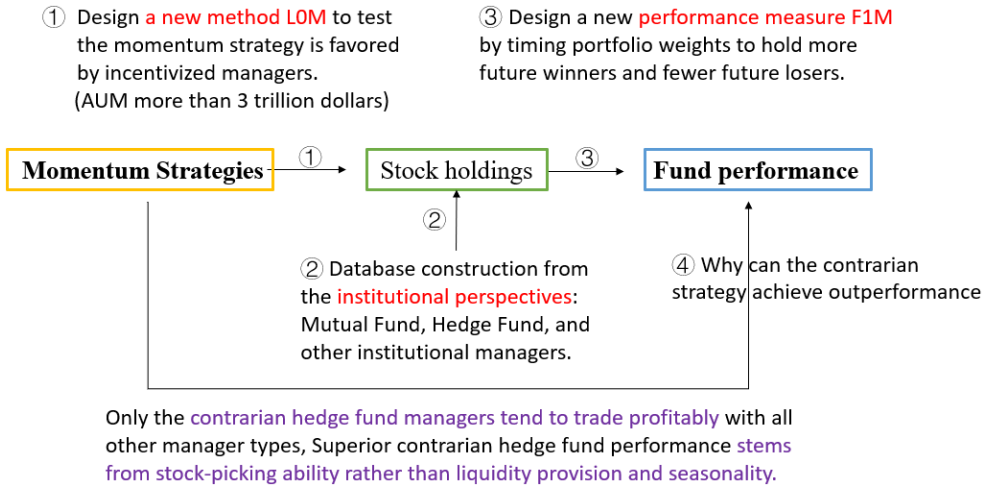
Grinblatt et al. -2020- Style and Skill: Hedge Funds, Mutual Funds, and Momentum

➢ 1. Introduction

1.1 Background and Motivation

- ➢ "Momentum" is simple to implement and popular, particularly among institutional investors. Grinblatt et al. (1995) and Carhart (1997) show that mutual funds tend to follow momentum strategies and earn superior returns.
- ➢ Despite widespread research exploring how past returns influence mutual fund managers' trading styles, little evidence exists on whether momentum trading is also favored by the hedge fund managers.
- ➢ Motivated by this fact, we develop an extensive hedge fund manager database from a comprehensive sample of 13F institutional stockholdings.
- ➢

1.2 Framework



1.3 Contribution

In sum, this paper offers the main contributions to the literature.

- ✓ First, we document that most hedge fund managers are contrarian traders, and about two thirds of mutual fund managers follow momentum strategies, for both purchases and sales.
- ✓ Second, holdings-based hedge fund evaluation avoids well-known biases in hedge fund return databases, our holdings data empirically confirm that hedge fund advisers profitably buy stocks that mutual funds later regret they sold.
- ✓ Third, superior contrarian hedge fund performance exhibits persistence and stems from stock-picking ability rather than liquidity provision.

➢ 2. Data

2.1 Why we use the mandatory quarterly 13F filings of investment advisers?

1. Prior research on hedge fund style generally employs return databases, which are contaminated by expenses and asset marks that smooth hedge fund returns as well as survivorship, backfill, and reporting biases. Furthermore, questions remain about the reliability of self-reported returns (Patton et al., 2015).
2. Since 1980, all institutional investment advisers managing more than $100 million must report their stockholdings on form 13F to the Securities and Exchange Commission.
3. There is no exemption for bankruptcies and liquidation as long as any reportable securities remain in the adviser's portfolio and is free of survivorship bias.
    - Rule 13f-1(a)(1) also requires filings for at least three quarters after falling below the $100 million threshold. These reporting requirements, along with the use of performance measures that track holdings-implied returns for at least one quarter.

