

The Strategic Use of 13F Restatement by Hedge Funds

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ABSTRACT

Hedge funds can amend their originally reported 13F holdings using restatements subsequently. We conduct the first systematic analysis of such filings, which are as common as the confidential filings but affect three times more stocks. We find the restated holdings are associated with significant abnormal returns, suggesting that restatements are often used strategically to hide funds' trading intention (for both buys and sells). We examine fund- and stock-characteristics that are related to this strategic choice. We also construct a return gap measure to gauge the value-added from such restatements and find it to predict future fund performance. Finally, we show that commonly-used databases such as Thomson Reuters do not fully adjust for restatements. While the resulting discrepancy is small in aggregate, it can be large for many funds.

JEL Classification: G10, G19

Key Words: Strategic Disclosure, Hedge Funds, Ownership Disclosure, 13F Holdings, Restatement, Fund Skill

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1 Introduction

On July 10, 2020, the Securities and Exchange Commission (SEC) announced a proposal to increase the reporting threshold for Form 13F from \$100 million to \$3.5 billion.¹ Form 13F was adopted in 1975 and required managers with more than \$100 million under investment to report their equity holdings on a quarterly basis. In the subsequent 45 years, the number of 13F filers increased 17 folds to reach 5,089. Not surprisingly, given the drastic increase in reporting volume, there were no systematic checks for accuracy, and there were no fines for erroneous data.² Still, the plan to raise the reporting threshold faced overwhelming pushback from company CEOs, hundreds of investment managers, major stock exchanges, institutional investors, academics, and was ultimately abandoned.³ The pushback suggests that the investment community finds the reported 13F holdings to be very valuable despite potential reporting errors and even among the smaller managers.

The 13F reports are useful for market participants for several reasons. For example, industrial firm executives want to know who their shareholders are, on a timely basis, especially to detect share build-up by activist investors. The disclosure of holdings are also useful for fund managers by enabling them to front-run and copycat other investors (Cao, Du, Yang, and Zhang, 2021). In response, managers often seek SEC’s permission to delay disclosure of “confidential holdings.” Agarwal, Jiang, Tang, and Yang (2013, “AJTY” hereafter) and Aragon, Hertz, and Shi (2013) find such confidential holdings by hedge funds are highly informative.

In addition to confidential filings, managers may also amend previously reported holdings using 13F restatements. In our sample of 1,673 hedge funds, restatements are as common as confidential filings. We observe restatements for 3.12% of the fund-quarters, and confidential filings for 2.08%. Moreover, restatement are more sizable. For example, on average, restatement affects 11% (median) of the portfolio in terms of dollar stake while confidential filings affect only 4%. Yet, such prevalent restating activities by hedge funds have not been systematically examined before and our paper

¹Source: “Statement on the Proposal to Substantially Reduce 13F Reporting”, July 10, 2020, by SEC Commissioner Allison Herren Lee.

²For instance, according to an SEC internal audit review in 2010, “as a general matter, apart from the review of Form 13F as a result of an institutional investment manager’s request for confidential treatment of Form 13F information, the majority of the monitoring or checking of this information by IM is performed only after a member of the public notifies IM of an error in or problem with a Form 13F, or IM receives a referral from another SEC division or office.”

³Source: “Hedge Funds’ SEC Reporting Loss Is Actually a Win,” by Aaron Brown, October 29, 2020, *Bloomberg*.

fills in this gap in the literature.

In theory, restatements should be used to correct “honest” mistakes made randomly in prior filings, in which case, the affected holdings should not be associated with abnormal returns. In reality, we find that is not the case. For example, new holdings revealed in the restatement are associated with significant abnormal annualized returns of 5.897% during the restatement period, which goes from the end of previous quarter to the restatement date (or the end of current quarter, whichever is earlier). We find similar abnormal return when we zoom into the period from the original filing date to the restatement date, consistent with the notion that managers are likely to gradually and quietly build up positions without public notice. The magnitude of the abnormal return is similar to that of confidential holdings, suggesting that some hedge fund managers may use restatement strategically as an alternative to confidential holding treatment. However, differing from the confidential holding, restatement does not require prior SEC approval. Given that SEC does not systematically check the accuracy of 13F filings, managers may view it as a low-cost alternative to hide these holdings from the original filing date to the restatement date.

Unlike the confidential holding treatment that only hide additions to the portfolio, managers can use restatement to report reduced holdings as well. In this case, the manager reports inflated holdings on the original report date and reveals a smaller holding (revision down) on the restatement date. Such behavior allows managers to hide partial liquidation in order to reduce price impact associated with the remaining holdings. Indeed, we find the affected holdings are associated with a significant abnormal annualized return of 13.43% from the original filing date to the restatement date. In contrast, we do not find significant abnormal returns associated with holdings that are completely revised down to zero on restatement date. This is not surprising. Managers are less concerned with revealing negative signal if they no longer hold the stocks. Restatements in this case are more likely to be honest mistakes.

As further support for the strategic motivation, we find the abnormal returns associated with the restated holdings to increase if such holdings represent high dollar stake or if the number of restated holdings is small. Furthermore, examining subsequent trading decisions on the restated holdings reveals a mean reversion pattern: holdings that were revised down (up) are more likely to be bought (sold) in the future. The pattern suggests that restatement is often used to “hide”

temporary deviation from a benchmark weight and such deviation is likely motivated by short-lived private signals. Indeed, the restated holdings experience abnormally large amount of firm information disclosure during the period from the original filing date to the restatement date.

Using logistic regressions, we then study fund-quarter characteristics that predict their use of restatements or confidential holdings, respectively. Funds almost never use restatements and confidential holdings simultaneously in the same quarter. Younger funds, larger funds and funds experiencing large flows are more likely to use restatements or confidential holdings. Both types of actions are persistent. While high turnover and portfolio concentration predict the use of confidential holdings, heavy download of previous amendments reduces the use of restatement.

Using stock-fund-quarter panels, we examine stock characteristics that are related to different types of restatement. Restated holdings tend to be smaller stocks covered by fewer analysts, where hedge funds are more likely to possess private information about them. We find recent winners (losers) are more likely to be revised up (down), consistent with the notion that funds are trying to trade on momentum strategy quietly to minimize potential price impact. Interesting, the 13D filing by an activist hedge fund predicts both confidential holdings and “new” positions in a restatement, consistent with the notion that the fund wants to quietly build up a stake without attracting the attention from the target firm until it reaches the 5% 13D reporting threshold. For this purpose, some activist funds are using restatement as a substitute for applying for confidential holding treatment, which may not be approved by the SEC.

We capture the value added from restatements by computing a restatement return gap (RRG). Specifically, at the end of each quarter for each fund, we construct two portfolios. The reported portfolio contains holdings in the original filing. The true portfolio corrects the reported holdings for all subsequent restatements. RRG is then defined as the true portfolio return minus the reported portfolio return over the next quarter. We then compute a similar return gap to capture the value added from confidential filings.

While returns gaps are positive on average for both restatements and confidential holdings, neither is significant. Nevertheless, we documents fund characteristics that reliably predict positive return gaps in the future. For example, restatements that represent large stakes are likely to be associated with a positive return gap. In addition, we also find positive return gap among funds

frequently using restatements in the past and funds whose confidential filings have been denied before. The restatements of these funds are more likely to be used for strategic reasons to hide private information that results in the positive RRG. Consistent with the notion that positive return gap reflect fund skill, we find it to predict future fund performance. Hedge funds with positive restatement return gaps this quarter outperform those with negative return gaps by about 50 bps next quarter, after risk adjustments. The predictive power of the return gap is also robust to controlling for fund and stock characteristics.

Finally, we examine whether the commonly used Thomas Reuters (TR) 13F holdings account for restatements and/or confidential holdings among hedge funds in our sample. To do that, we compare the true hedge fund portfolio (corrected for restatements or confidential holdings) using SEC restatement filing data against the TR reported portfolio to identify discrepancies. We find that TR has not made full adjustments. The discrepancies are not huge. As percentages of the total dollar value of our hedge fund portfolios, they are 0.544% and 0.339% on average, due to restatements and confidential holdings, respectively. Although for some quarters, they exceed 1%. While the discrepancy due to confidential holdings has dropped to almost zero since 2011, possibly due to the attention brought by [AJTY](#), discrepancy due to restatements remained relatively large.

Our study contributes to several branches of literature. First, the theoretical literature of disclosure has shown that corporations and investors disclose strategically given the costs of sharing proprietary information with competitors and the benefits of informing potential investors in the market (e.g., [Verrecchia, 1983](#); [Vives, 1984](#); [Diamond and Verrecchia, 1991](#); [Fishman and Hagerty, 1989, 2003](#); [Admati and Pfleiderer, 2000](#)).⁴ Given the easiness of following trading strategies, institutional investors are particularly subject to the costs of front-running and copycatting when they disclose their portfolio holdings (e.g., [Frank, Poterba, Shackelford, and Shoven, 2004](#); [Verbeek and Wang, 2013](#); [Phillips, Pukthuanthong, and Rau, 2018](#); [Agarwal, Mullally, Tang, and Yang, 2015](#); [Shi, 2017](#); [Cao, Du, Yang, and Zhang, 2021](#)). Therefore, hedge funds have taken advantage of the SEC's 13F confidential treatment to hide their informative trades (e.g., [Agarwal, Jiang, Tang, and Yang, 2013](#); [Aragon, Hertz, and Shi, 2013](#)). Our paper is the first to offer systematic evidence on 13F restatements and their strategic use by hedge funds. We compile a comprehensive

⁴See also the surveys [Verrecchia \(2001\)](#), [Leuz and Wysocki \(2016\)](#), and [Goldstein and Yang \(2017\)](#) for more complete descriptions of this literature.

database of 13F restatements and show that despite being intended as a means to correct honest disclosure mistakes, restatements are extensively used by hedge funds to delay the disclosure of private information to the market.

Our paper also contributes to the large literature on identifying skill from institutional investors' holdings (e.g., [Daniel, Grinblatt, Titman, and Wermers, 1997](#); [Wermers, 2000](#); [Kacperczyk, Sialm, and Zheng, 2005, 2008](#); [Cremers and Petajisto, 2009](#) on mutual funds, and [Griffin and Xu, 2009](#); [Aragon and Martin, 2012](#); [Agarwal, Jiang, Tang, and Yang, 2013](#); and [Aragon, Hertz, and Shi, 2013](#) on hedge funds). In this paper, we construct a new skill measure, restatement return gap, that captures the information difference between a fund and the market and show that this measure can predict future hedge fund returns.

Finally, our paper contributes to the understanding of the 13F portfolio holdings data. The 13F data has been important for academic researchers and investors (see the debate mentioned at the beginning of the introduction). Therefore, the accuracy of such data has a lot of implications. Prior research (e.g., [Ljungqvist, Malloy, and Marston, 2009](#); [Ben-David, Franzoni, Landier, and Moussawi, 2013](#)) has shown that disclosure data can deviate from the true states of the world. We demonstrate that in portfolio holdings reported in 13F amendments (including restatements and confidential filings) are largely uncaptured by the Thomson Reuters database, which is the standard database widely used in academic research. We find that although the bias and error in portfolio returns attributable to the amendments vary across funds, the average bias and error are small in magnitudes, offering a comforting message to the validity of the prior literature.

2 Institutional Background and Data

2.1 Institutional background

According to Section 13(f) of the 1934 Securities Exchange Act, all institutional investment managers (including foreign investors) that have investment discretion over \$100 million or more in Section 13(f) securities (mostly publicly traded equity, but also convertible bonds and options) are required to disclose their quarter-end holdings in these securities. The same rule requires institutional investment manager to amend their Form 13F filing. For example, upon either the denial

of a request for confidential treatment, or the expiration of a grant of confidential treatment, institutional investment managers should file amendments within six business days of the denial of a confidential treatment request or the expiration of confidential treatment. The economic consequence of this type of amendment has been well studied by the prior literature (e.g., [Agarwal, Jiang, Tang, and Yang, 2013](#); [Aragon, Hertzelt, and Shi, 2013](#))⁵.

Amendments could also be filed for reasons not relating to confidential treatment. In particular, if filers discover any error in any Form 13F that they previously filed with the Commission, they should promptly amend their Form 13F filings. On the one hand, errors could arise if previously filed Form 13F filings include incorrect information, e.g., number of shares or fair market value misstated. In this case, filers must resubmit their entire filing, as corrected, to supersede their original filing with the amended filing. On the other hand, if certain reportable securities are not listed on the previously filed Form 13f filing, then amendment should be filed to only include securities that are being added. Such amendment will supplement rather than supersede the original filing.

To differentiate the aforementioned two types of amendments, in this study, we refer to the amendments not relating to the confidential treatment as restatements. And amendments that filed because of confidential treatment are referred to as confidential filings.

We provide an example restatement filing by Symphony Asset Management in [Appendix B](#). Compared with the original 13F filing, the restated filing contains revised positions (Panel A), new positions (Panel B), and unchanged positions (Panel C). Notably, the revised and new holdings are not reflected in the widely used Thomson Reuters database of 13F holdings.

2.2 Data sources and sample construction

We study 13F filings by hedge fund companies over the period from 1999 to 2018.⁶ We focus on hedge funds companies in our study since they tend to be the most informative investment companies (e.g., [Brunnermeier and Nagel, 2004](#); [Griffin and Xu, 2009](#)) and have more incentives to

⁵If an amendment is filed because of confidential treatment, then the following legend should be included at the top of the Form 13F Cover Page: THIS FILING LISTS SECURITIES HOLDINGS REPORTED ON THE FORM 13F FILED ON (DATE) PURSUANT TO A REQUEST FOR CONFIDENTIAL TREATMENT AND FOR WHICH (THE REQUEST WAS DENIED/CONFIDENTIAL TREATMENT EXPIRED) ON (DATE).

