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Hedge Funds and Public Information Acquisition

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Abstract. Hedge funds actively acquire publicly available financial disclosures. Funds acquiring such information subsequently earn 1.5% higher annualized abnormal returns than nonacquirers. Trades by the same fund in the same quarter are more profitable when accompanied by public information acquisition. Acquiring public filings is relatively less profitable when macrouncertainty is high. Funds employ a wide range of strategies for acquiring public filings. Those that systematically scrape large volumes of information, specialize in certain filing types, acquire filings with more content changes, or access information immediately outperform other funds.

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1. Introduction

Hedge funds have access to many potential sources of information but have limited time to research, develop, and implement investment strategies. The literature has shown that hedge funds profit from information not widely available to other investors (Massoud et al. 2011, Gargano et al. 2017) and from sophisticated investment strategies (Fung and Hsieh 2000, Stulz 2007, Sun et al. 2011). In this paper, we study how hedge funds pay attention to arguably the most widely available information in markets—publicly disclosed filings accessible through the Securities and Exchange Commission (SEC) website. We examine how fund performance relates to (1) the extent of funds' information acquisition and (2) the different strategies employed to acquire public information.

Theoretical predictions for the extent and profitability of public information acquisition are mixed. Public information acquisition could be positively related to fund performance if the benefits of processing filings outweigh the costs (Grossman and Stiglitz 1980, Garleanu and Pedersen 2018). Public information could also be used profitably in conjunction with private information (Kim and Verrecchia 1997). On the other hand, the relation between public information acquisition and performance could be negative if the opportunity cost of paying attention to public information is high for the best hedge funds (Kacperczyk and Seru 2007).

Empirically, paying attention to public information is robustly positively related to hedge fund performance. Specifically, funds that acquire public information in a given month subsequently outperform funds that do not. The performance difference is economically large—about 1.5% per year. Over our 14-year sample period, the cumulative difference in abnormal returns between fund-months that follow public information acquisition and those that do not is almost 25 percentage points. The relation is not just a proxy for managerial ability or other fixed fund characteristics; performance is higher even *within fund* following public information acquisition. In other words, a fund's performance following an acquisition month exceeds that of the same fund's performance following months with no information acquisition.

The value of strategies based on public information acquisition may vary with the supply of public information or as managers reallocate attention to and from stock-specific information over the business cycle (Kacperczyk et al. 2014, 2016). We do not find evidence of the former explanation; although the acquisition-performance relation is larger when the number of new SEC filings increases, the estimates are not significant. We do find evidence consistent with the latter possibility; funds' information acquisition is less related to performance during National Bureau of Economic Research (NBER) recessions and when the Chicago Board Options Exchange Volatility Index (VIX) is elevated. This is consistent with fund managers allocating more attention to idiosyncratic information during economic expansions as in Kacperczyk et al. (2014, 2016).

If managers happen to download filings during periods in which they focus their attention on stock

picking, the relation we observe between performance and information acquisition may merely capture this focus. To address whether time-varying attention to idiosyncratic information explains all of the observed relation, we conduct within–fund-quarter analyses that link the stock-level performance of funds' positions to their information acquisition and trading behavior. When funds trade stocks for which they have acquired public information, those purchased (sold) stocks outperform (underperform) stocks traded in the absence of information acquisition. Specifically, a one-standard deviation increase in a fund's researched stock position in quarter t predicts a 10-basis point (bp) higher abnormal stock return in quarter $t+1$ compared with position changes not accompanied by public information acquisition. This relation is especially sizeable for position exits that are researched; a fund that exits a stock position it researches (does not research) in quarter t avoids a 49-bp (17-bp) lower abnormal return in that stock in quarter $t+1$. The relations are stronger when funds access periodic financial statements (Forms 10-K/Q) and management trading disclosures (Form 4) and are unrelated to when funds acquire unscheduled disclosures (Form 8-K).[1] Importantly, the results hold when comparing trades for the same fund in the same quarter, thus suggesting the acquisition-performance relation is not because of time-varying attention to idiosyncratic information.

We next examine how hedge funds' performance varies with the strategies employed to acquire public information. Prior work suggests there is substantial variation in hedge fund "skill" (Chen et al. 2017) as well as in the underlying investment strategies employed by funds. Our granular data reveal several ways in which hedge funds employ different strategies with respect to public information acquisition. First, they vary in the amount of information acquired. About 60% of funds acquire at least one filing in a month during our sample period. Conditional on acquisition, the 25th percentile of funds only acquires about five filings per month, whereas the 90th percentile of funds acquires hundreds of filings per month. Second, there is substantial variation in the types of filings acquired. About 70% (8%) of accessed filings are Forms 10-K/Q for the 75th (25th) percentile fund. Third, some funds focus on acquiring recent filings. For example, almost 90% of the 3 million filings acquired by Hutchin Hill were acquired on the day the filing was released. By contrast, only 14% of Renaissance Technologies' filing acquisitions occurred on the release date. Fourth, some funds clearly acquire enormous quantities of filings with computer algorithms. Consistent with algorithmic use, Renaissance Technologies typically acquires about 22,000 Form 4 filings a month, whereas PanAgora regularly acquires several thousand Form 13-F filings. Finally, some funds focus on a particular filing type. For example, about 86% of Renaissance Technologies' 4 million acquired filings are Form 4.

Given the substantial variation in acquisition behavior, we examine whether acquisition strategies relate differentially to fund performance. Funds employing the following strategies associated with public information acquisition outperform other funds. "Timely" funds acquire filings upon their release. "Scraper" funds acquire large volumes of filings quickly. "Specialist 10-K/Q" funds focus on acquiring annual and periodic financial statements (Forms 10-K and 10-Q). Finally, the trades by "RPI" (reliance on public information) funds are better explained by past information acquisition (Kacperczyk and Seru 2007). Each of these fund types outperforms in the cross-section, earning additional 0.96%, 1.61%, 1.15%, and 1.06% per year in abnormal returns, respectively. At the fund-stock level, quarterly position changes associated with timely information acquisition outperform those that are associated with nontimely information acquisition. This is consistent with information processing—speed of information acquisition matters for performance.

We characterize funds' acquisition strategies with respect to filing content, which also varies cross-sectionally. Motivated by prior work that shows that changes to filings' content can forecast future stock returns, we test whether funds that focus on filings with significant content changes perform differently. Intuitively, when there are more changes in a filing's characteristics, there are more likely to be new developments to process (Zhang 2006, Goldstein and Yang 2015, Cohen et al. 2020). Like the findings in Cohen et al. (2020), hedge fund holdings with greater changes in word count perform significantly worse the next quarter. Cross-sectionally, funds that tend to acquire filings with larger changes in word count outperform. Trades associated with information acquisition and larger content changes do not perform differently, but this may be because we can only analyze changes in long positions rather than in short positions.

The first contribution of our paper is to show that information acquisition is related to fund-level performance. This complements several recent studies examining stock-level profitability in relation to public information acquisition by institutional investors. The most closely related of these is Chen, Cohen, Gurun, Lou, Malloy (2020a) (CCGLM), which finds that mutual fund managers "track" company insider trades by acquiring their Form 4 filings and that a Form 4 is more predictive of stock returns when a tracking fund trades on its release. Unlike CCGLM's focus on insider trading disclosures, our primary focus is on funds' acquisition of financial statements (10-K/Q) and material-event disclosures (8-K), which generate different information sets for investors than insider trading disclosures. Extracting signals from financial statements requires processing and contextualizing more information than a typical insider's trade disclosure. This focus on financial statements also

allows for cross-sectional tests utilizing textual analyses of the disclosures themselves. Perhaps most importantly, our study also differs from CCGLM in our focus on fund-level performance. We are therefore able to use download behavior to identify fund strategies (e.g., scraping) that correspond to cross-sectional differences in fund-level performance, an analysis that is novel to this growing literature.

Aside from CCGLM, several other papers also consider stock-level profitability of public information acquisition. Dyer (2021) studies whether local institutional investors (Form 13-F filers) disproportionately acquire public information in local stocks. Drake et al. (2020) show that stock-level performance is more strongly associated with acquisition behavior of institutional investors relative to less sophisticated retail acquirors.[2] Chen et al. (2020b) show that hedge funds trade more aggressively in stocks with less analyst coverage resulting from brokerage house closures and that these trades are more profitable. They provide suggestive evidence that Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) traffic for these firms' filings is higher in geographic areas closer to hedge funds.

Importantly, our results differ from these papers by showing that the investors (i.e., the funds) themselves outperform. Such a result does not immediately follow from the stock-level evidence presented in the literature. Prior to our work, the only paper relating fund-level performance to the use of public information is Kacperczyk and Seru (2007), which shows that mutual funds relying on publicly available analyst reports *underperform* other funds. The economic mechanism identified by Kacperczyk and Seru (2007) is that reliance on public information may be an inferior substitute for more valuable private information. That is, if sophisticated investors have access to other more profitable sources of information, those that rely on the public filings may actually underperform despite the unconditional trade-level profitability of the public information. Our results suggest that the economic mechanism of Kacperczyk and Seru (2007) does not drive the relation between public information acquisition and performance for our sample of hedge funds. For these sophisticated funds, the profitability of strategies relying, at least in part, on public information acquisition exceeds the opportunity cost of employing strategies that rely solely on other information sources, resulting in fund-level outperformance by those funds actively acquiring public information.

Our second main contribution is to show that fund-level strategies of public information acquisition translate into cross-sectional differences in fund performance. This contributes to the empirical literature on information acquisition by hedge funds, which primarily focuses on the acquisition of private information (Massoud et al. 2011, Gao and Huang 2016, Gargano et al. 2017). The common challenge is finding ways to examine how hedge funds generate their performance as they are quite secretive. For example, even when disclosure is mandatory, these investors delay disclosure for positions which subsequently outperform (Agarwal et al. 2013, Aragon et al. 2013, Shi 2017). The paper also contributes to the large literature on hedge fund performance, documenting differences in managerial ability (e.g., Titman and Tiu 2011, Sun et al. 2011).

More generally, this study contributes to the literature on investor attention. Our direct measure of attention by a specific fund to a specific filing differs from measures of attention in prior work.[3] Consistent with predictions in Van Nieuwerburgh and Veldkamp (2010) that investors prefer to pay attention to stocks with greater uncertainty, we find that funds acquire more filings related to small stocks with less tangible assets, higher market-to-book values, and greater leverage. Prior work also shows that attention matters for market outcomes (Hirshleifer and Teoh 2003, Corwin and Coughenour 2008, Hirshleifer et al. 2009, Chakrabarty and Moulton 2012). For example, Ben-Rephael et al. (2017) show that a dearth of attention by sophisticated investors (Bloomberg users) correlates with greater postearnings announcement drift. We find that hedge funds' allocate their attention strategically as their trades associated with public information outperform those that do not.

2. Data and Sample Construction

An innovation of this paper is linking fund-level performance to hedge fund information acquisition from the SEC EDGAR database and related stock-level performance. Our sample runs from January 2003 to March 2017. The panel of hedge fund information acquisition is derived from four main sources: the SEC's EDGAR server log files, the American Registry for Internet Numbers (ARIN), MaxMind, and the Hedge Fund Research (HFR) database.[4] We identify hedge funds' information acquisition activity by matching their Internet Protocol (IP) addresses to the SEC's server logs. In Section 2.1, we detail the steps used to construct this data set. We link this panel to additional data sources. Stock-level information comes from Center for Research in Security Prices (CRSP) and Compustat. Hedge fund holdings data are from the Thompson Reuters 13-F filings database. We also use the SEC master files to reference the set of filings filed by firms with EDGAR and the Wharton Research Data Services SEC Analytics database for filing characteristics.

