Do Hedge Funds Strategically Misreport Their Holdings?

Evidence from 13F Restatements [*]

Sean Cao[†]   Zhi Da[‡]   Xin Daniel Jiang[§]   Baozhong Yang[¶]

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ABSTRACT

Hedge funds can subsequently amend their originally reported 13F quarterly holdings using restatements. We conduct the first systematic analysis of such filings, which are as common as confidential filings (used by funds to delay holding disclosures) but affect four times as many stocks. Restated holdings are associated with significant abnormal returns, suggesting that some original holdings are strategically misreported to hide funds' trading intentions, and later, restatements are filed to encourage copycat trading. We construct a restatement return gap measure to gauge the value added by such restatements and find it to predict future fund performance in real time.

JEL Classification: G10, G19

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

[†]Robert H. Smith School of Business, University of Maryland. Email: scao824@umd.edu

[‡]Mendoza College of Business, University of Notre Dame. Email: zda@nd.edu

[§]School of Accounting and Finance, University of Waterloo. Email: daniel.jiang@uwaterloo.ca

[¶]J. Mack Robinson College of Business, Georgia State University. Email: bzyang@gsu.edu

1   Introduction

On July 10, 2020, the Securities and Exchange Commission (SEC) proposed a significant change to the reporting threshold for Form 13F, raising it from \$100 million to \$3.5 billion.[1] Originally implemented in 1975, Form 13F required investment managers with more than \$100 million under investment to report their equity holdings quarterly. Over the subsequent 45 years, the number of 13F filers increased dramatically. However, with the exponential growth in reporting volume, systematic checks for accuracy were absent, and no fines were imposed for erroneous data.[2] Despite the proposed increase in the reporting threshold, the plan faced strong opposition from CEOs, investment managers, major stock exchanges, institutional investors, and academics. Consequently, it was ultimately abandoned, indicating the perceived value of 13F holdings reporting within the investment community.[3] This pushback also underscores the importance attached to 13F filings, despite potential reporting errors.

The disclosure of 13F holdings is valuable to various market participants. Company executives, for example, seek timely information about their shareholders, particularly to detect share accumulation by activist investors. Fund managers also benefit from the availability of holdings data, as it enables them to engage in front-running and copycat strategies (Cao, Du, Yang, and Zhang, 2021). Consequently, fund managers often request SEC permission to delay the disclosure of "confidential holdings", which have been found to be highly informative (Agarwal, Jiang, Tang, and Yang, 2013, "AJTY" hereafter; Aragon, Hertzel, and Shi, 2013).

In addition to confidential filings, managers can submit 13F restatements to correct prior reporting errors. Our study focuses on hedge fund companies, as they are arguably the most informative and have greater incentives to avoid disclosure. In our sample of 1,673 hedge fund companies, restatements are just as prevalent as confidential filings, accounting for 3.39% and 3.55% of 13F filings, respectively. Surprisingly, the use of restatements by hedge fund companies has not been

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

[2]For 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." Source: Review of the SEC's Section 13(f) Reporting Requirements, 2010, SEC Office of Inspector General. Available at https://www.sec.gov/files/480.pdf.

[3]Source: "Hedge Funds' SEC Reporting Loss Is Actually a Win," by Aaron Brown, October 29, 2020, *Bloomberg.*

thoroughly examined, and our paper aims to address this gap.

Although the SEC allows investment companies to file restatements to correct honest mistakes in previous 13F filings, in practice, hedge fund managers may also exploit restatements to rectify intentionally misreported holdings. For instance, a fund manager might initiate trading based on a short-lived private signal before the quarter-end. Consequently, on the subsequent original filing date (within 45 days after the previous quarter's end), the manager may not have completed their trades, leading to a misreporting of their previous quarter-end holdings to conceal their trading intention. Subsequently, when the private signal becomes public, the manager files a restatement to correct the initial misreporting. Furthermore, the manager could even use the restatement to encourage copycat trading, which facilitates price convergence. Given the lack of systematic checks by the SEC regarding the accuracy of 13F filings, managers may perceive misreporting during the period between the original filing date and the restatement date as a relatively low-cost strategy.[4]

To examine restatements driven more by strategic considerations than honest mistakes, we exclude restatements filed only one day after the original filing and those filed to correct technical errors (i.e., *technical* restatements). We also exclude filings with a large number of holdings and filed by hedge fund companies managing a significant number of funds (i.e., *non-suspect* restatements), as the likelihood of honest mistakes increases in such cases. Our analysis focuses on the remaining 921 restatements (i.e., *suspect* restatements).

Under the null hypothesis that restatements are solely used to correct honest mistakes, we would not expect holdings affected by restatements to be associated with abnormal returns. However, our analysis reveals the opposite. For example, we find that new holdings disclosed in suspect restatements exhibit annualized abnormal returns of 12.985% during the restatement period, extending from the end of the previous quarter to the restatement date or the end of the current quarter, whichever is earlier.[5] The magnitude of the abnormal returns for suspect restatements is comparable to that of confidential holdings, suggesting that some hedge fund managers may

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[4]It is worth noting that penalties for violation of 13F filing rules are rather rare, with only one well-known case resulting in a penalty of $100,000 for failing to file the 13F form for an extended period (Quattro Global Capital, LLC). No penalties specifically related to restatements have been identified. However, the absence of realized penalties does not imply a lack of cost associated with the strategic use of restatements, as the SEC has the potential to allocate additional resources to monitor 13F filings and initiate retrospective enforcement actions (Fang, Li, Wang, and Zhang, 2022).

[5]In contrast, technical restatements and non-suspect restatements show no significant abnormal returns during the restatement periods.

strategically use restatements as an alternative. Notably, unlike confidential filings, restatements do not require prior SEC approval, potentially providing fund managers with greater flexibility.

Another notable distinction between restatements and confidential filings is that restatements can also serve to conceal reduced holdings. In such scenarios, a manager may overstate holdings in the original 13F filing and subsequently reveal smaller holdings (a revision down) in the restatement, potentially masking partial liquidation and reducing the price impact on remaining holdings. Our analysis demonstrates the effectiveness of this strategy, as the affected holdings are associated with a significant annualized abnormal return of 9.838% from the original filing date to the restatement date. However, we do not observe significant abnormal returns for holdings revised to zero in the restatement, which is unsurprising since managers are less concerned with revealing negative signals if they no longer hold the relevant stocks. This suggests that restatements of this type are more likely to reflect honest mistakes in the original 13F filings. Furthermore, our analysis indicates that mutual funds and pension funds do not exhibit significant abnormal returns associated with restated holdings, aligning with the notion that these institutional investors are less likely to possess the same private information as hedge funds and have fewer incentives to misreport their holdings strategically.

Moreover, restated holdings in the suspect restatements experience a significantly higher level of firm information disclosures during the period from the original filing date to the restatement date, supporting our conjecture that hedge fund managers may possess private information related to such disclosures. Once this private information becomes public, its value diminishes, prompting the correction of misreported holdings through restatements. The timing of the restatement itself could also be strategic, aiming to encourage copycat trading and expedite price convergence after hedge fund managers have completed their trades on the restated holdings. Consistent with this hypothesis, we observe significant cumulative abnormal returns for restated holdings up to five days after the restatement date.

To investigate stock characteristics associated with restated and confidential holdings, we analyze stock-fund-quarter panels. Our findings suggest that restated holdings are more likely to involve stocks without listed options or those with very illiquid options, which is expected given that hedge funds often prefer trading options due to their embedded leverage. Moreover, restated

holdings, particularly new holdings in restatements, resemble confidential holdings in that they tend to involve smaller stocks with lower analyst coverage, indicating that hedge funds possess private information about these stocks. We also find that recent winners and losers are more likely to be revised up or down, respectively, implying that funds may strategically misreport to disguise their momentum strategy and minimize potential price impact quietly. In other words, by strategically misreporting, hedge fund managers can conceal firm-specific information or a specific trading strategy. Additionally, we observe that 13D filings by activist hedge funds predict both confidential holdings and new holdings in restatements, suggesting that some activist funds may attempt to quietly accumulate a stake without attracting the target firm's attention until it reaches the 5% reporting threshold mandated by 13D filing rules. For this purpose, some activist funds may be using restatements as a substitute for applying for confidential treatment, which may not be approved by the SEC.

The strategic misreporting and use of restatements should add value to the fund by enhancing its return. We capture this value-added aspect by calculating the *restatement return gap*. This measure involves creating two portfolios for each fund at the end of each quarter. The original portfolio comprises holdings disclosed in the original 13F filing, while the true portfolio adjusts the reported holdings for all subsequently filed restatements. The restatement return gap is calculated as the difference in returns between the true portfolio and the original portfolio over the next quarter.

On average, the restatement return gap is positive but not statistically significant. Nevertheless, positive restatement return gaps are found to predict future fund performance in real-time, consistent with the notion that they reflect fund managers' skills. Specifically, hedge fund companies with positive restatement return gaps at the beginning of a month outperform those with negative return gaps by almost 2% annually in the subsequent month after adjusting for risks. The predictive power of the return gap remains robust even when controlling for fund and stock characteristics. Furthermore, investors react rationally to a positive restatement return gap by monitoring the fund's future restatements more closely and investing more capital in the fund. These findings indicate that the value derived from strategically misreporting holdings is significant and that investors pay attention to it.

Finally, we examine whether Thomson Reuters (TR) 13F holdings, commonly used in research, account for restatements or confidential filings among hedge fund companies in our sample. To do so, we compare the true hedge fund portfolio, corrected for restated or confidential holdings using SEC amendment filing data, against the TR-reported portfolio to identify discrepancies. Our analysis reveals that while TR has made some adjustments, discrepancies still exist. As a percentage of the total dollar value of our hedge fund portfolios, the median discrepancies amount to 0.50% and 0.62% for restatements and confidential filings, respectively. However, for over 25% of fund-quarters, the discrepancies exceed 1%. While discrepancies due to confidential holdings have diminished nearly to zero since 2011, possibly due to increased attention prompted by AJTY, discrepancies related to restatements remain relatively large.

Our study makes several contributions to various branches of literature. First, in the theoretical literature of disclosure, previous studies have demonstrated that corporations and investors strategically disclose information considering 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).[6]. Institutional investors, in particular, face the costs of front-running and copycatting when disclosing their portfolio holdings due to the ease of replicating their trading strategies (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). Hedge funds have leveraged the SEC's 13F confidential treatment to conceal their informative trades (e.g., AJTY; Aragon, Hertzel, and Shi, 2013). Our paper contributes by offering systematic evidence on 13F restatements and their strategic use by hedge fund companies. We compile a comprehensive database of 13F restatements and demonstrate that, despite being intended to correct honest disclosure mistakes, hedge fund companies frequently utilize restatements to delay the disclosure of private information to the market. We believe that our paper underestimates the true extent of strategic misreporting by hedge fund companies, as there is no guarantee that misreporting will always be corrected through a future restatement.