⁶We start our sample in 1999 because electronic 13F filings were first available on SEC EDGAR in 1999.

use restatements strategically. Hedge funds are classified manually based on a number of sources, including company websites, Form ADV filings, industry directories and publications, and news article searches, following [AJTY](#).⁷

Our key data are from the original 13F filings and amendments to these filings. Following , we directly retrieve both the original and the amended 13F filings (forms 13F-HR and 13F-HR/A) filed by hedge funds between March 1999 and June 2018 from the SEC’s EDGAR database. We first use an automated programming to process the holding information on each filing and then we manually check the data to ensure its accuracy. The resulting sample has 42,303 original 13F filings and 3,513 amended filings, of which 1,539 (1,614) are restatements (confidential filings). The sample filings are filed by 1,673 hedge fund companies.

Figure 1 plots the time-series trend of hedge funds’ filing restatement and confidential filings. Overall, restatements seem as common as confidential filings. Besides, we could also observe a mildly decreasing trend in frequencies of both types of amendments, from around 6% in early 2000s to around 2% during more recent years.

[Insert Figure 1 Here]

Table 1 provides the summary statistics. Panel A reports the distribution of the delay (in quarters) between the quarter-end portfolio date and the filing date for restatement or confidential filings. We further categorize restatements into two types, namely *standalone* and *consecutive* restatement. If a single restatement is filed for a specific quarter, then it is classified as a *standalone* restatement. Otherwise, if multiple restatements are filed for consecutive quarters on the same date, then they are classified as consecutive restatements. Different from confidential filings, 85% of which are filed more than one quarter away from the quarter-end, about 65% of restatements are filed in the quarter right after the quarter-end. Not surprisingly, between two types of restatement filings, *standalone* restatements are usually filed in a timelier manner. About 84% of *standalone* restatements are filed within one quarter from the quarter-end date, whereas all *consecutive* restatements are filed at least one quarter away from the quarter-end date.

Panel B of Table 1 summarizes the number of amended filings filed by each hedge fund. Not all hedge funds have ever filed an amendment. Only 34% (13%) of hedge funds have filed at least one

⁷We thank the authors of [Cao, Du, Yang, and Zhang \(2021\)](#) for sharing the hedge fund classification data.

restatement (confidential filing). In terms of the number of stock holdings reported on 13F filings, Panel C suggests that, on average, there are 116 stocks on the original 13F filing, 81 stocks on the restatement and 20 stocks on the confidential filing.

For stock holdings included in the restatement (i.e., restated holdings), we further categorize them into four different groups after comparing the number of split-adjusted shares reported on the restatement with the one reported on the corresponding original filing. When a stock holding is included in both restatement and the original filing, then it is classified as *revision up (down)*-type restated holding if the number of shares is greater (smaller) on the restatement than on the original filing. When a stock holding is only reported on restatement (original filing), then it is classified as *new (complete revision down)*-type restated holding. After separating different types of restated holdings, we find that hedge funds includes more *new* and *revision up*-type restated holdings in their restatement filings.

In Panel D, we report the summary statistics about the dollar value of 13F filing, which is calculated as the dollar value of all stock positions on a filing. Similar with what we observe in Panel C, on average, restatement has a higher dollar value than confidential filing. Conditional on a hedge fund filing both an original 13F filing and an amendment for a given quarter, we calculate the dollar value of an amendment as percentage of the dollar value of total portfolio (i.e., dollar stake). We learn from Panel E that the dollar value of stock positions on restatement is significant: their average value constitutes more than half (56%) of the value of total portfolio, whereas the dollar value of confidential holdings, on average, is about 15% of the value of total portfolio. The medians are 11% and 4% for restatements and confidential holdings, respectively.

[Insert Table 1 Here]

3 Strategic Use of Restatement Filings

The SEC allows restatements of 13F filings with the intention to correct “honest” mistakes.⁸ However, given the limited oversight over 13F filings in general (as discussed in Section 1), hedge fund companies may have incentives to use 13F restatements to hide and delay the disclosure of certain

⁸See Section “Amending Form 13F” on the website <https://www.sec.gov/divisions/investment/13ffaq.htm>

positions. In this section, we present evidences for and discussion implications of such strategic use of restatements.

3.1 Abnormal returns of restatement holdings

Hedge funds may have incentives to hide private information to prevent front-running by other investors (e.g., [AJTY](#); [Shi, 2017](#); [Cao, Du, Yang, and Zhang, 2021](#)). One way to distinguish strategic from honest use of restatements is to examine the abnormal returns associated with restated holdings over the period when these holdings are misreported. Honest mistakes should be uncorrelated with returns while hidden private information should imply significant abnormal returns.

When a fund files a restatement for holdings in quarter t , the restated positions are hidden from investors' views during the *restatement period*, defined as the period from the end of quarter t to the earlier of two dates: (1) the restatement 13F filing date or (2) the end of subsequent quarter $t + 1$.⁹ The restatement period is further divided into two subperiods by the filing date of the original 13F filing for quarter t (which is required within 45 days after the end of quarter t). [Figure 2](#) illustrates the restatement period as well as the two subperiods. In the first subperiod, all holdings are hidden from the public, while in the second subperiod, only the restated holdings are misreported. A manager's strategic decision of restatement thus mostly applies to the second subperiod. Since strategic restatement decisions must be made before the 13F original filing date, the first subperiod can also affect the manager's decision. Overall, if managers restate holdings to withhold private information, we expect such holdings to generate abnormal returns within the restatement period, and especially the second subperiod.

[Insert [Figure 2](#) Here]

We consider two measures of abnormal returns. the first one is [Daniel, Grinblatt, Titman, and Wermers \(1997\)](#), "DGTW" hereafter) benchmark-adjusted return. In particular, we form 125 portfolios at the end of June of each year using all common stocks listed on NYSE, Amex, and NASDAQ after performing a three-way quintile sorting along the size (using the NYSE size quintile),

⁹We stop at the subsequent quarter end since companies need to report new portfolio holdings at each quarter end.

book-to-market ratio, and momentum dimensions. The daily abnormal return of a given stock is the return in excess of that of the benchmark portfolio it belongs to. The second performance measure is abnormal return computed using Carhart (1997) four-factor model. The daily abnormal return for stock holding i is calculated as $AR_{i,t} = R_{i,t} - E[R_{i,t}]$. The expected return, $E[R_{i,t}]$, is computed as the following:

$$E[R_{i,t}] = \alpha_i + \beta_i^{MKT}(R_{m,t} - R_{f,t}) + \beta_i^{SMB}SMB_t + \beta_i^{HML}HML_t + \beta_i^{MOM}MOM_t$$

The risk exposures for various factor returns, β s, are estimated during the period $[t - 210, t - 31]$, where t is the current quarter-end date. With both abnormal performance measures, we compute the daily abnormal performance of the portfolio as the value-weighted average return of all component stocks.

Table 2 reports the return performances of original and restated holdings separately using the DGTW benchmark-adjusted return measure (Panel A) and Carhart four-factor model-based abnormal returns (Panel B). We put a minus sign on the abnormal return of the restated holding if it is *revision down* or *complete revision down*-type holdings because hedge fund managers file restatement to hide a stock sale. We find similar results using both abnormal return measures. For example, we find in Panel A that, by trading the restatement portfolio for the entire restatement period, investors would make annualized benchmark-adjusted returns of 6.186%, which is significant at 1% level. After we break the restatement period into two subperiods, we find that the annualized benchmark-adjusted returns for both subperiods are significantly positive at 5% level. In particular, in the second subperiod when the restated holdings are misreported, investors would make annualized benchmark-adjusted returns of 8.392%. Then we separately examine the return performance of different types of restated holdings. We find that the abnormal returns to restated holdings concentrate on the *revision down* and *new*-type restated holdings, which suggests that restatements can be used strategically to hide both negative and positive private information. In contrast, confidential holding can only be used to hide positive private information as the fund quietly build up a position.

After examining the abnormal performance of all restated holdings together, we focus on subsets of restated holdings which, in our opinion, are more likely due to hedge funds' strategic choice

rather than honest mistake. We first focus on restated holdings that are deemed *high dollar stake*. They are restated holdings whose dollar values are at least 0.5% of the total portfolio. We find that if investors hold *high dollar stake* restated holdings for the whole restatement period (second subperiod), they would make annualized benchmark-adjusted returns of 6.272% (9.848%), which is significant at 5% level. The second subset of restated holdings we examine are the ones on the restatements with small numbers of stocks (below median). By holding them, investors would earn annualized benchmark-adjusted returns of 9.838% and 14.881% during the whole restatement period and the second subperiod, respectively.

[Insert Table 2 Here]

3.2 Subsequent trading decisions

Having established that restatement decisions involve substantial private information, we study the subsequent trading decisions of restating funds to understand the nature and duration of such information.

To determine the trading decision, we compare each stock position at the current quarter-end to that of the same stock by the same hedge fund at the subsequent quarter-end and classify a net increase (decrease) in shares as a *buy* (*sell*). In terms of *sell*, we further differentiate the trading decisions between *partially sell* and *liquidation* depending on whether hedge fund still hold some shares of the same stock in the subsequent quarter. Finally, if hedge fund holds the same number of shares of the stock at the end of both current and subsequent quarter, the trading decision is deemed as *hold*.

Table 3 reports the trading decisions for original, restated, and confidential holdings separately. We also compare the trading decisions between restated/confidential holdings and original holdings. The result suggests that hedge funds are more likely to continue building up their trading positions in restated and confidential holdings than original holdings. In particular, we find that hedge funds keep acquiring shares of 40.69% of restated holdings and 32.02% of confidential holdings in the next quarter, whereas we only observe the increase in the number of shares for 28.94% of original holdings.

We also examine hedge funds' trading decisions separately for different types of restated holdings

and find that investors are more likely to reverse their trading positions in restated holdings in the subsequent quarter. For example, more than half, 56.79%, of *revision up*-type restated holdings experience selling in the subsequent quarter. Similarly, 59.18% of *new*-type restated holdings are sold in the subsequent quarter. In contrast, hedge funds choose to buy back 50.56% of stock holdings that they revise down in the current quarter. The pattern suggests that restatement is often used to “hide” temporary deviation from a benchmark weight and such deviation is likely motivated by short-lived private signals.

[Insert Table 3 Here]

3.3 Subsequent information event intensity

If a restatement is indeed filed to exploit hedge fund managers’ private information, then we should expect that, relative to original holdings, restated holdings should experience more information events during the restatement period. To exploit this idea, we compare the information event intensity between original and restated holdings.

We obtain information event data from Capital IQ’s Key Development database. Because the data coverage in this database starts in 2002, we restrict our analysis in this subsection to the post-2002 period. Following [Edmans, Goncalves-Pinto, Groen-Xu, and Wang \(2018\)](#), we only retain information events generated from within the firm: those whose sources are company websites, news wires that disseminate corporate press releases (e.g., Business Wire, PR Newswire, Market Wire, and GlobeNewsWire), SEC filings, and the Capital IQ transactions database (e.g., M&A announcements, debt issuances, and share buybacks).

A stock holding is considered experiencing an information event at date t if there is at least one information event identified from the Key Development database on that date. The information event intensity is then defined as the percentage of stock holdings experiencing information events. In particular, for each portfolio, we first calculate the percentage of stock holdings experiencing information event at date t . And then, for each portfolio, we calculate the mean percentage of stock holdings experiencing information events during the restatement period as well as during the two sub-periods. Finally, we take the average of the previously computed mean percentage across different portfolios and report the results in [Table 4](#).

Although restated holdings experience slightly fewer information events during the whole restatement period than original holdings do, after we break the restatement period into two sub-periods, we find that restated holdings experience more information events during the second sub-period when restated holdings are yet to be reported. In particular, on a typical date during the second sub-period, Key Development database identifies information event for 4.7% of restated holdings and for 1.7% of original holdings. The difference is significant at the 1% level. We further examine information event intensities for four different types of restated holdings and compare them with the information event intensity for original holdings, separately. Similar patterns are documented. In particular, all types of restated holdings experience significantly more information events during the second restatement sub-period, suggesting that hedge funds may use restatements to protect their private information about corporate events.

[Insert Table 4 Here]

3.4 Characteristics of funds making amendment filings

The strategic decision to file 13F amendments, including restatements and confidential filings, should be related to investment companies' characteristics (e.g., [AJTY](#); [Aragon, Hertz, and Shi, 2013](#)). On the other hand, honest restatements should be quasi-random and not related to fund characteristics, except perhaps through the quality of internal control ([Cassar and Gerakos, 2010](#)). In this section, we consider the determinants of 13F amendment filings and study the strategic motives of hedge funds in filing them.

Panel A of [Table 5](#) reports the distribution of funds' decisions to file restatement and confidential 13F filings. Among 42,979 fund-quarters in our sample, we observe 1,319 (880) fund-quarters in which hedge funds file a restatement (confidential filing) only. In 141 fund-quarters, hedge funds file both restatements and confidential filings. Given that the last case is relatively rare, we exclude it from our subsequent analyses.

Following , we consider the following hedge fund companies' characteristics in our analysis to capture the degree of active portfolio management as well as the market impact of the institution. *Age* is the number of years since the institution's first appearance on Thompson Reuters. *Portsize* is the total equity portfolio size of an institution calculated as the market value of its quarter-

end holdings. *Turnover* is the inter-quarter portfolio turnover rate calculated as the lesser of purchases and sales divided by the average portfolio size of the last and current quarters. *PortHHI* is the Herfindahl index of the portfolio, calculated from the market value of each component stock. *PortRet* is the monthly average return on the portfolio during the quarter, *PortVol* is the monthly portfolio return volatility during the past 12 months ending in this quarter-end, $|Flow|$ is the absolute change in total portfolio value between two consecutive quarters, net of the increase due to returns, scaled by the portfolio size at the previous quarter-end. That is

$$|Flow_{i,t}| = \frac{PortSize_{i,t} - PortSize_{i,t-1}(1 + PortRet_{i,t})}{PortSize_{i,t-1}}$$

Additionally, to examine if hedge funds persistently file amendment 13F filing, we include in our analysis the number of restatement and confidential filings filed previously by the same fund (i.e., $N_PriorRest$ and $N_PriorConf$). Furthermore, we include a set of variables to gauge if outside investors' and regulators' attention affect funds' choice of filing amendment filing. $N_Download_Org$ ($N_Download_Rest$, $N_Download_Conf$) is the number of times previously filed original (restatement, confidential) 13F filings were downloaded from EDGAR database. CF_Denial is an indicator which equals to one if at least one of previously filed confidential filings has been denied by SEC. Finally, we intend to evaluate the extent to which hedge fund activism affects its choice of filing amendments by including an indicator *Activism* which equals to one if hedge fund files an 13D filing in the same quarter as of the original 13F filing.

