Style-level Feedback Trading in Passive Funds

Internet Appendix

The Internet Appendix (IA) provides additional details on the data construction and cleaning, as well as additional results.

IA 1. ETF data cleaning

There are a number of anomalous ETF premiums that need to be corrected. I use three sources for NAV prices (Bloomberg, CRSP MFDB and Morningstar Direct) to verify accuracy. I primarily use Bloomberg for NAV prices, and I prioritize CRSP MFDB over Morningstar Direct.

The following screens are implemented. *Stale pricing screen:* If the Bloomberg NAV price is stale while the ETF return is non-zero, then I use the CRSP MFDB NAV price. If both Bloomberg and CRSP MFDB NAV prices are stale, then I use NAV prices from Morningstar Direct. If the Bloomberg NAV price is missing, but both CRSP MFDB and Morningstar exist, and the corresponding premiums are within 10 bps of each other, then I use NAV prices from CRSP MFDB.

Extreme premium screen: If the (absolute) difference between Bloomberg and CRSP MFDB premiums is greater than 0.5 %, and the (absolute) difference between Bloomberg and Morningstar Direct premiums is greater than 0.5 %, but CRSP MFDB and Morningstar Direct premiums agree (difference less than 0.1 % in absolute terms), then I use the CRSP MFDB premium. If Morningstar Direct NAV prices are missing, and the (absolute) difference between Bloomberg and CRSP MFDB premiums is greater than 1.0 %, and the former is more than five times greater than the latter, then I use CRSP MFDB premiums instead. Similarly, if CRSP MFDB

NAV prices are missing, and the (absolute) difference between Bloomberg and Morningstar premiums is greater than 1.0 %, and the former is more than five times greater than the latter, then I use Morningstar premiums instead. Finally, I winsorize daily ETF premiums at five Std. Dev. from the mean (at the fund-level).

IA 2: Baseline results for the net flow-performance relationship

Here I provide the baseline results for the net flow-performance relationship with 12 monthly lags of returns and flows included separately.

Table IA2: Baseline results for the net flow-performance relationship

This table reports the results from regressions of monthly net flows on lagged flows and monthly returns over the prior 12 months and control variables. Control variables include the net expense ratio, log(age), assets under management (AUM), the average monthly premium and an index of ETF liquidity. For variable definitions see Appendix 1. Specification (1) includes fixed effects for calendar time and style (Morningstar 3-by-3 size and value/growth for core styles, 11 broad sectors for sector styles and 1 for the quality style; 9 + 11 + 1 = 20). Specification (2) corresponds to a Fama-MacBeth regression. Adjusted R^2 is the adjusted R-squared. */**/*** denotes statistical significance at the 10, 5 and 1 percent levels. Standard errors are double clustered by fund and calendar time (t-statistics in brackets).