Our study also aligns with research on fraudulent and manipulative behaviour among institu-

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

tions, including consequences of financial misrepresentation (Karpoff, Lee, and Martin, 2008a,b), misreporting in securitized loans (Griffin and Maturana, 2016), return smoothing and misreporting by hedge funds (Bollen, and Pool, 2008, 2012), and prediction of investment fraud (Dimmock and Gerken, 2012).[7] We contribute to this line of research by examining another dimension of institutional misreporting and strategic behaviour through the analysis of hedge fund companies' use of 13F restatements.

Additionally, our study contributes to the extensive literature on identifying skills from institutional investors' holdings. Prior studies have explored this topic in the context of mutual funds (e.g., Daniel, Grinblatt, Titman, and Wermers, 1997; Wermers, 2000; Kacperczyk, Sialm, and Zheng, 2005, 2008; Cremers and Petajisto, 2009; ?) and hedge funds (e.g., Griffin and Xu, 2009; ?; Aragon and Martin, 2012; AJTY; and Aragon, Hertzel, and Shi, 2013). In our paper, we introduce a new skill measure, the restatement return gap, which captures the information difference between a hedge fund company and the market. We demonstrate that this measure has predictive power for future hedge fund returns.

Finally, our study contributes to the understanding of 13F portfolio holdings data. The 13F data is crucial for academic researchers and investors, as highlighted in the debate mentioned at the beginning of the introduction. Therefore, the accuracy of such data carries significant implications. Previous research (e.g., Ljungqvist, Malloy, and Marston, 2009; Ben-David, Franzoni, Landier, and Moussawi, 2013; Anderson and Brockman, 2018) has shown that disclosure data can deviate from reality.[8] Christoffersen, Danesh, and Musto (2015) find investment companies tend to wait longer to file 13F forms to avoid front-running and copycatting, or to hide their voting power. We contribute by demonstrating that 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. Although the biases and errors in portfolio returns attributable to the amendments vary significantly across funds, the average bias and error are small, providing reassurance to researchers regarding the validity of previous findings.

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[7]For a more complete discussion of the literature, we refer the reader to survey papers by Amiram, Bozanic, Karpoff, Cox, Dupont, and Sloan (2018) and Griffin (2021).

[8]In studies of mutual fund fund-level holdings data (different from the 13F data, which are reported at the company level and mandated for a larger set of institutional investors), Schwarz and Potter (2016) find that voluntarily reported holdings data to differ from those directly filed to the SEC.

2 Institutional Background and Data

2.1 Institutional background

According to Section 13(f) of the 1934 Securities Exchange Act, institutional investment managers, including foreign investors, who have investment discretion over $100 million or more in Section 13(f) securities (primarily publicly traded equity, but also convertible bonds and options) are obligated to disclose their quarter-end holdings in these securities. The same rule also requires institutional investment managers to file amendments to their Form 13F filings. For instance, if a request for confidential treatment is denied or the grant of confidential treatment expires, institutional investment managers must submit amendments within six business days of the denial or expiration. The economic implications of such amendments have been extensively examined in previous literature (e.g., AJTY; Aragon, Hertzel, and Shi, 2013).[9]

Amendments may also be filed for reasons unrelated to confidential treatment. In particular, if filers identify any errors in previously filed Form 13F reports, they are required to amend their filings promptly. Errors could arise if the original filing contained incorrect information, such as misstated share numbers or fair market values. In such cases, filers must resubmit their entire filing, incorporating the necessary corrections, to supersede the original filing with the amended version. Alternatively, if certain reportable securities were not included in the original Form 13F filing, an amendment should be filed specifically listing the additional securities. This type of amendment serves as a supplement to the original filing rather than replacing it entirely.[10]

In this study, we adopt a conservative approach to identifying and distinguishing between 13F restatements and confidential filings. Appendix A provides an example of the 13F Amendment header. On the cover page, investment managers specify the original calendar quarter to which the amendment pertains. To indicate the type of amendment, the investment manager selects one of two checkboxes: (1) "is a restatement," or (2) "adds new holdings entries." In our analysis, we

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[9]If 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).

[10]The detailed SEC guidance for filing amendments is available at https://www.sec.gov/divisions/investment/13ffaq.htm.

classify a 13F amendment as a restatement only if the first checkbox is checked.[11]

2.2 Data sources and sample construction

We analyze 13F filings submitted by hedge fund companies between 1999 and 2018.[12] Hedge fund companies are the focus of our study because they are widely recognized as among the most informative investment companies (e.g., Brunnermeier and Nagel, 2004; Griffin and Xu, 2009) and have stronger incentives to use restatements strategically. We manually classify hedge fund companies using multiple sources, including company websites, Form ADV filings, industry directories and publications, and news articles, following AJTY.[13]

Our primary data consist of the original 13F filings and the amendments to these filings. Consistent with AJTY, we collect both the original and amended 13F filings (Forms 13F-HR and 13F-HR/A) submitted by hedge fund companies between March 1999 and June 2018 directly from the SEC's EDGAR database.[14] Initially, we employ an automated program to process the holdings information in each filing, followed by manual verification for accuracy. The resulting sample comprises 42,303 original 13F filings and 3,513 amended filings, of which 1,539 are restatements, and 1,614 are confidential filings.[15] These filings are filed by 1,673 hedge fund companies.

Figure 1 illustrates the time-series trend of hedge fund companies' use of restatements and confidential filings. Our analysis reveals that restatements are just as prevalent as confidential filings, with both types of amendments distributed relatively evenly over time. Additionally, we observe a slight decline in the frequency of both types of amendments since the financial crisis. The frequency has decreased from approximately 6% to around 2% in more recent years.

[Insert Figure 1 Here]

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[11]When filing for confidential treatment, the investment company must check the second box (see also AJTY). In this study, we exclude amendments in which the investment company checks neither box, as those cases can be ambiguous.

[12]we chose to start in 1999 because electronic 13F filings first became available on SEC EDGAR that year.

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

[14]The SEC 13F holdings data are also available in WRDS SEC Analytics Suite. However, the data are complete only after June 2013 on WRDS.

[15]Starting in 2013, investment companies can report background information or reasons for filing restatement using the "additionalInformation" field in the 13F form. We parsed this field for all 13F filings and found only 90 restatements in our sample with such background information. Reasons provided include "printer formatting error," "clerical error," "wrong file was uploaded," and "data lost." Our main results remain qualitatively unchanged after excluding these 90 restatements. We thank Tanja Kirmse for bringing this field to our attention.

Table 1 presents the summary statistics. In Panel A, we provide the distribution of the delay, measured in quarters, between the quarter-end portfolio date and the filing date for restatements and confidential filings. We find that 85% of confidential filings are submitted more than one quarter after the quarter-end, while 65% of restatements are filed in the quarter immediately following the quarter-end. In Panel B, we summarize the number of amendment filings submitted by each hedge fund company. Not all hedge fund companies have filed an amendment, with only 34% and 13% of them having submitted at least one restatement or confidential filing, respectively. We also observe that six hedge fund companies have filed restatements more than 20 times. However, excluding these frequent restatement users in our subsequent analyses does not significantly impact our results.

Panel C of Table 1 presents the average number of stock holdings reported in the original 13F filings, restatements, and confidential filings. Our analysis reveals that the average number of stock holdings in the original 13F filing is 115, while the average number in the restatement and confidential filing is 82 and 20, respectively. We further categorize the stock holdings included in the restatements (i.e., restated holdings) into four groups based on a comparison of the number of split-adjusted shares reported in the restatement with the corresponding original filing. Specifically, we classify a restated holding as a *revision up* (*revision down*) if the number of shares is greater (smaller) in the restatement than in the original filing when the holding is reported in both filings. If a stock holding is only reported in the restatement (original filing), we classify it as a *new* (*complete revision down*)-type restated holding. Our analysis reveals that hedge fund companies include more new and revision up-type restated holdings in their restatement filings.

[Insert Table 1 Here]

3 Strategic Use of Restatement Filings

While the SEC permits restatements of 13F filings to rectify "honest" errors, the lack of extensive oversight over 13F filings, as highlighted in Section 1, raises concerns regarding the potential strategic use of restatements by hedge fund companies to conceal or postpone the disclosure of specific positions. In this section, we provide empirical evidence and discuss the implications of

this strategic use of restatements.

3.1 Suspect restatements

Given hedge fund companies' incentives to withhold private information from the public (e.g., AJTY; Cao, Du, Yang, and Zhang, 2021; Shi, 2017), the true intention behind a restatement filing remains unobservable. To distinguish between strategic and honest use of restatements, we employ several filters on our sample of 1,539 restatements. Specifically, we exclude 220 restatements filed within one day of the original filing, as these are likely intended to correct honest mistakes.

We then manually review the remaining 1,319 restatements to identify and exclude *technical* restatements filed to rectify seemingly honest errors in the original filings. For instance, we come across restatements where the hedge fund company (1) interchanged the data for the "number of shares" and the "market value," (2) used a different unit of shares in the original filing and the restatement, or (3) truncated the "number of shares." We exclude 254 such technical restatements.

Next, we consider two scenarios in which hedge fund companies are more prone to making honest mistakes. First, a higher number of holdings in the portfolio increases the likelihood of an honest mistake. Second, since a 13F filing is filed at the investment company level, a hedge fund company managing multiple funds is more susceptible to errors as it must collect and organize holding information from all the funds it oversees. If a restatement revises a number of holdings above the median and is filed by a hedge fund company managing more funds than the median company, we categorize it as a *non-suspect* restatement and exclude it from our analysis. We eliminate 144 such non-suspect restatements.

The remaining 921 restatements, labelled as *suspect* restatements, will be the focus of our analysis (except in Section 5 where we document the discrepancies between the Thomson Reuters and SEC 13F datasets).

3.2 Abnormal returns of restated holdings

To validate our identification of suspect restatements and provide evidence for the correction of previous strategic misreporting, we examine the abnormal returns associated with restated holdings. If misreported holdings in the original filing were due to honest mistakes, they should not be

associated with abnormal returns. However, if the misreporting was intended to conceal private information, it should result in significant abnormal returns in the direction of future restatements.[16]

When a hedge fund company files a restatement for holdings in quarter t, the restated positions remain undisclosed to the public during the restatement period. This period spans from the end of quarter t to the earlier of two dates: (1) the restatement filing date or (2) the end of quarter $t + 1$. We divide the restatement period into two sub-periods based on 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 and the two sub-periods. During the first sub-period, all holdings are hidden, while during the second sub-period, only the restated holdings are misreported.

As shown in Panel A of Table 1, the majority (65%) of restatements occur in the same quarter as the original filing, falling into the first case illustrated in Panel A of Figure 2. For the remaining restatements filed in subsequent quarters, we end the restatement period at the end of quarter $t + 1$ (Panel B of Figure 2) for conservative reasons, as misreporting could be corrected before the restatement.[17] Panel A of Figure 2 depicts a potential hedge fund strategy's timeline. In this scenario, during quarter t, the hedge fund manager obtains a private signal and initiates trading immediately.[18] To minimize price impact, the fund manager gradually executes trades and does not complete them by the original filing date. The fund then has an incentive to misreport in the original filing. When the private signal is released to the market (via an earnings announcement or other public information disclosure) or when the fund manager finishes accumulating their trading position, the hedge fund company files a restatement to correct the initial misreporting.