Panel B of Table 5 reports separately the means of the characteristics discussed above for fund-quarters in which (1) no amendment is filed, (2) only restatement is filed, and (3) only confidential filing is filed. Relative to the benchmark case where neither restatement nor confidential filing is filed, hedge funds filing either type of amendment manage larger portfolios with greater turnovers. This finding provides supporting evidence that amendment filings are more likely to be filed by funds with larger market impact. We also find that the choice of filing type is persistent. Funds that have filed restatement (confidential filing) in the past are more likely to file restatement (confidential filing) later. Moreover, activist funds are more likely to use amendment filings, especially the confidential filings.

We supplement the univariate analyses in Panel B of Table 5 with multivariate logistic regres-

sions. The model specification is as follows:

$$Amend_{i,t} = (\beta InstChar_{i,t} + \lambda_t + \varepsilon_{i,t} > 0), \quad (1)$$

where $Amend_{i,t}$ is either $Rest_{i,t}$ or $CF_{i,t}$, an indicator variable for the existence of a restatement or a confidential filing in fund-quarter (i, t) . We run above regression separately for restatement and confidential filings and then compare the coefficients between two regressions.

Regression estimates are reported in Panel C of Table 5. In terms of determinants of restatement filings, we find that both portfolio size ($PortSize$) and absolute fund flow ($|Flow|$) are positively associated with more frequent restatement filings. The finding is consistent with the notion that larger hedge funds have larger capacity to collect private information. In addition, funds experiencing frequent flows worry more about price impact of their trades and have stronger incentives to trade “quietly”. After controlling for size and other fund characteristics, fund age is inversely related to the likelihood of restatement filing. Additionally, hedge funds who have filed restatement (confidential) filing previously are found to be more (less) likely to file restatement in the future. Moreover, we find that outside investors’ attention, proxied by the number of downloads of previous restatement filings, could deter hedge funds’ attempt to hide their trading positions through restatement filings.

Results regarding the determinants to confidential filings are largely consistent with findings in . For example, funds with greater turnovers and portfolio concentrations are more likely to file confidential filings while both characteristics are insignificant in explaining the use of restatements. Among the additional variables examined, we find evidence that a hedge fund’s choice of the amendment type is persistent. Hedge funds that filed confidential filings previously are more likely to file confidential filing in the future. Moreover, if previously filed confidential filings have been denied by SEC, then hedge funds are more cautious and therefore less likely to file confidential filing. Similarly, if outside investors paid more attention to a fund’s previous restatement filings, hedge fund is more likely to file confidential filings in the future. Finally, the activism dummy is significant, suggesting that activist funds often use confidential filings to build up a large position in the target.

[Insert Table 5 Here]

3.5 Characteristics of the amended holdings

We then examine the characteristics of stocks that are affected by amendment filings. This analysis is conducted on a stock-fund-quarter panel. Unlike confidential holdings, restated holdings have different types (*revision up*, *revision down*, *new*, and *complete revision down*) and each type may be associated with different stock characteristics. The stock-level analysis therefore allows us to gain more insights regarding potential strategic motivations behind restatements.

Following , we consider the following stock characteristics in our analysis. *ME* is the market capitalization at the end of the quarter. *BM* is the firm’s book-to-market ratio. We control for momentum by including *Adj. Past Return*, which is the stock return during the 12 months prior to the quarter-end adjusted by the CRSP value-weighted market return. We adopt a variant of the Amihud (2002) illiquidity measure as a proxy for trading liquidity (*Illiquidity*). We compute this measure as the yearly average of the square root of $|return|/(price \times volume)$, a ratio calculated using daily data from CRSP database. We measure analyst coverage of a firm as the number of analysts issuing at least one forecast or recommendation on the firm during the year in the I/B/E/S database (*Analyst*). We proxy for the probability of financial distress with the distance to default (*DtD*). This measure is motivated by Merton (1974) bond pricing model and estimated for each firm at the end of each year following the procedure outlined in Vassalou and Xing (2004). We create an indicator, *DD*, which equals to one if *DtD* is smaller than 1.64. We measure *Volatility* by the standard deviation of the returns for the past 36 months of stock returns. Finally, we create an indicator *Activism* which equals to one if the same stock holding is included in a 13D filing, which is filed in the same quarter as of original 13F filing.¹⁰ We estimate the following multivariate logistic regression to understand the determinants to different types of amendment holdings:

$$AmendStock_{i,j,t} = (StockChar_{i,j,t} + \alpha_t + \delta_{Ind} + \varepsilon_{i,j,t} > 0), \quad (2)$$

where $AmendStock_{i,j,t}$ is a dummy variable equal to one if stock j is considered as a certain type of

¹⁰We thank Wei Jiang for sharing the data on hedge fund activism, as used in Brave, Jiang, Partnoy, and Thomas (2008) and Bebchuk, Brav, and Jiang (2015).

amendment holding and is included in the institution i 's portfolio at the end of quarter t . Besides the stock characteristics we discussed above, we also include quarterly dummies (α_t) to control for time fixed effects and Fama and French (1997) dummies (δ_{Ind}) to control for industry fixed effects in the regression.

We report results in Table 6. Several interesting patterns surface. First, restatement and confidential holdings generally tend to be smaller stocks covered by fewer analysts, suggesting that hedge funds are more likely to possess private information about them. Second, increased holdings tend to be past winners while decreased holdings tend to be past losers, consistent with the view that funds are trying to trade on momentum strategy quietly to minimize potential price impact. Third, new holdings and complete revision down holdings are less covered by the analysts. Recall that these two types of holdings are associated with stronger abnormal returns during the restatement period, as private signals tend to be more valuable on these “neglected” stocks. Finally, once we separate different types of restated holdings, we find a positive and significant relation between the activism dummy and the new holding, suggesting that activist funds also use restatement filings to build up a large position in the target.

[Insert Table 6 Here]

4 Amendment, Manager Skill and Fund Alpha

So far, we have provided empirical evidence that restatement filings are often used strategically by hedge funds, sometimes as substitutes for confidential filings, to temporarily hide their trading intentions.

Given the use of restatements or confidential filings, the 13F portfolio observed by investors on the original filing date is different from the “true” portfolio that the fund actually holds. A return gap, defined as the return difference between the true and observed portfolio during the subsequent quarter, therefore measures the value-added coming from the amendment filing. In this section, we examine such return gaps, their determinants, and to the extent that a positive return gap indicates managerial skills, we test if it predicts future hedge fund performance.

4.1 Return gap of 13F amendments

We measure return gap to capture fund returns that can be attributed to the differences between the true and observed 13F portfolios due to restatements or confidential filings. Our measure is similar in spirit to the one proposed in [Kacperczyk, Sialm, and Zheng \(2008\)](#), which captures mutual fund returns attributed to intra-quarter trades that occur between adjacent quarterly holdings reports.

For each institution-quarter (i, t) , we calculate *Original Return* as the value-weighted quarterly portfolio return based on the original 13F portfolio holdings at quarter end $t - 1$. We also calculate *True Return* as the value-weighted return based on the true portfolio at quarter end $t - 1$ that incorporates holdings reported in subsequent restatements or confidential filings. We then calculate *Raw Return Gap* as *True Return* minus *Original Return*. Similarly, we define DGTW benchmark-adjusted return gap and four-factor alpha gap measures as the differences in the DGTW-adjusted returns and alphas between the true and original portfolios. Table 7 reports the mean statistics of returns of the true and original portfolios as well as the return gap.

The mean annualized *Raw Return Gap* attributed to restatements alone is 0.75% (Column (2) of Table 7). The mean annualized DGTW-adjusted return gap and four-factor alpha gap, are 0.54% and 0.39%, respectively. Results are qualitatively similar when return gap is attributed to confidential filings alone (Column (3)). Although return gaps are on average positive, they are statistically indifferent from zero. The insignificant mean return gaps across all hedge funds are similar to the results in [Kacperczyk, Sialm, and Zheng \(2008\)](#) and may hide substantial cross-sectional variation, which we are going to examine next.

[Insert Table 7 Here]

4.2 Determinants of positive amendment return gaps

Since positive return gaps are likely indicative of fund manager’s skill, we study fund and stock characteristics that can predict positive return gaps by estimating a logistic regression. In addition to control variables used in Table 6, we also include the following (lagged) variables: *% Rest Stocks* (*% CF Stocks*) is the number of restated (confidential) holdings in restatement (confidential filing) as a percentage of the total portfolio. *% Rest Value* (*% CF Value*) is the market value of restated (confidential) holdings as percentage of the value of the total portfolio. *Avg. Rest*

Position (*Avg. CF Position*) is the average number of shares of restated (confidential) holdings as a percentage of shares outstanding. *Large_Stake* is an indicator which equals to one if at least one restated/confidential holding of which market value is at least 0.5% of the market value of total portfolio. We also include year-quarter fixed effects in the regressions.

Table 8 reports the results of the logistic regressions. Panel A shows that restatements that include at least one large-stake restated holding are likely to be associated with a positive return gap. In addition, there is some evidence that positive return gaps are more likely to be found among funds who frequently filed restatements in the past and funds whose confidential filings have been denied before. The restatements of these funds are more likely to be used for strategic reasons to hide private information that results in the positive return gap.

Panel B shows that confidential filings with illiquid holdings tend to generate a positive return gap, consistent with the notion that such holdings may be subject to higher information asymmetry and hedge funds are more likely to possess private information about them.

[Insert Table 8 Here]

4.3 Amendment return gap and future performance

Amendment return gaps capture the extent of private information hidden by the amendment filings and thus reflect the skills of hedge funds in procuring private information or processing public information. Given that such skills are likely to be persistent over time, the return gaps have the potential to predict future returns of hedge funds.

To examine the predictability of hedge fund performance by past amendment gaps, we first divide our sample of hedge fund into three groups based on the signs of the (lagged) amendment return gap measure, i.e., groups with positive gap, zero gap, and negative gap. The hypothesis is that funds with positive return gaps file amendments (restatement or confidential filings) strategically to hide truly informative trades and thus are more likely to have higher future performance.

Table 9 reports the comparison of hedge fund performance among the three groups. We use both the returns reported to commercial databases (including Eurikahedge, HFR, and TASS) and Fung and Hsieh (2001) eight-factor alphas to measure hedge fund performance. Panel A shows that hedge funds with positive restatement raw return gaps outperform those with negative return gaps

by 16.3 bps per month or 1.96% annually, after adjusting for the [Fung and Hsieh \(2001\)](#) hedge fund risk factors. The performance difference is also statistically significant at the 5% level. The results using DGTW-adjusted return gaps and four-factor alpha gaps are quantitatively and qualitatively similar. Panel B shows similar results for funds with positive and negative confidential filing return gaps, albeit with slightly smaller performance spreads.

The return difference found in Panel A may not always generate a tradeable strategy for investors because the calculation of return gap measures for quarter $t - 1$ requires the knowledge of restatement holdings, which may not always be disclosed by the end of quarter $t - 1$. Therefore, in Panel C, we consider the subsample of funds with standalone restatements that are disclosed within one quarter after the holdings date. Investors can thus calculate return gap measures in quarter $t - 1$ for funds in this sample and make investment decisions by the beginning of quarter $t + 1$. Panel C shows that a long-short strategy that longs positive gap funds and shorts negative gap funds generates a statistically significant return of 17.3 bps per month, or 2.06% annually.

[Insert Table 9 Here]

The above results suggest that positive restatement return gaps potentially capture the skill of hedge funds. To rule out that such findings are driven by other fund or holdings characteristics, we estimate the following multivariate regression,

$$Return_{i,t} = \beta D_Positive_Gap_{i,t-1} + \gamma X_{i,t-1} + \epsilon_{i,t}, \quad (3)$$

where i and t indicate fund and quarter, respectively. $D_Positive_Gap$ is the variable that equals 0.5 for funds with a positive return gap, -0.5 with a negative return gap, and 0 otherwise. X include a number of fund characteristics, such as fund age and size, and fund-level holdings characteristics (equally weighted at the holdings level), such as the average holdings size, book-to-market ratio. We estimate Equation (3) using the Fama-MacBeth approach, to eliminate concerns about time-series correlations of predictors and errors.

Table 10 shows that positive return gaps can predict hedge fund returns consistently, even after controlling for a host of fund and holdings characteristics. For example, the change from negative return gap to positive return gap leads to a 15.4 bps increase in monthly eight-factor hedge fund

alphas, or 1.85% in annual terms. The results are robust to using DGTW-based and four-factor alpha-based return gaps. The results also hold for restatements and confidential filings, suggesting both types of amendment return gaps capture hedge fund skill.

[Insert Table 10 Here]

5 Potential Biases of 13F Holdings Databases

Financial researchers have relied on the Thomson Reuters (TR; previously CDA/Spectrum) 13F databases in numerous studies in the past decades. However, TR does not separate holdings reported in original filings from amendments and only reports one set of holdings for each investment company at each quarter end. Given the wide use of the TR database, two important questions thus arise: 1) Do TR incorporate holdings information from 13 amendments? 2) If that is not always the case, what is the potential bias in using the holdings data in TR?