1.2 Disadvantage of the 13F filings

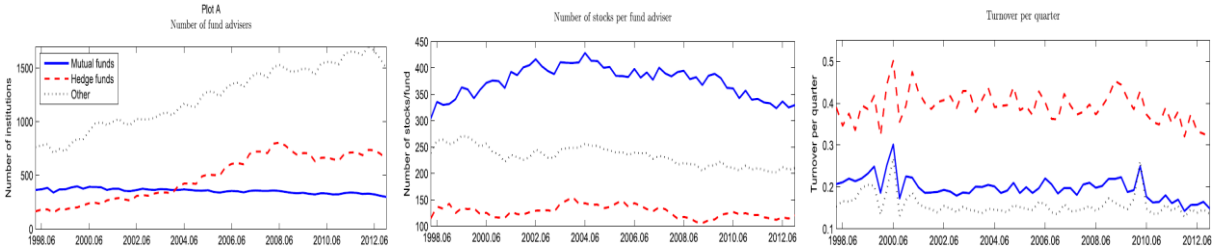
- ✓ The 13F reports have the limitation of omitting intra-quarter positions, short positions, derivatives, small positions and some confidential position.
- ✓ The omission of derivatives positions and confidential holdings makes it less likely that we will identify superior performance among skilled hedge fund advisers who frequently make use of these tools, which would make any findings of skill conservative .

2.3 Data source and database construction

Institutional stock ownership is computed from the mandatory quarterly 13F filings of investment advisers. The 13F filings do not report the types of funds the adviser manages. We classify each 13F filing as belonging to a mutual fund adviser, hedge fund adviser, or other adviser.

- Mutual fund advisers are identified from the Thomson Reuters S12 mutual fund holding database, which provides their advisers' corresponding number on the 13F file.
- The remaining 13F filers are manually identified as hedge fund or other advisers by matching their names with a list of hedge fund manager names.
- A firm is classified as a hedge fund adviser only if the form indicates that more than 50% of its regulatory AUM belong to pooled investment vehicles other than investment companies.
- Starting from 1988, because the databases used to identify hedge fund managers do not retain dead funds until 1998.

Over our 1998–2012 sample period, we identify 589 unique mutual fund advisers, 1,342 hedge fund advisers, and 2,894 "other" advisers.



Of the stocks that hedge fund advisers hold, 99% are also held by mutual fund advisers. Yet only 76%of the stocks held by mutual funds are also held by hedge funds.

➢ 3. Methodology

3.1 Measuring Style

Following GTW, we assess whether an adviser follows a momentum strategy from lag 0 momentum (L0M), the vector product of portfolio weight changes (observed quarterly) and past returns (observed monthly):

$$L0M_{iq} = \sum_{j=1}^{N(q)} (\omega_{i,j,q} - \omega_{i,j,q-1})\, R_{j,q}$$

where $\omega_{i,j,q}$ is fund manager i's quarter-q ending weight on stock j, $N(q)$ is the number of stocks in quarter q, and $R_{j,q}$ is the sum of stock j's monthly returns in quarter q.

A positive L0M indicates a tendency toward momentum investing—the fund manager is buying stocks with positive past returns or selling stocks with negative past returns. Conversely, a negative L0M points to contrarian investing.

- Each quarter, we average the $L0M_{iq}$ measures with a time series method across fund advisers to evaluate their aggregate tendency ($L0M_q$) to follow momentum:

$$L0M_q = \frac{1}{K(q)} \sum_{i=1}^{K(q)} L0M_{iq}$$

$$L0M = \frac{1}{Q} \sum_{q=1}^{Q} L0M_q$$

$$t - stat(L0M) = \frac{L0M}{s.e.(L0M)} = \frac{L0M}{\sigma(L0M_q)/\sqrt{Q}}$$

where K(q) is the number of fund managers of a given type (hedge, mutual, or other) in quarter q and Q is the number of quarters in the sample.

