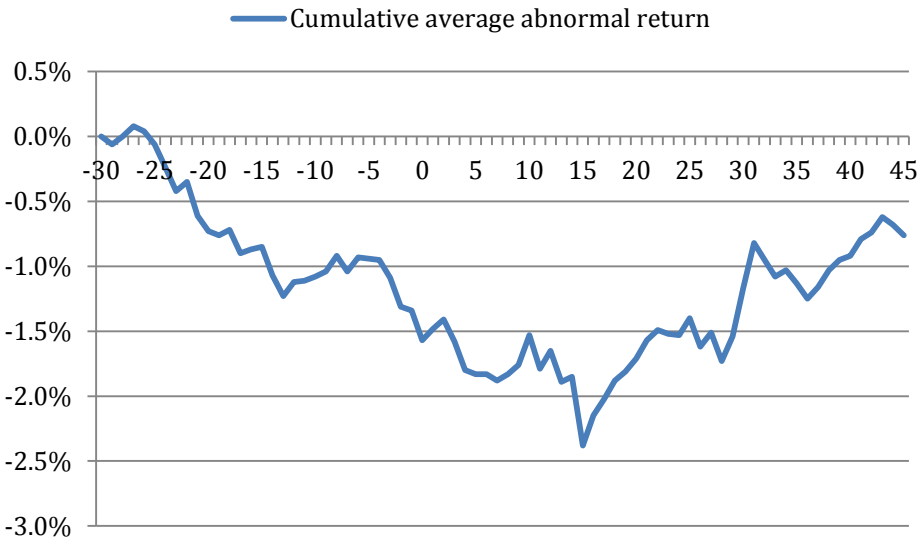
Figure 1 – continued

Figure 1C: Warning Letter (N=168)



CAR (-30, 0) = -1.94% (*t*-statistic = -1.82; p < 0.10; CAR (+5, +45) = -0.87% (*t*-statistic = -1.24; p > 0.10)

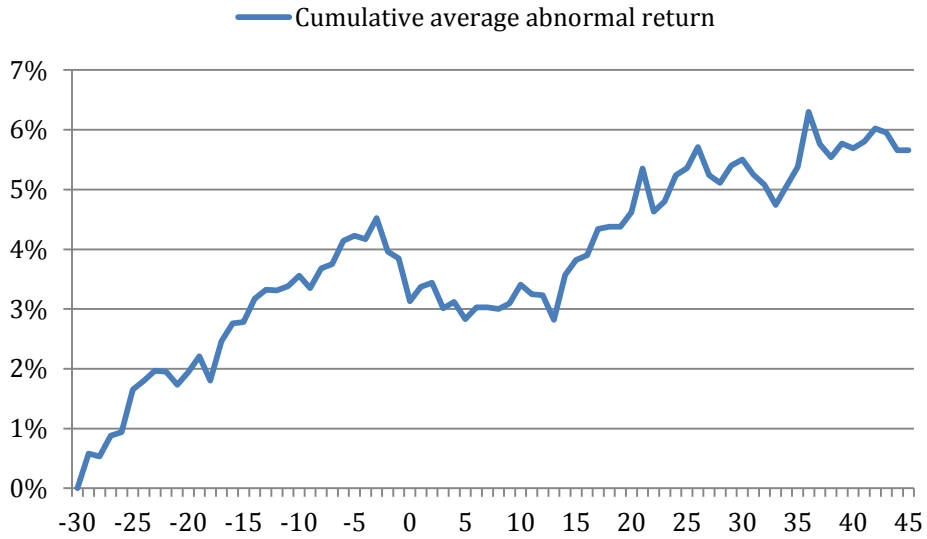
Figure 1D: Complaints : FAER, MDR, CFSAN, CAERS, and VAERS, (N=304)



CAR (-30, 0) = -1.57% (*t*-statistic = -1.74; p < 0.10; CAR (+5, +45) = 1.07% (*t*-statistic = 1.41; p > 0.10)

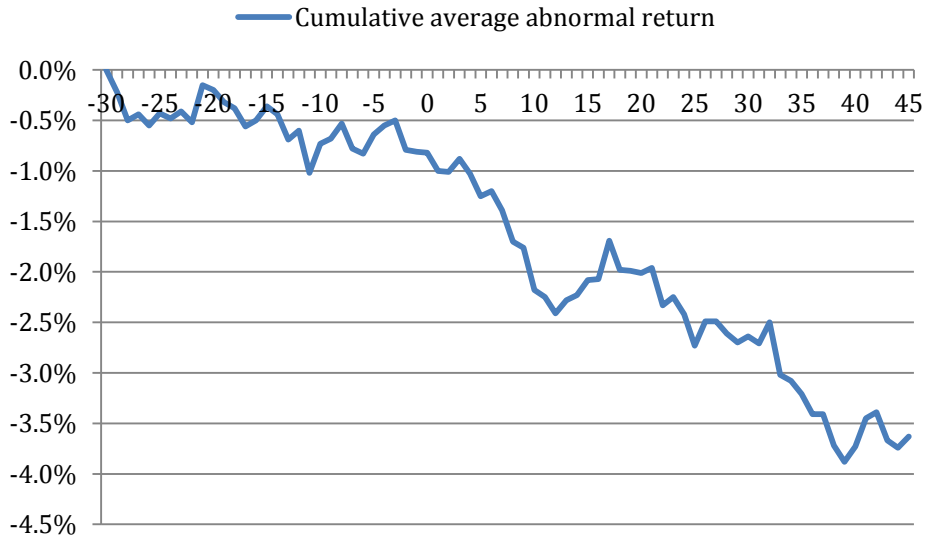
Figure 1 – continued

Figure 1E: REC (N=116)



CAR (-30, 0) = 3.13% (*t*-statistic = 2.41; p < 0.05); CAR (+5, +45) = 2.83% (*t*-statistic = 2.30; p < 0.05)

Figure 1F: Other (N=353)



CAR (-30, 0) = -0.96% (*t*-statistic = -0.99; p > 0.10); CAR (+5, +45) = -2.16% (*t*-statistic = -2.42; p < 0.05)

Figure 2
Short Interests of Stocks Surrounding Hedge Fund's Receipt of FDA Records (Close Date)