Our main variable of interest is public information acquisition by hedge funds, which we aggregate to the monthly or quarterly level depending on the available frequency of other variables. Analyses relating fund returns to public information acquisition are generally

at the monthly frequency, which is the reporting frequency of HFR. Analyses using hedge fund portfolio holdings are conducted at the quarterly frequency, which is the Form 13-F reporting frequency.

We restrict the sample to funds whose IP addresses we identify in our internet address books (detailed in Section 2.1) and that report return information to HFR. We determine funds' abnormal returns using the Fama and French (2015) five-factor model augmented with the Carhart (1997) momentum factor and limit the sample to funds with at least 36 months of returns data.[5] Although the HFR database is at the fund level, EDGAR usage is at the management-company level; thus, we aggregate fund-level returns to the institution level by weighting fund-level returns by each fund's assets under management. An advantage of studying hedge funds is that hedge funds typically manage a few related funds rather than a wide variety of funds, typical of, for example, mutual fund complexes.

We also filter the sample based on fund strategy. Unsurprisingly, macrofunds access firm-specific filings much less frequently than equity long-short funds. We exclude macrohedge funds and fund of funds. Our sample consists of event-driven, equity-hedge, and relative value funds.

2.1. Identifying Hedge Funds' Information Acquisition in the Data

To identify hedge funds' information acquisition activity, we use four data sources: the SEC's EDGAR server log files, the ARIN, MaxMind, and the HFR database.

2.1.1. Step 1: Identify IP Addresses of Hedge Funds.

Our sample of hedge funds is initially determined by all hedge funds in the HFR database, which is survivorship bias free because it includes alive and dead funds. HFR provides each fund's monthly returns and often, the monthly assets under management (AUM) of the fund. We also have details about the strategies and fees of the funds.

For each sample hedge fund, we search three sources for associated IP addresses. The first two sources are cross-sectional snapshots in 2014 and 2017 of the ARIN WHOIS database. We match records using the organization's name in ARIN and the hedge fund's name in HFR. A challenge is that the ARIN WHOIS database only provides bulk snapshots of the current IP registration landscape. As a result, funds that exit the HFR sample before 2014 may or may not be present in the ARIN snapshots. To mitigate this issue, we use a third "IP address book" from MaxMind that provides historical mappings of organizations to IP ranges for 2006 to 2017.[6] Name matching between HFR and MaxMind produces additional hedge fund-IP matches.

This procedure results in a number of potential hedge fund-IP address matches resulting from (1) the 2014 ARIN, (2) the 2017 ARIN, or (3) the MaxMind IP address registrars. For each potential match, we use the ARIN WHOWAS database to determine the dates a hedge fund used a particular IP. ARIN WHOWAS provides historical information about the ownership of particular IP addresses, including registration start and end dates for each hedge fund's IPs.[7] We restrict our study to IP-related activity between these registration dates.

2.1.2. Step 2: Identify Hedge Funds' Use of EDGAR.

For each HFR hedge fund and associated IP, we examine the IP's activity on the SEC EDGAR server. The EDGAR server tracks all usage, including which files were downloaded and all clicks users made when navigating the database (including views of the EDGAR file directory).[8] Each record includes the IP address of the user and precise time stamps of the IP's activity on the server. The server reports the Central Index Key (CIK) of the firm being examined by the IP. For example, an investor studying CIK 21344 would be requesting files related to Coca-Cola Enterprises. We also have an accession number, which uniquely identifies each filing on EDGAR. If the investor clicks on a file with accession number 21344-17-000026, then the investor would be looking at the Coca-Cola 10-Q filed on July 27, 2017. The data also provide the file name, which allows us to see whether the investor is accessing the 10-Q or one of the various exhibits. We obtained the server log files for the SEC EDGAR database for all days from January 1, 2003 to March 31, 2017, with the exception of September 24, 2005 to May 11, 2006. The SEC did not retain log data for these days (Bauguess et al. 2018).

One challenge is that the fourth section of the IP addresses provided by the SEC EDGAR server logs is obfuscated (e.g., 191.191.191.abc). To resolve this challenge, we link IP activity on the EDGAR server to hedge funds in the constructed HFR-ARIN sample using the first three sections of an IP address. Often, hedge funds register the full range of possible IPs available in the fourth section of the IP address (xxx.xxx.xxx.0 to xxx.xxx.xxx.255). Even if a fund only registers a portion of the 0 to 255 range, the other registered owners are frequently unrelated to the financial industry.

This merge results in a panel of public information acquisition by hedge funds. We aggregate across all IPs linked to a hedge fund to determine their total monthly EDGAR usage. The panel of public information acquisition is subsequently merged with the panel of monthly

Table 1. Summary Statistics: Hedge Fund Characteristics

	Mean	Standard deviation	25th	Median	75th	90th	99th
Firm Assets (mm)	28,838.60	260,067.13	132.00	615.00	3,851.00	22,400.00	490,700.00
Months in HFR	149.91	79.04	88.00	132.63	203.29	257.27	373.00
Months in Sample	79.16	43.95	43.00	74.00	115.00	146.00	160.00
Age in Months	149.76	78.87	88.00	132.63	203.29	257.00	373.00
VW Excess Ret	0.41	0.72	0.12	0.42	0.70	1.07	2.37
VW Abnormal Return	0.05	0.63	−0.21	0.09	0.38	0.65	1.63
Incentive Fee	18.97	4.43	20.00	20.00	20.00	20.00	28.55
Management Fee	1.50	0.45	1.00	1.50	2.00	2.00	2.50
Market β	0.37	0.35	0.13	0.35	0.56	0.85	1.34
SMB β	0.10	0.26	−0.01	0.08	0.20	0.39	0.74
HML β	−0.03	0.23	−0.14	−0.02	0.09	0.19	0.61
RMW β	−0.06	0.32	−0.18	−0.04	0.07	0.24	0.65
CMA β	−0.05	0.37	−0.17	−0.03	0.11	0.26	0.85
MOM β	−0.01	0.24	−0.09	−0.01	0.06	0.16	0.42
Observations	557						

Notes. The table reports distributional statistics of the cross-section of hedge funds in the sample. The β-values from the Fama–French five-factor model augmented with a momentum factor are estimated using a hedge fund's full time series of fund-level returns net of fees reported to the Hedge Fund Research database. Hedge funds may have multiple funds; we collapse returns to the firm level and use AUM-weighted returns.

hedge fund returns and characteristics from HFR as well as the other data as described in the text.

3. Public Information Acquisition by Hedge Funds

In this section, we introduce our sample of hedge funds and discuss the variation in public information acquisition across hedge funds. We use this variation in Sections 4 and 5 to examine the relation between hedge fund performance and the extent and manner of public information acquisition from the EDGAR database.

3.1. Sample Summary Statistics

Table 1 reports summary statistics of the 557 hedge funds in the sample. The median fund has $615 million in assets under management. The median management fee is 1.5%, and the median incentive fee is 20%. The median market β from the benchmark model is 0.35, indicating that funds are hedged relative to market risk to some extent.

Table 2 reports information acquisition statistics for the fund-month panel used in our subsequent performance analyses. In the median fund-month, the total number of unique filings downloaded is a modest four filings. For the 90th percentile fund-month, the total number of downloads is 217. Table 2 also reports the relative proportion of form types accessed in a given fund-month. On average, a third of the filings are annual or quarterly financial reports (i.e., 10-K or 10-Q). The next most common filing accessed is the disclosure of unscheduled material events reported in the 8-K, which accounts for 18% of the average fund-

Table 2. Summary Statistics: Public Information Acquisition by Hedge Funds

	Mean	Standard deviation	25th	Median	75th	90th	99th
Downloads	672	19,476	0	4	47	217	5,464
Downloads of 10-K or 10-Q	101	3,945	0	1	14	71	620
Downloads of 8-K	140	7,340	0	0	7	38	587
Downloads of Form 4	290	16,601	0	0	1	6	93
Downloads of 13-D	11	833	0	0	0	3	29
Downloads of 13-F	49	2,068	0	0	0	4	68
Downloads of 13-G	17	1,820	0	0	0	3	30
% 10-K/Q	32	28	8	29	50	70	100
% 8-K	18	21	0	13	25	41	100
% 4	5	15	0	0	3	13	97
% 13-D	2	8	0	0	1	5	33
% 13-F	4	13	0	0	2	9	80
% 13-G	2	8	0	0	1	5	36
% Other	37	29	14	32	51	85	100
Observations	44,180						

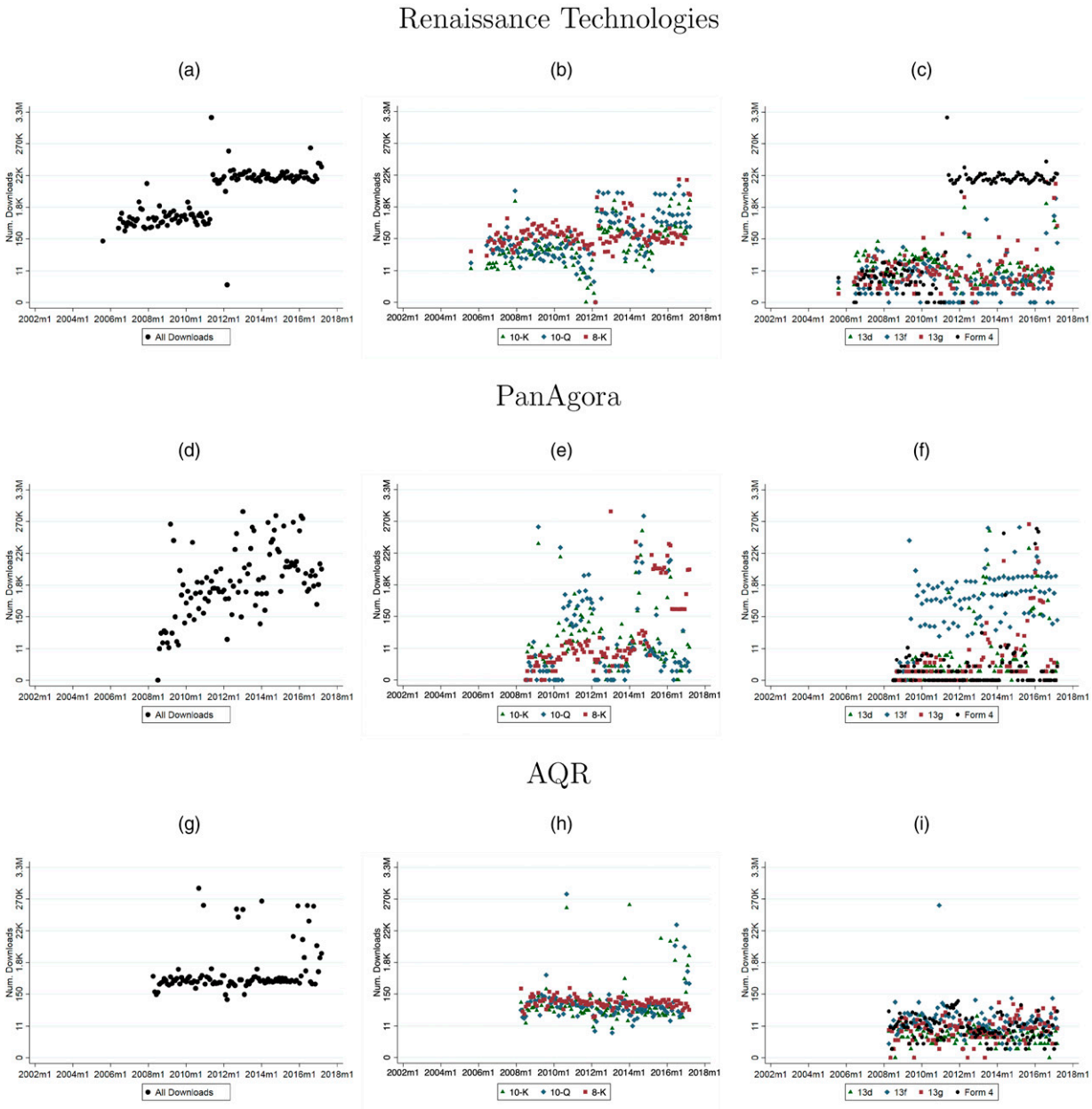
Notes. The table reports distributional statistics of the monthly download activity of hedge funds in the sample. "Downloads" is the number of unique filings downloaded from the SEC's EDGAR database by a given hedge fund in a month. The bottom portion reports the number of downloads by form type and conditional on downloading in a given month, the proportion of monthly downloads by form type.

month's downloads. Insider trading filings (Form 4) are the next most accessed filing—they account for 5% of downloads for the average fund-month.