[Insert Figure 2 Here]

The strategic misstatement of holdings in the original filing and subsequent correction through restatement by hedge fund companies suggests two outcomes: (1) restated holdings experience

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[16]It is also possible that hedge funds may routinely add random noises to their originally reported holdings. They correct such noises with subsequent restatements in an effort to discourage front-running or copycat trading (Huddart, Hughes and Levine, 2001). Such regular misreporting and restatement behaviour run the risk of drawing the SEC's attention. More importantly, as long as the "noise" is random, the restated holding should not be associated with an abnormal return.

[17]For example, through the original filing in quarter $t + 2$. Our main results hold similarly if we only examine restatements filed in the same quarter as the original filing.

[18]Hedge funds could also trade on the signal using options instead. Indeed, our subsequent analyses suggest that restated stocks are more likely to be those without options or those with very illiquid options. In addition, hedge funds also need to report their option holdings in 13F filings, though we do not examine them in the paper.

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abnormal returns in the direction of the restatement during the restatement period, and (2) restated holdings are more likely to be influenced by public information or events during the second sub-period.

To measure abnormal returns, we compute benchmark-adjusted returns following Daniel, Grinblatt, Titman, and Wermers (1997, "DGTW" hereafter). Specifically, we form 125 portfolios at the end of June each year using all common stocks listed on NYSE, Amex, and NASDAQ, sorted into quintiles based on size (using the NYSE size quintile), book-to-market ratio, and momentum. The daily abnormal return of a given stock is its excess return over that of the benchmark portfolio to which it belongs.[19] We compare the abnormal returns of restated holdings during the restatement period to those of the original holdings from the same institution during the same timeframe.

Table 2 presents the value-weighted abnormal returns of the original and restatement portfolios, as well as the differences between them. We use the original portfolio as a benchmark to account for the possibility that the average stock held by a hedge fund company in our sample generates positive abnormal returns due to managerial skill. To account for the potential concealment of stock sales through restatements, we multiply the abnormal returns of revision down or complete revision down-type holdings by -1 when measuring the abnormal returns of the restatement portfolio. The results indicate that restatement portfolios consistently exhibit higher abnormal returns than the matched original portfolios throughout the restatement period. These differences are statistically significant at the 10% level or better. For instance, by trading the restatement portfolio for the entire restatement period, investors could have earned annualized abnormal returns of 7.707%, which is 6.534% higher than the returns of the matched original portfolio. Furthermore, our analysis demonstrates that the abnormal returns of restatement portfolios primarily stem from *suspect* restatements. Trading the suspect restatement portfolios during the restatement period would have yielded annualized abnormal returns of 10.708%. In contrast, the abnormal returns for technical and non-suspect restatements are not significantly different from zero.

We also find that the abnormal returns for both restatement sub-periods are significantly positive, particularly for suspect restatement portfolios. For example, trading the suspect restatement portfolios during the second sub-period, when the restated holdings are hidden, would have gen-

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[19]In the Internet Appendix, we also calculate an alternative abnormal return based on Carhart (1997)'s four-factor model, and we find that our portfolio analysis results remain qualitatively unchanged.

erated annualized abnormal returns of 14.772%. The difference between the abnormal returns of suspect restatement portfolios and technical (or non-suspect) restatement portfolios is statistically significant over the restatement period or the second sub-period.

[Insert Table 2 Here]

Furthermore, we conduct a separate analysis to examine the return performance of different types of restated holdings within the suspect restatements. We construct four restatement portfolios, each containing one type of restated holding. Table 3 reveals that the abnormal returns of suspect restatement portfolios primarily arise from revision down-type and new holdings.[20] This finding suggests that hedge fund managers strategically misreport their original filings to conceal both negative and positive private information from the public. In contrast, confidential filings can only hide positive private information as the fund manager quietly accumulates a position.

[Insert Table 3 Here]

Although our finding of superior returns suggests that restated holdings contain more information than original holdings, a potential reverse causality argument is that misreporting on the original filing day was an honest mistake. Extreme returns during the second sub-period draw attention to these mistakes and lead to restatements. However, this explanation does not fully account for the consistent direction of the extreme returns during the second sub-period, particularly for downward revisions. Moreover, our results remain robust even after excluding restated holdings with extreme returns during the second sub-period. Additionally, the interpretation of "honest mistake" does not align with our subsequent findings that the value added by restatements predicts future fund performance, inflows, and increased downloads of restatements.

While our focus is primarily on hedge funds, we conduct a placebo test with holdings restated by mutual funds and pension funds to examine if they exhibit similar behaviour. To identify mutual funds and pension funds, we use the classifications of 13F institutions from AJTY. The results, presented in Table IA2 of the Internet Appendix, indicate no significant abnormal returns for the restated portfolios of mutual funds and pension funds during the restatement periods. These

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[20]For both new and complete revision down-type restated holdings, we also exclude those around the 13F Reporting Omission Threshold (i.e., less than 10,000 shares and market value not exceeding $200,000), and the result remains qualitatively similar.

insignificant returns suggest that unlike hedge funds, mutual funds and pension funds are less likely to misstate their portfolios in their disclosures strategically. This finding aligns with the notion that hedge funds possess more private information and stronger incentives to conceal their positions and strategies.

3.3 The strategic nature of restatements

Thus far, we have presented evidence indicating that some hedge fund managers file restatements due to misreporting their holdings on the original 13F filings. However, the motivations behind hedge fund companies filing restatements remain unclear. Given the limited oversight of 13F filings, hedge fund companies could choose to remain silent about their misreporting, and outside investors would be unaware of any discrepancies. In this section, we propose and test two possible motivations behind hedge fund companies' filing for restatements.

The first hypothesis suggests that restatements may be triggered by public information disclosures, after which the private signal loses its value, and hedge fund managers no longer have the incentive to misreport. The second hypothesis posits that hedge fund companies could use restatements to prompt copycat trading. After accumulating trading positions on the later-restated holdings, hedge fund companies file restatements to accelerate price convergence. These two motivations are not mutually exclusive, and we explore both possibilities in our analysis.

To test the hypothesis that hedge fund managers file restatements after a public information disclosure, we examine the intensity of information events associated with the restated holdings during the restatement period, particularly the second sub-period. Following Edmans, Goncalves-Pinto, Groen-Xu, and Wang (2018), we gather information event data from Capital IQ's Key Development database, focusing on events originating from within the firm and excluding external news media or competitor disclosures. We also incorporate information from 8-K filings to capture important events affecting the company. By combining data from multiple sources, we aim to analyze the impact of information events on restatements comprehensively.

It is important to note that our approach may underestimate the impact of public information disclosure on restatements, as news media or competitor disclosures could also influence the filing of restatements. However, by limiting our analysis to events originating from within the firm, we

maintain consistency with previous studies and facilitate comparison with their results.

We consider a stock holding to have experienced an information event if it is associated with at least one information event from the Key Development database or files an 8-K filing on a specific date. The information event intensity is measured as the percentage of stock holdings experiencing information events during a specified period. To calculate it, we first compute the percentage of holdings with information events at each date t for each portfolio. We then calculate the mean percentage of holdings with information events over the restatement and two sub-periods. Finally, we take the average mean percentages across different portfolios. We calculate the information event intensity separately for restated holdings and unrestated holdings within the same 13F portfolio and compute the abnormal information event intensity by subtracting the intensity of unrestated holdings from that of restated holdings. The mean abnormal information event intensity of restatement holdings over the restatement period and two sub-periods is reported in Table 4.

While the average abnormal information event intensity is insignificant during the overall restatement period, our analysis reveals that restated holdings experience more information events during the second sub-period when they are not yet reported. On an average day during the second sub-period, we observe 2.62% more information events for restated holdings than for unrestated holdings. This abnormal information event intensity is statistically significant at the 1% level. We further examine the abnormal information event intensities for the four different types of restated holdings and find similar patterns across all types, with each experiencing significantly more information events during the second sub-period. These findings suggest that hedge fund managers may misreport their holdings on the original 13F filings to protect their private information about corporate events until public information disclosure prompts the restatement.

[Insert Table 4 Here]

In untabulated analyses, we also show that the information events for revision-down and complete revision-down (revision-up and new) restated holdings are more likely to convey bad news (good news).[21] This is consistent with the idea that funds strategically conceal their trades when they possess private information that has not been revealed to the market.

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[21]We define an event to be a good (bad) news event if the [-1,1] 3-day accumulative abnormal return around the event is positive (negative).

Having identified how public disclosure affects hedge fund companies' decision to file restatement, we now explore the second hypothesis. Specifically, we examine whether hedge fund managers file restatements to encourage copycat trading and accelerate price convergence. To test this hypothesis, we analyze the market reaction to the filing of restatements as an indicator of copycat trading. If hedge fund managers file restatements to prompt copycat trading and copycats trade the restated holdings in the direction of the restatement, we expect to observe significant market reactions to the filing of restatements.

Table 5 reports the average cumulative abnormal returns (CARs) for restatements over three different windows: $[0, 1]$, $[0, 3]$, and $[0, 5]$, where date 0 is the restatement filing date that discloses the restated positions. For each stock holding in each filing, we compute abnormal returns using DGTW-benchmark adjusted returns and multiply the abnormal returns of (complete) revision-down-type restated holdings by -1 to account for downward revisions. We then equally weigh the CARs of individual stocks to compute the CARs for each filing. Our results show that the mean CARs for the restatement filings over the three windows are positive: 0.028%, 0.126%, and 0.165%. Except for the $[0, 1]$ window, all other CARs are significant at the 5% level.

In a supplementary analysis, we examine market reactions to alternative restatement portfolios comprising only one type of restated holdings. Our findings support the earlier conclusion that abnormal returns of restatement portfolios are concentrated in revision-down-type and new holdings. Specifically, market reactions to these two types of restated holdings remain significant for up to five days after the restatement filing, with mean CARs of 0.214% and 0.226%, respectively.

[Insert Table 5 Here]

3.4 Characteristics of the restated holdings

We next examine the characteristics of stocks affected by amendment filings with a stock-fund-quarter panel analysis. Unlike confidential holdings, restated holdings have different types (i.e., *revision up*, *revision down*, *new*, and *complete revision down*), and each type may exhibit distinct stock characteristics. By conducting a stock-level analysis, we gain further insights into potential strategic motivations behind restatements.

Following AJTY, we consider several stock characteristics in our analysis. *ME* is the market

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capitalization at the end of the quarter, while *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 to proxy for trading liquidity (*Illiquidity*), which is computed as

the yearly average of the square root of $|Return|/(Price \times Volume)$, a ratio calculated using daily

data from the 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 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. We also create an indicator *Activism*, which

equals one if the same stock holding is included in a 13D filing, which is filed in the same quarter as

the original 13F filing. Finally, to control for the impact of option trading, we calculate the average

daily options trading volume during the 12-month period ending at the beginning of the current

quarter, and we add *OptVolume* as an additional control in the regression analysis.