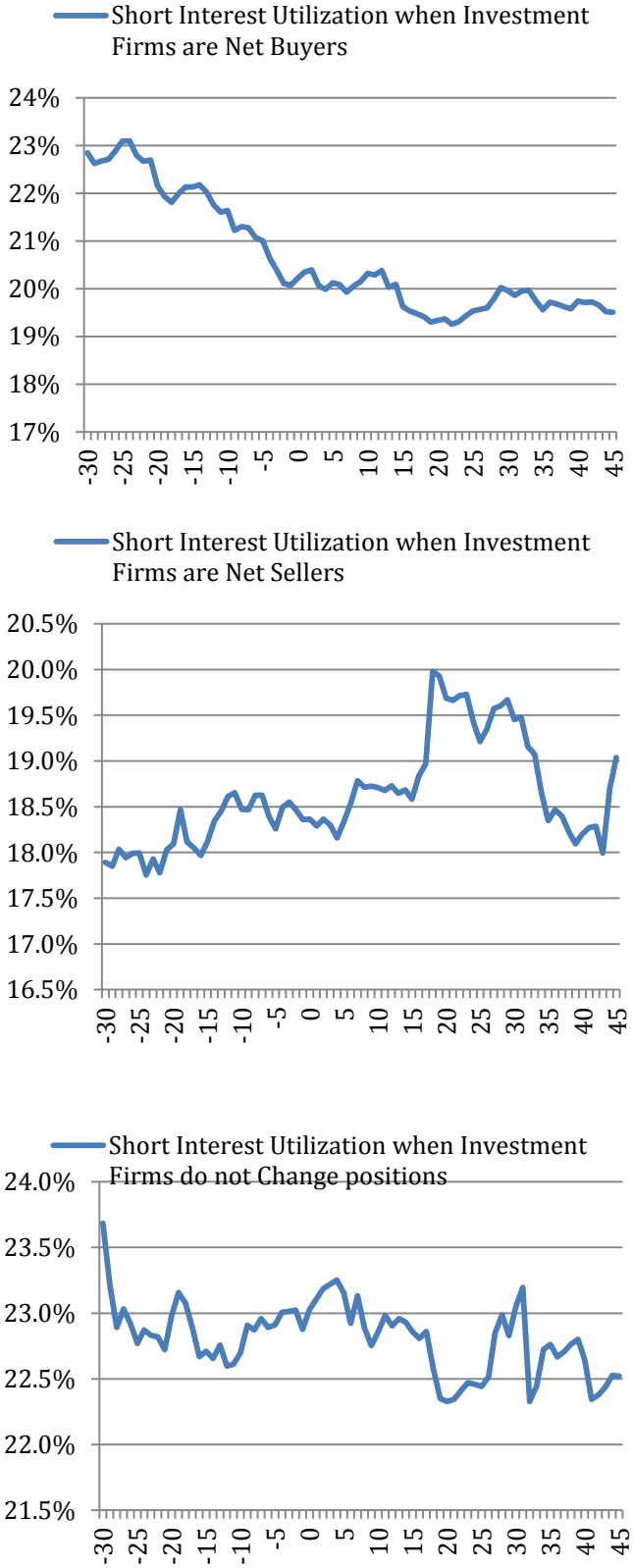
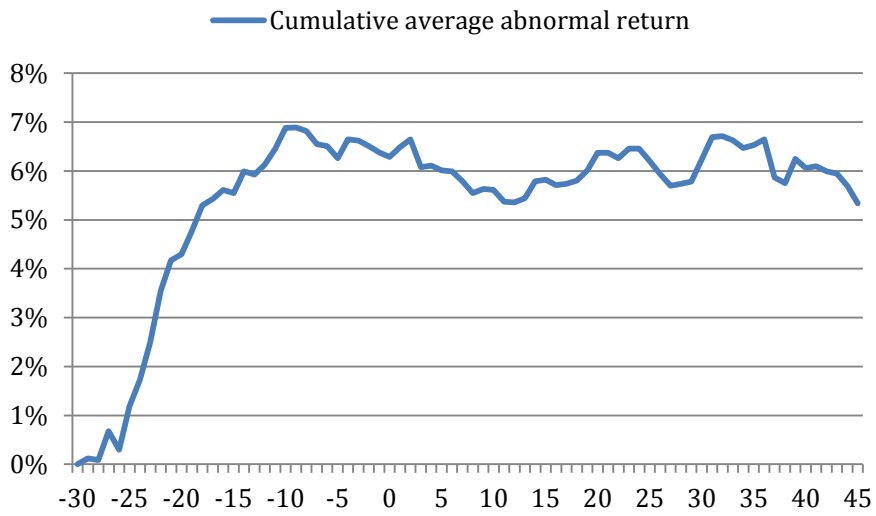


Figure 3
Cumulative Abnormal Returns by Hedge Fund's Trading Direction Around Receipt of FDA Request (Close Date)

Figure 3A: Investment Firm is Net Buyer (N=206)

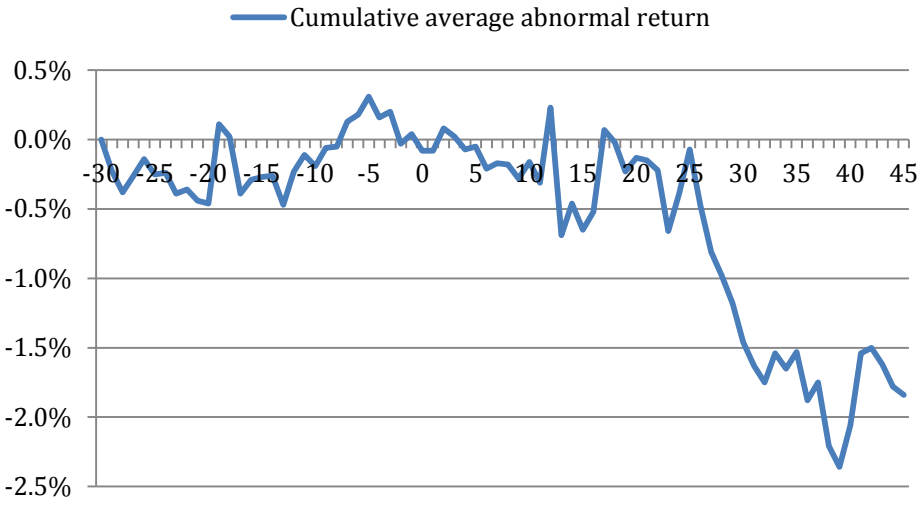


CAR (-30, 0) = 6.44% (*t*-statistic = 3.93, p-value < 0.01)
CAR (+5, +45) = -0.67% (*t*-statistic = -1.07, p-value > 0.10)

First Request within any 2-month window (N=151)
CAR (-30, 0) = 2.22% (*t*-statistic = 2.14, p-value < 0.05)
CAR (+5, +45) = 0.44% (*t*-statistic = 0.41, p-value > 0.10)

Figure 3 – continued

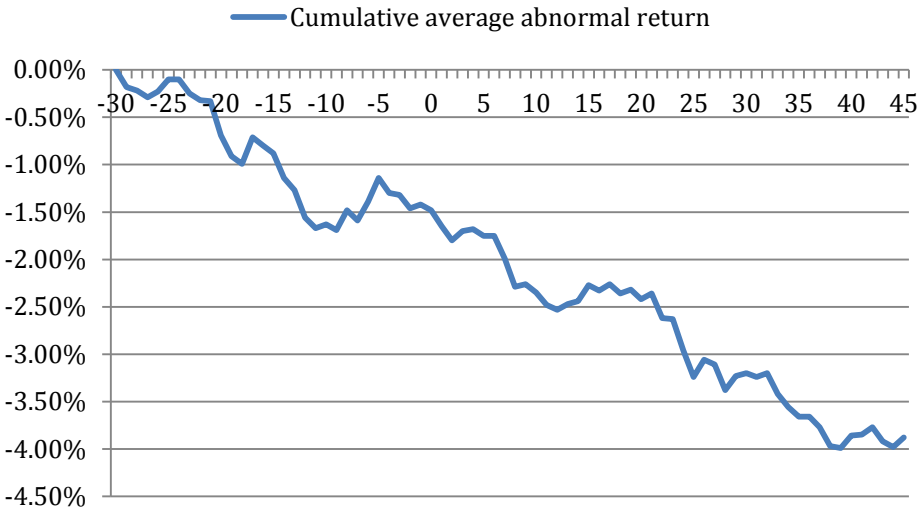
Figure 3B: Investment Firm is Net Seller (N=174)