To answer the first question above, we consider the total number of restated or confidential holdings over our sample period and examine the percentage of these not accurately reported in TR in Panel A of Table 11. We find 46.81% of restated holdings and 95.39% of confidential holdings fail to be accurately incorporated in the TR database. We further break down restated holdings into four subcategories and find revision up, revision down, and new restated holdings have broadly similar percentages missed by TR, ranging from 43.32% to 54.23%. Interestingly, TR only missed 18.67% of complete revision down holdings, possibly because complete liquidations are easier to catch attention.

We further separate amending filings into timely and delayed filings based on whether they are filed within the same quarter as the original 13F filing. Among delayed amendment filings, TR missed 78.13% (97.60%) of restated (confidential) holdings; the corresponding number for timely amendment filings is 26.25% (45.89%). These results suggest that TR tends to incorporate amendments that are filed timely but do not actively revise its database with delayed amendments.

Given the substantial omission of amendment holdings by TR, it would be useful to understand the potential bias caused by using the TR database. We compute the TR bias rate as follows. First, we compute the difference between the number of shares reported by TR and the number reported in

the true 13F portfolio (based on original and amended 13F filings) for each individual stock holding. We then aggregate the values of the difference across holdings within the same portfolio. In the end, we aggregate the value difference across different portfolios within the same calendar quarter and divide it by the aggregate portfolio value in the same calendar quarter. We also calculate the TR error rate in a similar way, using absolute differences throughout the above process. We further break down bias and error rates based on the source of difference in number of shares: restatement or confidential filings.

Panel B of Table 11 reports summary statistics of TR bias rate and TR error rate. The average quarterly TR bias rate is -0.659% over our sample. The contribution to this bias from restated and confidential holdings are -0.321% and -0.338%, respectively. However, there are substantial time-series variation in the bias rate – with the maximum quarterly bias rate equal to -3.987%. The average quarterly TR error rate is 0.883%, with 0.544% and 0.339% contributed by restated and confidential holdings, respectively. As a comforting message to researchers using the TR data, the potential error and bias caused by using TR is not very substantial, at less than 1% per quarter.

[Insert Table 11 Here]

We take a closer look at the time-series variation in the TR error and bias rate in Figure 3. Panel A shows that the TR error and bias rates fluctuate over time and attenuate somewhat after 2011. Panels B and C examine the break-down of error and bias rates into the components due to restated and confidential holdings. We find that the discrepancy between TR and the SEC 13F databases due to confidential holdings has dropped to almost zero since 2011. The sudden decline may be due to the attention brought on confidential filings by [AJTY](#) and [Aragon, Hertz, and Shi \(2013\)](#),¹¹ We note that the error rates due to restated holdings continue to be substantial until around 2016.

[Insert Figure 3 Here]

¹¹The working paper versions of these papers were in circulation for several years before their publication in 2013.

6 Concluding Remarks

13F filing constitutes an important source of information disclosed by investment managers and they are closely watched by corporate executives, institutional investors, regulators and academics alike. Yet such filings often contain errors that are subsequently corrected using restatement filings. In this paper, We conduct the first systematic analysis of such filings, among hedge funds.

Our analysis reveals several important findings. First, restatements are as common as the previous studied confidential filings but affect three times more stocks. Second, many restatements (for both buys and sells) are strategic and the affected holdings are associated with significant abnormal returns. Third, we construct a novel return gap measure to gauge the value-added from restatements and find the gap to predict future fund performance. Finally, we show that commonly-used databases such as Thomson Reuters do not fully adjust for restatements. While the resulting discrepancy is small in aggregate, it can be large for many funds. Our findings suggest that restatements contain useful information that can be better harnessed by future research.

Appendix A: Definitions of Variables

Variable	Definitions
<i>% CF Stocks</i>	Number of confidential holdings in the confidential 13F filing as a percentage of total portfolio.
<i>% CF Value</i>	Market value of confidential holdings in the confidential 13F filing as a percentage of the value of total portfolio.
<i>% Rest Stocks</i>	Number of restated holdings in the restatement 13F filing as a percentage of total portfolio.
<i>% Rest Value</i>	Market value of restated holdings in the restatement 13F filing as a percentage of the value of total portfolio.
<i>Activism</i>	An indicator which equals to one if institution files an 13D filing in the same quarter as of the original 13F filing.
<i>Activism_Stock</i>	An indicator which equals to one if the same stock holding is included in 13D filing, which is filed in the same quarter as of the original 13F filing.
<i>Adj. Past Return</i>	Cumulative stock returns during the 12 months prior to the quarter-end portfolio date adjusted by the CRSP value-weighted market return.
<i>Age</i>	Portfolio age which is calculated as the number of years since the institution's first appearance on Thomson Reuters.
<i>Analyst</i>	Number of I/B/E/S analysts covering the firm during the year.
<i>Avg. CF Position</i>	Average number of shares of confidential holdings as a percentage of shares outstanding.
<i>Avg. Rest Position</i>	Average number of shares of restated holdings as a percentage of shares outstanding.
<i>BM</i>	Book-to-market ratio.
<i>Buy</i>	An indicator which equals to one if investors hold more shares in the subsequent quarter, zero otherwise.
<i> Flow </i>	The absolute change in total portfolio value between two consecutive quarters net of the increase due to returns.
<i>CF_Denial</i>	An indicator which equals to one if at least one of the previously filed confidential 13F filings has been denied by SEC.
<i>DD</i>	An indicator which equals to one if the Merton (1974) distance-to-default measure is smaller than 1.64, and zero otherwise.
<i>Hold</i>	An indicator which equals to one if investors hold the same number of shares in the subsequent quarter, zero otherwise.
<i>Illiquidity</i>	Stock illiquidity which is calculated as the average of the square root of daily $ Return /(Price \times Vol)$.

Appendix A (Cont.)

Variable	Definitions
<i>Large_Stake</i>	An indicator which equals to one if at least one restated/confidential holding of which market value is at least 0.5% of the market value of total portfolio.
<i>Liquidation</i>	An indicator which equals to one if investors liquidates their positions in stock holdings in the subsequent quarter, zero otherwise.
<i>ME</i>	Quarter-end market capitalization of the stock in billions of dollars.
<i>N_Download_Conf</i>	Number of times previously filed confidential 13F filings were downloaded from EDGAR database.
<i>N_Download_Org</i>	Number of times previously filed original 13F filings were downloaded from EDGAR database.
<i>N_Download_Rest</i>	Number of times previously filed restatement 13F filings were downloaded from EDGAR database.
<i>N_PriorConf</i>	Number of confidential 13F filings filed prior to current quarter.
<i>N_PriorRest</i>	Number of restatement 13F filings filed prior to current quarter.
<i>Partially Sell</i>	An indicator which equals to one if investors hold less but non-zero number of shares in the subsequent quarter, zero otherwise.
<i>PortHHI</i>	The Herfindahl index of the portfolio, which is calculated from the market value of each component stock.
<i>PortRet</i>	Monthly average return on the portfolio during the quarter.
<i>PortSize</i>	Total equity portfolio size of an institution which is calculated as the market value of its quarter-end holdings.
<i>PortVol</i>	Monthly portfolio return volatility during the past 12 months ending in current quarter-end.
<i>TR_Bias</i>	Thomson Reuters (TR) bias rate based on the difference between the number of shares reported by TR and the number reported on 13F filing.
<i>TR_Error</i>	Thomson Reuters (TR) error rate based on the absolute difference between the number of shares reported by TR and the number reported on 13F filing.
<i>Turnover</i>	Inter-quarter portfolio turnover rate which is calculated as the lesser of purchases and sales divided by the average portfolio size of the last and current quarters.
<i>Volatility</i>	Monthly stock return volatility which is calculated using the past 36 months' returns.

Appendix B: Restated Holdings of Symphony Asset Management

This table lists the example of common stock restated holdings reported in the 13F amendment filed by Symphony Asset Management for the quarter 1999Q4. “Issuer Name” is the name of the company issuing the common stock. “Portfolio Date” is the quarter-end date from which the portfolio holdings are reported. “Filing Date” is the date when the original 13F filing or the amendment is filed. “Shares” is the number of shares reported on the original 13F filing or the amendment. “Thomson Reuters” is the number of shares reported by Thomson Reuters.

Panel A: Ten Revised Holdings Example

Issuer Name	CUSIP	Portfolio Date	Original Filing		Restatement Filing		Thomson Reuters
			Filing Date	Shares	Filing Date	Shares	
City National Corp.	17856610	12/31/1999	02/14/2000	1,090,100	07/13/2001	1,408,800	1,090,100
Fairchild Semiconductor Intl.	30372610	12/31/1999	02/14/2000	27,600	07/13/2001	293,300	27,600
The Goldman Sachs Group	38141G10	12/31/1999	02/14/2000	85,500	07/13/2001	347,000	85,500
AXA Financial Inc.	00245110	12/31/1999	02/14/2000	907,000	07/13/2001	1,147,800	907,000
3Com Corp.	88553510	12/31/1999	02/14/2000	439,300	07/13/2001	665,500	439,300
Safeway Inc.	78651420	12/31/1999	02/14/2000	722,200	07/13/2001	928,500	722,200
Cadence Design System Inc.	12738710	12/31/1999	02/14/2000	623,900	07/13/2001	829,000	623,900
Limited Inc.	53271610	12/31/1999	02/14/2000	491,600	07/13/2001	689,800	491,600
Amdocs Inc.	G0260210	12/31/1999	02/14/2000	205,400	07/13/2001	384,200	205,400
Broadwing Inc.	11162010	12/31/1999	02/14/2000	887,700	07/13/2001	1,038,800	887,700

Panel B: Ten New Holdings Example

Issuer Name	CUSIP	Portfolio Date	Original Filing		Restatement Filing		Thomson Reuters
			Filing Date	Shares	Filing Date	Shares	
Charter Communication	16117M10	12/31/1999	02/14/2000		07/13/2001	503,400	
Pac-West Telecomm Inc.	69371Y10	12/31/1999	02/14/2000		07/13/2001	351,600	
American National Can Co.	02771410	12/31/1999	02/14/2000		07/13/2001	305,300	
Rudolph Technologies	78127010	12/31/1999	02/14/2000		07/13/2001	246,000	
Agilent Tech Inc.	00846U10	12/31/1999	02/14/2000		07/13/2001	239,000	
Netsilicon Inc.	64115X10	12/31/1999	02/14/2000		07/13/2001	236,200	
Ibasis Inc.	45073210	12/31/1999	02/14/2000		07/13/2001	234,500	
United Parcel Service	91131210	12/31/1999	02/14/2000		07/13/2001	225,600	
Rainmaker Systems Inc.	75057510	12/31/1999	02/14/2000		07/13/2001	194,200	
Sagent Technology Inc.	78669310	12/31/1999	02/14/2000		07/13/2001	189,700	

Panel C: Ten Unchanged Holdings Example

Issuer Name	CUSIP	Portfolio Date	Original Filing		Restatement Filing		Thomson Reuters
			Filing Date	Shares	Filing Date	Shares	
IBP Inc.	44922310	12/31/1999	02/14/2000	338,300	07/13/2001	338,300	338,300
Energy East Corp.	29266M10	12/31/1999	02/14/2000	302,100	07/13/2001	302,100	302,100
USG Corp.	90329340	12/31/1999	02/14/2000	233,200	07/13/2001	233,200	233,200
Valassis Communication	91886610	12/31/1999	02/14/2000	229,700	07/13/2001	229,700	229,700
Dime Bancorp Inc.	25429Q10	12/31/1999	02/14/2000	209,700	07/13/2001	209,700	209,700
Medquist Inc.	58494910	12/31/1999	02/14/2000	177,600	07/13/2001	177,600	177,600
Biogen Inc.	09059710	12/31/1999	02/14/2000	177,300	07/13/2001	177,300	177,300
American Management System Inc.	02735210	12/31/1999	02/14/2000	177,000	07/13/2001	177,000	177,000
Fossil Inc.	34988210	12/31/1999	02/14/2000	174,525	07/13/2001	174,525	174,525
Noble Drilling Corp.	65504210	12/31/1999	02/14/2000	173,800	07/13/2001	173,800	173,800

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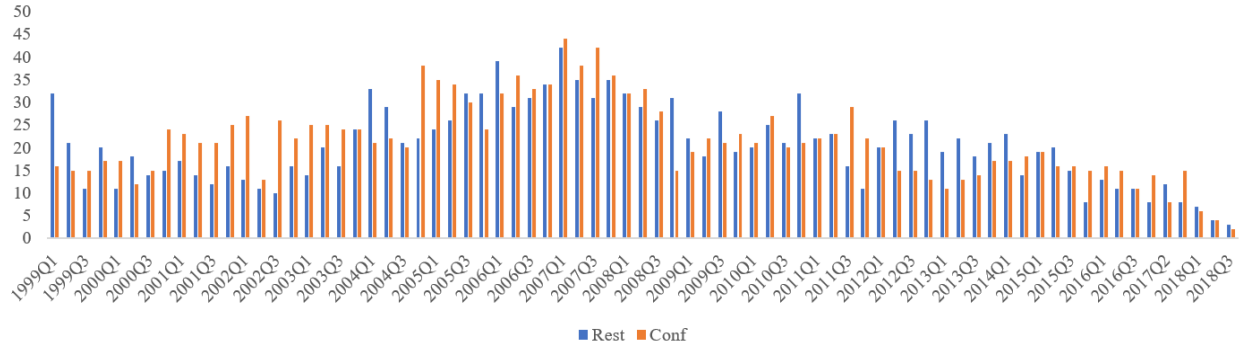
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Figure 1: Time-Series Trend of Restatement and Confidential Filing

Panel A plots the number of institutions filing restatement 13F filings (blue bars) and confidential 13F filings (orange bars) in each calendar quarter from 1999 to 2018. Panel B plots the percentage of institutions filing restatement 13F filings (blue line) and confidential 13F filings (orange line) in each calendar quarter from 1999 to 2018.