We estimate a logistic regression to examine the determinants of different types of amendment

holdings, given by the equation:

$$AmendStock_{i,j,t} = (\lambda StockChar_{i,j,t} + \alpha_t + \delta_{Ind} + \varepsilon_{i,j,t} > 0), \tag{1}$$

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

of amended holding and is included in institution i's portfolio at the end of quarter t. In addition

to the stock characteristics mentioned earlier, we 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.

Our findings, presented in Table 6, reveal several interesting patterns. First, new holdings on

suspect restatements exhibit similar characteristics to confidential holdings. These holdings tend to

involve smaller stocks with limited analyst coverage, 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, indicating a tendency to trade on momentum quietly to minimize potential price impacts. Third, we observe a positive and significant relationship between the activism dummy and new holdings, particularly when we differentiate between different types of restated holdings. This suggests activist funds also utilize restatements to build substantial positions in their targets. Finally, we find that hedge fund managers are more inclined to include stocks on their amendment 13F filings if those stocks lack an active options trading market, which could have provided alternative means to conceal their trades.

[Insert Table 6 Here]

4 Restatement, Managerial Skill, and Fund Alpha

Our study has thus far presented empirical evidence suggesting that certain restatements are filed after hedge fund companies temporarily conceal their trading intentions and misreport stock holdings on the original 13F filings.

Considering the use of restatements or confidential filings, it is important to acknowledge that the 13F portfolio observed by investors on the original filing date (i.e., the original portfolio) may differ from the actual portfolio held by the fund (i.e., the true portfolio). When constructing the true portfolio, investors must update the original portfolio with the information from available 13F amendments. To capture the value added from the restated holdings, we define the *restatement return gap* as the return difference between the true and original portfolios during the subsequent quarter. We then proceed to investigate whether a positive restatement return gap, indicative of managerial skill, predicts future hedge fund performance and examine how investors respond to the observation of a positive restatement return gap.

4.1 Restatement return gap

We employ the restatement return gap as a measure to capture the fund returns that can be attributed to the discrepancies between the true and observed 13F portfolios, accounting for all subsequent restatements. This measure is similar in concept to the one proposed by Kacperczyk, Sialm, and Zheng (2008), which captures mutual fund returns resulting from trades made between

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adjacent quarterly holdings reports.

For each fund-quarter (i, t), we calculate the *Original Return* as the value-weighted quarterly portfolio return based on the original 13F portfolio holdings at the end of quarter $t-1$. Similarly, we calculate the *True Return* as the value-weighted return based on the true portfolio at the end of quarter $t-1$, incorporating all subsequent *suspect* restatements corresponding to holdings at the end of quarter $t-1$.[22]

We then derive two measures of the restatement return gap. The *Raw Restatement Return Gap* represents the difference between the true portfolio return and the original portfolio return during quarter t. Similarly, the *DGTW Restatement Return Gap* reflects the disparity in DGTW-adjusted returns between the true and original portfolios. It's important to note that these restatement return gaps isolate the contribution to fund performance from restated holdings, underestimating the fund's overall trading skill, which also manifests in the return of the original portfolio. Table 7 presents the mean statistics of returns for the true and original portfolios, as well as the restatement return gap.

Column 2 of the table highlights that the average annualized *Raw Restatement Return Gap* attributed solely to suspect restatements is 0.25% (column 2 of Table 7). Similarly, the mean annualized *DGTW Restatement Return Gap* is 0.12%. For comparison, Column 3 presents the results for a similar return gap related to confidential holdings.[23] Overall, the restatement return gaps exhibit positive values, although they are not statistically different from zero. It is worth noting that the relatively small mean restatement return gaps across all hedge funds resemble the findings of Kacperczyk, Sialm, and Zheng (2008) and may mask significant cross-sectional variation, which we will explore in the subsequent analysis.

[Insert Table 7 Here]

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[22]We specifically focus on subsequent *suspect* restatements to maintain consistency with previous analyses. However, defining the true portfolio to account for *all* subsequent restatements yields qualitatively similar results for all tests conducted in this section.

[23]Confidential holdings are primarily used to protect the value of private information. However, the incorporation of such information into stock prices may take longer, potentially not being fully captured by the subsequent quarter's return.

4.2 Restatement return gap and future performance

Given the previous findings that hedge fund managers may misreport holdings on the original 13F filings to exploit private information, the restatement return gap provides valuable insights into hedge fund managers' skills in generating alpha through informed trading. These skills are likely persistent over time, making the restatement return gap a potential predictor of future returns. By identifying hedge fund managers who consistently demonstrate skill in exploiting private information or generating alpha, investors can enhance their portfolio performance.

To effectively utilize restatement return gaps as a tool for identifying high-performing hedge fund managers, investors need access to timely and accurate information about 13F amendments. In this and the next subsection, we focus on publicly available information and study potential tradeable strategies and investor actions. At the beginning of each month, we calculate the average monthly restatement return gap over the previous three months using only publicly available suspect restatements for each hedge fund company. Based on the sign of the average restatement return gap, we classify hedge fund companies into three groups: positive, zero, or negative. Our hypothesis is that hedge fund companies with a positive restatement return gap at the beginning of the month are more likely to report higher returns in the following month, reflecting their ability to exploit private information or generate alpha.

Table 8 presents the results of our portfolio analysis, using returns reported to commercial databases (including Eurikahedge, HFR, and TASS) and the eight-factor alphas proposed by Fung and Hsieh (2001) to measure hedge fund performance. As expected, we find that hedge fund companies with a positive restatement return gap outperform those with a negative restatement return gap by 16.3 basis points per month or 1.96% annually after adjusting for the Fung and Hsieh (2001)'s hedge fund risk factors. This performance difference is statistically significant at the 5% level. The results using DGTW-benchmark adjusted restatement return gaps are quantitatively similar, further supporting the robustness of our findings.

[Insert Table 8 Here]

To control for potential impacts from other fund or holdings characteristics, we estimate a multivariate regression model:

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$$Return_{i,t} = \beta D\_Positive\_Gap_{i,t-1} + \gamma X_{i,t-1} + \epsilon_{i,t}, \tag{2}$$

where i and t represent the hedge fund company and month, respectively. *D_Positive_Gap* is an indicator that takes a value of 0.5 for funds with a positive restatement return gap, for funds with a negative restatement return gap, and 0 otherwise. In addition to fund-level holdings characteristics (value-weighted at the holdings level), such as average holdings size and book-to-market ratio, we include a range of fund characteristics following AJTY. All fund characteristics are measured at the end of the most recent quarter. *Age* denotes the number of years since the institution's first appearance on Thomson Reuters. *PortSize* represents the total equity portfolio size of the institution, calculated as the market value of its quarter-end holdings. *Turnover* captures 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 based on the market value of each component stock. *Flow* represents the 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,

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

We employ the Fama-MacBeth approach to estimate Equation (2), which addresses concerns about time-series correlations of predictors and errors and provides a robust test of the relationship between restatement return gaps and hedge fund companies' future reported returns.

Table 9 presents the results of our multivariate regression analysis, which control for a range of fund and holdings characteristics. We find that positive restatement return gaps consistently predict hedge fund companies' reported returns, even after accounting for these factors. For example, changing from a negative restatement return gap to a positive restatement return gap leads to a 14.9 basis point increase in monthly eight-factor hedge fund alphas, equivalent to 1.79% on an annual basis. These findings provide further evidence that restatement return gaps are a reliable predictor of future hedge fund returns. The results using DGTW-based restatement return gaps are consistent with these findings.

4.3   Restatement return gap and investor response

Our analysis has shown that the restatement return gap captures hedge fund managers' skills and predicts future hedge fund performance. However, it is essential to understand how investors react to this information and whether they pay attention to the restatement return gap.

To test the hypothesis that investors respond to the restatement return gap, we calculate the average monthly restatement return gap over the previous quarter using available suspect restatements for each hedge fund company. We then estimate a multivariate regression model to examine investors' responses:

$$Response_{i,t} = \beta D\_Positive\_Gap_{i,t-1} + \gamma X_{i,t-1} + \epsilon_{i,t}, \tag{3}$$

where i and t indicate the fund and quarter, respectively. We use two proxies to measure investors' response: (1) the number of times investors download previously-filed 13F filings of hedge fund companies, and (2) portfolio fund flow during the current quarter. In the model, we include $D\_Positive\_Gap$ as an indicator that takes a value of 0.5 for hedge funds with a positive restatement return gap at the beginning of the quarter, -0.5 for funds with a negative restatement return gap, and 0 otherwise.

Table 10 presents evidence that investors respond to the restatement return gap by adjusting their behaviour towards hedge fund companies with a positive restatement return gap. Specifically, we find that investors download more previously-filed 13F filings of hedge fund companies with a positive restatement return gap, particularly 13F amendments. Columns (1) and (3) show that investors download approximately 6.7% more 13F filings and 4.1 times more amendment 13F filings of hedge funds with a positive restatement return gap, respectively, both statistically significant at the 1% level.[24] Moreover, we find that investor flows also respond to positive restatement return gaps. Column (4) shows that hedge funds with a positive restatement return gap at the beginning of the quarter experience a 6.0% increase in their flow, which is statistically significant at the 10%

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[24]The coefficient of $D\_Positive\_Gap_{i,t-1}$ is 0.065 and 1.662 in Columns (1) and (3), respectively. Since we use the natural logarithm of the number of downloads as a dependent variable, we convert these coefficients to the corresponding percentage changes.

level after controlling for a range of fund and stock characteristics.

[Insert Table 10 Here]

5 Potential Biases of 13F Holdings Databases

Over the past few decades, financial researchers have relied on the Thomson Reuters (TR; previously CDA/Spectrum) 13F database in numerous studies. 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. The wide use of the TR database thus raises two important questions: 1) Does TR incorporate holdings information from 13F amendments? and 2) If that is not always the case, what is the potential bias in using the holdings data from TR?

To answer the first question, we examine the percentage of restated and confidential holdings that are not accurately reported in TR. In Panel A of Table 11, we find that 46.81% of restated holdings and 95.39% of confidential holdings have not been accurately incorporated into the TR database. When we break down restated holdings into different categories, we find similar percentages missed by TR, ranging from 43.32% to 54.23%, for revision up-type, revision down-type, and new restated holdings. Interestingly, TR only misses 18.67% of complete revision down-type holdings, possibly because complete liquidations are easier to identify.

We further classify amendment filings into concurrent and non-concurrent filings based on whether they are filed within the same quarter as the original 13F filing. Among non-concurrent amendment filings, TR misses 78.13% of restated holdings and 97.60% of confidential holdings. The corresponding numbers for concurrent amendment filings are 26.25% and 45.89%. These results suggest that while TR tends to incorporate a proportion of timely amendments, it does not actively revise its database to reflect 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 the number of shares: restatements or confidential filings.

Panel B of Table 11 reports summary statistics of the TR bias rate and TR error rate. The average quarterly TR bias rate is -0.572% over our sample. The average biases from restated and confidential holdings are -0.304% and -2.243%, respectively. However, there are substantial time-series variations in the bias rate, with the quarterly bias rate ranging between -170.511% and 9.640%. The average quarterly TR error rate is 1.875%, with 1.533% and 3.580% for restated and confidential holdings, respectively. To reassure researchers using the TR data, the potential error and bias caused by using TR are not very substantial, at less than 5% per quarter.