CAR (-30, 0) = -0.08% (*t*-statistic = -0.29, p-value > 0.10)
CAR (+5, +45) = -1.91% (*t*-statistic = -2.05, p-value < 0.05)

First Request within any 2-month window (N=123)
CAR (-30, 0) = -1.37% (*t*-statistic = -1.31, p-value > 0.10)
CAR (+5, +45) = -2.63% (*t*-statistic = -2.44, p-value < 0.05)

Figure 3C: No Change in Holdings (N=486)



CAR (-30, 0) = -1.48% (*t*-statistic = -1.35, p-value > 0.10)
CAR (+5, +45) = -2.13% (*t*-statistic = -2.55, p-value < 0.05)

First Request within any 2-month window (N=355)
CAR (-30, 0) = -1.93% (*t*-statistic = -1.88, p-value < 0.10)
CAR (+5, +45) = -1.67% (*t*-statistic = -1.76, p-value < 0.10)

Table 1
FDA Record Types

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.
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.
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.
Vaccine Adverse Event Reporting System (VAERS)	The purpose of VAERS is to detect possible signals of adverse events associated with vaccines.
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.
FOIA Record Date	The date on which FDA receives an FOIA request.
FOIA Close Date	The date on which FDA closes an FOIA request, and notifies the requester of its decision.

Table 2
Freedom of Information Act (FOIA) Requests for FDA Records

This table presents descriptive data on FOIA requests for Food and Drug Administration (FDA) records. Panel A shows the number of requests by year and by whether the requesting party is an investment firm or another entity. Other entities include public and private companies, hospitals, doctors, law firms, consulting firms and individuals. Year is the year of the record date. Panel B presents the top 12 investing firm requesters. Panel C shows the breakdown of FDA requests by the target firms' GIC industry number.

Panel A: FOIA Requests by Year

Year	Investment Firm	Other	Total
1999	3	3,637	3,640
2000	7	3,958	3,965
2001	12	4,532	4,544
2002	56	19,594	19,650
2003	74	16,520	16,594
2004	49	19,917	19,966
2005	44	17,422	17,466
2006	69	18,339	18,408
2007	77	10,885	10,962
2008	101	8,854	8,955
2009	143	9,860	10,003
2010	77	9,269	9,346
2011	112	9,254	9,366
2012	193	8,655	8,848
2013	217	9,691	9,908
Total	**1,234**	**170,387**	**171,621**

Panel B: Most Frequent Hedge Fund Requesters

Investment Companies	Frequency	Rank
SAC Capital Advisors	191	1
Bridger Management	165	2
Millennium Management	80	3
Ridgeback Capital Management	60	4
Janus Capital Group	57	5
HealthCor Partners Management	42	6
Oracle Investment Management	33	7
Balyasny Asset Management	26	8
UBS Global Asset Management	25	9
First Manhattan Co.	25	10
Visium Funds	22	11
Great Point Capital	18	12

Table 2 – continued

Panel C: Hedge Fund's FOIA Requests by GIC Industry

GIC Industry Code	GIC Industry Name	Frequency	Percent
15110	Chemicals	3	0.3%
201050	Industrial Conglomerates	1	0.1%
253010	Hotels, Restaurants & Leisure	2	0.2%
255040	Specialty Retail	1	0.1%
302010	Beverages	10	1.0%
303020	Personal Products	6	0.6%
351010	Healthcare Equipment & Supplies	181	17.9%
351020	Healthcare Providers & Services	6	0.6%
351030	Healthcare Technology	1	0.1%
352010	Biotechnology	375	37.1%
352020	Pharmaceuticals	413	40.9%
352030	Life Sciences Tools & Services	9	0.9%
402010	Diversified Financial Services	1	0.1%
402030	Capital Markets	1	0.1%
501010	Diversified Telecommunication Services	1	0.1%
Total		**1,011**	**100%**

Table 3
Hedge Funds FOIA Requests for FDA Records

This table presents descriptive data on the type of FDA records hedge funds request under the FOIA (Panel A), the outcomes of these requests (Panel B), and the calendar days between requesting (record date) and receiving (close date) these records (Panel C). For Panel A, see Table 1 for a description of each FDA report type. Complaints are a combination of FAERS, MDR, CAERS, and VAERS. Other includes company responses to FDA reports, correspondence, meeting minutes, alert, safety review and Notices of Inspection (Form 482). 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 record date.

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

Year	Establishment Inspection Report (EIR)	Form 483	Complaints	Warning Letter (WL)	Approval Recommendation (REC)	Other	Total
1999	2	2	1	0	1	2	8
2000	2	1	0	0	1	5	9
2001	0	1	2	2	4	6	15
2002	5	32	8	23	6	35	109
2003	1	29	14	26	22	45	137
2004	4	19	15	14	7	25	84
2005	4	22	6	14	8	30	84
2006	2	17	33	7	13	14	86
2007	1	9	50	7	8	15	90
2008	12	33	47	30	10	40	172
2009	55	79	7	14	13	50	218
2010	14	30	26	10	7	19	106
2011	16	66	23	18	12	17	152
2012	51	96	41	17	24	75	304
2013	40	83	70	18	11	103	325
Total	**209**	**519**	**343**	**200**	**147**	**481**	**1,899**

Table 3 – continued

Panel B: Outcomes of Requests by Hedge Funds for FDA Records

	Sent	Partial Sent	Denial	No Record	Withdrawn	Other Reason	Pending	Total
1999	1	0	0	0	2	0	0	3
2000	1	0	2	0	4	0	0	7
2001	9	0	0	0	3	0	0	12
2002	34	0	1	7	12	2	0	56
2003	36	0	4	11	19	4	0	74
2004	29	0	0	12	6	2	0	49
2005	17	1	0	6	14	6	0	44
2006	53	0	1	4	7	4	0	69
2007	68	0	1	3	4	1	0	77
2008	79	2	2	8	8	2	0	101
2009	71	9	16	24	9	14	0	143
2010	61	1	2	5	7	1	0	77
2011	72	4	2	16	7	11	0	112
2012	131	6	7	27	14	5	3	193
2013	150	14	10	18	15	2	8	217
Total	**812**	**37**	**48**	**141**	**131**	**54**	**11**	**1,234**

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

	5% percentile	25% percentile	Median	75% percentile	95% percentile
Sent	2	10	30	89	577
Partial Sent	10	25	37	61	139
Denial	2	9	45	137	512
No Record	0	5	17	42	494
Withdrawn	0	18	407	706	1,154
Other Reasons	0	20	243	478	957
All requests	1	10	33	121	749

Table 4
Trading Activity around the Receipt of Different FOIA FDA Records

This table presents changes in holdings (in thousands of shares) by hedge funds around the receipt of at least one FDA record under the FOIA. Only close dates in which the hedge fund received a least one requested record is included in the sample. See Tables 1 and 2 for a description of each FDA report type.