- We also compute L0M using a cross-sectional average in lieu of a time series average

$$L0M_q = \frac{1}{Q(i)} \sum_{q=1}^{Q(i)} L0M_{iq}$$

$$L0M = \frac{1}{K} \sum_{i=1}^{K} L0M_i$$

Compared with the time series average, the cross sectional average places more weight on shorter-tenure managers and those operating in months with greater numbers of advisers

- A fund's investment style may differ on the buy and sell sides or may be influenced more by one side than the other. To capture this difference, we measure an adviser's buy and sell momentum style, respectively, L0Mb and L0Ms, from quarterly measures of the style as follows:

$$L0Mb_{iq} = \sum_{\omega_{i,j,q} > \omega_{i,j,q-1}} (\omega_{i,j,q} - \omega_{i,j,q-1})\,(R_{j,q} - B_{j,q})$$

$$L0Ms_{iq} = \sum_{\omega_{i,j,q} < \omega_{i,j,q-1}} (\omega_{i,j,q} - \omega_{i,j,q-1})\,(R_{j,q} - B_{j,q})$$

where $B_{i,q}$ is a benchmark return, a constant for each fund adviser i in quarter q, which equals the stockholdings weighted average of the returns of the size and book to market portfolios to which each stock j belongs

$$B_{j,q} = \sum_{j=1}^{N(q)} \omega_{i,j,q-1} SZBM_{j,q}$$

The benchmark return is a proxy for the fund adviser's expected return that quarter based on the size and book to market characteristics of the fund's beginning-of-quarter portfolio.

3.2 Measuring Performance

The performance measure, adapted from Grinblatt and Titman (1993), employs the portfolio held by the manager at the end of the previous quarter as its benchmark

$$F1M_{iq}^{*} = \sum_{j=1}^{N} (\omega_{i,j,q} - \omega_{i,j,q-1})\, R_{j,q+1}^{*}$$

where $R_{j,q+1}^{*}$ is the noncumulative risk-adjusted return for stock j in quarter $q + 1$. A measure greater than zero indicates that purchases outperform sales.

➢ 3. Results

3.1. Hedge Fund and Mutual Fund Adviser Styles

Table 2. Style Measures

Panel A: Quarterly style measures

	Adviser type					
	Mutual fund			Hedge fund		
Measure	All	Buys	Sells	All	Buys	Sells
Time-series average of adviser-level style measures						
L0M	0.71	0.39	0.32	−0.34	−0.37	0.03
	(14.88)	**(5.94)**	**(5.66)**	**(−3.62)**	**(−2.43)**	(0.29)
	[1.00]	[0.87]	[0.82]	[0.30]	[0.45]	[0.48]
Cross-sectional average of adviser-level style measures						
L0M	1.07	0.47	0.59	−0.70	−0.66	−0.04
Distribution of momentum (*L0M* > 0) and contrarian (*L0M* < 0) traders						
Momentum traders, #	396	352	406	475	444	644
Contrarians, #	193	237	183	867	898	698
Proportion of contrarians	0.33	0.40	0.31	0.65	0.67	0.52

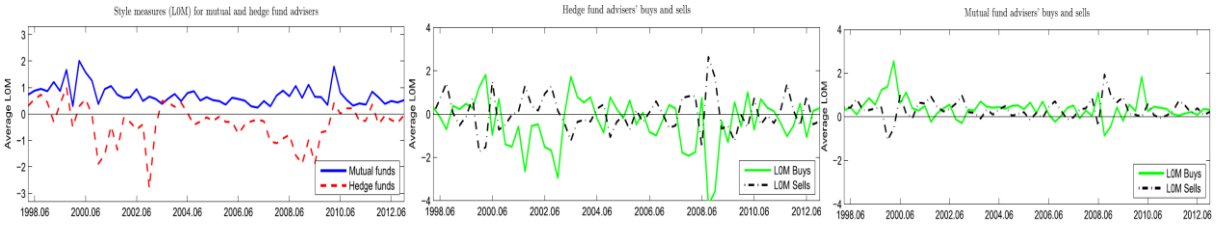
Panel B: Persistence of investment style

	Style during second subperiod					
	Average *L0M*			Proportion of contrarians (*L0M*< 0)		
Style during first subperiod	MF	HF	Other	MF	HF	Other
Contrarians (*L0M*<0)	−0.33	−1.67	−0.37	0.71	0.79	0.63
Momentum traders (*L0M*>0)	1.04	1.06	0.61	0.22	0.36	0.22

Panel D: Stock holdings overlap across fund advisers

Mutual fund advisers	100.00	76.32	85.31
Hedge fund advisers	99.23	100.00	92.24
Other advisers	99.09	82.40	100.00

- ✓ 2/3 Hedge fund managers are contrarian, and 2/3 mutual fund managers are momentum investors.
- ✓ Mutual fund managers follow momentum both in their buys and sells, and the hedge fund advisers are contrarian only in their buys.