3.2. Information Acquisition by Notable Hedge Funds

Figure 1 reports information acquisition by some prominent hedge funds—Renaissance Technologies, PanAgora, and AQR—based on the IP addresses we link to these firms. The figure reports the time series of total downloads as well as the time series of downloads of various company reports (10-K/Q, 8-K) and investor reports (4, 13-D/F/G). Some funds consistently use EDGAR. For instance, AQR regularly downloads 400–500 filings each month, apart from a handful of months when the firm downloads over 100,000 filings in a single month. In the early part of the sample, downloads by Renaissance Technologies also number in the hundreds before

Figure 1. (Color online) Download Activity of Notable Hedge Funds



Notes. The figure plots the time series of EDGAR usage by some notable hedge funds. Panels (a), (d), and (g) plot total downloads. Panels (b), (e), and (h) plot downloads of filings containing corporate financial information. Panels (c), (f), and (i) plot downloads of filings concerning investor reports (including firm insiders). Downloads are plotted on a log scale. The time series have gaps in 2005–2006 because of missing SEC server log files. Renaissance Technologies: (a) all downloads, (b) company reports, and (c) investor reports. PanAgora: (d) all downloads, (e) company reports, and (f) investor reports. AQR: (g) all downloads, (h) company reports, and (i) investor reports. On the x-axis, "m" denotes the month of a year.

jumping higher. In late 2011, Renaissance Technologies downloaded over 2 million Form 4 filings in a single month and then in subsequent months, continued to download thousands of Form 4 filings. The shift in information acquisition behavior suggests a shift in strategy. PanAgora has increasingly accessed public financial information from the SEC since 2008. Its acquisition of various forms is somewhat episodic. For instance, for a period from mid-2010 to 2012, the firm downloaded over 500 10-Q each month, but then, the acquisition of quarterly reports fell in 2013. Similarly, PanAgora's acquisition of 8-K is also more pronounced in the latter part of the sample. We will use this type of within-fund variation later to control for time-varying fund strategies.

3.3. Heterogeneity of Public Information Acquisition

Table 3 reports the top 30 hedge fund users of EDGAR in our sample.[9] Renaissance Technologies and PanAgora are the top acquirors, although the proportions of various types of filings they view are not the same. There is clear heterogeneity in the types of forms acquired even among the most active users. For instance, 85% of downloads by Renaissance Technologies are Form 4, whereas PanAgora's information acquisition is more evenly split across form types. Like Renaissance, 8 of the 30 firms have at least 75% of their downloads concentrated in Form 4, whereas others predominantly acquire 8-K (First Pacific, Jennison Associates, Schroder Investment Management, and Weiss Asset Management) or 13-F (Clinton Group and Bronson Point). More generally, Figure IA.1 in the online appendix plots the cross-sectional distributions of the fraction of a fund's total downloads that are because of a particular type of filing. Not surprisingly, the most commonly acquired filings are the annual and quarterly 10-K/Q reports. However, there are sizable fractions of the cross-section that never access these reports.

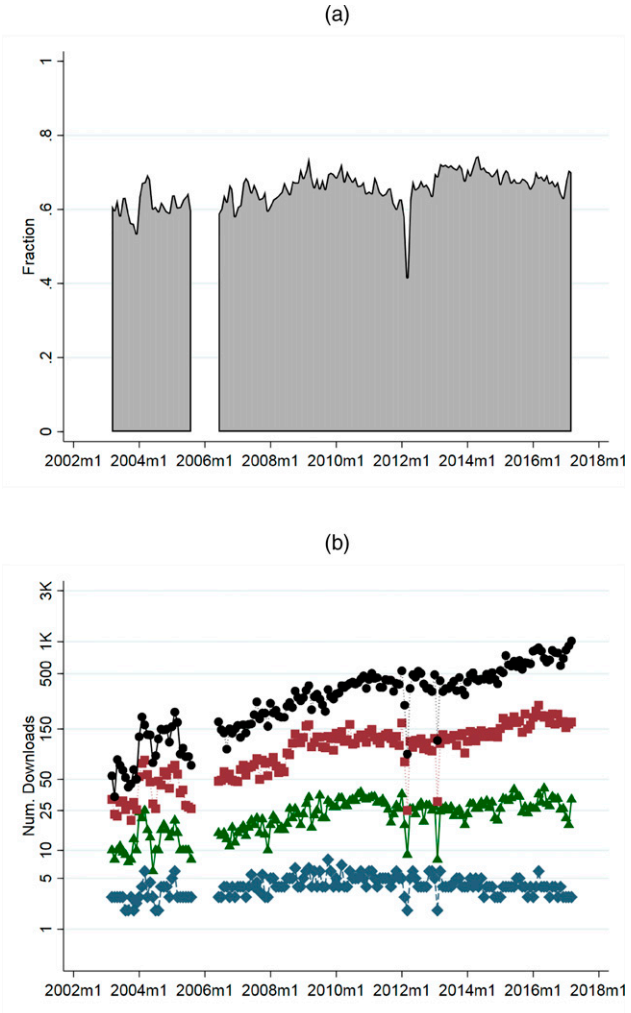
The fraction of the hedge funds accessing at least one filing in a month is fairly static over the sample period. This can be seen in Figure 2(a), which plots the time series of usage. The intensive margin of

Table 3. Summary Statistics: Top 30 Users of EDGAR in Sample Since 2003

		Form type						
Firm name	Total downloads	10-K/Q, %	8-K, %	4, %	13-D, %	13-F, %	13-G, %	AUM (MM)
Renaissance Technologies Corp.	4,016,439	3.5	2.0	85.8	0.2	0.2	0.9	50,941
PanAgora Asset Management, Inc.	3,969,668	24.2	21.6	10.9	4.9	15.0	7.2	42,798
BlackRock	3,704,596	3.5	0.7	92.4	0.1	0.1	0.2	5,689,273
Hutchin Hill Capital, LP	3,044,555	5.6	8.8	79.6	0.0	4.1	0.0	3,300
Tradeworx Inc.	2,068,017	11.2	5.6	51.4	5.0	11.0	15.2	61
First Pacific Advisors, LLC	2,003,707	0.0	73.8	0.0	0.0	26.0	0.0	30,800
AQR Capital Management	1,944,446	41.7	0.5	0.1	0.0	8.6	0.1	194,900
Jennison Associates LLC	1,857,445	4.4	87.7	1.5	1.0	0.0	0.3	167,000
Schroder Investment Management Ltd	1,590,526	39.4	55.1	0.0	0.0	4.7	0.0	490,700
Zacks Investment Management	1,540,158	1.8	0.3	96.8	0.0	0.2	0.0	4,736
Ten Asset Management	1,044,195	26.8	7.2	27.1	8.3	19.8	4.2	36
Neuberger Berman	915,603	3.9	1.7	89.3	0.9	0.3	0.3	270,728
Bailard	804,938	1.1	0.2	98.0	0.0	0.0	0.0	2,421
LIM Advisors Limited	424,800	1.6	5.8	76.8	0.7	0.7	2.4	1,800
Benchmark Capital Advisors	309,561	0.1	14.4	84.3	0.0	0.0	0.0	250
Weiss Asset Management	236,780	24.3	52.1	0.1	0.2	0.2	0.3	1,807
Numeric Investors LLC	230,576	41.8	0.6	3.0	0.1	0.1	0.1	30,367
AllianceBernstein L.P.	199,882	40.2	18.2	2.9	0.7	3.8	1.4	497,875
BlueCrest Capital Management LLP	197,330	36.9	11.7	0.0	0.0	50.9	0.0	14,000
Wellington Management Company, LLP	159,928	40.4	17.9	1.3	0.7	0.9	1.9	1,018,744
Marshall Wace LLP	157,094	13.6	24.6	2.7	2.9	0.7	1.8	22,000
Thornburg Investment Management	133,468	29.0	8.4	32.2	0.9	5.7	0.9	52,805
Ivory Investment Management, LLC	113,702	17.6	26.5	2.5	2.3	0.7	1.8	2,733
First Trust Advisors, L.P.	109,219	61.1	4.0	1.7	0.2	3.3	0.8	111,774
Oaktree Capital Management, LLC	102,263	41.3	25.4	2.3	1.3	1.1	1.4	99,260
Clinton Group, Inc.	88,109	5.0	2.9	0.8	0.6	85.1	0.2	650
Bronson Point Management	80,586	2.4	0.9	0.2	0.4	92.9	0.1	245
Alpha Equity Management LLC	73,095	14.7	26.8	4.4	3.1	0.5	2.1	177
HG Vora Capital Management, LLC	64,955	16.7	27.0	2.9	4.6	0.7	2.0	3,400
Calamos Investments	58,490	33.0	16.0	2.8	0.4	1.2	1.4	19,089

Notes. The table reports download statistics and download activity by form type for the top 30 institutional users that match to the HFR database sorted by total downloads (distinct within a month). We also report the end of sample assets under management. Referencing the entire SEC EDGAR database, the unconditional form type frequencies are 10-K/Q, 5%; 8-K, 9%; Form 4, 43%; 13-D, 2%; 13-F, 2%; 13-G, 6%; and other, 34%.

Figure 2. (Color online) Time Series of Acquisition



Notes. The figure plots the time series of EDGAR usage by hedge funds. Panel (a) plots the fraction of the cross-section acquiring at least one filing in a given month. Panel (b) plots the time series of the cross-sectional 25th, 50th, 75th, and 90th percentiles of download activity conditional on a fund acquiring at least one filing. Downloads are plotted on a log scale. The panel has a gap in 2005–2006 because of missing SEC server log files. (a) Fraction of funds acquiring at least one filing in a month. (b) Filing acquisition activity by percentile conditional on downloading in a month. On the x-axis, "m" denotes the month of a year.

EDGAR use, on the other hand, rises over the sample period (Figure 2(b)) for all but the lowest percentiles of users. For funds accessing at least one filing, the median number of filings downloaded increases from 10 to 20 per month to around 40 per month. At the 90th percentile, the number of filings acquired by hedge funds rises from about 50 filings per month in 2003 to around 1,000 filings per month in 2017. We break this out by form type in Figure 3. Although the general increase in acquisition behavior can be seen across the various form types, the growth rates differ some. For example, the acquisition of Form 4 has not increased as dramatically as the acquisition of Form 10-K/Q.[10]

Hedge funds' public information acquisition varies systematically both over time and with fund characteristics. In Table IA.1 in the online appendix, we provide evidence that larger funds and more hedged funds (lower β) are more likely to acquire public information. We also examine the characteristics of firms whose filings are downloaded by hedge funds. Table IA.2 in the online appendix shows that hedge funds are more likely to view filings associated with higher-leverage firms and growth firms. Consistent with predictions in Van Nieuwerburgh and Veldkamp (2010) that investors pay more attention to stocks with greater uncertainty, we find that funds acquire more filings related to small stocks, with lower tangible assets, higher market-to-book values, and greater leverage.