	EIR	Form 483	Complaint	WL	Other	REC
Change in Holdings (Thousands)						
Mean	-4.9	-18.7	18.6	-2.2	-2.8	83.7
Std. Dev.	630.7	523.1	1221.8	254.1	465.9	753.2
5% percentile	-944.6	-718.6	-1290.0	-292.5	-439.2	-148.2
25% percentile	-23.8	0	0	0	0	0
Median	0	0	0	0	0	0
75% percentile	0	0	0	0	0	0
95% percentile	478.2	569.2	945.2	370.0	400.0	340.0
Direction of Net Trades						
Number of net purchases	43	106	53	27	68	40
Number of net sales	50	109	83	28	73	6
Number of no changes in holdings	79	218	168	113	212	70
Number of close dates	172	433	304	168	353	116

Table 5
Summary Statistics for Empirical Proxies For Costs and Benefits of Information Acquisition and Other Publicly-Available Information

This table presents summary statistics for the study's empirical proxies. Prior Ownership is the natural log of the number of shares (in thousands) that the hedge fund has in the target company Long-term Investor is an indicator if the hedge fund owns the target firm's stock for at least a year. Fraction of Health-related Stocks in Portfolio is the dollar value of the fund's holdings in companies with GIC codes beginning with 35. All three variables are measured for the quarter prior to the close date. FOIA Request within Prior Year is an indicator if the hedge fund requested and received at least one FOIA FDA record within a year of the current close date. CAR is cumulative abnormal returns using a Fama-French 3-factor model. Earnings Announcement is an indicator if the firm announced earnings over the time period. # News Stories is the number of news stories from Factiva that mention the target firm. # FDA News Stories is the number of news stories from Factiva about the target firm that contain phrases "FDA" or "Food and Drug Administration." # Drug News Stories is the number of news stories from Factiva about the target firm that contains the phrases about drug releases. Day 0 is the close date. Net Purchases indicates the hedge fund increased its equity holdings of the target firm in quarter 0. Net Sales indicates the hedge fund decreased its equity holdings of the target firm in quarter 0.

	Average	Std. Dev.	1%	25%	50%	75%	99%
Net Purchases							
Prior Ownership	13.1	1.9	7.7	12.1	13.1	14.4	17.3
Long-term Investor	0.71	0.45	0	0	1	1	1
Fraction of Health-related Stocks in Portfolio	0.20	0.22	0.02	0.05	0.14	0.21	0.93
FOIA Request within Prior Year	0.23	0.42	0	0	0	0	1
CAR [-30, record date]	11.0%	72.0%	-37.0%	-11.4%	-0.9%	7.9%	269.4%
CAR [+5, +45]	-0.7%	19.8%	-79.0%	-10.2%	-0.2%	10.3%	60.0%
Earnings Announcement [-30, record date]	0.09	0.28	0	0	0	0	1
Earnings Announcement [record date, 0]	0.03	0.18	0	0	0	0	0
Earnings Announcement [+5, +45]	0.06	0.24	0	0	0	0	1
# News Stories [-30, record date]	20.2	34.1	0	2.0	6.0	20.0	154.0
# News Stories [+5, +45]	47.1	78.6	0	6.0	13.0	50.0	391.0
# FDA News Stories [-30, record date]	20.7	46.9	0	0	2.0	16.0	185.0
# FDA News Stories [+5, +45]	35.3	62.7	0	1.0	14.0	39.0	145.0
# Drug News Stories [-30, record date]	13.5	23.6	0	0	2.0	12.0	72.0
# Drug News Stories [+5, +45]	32.5	62.4	0	2.0	8.0	34.0	148.0
Net Sales							
Prior Ownership	12.7	2.2	7.4	11.3	13.1	14.2	16.9
Long-term Investor	0.80	0.41	0	1	1	1	1
Fraction of Health-related Stocks in Portfolio	0.24	0.29	0.03	0.05	0.11	0.26	0.98
FOIA Request within Prior Year	0.41	0.49	0	0	0	1	1
CAR [-30, request date]	3.8%	28.4%	-39.8%	-7.1%	3.3%	10.3%	62.1%
CAR [+5, +45]	-1.9%	25.0%	-70.7%	-10.5%	1.3%	11.1%	43.1%
Earnings Announcement [-30, record date]	0.13	0.33	0	0	0	0	1
Earnings Announcement [record date, 0]	0.08	0.28	0	0	0	0	1
Earnings Announcement [+5, +45]	0.09	0.30	0	0	0	0	1
# News Stories [-30, record date]	22.44	33.76	0	2.0	9.0	29.0	164.0
# News Stories [+5, +45]	37.39	52.83	0	4.0	16.0	62.0	204.0
# FDA News Stories [-30, record date]	26.5	35.1	0	0	8.0	59.0	85.0
# FDA News Stories [+5, +45]	32.1	52.9	0	2.0	12.0	50.0	107.0
# Drug News Stories [-30, record date]	22.7	33.7	0	0	6.0	28.0	97.0
# Drug News Stories [+5, +45]	28.6	48.3	0	1.0	10.0	42.0	106.0

Table 6
Hedge Fund Trading Activity Around FOIA Close Dates for Requested and Non-Requested Stocks

This table shows hedge fund trading activity around the receipt of requested FDA records. Net Buyer is when the number of shares held in the stock in the quarter of the close date increases; Net Seller is when the number of shares held in the stock in the quarter of the close date decreases; No Change in Holdings is when the change in the number of shares in the stock in the quarter is zero. Column (1) shows trading activity for stocks for which FOIA requests were received. Column (2) shows trading activity by the same hedge fund in non-requested health-related stocks. Column (3) shows trading activity by the same hedge fund for other stocks in the hedge fund's portfolio. We compare trading activity within the same quarter of the close date. In Panel A, data are from 13F filings as contained in the Thomson-Reuters database. In Panel B, changes in holdings are from transaction data. Positive values are mean shares bought and negative values are mean shares sold. *t*-statistics and z-statistics test for differences in means and medians, respectively * (**) (***) are significant at the 0.10, .005, and 0.01 levels, respectively.