3.2. Performance of Mutual and Hedge Fund Advisers

We now examine the F1M performance measure, we compute two versions of the performance measure that control for changing risk premia in individual stocks by using risk-adjusted returns. The first, $F1M_{SzBm}$, controls for size and BM; the second, $F1M_{DGTW}$, controls for size, book-to-market, and momentum.

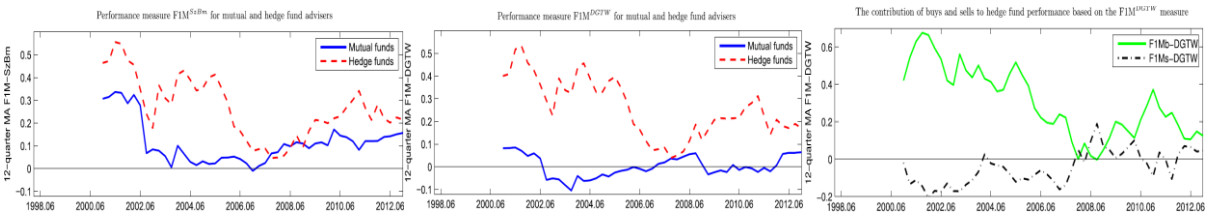
Table 3. Performance Measures

Panel A: Quarterly performance measures						
	Adviser type					
	Mutual fund			Hedge fund		
Measure	All	Buys	Sells	All	Buys	Sells
Time-series average of adviser-level performance measures						
$F1M^{SzBm}$	0.13	0.10	0.03	0.27	0.28	−0.01
	(2.67)	(1.71)	(0.82)	**(3.61)**	**(2.57)**	(−0.12)
	[0.65]	[0.62]	[0.52]	[0.65]	[0.62]	[0.45]
$F1M^{DGTW}$	0.02	0.04	−0.02	0.25	0.26	−0.01
	(0.51)	(0.99)	(−0.75)	**(3.72)**	**(3.17)**	(−0.15)
	[0.58]	[0.58]	[0.47]	[0.68]	[0.65]	[0.47]
Cross-sectional average of adviser-level performance measures						
$F1M^{SzBm}$	0.12	−0.00	0.12	0.46	0.27	0.19
$F1M^{DGTW}$	−0.08	−0.06	−0.02	0.40	0.26	0.15

Panel B: Persistence of performance						
	Performance during second subperiod					
	$F1M^{SzBm}$			$F1M^{DGTW}$		
Performance during first subperiod	MF	HF	Other	MF	HF	Other
Underperformers ($F1M < 0$)	−0.018	0.048	0.024	−0.005	0.176	−0.002
	(−0.22)	(0.42)	(0.93)	(−0.08)	(1.78)	(−0.10)
Number of advisers	137	217	701	150	234	740
Average life (quarters) 1st half	28	16	20	27	16	20
Average life (quarters) 2nd half	24	21	22	24	21	22
Percentage of funds still in 2nd half	71	76	72	68	78	72
Outperformers ($F1M > 0$)	0.055	0.428	−0.025	−0.021	0.327	−0.036
	(1.54)	**(3.65)**	(−0.54)	(−0.70)	**(2.98)**	(−0.78)
Number of advisers	223	322	639	210	305	600
Average life (quarters) 1st half	27	16	19	27	16	20
Average life (quarters) 2nd half	24	22	22	24	22	23
Percentage of funds still in 2nd half	71	79	70	72	78	70

The result would be less favorable to mutual fund advisers once we control for momentum.

- ✓ The hedge fund performance derives from their advisers' stock-picking ability rather than from following a strategy based on the size, value, or momentum anomalies.
- ✓ However, the mutual fund managers perform as well as a naive momentum investor.



1.3. Performance and Investment Style

To assess whether investment style influences performance, Table 4 sorts fund advisers into contrarians and momentum subgroups based on the sign of their average L0M measure over the sample period.