	Pooled OLS				Fama-MacBeth			
Variables	(1)		(2)		(3)		(4)	
RET, *t*-1	0.444***	(8.72)	0.456***	(9.24)	0.633***	(7.79)	0.586***	(6.65)
RET, *t*-2	0.179***	(4.35)	0.172***	(4.34)	0.364***	(4.53)	0.375***	(4.31)
RET, *t*-3	0.014	(0.33)	0.013	(0.32)	0.157**	(2.34)	0.227***	(3.00)
RET, *t*-4	-0.057	(1.49)	-0.047	(1.24)	0.030	(0.39)	0.020	(0.23)
RET, *t*-5	-0.101***	(2.87)	-0.089**	(2.46)	-0.082	(1.02)	-0.118	(1.38)
RET, *t*-6	-0.028	(0.93)	-0.019	(0.62)	0.050	(0.63)	0.066	(0.78)
RET, *t*-7	-0.091***	(2.78)	-0.082**	(2.53)	-0.120*	(1.80)	0.009	(0.13)
RET, *t*-8	-0.057*	(1.88)	-0.046	(1.49)	-0.031	(0.41)	-0.068	(0.83)
RET, *t*-9	-0.082***	(3.57)	-0.070***	(3.07)	-0.092	(1.31)	-0.104	(1.42)
RET, *t*-10	-0.063*	(1.67)	-0.054	(1.44)	-0.051	(0.76)	-0.005	(0.06)
RET, *t*-11	-0.010	(0.27)	-0.001	(0.04)	-0.030	(0.39)	-0.045	(0.54)
RET, *t*-12	-0.007	(0.22)	0.001	(0.02)	-0.219**	(2.51)	-0.108	(1.42)
Y, *t*-1	0.055*	(1.90)	0.034	(1.08)	0.003	(0.17)	-0.019	(1.14)
Y, *t*-2	0.072***	(3.09)	0.060**	(2.32)	0.039***	(2.62)	0.020	(1.57)
Y, *t*-3	0.080***	(4.14)	0.070***	(3.31)	0.071***	(5.57)	0.053***	(4.09)
Y, *t*-4	0.072***	(4.43)	0.065***	(3.79)	0.063***	(4.94)	0.055***	(4.24)
Y, *t*-5	0.033***	(2.78)	0.028**	(2.14)	0.021	(1.63)	0.017	(1.39)
Y, *t*-6	0.029***	(2.74)	0.023**	(2.13)	0.028*	(1.93)	0.012	(0.83)
Y, *t*-7	0.041***	(3.76)	0.034***	(3.06)	0.040***	(3.44)	0.020*	(1.67)
Y, *t*-8	0.042***	(3.86)	0.036***	(3.40)	0.039***	(4.10)	0.034***	(3.98)
Y, *t*-9	0.027***	(2.61)	0.021**	(2.09)	0.033***	(2.95)	0.026**	(2.25)
Y, *t*-10	0.009	(0.95)	0.005	(0.57)	0.014	(1.24)	0.005	(0.47)
Y, *t*-11	0.019	(1.59)	0.017	(1.50)	0.036***	(3.76)	0.028***	(3.04)
Y, *t*-12	0.013	(1.42)	0.010	(1.15)	0.029***	(2.91)	0.016	(1.58)
Exp. Ratio, *t*-1			-4.243***	(6.91)			-4.169***	(5.46)
log(Age), *t*			-0.235	(0.73)			-1.511***	(3.90)
*log(*AUM*)*, *t*-1			-1.295***	(9.09)			-0.931***	(8.10)
AVG PREM, *t*-1			18.697***	(4.61)			27.041***	(7.78)
STD(ΔPREM), *t*-1			-1.251	(1.61)			1.117	(0.59)
ETF(LIQ), *t*-1			1.781***	(7.17)			1.606***	(7.76)
Fixed effects								
Style	YES		YES		NO		NO	
Time	YES		YES		YES		YES	
Adjusted R^2	0.112		0.125					
Observations	31,720		31,705		31,720		31,705	

IA 3: The flow-performance relation for mutual funds

The AUM of U.S. domestic equity ETFs has grown almost exponentially in the past 10 years, from \$132 billion in December 2003 to \$1.2 trillion in December 2014. Over the same time-period, the AUM of U.S. domestic actively managed mutual funds has increased from \$2.7 trillion to \$4.8 trillion (ICI 2018). To provide a more appropriate basis of comparison, I estimate the flow-return relationship for mutual funds during an earlier time-period from 1990-2000 when the total AUM of U.S. domestic equity mutual funds was similar to that for U.S. ETFs in the 2003-2014 period.

The mutual fund data is from the Center for Research in Security Prices (CRSP) Survivor-Bias-Free Mutual Fund Database (CRSP MFDB). This database identifies each share class of a fund. To aggregate the data to the fund-level, I use the unique CRSP_CL_GRP variable which is available from August 31, 1998. My analysis includes actively managed U.S. equity funds, as identified by the first two digits ("ED") of the CRSP objective code. I keep both sector-based funds (third digit equals "S"), and style-based funds (third digit equals "C" for cap-based, or "Y" for style-based funds). Among sector funds, I remove commodity funds since these typically invest in futures contracts. Among style-focused funds, I keep the categories growth ("G"), Growth and Income ("B") and Income ("I"). I eliminate all index funds (INDEX_FUND_FLAG equals "B", "D", "E"), and ETFs (ET_FLAG equals "Y"). Furthermore, I screen out index funds/ETFs based on a search for the following key words: "ind", "S&P", "DOW", "Wilshire", "enhanced", "etf", and/or "Russell". I eliminated balanced funds, global funds, international funds (either by their CRSP objective code or by their name), variable annuities (as identified by VAU_FUND = "Y"), and target date funds (by their name). Following Elton, Gruber, and Blake (1996), a fund enters the sample once its AUM exceeds \$15 million for the first time. To mitigate incubation bias, I eliminate observations before the fund's inception date in CRSP MFDB (Evans (2010)). Following

Cremers and Petajisto (2009), I delete funds with missing names in CRSP MFDB. Finally, I require a fund to have between 70 % and 110 % of its assets in common stock.