Panel A: Quarterly Changes in Holdings (thousands of shares)

When investment firms are:		(1) Stocks for which FOIA requests are filed and received	(2) Other Health-related stocks (no FOIA request)	(3) All other stocks (no FOIA request)	(4) t-stat and z-stat b/t (1) & (2)	(5) t-stat and z-stat b/t (1) & (3)	(6) t-stat and z-stat b/t (2) & (3)
Net Buyer	Mean	989.0	66.7	44.3	t = 5.5***	t = 5.6***	t = 1.6
	Std. Dev.	2,413.6	1167.6	1259.4			
	5% percentile	11.7	-668.0	-589.0			
	25% percentile	61.4	-27.8	-20.4			
	Median	265.1	10.7	10.0	z = 10.5***	z = 14.4***	z = 1.9*
	75% percentile	707.0	120.0	79.9			
	95% percentile	4,444.7	961.0	793.6			
	Observation	206	7,339	98,728			
Net Seller	Mean	-636.2	24.3	10.4	t = -9.9***	t = -10.0***	t = 0.8
	Std. Dev.	851.4	1259.4	1471.5			
	5% percentile	-2,050.0	-747.0	-663.5			
	25% percentile	-886.0	-42.0	-29.3			
	Median	-297.4	4.9	4.9	z = -12.6***	z = -14.6***	z = -0.1
	75% percentile	-91.1	94.1	65.1			
	95% percentile	-17.8	928.9	715.3			
	Observation	174	6,233	78,817			
No Change in Holdings	Mean	0	56.8	32.4	t = -3.4***	t = -5.2***	t = 1.4
	Std. Dev.	--	1,468.7	1,743.6			
	5% percentile	--	-982.6	-757.3			
	25% percentile	--	-45.0	-17.1			
	Median	0	3.4	0.9	z = -6.5***	z = -6.4***	z = 1.2
	75% percentile	--	155.0	90.0			
	95% percentile	--	1,250.0	950.7			
	Observation	523	7,954	78,421			

Table 6 – continued

Panel B: Transaction Data around Close Date (thousands of shares)

When investment firms are:		(1) Stocks for which FOIA requests are filed and received	(2) Other Health-related stocks (no FOIA request)	(3) All other stocks (no FOIA request)	(4) t-stat and z-stat b/t (1) & (2)	(5) t-stat and z-stat b/t (1) & (3)	(6) t-stat and z-stat b/t (2) & (3)
Net Buyer over Quarter	(-30, 0)	469.0 [3.84]	29.5 [3.67]	32.3 [9.65]	t = 3.6***	t = 3.6***	t = -0.3
	(0, +5)	85.6 [2.16]	15.5 [2.38]	12.6 [6.79]	t = 1.7*	t = 1.8*	t = 0.4
	(+5, +15)	119.7 [2.41]	18.0 [2.92]	13.1 [7.61]	t = 2.0**	t = 2.1**	t = 0.8
	(+15, +30)	88.1 [2.02]	23.1 [2.70]	16.4 [7.75]	t = 1.5	t = 1.6	t = 0.7
	(+30, +45)	25.3 [1.19]	31.3 [3.17]	23.2 [9.18]	t = -0.2	t = 0.1	t = 0.8
Net Seller over Quarter	(-30, 0)	-40.2 [-1.23]	15.0 [3.06]	17.1 [6.53]	t = -1.8*	t = -1.9*	t = -0.5
	(0, +5)	-65.0 [-1.58]	8.0 [1.60]	10.4 [2.94]	t = -1.9*	t = -2.0**	t = -0.5
	(+5, +15)	-183.2 [-3.43]	10.0 [3.08]	12.7 [5.82]	t = -3.6***	t = -3.7***	t = -0.9
	(+15, +30)	-88.7 [-2.40]	9.1 [3.29]	15.0 [7.58]	t = -2.7***	t = -2.9***	t = -2.2**
	(+30, +45)	-37.5 [-1.94]	13.1 [3.19]	15.2 [7.75]	t = -2.7***	t = -2.8***	t = -0.6
No Change in Holdings over Quarter	(-30, 0)	-8.8 [-0.57]	44.5 [2.57]	45.4 [4.71]	t = -2.3**	t = -3.0***	t = -0.1
	(0, +5)	4.8 [0.41]	31.2 [2.01]	11.3 [1.29]	t = -1.7*	t = -0.7	t = 1.2
	(+5, +15)	3.1 [0.32]	23.7 [1.99]	5.5 [0.87]	t = -1.6	t = -0.2	t = 1.5
	(+15, +30)	-1.3 [-0.29]	24.0 [1.33]	0.7 [0.10]	t = -1.7*	t = -0.3	t = 1.3
	(+30, +45)	-0.5 [-0.20]	35.2 [1.86]	1.1 [0.16]	t = -1.9*	t = -0.2	t = 1.7

Table 7
Trading Activity in Target Stocks for Hedge Funds Requesters and Non-Requesting Investment Companies Around FOIA Close Dates

This table compares trading activity in the target stock around FOIA close dates between hedge funds receiving at least one FDA record and other investing companies not requesting FDA records. Other hedge funds are institutions whose type code equals to 4 or 5. Growth-oriented mutual funds are institutions whose investment objective code equals to 2 – manager level. Funds are further matched by fund size, measured as the dollar investment in the fund at quarter end. Institutional holdings (13F) and mutual fund holdings (S12) are obtained from Thomson Reuters for the period January 1999 – December 2013. In Panel A, we present changes in net holdings over the quarter in which the hedge fund FDA records were received. In Panel B, we use transactions data. T- and z-statistics measure differences in means and medians between columns. * (**) (***) are significant at the 0.10, 0.05, 0.01 levels, respectively.

Panel A: Quarterly Data (Number of Shares in Thousands)

		Stocks for which FOIA requests are filed					
When investment firms are:		(1) Hedge Fund filed and received FOIA requests	(2) Other hedge funds (non-requesters)	(3) Growth-oriented mutual funds (non-requesters)	(4) t-stat and z-stat b/t (1) & (2)	(5) t-stat and z-stat b/t (1) & (3)	(6) t-stat and z-stat b/t (2) & (3)
Net Buyer	Mean	989.0	0.2	9.1	t = 5.8***	t = 5.6***	t = -0.2
	Std. Dev.	2,413.6	859.2	871.1			
	5% percentile	11.7	-230.5	-256.0			
	25% percentile	61.4	-4.4	-7.2			
	Median	265.1	0	0	z = 15.6***	z = 14.8***	z = -0.9
	75% percentile	707.0	12.0	48.7			
	95% percentile	4,444.7	245.5	611.5			
	Observation	206	1,805	457			
Net Seller	Mean	-636.2	55.7	-18.6	t = -9.5***	t = -8.1***	t = 1.4
	Std. Dev.	851.4	1,165.8	717.7			
	5% percentile	-2,050.0	-353.7	-409.0			
	25% percentile	-886.0	-18.4	-6.4			
	Median	-297.4	0	0	z = -13.4***	z = -15.3***	z = -1.6
	75% percentile	-91.1	15.3	28.0			
	95% percentile	-17.8	498.7	479.2			
	Observation	174	1,170	311			
No Change in Holdings	Mean	0	-13.4	90.0	t = 0.9	t = -2.9***	t = -3.0***
	Std. Dev.	--	642.3	860.5			
	5% percentile	--	-252.4	-614.4			
	25% percentile	--	-1.7	-6.7			
	Median	0	0	0	z = 1.3	z = 3.3***	z = -1.4
	75% percentile	--	9.3	59.4			
	95% percentile	--	307.2	1,294.7			
	Observation	523	1,933	753			