Panel A: Number of Institutions Filing Restatement and Confidential Filing



Panel B: Percentage of Institutions Filing Restatement and Confidential Filing

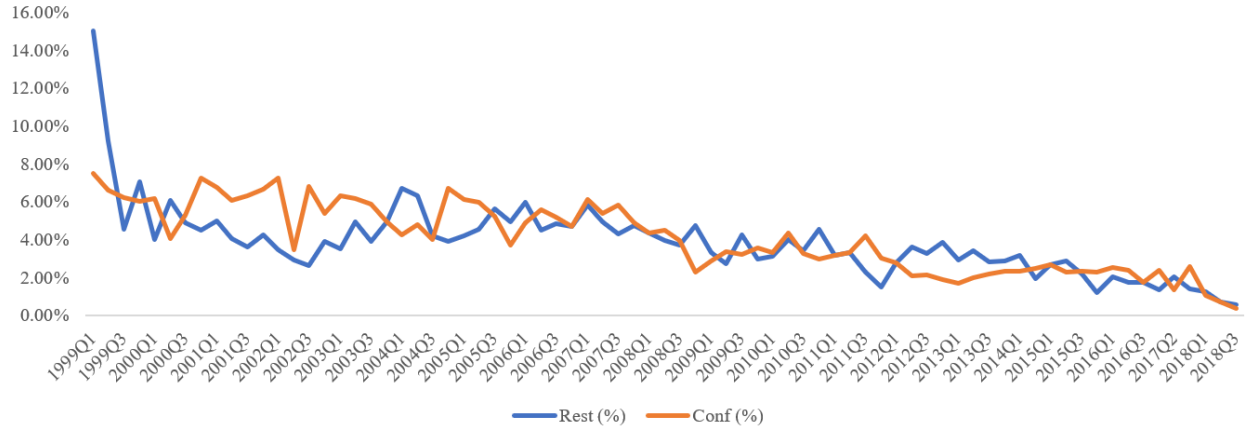
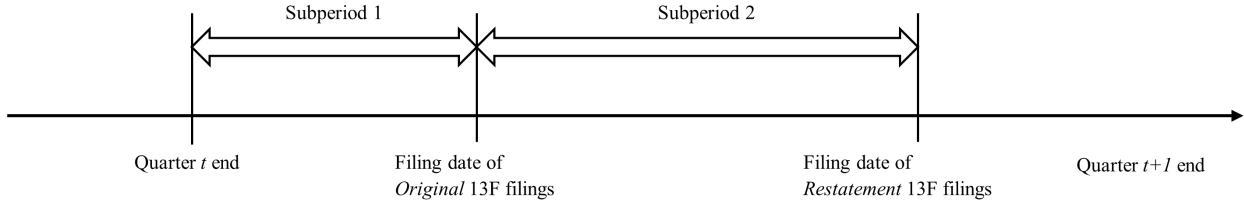


Figure 2: Restatement Period

This figure demonstrates the starting and end dates of the restatement period. The restatement period starts from the current quarter-end to the earlier of two dates: the restatement 13F filing date (Panel A) or the subsequent quarter-end (Panel B). We break down the restatement period into two sub-periods. Sub-period 1 starts from the current quarter-end to the original 13F filing date. And sub-period 2 starts from the original 13F filing date to the end of the restatement period.

Panel A: Restatement 13F Filing is Filed Prior to the Subsequent Quarter-End



Panel B: Restatement 13F Filing is Filed After the Subsequent Quarter-End

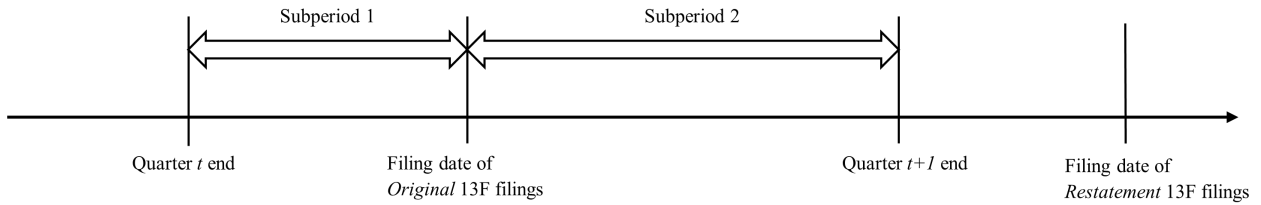
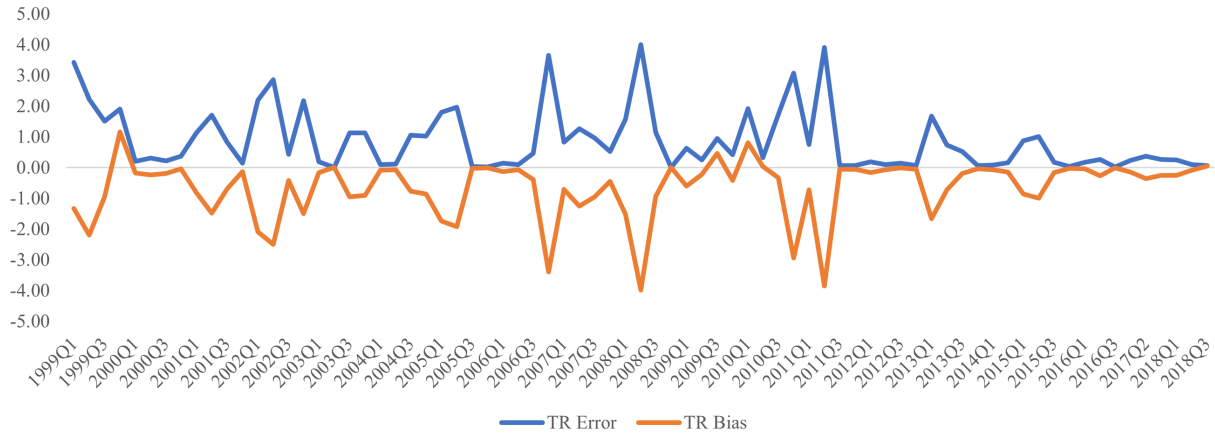


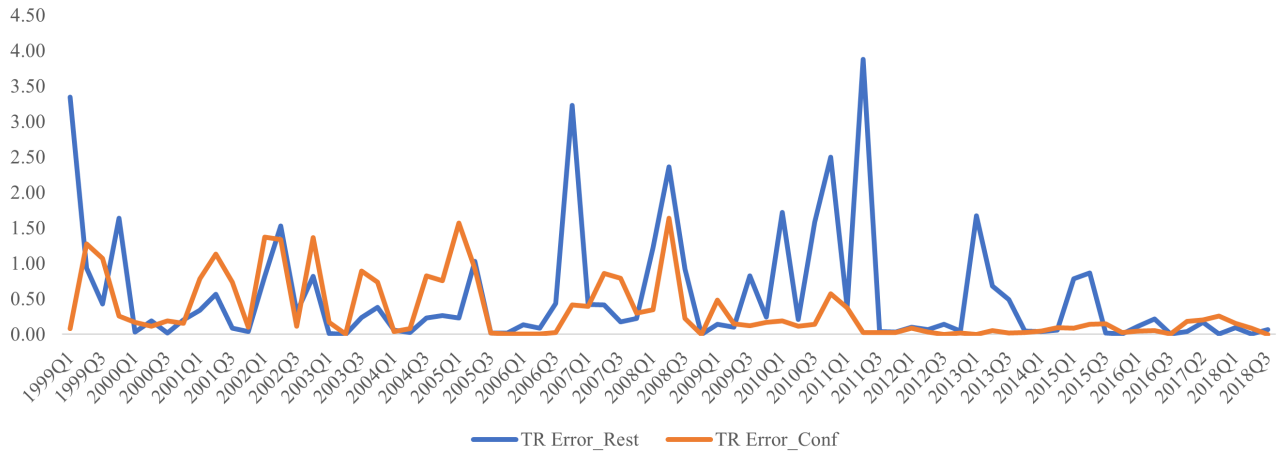
Figure 3: Time-Series Trend of Thomson Reuters (TR) Error Rate and Bias Rate

Panel A plots the Thomson Reuters (TR) error and bias rate in each calendar quarter between 1999 and 2018. Definitions of TR error and bias rate are detailed in Table 10. Panel B (C) plots the TR error (bias) rates caused by restatements and confidential filings, respectively.

Panel A: Thomson Reuters Error and Bias Rate



Panel B: Thomson Reuters Error Rate – Restatement vs. Confidential Filing



Panel C: Thomson Reuters Bias Rate – Restatement vs. Confidential Filing

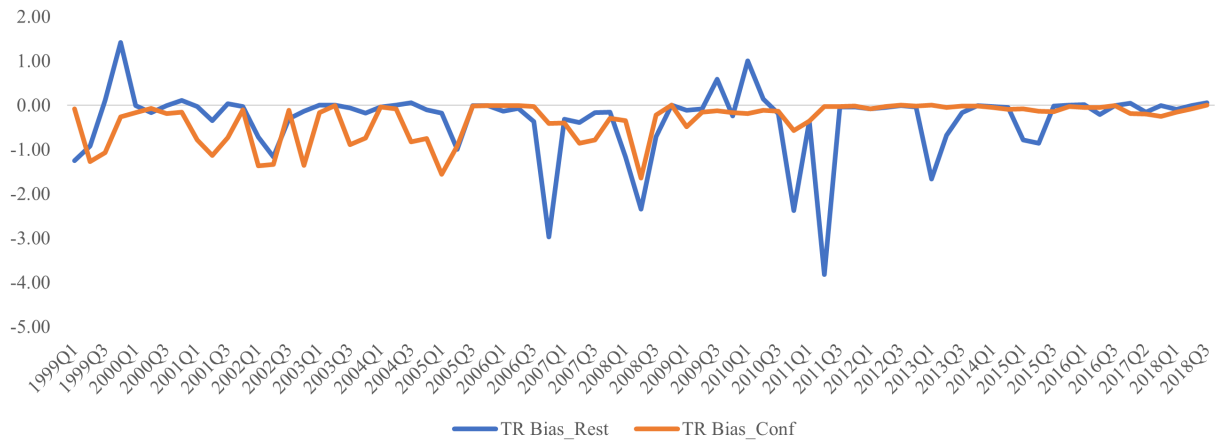


Table 1: Summary Statistics of 13F Original and Amendment Filings

Panel A of this table reports the distribution of the delay (in number of quarters) between the quarter-end portfolio date and the filing date for hedge funds' original, restatement and confidential 13F filings. We categorize restatement filings into two types: *standalone* and *consecutive* restatements. When a single restatement is filed for a specific quarter, then it is classified as standalone restatement. When multiple restatements are filed for consecutive quarters on the same date, then they are classified as consecutive restatements. Panel B reports the distribution of the number of restatement and confidential 13F filings filed by each hedge fund. Panel C reports the summary statistics of the number of stock holdings on original, restatement and confidential 13F filings. We categorize stock holdings on restatement 13F filings (*i.e.*, restated holdings) into four types: *revision up*, *revision down*, *new*, and *complete revision down*. If the same stock holding is reported on the original and restatement 13F filing for the same quarter, then the restated holding is classified as *revision up* (*down*) if the number of the shares is greater (smaller) on the restatement 13F filing than on the original 13F filing. If the stock holding is reported only on the restatement (original) 13F filing, then it is classified as *new* (*complete revision down*). Panel D reports the summary statistics of the market value of holdings on original, restatement and confidential 13F filings. Panel E reports the summary statistics of the dollar stake of restatement and confidential 13F filings. Dollar stake is computed as the market value of amendment filings as percentage of the value of the total portfolio.

Panel A: Delay Period between Quarter-End Date and 13F Amendment Filing Date

Delay (in quarters)	< 1	1	2	3	4-7	8-11	12-15	>15	Total
# Restatement Filings	991	170	77	44	120	46	39	52	1,539
Percent	64.39%	11.05%	5.00%	2.86%	7.86%	2.99%	2.53%	3.38%	100%
# Standalone Restatement	991	113	25	5	33	9	9	2	1,187
Percent	83.49%	9.52%	2.11%	0.42%	2.78%	0.76%	0.76%	0.17%	100%
# Consecutive Restatement	0	57	52	39	87	37	30	50	352
Percent	0.00%	16.19%	14.77%	11.08%	24.72%	10.51%	8.52%	14.20%	100%
# Confidential Filings	242	442	324	185	331	59	22	9	1,614
Percent	14.99%	27.39%	20.07%	11.46%	20.51%	3.66%	1.36%	0.56%	100%

Panel B: Number of Amendment Filings Filed by Each Institution

# Amendment Filings	0	1	2-5	6-10	11-15	16-20	>20	Total
# Restatement Filings	1,100	315	204	29	10	9	6	1,673
Percent	65.75%	18.83%	12.19%	1.73%	0.60%	0.54%	0.36%	100%
# Confidential Filings	1,451	117	58	20	9	2	16	1,673
Percent	65.75%	18.83%	12.19%	1.73%	0.60%	0.54%	0.36%	100%

Panel C: Number of Stock Holdings on 13F Original and Amendment Filings

	N	Mean	SD.	Min.	Q1	Median	Q3	Max.
Original Filings	42,303	115.45	257.49	1	18	42	92	3,571
Restatement Filings	1,539	81.51	279.63	1	2	11	61	3,568
Revision Up	1,539	23.34	118.30	0	0	1	6	2,760
Revision Down	1,539	18.83	95.11	0	0	0	4	2,439
New	1,539	30.64	144.60	0	0	1	11	2,583
Complete Revision Down	1,539	8.70	77.53	0	0	0	1	2,480
Confidential Filings	1,614	20.13	119.31	1	1	2	5	1,346