Only contrarian hedge fund advisers (the 867 advisers with L0M< 0) achieve significantly positive alpha. The difference of performance between contrarian and momentum hedge fund advisers is driven mostly by buys.

And table 4 shows no evidence of investment skill among mutual fund managers after adjusting for the effect of momentum on stock returns.

Table 4. Performance of Momentum and Contrarian Fund Advisers

	Adviser type					
	Mutual fund			Hedge fund		
Measure	All	Buys	Sells	All	Buys	Sells
Panel A: Time-series average of adviser-level quarterly performance measures						
Contrarian fund advisers ($L0M<0$)						
$F1M^{SzBm}$	−0.02	0.03	−0.04	0.35	0.34	0.01
	(−0.55)	(0.83)	(−1.34)	**(3.99)**	**(2.85)**	(0.12)
$F1M^{DGTW}$	0.01	0.04	−0.03	0.34	0.33	0.01
	(0.31)	(1.42)	(−1.42)	**(4.09)**	**(3.52)**	(0.21)
Momentum fund advisers ($L0M>0$)						
$F1M^{SzBm}$	0.22	0.14	0.08	0.10	0.14	−0.04
	(2.91)	(1.58)	(1.26)	(0.95)	(0.89)	(−0.33)
$F1M^{DGTW}$	0.02	0.04	−0.02	0.08	0.13	−0.05
	(0.42)	(0.68)	(−0.41)	(0.86)	(1.05)	(−0.53)
Panel B: Cross-sectional average of adviser-level performance measures						
Contrarian funds ($L0M<0$)						
$F1M^{SzBm}$	−0.11	−0.07	−0.04	0.65	0.44	0.21
$F1M^{DGTW}$	−0.04	−0.03	−0.01	0.60	0.41	0.19
Momentum funds ($L0M>0$)						
$F1M^{SzBm}$	0.23	0.03	0.20	0.12	−0.03	0.15
$F1M^{DGTW}$	−0.10	−0.08	−0.03	0.04	−0.03	0.07

➢ 4. Evidence from Stock Returns

Up to this point, the paper focused its performance analysis at the fund manager level. An alternative perspective comes from looking at the subsequent performance of the stocks that are bought or sold by various groups of fund advisers. This approach allows us to study why the contrarian hedge fund manager can earn excess return.

4.1 DGTW-Adjusted Stock Returns Sorted by Who Buys and Sells

Table 5. DGTW-Adjusted Returns Sorted on Aggregate Trades

Panel A: Buys and sells by fund adviser type			
Adviser type	Buys	Sells	Buys – sells
Mutual fund	0.004	0.207	−0.203
	(0.06)	**(3.32)**	**(−2.41)**
Hedge fund	0.187	0.004	0.183
	(3.26)	(0.10)	**(3.07)**
Contrarian hedge fund	0.224	−0.063	0.287
	(4.70)	(−10.41)	**(5.84)**
Momentum hedge fund	0.145	0.146	−0.001
	(1.93)	**(3.25)**	(−0.02)
Contrarian mutual fund	0.081	0.135	−0.054
	(1.95)	**(2.61)**	(−10.03)
Momentum mutual fund	0.029	0.196	−0.166
	(0.41)	**(3.17)**	(−10.63)

Panel B: Buy–sell interactions by mutual fund-hedge fund adviser style						
	Momentum MF		Contrarian MF		Momentum HF	
	Buys	Sells	Buys	Sells	Buys	Sells
Contrarian hedge fund buys	0.122	0.353	0.222	0.229	0.242	0.311
	(1.52)	**(4.57)**	**(4.41)**	**(3.30)**	**(3.43)**	**(5.34)**
Contrarian hedge fund sells	−0.048	−0.054	−0.064	−0.015	−0.002	−0.056
	(−0.62)	(−0.71)	(−10.26)	(−0.24)	(−0.03)	(−0.91)
Momentum hedge fund buys	0.139	0.154	0.143	0.177		
	(1.19)	**(2.56)**	(1.95)	(1.93)		
Momentum hedge fund sells	0.053	0.281	0.166	0.142		
	(0.83)	**(3.03)**	**(2.88)**	**(2.45)**		
Contrarian mutual fund buys	0.025	0.161				
	(0.36)	**(2.86)**				
Contrarian mutual fund sells	0.082	0.245				
	(0.98)	**(2.56)**				