The sample period is from 1990 to 2000. The starting year coincides with the first availability of monthly AUM data in CRSP MFDB, which is necessary to compute monthly net fund flows. In terms of the overall coverage, the sample includes about 85 % of the total AUM of all active U.S. equity funds in 12/1993, and about the same in 12/2000 (ICI (2018)).

I estimate the flow-return relationship (Equation (5)) for mutual funds during with the following fund-specific controls: lagged expense ratios, AUM, and natural log of age. I include fixed effects by time-period, and CRSP objective codes by sectors (12), cap-based styles (3) and valuation-based styles (3). I estimate three different specifications depending on the return predictor used: (1) raw returns, (2) CAPM alphas, and (3) Fama-French 4-factor alphas. Specifications (2) and (3) are more commonly used in the mutual fund literature, but (1) provides a better comparison to ETFs.

The results in Table IA3 for feedback trading in mutual funds during the 1990-2000 time-period are very similar to those reported by Barber et al. (2016) during the 1996-2011 time-period. The flow-return relationship exhibits the following decay: the first three lags are significant and positive (0.145; 0.092 and 0.079), while the remaining lags (4-6, 7-9, 10-12) are positive and economically small (0.065; 0.029; 0.017), but remain statistically significant. In contrast, the net ETF flow-return relationship at the one-month horizon is almost four times stronger and the *t*-statistic is almost twice as high despite the smaller sample size, but the decay at further lags is more rapid.

Table IA3: Style momentum trading in net mutual fund flows

This table reports the results from regressions of monthly net flows on lagged returns over the prior 12 months, fund characteristics and control variables. Returns (*RET*) are measured by 1) mutual fund returns (own-style narrow), 2) CAPM alphas, or by 3) 4-factor alphas. Fund characteristics include lagged 12-month net flows, expense ratio, age since inception, Assets Under Management (AUM). All specifications include time (year, month), and style (CRSP objective code sector, valuation, and capitalization) fixed effects. The sample period is from 01/1991 to 12/2000. */**/*** denotes statistical significance at the 10, 5 and 1 percent levels. Standard errors are clustered by fund (*t*-statistics in brackets).

RET =	*Fund return*			*CAPM alpha*	*3-factor alpha*
Variables	(1) All	(2) Core	(3) Sector	(4) All	(5) All
NIFL, [*t*-1, *t*-12]	0.044***	0.046***	0.034***	0.046***	0.047***
	(27.33)	(31.37)	(10.21)	(26.25)	(24.55)
RET, *t*-1	0.145***	0.160***	0.116***	0.145***	0.124***
	(5.73)	(5.71)	(2.88)	(5.25)	(5.60)
RET, *t*-2	0.092***	0.108***	0.063*	0.088***	0.065***
	(3.84)	(4.02)	(1.68)	(3.96)	(2.96)
RET, *t*-3	0.079***	0.090***	0.053*	0.088***	0.090***
	(3.58)	(3.81)	(1.73)	(3.89)	(3.65)
RET, [*t*-4, t-6]	0.065***	0.081***	0.028	0.063***	0.067***
	(5.41)	(6.70)	(1.38)	(6.05)	(5.46)
RET, [*t*-7, t-9]	0.029***	0.031***	0.018	0.031***	0.038***
	(3.18)	(3.35)	(1.21)	(3.90)	(2.93)
RET, [*t*-10, t-12]	0.017*	0.019**	0.007	-0.001	0.014
	(1.75)	(2.18)	(0.37)	(0.07)	(0.90)
EXP RATIO, *t*-1	-0.140***	-0.147***	-0.219	-0.098*	-0.123**
	(2.72)	(2.75)	(1.09)	(1.81)	(2.30)
log(AGE), *t*	0.007	0.032	0.014	0.019	0.032
	(0.22)	(1.03)	(0.08)	(0.53)	(0.91)
ln(AUM), *t*-1	-0.117***	-0.100***	-0.406***	-0.108***	-0.110***
	(5.63)	(5.38)	(4.07)	(5.19)	(5.21)
Fixed effects					
Style	YES	YES	YES	YES	YES
Time	YES	YES	YES	YES	YES
Adjusted R^2	0.120	0.143	0.069	0.124	0.114
Observations	118,319	105,171	13,148	97,794	97,794