4. Public Information Acquisition and Performance

4.1. Hedge Fund Acquisition of Public Information and Fund Returns

In this section, we test whether public information acquisition by hedge funds is positively or negatively related to subsequent fund-level abnormal performance. Prior work would predict a negative relation if the opportunity cost of paying attention to public information is high for the best hedge funds (Kacperczyk and Seru 2007). Alternatively, the relation may be positive if the benefits of processing filings outweigh the costs (Grossman and Stiglitz 1980, Garleanu and Pedersen 2018) or public information can be used in conjunction with private signals (Kim and Verrecchia 1997).

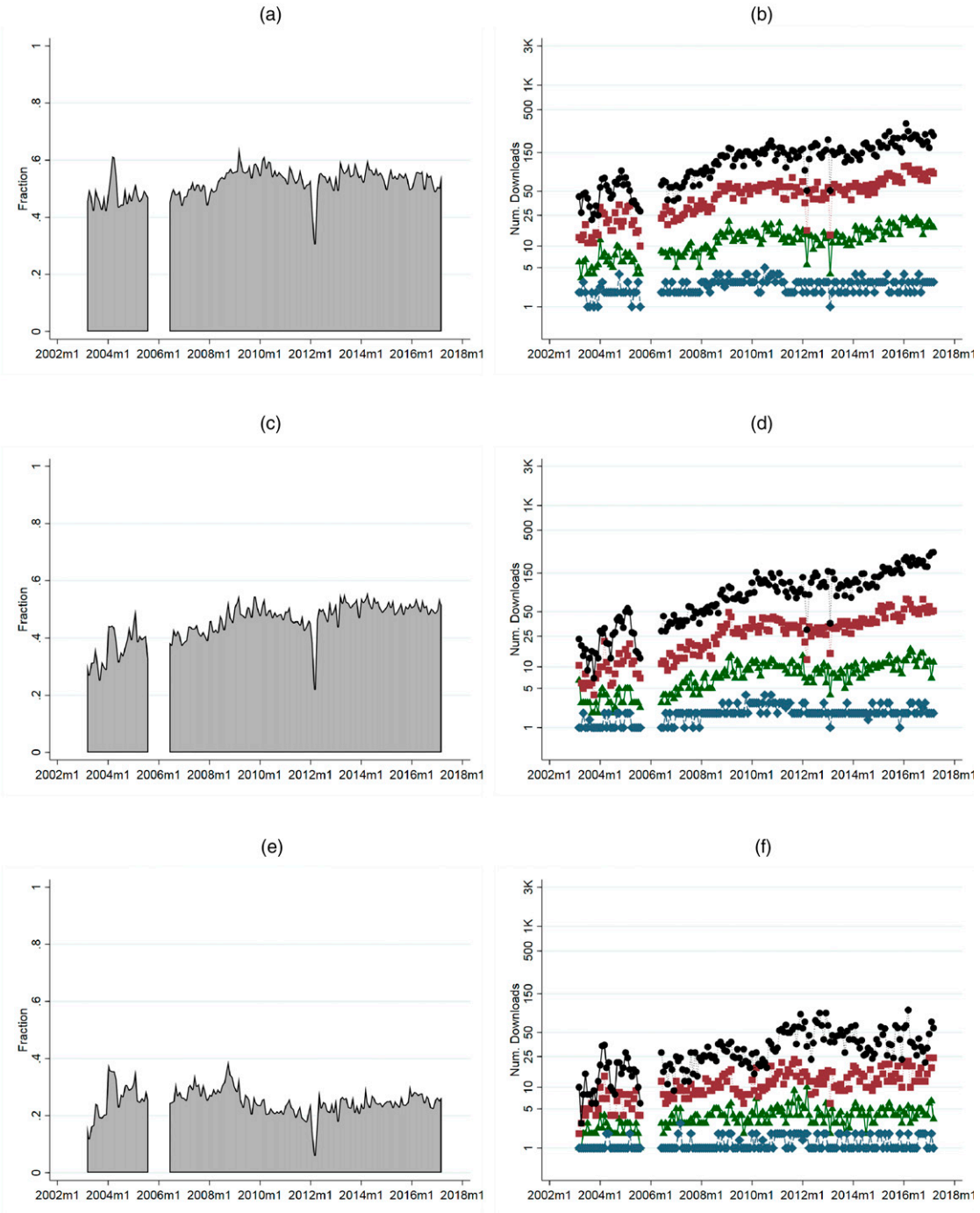
We first examine how the decision to seek any public information relates to subsequent abnormal fund-level performance. Figure 4 shows the difference in cumulative abnormal returns for fund-months following public information acquisition relative to fund-months preceded by no acquisition of EDGAR filings. This simple figure shows that public information acquisition relates positively to differences in fund performance. Over the 14-year sample period, the difference in cumulative abnormal returns between fund-months that follow public information acquisition and those that do not is almost 25 percentage points.

We test the performance-acquisition relation more formally in Table 4 with regressions controlling for time fixed effects, fund size, and lagged fund returns to account for documented return smoothing in funds:

$$\text{Return}_{i,t+1} = \beta \text{Info Acquisition}_{i,t} + \theta' X_{i,t} + \eta_{t+1} + e_{i,t+1}. \quad (1)$$

Abnormal returns, $Return_{i,t+1}$, for fund i in month $t+1$ are calculated using the Fama–French five-factor model plus momentum.[11] $InfoAcquisition_{i,t}$ is either the

Figure 3. (Color online) Time Series of Acquisition by Form Type

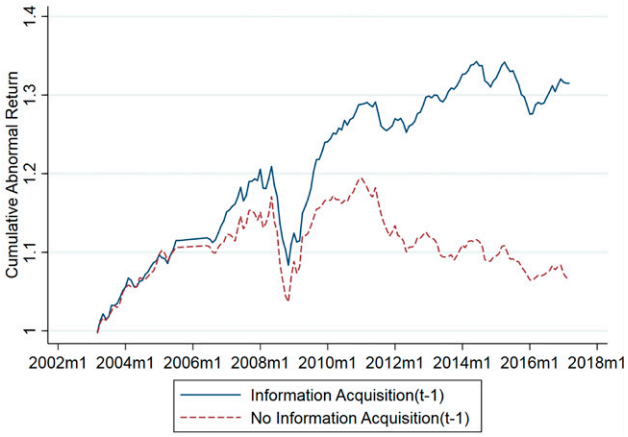


Notes. The figure plots the time series of EDGAR usage by hedge funds. Panels (a), (c), and (e) plot the fraction of the cross-section accessing a given file type. Panels (b), (d), and (f) plot the time series of the cross-sectional 25th, 50th, 75th, and 90th percentiles of download activity of the indicated form type conditional on a fund downloading that form type. Downloads are plotted on a log scale. The panel has a gap in 2005–2006 because of missing SEC server log files. (a) 10-K/Q. (b) 10-K/Q. (c) 8-K. (d) 8-K. (e) Form 4. (f) Form 4. On the x-axis, "m" denotes the month of a year.

extensive margin $AnyDownloads_{i,t}$ or the intensive margin $Downloads_{i,t}$. $X_{i,t}$ represents control variables (AUM and lagged abnormal returns). η_{t+1} is a month-year fixed effect.

Funds with any download activity exhibit higher abnormal returns in the subsequent month (column (1)). The point estimate indicates that funds downloading at least one filing in a month subsequently

Figure 4. (Color online) Cumulative Abnormal Returns Following Public Information Acquisition



Notes. This figure shows the difference in cumulative abnormal returns for fund-months following public information acquisition relative to fund-months preceded by no acquisition of EDGAR filings. Abnormal returns are calculated for each fund using the Fama–French five-factor model augmented with a momentum factor and averaged across funds each month as a function of whether the fund acquired public information in the previous month. On the x-axis, "m" denotes the month of a year.

experience 1.5% higher annualized abnormal returns than funds that do not acquire public information from EDGAR.

We next consider whether higher levels of information acquisition behavior are associated with higher performance. Column (2) of Table 4 reports a regression of abnormal returns on a continuous measure of the number of filings acquired by the fund in a given month. Specifically, download activity is measured as the log of one plus the number of filings downloaded. Conditional on any download activity, the median log download measure is 3.14 (i.e., 22 downloads). The estimate from the second column indicates that the median fund accessing filings exhibits a 1.16% higher annualized return in the following month than that of funds that do not acquire any filings in a given month. Funds at the first and third quartiles (conditional on use) exhibit 60- and 173-bp-higher returns than nonusers.

Prior work has shown that fixed manager or fund characteristics relate systematically to fund performance (e.g., managerial incentives as in Agarwal et al. 2009). It is therefore possible that public information acquisition and the related outperformance simply proxy for differences in fund or manager ability. To test this possibility, we consider whether within-fund variation in hedge funds' public information acquisition predicts subsequent within-fund performance. In other words, for a fixed fund, we examine whether months in which the fund acquires more information are followed by better fund returns next month. A primary purpose of these fixed effects is to rule out that the fund-level acquisition-performance relation is driven by an omitted fixed fund characteristic (e.g., "good" funds happen to use public filings). We model within-fund variation in two ways: (1) using a fund fixed effect to absorb average fund ability and (2) allowing for time-varying strategies for each fund. Columns (3) and (4) of Table 4 report regressions in the form of Equation (1) augmented with a fund fixed effect.

The positive relation between abnormal returns and public information acquisition holds even within fund. On the extensive margin, the annualized point estimate of the value of public information acquisition for next-month's returns only drops from 1.5% per year to 93 bp per year with the addition of fund fixed effects (moving from column (1) to column (3) of Table 4), so about a third of the performance-acquisition relation can be attributed to fixed differences in fund types. Nonetheless, public information acquisition is associated with a nontrivial performance differential *even within fund*; after absorbing fixed differences across funds, about two-thirds of the return-acquisition relation remains.[12] When considering the continuous measure of information acquisition (columns (2) and (4) of Table 4), the point estimates suggest that the subsequent outperformance for median information acquisition drops from 1.16% to 89 bp per year. Although some of the performance-acquisition relation is because of differences in fund type (a quarter to a third depending on the specification), the performance-acquisition relation is economically and statistically significant even when controlling for time-invariant fund types. We explore cross-sectional differences in fund types in more detail in Section 5.1.

Fund types may not be fixed through time. That is, a fund's information acquisition strategy may vary through time because of new ideas or time-varying efficiency of prices. To account for this, we consider a more flexible way to account for within-fund variation in columns (5) and (6) of Table 4. Specifically, we identify changes in a fund's public information acquisition strategy and relate these changes to subsequent abnormal returns. That is, we replace $InfoAcquisition_{i,t}$ in Equation (1) with a fund's abnormal information acquisition. Abnormal acquisition ranges from zero to one and is calculated based on a z score of downloads in month t relative to the distribution of the fund's own acquisition activity during the previous 24 months. The fixed effects specification used in columns (3) and (4) essentially compares a fund's acquisition to its full sample average. In contrast, the results in the last two columns use a rolling window of the past 24 months as the firm's baseline for comparison.

