Disagreement between hedge funds and other institutional investors and the cross-section of expected stock returns*

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Abstract

We find strong disagreements between hedge funds and other institutions in their common stock trades are twice as likely as agreements. Overall success of hedge funds' trades and poor performance of non-hedge funds' trades are both confined to disagreement stocks. Although hedge funds are commonly positive feedback traders, they are neither positive nor negative feedback traders for stocks heavily sold by other institutions. Hedge funds also depend less on earnings news. Our findings highlight the importance of disagreement in studying the performance of institutional investors' trades and are consistent with the notion that skilled investors rely less on public information.

KEYWORDS

disagreement, institutional investors, mispricing

JEL CLASSIFICATION

G10, G11, G14

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1 INTRODUCTION

Given the rising dominance of institutional investors in financial markets over the last two decades, a central question in finance has been the predictive power of institutional trading on stock returns. A vast literature on the information content of institutional trading provides mixed evidence. Among the earlier studies, Nofsinger and Sias (1999) document that stocks heavily bought by institutions subsequently outperform stocks heavily sold by institutions. Gompers and Metrick (2001) find that temporal demand shocks, rather than informed trading of institutional investors, positively predict future returns. More recently, whereas Lewellen (2011) shows that the aggregate institutional portfolio has overall performed poorly since 2000, Alldredge (2020) presents evidence that institutional investors generate abnormally high trading profits in lottery-like stocks during low-sentiment periods.

Within the heterogeneous nature of institutional investors, hedge funds, in particular, differ from other institutional investors in terms of their structure and flexibility. For this reason, one strand of the literature has focused specifically on the informational content of hedge funds' trading. While there are a few earlier studies that provide weak support for the informativeness of hedge funds' trades (e.g., Asness et al., 2001; Amin & Kat, 2003; Griffin & Xu, 2009), a growing number of recent studies present stronger evidence of informed trading by hedge funds (e.g., Agarwal et al., 2013; Jiao, 2013; Yuksel, 2015; Jiao et al., 2016; Sias et al., 2016; Grinblatt et al., 2020; Chen et al., 2022).[1]

Motivated by the significant differences in the performance of hedge funds and other institutions (hereafter referred to as non–hedge funds), this paper examines to what extent disagreements between

[1] One part of the literature that studies how hedge funds trade in stock markets in a more general manner include Brunnermeier and Nagel (2004), and Kang et al. (2014). Moreover, while there are some studies that focus on how hedge funds contribute to market efficiency (e.g., Akbas et al., 2015; Caglayan et al., 2018; Cao et al., 2018), other studies show that institutional investors as a whole group exacerbate mispricings (Jiang, 2010; Edelen et al., 2015).

In addition, there is an expanding literature on the superior performance of hedge funds attributing this outperformance to their timing and/or stock picking abilities. Fung and Hsieh (2001, 2004), Agarwal and Naik (2000, 2004), Fung et al. (2008), Jagannathan et al. (2010), Cao et al. (2013), Patton and Ramadorai (2013), Bali et al. (2014), and Duanmu et al. (2021) are among those studies that analyze the performance and risk attributes of hedge funds.

hedge funds and non–hedge funds play a role in their stock trade performances. We define strong disagreements as cases where stocks are heavily bought (sold) by hedge funds while contemporaneously heavily sold (bought) by non–hedge funds.[2]

We argue that such occurrences of disagreements can help disentangle the information content of hedge funds' and non–hedge funds' trades from each other in a more direct manner than a comparison of the univariate analyses of the relation between the trades of different institutional investor groups and future returns. That is, a stock that hedge funds may detect as mispriced can be traded in the same direction by non–hedge funds as well if both act on the same signal. This contemporaneous same-direction trading by hedge funds and non–hedge funds (probably against the trades of retail investors), in turn, speeds up the price adjustment to new information and thus makes it challenging to observe the differences in informational content between the trades of these two institutional investor groups. Therefore, analyzing the disagreements and their predictive power over future stock returns has the advantage of identifying which type of investors are better informed in their trades. However, there may be a potential limitation to this approach as disagreements can be scarce, given that all investors access the same public information around the same time. On the other hand, stocks bought by both hedge funds and non–hedge funds in the same quarter can be subject to significant price pressure since it may be more difficult for institutional investors to find counterparties (e.g., retail investors) to their trades. Therefore, this may discourage institutions from trading in the same direction, resulting in a smaller number of stocks on which they agree.[3] In the end, our objective is to empirically examine the extent of disagreement between hedge funds and non–hedge funds and analyze the role of strong disagreements in the performance of institutional trading.

[2] We define institutional trading (buying or selling) as the change in the fraction of shares held by institutional investors. We refer to heavy buy (sell) as the top (bottom) 20% of the institutional trading in the cross-section in each quarter.
[3] This requires the assumption that hedge funds and non–hedge funds can track each other's trades in the same quarter.

We find that hedge funds and non–hedge funds are more likely to strongly disagree with each other than to agree. That is, within stocks heavily sold (bought) by non–hedge funds, the number of stocks heavily bought (sold) by hedge funds is two times as high as the number of stocks subject to the agreement between these two groups (i.e., jointly heavily sold or bought).[4] With the assistance of this abundance of disagreement, we first examine whether one group is better informed than the other. For this, we compute the future returns to bivariate portfolios created by independently sorting stocks based on hedge fund and non–hedge fund trading in each quarter. We find that stocks heavily bought by hedge funds and contemporaneously heavily sold by non–hedge funds (i.e., disagreement stocks) earn 0.47% (*t*-stat = 7.55) characteristic-adjusted monthly return and 0.54% (*t*-stat = 5.97) four-factor monthly alpha over the next three months. This economically and statistically significant positive abnormal return suggests that hedge funds' buys are better informed than non–hedge funds' sells.[5]

One may argue that the superior performance of disagreement stocks could simply be due to hedge funds providing liquidity to other institutional investors' sell trades so that these other institutional investors can meet their investor redemptions. To rule out this possibility, we sort stocks with strong disagreements into terciles (low, medium, and high) based on their cumulative returns during the quarter in which disagreement is measured. We find that both losing and winning stocks of the disagreement portfolio (as well as the middle group) earn similar positive and significant returns and alphas in the subsequent quarter. The fact that losing stocks in the disagreement portfolio do not generate any statistically significant higher returns and alphas than the winning stocks in the following quarter suggests that the subsequent quarter positive abnormal returns of the disagreement portfolio are not

[4] We should note that because we do not observe the entire stock trading by all market participants including both institutional and retail investors in our study, our findings are not likely due to a mechanical artifact of market clearance and zero-sum game of total buys to total sells.

[5] At the other end of the disagreement spectrum, stocks heavily sold by hedge funds and contemporaneously heavily bought by non–hedge funds do not yield significant future abnormal returns. However, among these stocks, those that experience an increase in short interest deliver negative abnormal returns, which are consistent with Jiao et al. (2016). We discuss findings from our analysis that utilizes short interest data in more detail in Section 4.6.

confined to losing stocks.[6] This finding to a large extent rules out the possibility of flow-induced mispricings (fire sales) as the sole explanation for our findings.

We also examine to what extent the superior performance of the disagreement portfolio plays a role in the overall informativeness of hedge funds' and non–hedge funds' trades. We find that both the overall superior performance of hedge funds' trades and the overall poor performance of non–hedge funds' trades are strongly driven by the performance of this disagreement portfolio. Specifically, the positive future return spread between hedge funds' heavy buys and heavy sells is significant only for stocks heavily sold by non–hedge funds. Moreover, the future return spread between non–hedge funds' heavy buys and heavy sells are negative and significant mostly for stocks heavily bought by hedge funds. We confirm the strong impact the disagreement stocks have on the predictive power of hedge funds' and non–hedge funds' trades over future stock returns via multivariate Fama-MacBeth cross-section regressions controlling for various stock characteristics as well. These findings highlight the importance of the disagreement between hedge funds and non–hedge funds in studying the relation between institutional trading and subsequent stock returns.

We also investigate other potential sources of disagreements. First, we consider the well-known feedback trading behavior of institutions. Previous studies report that both institutional investors as a whole group (e.g., Falkenstein, 1996; Nofsinger & Sias, 1999; Yan & Zhang, 2009) and hedge funds (e.g., Griffin & Xu, 2009) engage in momentum trading. That is, investors may trade on common signals such as past stock returns rather than their own private information. Consistent with Griffin and Xu (2009), univariate sortings on hedge fund and non–hedge fund trading (demand) separately reveal a positive and significant past return spread for hedge funds; however, this is weaker than the positive past return spread observed for non–hedge funds.[7] More importantly, bivariate sorting on hedge fund and

[6] Coval and Stafford (2007) show that stocks that are subject to fire sales first experience a price drop in the period when fire sales occur and earn positive abnormal returns over the subsequent periods due to flow-induced mispricing.
[7] In the rest of the paper, we use the terms *demand* and *trading* interchangeably.

non–hedge fund trading reveals that hedge funds engage in neither positive nor negative feedback trading for stocks heavily sold by non–hedge funds. In contrast, we find that the larger positive past return spreads for non–hedge funds' trades are independent of the hedge fund trading.

The lack of evidence for hedge funds' feedback trading in stocks heavily sold by non–hedge funds does not necessarily mean that the superior performance of disagreement stocks is not related to past stock returns. In a recent study, Grinblatt et al. (2020) show that contrarian hedge funds trade profitably with momentum-oriented mutual funds, particularly through investing in loser stocks. To see if positive abnormal returns of the disagreement portfolio are actually related to past stock returns, we partition the disagreement portfolio into terciles based on past six-month stock returns. Unlike Grinblatt et al. (2020), we find that both past losers and past winners in the disagreement portfolio deliver similar significant positive abnormal returns in the future, which suggests that neither the positive nor the negative feedback trades of hedge funds alone generate the superior performance of the disagreement portfolio. We believe that Grinblatt et al.'s (2020) use of fund trades and stock returns in the same quarter in their estimation of a time-invariant-style measure of a fund for the entire sample period, as opposed to using an extending or a rolling window approach, might have led to this difference in results.[8]

As another potential source for disagreement, following Kim and Verrecchia (1991a, 1991b) who conjecture that the differential quality of prior private information among investors results in different reactions to public news, we examine if hedge funds and non–hedge funds differ from each other in their trades in relation to firms' earnings news. While there is a strong positive relation between earnings news and non–hedge fund trading, we find no evidence of a contemporaneous relation between earnings news and hedge fund trading. Furthermore, we show that current earnings news does not produce a significant future abnormal return spread within strong disagreement stocks.

[8] Grinblatt et al.'s (2020) methodology eliminates the possibility of a hedge fund to change styles from contrarian to momentum or vice versa through time.

In sum, these findings indicate a greater reliance of non–hedge funds on concurrent public news and past return trends, which may help disagreements to materialize more often. Moreover, the lack of significant differences in the future returns of the disagreement subportfolios generated based on past stock returns and current earnings news suggest that better-informed hedge fund trading may be the main factor that drives the future positive abnormal returns to the disagreement portfolio. These findings are consistent with Kacperczyk and Seru (2007) in the sense that higher-skilled fund managers' trades are less sensitive to public news.

We also conduct robustness tests to explore other potential explanations for the future positive abnormal returns of the disagreement portfolio. First, we consider window dressing as a possible cause of the observed disagreement and subsequent returns. Fund managers may distort their holdings by selling loser stocks to mislead investors, particularly at calendar year–ends (e.g., Lakonishok et al., 1991; Huang et al., 2007; Agarwal et al., 2014). Accordingly, when we exclude the first calendar quarter of each year from the sample (the quarter after which the strongest window dressing takes place), our findings remain the same, suggesting that window dressing is not the main driver of the observed future positive abnormal returns of the disagreement portfolio. Second, to see if our results are driven by hedge fund activism, we exclude stocks that are subject to activism by hedge funds (e.g., Brav et al., 2008). We find that the dispersion of stocks subject to activism is uniform across hedge fund versus non–hedge fund trading. Furthermore, the exclusion of such stocks does not affect our main findings.

We also examine if the positive abnormal returns to the disagreement portfolio are related to the market states. We find similar instances of disagreement across different market states. Furthermore, we show that the positive abnormal returns to the disagreement portfolio are similar in different states of the market as well. Therefore, we conclude that the state of the market does not play a major role in our findings. Lastly, we examine the evolvement of disagreement over time and find that our main findings remain robust in both halves of the sample period 1994–2017.

Overall, our study contributes to the literature on the informativeness of institutional investors' trades in common stocks in the following manner. First, using a comprehensive sample of hedge funds, we show that strong disagreements between hedge funds and non–hedge funds are two times more prevalent than strong agreements. Second, prior literature shows that stocks heavily bought by hedge funds outperform stocks heavily sold by hedge funds (e.g., Jiao, 2013; Cao et al., 2018) and hedge funds' trades are better informed than other institutions (e.g., Grinblatt et al., 2020). Our results indicate that the future return difference between heavy buys and heavy sells of hedge funds is primarily driven by the disagreement stocks. Third, there is a growing literature that shows a decline in the performance of institutional holdings (e.g., Lewellen, 2011) as well as a decline in the performance of institutional investors' trades (e.g., Ince & Kadlec, 2020). We show that the poor performance of non–hedge funds' trades is also strongly driven by the performance of disagreement stocks. Fourth, we provide evidence that the superior performance of disagreement stocks is not related to the past or contemporaneous stock returns and earnings news, which suggests that it is the hedge funds' trades that are contrarian to non–hedge funds' trades (not the hedge fund trades contrarian to stock returns) that drive the superior performance of disagreement stocks, which in turn explains the overall success of hedge funds' trades.

The article proceeds as follows. Section 2 describes the sample and data. Section 3 provides results from the main empirical tests. Section 4 presents robustness tests. Section 5 concludes the paper.

2. DATA AND SUMMARY STATISTICS

We obtain data for monthly stock returns, shares outstanding, share price, and volume from the Center for Research in Securities Prices (CRSP) for all NYSE/AMEX/NASDAQ common stocks. We exclude stocks with share prices less than $5 at the end of each quarter to avoid the potential effects of illiquid low-priced stocks. We obtain book value of equity, cash dividend, and quarterly earnings announcement dates from Compustat. We also exclude stocks with negative book equity values and stocks with less than 24 months of return data prior to a given quarter.