Table 7 – continued

Panel B: Transaction Data (Number of Shares in Thousands)

When investment firms are:		(1) Stocks for which FOIA requests are filed and received	(2) Other hedge funds (non-requesters)	(3) Growth-oriented mutual funds non-requesters	(4) t-stat and z-stat b/t (1) & (2)	(5) t-stat and z-stat b/t (1) & (3)	(6) t-stat and z-stat b/t (2) & (3)
Net buyer over quarter	(-30, 0)	469.0 [3.84]	-0.6 [-0.05]	-22.7 [-0.74]	t = 3.8***	t = 3.9***	t = 0.7
	(0, +5)	85.6 [2.16]	-6.6 [-0.55]	-8.1 [-0.67]	t = 2.2**	t = 2.3**	t = 0.1
	(+5, +15)	119.7 [2.41]	13.2 [1.22]	-9.8 [-0.81]	t = 2.1**	t = 2.5**	t = 1.4
	(+15, +30)	88.1 [2.02]	-0.1 [-0.01]	3.6 [0.27]	t = 2.0**	t = 1.8*	t = -0.2
	(+30, +45)	25.3 [1.19]	0.2 [0.05]	2.4 [0.21]	t = 1.1	t = 0.9	t = -0.2
Net seller over quarter	(-30, 0)	-40.2 [-1.23]	-10.2 [-2.01]	107.4 [1.85]	t = -0.9	t = -2.2**	t = -2.0
	(0, +5)	-65.0 [-1.58]	-2.8 [-1.18]	-11.1 [-1.26]	t = -1.6	t = -1.3	t = 0.9
	(+5, +15)	-183.2 [-3.43]	-16.1 [-1.26]	-49.1 [-2.13]	t = -3.0***	t = -2.3**	t = 1.3
	(+15, +30)	-88.7 [-2.40]	-9.3 [-0.82]	10.0 [0.59]	t = -2.1**	t = -2.4**	t = -0.9
	(+30, +45)	-37.5 [-1.94]	11.1 [1.14]	7.1 [0.84]	t = -2.3**	t = -2.1**	t = 0.3
No changes in holdings over quarter	(-30, 0)	-8.8 [-0.57]	14.4 [1.70]	11.7 [1.02]	t = -1.3	t = -1.1	t = 0.2
	(0, +5)	4.8 [0.41]	42.9 [2.28]	15.2 [0.91]	t = -1.7	t = -0.5	t = 1.1
	(+5, +15)	3.1 [0.32]	9.7 [1.42]	23.1 [2.00]	t = -0.7	t = -1.3	t = -1.0
	(+15, +30)	-1.3 [-0.29]	21.0 [2.24]	-5.7 [-0.24]	t = -2.1**	t = 0.2	t = 1.1
	(+30, +45)	-0.5 [-0.20]	-15.3 [-1.68]	-3.0 [-0.13]	t = 1.6	t = 0.1	t = -0.5

Table 8
Regressions of Processing Costs, Benefits, and Other Information on Hedge Fund Trading Around Receipt of FDA Records

This table presents coefficients and [t-statistics] for regressions on net purchases (Panel A) and net sales (Panel B) by hedge funds in the quarter surrounding the receipt of FOIA FDA records. Net purchases is the natural log of the increase in net holdings. Net sales is the natural log of the absolute value of the decrease in net holdings. Day 0 is the close date. ROA is return on assets during quarter *t*-1, defined as EBITDA/assets. Firm Size is the natural log of market capitalization in millions of dollars at the end of quarter *t*-1. Amihud Illiquidity is the yearly average (using daily data ending quarter *t*-1 from CRSP) of $1000\sqrt{|\text{ret}|/\text{dollar trading volume}}$. #Analysts is the natural log of the median number of analysts covering the company during quarter *t*-1, which are taken from I/B/E/S, and Institutional Holdings is the proportion of shares held by institutions at the end of quarter t-1. See Table 5 for definitions of other variables. Industry and yearly fixed effects are included in the regression analyses. *, **, *** Indicates significance at the 0.10, 0.05 and 0.01 levels, respectively

Panel A: Net Purchases (N=156)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Processing Costs												
Prior Ownership	0.723***				0.753***				0.827***			
	[16.07]				[13.45]				[18.21]			
Fraction of Health-related		1.576**				1.508*				1.478**		
Stocks in Portfolio		[2.14]				[1.87]				[2.04]		
Long-term Investor			0.236				0.362				0.420	
			[0.66]				[0.79]				[0.86]	
FOIA Request in Prior Year				0.719**				0.702*				0.594*
				[2.00]				[1.92]				[1.68]
CAR (+5, +45)	1.086**	1.987***	2.066***	1.986***								
	[2.05]	[2.76]	[2.86]	[2.87]								
Other Information (+5, +45)												
# News Stories					-0.320**	-0.411**	-0.307**	-0.338**				
					[-2.06]	[-2.35]	[-2.02]	[-2.13]				
# FDA News Stories									-0.107	-0.032	-0.004	-0.001
									[-0.83]	[-0.11]	[-0.01]	[-0.01]
# Drug New Stories									0.210	-0.040	-0.103	-0.125
									[1.60]	[-0.14]	[-0.37]	[-0.46]
Earnings Announcement	-0.691	-1.164	-1.152	-1.283	-1.346	-0.800	-0.571	-1.530	-1.930**	-0.771	-0.478	-0.270
	[-1.15]	[-1.55]	[-1.54]	[-1.63]	[-1.61]	[-0.55]	[-0.39]	[-1.14]	[-2.51]	[-0.63]	[-0.35]	[-0.17]
Other Information Before Receipt of FDA Records Days (-30, Record Date)												
CAR	0.512**	0.317*	0.341*	0.503								
	[2.09]	[1.65]	[1.72]	[1.20]								