Abnormal public information acquisition is positively related to performance (column (5) of Table 4). Because information-acquisition behavior can shift to more or less intensive strategies, column (6) reports

Table 4. Information Acquisition and Fund Performance

	% Abnormal monthly fund return (t + 1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Any Downloads (t)	0.1258***		0.0776*			
	(3.37)		(1.73)			
Downloads (t)		0.0308***		0.0235**		
		(4.06)		(2.20)		
Abnormal Downloads (t)					0.1063**	
					(2.41)	
High Abnormal Downloads (t)						0.1118***
						(3.01)
Low Abnormal Downloads (t)						0.0447
						(1.08)
AUM (t)	0.0164	0.0068	−0.4795***	−0.4833***	0.0312	0.0294
	(0.68)	(0.28)	(−7.00)	(−7.03)	(1.35)	(1.28)
% Abnormal Monthly Fund Return (t)	0.1042***	0.1042***	0.0749***	0.0749***	0.1004***	0.1004***
	(4.99)	(4.98)	(3.62)	(3.62)	(4.64)	(4.64)
Fund fixed effects	No	No	Yes	Yes	No	No
Date fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.08	0.08	0.09	0.09	0.08	0.08
Number of firms	557	557	556	556	555	555
Observations	43,435	43,435	43,434	43,434	42,321	42,321

Notes. The table presents the relation between download activity in month t and a fund's abnormal return (measured in percentage) in month t + 1. Abnormal returns are calculated using the Fama–French five-factor model augmented with a momentum factor. "*Any Downloads*" indicates whether the fund accessed any filings in month t. "*Downloads*" is the fund's log number of downloads in month t, ln(1 + # of downloads). "*Abnormal Downloads*" is the p-value resulting from applying the standard normal distribution function to the standardized trailing download measure, calculated as the fund-month's downloads in excess of the fund's trailing 24-month average downloads divided by the standard deviation of the fund's download activity over the trailing 24-month period. If there is no variation in download activity over the prior 24 months, the standardized trailing download measure is set to zero if the month's number of downloads is zero or is set to an arbitrarily large (small) number if the month's number of downloads is greater (less) than the fund's trailing average monthly download. "*High (Low) Abnormal Downloads*" is an indicator variable for abnormal downloads taking a value greater than 0.75 (less than 0.25). "*AUM*" is standardized for interpretation. All regressions contain year-month fixed effects. Columns (3) and (4) contain fund fixed effects. Standard errors are clustered by fund and year-month. The t statistics are in parentheses, and statistical significance is represented by asterisks.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

separate estimates for high and low abnormal acquisition activity. High abnormal acquisition activity is positively related to future performance, and the relation is highly significant. In the month following increased public information acquisition, funds with abnormally high acquisition activity exhibit approximately 1.3% higher returns (annualized). In contrast, low abnormal acquisition activity is not significantly related to future performance. This indicates that discontinuing information acquisition is not associated with declines in performance and is consistent with funds rationally taking into account the costs and benefits of information acquisition when considering whether to acquire additional information.

The value of strategies based on public information acquisition may increase with the number of public filings (more information to process) and decrease during recessions when investors optimally allocate more attention to resolving aggregate uncertainty rather than idiosyncratic information, as in Kacperczyk et al. (2014, 2016). Columns (1) and (2) in Table 5 show no significant evidence that the acquisition-performance relation increases with the number of SEC filings. However, the coefficients on the interaction terms are positive. Columns (3) and (4) show that funds' information acquisition is meaningfully less related to performance when the VIX is elevated. A standard deviation increase in the VIX reduces the sensitivity of performance to downloads by 43% (0.0138/0.0242 − 1). Relatedly, columns (5) and (6) show that funds' information acquisition is less related to performance during NBER recessions. This is consistent with theory and evidence that fund managers primarily focus on stock-specific risks outside of recessions (Kacperczyk et al. 2014, 2016).

4.2. Linking Hedge Funds' Information Acquisition to Holdings and Stock-Level Performance

If managers happen to download filings during periods in which they focus their attention on stock picking, the relation between performance and information acquisition may merely capture this focus. To address whether time-varying attention to idiosyncratic information explains the observed relation, we consider how hedge funds' public information acquisition relates to their holdings, trading decisions, and the profitability of their trades. These analyses control for time-varying

Table 5. Information Acquisition, Fund Performance, and Market Context

	% Abnormal monthly fund return (t + 1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Any Downloads (t)	0.0785*		0.0768*		0.1040**	
	(1.77)		(1.70)		(2.29)	
Downloads (t)		0.0243**		0.0242**		0.0294***
		(2.24)		(2.21)		(2.61)
Num. SEC Filings × Any Downloads (t)	0.0420					
	(1.25)					
Num. SEC Filings × Downloads (t)		0.0073				
		(1.13)				
VIX (t) × Any Downloads (t)			−0.0485			
			(−0.99)			
VIX (t) × Downloads (t)				−0.0138**		
				(−2.06)		
NBER Recession × Any Downloads (t)					−0.2226	
					(−1.55)	
NBER Recession × Downloads (t)						−0.0465*
						(−1.80)
AUM (t)	−0.4796***	−0.4835***	−0.4789***	−0.4822***	−0.4781***	−0.4816***
	(−7.01)	(−7.04)	(−6.98)	(−6.99)	(−6.92)	(−6.95)
% Abnormal Monthly Fund Return (t)	0.0749***	0.0749***	0.0749***	0.0748***	0.0748***	0.0748***
	(3.62)	(3.62)	(3.62)	(3.62)	(3.61)	(3.61)
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Date fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.09	0.09	0.09	0.09	0.09	0.09
Number of firms	556	556	556	556	556	556
Observations	43,434	43,434	43,434	43,434	43,434	43,434

Notes. The table presents the relation between download activity in month t and a fund's abnormal return (measured in percentage) in month t + 1 in various market contexts. Abnormal returns are calculated using the Fama–French five-factor model augmented with a momentum factor. "*Any Downloads*" indicates whether the fund accessed any filings in month t. "*Downloads*" is the fund's log number of downloads in month t, ln(1 + # of downloads). "*Num. SEC Filings*" is the standardized log total number of SEC filings of any type in month t. "*VIX*" is the standardized average VIX of month t. "*NBER Recession*" is an indicator that equals one for months between January 2008 and May 2009. "*AUM*" is standardized for interpretation. All regressions contain year-month and fund fixed effects. Standard errors are clustered by fund and year-month. The t statistics are in parentheses, and statistical significance is represented by asterisks.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

attention to stock picking by comparing the performance of a manager's trades with and without information acquisition in the same quarter.

Table 6 shows that a substantial portion of public filings acquired by hedge funds concerns observable long positions; 13.5% of hedge fund information acquisition in quarter t is related to funds' existing long positions in quarter t, and another 3.7% relates to new holdings acquired during the quarter. This link between 13-F holdings and public information acquisition is likely a lower bound for a few reasons. The quarterly frequency and the limited nature of the reporting create substantial noise in measuring actions of hedge funds. Some positions may be initiated and closed within a quarter, and they may never be reported on a 13-F. Moreover, the 13-F data only contain long equity positions, so any shorting activity or exposure through options trading is unobservable. Finally, the 13-F data are at the institution level, so we are unable to determine whether holdings relate to hedge fund or mutual fund activity for any management firms running both types side by side.[13]

Next, we link hedge funds' information acquisition to the performance of their holdings. Doing so allows us to rule out the possibility that the acquisition-performance relation documented is not because of the acquisition of information but because of time-varying attention to stock picking. We follow Gargano et al. (2017) and consider holdings analyses within a fund-quarter, comparing stock-level performance of holdings for which a fund acquired public information relative to those that were not researched. Thus, we absorb any differences in time-varying attention to stock picking using fund-quarter fixed effects. Specifically, we run regressions using a fund-stock-quarter panel of the form

$$\begin{aligned}\text{Return}_{i,j,t+1} = {} & \beta_1 \text{Any Downloads}_{i,j,t} + \beta_2 \text{Trade}_{i,j,t} \\ & + \beta_3 \text{Any Downloads}_{i,j,t} \cdot \text{Trade}_{i,j,t} \\ & + \beta_4 \text{Return}_{i,j,t} + \eta_{i,t+1} + e_{i,j,t+1}, \end{aligned} \quad (2)$$

where $Return_{i,j,t+1}$ is the abnormal return in quarter $t+1$ of stock j held by fund i at either the start or end of quarter t. $Trade_{i,j,t}$ is a measure of how the fund traded stock j; we consider a percentage change

Table 6. Funds Own and Trade What They View: Proportion of Public Information Acquisition by Funds That is Associated with Position Changes

Current quarter holdings action	Fraction of information acquisition events, %
Increases	4.3
Decreases	4.4
No change	1.4
New additions	3.7
Exits	3.4
Total	17.2

Notes. The table reports the proportion of all information acquisition by funds in a quarter about any stocks that is also related to 13-F holdings in that quarter. For 398 of the 557 funds in our sample, we can identify their long positions disclosed in quarterly Form 13-F filings. "Total" is the percentage of all filings acquired in quarter t about any stock that is also related to a stock the fund has a long position in at the end of quarter t or had a long position in at the end of quarter $t-1$ and exited by the end of quarter t. "Increases" is the percentage of all filings acquired in quarter t about any stock that is also related to stocks a fund held in quarter $t-1$ and added to in quarter t. "Decreases" is the percentage of all acquired filings in quarter t about any stock that is also related to stocks that a fund held in quarter $t-1$ and reduced, but did not exit, in quarter t. "No change" is the percentage of all acquired filings in quarter t about any stock that is also related to stocks that a fund held in quarter $t-1$ and also holds in equal amounts in quarter t. "New additions" is the percentage of all acquired filings in quarter t about any stock that is also related to stocks that a fund did not hold in quarter $t-1$ and now holds in quarter t. "Exits" is the percentage of all acquired filings in quarter t about any stock that is also related to a position that the fund completely exits in quarter t.

Table 7. Funds Own and Trade What They View: Fund-Stock Holding-Quarter Sample Characteristics

	Mean	Standard deviation
Any downloads	0.10	0.30
Any Form 10-K/Q	0.07	0.25
Any Form 8-K	0.03	0.18
Any Form 4	0.03	0.17
% Change	0.01	0.63
Increased position	0.46	0.50
New position	0.17	0.38
Decreased position	0.45	0.50
Exited position	0.16	0.37
Abnormal quarterly stock return	−0.26	15.66
Observations	2,606,622	

Notes. The table reports summary statistics for the fund-stock holding-quarter panel. "Any downloads" is an indicator for whether the fund acquired at least one filing on a specific stock holding in a specific quarter. "% Change" is the change in shares a fund holds in a particular stock from quarter $t-1$ to t scaled by the sum of the number of shares held at the beginning and end of quarter t, $\Delta\text{Shares}(t)/(\text{Shares}(t)+\text{Shares}(t-1))$. This ratio is between −1 and 1. "Increased position" equals one if the manager owns more shares at the end of quarter t than at the beginning of quarter t. "New position" equals one if the manager opens a new position in a stock in quarter t. Note that "increased position" equals one if "new position" equals one, but the converse is not true. "Decreased position" equals one if the manager has fewer shares at the end of quarter t than at the beginning of quarter t. "Exited position" equals one if the manager completely exits from a position in quarter t. Note that "decreased position" equals one if "exited position" equals one, but the converse is not true. "Abnormal quarterly stock return" is a stock's abnormal return relative to the Fama–French five-factor model augmented with a momentum factor.

measure and indicators for increased or decreased positions as well as indicators for completely new or completely exited positions. $\eta_{i,t+1}$ is a fund-quarter fixed effect, which absorbs time-varying attention to stock picking.

Table 7 provides summary statistics for this fund-stock holding-quarter sample. Funds acquire any public information on 10% of their stock holdings on average. Funds are more likely to acquire Form 10-K/Q filings (7% of holdings) relative to Form 8-K (3%) or Form-4 (3%) filings.[14] There are also data on funds' position changes. For example, about 17% of a fund's holdings are new positions, and funds increase about 46% of holdings (including new positions) from quarter $t-1$ to t.