The institutional holdings (13F) data at calendar quarter–ends for all common stocks traded on NYSE, AMEX, and NASDAQ are from Thomson-Reuters. The Securities and Exchange Commission (SEC) requires all investment managers with holdings of securities worth more than $100 million to report equity positions greater than 10,000 shares or $200,000 at the end of each calendar quarter. We define institutional ownership ratio for each stock as the number of shares held by institutions divided by the total number of shares outstanding. We separately calculate hedge fund and non–hedge fund ownership for each stock.

To identify the list of hedge fund holding companies, we follow Agarwal et al. (2013). We first identify hedge fund companies from five commercial self-reported hedge fund databases (union database) that include CISDM, Eureka, HFR, MSCI, and TASS. Then a 13F filer is classified as a hedge fund institution if one of the following criteria is satisfied: (1) the institution is paired with the name of one or multiple funds from these five databases; (2) the institution is listed in industry publications (e.g., *Hedge Fund Group*, *Barron's*, *Alpha* magazine, and *Institutional Investors*) as one of the top hedge funds; (3) the company's website claims it to be a hedge fund management company or lists hedge fund management as a major line of business; or (4) the company is featured by news articles in Factiva as a hedge fund manager/sponsor.[9] Moreover, we manually check the ADV filings of 13F companies and include them in the sample as a hedge fund if the following two criteria are satisfied: (1) more than 50% of its clients are high-net-worth individuals or more than 50% of its investment is listed as "other pooled investment vehicles," and (2) the manager is compensated with performance-based fees.[10]

As these hedge fund databases exclude defunct funds prior to 1994, we start our sample in 1994. We calculate the change in institutional ownership for the first time in the second quarter of 1994, and

[9] We are grateful to Vikas Agarwal for sharing this comprehensive list of hedge funds.

[10] In terms of the distribution of sources in identifying the 13F-filing hedge funds among all institutions in our sample, the union database covers approximately 90% of our 13F-filing hedge fund sample. An additional 6% of the sample comes from ADV filings. The other three criteria combined (industry publications, company websites, and news articles in Factiva) constitute the remaining 4% of our 13F-filing hedge fund sample.

the last change in institutional ownership is calculated in the third quarter of 2017, covering a total of 94 quarters. In sum, in our sample during the period from 1994 to 2017, we detect 2,241 of the 8,149 institutions that file 13F forms as hedge fund companies.[11]

In Table 1, we report time-series averages of the quarterly cross-sectional statistics of hedge funds and non–hedge funds. Although, on average, the median size of a hedge fund equity portfolio is less than that of a non–hedge fund, hedge funds' median total buys and sales are significantly greater than those of non–hedge funds. This is also observed in two times greater turnover rates for hedge funds. Moreover, hedge funds hold fewer stocks than non–hedge funds, suggesting that hedge funds, on average, hold more concentrated positions. In addition, while non–hedge funds (hedge funds) as a whole on average hold 41.09% (11.73%) of a stock's outstanding shares, the average quarterly change in hedge fund ownership is not that much smaller compared to the average quarterly change in non–hedge fund ownership (0.28% vs. 0.39%). These pieces of evidence are consistent with the view that hedge funds are significantly more active traders than other institutions.

[[Please insert Table 1 about here]]

3. EMPIRICAL RESULTS

In this section, we first provide results on the extent of disagreements between hedge funds and non–hedge funds in the cross-section of common stocks. We then examine the subsequent returns to stocks that are subject to strong disagreement to determine which investor group is better informed. Lastly, we explore other potential drivers of strong disagreements in addition to the differences in information content.

[11] Figure A in the Online Appendix shows that hedge funds' market share (i.e., the percentage of the market value of securities) has steadily increased over the years. For example, hedge funds (non–hedge funds) hold 4.80% (45.60%) of the market value of all securities in 1994, and this figure increases to 16.47% (55.85%) in 2017. Similarly, the ratio of hedge fund ownership to non–hedge fund ownership has risen from 0.105 in 1994 to 0.295 in 2017. In 1994, hedge funds held on average 4.58% of outstanding shares of a stock, while non–hedge funds held 33.33%. These figures increased to 19.85% for hedge funds (more than quadruple the 1994 levels) and to 47.35% for non–hedge funds (almost 50% higher than the 1994 levels).

3.1 The extent of disagreements

We examine to what extent disagreements between hedge funds and non–hedge funds occur in the cross-section of stocks. For that purpose, we form 25 portfolios by independently sorting stocks into quintiles based on hedge fund trades (ΔHfown) and non–hedge fund trades (ΔNonhfown) at the end of each quarter from 1994:Q2 to 2017:Q3, covering 94 quarters. In Panel A of Table 2, we report the average number of stocks in each of these 25 portfolios.[12] In Panel B, for each non–hedge fund quintile, we report the percentages of stocks that fall in each hedge fund quintile. We find evidence that strong disagreements are two times more likely than agreements. That is, during the same quarter, stocks heavily bought by hedge funds constitute 37% of all stocks heavily sold by non–hedge funds. On the other hand, only 18% of stocks heavily sold by non–hedge funds are also heavily sold by hedge funds. Similarly, stocks heavily sold (bought) by hedge funds constitute 36% (21%) of all stocks heavily bought by non–hedge funds.

[[Please insert Table 2 about here]]

One may argue that because every buyer must have a seller for the markets to clear (a zero-sum game of total buys to total sells), it is therefore not surprising to observe more disagreements than agreements among hedge fund and non–hedge fund trading. However, we would like to highlight that we are not observing the entire universe of stock trading in our study. In addition to trading by institutional investors, there is a significant portion of stock trading conducted by retail investors (alongside hedge funds and non–hedge funds) that we do not observe in this study. Therefore, the higher prevalence of disagreements between hedge funds and other institutional investors is not likely a mere mechanical artifact of a zero-sum game.

[12] As reported in Panel A of Table 2, the total number of stocks in our sample of 25 portfolios is 2,987.18 per quarter. In the same panel, we find that the total number of strong disagreement stocks is 433.65 (218.97 + 214.68) per quarter, and the total number of strong agreement stocks is 231.81 (107.88 + 123.93) per quarter. These figures suggest that while 14.5% (433.65 / 2,987.18) of all stocks are subject to strong disagreements in our sample, only 7.8% (231.65 / 2,987.18) of all stocks are subject to strong agreements.

The large number of disagreements in comparison to agreements could also be an artifact of the limitation of the number of stocks an investor can sell (i.e., hedge funds can sell only the stocks they own among the stocks heavily sold by non–hedge funds). To alleviate this concern, we eliminate the stocks that have less than 10% hedge fund ownership ratio at the beginning of the quarter where we measure disagreement. We find that the number of stocks heavily sold by non–hedge funds and heavily bought by hedge funds remains at least two times greater than the number of stocks heavily sold by both hedge funds and non–hedge funds (i.e., 127 stocks vs. 62 stocks).

Lastly, in Panels C and D of Table 2, we report the average quarterly change in hedge fund ownership and non–hedge fund ownership, respectively, for each of the 25 portfolios. We observe that the demand figures for the disagreements are economically significant. That is, for the stocks heavily sold by non–hedge funds and heavily bought by hedge funds, the average quarterly hedge fund (non–hedge fund) demand is 4.02% (–5.58%). Similarly, for the other disagreement portfolio, hedge funds (non–hedge funds), on average, sell (buy) 3.08% (5.65%) of outstanding shares.

3.2 Returns on portfolios sorted by changes in institutional ownership

The large number of stocks subject to such strong disagreements between hedge funds and non–hedge funds is noteworthy, given some previous studies that examine institutional demand lump hedge funds with other institutions in their analyses.[13] In this section, we examine whether the disagreement portfolio plays an important role in the informativeness of institutional trades. For this reason, we look at the subsequent quarter returns to the bivariate portfolios created by independently sorting stocks into quintiles based on hedge fund and non–hedge fund trading. In Panel A of Table 3, we first report the average monthly Daniel-Grinblatt-Titman-Wermers (DGTW)-adjusted returns for each of these 25 portfolios. To the right of bivariate portfolios, in columns labeled as "All," we report the returns to the

[13] On the other hand, for example, Griffin and Xu (2009), Ben-David et al. (2012), Cao et al. (2018), Calluzzo et al. (2019), and Grinblatt et al. (2020), similar to our study, treat hedge funds separately in their analyses.

univariate portfolios created based on non–hedge fund and hedge fund trading separately. In addition, to further investigate the impact of disagreement stocks on the trades of hedge funds, in the column labeled "Exc. NonHF HS," we analyze the returns to the univariate portfolios based on hedge fund trading after excluding the stocks heavily sold by non–hedge funds. Similarly, to analyze the impact of disagreement stocks on the trades of non–hedge funds, in the column labeled "Exc. HF HB," we examine the performance of the univariate portfolios based on non–hedge fund trading after we exclude stocks heavily bought by hedge funds. For the same bivariate and univariate portfolio analysis, we report the monthly four-factor alphas generated from equally weighted (EW) returns in Panel B of Table 3. Last, we reproduce the DGTW-adjusted return and four-factor alpha results using the value-weighted (VW) returns and report them in Panels C and D of Table 3, respectively. In all panels of Table 3, we use the Newey and West (1987) standard errors to calculate the *t*-statistics.

[[Please insert Table 3 about here]]

In Panel A of Table 3, we observe that stocks heavily bought by hedge funds and heavily sold by non–hedge funds in the same quarter deliver an economically and statistically significant positive monthly DGTW-adjusted return of 0.47% (*t*-stat = 7.55) in the following quarter. Similarly, the EW four-factor alpha, the VW DGTW-adjusted return, and the VW four-factor alpha of this disagreement portfolio are 0.54% (*t*-stat = 5.97), 0.39% (*t*-stat = 6.03), and 0.47% (*t*-stat = 4.94) per month, respectively, and are highly significant (see Panels B–D of Table 3). These results suggest that hedge funds' buys are better informed than non–hedge funds' sells. At the other end of the disagreement spectrum, stocks heavily sold by hedge funds and heavily bought by non–hedge funds experience negative but statistically insignificant abnormal returns.[14] For stocks that are contemporaneously heavily bought or heavily sold by both hedge funds and non–hedge funds in quarter *q* (strong agreement stocks),

[14] In Section 4.6, we show that a subcomponent of this disagreement portfolio that experience an increase in short-interest positions actually delivers statistically significant negative abnormal returns in the following quarter, suggesting that hedge funds' sell trades are more informed when accompanied with shorting.

however, we find no evidence of return reversals (due to price pressure) or return continuation (due to informed trades) in the subsequent quarter (q+1).[15] This finding is consistent with the evidence provided by previous studies that examine institutional investors as a whole without separating hedge funds from other institutions. For example, Lewellen (2011) finds that institutional investors as a whole have little stock-picking skills. One possible explanation for no positive (negative) future abnormal returns for stocks that are heavily bought (sold) by both hedge funds and non–hedge funds could be that the same-direction trading by these two groups of investors speeds up the information incorporation process. Therefore, we do not observe any drift in abnormal returns in the subsequent quarter.[16]

The portfolio return analysis also highlights the important role that the disagreement portfolio (i.e., stocks heavily bought by hedge funds and heavily sold by non–hedge funds) plays in understanding the relation between institutional demand and future stock returns. For example, in Table 3, Panel A, the future return spread between hedge fund buys and hedge fund sells is significant only among stocks heavily sold by non–hedge funds, an EW DGTW-adjusted monthly return spread of 0.49% (t-stat = 4.79).[17] This spread is driven by the positive abnormal returns of the disagreement stocks 0.47% (t-stat

[15] In addition to reporting DGTW-adjusted returns and four-factor alphas, in Table I of the Online Appendix, we report alternative performance measures of the four corner portfolios (strong disagreement and strong agreement portfolios) generated from different factor models. The findings are consistent with the results reported in Table 3, suggesting that our main findings are not model-specific.

[16] In results not tabulated, when we reconduct the analysis in Table 3 for contemporaneous quarter returns (quarter q), we find significantly positive (negative) same-quarter abnormal returns when hedge funds and non–hedge funds strongly buy (sell) together. These results provide evidence for the existence of a same-quarter price move in the direction of hedge fund and non–hedge fund trading when hedge funds' and non–hedge funds' trades strongly agree. However, since we do not know the exact timing of these trades within a given quarter (whether the trades occur before returns or trades follow the returns), we cannot infer from these findings whether these trades are informed when these two groups of institutions heavily buy or sell together.

[17] Interestingly, among the stocks that non–hedge funds neither buy nor sell (non–hedge fund demand quintile 3), the stocks that hedge funds buy heavily do not outperform the stocks that hedge funds sell heavily in the following quarter (an EW DGTW-adjusted return of 0.05% per month with a t-statistic of 0.33). More importantly, within the same non–hedge fund demand quintile 3, the stocks that hedge funds buy heavily (hedge fund demand quintile 5) do not generate statistically significant positive abnormal returns in the subsequent quarter. When hedge funds are strongly buying but other institutions are neither buying nor selling, we can infer that it must be the individual (retail) investors who are selling those stocks that are heavily bought by hedge funds. The fact that these stocks do not generate positive abnormal returns in the following quarter suggests that it is more likely for hedge funds to trade profitability against other institutional investors rather than against individual investors. This might be due to other institutional investors' facing investment policies related to indexing and style categories that constrain their trading activity. In contrast, retail investors do not have such constraints, and this might explain why hedge funds cannot trade profitably against retail investors.

= 7.55), as there is no evidence of negative and significant abnormal returns on the stocks that both groups agree and jointly sell. Furthermore, in the last two columns of Table 3, we show that the magnitude of the positive abnormal return spread created by univariate sorting on hedge fund demand decreases by half when stocks heavily sold by non–hedge funds are excluded.[18] For example, the next-quarter EW DGTW-adjusted monthly return spread in Panel A drops from 0.25% (*t*-stat = 4.20) to 0.10% (*t*-stat = 1.37), and the next-quarter EW four-factor monthly alpha spread in Panel B drops from 0.31% (*t*-stat = 4.61) to 0.15% (*t*-stat = 1.89) when stocks heavily sold by non–hedge funds are excluded. We obtain similar results in Panels C and D of Table 3 when we use VW DGTW-adjusted returns and four-factor alphas.

Likewise, these disagreement stocks seem to be driving an economically significant part of the underperformance of the non–hedge fund trading as well. Particularly the VW analysis in Panels C and D of Table 3 reveals that the negative performance of non–hedge funds' trades is confined to the stocks heavily bought by hedge funds. When we remove the stocks that hedge funds buy heavily from univariate portfolio analysis where stocks are sorted based on non–hedge fund demand, the previously negative and significant next-quarter return and alpha spreads between the stocks that non–hedge funds buy and sell heavily become almost zero and statistically insignificant (see the column labeled "Exc. HF HB" in Panels C and D). We observe similar improvements in return and alpha spreads in univariate portfolio analysis of non–hedge funds' trades in Panels A and B of Table 3 (albeit still significant) when the analysis is conducted using EW returns and when we exclude stocks heavily bought by hedge funds.