IA 4: Sub-sample results for the net flow-performance relationship

Table IA4 provides sub-sample results for ETFs in i) core and sector styles, ii) core styles, iii) core styles excl. purely passive benchmarks, iv) core styles in well-defined twin styles (the corner boxes in Morningstar's 3-by-3 size and value-growth matrix) and v) sector funds. To provide comparable results across sub-samples, both the left- and right-hand-side variables are standardized by sub-sample.

Table IA4: Sub-sample results for the net flow-performance relationship

This table reports the results from regressions of monthly net flows on lagged returns and flows over the prior 12 months and control variables. Control variables include the net expense ratio, age, AUM, the average monthly premium and an index of ETF liquidity. For variable definitions see Appendix 1. Column (1) includes ETFs in core and sector styles, (2) includes only ETFs in core styles, (3) excludes ETFs in the large-blend category, (4) includes only the corner styles in Morningstar's 3-by-3 style box and (5) includes only sector styles. */**/*** denotes statistical significance at the 10, 5 and 1 percent levels. Standard errors are double clustered by fund and calendar time (*t*-statistics in brackets).

	Sub-samples				
Variables	(1) Core and sector styles	(2) Core	(3) Core ex. Purely Passive	(4) Core: Twin styles only	(5) Sector styles
RET, *t*-1	0.181***	0.244***	0.236***	0.277***	0.192***
	(9.05)	(9.51)	(9.07)	(9.38)	(8.47)
RET, *t*-2	0.066***	0.116***	0.111***	0.152***	0.076***
	(4.13)	(5.12)	(4.71)	(4.89)	(4.43)
RET, *t*-3	0.003	0.061***	0.057**	0.082***	0.008
	(0.19)	(2.66)	(2.28)	(3.16)	(0.45)
RET, [*t*-4, t-6]	-0.022**	0.001	0.002	0.017	-0.015
	(2.53)	(0.06)	(0.09)	(0.88)	(1.65)
RET, [*t*-7, t-9]	-0.028***	-0.019	-0.024*	-0.020	-0.025***
	(3.67)	(1.47)	(1.84)	(1.01)	(2.80)
RET, [*t*-10, t-12]	-0.007	0.001	-0.001	-0.002	-0.006
	(0.81)	(0.06)	(0.06)	(0.09)	(0.60)
Y, *t*-1	0.026	0.113**	0.128**	0.077**	-0.050**
	(0.79)	(2.18)	(2.22)	(2.42)	(2.11)
Y, *t*-2	0.057**	0.112***	0.124***	0.063**	-0.006
	(2.06)	(2.91)	(3.01)	(2.38)	(0.32)
Y, *t*-3	0.069***	0.090***	0.084***	0.041*	0.026
	(3.11)	(3.23)	(2.65)	(1.98)	(1.52)
Y, [*t*-4, t-6]	0.041***	0.048***	0.044***	0.037***	0.013
	(4.37)	(6.03)	(4.95)	(2.92)	(1.60)
Y, [*t*-7, t-9]	0.032***	0.035***	0.036***	0.044***	0.010
	(5.73)	(4.03)	(3.79)	(3.22)	(1.40)
Y, [*t*-10, t-12]	0.011*	0.009	0.006	0.020*	-0.007
	(1.85)	(0.97)	(0.66)	(1.73)	(1.26)
Controls	YES	YES	YES	YES	YES
Fixed effects					
Time	YES	YES	YES	YES	YES
Style (21)	YES	YES	YES	YES	YES
Adjusted R^2	0.122	0.239	0.257	0.181	0.096
Observations	29,909	15,670	12,357	7,188	14,239

IA 5: Over what horizon (if any) is it profitable to trade on style momentum?