Table 8 presents the estimates of Equation (2). Column (1) shows that, within a fund-quarter, changes in holdings without information acquisition are unrelated to abnormal stock returns in the subsequent quarter. By contrast, changes in holdings accompanied by information acquisition are positively and significantly related to subsequent stock returns. Thus, even holding constant a manager's time-varying attention to stock picking, information acquisition is associated with subsequent abnormal performance at the stock level. A one-standard deviation increase in a fund's position in a stock that it researches in quarter t predicts a 10.6-bp ($0.1692\% \cdot 0.6274$) higher abnormal return in quarter $t+1$ compared with position changes not accompanied by public information acquisition.

Column (2) of Table 8 shows that position increases are strongly positively associated with future stock returns. New positions (column (3)) coupled with information acquisition are positively, albeit not significantly so, related to subsequent stock returns. Columns (4) and (5) show that there is a strongly negative relation between position decreases accompanied by information acquisition and subsequent stock returns; the effect is especially strong when the fund completely exits a position. Stocks subsequently underperform when funds decrease their position (the coefficient on *Trade*), and this underperformance triples when the position change is associated with public information acquisition.[15] These results demonstrate that public information is related to profitable trading decisions by funds.

Different filing types convey different information by construction. It is therefore interesting to consider whether these within–fund-quarter results differ as a function of the types of public disclosures. In Table 9, we separately interact funds' trading activity with public information acquisition of various form types: financial statements (Form 10-K/Q), material-events disclosures (Form 8-K), and trades by company insiders

Table 8. Performance of 13-F Trades with and Without Information Acquisition

	% Abnormal quarterly stock return (t + 1)				
	(1)	(2)	(3)	(4)	(5)
Any Downloads (t)	0.0047	−0.0709	0.0036	0.0983	0.0408
	(0.04)	(−0.61)	(0.03)	(0.96)	(0.40)
Trade (t)	0.0222	0.0468	−0.1001	−0.0812**	−0.1665**
	(0.60)	(1.29)	(−1.59)	(−2.45)	(−2.37)
Any Downloads (t) × *Trade (t)*	0.1692***	0.1612**	0.0476	−0.1937***	−0.3215***
	(2.83)	(2.37)	(0.34)	(−2.91)	(−3.22)
% Abnormal Quarterly Stock Return (t)	0.0129	0.0129	0.0131	0.0129	0.0128
	(0.72)	(0.72)	(0.73)	(0.72)	(0.71)
Specification	% Change	Increased position	New position	Decreased position	Exited Position
Fund-quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.01	0.01	0.01	0.01	0.01
# Stocks	5,951	5,951	5,951	5,951	5,951
# Quarters	50	50	50	50	50
Observations	2,606,622	2,606,622	2,606,622	2,606,622	2,606,622

Notes. The table reports regressions of quarterly abnormal stock returns on hedge fund information acquisition and position changes. The unit of observation is a hedge fund-quarter-stock holding. The dependent variable is a stock's abnormal return for the subsequent quarter $t + 1$. The quarter t independent variables capture the extent to which a fund acquired filings from the SEC EDGAR database and traded. "*Any Downloads*" indicates whether the fund accessed any filings for a given stock in quarter t. The definition of "*Trade*" varies by column and is specified in the row marked "*Specification*." Specifically, column (1) uses % Change, which is the change in shares a fund holds in a particular stock from quarter $t-1$ to t scaled by the sum of the number of shares held at the beginning and end of quarter t, $\Delta\text{Shares}(t)/(\text{Shares}(t) + \text{Shares}(t-1))$. This ratio is between −1 and 1. "Increased position" equals one if the manager owns more shares at the end of quarter t than at the beginning of quarter t. "New position" equals one if the manager opens a new position in a stock in quarter t. "Decreased position" equals one if the manager has fewer shares at the end of quarter t than at the beginning of quarter t. "Exited position" equals one if the manager completely exits from a position in quarter t. The unconditional frequencies of increasing a position, starting a new position, decreasing a position, and exiting a position are 0.46, 0.17, 0.45, and 0.16, respectively. All columns include fund-quarter fixed effects to absorb time-varying attention to stock picking. All continuous explanatory variables are standardized. Standard errors are double clustered by stock and quarter. The t statistics are in parentheses, and statistical significance is represented by asterisks.

**$p < 0.05$; ***$p < 0.01$.

(Form 4). That is, we report regressions similar to Equation (2) but where $AnyDownloads_{i,j,t}$ is measured with respect to a single form type. Trades accompanied by acquisition of financial statements and insider trade disclosures are both significantly associated with positive subsequent stock returns.[16] On the other hand, there is no significant relationship within fund-quarter between fund trades and subsequent stock returns when funds acquire Form 8-K. Form 8-K may not predict subsequent quarterly performance because their information may be incorporated into prices within the quarter of acquisition.

Overall, Section 4 provides evidence that public information acquisition is positively related to fund-level performance. Although this result is stronger in expansions, the results do not seem to be driven by fixed differences in fund type or time-varying attention to stock picking. This suggests that public information plays an important role in hedge fund performance.

5. Profitability of Strategies Based on Public Information Acquisition Behavior

5.1. Strategies Based on Fund Acquisition Behavior

In this section, we examine whether cross-sectional differences in hedge funds' acquisition behavior translates into cross-sectional differences in their performance. We consider four different user types based on their information acquisition: timely acquirors, scrapers, 10-K/Q specialists, and RPI funds. A hedge fund is "timely" when both (1) the average fund-month proportion of filings of any type that are viewed on the day the filings are released and (2) the average fund-month number of filing acquisitions are above the cross-sectional median for each measure. A fund is a "scraper" if, in more than one month, the fund acquires more than 50 filings of any type in a day with a median time between filing acquisitions of less than 30 seconds. A fund is a "specialist 10-K/Q" when both (1) the average fund-month proportion of its total EDGAR usage that is because of 10-K/Q filings and (2) the average fund-month number of 10-K/Q filings it accesses are above the cross-sectional median for each measure. Finally, funds are classified as reliant on public information, "RPI," if the average adjusted R^2 of quarterly regressions of a fund's changes in positions from the end of quarter t to $t+1$ on that funds' number of filing acquisitions associated with each position in the prior four quarters ($t-3$ to t) exceeds the sample median.[17]

In Table 10, we tabulate the fraction of funds categorized into each of these strategies. Although there is some overlap in firms across strategies, there is substantial independent variation. For example, about

Table 9. Performance of 13-F Trades by Filing Type Acquired

	% Abnormal quarterly stock return (t + 1)		
	(1)	(2)	(3)
Trade (t)	0.0240	0.0363	0.0302
	(0.66)	(1.00)	(0.85)
Any Form 10-K/Q (t)	0.0242		
	(0.21)		
Any Form 10-K/Q (t) × Trade (t)	0.2221***		
	(3.25)		
Any Form 8-K (t)		−0.0928	
		(−0.63)	
Any Form 8-K (t) × Trade (t)		0.0333	
		(0.38)	
Any Form 4 (t)			−0.0525
			(−0.26)
Any Form 4 (t) × Trade (t)			0.2251***
			(2.81)
% Abnormal Quarterly Stock Return (t)	0.0129	0.0129	0.0129
	(0.72)	(0.72)	(0.72)
Fund-quarter fixed effects	Yes	Yes	Yes
Adjusted R^2	0.01	0.01	0.01
# Stocks	5,951	5,951	5,951
# Quarters	50	50	50
Observations	2,606,622	2,606,622	2,606,622

Notes. The table reports regressions of quarterly abnormal stock returns on hedge fund information acquisition by form type and position changes. The unit of observation is a hedge fund-quarter-stock holding. The dependent variable is a stock's abnormal return for the subsequent quarter t + 1. The quarter t independent variables capture the extent to which a fund acquired certain form types from the SEC EDGAR database and traded. "*Any Form 10-K/Q*," "*Any Form 8-K*," and "*Any Form 4*" indicate whether the fund accessed any Form 10-K/Q, Form 8-K, or Form 4, respectively, in quarter t for a given stock holding. "*Trade*" is the change in shares a fund holds in a particular stock from quarter $t-1$ to t scaled by the sum of the number of shares held at the beginning and end of quarter t, $\Delta\text{Shares}(t)/(\text{Shares}(t) + \text{Shares}(t-1))$. This ratio is between −1 and 1. All columns include fund-quarter fixed effects to absorb time-varying attention to stock picking. Standard errors are double clustered by stock and quarter. The t statistics are in parentheses, and statistical significance is represented by asterisks.
***$p < 0.01$.

50% of scrapers are also timely funds, and similar proportions of scrapers are also financial statement specialists or highly reliant on public information. Table IA.6 in the online appendix provides summary statistics for funds classified into each fund type. Tables IA.7–IA.10 in the online appendix list the management companies most strongly associated with each strategy we consider. Funds employing scraping strategies include Renaissance Technologies, PanAgora, and AQR.[18]

Table 11 reports regressions of monthly abnormal fund performance on information acquisition and indicator variables for each of these fund types:

$$\text{Return}_{i,t+1} = \beta_1 \mathbb{1}[\text{Info Acquisition Strategy}]_i + \beta_2 \text{Info Acquisition}_{i,t} + \theta X_{i,t} + e_{i,t+1}. \quad (3)$$

The point estimates for each fund type are significantly positive, and the economic differences are large; timely funds outperform others by 0.96% annually, and scrapers outperform other funds by 1.61% annually. Financial statement specialists and funds that are highly reliant on public filings also outperform other funds by 1.15% and 1.06% annually, respectively. Thus, funds' behavior with respect to public information acquisition is informative about cross-sectional differences in average performance across funds.

It is also worth noting that the intertemporal relation between download activity and subsequent fund returns

Table 10. Crosstabulation of Fund Strategies

Fund type	Scraper	Timely	Specialist 10-K/Q	RPI
Scraper	0.39			
Timely	0.20	0.28		
Specialist 10-K/Q	0.21	0.16	0.32	
RPI	0.19	0.13	0.17	0.34

Notes. The table reports the sample proportion of various fund type pairs. For example, 20% of funds are classified as both "timely" and "scraper" funds. A fund is "timely" when both (1) the average fund-month proportion of filings of any type that are viewed on the day the filings are released and (2) the average fund-month number of filing acquisitions are above the cross-sectional median for each measure. A hedge fund is a "scraper" if, in more than one month, the fund acquires more than 50 filings of any type in a day with a median time between filing acquisitions of less than 30 seconds. A fund is a "specialist 10-K/Q" when both (1) the average fund-month proportion of its total EDGAR usage that is because of 10-K/Q filings and (2) the average fund-month number of 10-K/Q filings it accesses are above the cross-sectional median for each measure. "RPI" or reliance on public information is an indicator that equals one if the average adjusted R^2 of quarterly regressions of a fund's changes in positions from the end of quarter t to t + 1 on that funds' number of filing acquisitions associated with each position in the prior four quarters ($t-3$ to t) exceeds the sample median.

is positive and generally significant even after absorbing the average performance of these strategy groups. That is, controlling for these cross-sectional differences in funds' public information acquisition strategies, information acquisition still strongly predicts abnormal fund performance, and the economic magnitude is not much reduced from Table 4. Thus, even *within strategy*, public information acquisition is related to future fund performance.