Next, we conduct a multivariate Fama-MacBeth regression framework to test the predictive power of disagreement over future returns after controlling for the cross-sectional variation in stock returns due to stock characteristics. For each month in quarter *q+1*, during the sample period of July 1994 to December 2017, we run a cross-sectional regression of stock returns on a disagreement dummy

[18] We keep the full sample breakpoints when we form portfolios after excluding stocks heavily sold by non–hedge funds.

variable. This dummy variable takes the value of one if a stock belongs to the portfolio of stocks that non–hedge funds heavily sell (i.e., bottom 20% based on non–hedge fund demand) and hedge funds heavily buy (i.e., top 20% based on hedge fund demand) in quarter *q*. Following Gompers and Metrick (2001) and Yan and Zhang (2009), we include the following stock characteristics: (i) *Size*: market capitalization calculated as share price times shares outstanding; (ii) *Bm*: book-to-market ratio, book value of equity for the fiscal year ended before June 30, divided by market capitalization of at the end of December of that fiscal year; (iii) *Ag*: asset growth (percentage change in total assets) in the fiscal year that ends in year *t*–1; (iv) *Gp:* gross profitability measured as total revenues minus cost of goods sold scaled by total assets; (v) *Age*: firm age as the number of months since first return appears in CRSP monthly stock file; (vi) *Dy*: dividend yield; (vii) *Prc*: share price at the end of quarter *q*; (viii) *Turnover*: average monthly turnover (calculated as share volume traded by shares outstanding for each month) in quarter *q*; (ix) *Ivol*: idiosyncratic volatility measured as the standard deviation of residuals from the regression of monthly stock returns on Fama-French-Carhart four-factor model over the prior 24 months; (x) *Pret*: cumulative return over the six months skipping a month prior to the stock return measurement. We take the natural log of all of these variables except for *Pret*.

[[Please insert Table 4 about here]]

Table 4 reports the time-series averages of the monthly slope coefficients along with Newey-West (1987) adjusted *t*-statistics. In model (1), when the disagreement dummy variable is used as the only explanatory variable, we find a positive coefficient of 0.0044 (*t*-stat = 4.64) on disagreement dummy. In models (2) and (3), we find that hedge fund demand has a positive and statistically significant coefficient of 0.0340 (*t*-stat = 3.75), and non–hedge fund demand has a negative and statistically significant coefficient of –0.0162 (*t*-stat = –2.21). These findings are consistent with the results of the portfolio analysis reported in Table 3. In model (4), where we include the disagreement dummy, hedge fund demand, and non–hedge fund demand together as explanatory variables, only the coefficient on the

disagreement dummy remains statistically significant. In other words, the disagreement dummy largely subsumes both the positive predictive power of hedge funds' trades and the negative predictive power of non–hedge funds' trades. Lastly, in model (5), we include other firm characteristics as control variables.[19] The coefficient on the disagreement dummy remains positive and significant, suggesting that stock characteristics cannot explain the positive predictive power of the disagreement portfolio.

In the next model, we introduce another common screen to remove the effect of small and illiquid stocks from the sample (e.g., Bali et al., 2016) in addition to the minimum price screen of $5, which we already incorporate in all of our analyses. Basically in model (6), we run the same model as in model (5) with all control variables after excluding small stocks with market capitalizations less than the NYSE 10th percentile breakpoint. Lastly, in model (7), we report results only for the small stocks. Model (6) shows that the exclusion of small stocks yields an average slope coefficient of 0.0036 (*t*-stat = 4.79) on the disagreement dummy, while model (7) reveals that the effect of disagreement is still strong within the smallest 10% of stocks as well.

3.3 Feedback trading, earnings news, and changes in analysts' consensus recommendations

Although differential information content about fundamental values can be one of the factors for the existence of disagreements between hedge funds and non–hedge funds, it is highly unlikely that it is the only driving mechanism of such disagreements. Thus, we explore other potential reasons for the disagreements. First, it is well recognized that institutions tend to chase past performance of stocks. Falkenstein (1996), Carhart (1997), Bennett et al. (2003), and Yan and Zhang (2009) are among the studies that show that institutions are positive feedback traders. Griffin and Xu (2009) provide evidence that hedge funds engage in positive feedback trading as well.[20] To investigate the impact of feedback

[19] We exclude S&P dummy from these regressions to be consistent across regressions run in different subsamples as S&P dummy is nonexistent within the small stocks subsample. Inclusion of S&P dummy in the full sample and the sample that excludes small stocks does not have any material impact on the results.

[20] On the other hand, Grinblatt et al. (2020) find evidence that hedge funds are more likely to be negative feedback traders. We would like to point out that our methodology in assessing institutional investors' tendencies toward momentum strategy

trading on the disagreement and the associated subsequent abnormal returns documented in our analysis, we first examine the average past six-month cumulative stock returns prior to the start of the quarter in which we measure disagreement.

The univariate portfolio analysis of hedge funds' and non–hedge funds' trades in Panel A of Table 5 (reported in the last two columns) shows that stocks heavily bought by non–hedge funds have 8.59% (*t*-stat = 9.87) higher past returns than stocks heavily sold by non–hedge funds. On the other hand, the past return spread between hedge funds' heavy buys and hedge funds' heavy sells is noticeably weaker at 2.30% (*t*-stat = 4.71). Furthermore, the bivariate portfolio analysis (reported on the left side of Table 5) reveals that although the past return spread of non–hedge fund trading is positive and significant across all quintiles of hedge fund trading, the past return spread of hedge fund trading is insignificant only for stocks heavily sold by non–hedge funds at –0.71% (*t*-stat = –0.76). In sum, these findings suggest that hedge funds are on average positive feedback traders, albeit weaker than non–hedge funds. However, for stocks heavily sold by non–hedge funds, hedge funds are neither positive nor negative feedback traders.[21]

Kim and Verrecchia (1991a, 1991b) propose that differences in the quality of private information may result in different reactions to news. Although institutional investors as a whole group are responsive to earnings news (e.g., Campbell et al., 2009), if hedge funds differ from non–hedge funds in terms of their attention to earnings news, this may contribute to the observed disagreements in their trades as well. For this reason, we analyze the average standardized unexpected earnings (SUE) in the quarter of

is different from theirs. For each institutional investor, they compute an average style measure to determine the extent to which that investor trades in the same/opposite direction with the contemporaneous quarter stock returns. To compute this measure, first, for each quarter, they multiply the change in weight of a stock in that institutional investor's portfolio with the sum of the monthly returns of the stock over the same quarter. Next, they aggregate this across all stocks that are traded by that particular institutional investor in that particular quarter. Lastly, they calculate the average of this sum over the number of quarters for which 13F is filed by this institutional investor during the full sample and determine once and for all whether this particular institutional investor is a contrarian or momentum trader. This methodology forces an institutional investor to have the same style over its lifetime.

[21] Our inferences remain unchanged when we look at the past three- or twelve-month cumulative returns instead of the past six-month cumulative returns.

disagreement across the 25 portfolios sorted independently based on hedge funds' and non–hedge funds' trades. Following Levnat and Mendenhall (2006), we measure SUE as the difference between the current quarter earnings and the four quarters lagged earnings, scaled by the stock price at the end of the prior quarter, where earnings is defined as earnings per share before extraordinary items.[22]

[[Please insert Table 5 about here]]

The univariate portfolio analysis in Panel B of Table 5 shows that the spread in SUEs based on non–hedge fund trading is much greater. The average difference in earnings news between non–hedge funds' strong buys and strong sells is 0.39% (*t*-stat = 9.21). On the other hand, the same SUE spread for hedge funds' trades is only 0.06% (*t*-stat = 1.55). Overall, the evidence based on past returns and contemporaneous earnings news suggests that hedge funds rely less on public information than non–hedge funds, which may, in turn, contribute to the observed disagreements.

In a separate analysis, we also investigate the role of changes in analysts' consensus recommendations on the evolution of disagreements, especially for stocks heavily sold by non–hedge funds and heavily bought by hedge funds. For this analysis, at the end of each calendar quarter, we calculate the consensus recommendation for each stock as the average of most-recent outstanding recommendations of all individual analysts covering that stock.[23] Next, we define the change in consensus ($\Delta Cons$) as the difference between the current calendar quarter–end consensus recommendation and the previous calendar quarter–end consensus recommendation. We then match this

[22] Measuring SUE by scaling the difference between the current quarter earnings and the four quarter lagged earnings by the standard deviation of prior eight quarters' unexpected earnings does not materially impact the inferences. Alternatively, measuring SUE as the difference between earnings and consensus mean forecast of analysts scaled by share price does not change the inferences either.

[23] We use Thomson Financial Institutional Broker's Estimate (IBES) U.S. Detail File to obtain individual analysts' ratings scaled from 1 (strong buy) to 5 (strong sell). Analysts convey their views by using other descriptions such as "overweight" or "underweight." IBES standardizes these views and converts them into numerical scores where 1 is strong buy, 2 is buy, 3 is neutral, 4 is sell, and 5 is strong sell. We reverse the order of these numerical scores such that higher ratings refer to more favorable recommendations (e.g., strong sell is denoted by 1, and strong buy is denoted by 5) so that a positive number can be assigned for an upgrade.

change in consensus measure at the stock level at calendar quarter–ends with the hedge fund and non–hedge fund demand measures derived from 13F institutional holdings data.

We find that the disagreement stocks (stocks heavily sold by non–hedge funds and heavily bought by hedge funds) are one of the two most heavily downgraded groups of stocks (among the 25 bivariate portfolios created earlier based on hedge fund and non–hedge fund demand in quarter *q*) by analysts on that same quarter, suggesting that although non–hedge funds' trades are in line with analysts' recommendation revisions, hedge funds' trades stand in sharp contrast to those changes in recommendations.[24] Specifically, the average change in consensus measure for the disagreement stocks is –0.052 and is more than four times larger than the average change in consensus value of –0.012 for the remaining 24 portfolios. This finding once again provides a possible explanation for the evolvement of disagreements where non–hedge funds pay close attention to another source of public information and hedge funds ignore that public information and form their trades based on their own judgment (information processing skill) and/or private information.[25]

We believe these results on changes in analysts' consensus recommendations, together with our previous findings on the differences between hedge funds' and non–hedge funds' trades with respect to past stock returns and contemporaneous earnings surprises, strengthen our conjecture for the source of disagreements between hedge funds and non–hedge funds as non–hedge funds rely heavily on public information while hedge funds do not. Considering the positive future abnormal returns of the strong disagreement portfolio, we believe our findings are also in line with Kacperczyk and Seru (2007), who

[24] This result is consistent with Caglayan et al. (2021) who show a negative relation between hedge funds' trades and analysts' recommendation revisions after the implementation of the Regulation Fair Disclosure Act in 2000.

[25] In this analysis, since we do not have information on the dates of intra-quarter trades of hedge funds and non–hedge funds, we cannot make a definite claim on whether analyst revisions lead to institutional trades, or whether institutional trades and their associated price impacts lead analysts to revise their recommendations. To alleviate this concern, we also compute the previous quarter (*q*–1) change in consensus values for the 25 bivariate portfolios created based on hedge fund and non–hedge fund demand in quarter *q*. The results show that the disagreement stocks were once again one of the two most heavily downgraded groups of stocks (among the 25 bivariate portfolios) by analysts during the previous quarter (*q*–1) before the disagreement is observed in quarter *q*. The average change in consensus measure for the disagreement stocks is –0.031 in the previous quarter and is almost three times larger than the average previous quarter change in consensus value of –0.011 for the remaining 24 portfolios.

show that there is a negative relation between fund managers' skill and their responsiveness to public information.

In two recent papers, Cao et al. (2018) provide evidence that hedge funds have a stronger stock-picking skill among underpriced stocks, and Grinblatt et al. (2020) show that contrarian hedge funds trade profitably with momentum-oriented mutual funds particularly through buying loser stocks. Although the evidence in Table 5 suggests a lower reliance on public information for hedge funds in comparison to non–hedge funds, we cannot conclude that the informativeness of hedge funds' trades is not driven by their trading against past returns or current earnings news (i.e., negative feedback trading). Hence, we next examine if the negative feedback trades of hedge funds with respect to past returns (i.e., buying losers) or earnings surprises (i.e., buying stocks with the most negative earnings surprises) have a role in the observed positive abnormal returns of the disagreement portfolio. For this, we partition the strong disagreement portfolio (i.e., hedge funds' heavy buys and non–hedge funds' heavy sells) into terciles (low, medium, and high) based on past stock returns and contemporaneous earnings news separately.

Table 6 reports the average characteristics, average monthly DGTW-adjusted returns, and four-factor alphas of these tercile portfolios. Panels A and B report the results for partitions on past six-month returns and contemporaneous SUEs, respectively. After partitioning the disagreement portfolio, we have, on average, 73 stocks in each tercile. In Panel A, we observe that the best (worst) past performers in the disagreement portfolio have an average cumulative return of 41.92% (–22.68%) in the past six months. However, we find no discernible future return spread between these two portfolios.[26] This particular finding suggests that the superior performance of disagreement portfolio is not driven by hedge funds' trades contrarian to past stock returns. This puts us apart from Grinblatt et al. (2020) who show that contrarian hedge funds trade profitably with momentum-oriented mutual funds, particularly through

[26] When we use quintiles instead of terciles, our inferences remain the same. In addition, we obtain similar results when we use the past three-, nine-, or twelve-month returns in partitioning the disagreement portfolio.

investing in loser stocks.[27] Overall, this analysis provides evidence that it is hedge funds' trades contrarian to other institutions (not the trades contrarian to past returns) that drive the superior performance of disagreement stocks.

In Panel B of Table 6, after sorting disagreement stocks into terciles based on contemporaneous earnings surprises in quarter *q*, we also find that disagreement stocks with both positive and negative earnings surprises have similar positive and significant future abnormal returns. This suggests that hedge funds' positive or negative feedback trading on current earnings news does not drive the positive abnormal returns of the disagreement portfolio either.