Panel D: Dollar Value (in \$M) of 13F Original and Amendment Filings

	N	Mean	SD.	Min.	Q1	Median	Q3	Max.
Original Filings	42,303	1,655.0	6,144.6	0.001	111.8	306.0	1,080.9	179,276.5
Restatement Filings	1,539	1,033.6	5,156.8	0.0	8.8	64.6	347.0	75,424.8
Revision Up	1,539	266.7	2,645.6	0.0	0.0	0.0	19.9	75,003.8
Revision Down	1,539	423.2	3,352.0	0.0	0.0	0.0	18.0	62,497.5
New	1,539	259.5	1,288.6	0.0	0.0	2.3	65.3	20,203.0
Complete Revision Down	1,539	84.2	940.6	0.0	0.0	0.0	0.8	27,246.2
Confidential Filings	1,614	219.3	515.2	0.01	18.9	71.7	229.71	7,301.7

Panel E: Dollar Stake of Amendment Filings (in %)

	N	Mean	SD.	Min.	Q1	Median	Q3	Max.
Restatement Filings	1,539	56.45	162.33	0.00	1.71	11.03	54.85	1,523.41
Revision Up	1,539	5.85	13.79	0.00	0.00	0.00	4.00	77.76
Revision Down	1,539	31.74	154.48	0.00	0.00	0.00	2.94	1,229.47
New	1,539	12.27	23.19	0.00	0.00	0.47	12.40	96.57
Complete Revision Down	1,539	6.58	33.77	0.00	0.00	0.00	0.09	293.94
Confidential Filings	1,614	14.57	32.74	0.00	1.08	4.01	15.85	1,004.07

Table 2: Abnormal Returns: Restated Holdings of Hedge Funds

This table reports the annualized Daniel, Grinblatt, Titman, and Wermers (1997, “DGTW” hereafter) benchmark-adjusted returns in Panel A and the annualized Carhart (1997) four-factor model-based abnormal returns in Panel B for both original and restated 13F holdings of hedge funds. Restatement filings are evaluated for their abnormal performance during different periods. In particular, the *Restatement Period* starts from the current quarter-end to the earlier of two dates: the restatement 13F filing date or the end of the subsequent quarter. We then break down the *Restatement Period* into two sub-periods. *Sub-Period 1* starts from the current quarter-end to the original 13F filing date. And *Sub-Period 2* starts from the original 13F filing date to the earlier of two dates: the restatement 13F filing date or the end of the subsequent quarter. We categorize restated holdings into four types: *revision up*, *revision down*, *new*, and *complete revision down*. Definitions about different types of restated holdings are detailed in Table 1. We make some further adjustments to both *new* and *complete revision down* restated holdings by excluding holdings around the Reporting Omission Threshold (i.e., less than 10,000 shares and market value not greater than \$200,000). The paired original holdings are holdings on the original 13F filing filed by the same institutions in the same quarter. They are not restated in the ensuing restatement. Both daily DGTW benchmark-adjusted returns and four-factor model-based abnormal returns are first computed for each holding and then averaged at the portfolio level using value weights of the portfolio. The average daily portfolio return is then multiplied by 252 to yield the annualized portfolio return. We also examine the abnormal performance for different subset of restated holdings, namely, high dollar stake restated holdings and restated holdings on restatement filings with fewer number of restated holdings. To determine high dollar stake restated holding, we first compute the ratio of market value of restated holdings to the value of total portfolio for each restated holding. A restated holding is then considered being high dollar stake if such ratio is greater than and equal to 0.5%. A restatement filing is considered having fewer number of restated holdings if its number of holdings is below the median of distribution. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

Panel A: DGTW Benchmark-Adjusted Annualized Returns

	N	Sub-Period 1	Sub-Period 2	Restatement Period
[1] Original Portfolios	255,275	0.455%	0.644%	0.536%
[2] Restatement Portfolios	125,085	5.890%**	8.329%**	6.186%***
[2.1] Revision Up	35,734	-4.577%	-2.453%	-2.901%
[2.2] Revision Down	28,958	5.115%	13.432%**	6.262%**
[2.3] New	47,080	7.583%**	5.947%**	5.897%**
[2.3.1] New, <i>Not Threshold</i>	36,178	8.914%**	6.480%**	7.633%***
[2.4] Complete Revision Down	13,313	1.608%	1.293%	1.387%
[2.4.1] Complete Revision Down, <i>Not Threshold</i>	8,733	1.378%	2.749%	1.141%
[3] Restatement Portfolios: High Dollar Stake	22,440	3.967%	9.848%**	6.272%***
[3.1] Revision Up	4,512	-1.755%	6.903%	2.377%
[3.2] Revision Down	6,901	4.529%	8.469%**	3.492%
[3.3] New	8,800	7.220%**	12.328%***	8.977%***
[3.3.1] New, <i>Not Threshold</i>	8,615	7.024%*	11.271%**	8.732%***
[3.4] Complete Revision Down	2,227	-2.348%	11.205%**	4.130%*
[3.4.1] Complete Revision Down, <i>Not Threshold</i>	2,166	-2.589%	11.403%**	4.922%*
[4] Restatement Portfolios: Fewer Number of Restated Holdings	2,242	12.074%**	14.881%**	9.838%***
[4.1] Revision Up	502	-16.691%	-5.194%	-14.115%
[4.2] Revision Down	441	16.806%*	49.127%***	17.102%**
[4.3] New	955	12.814%**	19.186%**	15.864%***
[4.3.1] New, <i>Not Threshold</i>	923	15.182%**	21.256%**	18.424%***
[4.4] Complete Revision Down	344	1.999%	-2.260%	-1.424%
[4.4.1] Complete Revision Down, <i>Not Threshold</i>	293	-0.878%	-9.313%	-9.000%

Panel B: Annualized Abnormal Returns based on Carhart (1997) Four-Factor Model

	N	Sub-Period 1	Sub-Period 2	Restatement Period
[1] Original Portfolios	255,275	-6.625%***	-7.674%***	-7.091%***
[2] Restatement Portfolios	125,085	2.052%	3.985%	2.536%
[2.1] Revision Up	35,734	-5.827%*	-8.592%**	-6.635%***
[2.2] Revision Down	28,958	3.372%	23.251%***	5.837%**
[2.3] New	47,080	1.811%	2.686%	1.993%
[2.3.1] New, <i>Not Threshold</i>	36,178	3.509%	4.288%*	4.018%*
[2.4] Complete Revision Down	13,313	0.740%	-0.737%	-0.712%
[2.4.1] Complete Revision Down, <i>Not Threshold</i>	8,733	-0.497%	2.223%	-0.132%
[3] Restatement Portfolios: High Dollar Stake	22,440	2.250%	4.465%*	2.899%
[3.1] Revision Up	4,512	-6.359%*	-4.577%	-6.669%**
[3.2] Revision Down	6,901	3.313%	15.557%**	3.637%
[3.3] New	8,800	5.124%*	5.160%*	5.281%*
[3.3.1] New, <i>Not Threshold</i>	8,615	5.158%**	4.160%*	5.420%**
[3.4] Complete Revision Down	2,227	-0.076%	3.113%	0.633%
[3.4.1] Complete Revision Down, <i>Not Threshold</i>	2,166	-0.303%	3.334%	0.429%
[4] Restatement Portfolios: Fewer Number of Restated Holdings	2,242	4.911%	12.060%**	5.072%***
[4.1] Revision Up	502	-8.075%	-21.617%	-9.008%
[4.2] Revision Down	441	-1.930%	53.246%***	3.1962%
[4.3] New	955	15.948%**	27.601%***	17.775%**
[4.3.1] New, <i>Not Threshold</i>	923	18.206%**	30.958%***	20.595%***
[4.4] Complete Revision Down	344	1.466%	-9.971%	-0.420%
[4.4.1] Complete Revision Down, <i>Not Threshold</i>	293	-1.344%	-8.795%	-4.054%

Table 3: Subsequent Trading Decisions

This table examines the subsequent trading decisions for different types of holdings, namely original, confidential, and restated holdings. We further categorize restated holdings into four types: *revision up*, *revision down*, *new*, and *complete revision down*. Definitions about different types of restated holdings are detailed in Table 1. For each holding, we compare the number of shares institutional investors hold between current quarter and subsequent quarter. If investors hold more shares in the subsequent quarter, the trading decision is deemed as *buy*. If investors hold the same number of shares in the subsequent quarter, the trading decision is deemed as *hold*. If investors hold less but non-zero number of shares in the subsequent quarter, the trading decision is deemed as *partially sell*. If, in the subsequent quarter, investors no longer hold any shares of the holding that they have in the current quarter, then the trading decision is deemed as *liquidation*. In the table, we report the percentage of holdings for different trading decisions. Numbers marked with ***, **, and * indicate the differences in the percentage of holdings are significant between original holdings and restated or confidential holdings at the 1%, 5%, and 10% level.

	<i>N</i>	Buy	Hold	Sell	
				<u>Partially Sell</u>	<u>Liquidation</u>
Original Holdings	310,985	28.94%	8.83%	30.29%	31.93%
Confidential Holdings	29,586	32.02%***	4.18%***	26.88%***	36.92%***
Restated Holdings	102,606	40.69%***	7.96%***	28.33%***	23.03%***
Revision Up	30,711	39.99%***	3.22%***	40.35%***	16.44%***
Revision Down	24,046	50.56%***	8.47%*	25.69%***	15.28%***
New	42,925	28.86%	11.99%***	24.49%***	34.69%***
Complete Revision Down	4,924	41.26%***			

Table 4: Information Events Intensity

This table reports, during different periods, the percentage of original and restated holdings' experiencing information events. We further categorize restated holdings into four types: *revision up*, *revision down*, *new*, and *complete revision down*. Definitions about different types of restated holdings are detailed in Table 1. A stock holding is considered experiencing an information event at date t if there is at least one information event identified from Capital IQ's Key Developments database. After determining if each individual stock holding experiences an information event at date t , we calculate, for each portfolio, the percentage of stock holdings experiencing information event at date t . And then, for each portfolio, we calculate the mean percentage of stock holdings experiencing information event during restatement period. Finally, we take the average of the mean percentage across different portfolios and report the results in the table. Numbers marked with ***, **, and * indicate the differences in the percentage of information events are significant between original holdings and restated or confidential holdings at the 1%, 5%, and 10% level.

	Sub-Period 1	Sub-Period 2	Restatement Period
Original Holdings	0.112	0.017	0.102
Restated Holdings	0.105***	0.047***	0.101**
Revision Up	0.109***	0.046***	0.104**
Revision Down	0.125***	0.063***	0.121***
New	0.091***	0.040***	0.089***
New, <i>Not Threshold</i>	0.093***	0.040***	0.091***
Complete Revision Down	0.097***	0.044***	0.092***
Complete Revision Down, <i>Not Threshold</i>	0.104***	0.045***	0.098***

Table 5: Institutions' Decisions to File Amendment Filings

Panel A summarizes institutions' decisions to file restatement and confidential 13F filings. Panel B reports and compares the fund characteristics for three different cases: (1) institution files neither restatement nor confidential 13F filing (i.e., *No Amendment*), (2) institution files restatement 13F filing only (i.e., *Restatement Only*), and (3) institution files confidential 13F filing only (i.e., *Conf. Filing Only*). *Age* is the number of years since the institution's first appearance on Thomson Reuters. *Portsize* is the total equity portfolio size of an institution calculated as the market value of its quarter-end holdings. *Turnover* is the inter-quarter portfolio turnover rate calculated as the lesser of purchases and sales divided by the average portfolio size of the last and current quarters. *PortHHI* is the Herfindahl index of the portfolio, calculated from the market value of each component stock. *PortRet* is the monthly average return on the portfolio during the quarter, $|Flow|$ is the absolute change in total portfolio value between two consecutive quarters net of the increase due to returns, *PortVol* is the monthly portfolio return volatility during the past 12 months ending in this quarter-end, *N_PriorRest* (*N_PriorConf*) is the number of restatement (confidential) 13F filings filed previously, *N_Download_Org* (*N_Download_Rest*, *N_Download_Conf*) is the number of times previously filed original (restatement, confidential) 13F filings were downloaded from EDGAR database, *CF_Denial* is an indicator which equals to one if at least one of previously filed confidential 13F filings has been denied by SEC, and *Activism* is an indicator which equals to one if institution files an 13D filing in the same quarter as of the original 13F filing. Statistics for different cases are reported separately, and those of *Restatement Only* and *Conf. Filings Only* are compared to statistics of the *No Amendment*. Panel C reports multinomial logistic regressions results on the determinants of institutions' decision to file amendment filings. In the column titled "Coefficient Comparison", we report (1) the difference in coefficient between the "Restatement" and "Conf. Filing" logistic regressions, and (2) χ^2 -statistics (in parentheses). Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

Panel A: Decisions to File Restatements and/or Confidential Filings

	Institution-Quarters	Percent
No Amendment	39,957	94.47%
Restatement Only	1,319	3.12%
Confidential Filing Only	880	2.08%
Both Restatement and Confidential Filing	141	0.33%
Total	42,297	100%

Panel B: Determinants of 13F Amendment Filings

	No Amendment	Restatement Only	Conf. Filing Only
<i>Age</i>	8.849	9.003	9.081
<i>PortSize (in \$Million)</i>	1,574.005	2,063.829***	4,054.071***
<i>Turnover</i>	0.215	0.232***	0.308***
<i>PortHHI</i>	0.092	0.073***	0.123***
<i>PortRet (in %)</i>	0.750	0.739	0.789
$ Flow $	0.204	0.217	0.309***
<i>PortVol</i>	0.056	0.053***	0.056
<i>N_PriorRest</i>	0.787	3.553***	2.001***
<i>N_PriorConf</i>	0.405	0.416	11.280***

Panel B (Cont.)