We next link the fund strategies to stock-level performance and trading, absorbing time-varying attention to stock picking by analyzing stock performance within a fund-quarter as in Tables 8 and 9. In Table 12, we report regressions where we interact the variables of interest in Equation (2) with an indicator for each strategy:

$$\begin{aligned}\text{Return}_{i,j,t+1} &= \beta_1 \text{Any Downloads}_{i,j,t} + \beta_2 \text{Trade}_{i,j,t} \\ &+ \beta_3 \text{Any Downloads}_{i,j,t} \cdot \text{Trade}_{i,j,t} \\ &+ \mathbb{1}[\text{Info Acquisition Strategy}]_i \cdot (\beta_4 \text{Any Downloads}_{i,j,t} \\ &+ \beta_5 \text{Trade}_{i,j,t} + \beta_6 \text{Any Downloads}_{i,j,t} \cdot \text{Trade}_{i,j,t}) \\ &+ \beta_7 \text{Return}_{i,j,t} + \eta_{i,t+1} + e_{i,j,t+1}. \end{aligned} \quad (4)$$

The coefficient β_6 on the triple interaction thus tells us how much more or less the joint decision to trade *and* acquire information predicts subsequent stock returns for funds following a given strategy compared with the baseline profitability of the same joint decision for all other funds (β_3). That is, are the effects in Tables 8 and 9 concentrated in funds following a particular strategy? Note that the average performance of each strategy type is absorbed by the fund-quarter fixed effect, $\eta_{i,t+1}$.

Table 12 shows that the results in Table 8 are predominantly because of trading and acquisition behavior of timely funds. When timely funds both acquire public information and trade a given stock, that stock subsequently outperforms other stocks held by the timely fund (positive, significant β_6). These results provide support for an information processing channel for the performance benefits of public information acquisition that we document.

For scraper, 10-K/Q specialist, and RPI strategies, the coefficient β_3 on the double interaction $AnyDownloads_{i,j,t} \cdot Trade_{i,j,t}$ is positive and of similar magnitude across

Table 11. Fund Strategies, Information Acquisition, and Fund Performance

	% Abnormal monthly fund return (t + 1)			
	(1)	(2)	(3)	(4)
Downloads (t)	0.0250***	0.0141	0.0238***	0.0276***
	(3.24)	(1.60)	(3.26)	(3.56)
Timely	0.0796*			
	(1.88)			
Scraper		0.1345***		
		(2.81)		
Specialist 10-K/Q			0.0958**	
			(2.13)	
RPI				0.0881*
				(1.91)
AUM (t)	0.0028	−0.0018	0.0021	−0.0007
	(0.11)	(−0.07)	(0.08)	(−0.03)
% Abnormal Monthly Fund Return (t)	0.1040***	0.1038***	0.1039***	0.1040***
	(4.98)	(4.97)	(4.96)	(4.97)
Fund fixed effects	No	No	No	No
Date fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.08	0.08	0.08	0.08
Number of firms	557	557	557	557
Observations	43,435	43,435	43,435	43,435

Notes. The table reports fund performance as a function of strategies defined based on how funds acquire public information. The regressions control for the acquisition-return relation, the relation between a fund's download activity in month t, and a fund's abnormal return (measured in percentage) in month t + 1. Abnormal returns are calculated using the Fama–French five-factor model augmented with a momentum factor. "*Downloads*" is the fund's log number of downloads in month t. A fund is "*Timely*" when both (1) the average fund-month proportion of filings of any type that are viewed on the day the filings are released and (2) the average fund-month number of filing acquisitions are above the cross-sectional median for each measure. A hedge fund is a "*Scraper*" if, in more than one month, the fund acquires more than 50 filings of any type in a day with a median time between filing acquisitions of less than 30 seconds. A fund is a "*Specialist 10-K/Q*" when both (1) the average fund-month proportion of its total EDGAR usage that is because of 10-K/Q filings and (2) the average fund-month number of 10-K/Q filings it accesses are above the cross-sectional medians for each measure. "*RPI*" or reliance on public information is an indicator that equals one if the average adjusted R^2 of quarterly regressions of a fund's changes in positions from the end of quarter t to t + 1 on that funds' number of filing acquisitions associated with each position in the prior four quarters (t − 3 to t) exceeds the sample median. All regressions contain year-month fixed effects. Funds' "*AUM*" is standardized for interpretation. Standard errors are clustered by fund and year-month. The t statistics are in parentheses, and statistical significance is represented by asterisks.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Table 12. Fund Strategies, Information Acquisition, and the Performance of 13-F Trades

	% Abnormal quarterly stock return (t + 1)			
	(1)	(2)	(3)	(4)
Any Downloads (t)	0.0324	−0.0083	−0.0431	−0.0011
	(0.24)	(−0.04)	(−0.32)	(−0.01)
Trade (t)	0.0046	0.0127	0.0033	−0.0233
	(0.12)	(0.31)	(0.08)	(−0.51)
Any Downloads (t) × Trade (t)	−0.0154	0.2305	0.2395***	0.2604***
	(−0.16)	(0.69)	(3.01)	(2.97)
Timely × Any Downloads (t)	−0.0431			
	(−0.32)			
Timely × Trade (t)	0.0428			
	(1.01)			
Timely × Any Downloads (t) × Trade (t)	0.2403**			
	(2.17)			
Scraper × Any Downloads (t)		0.0141		
		(0.06)		
Scraper × Trade (t)		0.0168		
		(0.47)		
Scraper × Any Downloads (t) × Trade (t)		−0.0708		
		(−0.21)		
10-K/Q Specialist × Any Downloads (t)			0.0777	
			(0.66)	
10-K/Q Specialist × Trade (t)			0.0530	
			(1.29)	
10-K/Q Specialist × Any Downloads (t) × Trade (t)			−0.1753	
			(−1.33)	
RPI × Any Downloads (t)				0.0183
				(0.13)
RPI × Trade (t)				0.1357***
				(2.81)
RPI × Any Downloads (t) × Trade (t)				−0.2308*
				(−1.68)
% Abnormal Quarterly Stock Return (t)	0.0129	0.0129	0.0129	0.0130
	(0.72)	(0.72)	(0.72)	(0.72)
Fund-quarter fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.01	0.01	0.01	0.01
# Stocks	5,951	5,951	5,951	5,951
# Quarters	50	50	50	50
Observations	2,606,622	2,606,622	2,606,622	2,606,622

Notes. The table reports regressions of quarterly abnormal stock returns on hedge fund information acquisition by fund strategies and position changes. The unit of observation is a hedge fund-quarter-stock holding. The dependent variable is a stock's abnormal return for the subsequent quarter t + 1. The quarter t independent variables capture the extent to which a fund acquired filings from the SEC EDGAR database and traded. "*Any Downloads*" indicates whether the fund accessed any filings for a given stock in quarter t. "*Trade*" is the change in shares a fund holds in a particular stock from quarter t − 1 to t scaled by the sum of the number of shares held at the beginning and end of quarter t, $\Delta\text{Shares}(t)/(\text{Shares}(t) + \text{Shares}(t-1))$. This ratio is between −1 and 1. A fund is "*Timely*" when both (1) the average fund-month proportion of filings of any type that are viewed on the day the filings are released and (2) the average fund-month number of filing acquisitions are above the cross-sectional median for each measure. A hedge fund is a "*Scraper*" if, in more than one month, the fund acquires more than 50 filings of any type in a day with a median time between filing acquisitions of less than 30 seconds. A fund is a "*Specialist 10-K/Q*" when both (1) the average fund-month proportion of its total EDGAR usage that is because of 10-K/Q filings and (2) the average fund-month number of 10-K/Q filings it accesses are above the cross-sectional median for each measure. "RPI" is an indicator that equals one if the average adjusted R^2 of quarterly regressions of a fund's trades in quarter t on a fund's information acquisition from EDGAR in quarter t − 1 exceeds the sample median. All columns include fund-quarter fixed effects to absorb time-varying attention to stock picking. Standard errors are double clustered by stock and quarter. The t statistics are in parentheses, and statistical significance is represented by asterisks.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

specifications, whereas the coefficient β_6 on the triple interaction is negative, partially or fully offsetting the double-interaction effect β_3 for funds following these strategies. Therefore, these strategies identify funds that outperform based on their information acquisition activities but that outperformance is not driven by their trades at the quarterly frequency (i.e., these strategies could proxy for fixed fund characteristics that are correlated with information acquisition activity).

5.2. Strategies Based on Filing Characteristics

Previous research has demonstrated that changes in filing content over time are associated with subsequent stock-level abnormal performance (Cohen et al.

2020). Therefore, we also classify funds into different strategies based on the content of the filings they access. We define a fund as following a strategy based on the average absolute change in some characteristic of the 10-K/Q it acquires. For this reason, we limit the sample to funds that acquired at least one 10-K/Q filing for this analysis. A fund follows a strategy associated with a filing characteristic if the average absolute change in the characteristic for the 10-K/Q acquired by the fund falls above the median across all funds. We consider three filing characteristics. The first characteristic measures changes in the amount of content using changes in filings' word count. The other two relate to the tone of the filing: uncertainty and positive.[19] For each filing characteristic, we have two groups of funds: one that tends to pull filings with large changes in the characteristic and one that does not.

Table 13 reports monthly panel regressions of performance on (time-invariant) indicator variables for each of these strategies, controlling for the continuous measure of fund downloads in a given month (regression Equation (3)). Column (1) shows that funds that acquire 10-K/Q with more changes in word count outperform by 9 bp per month or 108 bp per year. Columns (2) and (3) find no relation with changes in uncertainty or tone.

We also consider whether the absolute changes in the characteristics of a stock's recent periodic reports (Forms 10-K/Q) impact how the joint decision to trade *and* acquire information predicts subsequent stock returns, as documented in Table 8. In Table 14, we interact Any Downloads (t) × Trade (t) with a measure of how much the acquired filings' characteristic changed in absolute value terms for stock j:

$$\begin{aligned}&\text{Return}_{i,j,t+1}\\&= \beta_1 \text{Any Downloads}_{i,j,t} + \beta_2 \text{Trade}_{i,j,t}\\&\quad + \beta_3 \text{Any Downloads}_{i,j,t} \cdot \text{Trade}_{i,j,t}\\&\quad + |\Delta \text{Filing Characteristic}|_{j,t}\\&\quad \cdot (\beta_4 + \beta_5 \text{Any Downloads}_{i,j,t} + \beta_6 \text{Trade}_{i,j,t}\\&\quad + \beta_7 \text{Any Downloads}_{i,j,t} \cdot \text{Trade}_{i,j,t}) + \beta_8 \text{Return}_{i,j,t}\\&\quad + \eta_{i,t+1} + e_{i,j,t+1}. \qquad (5)\end{aligned}$$

The coefficient β_7 on this triple interaction thus tells us whether the predictive relation between a fund's researched trades and subsequent stock returns varies

Table 13. Content Strategies, Information Acquisition, and Fund Performance

	% Abnormal monthly fund return (t + 1)		
	(1)	(2)	(3)
Downloads (t)	0.0240***	0.0272***	0.0287***
	(3.23)	(3.66)	(3.92)
Word Count Strategy	0.0903**		
	(2.15)		
Uncertainty Strategy		0.0382	
		(0.96)	
Positive Strategy			−0.0346
			(−0.76)
AUM (t)	0.0023	0.0078	0.0101
	(0.09)	(0.32)	(0.40)
% Abnormal Monthly Fund Return (t)	0.1064***	0.1066***	0.1066***
	(5.01)	(5.02)	(5.02)
Fund fixed effects	No	No	No
Date fixed effects	Yes	Yes	Yes
Adjusted R^2	0.08	0.08	0.08
Number of firms	530	530	530
Observations	42,025	42,025	42,025

Notes. The table reports fund performance as a function of strategies defined based on the types of filings a fund predominantly acquires. The regressions control for the acquisition-return relation is the relation between a fund's download activity in month t and a fund's abnormal return (measured in percentage) in month t + 1. Abnormal returns are calculated using the Fama–French five-factor model augmented with a momentum factor. "*Downloads*" is the fund's log number of downloads in month t. "*Word Count Strategy*," "*Uncertainty Strategy*," and "*Positive Strategy*" are each indicators that equal one if the average fund-month absolute change in accessed 10-K/Q word counts, the proportion of uncertain words, and the proportion of positive words are above their respective medians across the subsample of funds that acquire at least one 10-K/Q filing in the sample. Words are classified as uncertain or positive words using lexicons from Loughran and McDonald (2011). All regressions contain year-month fixed effects. Funds' *AUM* is standardized for interpretation. Standard errors are clustered by fund and year-month. The t statistics are in parentheses, and statistical significance is represented by asterisks.