[Insert Table 11 Here]

Figure 3 provides a closer look at the time-series variation in TR error and bias rates. Panel A shows that the rates fluctuate over time and attenuate somewhat after 2011. Panels B and C examine the breakdown of error and bias rates for 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, likely due to increased scrutiny following studies by AJTY and Aragon, Hertzel, and Shi (2013).[25] However, error rates due to restated holdings remained substantial until around 2016.

[Insert Figure 3 Here]

6 Concluding Remarks

In conclusion, our study provides valuable insights into the nature and implications of restatement filings among hedge fund companies. We find that restatements are prevalent and impact a significant number of stocks, highlighting the importance of examining these filings alongside confidential

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

filings. The abnormal returns associated with restated holdings suggest strategic misreporting of original holdings to conceal trading intentions. Furthermore, we introduce the restatement return gap as a measure to capture the value added from restatements. Our analysis demonstrates that this measure has predictive power, enabling the identification of hedge fund managers with skill in exploiting private information or generating alpha. This information can be leveraged by investors to enhance portfolio performance. Importantly, we highlight the limitations of widely-used databases such as Thomson Reuters in fully incorporating restatement information. While the overall discrepancy is small, it can be substantial for individual funds. Our findings underscore the need for increased scrutiny of 13F filings by investors and regulators, as well as improvements in the accuracy and coverage of these filings.

In summary, our research contributes to a better understanding of the dynamics of restatement filings among hedge fund companies. We emphasize the value of restatement information, the potential for predicting future fund performance, and the importance of addressing the limitations in existing databases. By recognizing and utilizing the insights from restatement filings, investors and researchers can gain a deeper understanding of hedge fund strategies and improve their decision-making processes.

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

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

Panel A: Number of Institutions Filing Restatements and Confidential Filings
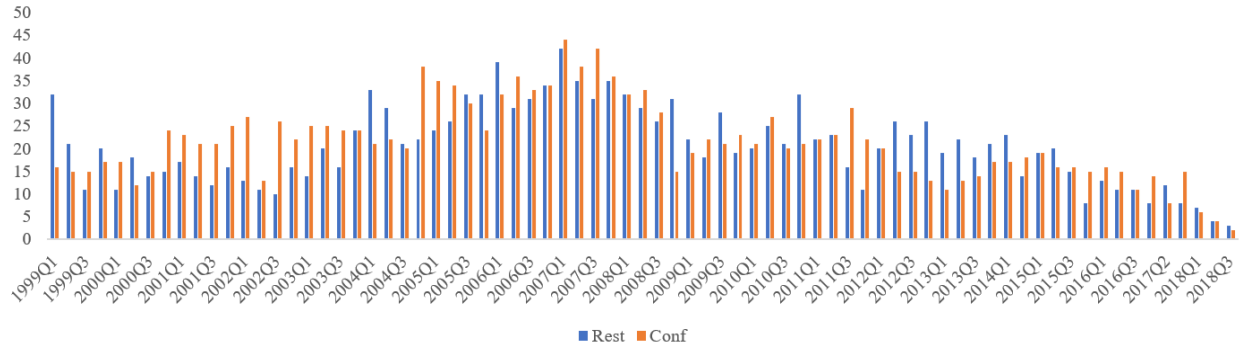
Panel B: Percentage of Institutions Filing Restatements and Confidential Filings
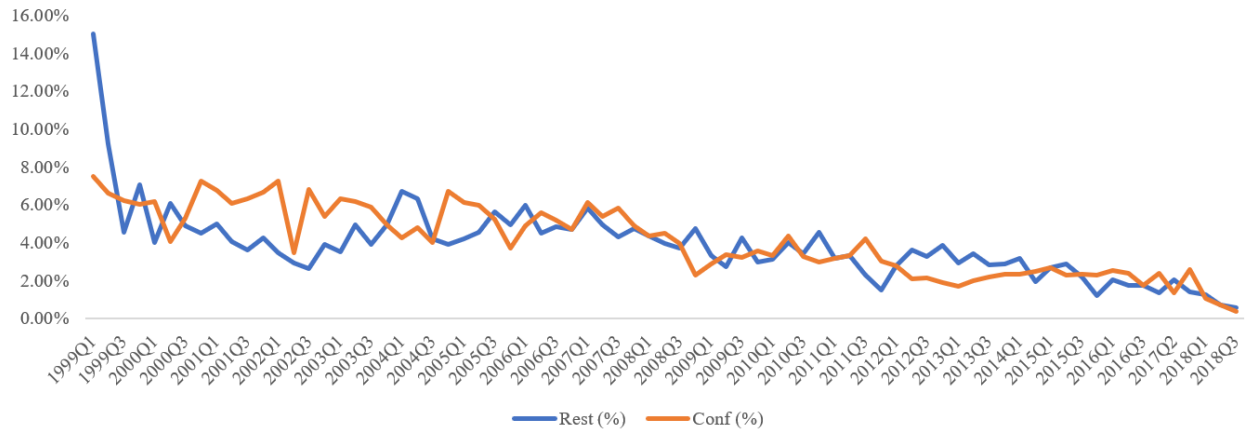
Figure 2: Restatement Period

This figure demonstrates the start and end dates of the restatement period. The restatement period extends from the current quarter-end to the earlier of two dates: (1) the restatement filing date (Panel A) and (2) the subsequent quarter-end date (Panel B). We divide the restatement period into two sub-periods based on the original 13F filing date.

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

		Subperiod 1		Subperiod 2	

Quarter *t* end · Filing date of *Original* 13F filings · Filing date of *Restatement* 13F filings · Quarter *t+1* end

HF acquired a *short*-lived private signal and start trading.	HF hasn't finished trading, misreported to hide trading intention.	Private signal was made public	HF filed restatement to correct misreporting.
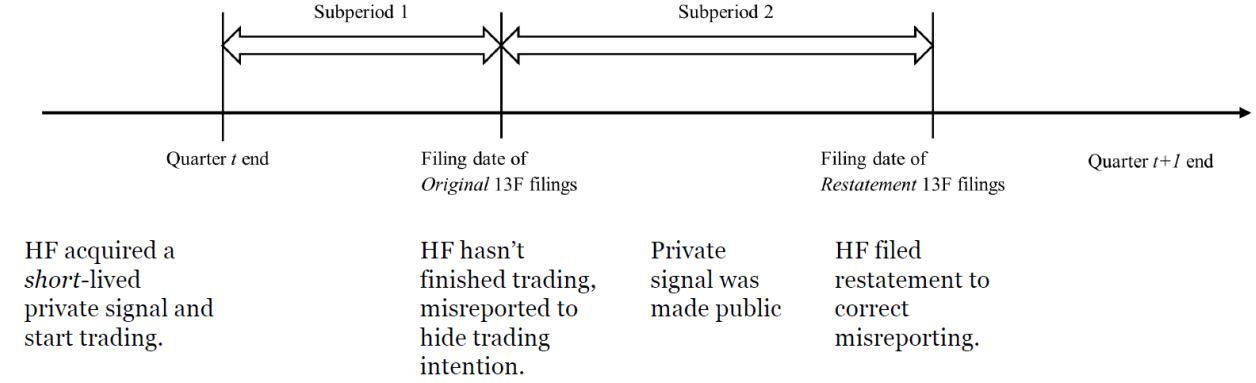
Panel B: 13F Restatement is Filed After the Subsequent Quarter-End Date

	Subperiod 1		Subperiod 2	

Quarter *t* end · Filing date of *Original* 13F filings · Quarter *t+1* end · Filing date of *Restatement* 13F filings

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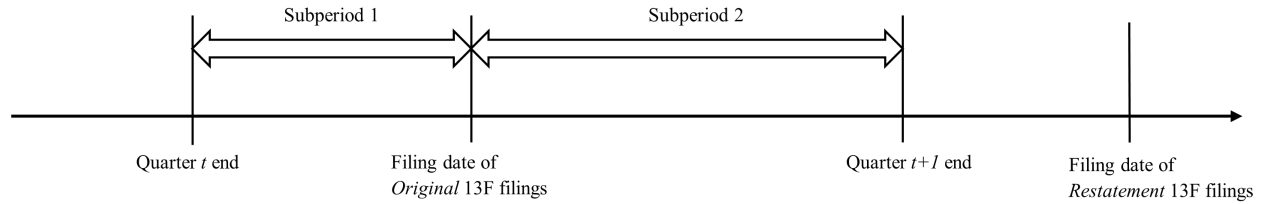
Figure 3: Time-Series Trend of Thomson Reuters (TR) Error Rate and Bias Rate

Panel A plots the Thomson Reuters (TR) error and bias rates in each calendar quarter between 1999 and 2018. Definitions of the TR error and bias rates are detailed in Table 11. Panel B (C) plots the TR error (bias) rates associated with restatements and confidential filings, respectively.