	No Amendment	Restatement Only	Conf. Filing Only
<i>N_Download_Org</i>	3,333.389	2,139.309	3,079.863
<i>N_Download_Rest</i>	298.531	375.002	1,164.173***
<i>N_Download_Conf</i>	71.362	60.491	2,416.562***
<i>CF_Denial</i>	0.035	0.023	0.446***
<i>Activism</i>	0.019	0.027*	0.067***

Panel C: Determinants of 13F Amendment Filings: A Multinomial Logistic Regression Analysis

Dependent Variable	(1) Restatement	(2) Conf. Filing	Coefficient Comparison
<i>Log(Age)</i>	-0.338*** (-3.52)	-0.691*** (-2.79)	0.35 (1.86)
<i>Log(PortSize)</i>	0.083* (1.85)	0.354*** (4.87)	-0.271*** (10.50)
<i>Turnover</i>	0.450 (1.02)	2.908*** (4.12)	-2.458*** (9.26)
<i>PortHHI</i>	0.029 (0.06)	1.789** (2.37)	-1.760** (3.90)
<i>PortRet</i>	-0.013 (-0.86)	-0.018 (-0.95)	0.005 (0.04)
<i> Flow </i>	0.162* (1.84)	0.193 (1.62)	-0.031 (0.04)
<i>PortVol</i>	0.004 (0.01)	0.599 (0.17)	-0.595 (0.02)
<i>Log(N_PriorRest)</i>	1.395*** (11.94)	-0.153 (-0.76)	1.548*** (49.85)
<i>Log(N_PriorConf)</i>	-0.274* (-1.85)	2.005*** (9.51)	-2.279*** (87.58)
<i>Log(N_Download_Org)</i>	0.057 (0.58)	-0.244** (-2.43)	0.301** (5.16)
<i>Log(N_Download_Rest)</i>	-0.118*** (-3.21)	0.171*** (2.65)	-0.289*** (15.12)
<i>Log(N_Download_Conf)</i>	0.021 (0.46)	-0.019 (-0.24)	0.040 (0.21)
<i>CF_Denial</i>	-0.370 (-1.19)	-0.913** (-2.48)	0.543 (1.55)
<i>Activism</i>	0.263 (0.92)	0.802*** (3.29)	-0.539 (2.28)
<i>Year × Quarter FE</i>		Yes	
<i>Standard Errors Cluster</i>		Institution	
<i>Observations</i>		31,857	
<i>Pseudo R²</i>		0.267	

Table 6: Determinants of 13F Restated and Confidential Holdings

This table reports the results from logistic regressions modeling the determinants of 13F restated and confidential holdings. The dependent variable is an indicator which equals to one if a stock is considered as a certain type of amended holding. The amendment type is indicated by the title of each column. All variables, unless otherwise specified, are calculated at the fiscal year-end before the portfolio dates. *ME* is the quarter-end market capitalization of the stock in billions of dollars. *BM* is the firm's book-to-market ratio. *Adj. Past Return* is the stock return during the 12 months prior to the quarter-end portfolio date adjusted by the CRSP value-weighted market return. *Illiquidity* is computed as the yearly average of the square root of daily $|Return|/(Price \times Vol)$. *Analysts* is the number of I/B/E/S analysts covering the firm during the year. *DD* is an indicator which equals to one if the Merton (1974) distance-to-default measure to be smaller than 1.64. *Volatility* is the stock return volatility using past 36 monthly stock returns. *Activism* is an indicator which equals to one if the same stock holding is included in 13D filing, which is filed in the same quarter as of original 13F filing. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level.

Dependent Variable	(1) Restatement	(2) Revision Up	(3) Revision Down	(4) New Holding	(5) Complete Rev. Down	(6) Conf. Filing
<i>Log(ME)</i>	-0.045*** (-13.28)	0.009 (1.30)	0.076*** (10.18)	-0.164*** (-24.13)	-0.179*** (-18.66)	-0.263*** (-27.84)
<i>Illiquidity</i>	-0.257*** (-6.77)	-1.194*** (-13.13)	-0.190** (-2.35)	-0.565*** (-9.36)	0.286*** (4.72)	-1.198*** (-13.79)
<i>Log(Analysts)</i>	-0.045*** (-5.81)	-0.001 (-0.05)	0.005 (0.33)	-0.077*** (-5.84)	-0.059*** (-2.91)	-0.037** (-2.00)
<i>Volatility</i>	-0.584*** (-7.46)	-1.021*** (-6.85)	-0.694*** (-4.35)	-0.646*** (-4.81)	-0.018 (-0.09)	0.778*** (5.09)
<i>DD</i>	-0.029** (-1.99)	-0.011 (-0.38)	-0.011 (-0.38)	-0.064** (-2.41)	0.016 (0.42)	-0.002 (-0.08)
<i>BM</i>	-0.001 (-0.09)	0.043** (2.56)	0.004 (0.22)	-0.041** (-2.55)	0.033 (1.47)	-0.049** (-2.33)
<i>Adj. Past Return</i>	0.016** (2.24)	0.109*** (7.70)	-0.055*** (-3.66)	0.068*** (5.83)	-0.158*** (-6.80)	0.068*** (5.16)
<i>Activism</i>	0.356 (0.54)			1.154* (1.71)		1.227* (1.84)
<i>Year × Quarter FE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry FE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Standard Errors Cluster</i>	Institution	Institution	Institution	Institution	Institution	Institution
<i>Observations</i>	3,813,533	3,813,533	3,813,533	3,813,533	3,813,533	3,813,533
<i>Pseudo R²</i>	0.053	0.067	0.068	0.081	0.136	0.142

Table 7: Annualized 13F Portfolio Return Gap

This table summarizes the annualized true portfolio returns, original portfolio returns, and the return gaps for institution-quarters where (1) neither restatement nor confidential 13F filing is filed (i.e., *No Amendment*), (2) only restatement 13F filing is filed (i.e., *Restatement Only*), and (3) only confidential filings is filed (i.e., *Conf. Filing Only*). In addition to raw return gap, we also report DGTW benchmark-adjusted return gap and the [Carhart \(1997\)](#) four-factor alpha gap. The significance levels are denoted by ***, **, and * and indicate whether returns are statistically different from zero at 1%, 5%, and 10% levels, respectively.

	No Amendment	Restatement Only	Conf. Filing Only
True Returns	8.91%*** (33.17)	8.56%*** (6.01)	8.73%*** (5.21)
Original Returns		7.82%*** (5.59)	8.62%*** (4.54)
Raw Return Gap		0.75% (1.48)	0.11% (0.10)
DGTW Benchmark-Adjusted Return Gap		0.54% (1.37)	0.18% (0.17)
Four-Factor Alpha Gap		0.39% (0.84)	0.90% (0.94)

Table 8: Determinants of Positive Return Gap

This table estimates the determinants of positive return gap using the logistic model. The sample includes institution-quarters where only restatement (confidential) 13F filing is filed in Panel A (B). *% Rest Stocks* (*% CF Stocks*) is the number of restated (confidential) holdings in the restatement (confidential) 13F filing as a percentage of the total portfolio. *% Rest Value* (*% CF Value*) is the market value of restated (confidential) holdings as percentage of the value of the total portfolio. *Avg. Rest Position* (*Avg. CF Position*) is the average number of shares of restated (confidential) holdings as a percentage of shares outstanding. *Large_Stake* is an indicator which equals to one if at least one restated/confidential holding of which market value is at least 0.5% of the market value of total portfolio. Fund characteristics are as defined in Table 4. Stock characteristics are as defined in Table 5. All standard errors adjust for heteroskedasticity and cluster at the institution level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

Panel A: Return Gap Due to Restatements

	(1) Positive Raw Gap	(2) Positive DGTW Gap	(3) Positive Alpha Gap
Restatement Filing Characteristics			
<i>% Rest. Stocks</i>	-0.050 (-0.25)	-0.190 (-0.88)	-0.262 (-1.23)
<i>% Rest. Value</i>	-0.005 (-0.84)	0.002 (0.27)	0.001 (0.12)
<i>Avg. Rest Position</i>	0.019 (0.60)	0.015 (0.44)	-0.004 (-0.12)
<i>Large_Stake</i>	0.478* (1.79)	0.601** (2.41)	0.500** (2.04)
Fund Characteristics			
<i>Log(Age)</i>	0.004 (0.04)	-0.001 (-0.01)	0.016 (0.15)
<i>Log(PortSize)</i>	-0.079 (-1.61)	-0.075 (-1.52)	-0.043 (-0.94)
<i>Turnover</i>	0.610 (1.59)	0.670 (1.60)	-0.083 (-0.22)
<i>PortHHI</i>	-0.839 (-1.09)	0.230 (0.31)	-0.066 (-0.08)
<i> Flow </i>	-0.135 (-0.82)	-0.031 (-0.21)	-0.030 (-0.19)
<i>Log(N_PriorRest)</i>	0.115* (1.79)	-0.019 (-0.25)	0.116* (1.85)
<i>CF_Denial</i>	0.860** (2.21)	1.448** (2.08)	0.402 (0.97)
Stock Characteristics			
<i>Log(ME)</i>	0.028 (0.26)	0.033 (0.29)	-0.076 (-0.69)
<i>Log(BM)</i>	-0.077 (-0.13)	-0.035 (-0.06)	0.032 (0.05)
<i>Illiquidity</i>	1.133 (0.72)	-1.151 (-0.74)	3.014 (1.42)
<i>Log(Analyst)</i>	0.012 (0.03)	-0.160 (-0.42)	0.598 (1.52)
<i>Volatility</i>	-0.946 (-0.44)	-5.465** (-2.35)	-0.080 (-0.04)
<i>Year × Quarter FE</i>	Yes	Yes	Yes
<i>Standard Errors Cluster</i>	Institution	Institution	Institution
<i>Observations</i>	1,065	1,065	1,065
<i>Pseudo R²</i>	0.056	0.075	0.051

Panel B: Return Gap Due to Confidential Filings

	(1) Positive Raw Gap	(2) Positive DGTW Gap	(3) Positive Alpha Gap
Confidential Filing Characteristics			
<i>% CF Stocks</i>	-0.779 (-1.15)	0.178 (0.27)	-0.503 (-0.83)
<i>% CF Value</i>	0.621 (0.95)	-0.4112 (-0.70)	0.190 (0.27)
<i>Avg. CF Position</i>	-0.050 (-1.04)	-0.080* (-1.69)	-0.063 (-1.49)
<i>Large_Stake</i>	0.049 (0.11)	0.517 (1.47)	0.037 (0.10)
Fund Characteristics			
<i>Log(Age)</i>	-0.050 (-0.31)	-0.052 (-0.38)	-0.309** (-2.03)
<i>Log(PortSize)</i>	0.095 (1.10)	0.029 (0.36)	-0.089 (-1.05)
<i>Turnover</i>	-0.053 (-0.08)	0.693 (1.09)	-0.134 (-0.22)
<i>PortHHI</i>	0.984 (1.12)	0.718 (0.83)	-1.061 (-1.33)
<i> Flow </i>	0.204 (1.20)	0.016 (0.12)	0.068 (0.40)
<i>Log(N_PriorCF)</i>	-0.039 (-0.43)	-0.098 (-0.97)	0.159* (1.95)
<i>CF_Denial</i>	0.085 (0.38)	0.149 (0.57)	-0.032 (-0.15)
Stock Characteristics			
<i>Log(ME)</i>	-0.032 (-0.23)	-0.075 (-0.51)	0.143 (0.96)
<i>Log(BM)</i>	0.332 (0.39)	-0.221 (-0.29)	-1.132 (-1.37)
<i>Illiquidity</i>	4.563** (1.99)	4.227** (2.24)	4.360* (1.82)
<i>Log(Analyst)</i>	0.477 (0.97)	0.563 (1.39)	0.002 (0.00)
<i>Volatility</i>	-7.549** (-1.97)	-1.183 (-0.36)	-3.692 (-1.27)
<i>Year × Quarter FE</i>	Yes	Yes	Yes
<i>Standard Errors Cluster</i>	Institution	Institution	Institution
<i>Observations</i>	738	723	745
<i>Pseudo R²</i>	0.129	0.110	0.107

Table 9: Hedge Fund Reported Returns based on Return Gap: A Portfolio Analysis

This table reports the mean monthly reported returns and the corresponding t -statistics (in parentheses) for three groups of hedge funds sorted according to the sign of lagged one-quarter return gap. The return gap is lagged for one quarter to account for the delay in reporting the holdings. The return gap is defined as the difference between the true portfolio return and the original portfolio return. We use the raw return, DGTW benchmark-adjusted return and the four-factor alpha of [Carhart \(1997\)](#) to measure portfolio performance. This table also reports the differences in reported returns between hedge funds with positive return gap and hedge funds with negative return gap. The difference in the raw reported returns is further adjusted using the eight hedge fund risk factors of [Fung and Hsieh \(2001\)](#). The significance levels are denoted by ***, **, and * and indicate whether the results are statistically different from zero at the 1%, 5%, and 10% significance levels.

Gap	Raw Return Gap		DGTW-Adjusted Return Gap		Four-Factor Alpha Gap	
	# HFs/month	Reported Return	# HFs/month	Reported Return	# HFs/month	Reported Return
Panel A: Return Gap Due to Restatement Only						
[1] Positive Gap	6.54	0.739%*** (5.03)	6.46	0.736%*** (5.02)	6.70	0.737%*** (5.03)
[2] Zero Gap	103.25	0.685%*** (3.63)	103.48	0.645%*** (3.85)	103.25	0.683%*** (3.62)
[3] Negative Gap	5.68	0.610%*** (4.39)	5.61	0.613%*** (4.42)	5.52	0.606%*** (4.38)
[1]–[3]: Raw Returns		0.126%* (1.78)		0.122%* (1.73)		0.131%* (1.85)
[1]–[3]: HF Eight-Factor Alpha		0.163%** (2.16)		0.159%** (2.11)		0.168%** (2.23)
Panel B: Return Gap Due to Confidential Filing Only						
[1] Positive Gap	4.68	0.744%*** (5.08)	4.54	0.739%*** (5.04)	4.53	0.741%*** (5.05)
[2] Zero Gap	104.21	0.683%*** (3.62)	104.41	0.645%*** (3.85)	104.22	0.684%*** (3.62)
[3] Negative Gap	4.80	0.623%*** (4.41)	4.64	0.632%*** (4.47)	5.52	0.606%*** (4.43)
[1]–[3]: Raw Returns		0.121%* (1.81)		0.107% (1.60)		0.115%* (1.73)
[1]–[3]: HF Eight-Factor Alpha		0.146%** (2.07)		0.131%* (1.83)		0.140%** (1.97)

Table 8 (Cont.)