[[Please insert Table 6 about here]]

Next, we separately run quarterly cross-sectional regressions of hedge fund and non–hedge fund demand on lagged stock characteristics with a focus on past six-month returns (*Pret*) and current earnings news (SUE_q).[28] In regressions of non–hedge fund demand, we find that past six-month stock returns and current earnings news are positively and significantly related to non–hedge fund demand in quarter *q* in the full sample of stocks after controlling for other stock characteristics. Consistent with our earlier findings, we also show that the average slope coefficients on past returns and SUE are even larger when the same regression is run for the sample of stocks heavily bought by hedge funds. In regressions of hedge fund demand, we find that the positive relation that exists between hedge fund demand and past stock returns in the full sample is nonexistent in the subsample of stocks heavily sold by non–hedge funds. Lastly, in contrast to the positive and significant average slope coefficients obtained on SUE_q for the non–hedge fund demand, we find that none of the average slope coefficients on SUE_q are significant for the hedge fund demand. Overall, these results are in line with the prior portfolio analysis and suggest

[27] In a separate test, we sort stocks with strong disagreements into terciles based on their cumulative returns during the quarter in which disagreement is measured. We report in Table 7 that all three subportfolios of disagreement generate positive and significant abnormal returns with no significant performance differences between best and worst cumulative return terciles. We believe these different results from Grinblatt et al. (2020) is due to their estimation of a time-invariant style of a fund (contrarian or momentum) for the entire sample period, while our analysis provides flexibility for a fund to switch from contrarian to momentum or vice versa through time.

[28] The results of this analysis are reported in Table II of the Online Appendix.

that non–hedge funds' trades are more aligned with both past stock returns and current earnings news than hedge funds' trades.[29]

4. ROBUSTNESS TESTS

In this section, we conduct robustness tests in both time-series and cross-sectional dimensions to explore whether the substantial existence of disagreements and the associated subsequent abnormal returns are due to some alternative mechanical reasons.

4.1 Reversals of price pressure

We first consider if the positive abnormal returns of stocks subject to disagreement are due to the reversal of mispricings. Coval and Stafford (2007) document that stocks sold by funds that are subject to extreme outflows may experience sharp price drops initially due to this selling pressure (fire sales) and undergo subsequent reversals as their prices revert to their fundamentals. If the large positive abnormal returns of disagreement stocks are due to such fire sales and hedge funds providing liquidity to other institutional investors' sell trades due to these institutional investors' need to meet their investor redemptions, we cannot claim that these are due to hedge funds' informed trading. To control for the possible effect of such reversals, we sort stocks with strong disagreements into terciles (low, medium, and high) based on their cumulative returns during the quarter in which disagreement is measured. In Table 7, we report the

[29] In Online Appendix Table II, in the regression of non–hedge fund demand on stock characteristics for stocks heavily bought by hedge funds, we notice that the coefficients on asset growth (*Ag*) and dividend yield (*Dy*) are positive and significant. This suggests that among the stocks heavily bought by hedge funds, non–hedge funds prefer higher asset growth and higher dividend yield stocks. In contrast (as reported in column (4) of Online Appendix Table II), for stocks heavily sold by non–hedge funds, we see a negative relation between the hedge fund demand and these two stock characteristics, asset growth (*Ag*) and dividend yield (*Dy*). This suggests that hedge funds prefer lower asset growth and lower dividend yield stocks among the stocks heavily sold by non–hedge funds. These results might indicate that one of the reasons for disagreement between hedge funds and non–hedge funds is their differing preferences for these two stock characteristics and may suggest that hedge funds are better than non–hedge funds in exploiting the well-known asset growth anomaly of Cooper et al. (2008). However, these differences in preferences between hedge funds and non–hedge funds do not account for the totality of the superior abnormal positive performance of disagreement stocks in the next quarter. As revealed before, in regressions of future stock returns on disagreement and stock characteristics, Table 4 shows that controlling for asset growth and dividend yield does not eliminate the strong positive predictive power of disagreement over future stock returns.

monthly excess returns, DGTW-adjusted returns, and the four-factor alphas of these three portfolios in the subsequent quarter. We find that both losing and winning stocks of the disagreement portfolio (as well as the middle group) earn similar positive and significant returns and alphas in the subsequent quarter with no significant performance differences between winning and losing tercile stocks. The fact that losing stocks in the disagreement portfolio do not generate any statistically significant higher returns and alphas than the winning stocks in the following quarter suggests that the reversal we see in returns in the disagreement portfolio are not driven by the group of stocks that experience large losses in quarter *q*. This finding, to a large extent, rules out the possibility of flow-induced mispricings (fire sales) as the sole explanation for our findings.

[[Please insert Table 7 about here]]

4.2 Window dressing

Next, we consider window dressing as a possible cause of the observed disagreement and the subsequent abnormal positive stock returns. Fund managers may distort their holdings by selling loser stocks to mislead investors. Previous studies (e.g., Lakonishok et al., 1991; Huang et al., 2007; Agarwal et al., 2014) show that window dressing is more pronounced at calendar year–ends compared to other quarter-ends because investors tend to evaluate funds on a calendar-year basis. If the positive abnormal returns of disagreement stocks are driven mostly by trades due to such window-dressing motive, then we cannot necessarily conclude that the disagreement is due to some fundamental difference between hedge funds and non–hedge funds. To remove the impact of window dressing on our main findings, in Table III of the Online Appendix, we regenerate our results from Table 3 by excluding the first calendar-quarter returns of each year from our sample period (the quarter after which the strongest window dressing takes place). We observe that the disagreement portfolio delivers a DGTW-adjusted monthly return of 0.43% (*t*-stat = 5.97) in the subsequent quarter, similar to the full-sample results. These findings suggest that

window dressing is not the main driver behind the future positive abnormal returns of the disagreement portfolio.

4.3 Activist hedge funds

Previous literature documents a significantly positive price reaction to the announcement of hedge fund activism (e.g., Brav et al., 2008; Bebchuk et al., 2015; Mihov, 2020). Activists may also camouflage their purchases among other institutions' sales (e.g., Gantchev & Jotikasthira, 2017). In this section, we examine if the positive subsequent abnormal returns to the disagreement stocks are related to hedge fund activism. For this test, we exclude all stocks that are subject to hedge fund activism. Even though this exclusion reduces our sample size by 19.6%, regenerating our independent bivariate portfolio sorts on hedge fund and non–hedge fund trading for this reduced sample in Online Appendix Table IV shows that hedge fund activism does not materially alter our main findings. Disagreement stocks continue to deliver a monthly 0.49% (*t*-stat = 7.15) DGTW-adjusted return and a monthly four-factor alpha of 0.54% (*t*-stat = 5.80) in the following quarter in the absence of hedge fund activism.

4.4 Evolvement of disagreement in the time series: Subperiods

Given the rising market share of hedge funds over time (as documented in Figure A of the Online Appendix), it is natural to ask if the scope of disagreement in the cross-section has changed over the years as well. We think the scope of disagreement can be related to the extent that one group is more sophisticated than the other. More specifically, if hedge funds are better informed, the scope of disagreement may go up over time as hedge funds increase their market share. Figure B in the Online Appendix plots the percentage of stocks subject to disagreement (i.e., stocks heavily bought by hedge funds within the group of stocks heavily sold by non–hedge funds) over the years. This figure provides evidence for the increasing scope of disagreement in the last decade.

To better understand both the prevalence and the impact of disagreement on future stock returns over the years, we divide our sample period into two halves, from 1994:Q2 to 2005:Q4 and from 2006:Q1 to 2017:Q3, and conduct our main tests for these two subsample periods separately. Table V in the Online Appendix reports for the split-sample periods both the disagreement/agreement percentages as well as the next-quarter monthly abnormal returns of the four corner portfolios obtained from independent bivariate portfolio sorting based on hedge fund and non–hedge fund trading. First, Panel A in Table V shows, in line with Figure B of the Online Appendix, that the average percentage of stocks heavily bought by hedge funds within stocks heavily sold by non–hedge funds increases from 31.25% in the first half of the sample to 41.94% in the second half of the sample. Furthermore, both Panel B and Panel C of Online Appendix Table V show that the disagreement portfolio continues to deliver positive and significant abnormal returns in both halves of the sample.[30]

Next, we plot the monthly DGTW-adjusted returns of the disagreement portfolio over time. Figure C in the Online Appendix shows that the positive abnormal returns of the disagreement portfolio are not driven by a few extreme observations. Quite the contrary, the median DGTW-adjusted monthly return of the disagreement portfolio over our sample period is 0.46%, which is very close to the mean value of 0.47%.[31] It is also worth noting that during our sample period, 72.3% of all monthly observations of the disagreement portfolio are positive. These results suggest that the disagreement portfolio generates very consistent positive returns in the following quarter throughout our sample period.

Lastly, our sample period 1994–2017 has two major recessionary periods. We examine if the large existence of disagreements in the cross-section and the subsequent positive abnormal returns are related to these recessionary periods. To analyze the impact of recessions on our main findings, we

[30] Although there is a decline in the DGTW-adjusted returns of the disagreement portfolio in the more recent sample period, the decline relative to the earlier period is not statistically significant. The *t*-statistic for the difference of 0.12% in means (from 0.53% in the first half of the sample to 0.41% in the second half of the sample) is only 0.43.

[31] Moreover, the minimum and maximum DGTW-adjusted monthly returns on the disagreement portfolio are –3.24% and 4.52%, respectively, which are not extremely high.

exclude from our sample period the four quarters in 2001 and the seven quarters from 2007:Q4 to 2009:Q2 identified as recessionary periods by the National Bureau of Economic Research (NBER). Panel A1 of Online Appendix Table VI shows that the percentage of disagreement stocks is not that different during the nonrecessionary periods (36.41%) compared to recessionary periods (39.04%). Moreover, as can be seen in Panels A2 and A3 of Online Appendix Table VI, we find that the disagreement portfolio delivers positive abnormal returns in the subsequent quarter during both the recessionary and nonrecessionary periods.

As an additional analysis, we also show results from a similar alternative test in Panels B1–B3 of Online Appendix Table VI after we split the sample into up and down markets. We define the market state as a down (up) market when the previous four-quarter cumulative market returns are negative (non-negative), and investigate the performance of disagreement stocks for up and down markets separately. We once again find that the disagreement portfolio generates positive and highly significant abnormal returns (DGTW-adjusted returns and four-factor alphas) in both states of the market. In sum, these results suggest that the occurrences of disagreements and the subsequent positive abnormal returns are not unique to a specific market state.[32]

4.5 Long-run performance

As documented in the descriptive statistics in Table 1, hedge funds have on average shorter investment horizons, as evidenced by their two-times-higher turnover rates. Therefore, an alternative explanation for the superior performance of the disagreement portfolio could be that hedge funds may pressure managers to focus on the short term, sacrificing long-run firm value. This "short-term pressure" hypothesis (e.g., Bushee, 2001) predicts reversal in the long run. In this section, we examine the long-run returns to the disagreement portfolio after the disagreement takes place. For this test, at the end of

[32] Moreover, Table VII of the Online Appendix shows that the disagreement portfolio continues to generate positive and significant abnormal returns during both high and low economic uncertainty, and high and low volatility periods.

each quarter, we form 25 portfolios by independently sorting stocks into quintiles based on hedge fund and non–hedge fund trading. We apply Jegadeesh and Titman (1993) calendar time portfolio approach to calculate the monthly abnormal returns for holding periods of six months and one year. In addition, we examine the performance for one-year holding period skipping the first year following the portfolio formation.

Panels A and B of Table VIII in the Online Appendix show that after the portfolio formation quarter, the disagreement portfolio earns positive abnormal returns over the next six-month and one-year periods, respectively. Panel C shows that the disagreement portfolio does not experience any reversal over the one-year holding period after skipping the first year following the portfolio formation. The lack of reversal in the long run as evidenced by these tests suggests that the initial outperformance of the disagreement portfolio is not likely due to short-term pressure by hedge funds.

4.6 Short-interest and hedge fund trading

We next examine if the future returns of strong disagreement stocks are related to the interplay between hedge fund trading and short-interest positions. As widely known, hedge funds constitute a significant portion of the short-interest positions in common stocks. Using this fact, Jiao et al. (2016) document that hedge funds' buys (sells) accompanied by decreases (increases) in short-interest positions are more informed about future stock returns. To see the impact of short-interest positions on future returns of disagreement stocks, we divide each of the two strong disagreement portfolios into three groups (low, medium, and high) based on the change in short-interest ratio in quarter q.[33] We find that within stocks heavily sold by hedge funds and contemporaneously heavily bought by non–hedge funds, the stocks that experience the largest increase in short-interest ratio deliver negative and significant abnormal returns

[33] We obtain outstanding short shares of all common stocks in NYSE, AMEX, and NASDAQ from Compustat Short Interest Supplemental File, which contains data for NYSE and AMEX firms beginning in 1973 and for NASDAQ stocks beginning in July 2003. We obtain the short-sale data of NASDAQ stocks prior to July 2003 directly from NASDAQ. Until the end of 2006, all member firms were required to report the aggregate number of shares sold short as of the middle of each month. After 2007, firms started reporting the shares shorted on a biweekly basis.

in the following quarter, consistent with the notion that hedge funds' sells are more informed when they are accompanied by an increase in short positions. On the other end of the disagreement spectrum, we also show that stocks heavily sold by non–hedge funds and contemporaneously heavily bought by hedge funds deliver strong positive abnormal returns in the subsequent quarter for all tercile portfolios.[34] Thus, we conclude that the superior performance of stocks heavily bought by hedge funds and heavily sold by non–hedge funds is not solely driven by hedge funds' buys accompanied by a decrease in short-interest ratios.

5. CONCLUSION

This study shows that disagreement between hedge funds and other institutions has an important role in analyzing the informational content of institutional trading, which is supported by our findings of (i) a large presence of disagreement in the cross-section of stocks and (ii) significant predictive ability of disagreements over subsequent stock returns. Specifically, we find that disagreements exist at a rate twice as high as agreements. Furthermore, stocks heavily sold by non–hedge funds and heavily bought by hedge funds in the same quarter deliver economically significant positive abnormal returns in the subsequent periods. Notably, both the success of hedge funds' trades and the poor performance of non–hedge funds' trades are closely related to the superior performance of the disagreement portfolio, highlighting the importance of disagreement in studying the relative informativeness of hedge funds' and non–hedge funds' trades.

Although the informational superiority of hedge funds over non–hedge funds is likely to be one of the main factors causing disagreement, it cannot explain the abundance of strong disagreements in the cross-section of stocks by itself. Our analyses indicate that non–hedge funds' trades are more in line with past stock returns and contemporaneous earnings news compared to hedge funds. Although there is

[34] For the sake of brevity, these results are not presented in the paper but are reported in Table IX in the Online Appendix.

support for hedge funds' positive feedback trading in general (albeit weaker compared to non–hedge funds), we find that hedge funds are neither positive nor negative feedback traders for stocks heavily sold by non–hedge funds. Furthermore, we show that hedge funds' feedback trading based on past stock returns or contemporaneous earnings news do not drive the superior returns of the disagreement portfolio. These findings are consistent with the view that skilled fund managers rely less on public information.