Panel A: Thomson Reuters Error and Bias Rates
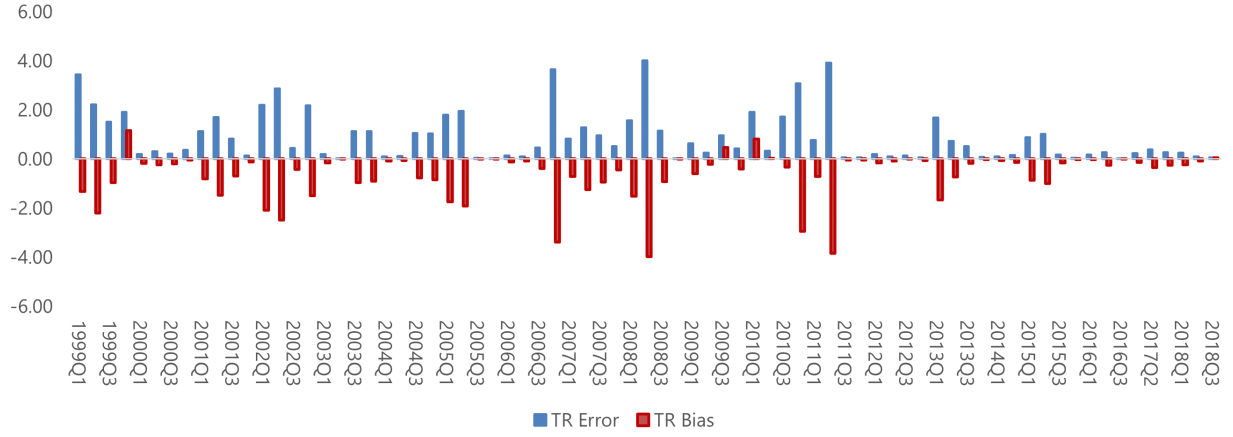
Panel B: Thomson Reuters Error Rate – Restatement vs. Confidential Filing
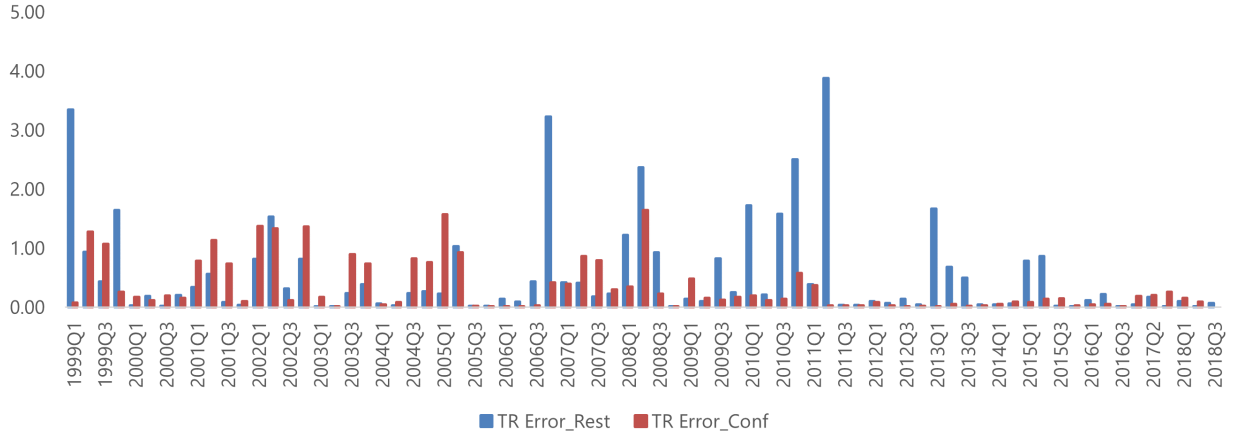
Panel C: Thomson Reuters Bias Rate – Restatement vs. Confidential Filing
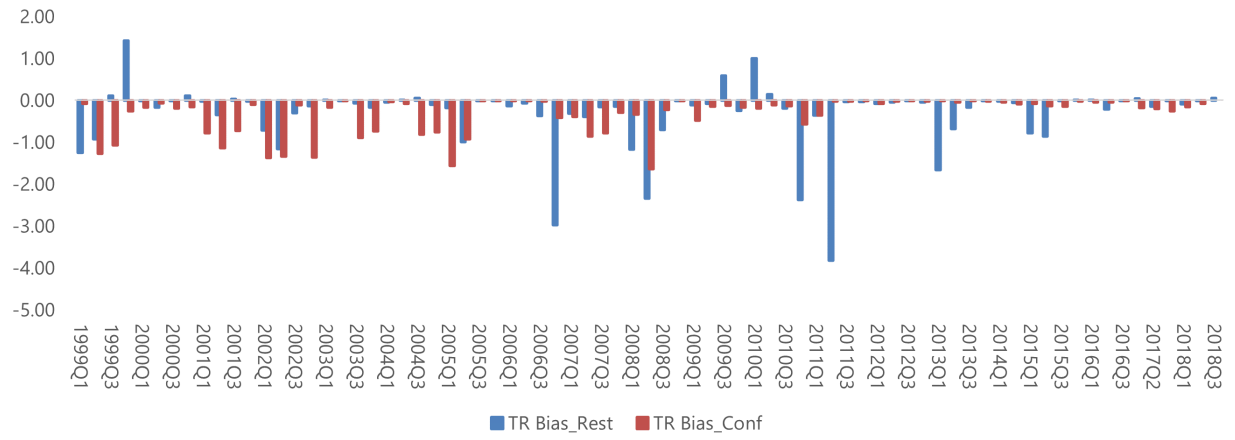
Table 1: Summary Statistics of 13F Original and Amendment Filings

Panel A of this table reports the distribution of the delay, measured in quarters, between the quarter-end portfolio date and the filing date for hedge fund companies' 13F restatements and confidential filings. Panel B reports the distribution of the number of 13F restatements and confidential filings filed by each hedge fund company. Panel C reports the summary statistics of the number of stock holdings on 13F original filings, restatements, and confidential filings. We categorize stock holdings in 13F restatements (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 filings 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 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
Number of Restatements	991	170	77	44	120	46	39	52	1,539
Percentage	64.39%	11.05%	5.00%	2.86%	7.86%	2.99%	2.53%	3.38%	100%
Number of Confidential Filings	242	442	324	185	331	59	22	9	1,614
Percentage	14.99%	27.39%	20.07%	11.46%	20.51%	3.66%	1.36%	0.56%	100%

Panel B: Distribution of Number of Amendment Filings Filed by Each Institution

Number of Amendment(s)	0	1	2-5	6–10	11–15	16–20	>20	Total
Restatements								
Number of Hedge Funds	1,100	315	204	29	10	9	6	1,673
Percentage	65.75%	18.83%	12.19%	1.73%	0.60%	0.54%	0.36%	100%
Confidential Filings								
Number of Hedge Funds	1,451	117	58	20	9	2	16	1,673
Percentage	86.73%	6.99%	3.47%	1.20%	0.54%	0.12%	0.96%	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
Restatements	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

Table 2: Abnormal Returns to Restatement Portfolios

This table examines the annualized abnormal returns of 13F original and restatement portfolios during the restatement period. For restatement portfolios, the restatement period extends from the current quarter-end portfolio date to the earlier of two dates: (1) the restatement filing date and (2) the subsequent quarter-end date. For original portfolios, the restatement period ends at the close of the subsequent quarter. The restatement period is further divided into two sub-periods based on the original 13F filing date. We measure the abnormal returns with DGTW benchmark-adjusted returns. To be included in the analysis, a restatement must be filed at least two days apart from the matched original 13F filing. We categorize a restatement as a *technical* restatement if one of the following three issues occurs: (1) the filer interchanged the data for the "number of shares" and the "market value" in the original filing; (2) the filer used a different unit of shares in the original filing and the restatement; (3) the filer truncated the "number of shares" in the original filing. After removing technical restatements, we independently sort the remaining restatements into two groups based on (1) the number of restated holdings and (2) the number of funds managed by the same investment manager. We categorize a restatement as a *non-suspect* restatement if it revises a number of holdings above the median and is filed by a hedge fund company managing more funds than a median company. The rest are *suspect* restatements. When calculating portfolios' abnormal returns, we multiply -1 to the abnormal return of the *revision down* or *complete revision down*-type restated holding. The average daily DGTW benchmark-adjusted return is first calculated during different periods for each portfolio and then averaged across different portfolios. In the end, we multiply the average daily portfolio returns by 252 to yield the annualized portfolio return. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	N	Sub-Period 1	Sub-Period 2	Restatement Period
[1] Original Portfolios	1,249	1.250%	1.122%	1.173%
		(0.99)	(1.29)	(1.00)
[2] All Restatements	1,319	7.180%**	7.755%***	7.707%***
		(2.40)	(2.74)	(3.74)
[2.1] *Technical* Restatements	254	3.976%	-8.780%	2.004%
		(0.66)	(-1.05)	(0.55)
[2.2] *Non-Suspect* Restatements	144	0.776%	-8.363%	-1.429%
		(0.10)	(-0.69)	(-0.25)
[2.3] *Suspect* Restatements	921	9.065%**	14.772%***	10.708%***
		(2.41)	(2.64)	(3.09)
Two Samples Comparison				
[2] $-$ [1]		5.930%*	6.633%**	6.534%***
		(1.83)	(1.96)	(3.31)
[2.3] $-$ [2.1]		5.089%	23.552%**	8.704%*
		(0.71)	(2.34)	(1.94)
[2.3] $-$ [2.2]		8.289%	23.134%*	12.137%*
		(1.00)	(1.72)	(1.92)

Table 3: Abnormal Returns to Restatement Portfolios: By Restated Holdings' Types

This table reports the annualized abnormal returns of 13F restatement portfolios, each comprising a single type of restated holding at a time. There are four types of restated holdings: *revision up*, *revision down*, *new*, and *complete revision down*-type restated holdings. Definitions of different types of restated holdings are detailed in Table 1. When constructing restatement portfolios with *new* or *complete revision down*-type restated holdings, we further exclude holdings around the Reporting Omission Threshold (i.e., less than 10,000 shares and market value not exceeding $200,000). Abnormal returns are measured using DGTW benchmark-adjusted returns during the restatement period, which extends from the current quarter-end portfolio date to the earlier of two dates: (1) the restatement filing date and (2) the subsequent quarter-end date. The restatement period is further divided into two sub-periods based on the original 13F filing date. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	N	Sub-Period 1	Sub-Period 2	Restatement Period
[1] Revision Up	446	−1.863%	−2.552%	−1.952%
		(−0.52)	(−0.62)	(−0.64)
[2] Revision Down	397	5.549%*	9.838%*	6.287%**
		(1.77)	(1.93)	(2.29)
[3] New	472	12.953%**	14.658%***	12.985%***
		(3.16)	(3.01)	(4.25)
[3.1] Not Around Threshold	439	14.368%***	16.607%***	15.131%***
		(3.20)	(3.20)	(4.38)
[4] Complete Revision Down	321	3.454%	10.114%	4.417%
		(0.62)	(1.52)	(0.97)
[4.1] Not Around Threshold	297	5.572%	8.170%	6.154%
		(0.93)	(1.22)	(0.95)

Table 4: Abnormal Information Event Intensity

This table reports the abnormal information event intensity for restated holdings in suspect restatements during the restatement period. The restatement period extends from the current quarter-end portfolio date to the earlier of two dates: (1) the restatement filing date and (2) the subsequent quarter-end date. The restatement period is further divided into two sub-periods based on the original 13F filing date. In addition to analyzing the suspect restatement itself, we construct and examine the abnormal information intensity for alternative restatement portfolios, each comprising a single type of restated holding at a time: *revision up*, *revision down*, *new*, and *complete revision down*-type restated holdings. When constructing restatement portfolios with *new* or *complete revision down*-type restated holdings, we further exclude holdings around the Reporting Omission Threshold (i.e., less than 10,000 shares and market value not exceeding \$200,000). A stock holding is considered to have experienced an information event at date t if it is associated with at least one information event from the Key Development database or files an 8-K filing on that date. The information event intensity is defined as the percentage of stock holdings experiencing information events during a specified period. To calculate it, we first compute the percentage of holdings with information events at each date t for each portfolio. We then calculate the mean percentage of holdings with information events over the restatement period, as well as over the two sub-periods. Finally, we take the average of the mean percentages across different portfolios. After calculating the information event intensity separately for restated holdings and unrestated holdings in the same 13F portfolio, we calculate the abnormal information event intensity by subtracting the intensity of the unrestated holdings from that of the restated holdings. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively

	N	Sub-Period 1	Sub-Period 2	Restatement Period
Suspect Restatements	921	−0.090%	2.620%***	0.205%
		(−0.23)	(12.78)	(0.55)
[1] Revision Up	446	1.524%***	2.549%***	1.612%***
		(2.65)	(9.01)	(3.13)
[2] Revision Down	397	1.885%***	2.754%***	2.199%***
		(3.22)	(9.34)	(4.02)
[3] New	472	−1.606%***	2.625%***	−1.335%***
		(−3.37)	(8.51)	(−3.04)
[3.1] Not Around Threshold	439	−2.079%***	2.710%***	−1.729%***
		(−4.36)	(8.03)	(−3.85)
[4] Complete Revision Down	321	0.061%	2.467%***	0.310%***
		(0.10)	(7.48)	(0.55)
[4.1] Not Around Threshold	297	0.166%	2.597%***	0.458%
		(0.26)	(7.18)	(0.75)