- ✓ Stocks that are bought by contrarian hedge fund advisers and sold by momentum mutual fund advisers.
- ✓ Stock sales of the mutual fund adviser group are cause for regret: these stocks tend to subsequently achieve large abnormal returns in the quarter after a sale is recorded.
- ✓ These tend to be losing stocks that the contrarian fund managers believe are going to bounce back.

4.2 Liquidity Provision

- ➢ Selling pressures by momentum investors can cause temporary price distortions that benefit contrarian investors who step in and provide liquidity (Jylh¨a et al., 2014). This liquidity provision may generate alphas that could erroneously be attributed to superior stock selection.
- ➢ If the alphas of contrarian hedge fund were due to liquidity provision rather than superior stock selection, the returns of stocks traded would tend to show short-term price reversals centered around trade dates.
- ➢ We address this possibility by further adjusting each stock's return for the effect of its prior-month return. we implement cross-sectional regressions of stock returns on the four characteristics—log(size), log(BM), momentum, and month t − 1 returns.

Table 6. CS-Adjusted Returns Sorted on Aggregate Fund Trades

Panel A: Buys and sells by fund adviser type

Adviser type	Buys	Sells	Buys – sells
Mutual fund	0.007	0.167	−0.160
	(0.26)	**(5.24)**	**(−3.22)**
Hedge fund	0.182	−0.015	0.196
	(5.47)	(−0.37)	**(4.12)**
Contrarian hedge fund	0.236	−0.116	0.352
	(6.88)	**(−3.15)**	**(7.73)**
Momentum hedge fund	0.112	0.131	−0.018
	(2.59)	**(2.66)**	(−0.34)
Contrarian mutual fund	0.105	0.079	0.027
	(3.19)	**(2.42)**	(0.54)
Momentum mutual fund	0.019	0.176	−0.158
	(0.60)	**(4.61)**	**(−2.85)**

Panel B: Buy–sell interactions by mutual fund-hedge fund adviser style

	Momentum MF		Contrarian MF		Momentum HF	
	Buys	Sells	Buys	Sells	Buys	Sells
Contrarian hedge fund buys	0.129	0.356	0.247	0.236	0.210	0.323
	(2.79)	**(6.02)**	**(5.03)**	**(5.19)**	**(4.21)**	**(5.63)**
Contrarian hedge fund sells	−0.112	−0.072	−0.065	−0.137	−0.060	−0.102
	(−2.19)	(−10.11)	(−10.34)	**(−2.59)**	(−10.01)	(−10.64)
Momentum hedge fund buys	0.091	0.164	0.131	0.111		
	(1.54)	**(2.69)**	**(2.48)**	(1.94)		
Momentum hedge fund sells	0.052	0.244	0.180	0.093		
	(0.87)	**(3.25)**	**(3.05)**	(1.53)		
Contrarian mutual fund buys	0.044	0.189				
	(0.93)	**(3.77)**				
Contrarian mutual fund sells	0.034	0.205				
	(0.73)	**(2.98)**				

The CS-alphas from Table 6, which control for past return reversals, suggest this hypothesis is unlikely.

4.3 Seasonality in Hedge Fund Performance

- ✓ For the contrarian hedge fund advisers of panel A, the January alphas of stocks purchased significantly exceed the alphas of the stocks they sell; however, that same alpha spread is larger in 5 of the remaining 11months.
- ✓ panel B shows no evidence or pattern of performance, seasonal or otherwise, for the momentum hedge fund advisers.