**$p < 0.05$; ***$p < 0.01$.

Table 14. Stock Filing Changes, Information Acquisition, and the Performance of 13-F Trades

	% Abnormal quarterly stock return (t + 1)		
	(1)	(2)	(3)
Any Downloads (t)	0.0147	0.0118	0.0058
	(0.14)	(0.11)	(0.06)
Trade (t)	0.0225	0.0218	0.0222
	(0.61)	(0.59)	(0.60)
Any Downloads (t) × *Trade (t)*	0.1650***	0.1689***	0.1678***
	(2.79)	(2.82)	(2.81)
Abs %Δ Word Count (t)	−0.1763***		
	(−3.53)		
Abs %Δ Word Count (t) × *Any Downloads (t)*	−0.0323		
	(−0.77)		
Abs %Δ Word Count (t) × *Trade (t)*	0.0535**		
	(2.43)		
Abs %Δ Word Count (t) × *Any Downloads (t)* × *Trade (t)*	−0.0288		
	(−0.63)		
Abs Δ % Uncertainty (t)		−0.1700**	
		(−2.49)	
Abs Δ % Uncertainty (t) × *Any Downloads (t)*		0.0057	
		(0.11)	
Abs Δ % Uncertainty (t) × *Trade (t)*		0.0299	
		(1.42)	
Abs Δ % Uncertainty (t) × *Any Downloads (t)* × *Trade (t)*		−0.0381	
		(−0.91)	
Abs Δ % Positive (t)			−0.0690
			(−1.15)
Abs Δ % Positive (t) × *Any Downloads (t)*			0.0091
			(0.16)
Abs Δ % Positive (t) × *Trade (t)*			0.0117
			(0.40)
Abs Δ % Positive (t) × *Any Downloads (t)* × *Trade (t)*			−0.0475
			(−0.83)
% Abnormal Quarterly Stock Return (t)	0.0128	0.0128	0.0129
	(0.71)	(0.71)	(0.72)
Fund-quarter fixed effects	Yes	Yes	Yes
Adjusted R^2	0.01	0.01	0.01
# Stocks	5,951	5,951	5,951
# Quarters	50	50	50
Observations	2,606,622	2,606,622	2,606,622

Notes. The table reports regressions of quarterly abnormal stock returns on hedge fund information acquisition by stock filing characteristic changes and position changes. The unit of observation is a hedge fund-quarter-stock holding. The dependent variable is a stock's abnormal return for the subsequent quarter t + 1. The quarter t independent variables capture the extent to which a fund acquired filings from the SEC EDGAR database and traded as well as how much the acquired filings changed compared with the previous filing. "*Any Downloads*" indicates whether the fund accessed any filings for a given stock in quarter t. "*Trade*" is the change in shares a fund holds in a particular stock from quarter $t-1$ to t scaled by the sum of the number of shares held at the beginning and end of quarter t, $\Delta\text{Shares}(t)/(\text{Shares}(t) + \text{Shares}(t-1))$. This ratio is between −1 and 1. "*Abs %Δ Word Count*" is the standardized absolute percentage change in word count in a stock's 10-K or 10-Q filings in quarter t. "*Abs Δ % Uncertainty*" and "*Abs Δ % Positive*" are the standardized absolute change in the proportion of uncertain and positive words, respectively, in a stock's 10-K (year over year) or 10-Q filing (quarter over quarter) in quarter t. Words are classified as uncertain or positive using Loughran and McDonald (2011). All columns include fund-quarter fixed effects to absorb time-varying attention to stock picking. Standard errors are double clustered by stock and quarter. The t statistics are in parentheses, and statistical significance is represented by asterisks.

**$p < 0.05$; ***$p < 0.01$.

as a function of changes in tone or the length of the filing.

Consistent with Cohen et al. (2020), we find that the absolute changes in word count and uncertainty are significantly negatively related to subsequent performance (β_4). The coefficient on positive tone is also negative but insignificant. None of the triple-interaction coefficients are statistically significant (β_7). This lack of significance may be because we only observe changes in funds' long positions and not funds' short positions. Because of the negative relation between content changes and future returns, hedge funds may focus their short positions on stocks with more content changes. More broadly, these results show that filing characteristics do not explain the overall outperformance we observe from stocks that are downloaded (Table 8). The coefficient on Any

Downloads (t) × Trade (t), β_3, remains positive and significant throughout.

Overall, Section 5 shows that differences in fund strategies as they relate to information acquisition correspond to cross-sectional differences in performance. Timely funds, scrapers, specialists, and RPI funds all outperform. The within–fund-quarter relationship between stock-level performance and funds' information acquisition and trading behavior is concentrated in timely funds, consistent with an important role of information processing. There is also evidence that funds focusing on stocks with more content changes outperform.

6. Conclusion

We document extensive acquisition of public information by hedge funds, a set of sophisticated institutional investors. Our first contribution is to show that hedge funds perform better subsequent to acquiring public information. Funds acquiring filings from EDGAR in a month exhibit 1.5% higher annualized abnormal returns in the following month than nonacquirers. In within-fund analyses, funds perform better in months following public information acquisition. Hedge funds' trades also perform better when accompanied by public information acquisition in within–fund-quarter analyses that account for time-varying attention to stock picking by managers. We complement prior work finding positive stock-level returns following information acquisition by showing that the value of public information acquisition is enough to outweigh the opportunity costs of pursuing alternative investment strategies.

The second main contribution of the paper is to characterize the strategies funds use to acquire public filings and relate those to cross-sectional differences in their performance. Hedge funds that retrieve filings from EDGAR in a timely or robotic manner outperform funds that do not. Funds that acquire filings with more content changes outperform. Overall, our work provides robust evidence that public information acquisition is positively related to hedge fund performance both in the cross-section and in the time series as well as for their underlying stock positions.

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Endnotes

[1] Prior work finds little market response upon filing an 8-K (Carter and Soo 1999). Instead, the response occurs earlier, likely because 8-K filings often come days after a press release.

[2] Like our work, Chen et al. (2020a), Drake et al. (2020), and Dyer (2021) also unmask IPs accessing EDGAR. Several other papers use IP addresses to identify specific EDGAR users outside the asset management space. Specifically, Bozanic et al. (2017) identifies internal revenue service usage, Li et al. (2017) identifies Federal Reserve and Federal Deposit Insurance Corporation usage, and Gibbons et al. (2021) identifies analyst usage. For determinants of EDGAR usage more generally, see Drake et al. (2015, 2016, 2017) and Loughran and McDonald (2017). For additional evidence relating EDGAR search volume to stock-level performance, see Li and Sun (2022). Gao and Huang (2020) finds that implementation of the EDGAR system improves information production.

[3] Da et al. (2011) and Drake et al. (2012) use Google Search volume. Barber and Odean (2008) use abnormal trading volume. Gervais et al. (2001), Barber and Odean (2008), and Hou et al. (2009) use abnormal returns. Grullon et al. (2004), Chemmanur and Yan (2009), Fang and Peress (2009), Lou (2014), and Ahern and Sosyura (2015) use advertising expense. Li and Yu (2012) and Yuan (2015) use new market highs.

[4] Funds' selective reporting to hedge fund databases or database backfilling can create potential selection biases in measuring the absolute level of hedge fund performance. These issues are mitigated in our sample because (1) we compare funds reporting to HFR with other funds that also report and (2) we employ within-fund and within–fund-quarter analyses.

[5] We use this benchmark because we restrict the sample to equity-oriented funds. The positive performance-acquisition relation is also obtained when using the risk factors developed in Fung and Hsieh (2001) to capture more esoteric hedge fund strategies. We report these results in the online appendix.

[6] We choose not to use the MaxMind panel alone because of potential data quality concerns. In particular, there is an abnormal temporary spike of registrations in 2011, and some funds that are matched using ARIN are present for only a couple of months in 2011 in MaxMind.

[7] We cannot use ARIN WHOWAS for the initial match to HFR because ARIN does not provide bulk downloads of ARIN WHOWAS. Historical registration details for IPs can only be accessed one IP at a time.

[8] We do not count such index views toward information acquisition totals in our subsequent analyses.

[9] It is worth noting that some of the investment companies presented in this table also manage mutual funds. We cannot identify from the SEC EDGAR server logs whether a view comes from hedge fund or mutual fund managers. Therefore, these totals represent the entire management company. Subsequent performance analyses use returns that are specific to the hedge funds. Any noise

in the independent variable induced by capturing mutual fund views should bias any coefficients in the performance regressions toward zero. Our within-fund analyses using fund fixed effects ensure that our results are not driven by potential differences between hedge funds with mutual funds attached and those without.

[10] See Figure IA.2 in the online appendix for plots of usage of additional form types.

[11] In Table IA.3 in the online appendix, we reproduce the analysis reported in Table 4 using Fung and Hsieh (2001) abnormal returns and find similar results.

[12] Some known predictors of hedge fund performance are based on time-invariant fund characteristics (e.g., managerial incentives (Agarwal et al. 2009) or share-restriction clauses (Aragon 2007)), and the fund fixed effects will absorb these cross-sectional differences. In Table IA.4 in the online appendix, we show that our within-fund results are also robust to controlling for two time-varying performance predictors: hedging ability (Titman and Tiu 2011) and strategy distinctiveness (Sun et al. 2011).

[13] We previously analyzed hedge fund returns as a function of institutional viewing of EDGAR filings. For our hedge fund performance analyses in Section 4.1, side by side management only introduces potential measurement error into our right-hand side variable (views of public filings), which should work against finding a relation between public information acquisition and subsequent fund-level returns (i.e., attenuate the relation).

[14] Conditional on a position increasing or decreasing (i.e., trading), about 10.7% of trades are associated with information acquisition in the same quarter.

[15] Decreases or complete position exits are the primary driver of the changes in holdings result in column (1). An alternative specification to Equation (2) is to include both position increases and decreases (columns (2) and (4)) or new positions and old positions (columns (3) and (5)) in a single regression (interacting each variable with information acquisition). This specification shows that the decision to either reduce or completely exit a position when coupled with information acquisition is strongly negatively predictive of next quarter stock-level returns, whereas position increases accompanied by information acquisition are not statistically different from nonresearched position increases.

[16] The Form 4 result is consistent with the findings in Chen et al. (2020a).

[17] Kacperczyk and Seru (2007) study mutual funds and compare performance across funds by sorting on funds' reliance on public information using past analyst recommendation changes as a proxy for public information. They measure how much the variation in a fund's quarterly holdings changes is explained by changes in past analyst recommendations for a stock. We use a direct analogue of their measure in our setting: the reliance on direct public information acquisition from EDGAR. We find a positive relation between our measure of RPI and subsequent fund performance (see Table IA.5 in the online appendix).

[18] Some studies using EDGAR remove robotic downloading activity from the EDGAR logs. We note that doing so for our sample would obscure true variation in the information acquisition behavior of the funds we study.

[19] These are determined by comparing the words in the Form 10-K/Q with lexicons tailored to finance texts from Loughran and McDonald (2011).

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