Table 5: Market Reactions to the Filing of 13F Restatements

This table reports the mean cumulative abnormal returns (CARs) associated with the filing of suspect restatements by hedge fund companies. Each restatement is treated as one event, with equal weights assigned to the restated holdings in the filing. Abnormal returns are measured using the DGTW benchmark-adjusted returns. While calculating CARs associated with the filing of suspect restatements, we multiply the abnormal returns to the revision down or complete revision down-type restated holdings by -1. CARs are reported over the [0, 1], [0, 3], and [0, 5] windows, where date 0 represents the restatement filing date. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	N	[0, 1]	[0, 3]	[0, 5]
Suspect Restatements	921	0.028%	0.126%**	0.165%**
		(0.57)	(2.06)	(2.27)
[1] Revision Up	446	0.124%**	0.206%**	0.128%
		(1.98)	(2.51)	(1.38)
[2] Revision Down	397	0.074%	0.140%*	0.214%**
		(1.10)	(1.75)	(2.15)
[3] New	472	0.053%	0.095%	0.226%**
		(0.57)	(0.85)	(2.54)
[3.1] Not Around Threshold	439	0.155%*	0.144%*	0.307%***
		(1.94)	(1.83)	(2.95)
[4] Complete Revision Down	321	-0.035%	-0.075%	-0.005%
		(-0.40)	(-0.72)	(-0.04)
[4.1] Not Around Threshold	297	-0.032%	-0.080%	0.016%
		(-0.31)	(-0.65)	(0.12)

Table 6: Determinants of 13F Restated and Confidential Holdings

This table reports the results from logistic regressions modelling the determinants of 13F restated and confidential holdings. Restated holdings are from suspect restatements. The dependent variable is an indicator of a specified type of amended holding. 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 $|Return|/(\text{Price} \times \text{Vol})$. *Analysts* is the number of I/B/E/S analysts covering the firm during the year. *DD* is an indicator which equals one if the Merton (1974) distance-to-default measure to be smaller than 1.64. *Volatility* is the stock return volatility using the past 36 monthly stock returns. *Activism* is an indicator that equals one if the same stock holding is included in the 13D filing, which is filed in the same quarter as the original 13F filing. *OptVolume* is the average daily options trading volume measured over the 12-month period ending at the beginning of the current quarter. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	(1) Restated Holding	(2) Revision Up	(3) Revision Down	(4) New Holding	(5) Complete Rev. Down	(6) Conf. Holding
Log(ME)	0.012**	0.062***	0.114***	−0.164***	−0.154***	−0.253***
	(2.19)	(6.74)	(10.39)	(−17.34)	(−8.64)	(−25.50)
Illiquidity	−0.350***	−1.122***	0.103	−1.283***	0.098	−1.205***
	(−6.28)	(−6.89)	(0.88)	(−13.68)	(0.85)	(−13.76)
Log(Analysts)	−0.005	0.089***	0.022	−0.075***	−0.032	−0.035*
	(−0.44)	(3.91)	(0.94)	(−3.88)	(−0.88)	(−1.86)
Volatility	0.002	−0.256	−0.399*	0.147	0.517*	0.839***
	(0.02)	(−1.14)	(−1.72)	(0.76)	(1.66)	(5.47)
DD	−0.005	−0.065	0.006	0.006	0.067	−0.001
	(−0.21)	(−1.42)	(0.13)	(0.14)	(0.85)	(−0.01)
BM	0.073***	0.070**	0.016	0.127***	0.038	−0.044**
	(5.33)	(2.62)	(0.57)	(5.52)	(0.91)	(−2.07)
Adj. Past Return	−0.013	−0.022	−0.119***	0.156***	−0.036	0.065***
	(−1.17)	(−1.03)	(−5.67)	(8.17)	(−1.09)	(4.97)
Activism	1.004*			2.100***		1.257*
	(1.78)			(3.24)		(1.88)
Log(OptVolume)	−0.005***	−0.001	−0.006*	−0.010***	0.002	−0.017***
	(−3.28)	(−0.08)	(−1.86)	(−3.23)	(0.31)	(−4.52)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Standard Errors Cluster	Institution	Institution	Institution	Institution	Institution	Institution
Observations	3,797,276	3,797,276	3,797,276	3,797,276	3,797,276	3,797,276
Pseudo R²	0.076	0.071	0.082	0.173	0.119	0.143

Table 7: 13F Portfolio Return Gap

This table reports the average annualized true portfolio returns, original portfolio returns, and the return gaps for fund-quarters under three scenarios (1) neither a restatement nor a confidential 13F filing is filed (i.e., *No Amendment*), (2) only a suspect restatement is filed (i.e., *Suspect Rest. Only*), and (3) only a confidential filing is filed (i.e., *Conf. Filing Only*). The true portfolio is constructed by updating the original portfolio's holdings using information from either the suspect restatement or the confidential filing filed subsequently. This table reports the raw return gap and the DGTW benchmark-adjusted restatement return gap. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	No Amendment	Suspect Rest. Only	Conf. Filing Only
True Portfolio Returns	8.16%***	8.59%***	8.76%***
	(33.17)	(4.98)	(5.21)
Original Portfolio Returns		8.34%***	8.64%***
		(4.79)	(4.54)
Raw Return Gap		0.25%	0.12%
		(0.32)	(0.10)
DGTW Benchmark-Adjusted Return Gap		0.12%	0.24%
		(0.24)	(0.17)

Table 8: Restatement Return Gap And Hedge Fund Reported Returns: A Portfolio Analysis

This table reports the average reported returns and the corresponding *t*-statistics (in parentheses) for three groups of hedge fund companies. At the beginning of each month, we compute the average restatement return gap over the previous three months for each hedge fund company and categorize them into three groups based on the sign of the restatement return gap. The restatement return gap is calculated as the difference in returns between the true portfolio and the original portfolio, where the true portfolio is updated using available suspect restatement information. We calculate the raw restatement return gap and DGTW benchmark-adjusted restatement return gap. Additionally, this table reports the differences in reported returns between hedge fund companies with positive restatement return gaps and those with negative restatement return gaps. These differences are further adjusted using the eight hedge fund risk factors in Fung and Hsieh (2001). Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

The sign of restatement return gap is determined by:	Raw Restatement Return Gap	DGTW Restatement Return Gap
[1] Positive Gap	0.748%***	0.745%***
	(5.06)	(5.04)
[2] Zero Gap	0.684%***	0.644%***
	(3.63)	(3.84)
[3] Negative Gap	0.621%***	0.627%***
	(4.37)	(4.40)
[1] − [3]: Raw Returns	0.127%*	0.118%*
	(1.86)	(1.71)
[1] − [3]: HF Eight-Factor Alpha	0.163%**	0.156%**
	(2.24)	(2.12)

Table 9: Restatement Return Gap And Hedge Fund Reported Returns: A Fama-MacBeth Regression Analysis

This table presents the results of the Fama-MacBeth cross-sectional regression analysis, which investigates whether the incidence of a positive restatement return gap predicts future reported returns for hedge fund companies. The restatement return gap is calculated as the difference in monthly returns between the true and original portfolios, with the true portfolio being updated using the available suspect restatement information. At the beginning of each month, the average raw restatement return gap and average DGTW benchmark-adjusted restatement return gap are calculated for each hedge fund company over the previous three months. The variable *D_Positive_Gap* is assigned a value of 0.5 (-0.5) for a positive (negative) average restatement return gap. The dependent variable is either raw reported returns (i.e., *Raw*) or excess reported returns based on Fung and Hsieh (2001)'s eight hedge fund risk factors adjustment (i.e., *Alpha*). In addition to the stock characteristics defined in Table 6, we also control for a host of fund characteristics. *Log(Age)* is the natural logarithm of 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. *Flow* is the change in total portfolio value between two consecutive quarters net of the increase due to returns. Reported coefficients and adjusted R^2 are the average values of monthly cross-sectional regressions. Fama-MacBeth *t*-statistics are reported in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

The sign of restatement return gap is determined by:	(1) Raw Restatement Return Gap		(2) DGTW Restatement Return Gap	
Dependent Variable	Raw	Alpha	Raw	Alpha
D_Pos_Gap	0.139*	0.149*	0.129*	0.148*
	(1.87)	(1.90)	(1.73)	(1.86)
Fund Characteristics				
Log(Age)	−0.089*	0.075	−0.088*	0.074
	(−1.95)	(1.56)	(−1.94)	(1.56)
Log(PortSize)	0.041*	−0.032	0.041*	−0.031
	(1.66)	(−1.05)	(1.76)	(−1.01)
Turnover	−0.912**	0.028	−0.917***	0.024
	(−2.61)	(0.09)	(−2.65)	(0.07)
PortHHI	−0.482	−0.132	−0.473	−0.119
	(−1.16)	(−0.30)	(−1.14)	(−0.27)
Flow	−0.006	−0.094	−0.005	−0.092
	(−0.04)	(−0.53)	(−0.03)	(−0.52)
Stock Characteristics				
Log(ME)	−0.115*	−0.035	−0.113*	−0.003
	(−1.82)	(−0.46)	(−1.80)	(−0.97)
Log(BM)	−0.379	−1.134***	−0.377	−1.132***
	(−1.13)	(−2.65)	(−1.12)	(−2.65)
Adj. Past Returns	−0.001	−0.003	−0.001	−0.003
	(−0.34)	(−0.98)	(−0.34)	(−0.97)
Illiquidity	0.584	0.385	0.582	0.404
	(0.53)	(0.35)	(0.53)	(0.37)
Log(Analysts)	0.009	−0.152	0.008	−0.147
	(0.04)	(−0.64)	(0.04)	(−0.62)
Vol	−0.152	−1.896	−0.140	−1.913
	(−0.06)	(−0.83)	(−0.06)	(−0.84)
Observations	22,590	22,590	22,590	22,590
Average Adj. R^2	0.086	0.065	0.086	0.065