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Table 1. Descriptive statistics: Time series average of quarterly cross-sectional statistics

This table presents time-series averages of the quarterly cross-sectional mean, median, 10^{th}, 25^{th}, 75^{th}, 90^{th} percentiles, and standard deviation of institutional trades and institutional ownership of common stocks. The sample period is 1994:Q1 to 2017:Q4 (96 quarters). Hedge funds and institutional holdings data are obtained from Thomson-Reuters 13F filings. Hedge funds are identified by matching the names of the 13F institutions with the names of the hedge funds included in the union database. Portfolio size is the total dollar value of equity held by each institution in a quarter. Sales (Buys) is the total dollar value of net sales (buys). Following Carhart (1997), turnover is defined for each institution as the minimum of the size of total buys and sells divided by the average equity portfolio size of the current and previous quarters. No. of stocks held is the number of stocks held by an institutional investor at the end of a quarter. IO (%) is the institutional ownership of a stock, measured as the ratio of the number of shares held by institutions to the total number of shares outstanding. ΔIO (%) is the change in institutional ownership in a quarter. No. of institutions is the number of institutions available in 13F in a quarter.

		Mean	Median	P10	P25	P75	P90	StdDev
Portfolio size (in million $)	Nonhf	3,197	364	88	153	1,394	6,388	9,573
	Hf	1,826	340	70	140	1,114	3,396	6,050
Sales (in million $)	Nonhf	377	41	4	12	185	822	1,103
	Hf	368	80	8	24	280	865	922
Buys (in million $)	Nonhf	403	42	4	13	195	865	1,204
	Hf	391	85	7	25	299	901	998
Turnover (%)	Nonhf	10.22	6.74	1.35	3.22	12.99	23.47	10.86
	Hf	20.14	16.00	2.59	6.94	30.06	45.19	16.24
No. of stocks	Nonhf	287	107	25	54	242	667	564
	Hf	160	62	13	30	138	333	330
IO (%)	Nonhf	41.09	42.82	6.08	20.57	60.46	72.20	24.29
	Hf	11.73	9.84	1.28	5.03	16.36	24.12	9.30
ΔIO (%)	Nonhf	0.39	0.21	-4.08	-1.35	2.13	5.14	4.71
	Hf	0.28	0.08	-2.31	-0.66	1.06	2.97	2.74
No. of institutions	Nonhf	1837						
	Hf	674						

Table 2. Prevalence of disagreements

This table reports the distribution of stocks and the change in hedge fund and non–hedge fund ownership of stocks in portfolios independently sorted into quintiles by the change in hedge fund ownership (ΔHfown) and non–hedge fund ownership (ΔNonhfown) in each quarter. Panel A reports the average number of stocks in each portfolio. Panel B presents the percentage of stocks in each portfolio with respect to the total number of stocks in the quintile sorted by the other dimension so that the sum of the rows or columns is equal to 100%. Panels C and D present the average change in hedge fund and non–hedge fund ownership in the quarter of portfolio creation, respectively. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

Panel A. No. of stocks

	ΔHfown				
ΔNonhfown	Heavy Sell	2	3	4	Heavy Buy
HS	107.88	86.23	67.27	116.65	218.97
2	76.93	125.38	147.39	142.82	105.12
3	72.50	134.59	199.10	122.54	68.83
4	125.01	144.39	126.69	121.16	80.45
HB	214.68	100.05	65.21	93.41	123.93

Panel B. Percentage of stocks

	ΔHfown				
ΔNonhfown	Heavy Sell	2	3	4	Heavy Buy
HS	18%	14%	11%	20%	37%
2	13%	21%	25%	24%	18%
3	12%	23%	33%	21%	12%
4	21%	24%	21%	20%	13%
HB	36%	17%	11%	16%	21%

Panel C. % change in hedge fund ownership

	ΔHfown				
ΔNonhfown	Heavy Sell	2	3	4	Heavy Buy
HS	-3.23%	-0.43%	0.11%	0.78%	4.02%
2	-2.38%	-0.38%	0.10%	0.73%	2.98%
3	-2.32%	-0.37%	0.09%	0.69%	3.04%
4	-2.35%	-0.42%	0.10%	0.71%	3.11%
HB	-3.08%	-0.47%	0.10%	0.74%	4.24%

Panel D. % change in non–hedge fund ownership

	ΔHfown				
ΔNonhfown	Heavy Sell	2	3	4	Heavy Buy
HS	-6.56%	-4.38%	-4.31%	-4.25%	-5.58%
2	-1.03%	-0.97%	-0.92%	-1.03%	-1.10%
3	0.20%	0.19%	0.15%	0.18%	0.18%
4	1.58%	1.47%	1.41%	1.46%	1.52%
HB	5.65%	4.98%	4.99%	5.23%	7.12%

Table 3. Returns to bivariate portfolios

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership. HB and HS contain stocks that experience the largest increase and decrease in institutional ownership, respectively. The rightmost four columns present returns to univariate portfolios based on hedge fund and non–hedge fund trading. The All columns include all stocks. The Exc. NonHF HS (Exc. HF HB) columns report the returns to univariate portfolios sorted by hedge fund trading (non–hedge fund trading), excluding stocks heavily sold by non–hedge funds (heavily bought by hedge funds). Panels A and B report, respectively, the equally-weighted (EW) time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas in the subsequent quarter. Panel C and D report the same performance measures in value-weighted (VW) terms. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

Panel A. EW DGTW-adjusted returns (%)

	ΔHfown						ΔNonhfown		ΔHfown		
ΔNonhfown	HS	2	3	4	HB	HB-HS	All	Exc. HF HB	ΔHfown	All	Exc. NonHF HS
HS	-0.02	-0.00	0.15	0.20	0.47	0.49	0.23	0.10	HS	-0.00	0.00
	(-0.22)	(-0.00)	(1.27)	(2.56)	(7.55)	(4.79)	(5.32)	(1.95)		(-0.07)	(0.01)
2	0.09	-0.01	-0.14	0.10	0.22	0.14	0.03	-0.01	2	-0.06	-0.07
	(0.92)	(-0.08)	(-1.27)	(1.19)	(2.52)	(1.09)	(0.43)	(-0.16)		(-0.98)	(-1.01)
3	0.03	-0.14	-0.23	-0.04	0.08	0.05	-0.10	-0.12	3	-0.17	-0.21
	(0.35)	(-1.44)	(-1.88)	(-0.36)	(0.68)	(0.33)	(-1.19)	(-1.39)		(-1.76)	(-2.00)
4	0.03	-0.07	-0.21	0.09	0.02	-0.01	-0.04	-0.05	4	0.08	0.04
	(0.39)	(-0.87)	(-1.70)	(1.10)	(0.17)	(-0.10)	(-0.59)	(-0.70)		(1.18)	(0.57)
HB	-0.02	-0.08	-0.14	-0.11	-0.01	0.01	-0.05	-0.06	HB	0.24	0.10
	(-0.24)	(-0.93)	(-1.12)	(-1.06)	(-0.07)	(0.07)	(-0.65)	(-1.02)		(3.91)	(1.26)
HB-HS	0.00	-0.08	-0.29	-0.31	-0.48	-0.48	-0.28	-0.16	HB-HS	0.25	0.10
	(0.02)	(-0.70)	(-1.72)	(-2.69)	(-3.37)	(-3.21)	(-3.51)	(-2.12)		(4.20)	(1.37)

Panel B. EW 4-factor alphas (%)

	ΔHfown						ΔNonhfown		ΔHfown		
ΔNonhfown	HS	2	3	4	HB	HB-HS	All	Exc. HF HB	ΔHfown	All	Exc. NonHF HS
HS	-0.04	0.05	0.35	0.28	0.54	0.58	0.30	0.16	HS	-0.01	0.01
	(-0.40)	(0.48)	(2.65)	(2.81)	(5.97)	(5.45)	(4.55)	(2.25)		(-0.08)	(0.10)
2	0.10	0.14	0.16	0.29	0.33	0.23	0.21	0.18	2	0.06	0.07
	(0.99)	(1.62)	(1.47)	(3.49)	(3.14)	(1.75)	(2.99)	(2.50)		(0.86)	(0.90)
3	0.17	0.07	0.07	0.24	0.27	0.10	0.18	0.16	3	0.12	0.09
	(1.58)	(0.67)	(0.59)	(2.75)	(2.28)	(0.69)	(2.43)	(2.05)		(1.33)	(0.99)
4	0.01	0.08	0.07	0.25	0.12	0.10	0.10	0.09	4	0.23	0.21
	(0.15)	(0.96)	(0.60)	(2.73)	(1.05)	(0.74)	(1.46)	(1.34)		(3.89)	(3.29)
HB	-0.05	-0.09	0.06	-0.11	-0.12	-0.07	-0.06	-0.06	HB	0.30	0.16
	(-0.64)	(-0.96)	(0.44)	(-1.05)	(-1.07)	(-0.57)	(-1.12)	(-0.93)		(4.30)	(2.07)
HB-HS	-0.01	-0.14	-0.30	-0.39	-0.66	-0.65	-0.36	-0.21	HB-HS	0.31	0.15
	(-0.05)	(-1.12)	(-1.65)	(-2.71)	(-5.47)	(-4.46)	(-5.32)	(-2.94)		(4.61)	(1.89)

Table 3. (continued)

Panel C. VW DGTW-adjusted returns (%)

	ΔHfown						ΔNonhfown		ΔHfown		
ΔNonhfown	HS	2	3	4	HB	HB-HS	All	Exc. HF HB	ΔHfown	All	Exc. NonHF HS
HS	-0.18	0.08	-0.00	0.14	0.39	0.56	0.15	0.02	HS	-0.04	0.00
	(-1.47)	(0.81)	(-0.01)	(1.62)	(6.03)	(4.47)	(3.39)	(0.40)		(-0.66)	(0.05)
2	-0.07	0.04	0.01	0.02	0.20	0.26	0.06	0.03	2	-0.06	-0.09
	(-0.59)	(0.52)	(0.11)	(0.27)	(2.17)	(1.96)	(0.95)	(0.52)		(-1.25)	(-1.50)
3	0.00	-0.06	-0.19	0.01	0.05	0.05	-0.09	-0.10	3	-0.07	-0.07
	(0.03)	(-0.64)	(-1.84)	(0.08)	(0.38)	(0.29)	(-1.42)	(-1.55)		(-0.94)	(-0.96)
4	0.09	-0.18	-0.12	0.04	-0.04	-0.13	-0.05	-0.06	4	0.03	-0.00
	(1.04)	(-2.18)	(-1.09)	(0.45)	(-0.34)	(-0.88)	(-0.99)	(-1.15)		(0.51)	(-0.06)
HB	0.01	-0.06	-0.22	-0.09	0.06	0.06	-0.01	-0.03	HB	0.22	0.10
	(0.07)	(-0.70)	(-1.47)	(-0.73)	(0.39)	(0.41)	(-0.20)	(-0.52)		(3.10)	(1.12)
HB-HS	0.18	-0.15	-0.22	-0.22	-0.33	-0.51	-0.16	-0.05	HB-HS	0.25	0.10
	(1.23)	(-1.07)	(-1.13)	(-1.76)	(-1.99)	(-3.00)	(-1.79)	(-0.60)		(3.88)	(1.28)

Panel D. VW 4-factor alphas (%)

	ΔHfown						ΔNonhfown		ΔHfown		
ΔNonhfown	HS	2	3	4	HB	HB-HS	All	Exc. HF HB	ΔHfown	All	Exc. NonHF HS
HS	-0.18	0.07	0.11	0.12	0.47	0.65	0.17	0.00	HS	-0.10	-0.05
	(-1.31)	(0.46)	(0.73)	(0.96)	(4.94)	(4.73)	(2.67)	(0.05)		(-1.58)	(-0.76)
2	-0.11	0.14	0.13	0.14	0.38	0.49	0.19	0.15	2	0.00	-0.01
	(-0.85)	(1.46)	(1.10)	(1.76)	(3.45)	(2.85)	(2.86)	(2.34)		(0.01)	(-0.14)
3	0.00	0.06	-0.12	0.13	0.17	0.17	0.00	-0.40	3	0.07	0.07
	(0.02)	(0.71)	(-0.94)	(1.28)	(1.08)	(0.88)	(0.06)	(-0.07)		(1.08)	(0.97)
4	-0.01	-0.08	0.04	0.05	-0.03	-0.01	0.01	-0.01	4	0.08	0.06
	(-0.14)	(-1.00)	(0.34)	(0.55)	(-0.18)	(-0.07)	(0.10)	(-0.10)		(1.60)	(1.10)
HB	-0.04	-0.10	-0.10	-0.11	-0.08	-0.05	-0.05	-0.05	HB	0.27	0.13
	(-0.43)	(-0.94)	(-0.58)	(-0.90)	(-0.60)	(-0.31)	(-0.84)	(-0.74)		(3.73)	(1.73)
HB-HS	0.14	-0.17	-0.21	-0.22	-0.56	-0.70	-0.22	-0.05	HB-HS	0.36	0.18
	(0.96)	(-0.96)	(-0.99)	(-1.37)	(-3.55)	(-4.21)	(-2.58)	(-0.53)		(4.32)	(1.96)

Table 4. Regressions of future stock returns on disagreement and stock characteristics

This table presents the time-series average regression coefficients of monthly cross-sectional regressions of stock returns on the disagreement and control variables using Fama and MacBeth (1973) methodology. Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. *Disagreement* dummy takes the value of 1 if a stock belongs to the largest increase in hedge fund ownership and largest decrease in non–hedge fund ownership, and 0 otherwise. *Size*: market capitalization calculated as share price times shares outstanding, ii) *Bm*: book-to-market ratio, book value of equity for the fiscal year ended before June 30, divided by market capitalization of at the end of December of that fiscal year, iii) *Ag*: asset growth (percentage change in total assets) in the fiscal year that ends in year *t*-1, iv) *Gp:* gross profitability measured as total revenues minus cost of goods sold scaled by total assets, v) *Age*: firm age as the number of months since first return appears in CRSP monthly stock file, vi) *Dy*: dividend yield, vii) *Prc*: share price at the end of quarter *q*, viii) *Turnover*: average monthly turnover (calculated as share volume traded by shares outstanding for each month) in quarter *q*, ix) *Ivol*: idiosyncratic volatility measured as the standard deviation of residuals from the regression of monthly stock returns on Fama-French-Carhart (1997) four-factor model over the prior 24 months, x) *Pret*: cumulative return over the six months skipping a month prior to the stock return measurement, The first five columns present the results for the full sample. The next two columns run the full specification model for small stocks and the rest separately. The column (Exc. Small) is the sample of stocks that have market caps greater than the NYSE 10th percentile breakpoint. Numbers in parentheses are *t-statistics* based on Newey–West standard errors.