Gap	Raw Return Gap		DGTW-Adjusted Return Gap		Four-Factor Alpha Gap	
	<u># HFs/month</u>	<u>Reported Return</u>	<u># HFs/month</u>	<u>Reported Return</u>	<u># HFs/month</u>	<u>Reported Return</u>
Panel C: Return Gap Due to Standalone (Tradeable) Restatement Only						
[1] Positive Gap	6.13	0.740%*** (5.04)	5.10	0.737%*** (5.01)	5.19	0.739%*** (5.02)
[2] Zero Gap	104.23	0.686%*** (3.64)	104.43	0.646%*** (3.86)	104.22	0.684%*** (3.62)
[3] Negative Gap	5.41	0.606%*** (4.33)	5.32	0.613%*** (4.37)	5.26	0.605%*** (4.33)
[1]-[3]: Raw Returns		0.134%* (1.87)		0.124%* (1.73)		0.134%* (1.87)
[1]-[3]: HF Eight-Factor Alpha		0.172%** (2.26)		0.163%** (2.14)		0.172%** (2.27)

Table 10: Hedge Fund Reported Returns based on Return Gap: A Fama-MacBeth Regression Analysis

This table reports the results of Fama-MacBeth cross-sectional regression of monthly reported returns on various fund and stock characteristics. The dependent variable is either raw reported returns (*Raw*) or excess reported returns based on Fung and Hsieh (2001) eight hedge fund risk factors (*Alpha*). The variable of interest is *D_Positive_Gap*, an indicator which equals to one if the lagged one-quarter return gap is positive. Other fund (stock) characteristics are as defined in Table 4 (5). Reported coefficients and adjusted R^2 are the average values of monthly cross-sectional regressions. Fama-MacBeth *t*-statistics are reported in parentheses. The significance levels are denoted by ***, **, and * and indicate whether the results are statistically different from zero at the 1%, 5%, and 10% significance levels.

Panel A: Return Gap Due to Restatement Only

Gap Dependent Variable	(1) Raw Return Gap		(2) DGTW-based Return Gap		(3) Alpha Return Gap	
	Raw	Alpha	Raw	Alpha	Raw	Alpha
<i>D_Positive_Gap</i>	0.128* (1.74)	0.154* (1.95)	0.126* (1.72)	0.153* (1.93)	0.137* (1.88)	0.158** (2.05)
Fund Characteristics						
<i>Log(Age)</i>	-0.084* (-1.79)	0.079 (1.64)	-0.083* (-1.77)	0.080 (1.65)	-0.082* (-1.76)	0.081* (1.68)
<i>Log(PortSize)</i>	0.046* (1.85)	-0.027 (-0.91)	0.046* (1.87)	-0.024 (-0.82)	0.045* (1.83)	-0.026 (-0.89)
<i>Turnover</i>	-0.871** (-2.51)	0.068 (0.21)	-0.873** (-2.52)	0.066 (0.21)	-0.879** (-2.54)	0.070 (0.22)
<i>PortHHI</i>	-0.526 (-1.29)	-0.169 (-0.39)	-0.513 (-1.26)	-0.154 (-0.35)	-0.51 (-1.25)	-0.136 (-0.32)
<i> Flow </i>	-0.003 (-0.02)	-0.082 (-0.47)	0.003 (0.02)	-0.078 (-0.44)	0.004 (0.03)	-0.083 (-0.47)
Stock Characteristics						
<i>Log(ME)</i>	-0.118* (-1.84)	-0.05 (-0.66)	-0.115* (-1.80)	-0.05 (-0.66)	-0.118* (-1.84)	-0.049 (-0.66)
<i>Log(BM)</i>	-0.367 (-1.12)	-1.124*** (-2.64)	-0.367 (-1.12)	-1.129*** (-2.65)	-0.364 (-1.11)	-1.120*** (-2.63)
<i>Adj. Past Return</i>	-0.001 (-0.31)	-0.002 (-0.93)	-0.001 (-0.32)	-0.002 (-0.92)	-0.001 (-0.29)	-0.002 (-0.91)
<i>Illiquidity</i>	0.658 (0.59)	0.374 (0.33)	0.653 (0.59)	0.404 (0.36)	0.673 (0.61)	0.407 (0.36)
<i>Log(Analyst)</i>	0.035 (0.17)	-0.112 (-0.47)	0.033 (0.16)	-0.112 (-0.47)	0.041 (0.20)	-0.115 (-0.49)
<i>Volatility</i>	0.007 (0.01)	-1.802 (-0.79)	0.061 (0.03)	-1.834 (-0.80)	0.042 (0.02)	-1.857 (-0.81)
<i>Observations</i>	23,140	21,432	23,140	21,432	23,140	21,432
<i>Mean R²</i>	0.095	0.074	0.095	0.074	0.095	0.073

Panel B: Return Gap Due to Confidential Filing

Gap Dependent Variable	(1) Raw Return Gap		(2) DGTW-based Return Gap		(3) Alpha Return Gap	
	Raw	Alpha	Raw	Alpha	Raw	Alpha
<i>D_Positive_Gap</i>	0.142* (1.91)	0.148* (1.91)	0.134* (1.79)	0.142* (1.79)	0.132* (1.79)	0.150* (1.94)
Fund Characteristics						
<i>Log(Age)</i>	-0.071 (-1.57)	0.085* (1.82)	-0.07 (-1.55)	0.083* (1.79)	-0.069 (-1.52)	0.086* (1.84)
<i>Log(PortSize)</i>	0.043 (1.63)	-0.034 (-1.16)	0.043 (1.63)	-0.033 (-1.13)	0.043 (1.64)	-0.034 (-1.14)
<i>Turnover</i>	-0.790** (-2.43)	0.058 (0.18)	-0.786** (-2.42)	0.056 (0.18)	-0.778** (-2.39)	0.077 (0.25)
<i>PortHHI</i>	-0.398 (-1.01)	-0.152 (-0.35)	-0.382 (-0.98)	-0.141 (-0.32)	-0.388 (-1.00)	-0.146 (-0.33)
<i> Flow </i>	0.019 (0.13)	-0.03 (-0.18)	0.024 (0.17)	-0.025 (-0.15)	0.022 (0.15)	-0.03 (-0.18)
Stock Characteristics						
<i>Log(ME)</i>	-0.118* (-1.82)	-0.039 (-0.49)	-0.117* (-1.82)	-0.04 (-0.51)	-0.118* (-1.84)	-0.039 (-0.50)
<i>Log(BM)</i>	-0.440 (-1.32)	-1.074** (-2.50)	-0.440 (-1.32)	-1.076** (-2.51)	-0.440 (-1.32)	-1.070** (-2.50)
<i>Adj. Past Return</i>	-0.001 (-0.20)	-0.003 (-1.00)	-0.001 (-0.21)	-0.003 (-0.99)	-0.001 (-0.18)	-0.003 (-0.99)
<i>Iliquidity</i>	0.320 (0.26)	0.142 (0.13)	0.296 (0.25)	0.078 (0.07)	0.301 (0.25)	0.035 (0.03)
<i>Log(Analyst)</i>	0.016 (0.07)	-0.110 (-0.45)	0.018 (0.08)	-0.107 (-0.43)	0.021 (0.10)	-0.110 (-0.45)
<i>Volatility</i>	-0.546 (-0.24)	-1.680 (-0.75)	-0.526 (-0.23)	-1.649 (-0.74)	-0.525 (-0.23)	-1.640 (-0.74)
<i>Observations</i>	22,700	21,016	22,700	21,016	22,700	21,016
<i>Mean R²</i>	0.094	0.071	0.095	0.072	0.094	0.071

Panel C: Return Gap Due to Standalone (Tradeable) Restatement

Gap Dependent Variable	(1) Raw Return Gap		(2) DGTW-based Return Gap		(3) Alpha Return Gap	
	Raw	Alpha	Raw	Alpha	Raw	Alpha
<i>D_Positive_Gap</i>	0.138* (1.87)	0.149* (1.88)	0.133* (1.80)	0.150* (1.88)	0.143* (1.95)	0.156** (2.01)
Fund Characteristics						
<i>Log(Age)</i>	-0.090* (-1.93)	0.079 (1.62)	-0.089* (-1.91)	0.079 (1.63)	-0.089* (-1.92)	0.079 (1.63)
<i>Log(PortSize)</i>	0.041* (1.69)	-0.029 (-0.98)	0.041* (1.69)	-0.027 (-0.92)	0.041* (1.68)	-0.029 (-0.96)
<i>Turnover</i>	-0.928*** (-2.70)	0.042 (-0.13)	-0.931*** (-2.71)	0.038 (-0.12)	-0.930*** (-2.70)	0.048 (0.15)
<i>PortHHI</i>	-0.535 (-1.29)	-0.229 (-0.52)	-0.523 (-1.26)	-0.208 (-0.47)	-0.516 (-1.25)	-0.190 (-0.43)
<i> Flow </i>	-0.005 (-0.03)	-0.080 (-0.45)	-0.001 (-0.01)	-0.078 (-0.44)	-0.003 (-0.02)	-0.083 (-0.47)
Stock Characteristics						
<i>Log(ME)</i>	-0.107* (-1.67)	-0.043 (-0.56)	-0.105 (-1.64)	-0.042 (-0.56)	-0.106* (-1.67)	-0.041 (-0.54)
<i>Log(BM)</i>	-0.367 (-1.11)	-1.089** (-2.57)	-0.370 (-1.11)	-1.089** (-2.57)	-0.364 (-1.10)	-1.081** (-2.55)
<i>Adj. Past Return</i>	-0.001 (-0.27)	-0.002 (-0.93)	-0.001 (-0.28)	-0.002 (-0.92)	-0.001 (-0.27)	-0.002 (-0.92)
<i>Illiquidity</i>	0.630 (0.57)	0.374 (0.33)	0.624 (0.56)	0.397 (0.36)	0.642 (0.58)	0.405 (0.36)
<i>Log(Analyst)</i>	0.014 (0.07)	-0.126 (-0.53)	0.013 (0.06)	-0.127 (-0.54)	0.020 (0.09)	-0.129 (-0.55)
<i>Volatility</i>	0.076 (0.03)	-1.737 (-0.76)	0.114 (0.05)	-1.790 (-0.78)	0.108 (0.05)	-1.799 (-0.79)
<i>Observations</i>	22,937	21,270	22,937	21,270	22,937	21,270
<i>Mean R²</i>	0.094	0.073	0.094	0.073	0.094	0.073

Table 11: Does Thomson Reuters do the right thing?

This tables reports results about the discrepancy in the number of shares between Thomson Reuters (TR) data and 13F filing data. In Panel A, for each type of amended holdings, we reported the percentage of holdings of which the number of shares reported by TR is different from the 13F filing. In this panel, we differentiate holdings on *timely* amendment filings from ones on *delayed* amendment filings. An amendment is considered *timely* if it is filed in the same quarter as of the original 13F filing, otherwise it is considered *delayed*. Panel B reports summary statistics of TR bias rate (i.e., TR_Bias) and TR error rate (i.e., TR_Error). TR_Bias (TR_Error) is computed as following: first, we compute the (absolute) difference between the number of shares reported by TR and the number reported on 13F filing for each individual stock holding. And then, we aggregate the (absolute) difference across holdings within the same portfolio. In the end, we aggregate the (absolute) difference in number of shares across different portfolios within the same calendar quarter and divide it by the aggregate portfolio value in the same calendar quarter. We further break down bias and error rates based on the source of difference in number of shares: restatement or confidential filings.

Panel A: Discrepancy in reported number of shares

	Confidential Holdings	Restated Holdings	Revision Up	Revision Down	New	Complete Revision Down
[1] Amended Holdings on All Amendment Filings						
# Holdings	32,475	117,642	32,194	28,066	44,055	13,327
# Holdings which TR reports a different number of shares	30,978	55,064	16,525	12,158	23,893	2,488
(Percentage)	(95.39%)	(46.81%)	(51.33%)	(43.32%)	(54.23%)	(18.67%)
[2] Amended Holdings on <i>Delayed</i> Amendment Filings						
# Holdings	31,089	46,622	17,939	8,080	17,603	3,000
# Holdings which TR reports a different number of shares	30,342	36,424	12,933	6,398	15,111	1,982
(Percentage)	(97.60%)	(78.13%)	(72.09%)	(79.18%)	(85.84%)	(66.07%)
[3] Amended Holdings on <i>Timely</i> Amendment Filings						
# Holdings	1,386	71,020	14,255	19,986	26,452	10,327
# Holdings which TR reports a different number of shares	636	18,640	3,592	5,760	8,782	506
(Percentage)	(45.89%)	(26.25%)	(25.20%)	(28.82%)	(33.20%)	(4.90%)

Panel B: TR Bias Rate and Error Rate

	<i>N</i>	Mean	SD	Min	Q1	Median	Q3	Max
<i>TR_Bias</i>	75	-0.659%	0.957%	-3.987%	-0.952%	-0.259%	-0.072%	1.157%
<i>TR_Bias_Rest</i>	75	-0.321%	0.764%	-3.822%	-0.345%	-0.079%	-0.006%	1.417%
<i>TR_Bias_Conf</i>	75	-0.338%	0.435%	-1.639%	-0.482%	-0.148%	-0.029%	0.000%
<i>TR_Error</i>	75	0.883%	1.007%	0.001%	0.139%	0.428%	1.270%	4.003%
<i>TR_Error_Rest</i>	75	0.544%	0.824%	0.000%	0.043%	0.210%	0.786%	3.881%
<i>TR_Error_Conf</i>	75	0.339%	0.435%	0.000%	0.029%	0.148%	0.482%	1.640%