Table 10: Restatement Return Gap and Investor Responses

This table reports the results of the regression analysis that examines investor responses to the incidence of a positive restatement return gap. The restatement return gap is calculated as the difference in monthly returns between the true and original portfolios, with the true portfolio being updated using the available suspect restatement information. At the beginning of each quarter, the average raw restatement return gap is calculated for each hedge fund company over the last quarter. The variable *D_Positive_Gap* is assigned a value of 0.5 (-0.5) for a positive (negative) average restatement return gap. We measure investor responses with the frequency of previously-filed (original and/or amendment) 13F filings downloaded from the EDGAR database (i.e., *DL, DL_Org, and DL_Amend*) and the fund flow in the current quarter (i.e., *Flow*). Stock and fund characteristics are defined in Table 6 and Table 9. All standard errors are adjusted for heteroskedasticity and clustered at the institution level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	(1) $Log(DL)$	(2) $Log(DL\_Org)$	(3) $Log(DL\_Amend)$	(4) $Flow$
D_Pos_Gap	0.065*	−0.085***	1.622***	0.060*
	(1.77)	(−2.69)	(15.41)	(1.87)
Fund Characteristics				
Log(Age)	0.234***	0.229***	0.478***	−0.004
	(16.16)	(16.50)	(9.70)	(−1.05)
Log(PortSize)	0.127***	0.120***	0.215***	−0.015***
	(13.55)	(13.28)	(8.20)	(−6.42)
Turnover	0.283***	0.237***	0.836***	0.140***
	(5.61)	(4.95)	(4.02)	(7.27)
PortHHI	0.486***	0.470***	0.202	0.318***
	(5.53)	(5.55)	(0.76)	(7.15)
Flow	−0.021***	−0.021***	−0.012	
	(−3.10)	(−3.24)	(−0.45)	
Stock Characteristics				
Log(ME)	0.028**	0.025**	0.054	0.009***
	(2.33)	(2.12)	(1.53)	(2.47)
Log(BM)	0.228***	0.227***	0.259	0.045**
	(3.89)	(3.95)	(1.22)	(1.97)
Adj. Past Returns	−0.058***	−0.059***	−0.145**	0.019*
	(−2.85)	(−2.99)	(−2.25)	(1.66)
Illiquidity	0.161	0.157	0.152	−0.051
	(1.43)	(1.45)	(0.31)	(−0.98)
Log(Analysts)	−0.092**	−0.078*	−0.256**	0.015
	(−2.06)	(−1.72)	(−2.34)	(1.12)
Vol	1.139**	1.180***	1.104	0.005
	(4.73)	(5.07)	(1.24)	(0.06)
Year × Quarter FE	Yes	Yes	Yes	Yes
Standard Errors Cluster	Institution	Institution	Institution	Institution
Observations	29,496	29,496	29,496	29,496
Adj. R^2	0.968	0.970	0.291	0.030

Table 11: Thomson Reuters and 13F Amendments

This table examines whether Thomson Reuters (TR) updates the "number of shares" data based on 13F amendments. Panel A presents the number and percentage of confidential and restated holdings where TR reports a different "number of shares" compared to the respective 13F amendment. Restated holdings are further categorized into four types, namely *revision-up*, *revision-down*, *new*, and *complete revision-down*-type restated holdings. Data discrepancy analysis is repeated separately for concurrent and non-concurrent 13F amendments. An amendment is deemed concurrent if it is filed in the same quarter as the original 13F filing. Otherwise, it is a non-concurrent amendment. Panel B provides summary statistics for the TR bias rate (i.e., *TR_Bias*) and the TR error rate (i.e., *TR_Error*). To measure *TR_Bias* (*TR_Error*), we first calculate the (absolute) difference in the number of shares between TR and the 13F amendment for each individual stock holding. Then, we aggregate 1) the (absolute) difference in the number of shares and 2) the market value across stock holdings on the 13F amendments filed for the same calendar quarter. Finally, we divide the aggregated (absolute) difference in the number of shares by the aggregated market value. Both statistics are calculated separately for restatements and confidential filings.

Panel A: Discrepancy in the reported number of shares

	Confidential Holdings	Restated Holdings	Revision Up	Revision Down	New	Complete Revision Down
[1] Amended Holdings on All 13F Amendment						
# of Holdings	32,475	117,642	32,194	28,066	44,055	13,327
# of Holdings 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 Concurrent 13F Amendment						
# of Holdings	1,386	71,020	14,255	19,986	26,452	10,327
# of Holdings 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%)
[3] Amended Holdings on Non-Concurrent 13F Amendment						
# of Holdings	31,089	46,622	17,939	8,080	17,603	3,000
# of Holdings 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%)

Panel B: TR Bias Rate and Error Rate for Fund-Quarters where an amendment is filed

	N	Mean	SD	Min	Q1	Median	Q3	Max
TR_Bias	2,199	−0.572%	7.745%	−170.511%	−0.063%	0.107%	0.523%	9.640%
TR_Bias_Rest	1,319	−0.304%	5.829%	−136.662%	0.000%	0.160%	0.557%	9.640%
TR_Bias_Conf	880	−2.243%	18.125%	−170.511%	−0.206%	0.026%	0.412%	8.332%
TR_Error	2,199	1.875%	8.002%	0.000%	0.173%	0.540%	1.385%	170.511%
TR_Error_Rest	1,319	1.533%	5.915%	0.000%	0.178%	0.502%	1.251%	136.662%
TR_Error_Conf	880	3.580%	18.055%	0.000%	0.168%	0.627%	1.561%	170.511%

Appendix A: An Example of a 13F Restatement Header

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                        UNITED STATES
              SECURITIES AND EXCHANGE COMMISSION
                    Washington, D.C. 20549


                          Form 13F

                      Form 13F COVER PAGE

Report for the Calendar Year or Quarter Ended:    December 31, 1999

Check here if Amendment [ X ];      Amendment Number:  2
                                                       --

        This Amendment (Check only one.):   [ X ] is a restatement.
                                            [    ] adds new holdings entries.

Institutional Investment Manager Filing this Report:

Name:        Symphony Asset Management LLC
Address:     555 California Street
             Suite 2975
             San Francisco, California 94104

Form 13F File Number:   28-5958

The institutional  investment  manager filing this report and the person by whom
it is signed hereby  represent  that the person signing the report is authorized
to  submit  it,  that all  information  contained  herein is true,  correct  and
complete,  and  that it is  understood  that  all  required  items,  statements,
schedules, lists, and tables, are considered integral parts of this form.

Person Signing this Report on Behalf of Reporting Manager:

Name:        Neil L. Rudolph
Title:       COO
Phone:       (415) 676-4000

Signature, Place, and Date of Signing:

             /s/ Neil L. Rudolph    San Francisco, California    07/10/01
             --------------------    --------------------------    --------
             [Signature]                       [City, State]        [Date]
```

Appendix B: Definitions of Variables

Variable	Definitions
Activism	An indicator that equals one if the same stock holding is included in a 13D filing that was filed in the same quarter as the original 13F filing.
Adj. Past Return	Cumulative stock returns during the 12 months prior to the quarter-end portfolio date adjusted by the CRSP value-weighted market return.
Age	Portfolio age calculated as the number of years since the institution's first appearance on Thomson Reuters.
Analyst	Number of I/B/E/S analysts covering the firm during the year.
BM	Book-to-market ratio.
Flow	Change in total portfolio value between two consecutive quarters net of the increase due to returns.
D_Pos_Gap	An indicator that takes the value of 0.5 if the three-month average restatement return gap is positive at the beginning of the month/quarter, −0.5 if negative, and 0 otherwise.
DD	An indicator that equals one if the Merton (1974) distance-to-default measure is smaller than 1.64 and zero otherwise.
Illiquidity	Stock illiquidity calculated as the average of the square root of daily $|Return|/(Price \times Vol)$.
ME	Quarter-end market capitalization of the stock in billions of dollars.
OptVolume	Average daily options trading volume over the 12-month period ending at the beginning of the current quarter.
PortHHI	The Herfindahl index of the portfolio, which is calculated from the market value of each component stock.
PortSize	Total equity portfolio size of an institution calculated as the market value of its quarter-end holdings.
TR_Bias	Thomson Reuters (TR) bias rate based on the difference between the number of shares reported by TR and the number reported on the corresponding 13F filing.
TR_Error	Thomson Reuters (TR) error rate based on the absolute difference between the number of shares reported by TR and the number reported on the corresponding 13F filing.
Turnover	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.
Volatility	Monthly stock return volatility calculated using the past 36 months' returns.

Internet Appendix of "Do Hedge Funds Strategically Misreport Their Holdings? Evidence from 13F Restatements"

Table IA1: Abnormal Returns: Carhart (1997) Four-Factor Alpha

This table reports the annualized four-factor alpha described by Carhart (1997). Suspect restatements are evaluated for their abnormal performance during the restatement period. The restatement period extends from the current quarter-end to the earlier of two dates: (1) the restatement 13F filing date or (2) the end of the subsequent quarter. The restatement period is further divided into two sub-periods based on the original 13F filing date. The identification of suspect restatements is detailed in Table 2. We also examine the abnormal returns for alternative restatement portfolios, each comprising a single type of restated holding from the suspect restatements at a time. There are four types of restated holdings: *revision up*, *revision down*, *new*, and *complete revision down*. Definitions of different types of restated holdings are provided in Table 1. When constructing restatement portfolios with *new* or *complete revision down*-type restated holdings, holdings around the Reporting Omission Threshold (i.e., less than 10,000 shares and market value not exceeding $200,000) are excluded. Abnormal returns for the *revision down* or *complete revision down*-type restated holdings are multiplied by -1 during calculation. The average daily abnormal returns are calculated for each portfolio during different periods and then averaged across different portfolios. Finally, the average daily portfolio returns are multiplied by 252 to yield the annualized portfolio return. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	N	Sub-Period 1	Sub-Period 2	Restatement Period
Suspect Restatements	921	4.242%	5.447%*	4.579%*
		(1.56)	(1.93)	(1.90)
[1] Revision Up	446	-2.878%	-7.582%*	-3.623%
		(-0.94)	(-1.77)	(-1.51)
[2] Revision Down	397	3.133%	11.273%**	3.432%
		(0.93)	(2.19)	(1.31)
[3] New	472	3.611%	4.543%*	3.797%
		(1.01)	(1.88)	(1.35)
[3.1] Not Around Threshold	439	3.946%	8.239%**	4.638%
		(1.06)	(2.10)	(1.64)
[4] Complete Revision Down	321	4.960%	9.351%**	5.940%*
		(1.09)	(1.96)	(1.75)
[4.1] Not Around Threshold	297	5.432%*	7.633%*	5.550%*
		(1.74)	(1.77)	(1.71)

Table IA2: Abnormal Returns: Restated Holdings of Mutual Funds and Pension Funds

This table reports the annualized DGTW benchmark-adjusted returns for restated holdings of mutual funds (in Panel A) and pension funds (in Panel B). 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. 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. The average daily DGTW benchmark-adjusted returns during different periods are first calculated for each portfolio and then averaged across different portfolios. In the end, we multiply the average daily portfolio returns by 252 to yield the annualized portfolio return. Numbers marked with ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	N	Sub-Period 1	Sub-Period 2	Restatement Period
Panel A: Mutual Funds				
[1] Original Portfolios	193	1.107%	−0.005%	−0.050%
		(1.18)	(−0.01)	(−0.11)
[2] Restatement Portfolios	213	2.867%	−6.878%*	−1.250%
		(0.77)	(−1.66)	(−0.59)
Diff: [2] − [1]		1.760%	−6.873%*	−1.200%
		(0.46)	(−1.66)	(−0.56)
Panel B: Pension Funds				
[1] Original Portfolios	19	−0.485%	−1.336%	−1.156%
		(−0.16)	(−1.49)	(−1.13)
[2] Restatement Portfolios	21	5.016%	−4.452%	−3.089%
		(0.73)	(−0.84)	(−0.70)
Diff: [2] − [1]		5.501%	−3.117%	−1.933%
		(0.73)	(−0.58)	(−0.43)