	Full sample					Exc. Small	Small
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.0102	0.0105	0.0106	0.0103	-0.0003	0.0046	-0.0224
	(3.40)	(3.50)	(3.51)	(3.52)	(-0.03)	(0.48)	(-2.72)
Disagreement	0.0044			0.0035	0.0043	0.0036	0.0037
	(4.64)			(2.90)	(5.87)	(4.79)	(1.97)
ΔHfown		0.0340		0.0119	0.0023	0.0156	-0.0236
		(3.75)		(1.11)	(0.29)	(1.86)	(-1.61)
ΔNonhfown			-0.0162	-0.0068	-0.0116	-0.0098	-0.0253
			(-2.21)	(-0.83)	(-2.28)	(-1.89)	(-2.17)
Pret					0.0059	0.0045	0.0110
					(2.10)	(1.47)	(4.92)
Ivol					-0.0041	-0.0034	-0.0055
					(-2.55)	(-1.98)	(-3.74)
Bm					0.0011	0.0007	0.0029
					(1.51)	(0.82)	(3.98)
Size					0.0001	-0.0004	0.0031
					(0.00)	(-1.07)	(3.71)
Ag					-0.0033	-0.0039	-0.0022
					(-2.64)	(-3.00)	(-1.16)
Gp					0.0061	0.0049	0.0097
					(3.33)	(2.37)	(4.93)
Turnover					0.0000	-0.0002	-0.0008
					(0.06)	(-0.22)	(-1.11)
Prc					-0.0003	-0.0002	-0.0008
					(-0.36)	(-0.24)	(-0.77)
Age					-0.0001	0.0000	0.0006
					(-0.23)	(0.02)	(1.11)
Dy					-0.0278	-0.0396	0.0115
					(-1.26)	(-1.55)	(0.60)
R^2 (%)	0.09	0.06	0.12	0.29	6.31	7.55	5.32
# of obs.	2,818					2,021	797

Table 5. Trend-chasing and contemporaneous earnings news

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB contains stocks that experience the largest increase in institutional ownership. Portfolio HS contains stocks that experience the largest decrease in institutional ownership. Panel A presents the average cumulative returns for these 25 portfolios over the two quarters (*q-2 to q-1*) prior to qtr *q*, where disagreement is measured. Panels B presents the average SUE in quarter *q* for the 25 portfolios. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

Panel A. Cumulative return over q-2 to q-1(%)

	ΔHfown$_q$							All			
ΔNonhfown$_q$	HS	2	3	4	HB	HB-HS		ΔNonhfown$_q$		ΔHfown$_q$	
HS	8.43	6.85	8.12	7.68	7.72	-0.71	(-0.76)	7.79	(3.93)	10.84	(5.27)
2	8.91	7.63	8.18	8.98	10.76	1.86	(3.39)	8.87	(5.42)	9.18	(5.36)
3	8.42	8.36	8.94	9.04	12.54	4.12	(7.04)	9.23	(5.80)	9.58	(6.01)
4	9.86	9.71	10.39	10.62	15.08	5.22	(6.57)	10.77	(6.09)	10.22	(5.93)
HB	14.16	13.54	14.11	16.67	24.02	9.86	(7.16)	16.38	(6.84)	13.15	(5.77)
HB-HS	5.73	6.69	5.98	8.99	16.30	10.57	(5.14)	8.59	(9.87)	2.30	(4.71)
	(6.44)	(7.21)	(5.91)	(7.63)	(9.53)						

Panel B. SUE in q (%)

	ΔHfown$_q$							All			
ΔNonhfown$_q$	HS	2	3	4	HB	HB-HS		ΔNonhfown$_q$		ΔHfown$_q$	
HS	-0.27	-0.31	0.00	-0.06	-0.16	0.11	(1.55)	-0.16	(-1.44)	0.00	(0.01)
2	-0.03	-0.06	0.06	0.06	0.01	0.03	(0.37)	0.01	(0.15)	0.00	(-0.03)
3	0.04	0.05	0.06	0.11	0.05	0.01	(0.14)	0.07	(0.97)	0.10	(1.54)
4	0.04	0.08	0.11	0.12	0.16	0.12	(1.81)	0.10	(1.31)	0.09	(1.23)
HB	0.11	0.12	0.24	0.36	0.50	0.39	(3.42)	0.23	(2.28)	0.06	(0.52)
HB-HS	0.38	0.43	0.24	0.42	0.66	0.28	(1.88)	0.39	(9.21)	0.06	(1.55)
	(5.08)	(3.64)	(3.40)	(4.72)	(4.94)						

Table 6. Trivariate portfolios: The role of trend-chasing and current earnings news in the superior performance of disagreement portfolio (Hedge funds heavy buy and non–hedge funds heavy sell)

Each quarter *q*, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB contains stocks that experience the largest increase in institutional ownership. Portfolio HS contains stocks that experience the largest decrease in institutional ownership. The stocks in the disagreement portfolio (hedge fund heavy buy and no-hedge fund heavy sell) are further ranked into terciles based on *q-2 to q-1* cumulative returns in Panel A. Panel B reports the results for the terciles of disagreement portfolio based on SUE in quarter *q*. The table reports the time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas of the five portfolios in the subsequent quarter along with the average portfolio characteristics. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

Panel A. Disagreement portfolio partitioned based on $Ret_{q-2, q-1}$

$Ret_{q-2,q-1}$	DGTW-adj. ret. (%)		4-factor alphas (%)		$Ret_{q-2,q-1}$	Sue_q	$\Delta Hfown_q$	$\Delta Nonhfown_q$
Low	0.44	(3.70)	0.48	(3.26)	-22.68%	-0.97%	4.20%	-5.92%
Medium	0.49	(5.49)	0.68	(6.10)	3.76%	-0.01%	3.83%	-5.37%
High	0.48	(3.97)	0.46	(3.94)	41.92%	0.48%	4.02%	-5.44%
High - Low	0.05	(0.24)	-0.02	(-0.09)				

Panel B. Disagreement portfolio partitioned based on SUE_q

SUE_q	DGTW-adj. ret. (%)		4-factor alphas (%)		$Ret_{q-2,q-1}$	Sue_q	$\Delta Hfown_q$	$\Delta Nonhfown_q$
Low	0.47	(4.34)	0.49	(3.88)	-1.13%	-2.88%	4.18%	-5.71%
Medium	0.37	(3.66)	0.53	(4.45)	9.57%	0.05%	3.87%	-5.56%
High	0.60	(5.40)	0.66	(4.60)	14.96%	2.33%	3.99%	-5.46%
High - Low	0.13	(0.78)	0.17	(0.92)				

Table 7. Reversal of price pressure in quarter *q*

The stocks in the disagreement portfolio (hedge fund heavy buy and non–hedge fund heavy sell) are further ranked into terciles based on their qtr *q* cumulative returns. The table reports the time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas of the three portfolios in the subsequent quarter. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

	Ret_q (%)	Excess returns (%)		DGTW-adj. ret. (%)		4-factor alphas (%)	
Low	-19.51	1.37	(3.05)	0.62	(4.49)	0.59	(3.42)
Medium	1.04	1.26	(3.85)	0.43	(4.95)	0.54	(4.83)
High	29.13	1.29	(3.92)	0.36	(2.80)	0.51	(3.66)
High - Low	48.64	-0.08	(-0.32)	-0.26	(-1.21)	-0.08	(-0.34)

Disagreement between Hedge Funds and Other Institutional Investors and the Cross-Section of Expected Stock Returns

Mustafa O. Caglayan, Umut Celiker, Gokhan Sonaer

Online Appendix

Figure A. Market share of hedge funds vs. non–hedge funds
This figure plots the market share of hedge funds vs. non–hedge funds (i.e., the ratio of the market value of securities held by hedge funds vs. non–hedge funds to the total market value of common stocks) for each year over 1994-2017 sample period.

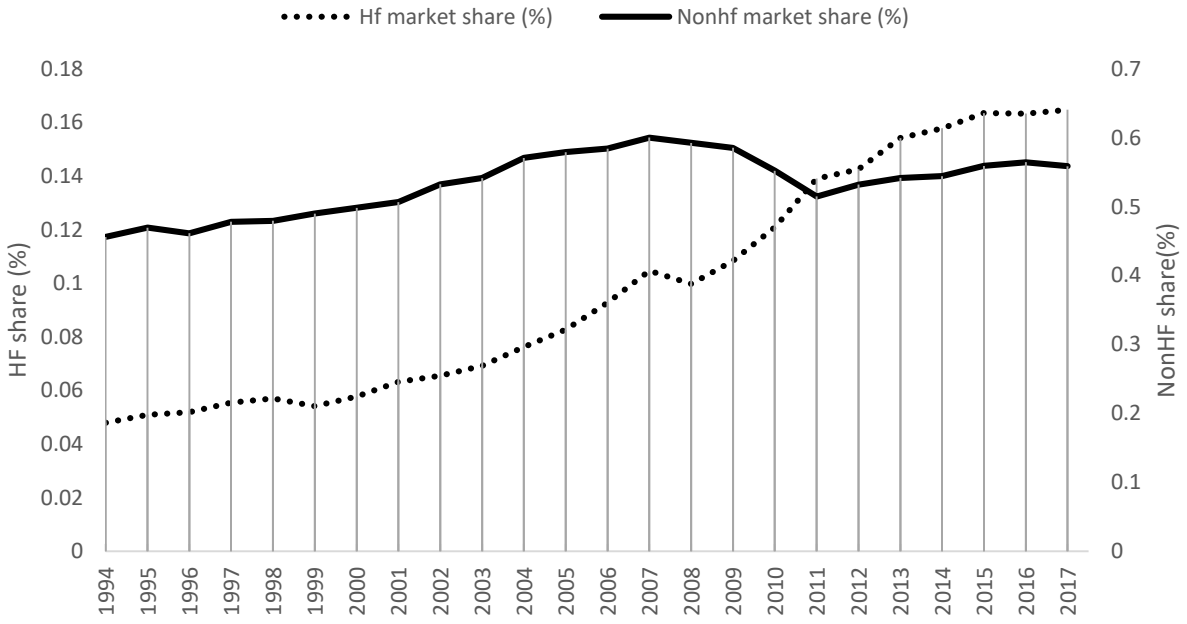

Figure B. Scope of disagreement over time

This figure plots the ratio of stocks heavily invested by hedge funds (i.e., top quintile based on hedge fund demand) within the stocks heavily sold by non–hedge funds (i.e., bottom quintile based on non–hedge fund demand) for each quarter from the second quarter of 1994 to the third quarter of 2017.

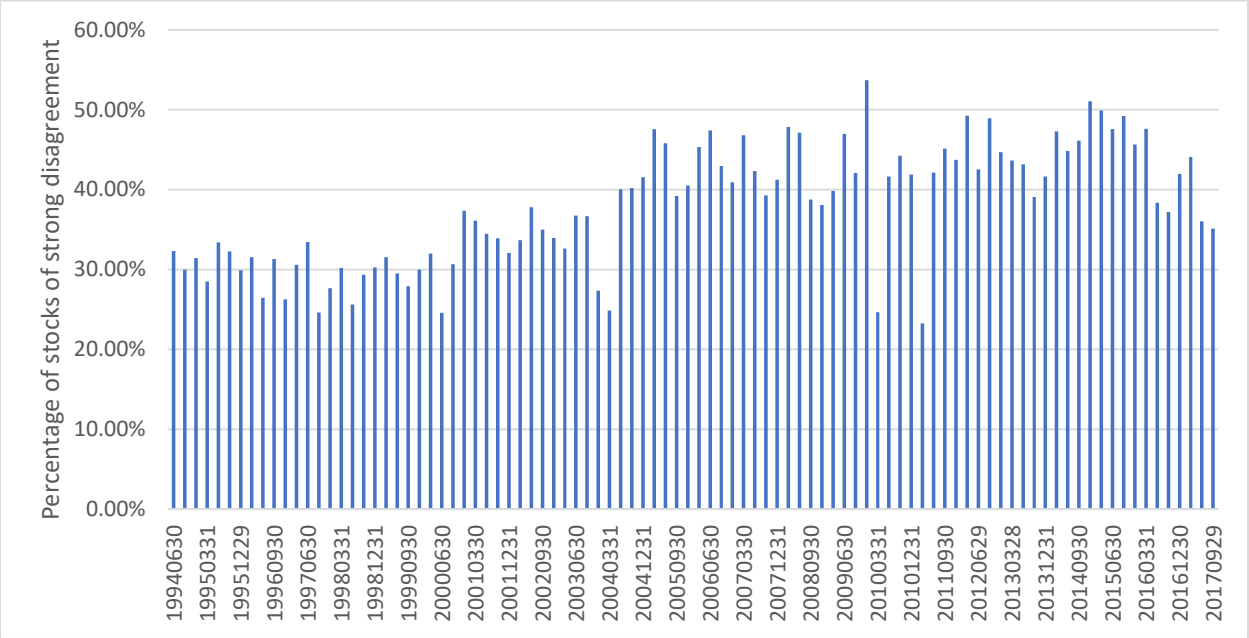

Figure C. DGTW-adjusted monthly returns of disagreement portfolio
This figure plots the time-series DGTW-adjusted monthly returns of stocks heavily invested by hedge funds and heavily sold by non–hedge funds in the same quarter.