Table 8. Seasonality in Hedge Fund Returns

Portfolio	Buys	Sells	Buys – sells
Panel A: Contrarian hedge fund advisers			
January	0.245	−0.238	0.483
	(2.11)	(−20.05)	**(6.31)**
February	0.090	−0.082	0.172
	(0.95)	(−0.67)	(1.13)
March	0.124	0.090	0.034
	(1.23)	(0.77)	(0.20)
April	0.330	−0.078	0.408
	(1.90)	(−0.60)	**(2.30)**
May	0.232	−0.256	0.488
	(1.86)	**(−3.00)**	**(2.74)**
June	0.223	0.049	0.174
	(2.53)	(0.44)	(1.43)
July	0.196	−0.343	0.540
	(1.47)	(−10.88)	**(2.97)**
August	0.274	−0.219	0.493
	(1.80)	(−10.82)	**(4.65)**
September	0.168	−0.090	0.258
	(2.40)	(−0.58)	(1.53)
October	0.312	−0.266	0.578
	(2.65)	(−10.95)	**(2.94)**
November	0.452	−0.123	0.575
	(4.46)	(−10.05)	**(4.19)**
December	0.196	0.170	0.026
	(1.42)	**(2.44)**	(0.18)
Panel B: Momentum hedge fund advisers			
January	−0.105	−0.155	0.050
	(−0.90)	(−0.97)	(0.24)
February	−0.147	0.213	−0.361
	(−0.85)	(1.36)	(−10.63)
March	0.083	0.436	−0.353
	(0.91)	**(3.55)**	**(−2.36)**
April	0.373	0.147	0.226
	(2.03)	(0.77)	(1.10)
May	−0.181	−0.017	−0.164
	(−10.95)	(−0.11)	(−0.93)
June	0.243	0.292	−0.049
	(1.71)	**(2.20)**	(−0.30)
July	0.236	−0.360	0.595
	(1.23)	(−10.98)	**(4.01)**
August	−0.072	0.107	−0.179
	(−0.48)	(0.55)	(−10.15)
September	0.128	0.151	−0.023
	(1.09)	(1.46)	(−0.28)
October	0.174	0.103	0.070
	(1.12)	(0.44)	(0.28)
November	0.220	0.163	0.058
	(1.99)	(1.39)	(0.33)
December	0.414	0.488	−0.074
	(2.23)	**(2.79)**	(−0.42)

4.4 Fund Trades and Short Interest

4.4.1. Performance of Short Positions

- Hedge fund managers frequently establish short positions in stocks, when they possess negative information about a company or the economic climate in which it operates. Several studies find significant negative relationships between a stock's short-interest ratio (SIR) and its subsequent return (Desai et al., 2002, Boehmer et al., 2010).
- We study short sales by first sorting stocks into two subsamples based on their end-of-prior-month SIR: below versus above the month's median SIR.

$$SIR = \frac{number\ of\ shares\ short\ in\ a\ stock}{average\ daily\ trading\ volume}$$

Table 9. CS-Adjusted Returns by Aggregate Fund Trades and Short Interest

Panel A: Buys and sells by fund adviser type and SIR						
	Below-median SIR			Above-median SIR		
Adviser type	Buys	Sells	Buys – sells	Buys	Sells	Buys – sells
Mutual fund	0.239	0.349	−0.110	−0.049	0.172	−0.221
	(3.05)	**(4.73)**	(−10.96)	(−0.69)	**(2.30)**	**(−3.26)**
Hedge fund	0.398	0.221	0.177	0.133	−0.017	0.150
	(5.21)	**(2.83)**	**(2.83)**	**(2.08)**	(−0.22)	**(2.49)**
Contrarian hedge fund	0.453	0.152	0.301	0.212	−0.136	0.347
	(5.55)	**(1.97)**	**(4.07)**	**(3.17)**	(−10.90)	**(6.11)**
Momentum hedge fund	0.350	0.381	−0.031	0.064	0.126	−0.062
	(4.16)	**(4.24)**	(−0.44)	(0.99)	(1.65)	(−0.97)
Contrarian mutual fund	0.321	0.286	0.034	0.063	0.061	0.002
	(4.35)	**(3.82)**	(0.52)	(0.89)	(0.89)	(0.04)
Momentum mutual fund	0.246	0.367	−0.121	−0.032	0.165	−0.197
	(3.23)	**(4.94)**	(−10.93)	(−0.42)	**(2.12)**	**(−2.53)**

- ✓ Although the SIR classification changes the alpha, it does not alter our conclusions about which groups enjoy good overall performance. None of the buy–sell alpha spreads of mutual fund or of momentum hedge fund advisers in panel A of Table 9 are significantly positive.