# News Stories					0.168	0.277	0.271	0.206				
					[1.33]	[1.23]	[1.18]	[1.02]				
# FDA News Stories									0.001	-0.302	-0.322	-0.362
									[0.01]	[-1.13]	[-1.19]	[-1.37]
# Drug News Stories									-0.029	0.192	0.213	0.266
									[-0.21]	[0.68]	[0.75]	[0.96]
Earnings Announcement	-0.495	-1.334*	-1.179	-0.968	-1.293*	-1.042	-0.778	-0.742	-0.553	-1.602*	-1.547	-1.265
	[-0.86]	[-1.69]	[-1.49]	[-1.30]	[-1.66]	[-0.96]	[-0.71]	[-0.74]	[-1.13]	[-1.67]	[-1.58]	[-1.35]
Days (Record Date, 0)												
CAR	0.403	0.260	0.305	0.315								
	[0.55]	[0.59]	[0.70]	[0.74]								
Earnings Announcement	1.075***	0.974*	1.058*	1.214**	1.683**	0.800	0.540	1.428	2.342***	0.564	0.320	0.155
	[2.87]	[1.67]	[1.79]	[2.21]	[2.25]	[0.70]	[0.47]	[1.43]	[3.99]	[0.62]	[0.23]	[0.12]
Control Variables												
ROA	-0.213	-1.927**	-2.071**	-2.050**	-0.840	-1.897*	-1.647	-1.928*	-0.198	-1.482	-1.366	-1.292
	[-0.40]	[-2.45]	[-2.49]	[-2.53]	[-0.92]	[-1.70]	[-1.43]	[-1.80]	[-0.33]	[-1.48]	[-1.34]	[-1.33]
Firm Size	0.080	0.392**	0.339**	0.411**	0.057	0.282	0.146	0.212	0.099	0.561**	0.492**	0.478**
	[0.81]	[2.51]	[2.19]	[2.56]	[0.40]	[1.19]	[0.61]	[0.93]	[0.93]	[2.52]	[2.23]	[2.26]
Amihud Illiquidity	-9.813***	-8.155**	-8.540**	-9.132**	-9.092*	-7.018*	-7.921**	-7.988**	-5.986	-6.359*	-7.223*	-6.420*
	[-2.64]	[-2.08]	[-2.18]	[-2.49]	[-2.27]	[-1.78]	[-2.05]	[-2.09]	[-1.62]	[-1.70]	[-1.78]	[-1.69]
#Analysts	-0.492*	-0.216	-0.194	-0.179	-0.548*	0.125	0.246	0.246	-0.500	-0.955	-0.841	-0.649
	[-1.89]	[-0.54]	[-0.49]	[-0.47]	[-1.89]	[0.23]	[0.45]	[0.46]	[-1.31]	[-1.23]	[-1.07]	[-0.87]
	-0.651	0.151	0.040	0.245	-0.772	0.368	-0.084	0.274	0.456	0.127	-0.450	-0.628
Institutional Holdings	[-1.02]	[0.17]	[0.04]	[0.28]	[-0.79]	[0.28]	[-0.06]	[0.22]	[0.60]	[0.11]	[-0.42]	[-0.61]
Industry and Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.84	0.46	0.45	0.50	0.84	0.15	0.14	0.19	0.90	0.24	0.22	0.26

Panel B: Net Sales (N=121)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Processing Costs												
Prior Ownership	1.212***				1.218***				1.112***			
	[14.70]				[15.68]				[9.00]			
Fraction of Health-related		1.350**				1.725**				1.042*		
Stocks in Portfolio		[2.23]				[2.31]				[1.88]		
Long-term Investor			1.303*				0.904				1.909**	
			[1.95]				[1.14]				[2.33]	
FOIA Request in Prior Year				0.889**				0.939**				1.294**
				[2.28]				[2.43]				[2.63]
CAR (+5, +45)	-1.033**	-1.342**	-1.294*	-1.441*								
	[-2.10]	[-2.36]	[-1.73]	[-1.91]								
Other Information(+5, +45)												

# News Stories					0.339*	0.532**	0.513**	0.612**				
					[1.88]	[2.16]	[2.13]	[2.43]				
# FDA News Stories									-0.103	-0.039	-0.065	-0.330
									[-0.48]	[-0.11]	[-0.19]	[-1.00]
# Drug News Stories									-0.445*	-0.858**	-0.696*	-0.669*
									[-1.73]	[-2.08]	[-1.75]	[-1.79]
Earnings Announcement	0.442	0.924	1.166	0.958	0.740*	1.556*	1.833**	1.764**	0.665	0.710	1.639	1.380
	[1.02]	[1.14]	[1.44]	[1.34]	[1.91]	[1.78]	[2.05]	[2.30]	[0.93]	[0.60]	[1.41]	[1.30]
Days (-30, Record Date)												
CAR	-0.397	0.037	0.340	0.004								
	[-1.01]	[0.05]	[0.47]	[0.01]								
# News Stories					0.248*	0.435**	0.443**	0.544**				
					[1.80]	[2.27]	[2.33]	[2.61]				
# FDA News Stories									0.374	0.366	0.276	0.236
									[1.48]	[0.88]	[0.70]	[0.64]
# Drug News Stories									-0.156	0.387	0.420	0.444
									[-0.59]	[0.92]	[1.06]	[1.20]
Earnings Announcement	0.021	0.339	0.413	0.088	0.748	1.294	1.178	0.726	-0.540	0.299	-0.323	-0.730
	[0.05]	[0.43]	[0.53]	[0.13]	[1.49]	[1.17]	[1.07]	0.79]	[-0.69]	[0.24]	[-0.26]	[-0.61]
Days (Record Date, 0)												
Earnings Announcement	0.329	1.037	0.970	1.026	-0.070	-1.664*	-1.615**	-1.684**	-0.355	-0.902	-0.457	-0.632
	[0.85]	[1.48]	[1.41]	[1.63]	[-0.21]	[-2.26]	[-2.23]	[-2.60]	[-0.58]	[-0.88]	[-0.48]	[-0.71]
CAR	-1.428**	-1.266**	-1.141*	-1.349*								
	[-2.27]	[-1.99]	[-1.75]	[-1.94]								
Control Variables												
ROA	1.228**	0.401	0.386	0.136	1.014*	0.795	0.676	0.421	1.523*	0.985	0.687	0.588
	[2.00]	[0.35]	[0.34]	[0.14]	[1.90]	[0.65]	[0.56]	[0.42]	[1.81]	[0.72]	[0.52]	[0.48]
Firm Size	0.283*	0.290	0.223	0.395	0.170	0.429	0.448	0.203	0.461**	0.426	0.289	0.721**
	[1.76]	[0.96]	[0.75]	[1.50]	[1.00]	[1.13]	[1.20]	[0.65]	[2.21]	[1.21]	[0.52]	[2.27]
Amihud Illiquidity	-24.147**	-13.435*	-13.886*	-18.262**	-17.692*	-14.471	-11.581	-16.901*	-24.984**	-12.936	-11.354	-17.400*
	[-2.54]	[-1.73]	[-1.79]	[-2.01]	[-1.67]	[-1.52]	[-1.43]	[-1.65]	[-1.99]	[-1.49]	[-1.43]	[-1.70]
#Analysts	-0.191	-0.194	-0.241	-0.249	0.170	2.287**	2.119*	2.146**	-0.875	0.527	0.051	0.349
	[-0.33]	[-0.18]	[-0.23]	[-0.26]	[0.33]	[2.01]	[1.87]	[2.23]	[-1.01]	[0.38]	[0.04]	[0.29]
Institutional Holdings	0.034	1.112	-0.112	1.363	-0.514	0.097	-0.845	0.214	0.891	1.214	-0.771	1.427
	[0.04]	[0.73]	[-0.07]	[1.02]	[-0.67]	[0.06]	[-0.44]	[0.14]	[0.84]	[0.70]	[-0.42]	[0.94]
Industry and Year FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.75	0.14	0.17	0.19	0.85	0.23	0.25	0.32	0.74	0.31	0.37	0.40