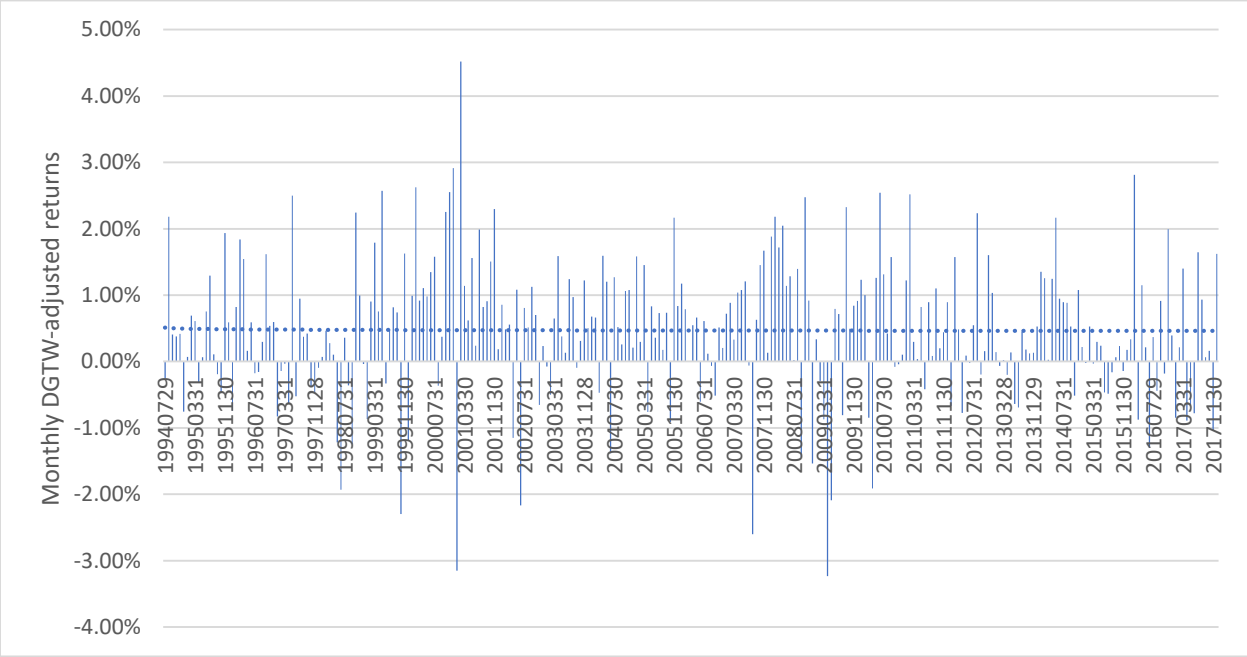

Table I. Returns of strong agreement and strong disagreement portfolios generated from alternative models

Each quarter, all common stocks with share prices greater than $5 are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership. HB and HS contain stocks that experience the largest increase and decrease in institutional ownership, respectively. Panel A reports the time-series means of both equal- and value-weighted monthly returns in excess of the risk-free rate. Panel B reports the alphas from Fama-French (1993) three-factor model. Panel C reports the alphas from Fama-French (2015) five-factor model with momentum as an additional factor. Panel D reports the alphas from Hou-Xue-Zhang (2015) *q*-factor model. Panel E reports the alphas from Daniel-Hirshleifer-Sun (2020) model. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

Panel A. Excess returns (%)

	Equal-weighted			Value-weighted		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.73	1.30	0.58	0.60	1.18	0.58
	(1.87)	(3.69)	(5.02)	(1.59)	(3.65)	(3.72)
HB	0.82	0.90	0.09	0.82	0.94	0.12
	(2.23)	(2.21)	(0.65)	(2.34)	(2.32)	(0.80)
HB-HS	0.09	-0.40	-0.49	0.22	-0.24	-0.46
	(0.68)	(-2.33)	(-2.80)	(1.37)	(-1.25)	(-2.26)

Panel B. FF 3-factor alphas (%)

	Equal-weighted			Value-weighted		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.23	0.40	0.63	-0.31	0.35	0.66
	(-1.70)	(3.78)	(5.92)	(-2.04)	(3.24)	(4.76)
HB	-0.10	-0.06	0.04	-0.06	-0.02	0.04
	(-1.29)	(-0.50)	(0.34)	(-0.75)	(-0.15)	(0.26)
HB-HS	0.13	-0.46	-0.59	0.24	-0.38	-0.62
	(1.00)	(-3.11)	(-4.04)	(1.57)	(-2.00)	(-3.55)

Panel C. FF 5-factor+Momentum alphas (%)

	Equal-weighted			Value-weighted		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.09	0.45	0.54	-0.18	0.38	0.56
	(-0.83)	(5.35)	(4.61)	(-1.19)	(4.02)	(3.67)
HB	-0.07	-0.02	0.05	-0.06	0.06	0.12
	(-0.95)	(-0.20)	(0.44)	(-0.73)	(0.40)	(0.76)
HB-HS	0.02	-0.47	-0.49	0.12	-0.32	-0.44
	(0.15)	(-3.75)	(-3.20)	(0.71)	(-1.90)	(-2.58)

Table I. (continued)

Panel D. Q-factor alphas (%)

	Equal-weighted			Value-weighted		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.09	0.46	0.55	-0.20	0.40	0.60
	(-0.51)	(3.64)	(4.15)	(-1.13)	(3.28)	(3.68)
HB	-0.10	-0.10	-0.01	-0.08	-0.05	0.03
	(-1.19)	(-0.85)	(-0.04)	(-0.91)	(-0.28)	(0.16)
HB-HS	-0.01	-0.56	-0.55	0.12	-0.45	-0.57
	(-0.06)	(-3.09)	(-3.23)	(0.65)	(-2.02)	(-2.87)

Panel E. DHS 3-factor alphas (%)

	Equal-weighted			Value-weighted		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.22	0.77	0.55	0.03	0.63	0.61
	(1.13)	(4.77)	(4.37)	(0.16)	(4.68)	(3.92)
HB	0.21	0.33	0.11	0.20	0.30	0.10
	(1.37)	(1.51)	(0.73)	(1.55)	(1.34)	(0.51)
HB-HS	0.00	-0.44	-0.44	0.18	-0.33	-0.51
	(-0.01)	(-2.62)	(-2.38)	(1.03)	(-1.54)	(-2.78)

Table II. Determinants of hedge fund vs. non–hedge fund demand

This table presents the time-series average regression coefficients of monthly cross-sectional regressions of change in institutional ownership on stock characteristics using Fama and MacBeth (1973) methodology. Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Pret is the cumulative stock return over the two quarters (*q-2 to q-1*) prior to qtr *q*, where disagreement is measured. SUE is the standardized unexpected earnings measured as earnings in a quarter minus four-quarter lagged earnings and scaled by the share price at the end of the previous quarter. The dependent variable is the non–hedge fund ownership (hedge fund ownership) in models 1 and 2 (3 and 4). The table reports the results using the full sample of stocks as well as the subsample of stocks in which hedge funds (non–hedge funds) buy heavily (sell heavily). Stocks in the hedge fund heavy buy (HB) are those that experience the largest increase in hedge fund ownership, and stocks in the non–hedge fund heavy sell (HS) are those that experience the largest decrease in non–hedge fund ownership. The control variables are as described in the previous tables. *SP500* is a dummy variable that takes the value of 1 if a stock belongs to S&P 500 index at the end of quarter *q*. Numbers in parentheses are *t-statistics* based on Newey–West standard errors.

	Dep. Var.: ΔNonhfown in q		Dep. Var.: ΔHfown in q	
	Full sample	HF heavy buy	Full sample	NonHF heavy sell
Variable	(1)	(2)	(3)	(4)
Intercept	0.008	0.017	0.008	0.015
	(3.64)	(3.90)	(4.73)	(4.30)
Pret	0.013	0.022	0.002	-0.000
	(15.07)	(14.87)	(4.53)	(-0.26)
SUE_q	0.036	0.062	0.003	-0.002
	(6.89)	(6.00)	(0.72)	(-0.28)
SUE_{q-1}	0.001	0.001	0.000	0.003
	(0.16)	(0.05)	(0.05)	(0.47)
Ag	0.001	0.005	-0.001	-0.003
	(1.48)	(3.41)	(-2.09)	(-4.16)
Gp	0.000	-0.000	0.000	0.000
	(0.42)	(-1.65)	(0.86)	(1.08)
Age	-0.001	-0.002	-0.000	-0.001
	(-4.16)	(-4.05)	(-1.36)	(-2.84)
Bm	-0.000	-0.000	0.000	0.000
	(-0.74)	(-0.59)	(1.51)	(1.30)
Dy	-0.012	0.062	-0.007	-0.085
	(-1.77)	(2.98)	(-1.99)	(-7.04)
Ivol	0.002	0.007	0.001	0.001
	(5.54)	(7.43)	(4.96)	(0.90)
Turnover	-0.001	-0.005	0.000	0.001
	(-2.31)	(-7.87)	(0.70)	(1.71)
Size	-0.000	-0.002	-0.000	0.001
	(-0.52)	(-4.45)	(-1.48)	(2.60)
SP500	-0.001	0.005	0.000	-0.003
	(-1.45)	(5.06)	(0.36)	(-4.77)
Avg. Adj.R^2	3.22	5.81	1.65	2.49

Table III. Window dressing effect

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB contains stocks that experience the largest increase in institutional ownership. Portfolio HS contains stocks that experience the largest decrease in institutional ownership. The January, February, and March returns are excluded from the analysis. Panel A and B report the time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas of the 25 bivariate portfolios in the subsequent quarter, respectively. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3.

Panel A. DGTW-adjusted returns (%)

	ΔHfown					
ΔNonhfown	HS	2	3	4	HB	HB-HS
HS	-0.07	0.04	0.13	0.27	0.43	0.50
	(-0.64)	(0.34)	(0.97)	(3.17)	(5.97)	(4.47)
2	0.15	0.05	-0.15	0.11	0.23	0.08
	(1.37)	(0.53)	(-1.12)	(1.02)	(2.28)	(0.57)
3	-0.01	-0.07	-0.22	-0.04	0.09	0.10
	(-0.10)	(-0.58)	(-1.50)	(-0.33)	(0.73)	(0.64)
4	0.06	-0.01	-0.20	0.05	-0.02	-0.08
	(0.76)	(-0.06)	(-1.47)	(0.54)	(-0.18)	(-0.62)
HB	0.00	-0.03	-0.11	-0.03	0.02	0.02
	(-0.01)	(-0.24)	(-0.70)	(-0.24)	(0.15)	(0.16)
HB-HS	0.06	-0.06	-0.23	-0.29	-0.41	-0.48
	(0.48)	(-0.42)	(-1.22)	(-2.60)	(-2.99)	(-2.55)

Panel B. 4-factor alphas (%)

	ΔHfown					
ΔNonhfown	HS	2	3	4	HB	HB-HS
HS	-0.15	0.01	0.30	0.31	0.49	0.64
	(-1.35)	(0.08)	(1.99)	(3.01)	(5.00)	(5.55)
2	0.17	0.14	0.10	0.25	0.31	0.14
	(1.49)	(1.43)	(0.77)	(2.84)	(2.62)	(0.98)
3	0.09	0.11	0.03	0.16	0.25	0.16
	(0.71)	(0.86)	(0.23)	(1.81)	(1.78)	(0.93)
4	0.05	0.10	0.01	0.15	-0.01	-0.07
	(0.50)	(1.03)	(0.05)	(1.44)	(-0.13)	(-0.49)
HB	-0.07	-0.09	0.04	-0.08	-0.11	-0.04
	(-0.75)	(-0.91)	(0.26)	(-0.65)	(-0.95)	(-0.31)
HB-HS	0.08	-0.10	-0.26	-0.39	-0.60	-0.68
	(0.64)	(-0.67)	(-1.24)	(-2.87)	(-4.80)	(-3.89)

Table IV. Hedge fund activism

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB contains stocks that experience the largest increase in institutional ownership. Portfolio HS contains stocks that experience the largest decrease in institutional ownership. We exclude all stocks that are subjected to hedge fund activism. Panel A presents the percentage of stocks in each portfolio with respect to the total number of stocks in the quintile sorted by the other dimension so that the sum of the rows or columns is equal to 100%. Panels B and C report, respectively, the time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas in the subsequent quarter. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3.

Panel A. Distribution of stocks (%)

	ΔHfown					
ΔNonhfown	HS	2	3	4	HB	All
HS	17.94	14.91	11.79	19.80	35.56	100.00
2	12.42	21.34	25.58	23.98	16.68	100.00
3	11.58	22.83	34.37	20.52	10.71	100.00
4	20.02	24.61	22.13	20.40	12.83	100.00
HB	35.10	17.28	11.35	15.87	20.40	100.00

Panel B. DGTW-adjusted returns (%)

	ΔHfown					
ΔNonhfown	HS	2	3	4	HB	HB-HS
HS	-0.05	0.07	0.13	0.19	0.49	0.54
	(-0.58)	(0.72)	(1.11)	(2.38)	(7.15)	(5.05)
2	0.06	0.00	-0.14	0.08	0.29	0.23
	(0.59)	(0.03)	(-1.26)	(0.87)	(2.94)	(1.58)
3	0.03	-0.12	-0.26	0.00	0.10	0.08
	(0.27)	(-1.18)	(-2.15)	(0.01)	(0.80)	(0.51)
4	0.08	0.00	-0.20	0.14	0.07	-0.01
	(1.04)	(-0.03)	(-1.63)	(1.67)	(0.66)	(-0.05)
HB	0.04	-0.05	-0.11	-0.09	-0.07	-0.10
	(0.43)	(-0.58)	(-0.80)	(-0.84)	(-0.50)	(-0.87)
HB-HS	0.00	0.00	0.00	0.00	-0.01	-0.01
	(0.73)	(-0.97)	(-1.35)	(-2.35)	(-3.97)	(-4.02)

Panel C. 4-factor alphas (%)

	ΔHfown					
ΔNonhfown	HS	2	3	4	HB	HB-HS
HS	-0.08	0.12	0.32	0.28	0.54	0.63
	(-0.81)	(1.01)	(2.38)	(2.96)	(5.80)	(5.98)
2	0.06	0.16	0.16	0.28	0.40	0.34
	(0.54)	(1.75)	(1.49)	(3.32)	(3.27)	(2.10)
3	0.13	0.11	0.03	0.29	0.28	0.15
	(1.08)	(0.95)	(0.24)	(3.46)	(2.23)	(0.95)
4	0.05	0.15	0.07	0.29	0.16	0.11
	(0.53)	(1.83)	(0.61)	(3.24)	(1.31)	(0.68)
HB	0.00	-0.02	0.09	-0.08	-0.17	-0.17
	(0.05)	(-0.26)	(0.68)	(-0.74)	(-1.56)	(-1.49)
HB-HS	0.09	-0.15	-0.23	-0.36	-0.71	-0.80
	(0.75)	(-1.03)	(-1.16)	(-2.59)	(-5.60)	(-5.10)

Table V. Split sample results

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB contains stocks that experience the largest increase in institutional ownership. Portfolio HS contains stocks that experience the largest decrease in institutional ownership. Panel A presents the percentage of stocks in each portfolio with respect to the total number of stocks in the quintile sorted by the other dimension so that the sum of the rows or columns is equal to 100%. Panels B and C report, respectively, the time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas in the subsequent quarter. In all panels, the analysis is conducted separately for the split-sample periods. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3.