Panel B: Buy–sell interactions by fund adviser style and SIR

	Momentum MF		Contrarian MF		Momentum HF	
	Buys	Sells	Buys	Sells	Buys	Sells
Below-median short interest						
Contrarian hedge fund buys	0.475	0.448	0.507	0.381	0.515	0.577
	(5.29)	**(4.83)**	**(5.38)**	**(3.91)**	**(4.96)**	**(5.43)**
Contrarian hedge fund sells	0.106	0.296	0.247	0.109	0.187	0.186
	(1.17)	**(3.02)**	**(2.75)**	(1.14)	(1.88)	(1.62)
Momentum hedge fund buys	0.357	0.435	0.418	0.348		
	(3.83)	**(3.76)**	**(4.45)**	**(3.23)**		
Momentum hedge fund sells	0.397	0.429	0.432	0.289		
	(3.63)	**(4.15)**	**(3.100)**	**(2.67)**		
Contrarian mutual fund buys	0.327	0.361				
	(4.14)	**(4.22)**				
Contrarian mutual fund sells	0.241	0.428				
	(2.77)	**(4.20)**				
Above-median short interest						
Contrarian hedge fund buys	0.035	0.402	0.212	0.233	0.173	0.295
	(0.42)	**(4.70)**	**(2.73)**	**(3.13)**	**(2.52)**	**(3.48)**
Contrarian hedge fund sells	−0.105	−0.145	−0.109	−0.145	−0.100	−0.095
	(−10.22)	(−10.54)	(−10.38)	(−10.76)	(−10.25)	(−10.09)
Momentum hedge fund buys	0.040	0.104	0.083	0.055		
	(0.48)	(1.32)	(1.11)	(0.73)		
Momentum hedge fund sells	0.006	0.270	0.157	0.119		
	(0.07)	**(2.59)**	(1.89)	(1.34)		
Contrarian mutual fund buys	−0.045	0.191				
	(−0.52)	**(2.31)**				
Contrarian mutual fund sells	0.009	0.178				
	(0.11)	(1.76)				

4.5 Robustness Tests

4.5.1. Alternative Weights

A stock's weight may change without a trade in the stock when an adviser's portfolio trades other securities or even when prices of other stocks in a portfolio change. We compute "real" buy ("real" sell) L0M and F1M measures as partial sums only over the stocks for which there is an increase (decrease) in both portfolio weight and number of shares held.

4.5.2. Alternative Formation Period

we compute an L1M measure (lag 1 momentum), which relates current quarter weight changes to the previous quarter's returns.

4.5.3. Alternative Return Adjustments.

Our main performance measures combine two risk-adjustment approaches: (1) self-benchmarking and (2) characteristics benchmarking. in this part, we use the performance measures based on raw and excess returns.

4.5.4. Excluding Passive Managers

We define as passive an adviser who rebalances less than 5% of portfolio holdings in any given quarter. Using this criterion, about 5% of the sample's mutual fund and almost no hedge fund advisers are passive.

4.5.5. Different Subperiods

This part compares adviser performance in the first and second halves of the sample period, and compares performance in two sets of months stratified by whether the momentum factor (and, hence, a momentum strategy) performs well or poorly.

4.5.6. Disaggregation of Mutual and Hedge Fund Holdings

Because 13F reports are filed at the fund adviser level, they combine mutual and hedge fund holdings of advisers to both types of funds. This aggregation raises the possibility that within-adviser netting and offsetting of positions may mask the true dominant style and performance of hedge fund versus mutual fund advisers.

To examine whether these hybrid fund managers differ in their performance and style, we further subdivide mutual fund advisers into 458 pure mutual fund and 131 hybrid managers. To further address the aggregation issue, we also collected fund-level data on mutual fund holdings from the Thomson Reuters database (S12).