Table 9
Other Measures of Trading Activity

Panel A: Trading Activity is Measured as Ln |Change in Dollar Holdings|

Net Purchases (N=144)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Processing Costs												
Prior Ownership in Dollars	0.518***				0.514***				0.502***			
	[9.10]				[7.78]				[7.82]			
Fraction of Health-related		1.240*				1.432*				2.398**		
Stocks in Portfolio		[1.66]				[1.75]				[2.53]		
Long-term Investor			0.283				0.574				0.728	
			[0.69]				[1.11]				[1.45]	
FOIA Request in Prior Year				0.682				0.974*				0.775*
				[1.50]				[1.97]				[1.69]
Benefits												
CAR (+5, +45)	1.071*	1.260**	1.317*	1.615**								
	[1.95]	[2.28]	[2.39]	[2.49]								
#News Stories	N	N	N	N	Y	Y	Y	Y	N	N	N	N
#FDA/Drug News Stories	N	N	N	N	N	N	N	N	Y	Y	Y	Y
Controls and FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.45	0.23	0.22	0.20	0.40	0.13	0.13	0.16	0.45	0.17	0.14	0.16
Net Sales (N=116)												
Processing Costs												
Prior Ownership in Dollars	0.834***				0.902***				0.857***			
	[9.59]				[8.43]				[7.23]			
Fraction of Health-related		1.232**				1.472**				1.121*		
Stocks in Portfolio		[2.12]				[2.03]				[1.92]		
Long-term Investor			1.125**				0.787				1.046*	
			[2.09]				[1.15]				[1.73]	
FOIA Request in Pr. Year				0.219				0.264				0.204
				[0.76]				[0.77]				[0.48]
Benefits												
CAR (+5, +45)	-0.790*	-1.194**	-1.079**	-0.914*								
	[-1.69]	[-2.11]	[-1.99]	[-1.72]								
#News Stories	N	N	N	N	Y	Y	Y	Y	N	N	N	N
#FDA/Drug News Stories	N	N	N	N	N	N	N	N	Y	Y	Y	Y
Controls and FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Adj. R-squared	0.59	0.43	0.44	0.48	0.57	0.39	0.40	0.48	0.58	0.43	0.44	0.50

Panel B: Trading Activity is Measured as |Change in % Weight of Target Stock in Portfolio|

Net Purchases (N=144)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Processing Costs												
%Prior Ownership	0.266***				0.301**				0.235**			
	[4.28]				[2.55]				[2.04]			
Fraction of Health-related		2.866***				4.022***				5.755***		
Stocks in Portfolio		[6.00]				[4.72]				[7.24]		
Long-term Investor			0.721***				2.055***				1.375***	
			[3.01]				[4.36]				[3.01]	
FOIA Request in Prior Year				0.108				0.754*				0.528
				[0.16]				[1.68]				[1.22]
Benefits												
CAR (+5, +45)	1.991***	1.789***	2.094***	2.078***								
	[7.36]	[6.97]	[7.47]	[7.20]								
# New Stories	N	N	N	N	Y	Y	Y	Y	N	N	N	N
#FDA/Drug News Stories	N	N	N	N	N	N	N	N	Y	Y	Y	Y
Controls and Fes	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.63	0.68	0.60	0.57	0.23	0.37	0.34	0.22	0.26	0.55	0.30	0.22
Net Sales (N=116)												
Processing Costs												
%Prior Ownership	0.487***				0.361***				0.514***			
	[9.14]				[10.44]				[7.50]			
Fraction of Health-related		2.501***				2.941***				4.309***		
Stocks in Portfolio		[3.66]				[6.59]				[4.68]		
Long-term Investor			0.767**				0.252				1.287**	
			[2.14]				[0.74				[1.73]	
FOIA Request in Pr. Year				0.209				0.339*				1.032**
				[1.12]				[1.91]				[2.43]
Benefits												
CAR (+5, +45)	-1.454***	-1.334***	-1.592***	-2.272***								
	[-3.21]	[-2.20]	[-2.53]	[-3.77]								
#News Stories	N	N	N	N	Y	Y	Y	Y	N	N	N	N
#FDA/Drug News Stories	N	N	N	N	N	N	N	N	Y	Y	Y	Y
Controls and Fes	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.68	0.45	0.39	0.34	0.73	0.55	0.22	0.35	0.66	0.50	0.35	0.31

Table 10
Probit Analysis of FOIA Requests for FDA Records

This table reports the effects of covariates on the probability of being a target firm. The dependent variable is a dummy variable equal to one if the hedge fund filed an FOIA request with the FDA for the target firm, and zero otherwise. The target firm is matched with firms in the requesters' portfolio in the same quarter and in the same 10 X 10 firm size/book-to-market portfolio. Health-related stocks are stocks with GIC codes of 35. In each column we report coefficient estimates, their robust *t*-statistics, and the marginal probability change induced by a one-standard deviation increase in the values of covariates from their sample averages. B/M is book value of equity divided by market value of equity, Prior-year Stock Return is the buy-and-hold abnormal stock return during the 12 months before the request, Leverage is total debt / (total debt + book value of equity, Cash is (cash + cash equivalents)/assets, Dividend Yield is (common dividend + preferred dividend)/(market value of common stock + book value of preferred stock), and R&D is R&D/assets. See Table 5 for other variable definitions. *, **, *** Indicates significance at the 0.10, 0.05 and 0.01 levels, respectively

	Matched firms from requesters' portfolios			**Matched firms from requesters' portfolios (Health-related stocks only)**		
Dependent Variable: Dummy of Being Requested	Coefficient	*t*-statistic	Marg. Prob.	Coefficient	*t*-statistic	Marg. Prob.
Prior Ownership	0.17**	2.28	2.61%	0.16**	2.16	2.50%
Long-term Investor	-2.60***	-10.25	-14.01%	-3.48***	-8.74	-16.57%
FOIA Request in Prior Year	2.62***	9.35	7.81%	2.41***	8.01	12.95%
Firm Size	0.06***	3.40	3.11%	0.07***	3.65	6.76%
B/M	-0.98**	-2.09	-0.12%	-1.55**	-2.42	-0.52%
ROA	1.03*	1.82	0.22%	1.39**	2.01	1.73%
Prior-year Stock Return	-0.14**	-2.63	-2.74%	-0.22***	-3.05	-3.22%
Leverage	0.26	0.50	0.10%	0.61	0.93	0.15%
Cash	-0.22	-0.41	-0.10%	-0.18	-0.29	-0.07%
Dividend Yield	0.71	0.63	0.01%	0.69	0.59	0.01%
R&D	-2.80**	-2.18	-3.17%	-2.79*	-1.84	-3.40%
#Analysts	0.03	1.36	1.34%	0.04	1.48	2.72%
Institutional Holdings	1.12***	2.78	1.52%	2.48***	2.99	2.76%
Amihud Illiquidity	-2.86	-1.10	-0.41%	-1.41	-0.66	-0.29%
Industry FEs	Y			Y		
Year FEs	Y			Y		
Observations	4,897			2,662		
Pseudo R-squared	0.59			0.60		