Panel A. Disagreement percentages

	1994:Q2 - 2005:Q4 (47 qtrs)		2006:Q1 - 2017:Q3 (47 qtrs)	
	ΔHfown		ΔHfown	
ΔNonhfown	HS	HB	HS	HB
HS	20.96%	31.25%	13.49%	41.94%
HB	31.71%	22.85%	40.02%	16.84%

Panel B. DGTW-adjusted returns (%)

	1994:07 – 2006:03 (141 months)			2006:04 – 2017:12 (141 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.09	0.53	0.44	-0.13	0.41	0.54
	(0.72)	(6.41)	(3.40)	(-0.97)	(4.44)	(3.42)
HB	0.09	0.24	0.15	-0.12	-0.26	-0.14
	(0.66)	(1.05)	(0.85)	(-1.47)	(-1.63)	(-0.90)
HB-HS	-0.01	-0.29	-0.29	0.01	-0.66	-0.68
	(-0.03)	(-1.29)	(-1.28)	(0.07)	(-4.02)	(-3.47)

Panel C. 4-factor alphas (%)

	1994:07 – 2006:03 (141 months)			2006:04 – 2017:12 (141 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.17	0.64	0.47	-0.24	0.45	0.69
	(1.05)	(4.38)	(3.40)	(-1.77)	(4.40)	(4.37)
HB	0.06	0.14	0.08	-0.15	-0.35	-0.20
	(0.47)	(0.87)	(0.46)	(-1.84)	(-2.47)	(-1.24)
HB-HS	-0.11	-0.50	-0.39	0.09	-0.80	-0.89
	(-0.69)	(-3.20)	(-2.03)	(0.57)	(-4.45)	(-3.93)

Table VI. Disagreement in market states based on recessions and stock market performance
Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB (HS) contains stocks that experience the largest increase (decrease) in institutional ownership. In Panels A, market states are defined according to NBER recessionary periods. In Panels B, market state is defined as a down (up) market if the previous four-quarter cumulative market return is negative (non-negative). Panel A1 and B1 presents the percentage of stocks in each portfolio with respect to the total number of stocks in the quintile sorted by the other dimension. Panel A2 (A3) and Panel B2 (B3) report the time-series means of the monthly DGTW (1997) benchmark adjusted returns (four-factor alphas) in the subsequent quarter. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3.

Panel A1. Market states based on NBER recessionary periods

	Recession (11 qtrs)		Non-recession (83 qtrs)	
	ΔHfown		ΔHfown	
ΔNonhfown	HS	HB	HS	HB
HS	16.20%	39.04%	18.29%	36.41%
HB	37.93%	19.70%	35.71%	20.87%

Panel A2. DGTW-adjusted returns in recession and non-recession periods (%)

	Recession (33 months)			Non-recession (249 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.17	0.64	0.46	-0.05	0.45	0.49
	(0.63)	(2.43)	(1.10)	(-0.46)	(7.70)	(4.81)
HB	-0.19	-0.60	-0.41	0.00	0.07	0.06
	(-0.63)	(-1.31)	(-1.18)	(0.05)	(0.47)	(0.52)
HB-HS	-0.36	-1.23	-0.87	0.05	-0.38	-0.43
	(-0.93)	(-3.12)	(-1.90)	(0.39)	(-2.57)	(-2.73)

Panel A3. 4-factor alphas in recession and non-recession periods (%)

	Recession (33 months)			Non-recession (249 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.20	0.72	0.52	-0.08	0.51	0.59
	(0.60)	(2.47)	(1.29)	(-0.65)	(5.45)	(5.28)
HB	0.01	0.01	0.00	-0.06	-0.13	-0.08
	(0.03)	(0.04)	(0.01)	(-0.74)	(-1.16)	(-0.64)
HB-HS	-0.19	-0.70	-0.51	0.02	-0.65	-0.67
	(-0.62)	(-1.36)	(-0.82)	(0.17)	(-5.52)	(-4.64)

Table VI. (continued)

Panel B1. Market states based on past market return

	Down markets (22 qtrs)		Up markets (72 qtrs)	
	ΔHfown		ΔHfown	
ΔNonhfown	HS	HB	HS	HB
HS	16.69%	39.05%	18.43%	36.05%
HB	38.27%	20.05%	35.35%	20.95%

Panel B2. DGTW-adjusted returns in up and down markets (%)

	Down markets (66 months)			Up markets (216 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.21	0.48	0.27	-0.09	0.47	0.56
	(0.72)	(6.41)	(0.97)	(-0.93)	(6.98)	(5.43)
HB	-0.25	-0.59	-0.33	0.05	0.17	0.11
	(-1.36)	(-1.80)	(-1.22)	(0.62)	(1.08)	(0.88)
HB-HS	-0.47	-1.07	-0.60	0.15	-0.30	-0.45
	(-1.63)	(-3.66)	(-1.72)	(1.08)	(-1.86)	(-2.67)

Panel B3. 4-factor alphas in up and down markets (%)

	Down markets (66 months)			Up markets (216 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.19	0.67	0.47	-0.12	0.50	0.62
	(0.74)	(4.25)	(1.76)	(-1.00)	(4.66)	(5.41)
HB	-0.08	-0.05	0.03	-0.03	-0.13	-0.10
	(-0.52)	(-0.22)	(0.11)	(-0.41)	(-1.07)	(-0.83)
HB-HS	-0.28	-0.72	-0.44	0.08	-0.63	-0.72
	(-1.08)	(-2.53)	(-1.12)	(0.63)	(-4.78)	(-4.92)

Table VII. Disagreement in market states based on economic uncertainty and volatility

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB (HS) contains stocks that experience the largest increase (decrease) in institutional ownership. In Panels A, market state is defined as a low (high) macroeconomic uncertainty (UNC) period based on the economic uncertainty index (UNC) of Jurado, Ludvigson, and Ng (2015) if the monthly UNC index is below (above) its time-series median value. In Panels B, market state is defined as a low (high) equity volatility (VIX) period if the monthly VIX index is below (above) its time-series median value. Panel A1 and B1 presents the percentage of stocks in each portfolio with respect to the total number of stocks in the quintile sorted by the other dimension. Panel A2 (A3) and Panel B2 (B3) report the time-series means of the monthly DGTW (1997) benchmark adjusted returns (four-factor alphas) in the subsequent quarter. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3.

Panel A1. Market states based on economic uncertainty index (UNC)

	Low UNC (47 qtrs)		High UNC (47 qtrs)	
	ΔHfown		ΔHfown	
ΔNonhfown	HS	HB	HS	HB
HS	20.40%	36.09%	16.55%	38.93%
HB	35.40%	23.13%	38.14%	19.32%

Panel A2. DGTW-adjusted returns in low vs. high UNC periods (%)

	Low UNC (141 months)			High UNC (141 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.20	0.34	0.54	0.15	0.60	0.44
	(-1.83)	(4.84)	(4.66)	(1.01)	(5.89)	(2.58)
HB	-0.01	0.02	0.02	-0.03	-0.04	-0.01
	(-0.07)	(0.14)	(0.17)	(-0.22)	(-0.15)	(-0.03)
HB-HS	0.19	-0.33	-0.52	-0.19	-0.63	-0.45
	(1.55)	(-2.39)	(-2.94)	(-0.85)	(-2.52)	(-1.79)

Panel A3. 4-factor alphas in low vs. high UNC periods (%)

	Low UNC (141 months)			High UNC (141 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.25	0.33	0.58	0.16	0.74	0.59
	(-1.85)	(2.88)	(4.39)	(0.85)	(5.24)	(3.38)
HB	-0.10	-0.22	-0.12	0.00	-0.01	-0.01
	(-1.10)	(-1.69)	(-0.82)	(0.03)	(-0.06)	(-0.08)
HB-HS	0.15	-0.55	-0.70	-0.16	-0.76	-0.60
	(1.02)	(-4.23)	(-3.92)	(-0.83)	(-3.89)	(-2.38)

Table VII. (continued)

Panel B1. Market states based on equity volatility index (VIX)

	Low VIX (47 qtrs)		High VIX (47 qtrs)	
	ΔHfown		ΔHfown	
ΔNonhfown	HS	HB	HS	HB
HS	15.86%	37.48%	21.45%	37.53%
HB	36.99%	19.08%	36.52%	23.67%

Panel B2. DGTW-adjusted returns in low vs. high VIX periods (%)

	Low VIX (141 months)			High VIX (141 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.19	0.38	0.57	0.15	0.56	0.41
	(-1.78)	(6.50)	(5.32)	(1.00)	(5.32)	(2.44)
HB	-0.01	0.02	0.03	-0.03	-0.04	-0.01
	(-0.15)	(0.15)	(0.22)	(-0.19)	(-0.14)	(-0.05)
HB-HS	0.18	-0.37	-0.54	-0.17	-0.59	-0.42
	(1.42)	(-2.94)	(-3.44)	(-0.86)	(-2.32)	(-1.69)

Panel B3. 4-factor alphas in low vs. high VIX periods (%)

	Low VIX (141 months)			High VIX (141 months)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.20	0.40	0.60	0.11	0.68	0.56
	(-1.51)	(4.42)	(4.81)	(0.65)	(4.18)	(3.30)
HB	-0.07	-0.16	-0.09	-0.03	-0.07	-0.04
	(-0.77)	(-1.24)	(-0.70)	(-0.21)	(-0.39)	(-0.23)
HB-HS	0.13	-0.56	-0.69	-0.14	-0.75	-0.60
	(0.91)	(-4.33)	(-4.32)	(-0.81)	(-3.61)	(-2.43)

Table VIII. Long-run performance

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB contains stocks that experience the largest increase in institutional ownership. Portfolio HS contains stocks that experience the largest decrease in institutional ownership. The time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas are reported for each of the four corner portfolios obtained from bivariate sorting. Panels A and B report the results for holding the portfolios for six months and one year, respectively. Panel C reports the results for holding period of one year skipping the first year after portfolio formation. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

Panel A. Portfolios formed with six-month holding period (q+1, q+2)

	DGTW-adjusted returns (%)			4-factor alphas (%)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	-0.05	0.31	0.35	-0.08	0.40	0.48
	(-0.62)	(6.42)	(4.83)	(-0.77)	(4.74)	(5.16)
HB	0.06	-0.02	-0.08	0.05	-0.13	-0.17
	(0.92)	(-0.16)	(-0.92)	(0.63)	(-1.48)	(-1.86)
HB-HS	0.11	-0.32	-0.43	0.12	-0.53	-0.65
	(1.19)	(-3.19)	(-4.16)	(1.28)	(-5.49)	(-4.97)

Panel B. Portfolios formed with one-year holding period (q+1, q+4)

	DGTW-adjusted returns (%)			4-factor alphas (%)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.02	0.21	0.18	0.05	0.30	0.24
	(0.41)	(5.34)	(3.24)	(0.57)	(3.73)	(2.84)
HB	0.07	-0.06	-0.12	0.09	-0.13	-0.22
	(1.51)	(-0.79)	(-2.18)	(1.26)	(-1.71)	(-3.50)
HB-HS	0.04	-0.26	-0.31	0.04	-0.42	-0.46
	(0.70)	(-3.85)	(-3.88)	(0.47)	(-5.92)	(-3.99)

Panel C. Portfolios formed with one-year holding period after skipping the first year following the disagreement (q+5, q+8)

	DGTW-adjusted returns (%)			4-factor alphas (%)		
	ΔHfown			ΔHfown		
ΔNonhfown	HS	HB	HB-HS	HS	HB	HB-HS
HS	0.12	0.13	0.02	0.27	0.27	0.00
	(2.29)	(3.08)	(0.35)	(2.52)	(2.95)	(0.03)
HB	0.14	0.06	-0.08	0.23	0.12	-0.12
	(2.87)	(1.19)	(-1.50)	(2.84)	(1.09)	(-1.82)
HB-HS	0.03	-0.07	-0.10	-0.04	-0.15	-0.12
	(0.51)	(-1.23)	(-1.22)	(-0.52)	(-2.37)	(-1.12)

Table IX. Short interest and disagreement

Each quarter, all common stocks are independently ranked into quintiles based on the change in hedge fund and non–hedge fund ownership, respectively. Portfolio HB contains stocks that experience the largest increase in institutional ownership. Portfolio HS contains stocks that experience the largest decrease in institutional ownership. The two strong disagreement portfolios are then ranked into terciles based on the change in short interest ratio, where the short-interest ratio is defined as the ratio of shares shorted to the shares outstanding. The table reports, for each of the two disagreement portfolios, the time-series means of the monthly DGTW (1997) benchmark adjusted returns and Carhart (1997) four-factor alphas of the three tercile portfolios in the subsequent quarter. The returns are in percent. Numbers in parentheses are Newey-West adjusted *t*-statistics. The sample period is 1994:Q2 to 2017:Q3, covering 94 quarters.

Panel A. Hedge funds heavy sell (HS) and non–hedge funds heavy buy (HB)

ΔSIR(q)	DGTW-adj. ret. (%)		4-factor alphas (%)		Ret_q	ΔSIR_q	$\Delta Hfown_q$	$\Delta Nonhfown_q$
Low	0.02	(0.18)	-0.03	(-0.26)	8.41%	-1.12%	-3.39%	5.38%
Medium	0.13	(1.26)	0.17	(1.50)	8.98%	0.20%	-2.95%	5.30%
High	-0.24	(-2.12)	-0.32	(-2.95)	8.51%	2.00%	-3.02%	6.33%
High - Low	-0.26	(-2.04)	-0.28	(-1.86)				

Panel B. Hedge funds heavy buy (HB) and non–hedge funds heavy sell (HS)

ΔSIR(q)	DGTW-adj. ret. (%)		4-factor alphas (%)		Ret_q	ΔSIR_q	$\Delta Hfown_q$	$\Delta Nonhfown_q$
Low	0.62	(4.82)	0.60	(4.12)	3.19%	-1.74%	4.01%	-6.26%
Medium	0.42	(4.26)	0.61	(4.92)	4.77%	-0.12%	3.80%	-5.07%
High	0.44	(4.53)	0.46	(3.51)	3.08%	1.41%	4.43%	-5.41%
High - Low	-0.18	(-1.12)	-0.14	(-0.83)				