Sophisticated investors that are aware of the degree of persistence in style switcher demand should engage in style momentum trading in the short run but switch to style contrarian trading over intermediate horizons. If style switchers generate style momentum in asset prices as suggested by Barberis and Shleifer (2003), then we might be able to infer the persistence in switcher demand by observing the horizon over which it is profitable to trade on style momentum. Then again, more recent theoretical work suggests that positive feedback traders do not necessarily generate momentum in asset prices. Barberis et al. (2015) introduce a more complex, continuous-time, model that includes infinite horizon investors and two groups of investors, extrapolators and rational arbitrageurs. In their model, the extrapolator's demand is a function of even the most recent price change up until time *t*, unlike earlier models that condition on information up until *t*-1). They show that this feature alone is sufficient to remove momentum from stock prices. In fact, their models that price changes are negatively correlated at all lags. Given this contradiction in the theoretical literature, the evidence presented below is suggestive.

I investigate the abnormal performance of a style momentum strategy over various horizons. I include the six Fama-French size-B/M portfolios (core styles) and 11 Fama-French industry portfolios (sector styles) as base assets. These are similar to the ETFs that are available today. I sort the base assets into four buckets based on prior performance over a formation period (between one and 24 months) and assign equal weight to each asset within a bucket[1]. I consider holding periods (K) of one or three months. At the quarterly horizon (K = 3), 1/3 of the portfolio

[1] For conciseness, I pool sector and core style together. Similar results are also obtained separately for ETFs in core or sector styles.

is rebalanced monthly as is the common practice in the momentum literature. The sample period uses all available historical data from 1963 to 2017.

As shown in Table IA5, a style momentum strategy with a one-month holding and formation period has a positive and highly significant Fama-French-Carhart alpha of 7.49 percent (*t*-stat = 4.49). For the one-month holding period and three-month formation period, the annualized alpha remains positive (0.627 percent), but it is insignificant. For holding and formation periods of three months (or longer), the alphas become negative and significant. For example, at the three-month holding and formation period the annualized alpha is -3.23 percent (*t*-stat = 2.18).

Table IA5: The Performance of Style Momentum Strategies

This table reports annualized Fama-French 4-factor alphas and the corresponding factor loadings for trading strategies based on style momentum. The style momentum strategy takes long positions in the top 3 (winner) styles, and short positions in the bottom 3 (loser) styles. The base assets include the six Fama-French size-B/M portfolios and 11 Fama-French industry portfolios. The sample period is 01/1963-12/2017. The strategies are constructed using *J*-month formation periods, and *K*-month rebalancing periods. When $K > 1$ months, I use partial rebalancing following the Jegadeesh and Titman (1993) methodology. ***/**/* denotes statistical significance at the 1, 5, and 10 percent levels.

Formation period (*J*)	Holding period (*K*)	Annualized $\hat{\alpha}$	MKT_RF	SMB	HML	WML
1	1	7.490***	-0.073*	-0.051	0.094	0.160**
		(4.49)	(1.77)	(0.74)	(1.19)	(2.15)
3	1	0.627	-0.070	0.049	0.131	0.444***
		(0.35)	(1.54)	(0.47)	(1.3)	(6.05)
6	1	-1.105	-0.033	0.075	0.213***	0.671***
		(0.69)	(0.9)	(1.02)	(2.77)	(14.93)
3	3	-3.223**	-0.036	0.096	0.131	0.494***
		(2.18)	(0.96)	(1.15)	(1.58)	(9.14)
6	3	-3.843***	0.004	0.124*	0.167**	0.692***
		(2.50)	(0.11)	(1.85)	(2.17)	(15.62)
6	6	-3.265***	0.026	0.147***	0.118**	0.689***
		(2.55)	(1.00)	(2.68)	(2.08)	(20.07)

Thus, truly sophisticated investors should act as momentum traders only within the quarter (especially the first month), after which they should switch to contrarian strategies. In this case, the institutional demand-performance relation for sophisticated investors might actually be insignificant at the first quarterly lag if they enter and exit within the same quarter, while further lags should be negative and significant. In contrast to the sophisticated investor hypothesis, the relation between quarterly institutional demand and lagged one-quarter performance (corresponding to a three-month holding and formation period) is actually positive and highly significant while the second and third return lags are insignificant (see Table 4). This is more consistent with the idea that the average institutional investor is an uninformed style switcher.

IA 6: Institutional investor style orientation and style momentum trading

Frijns et al. (2013) show that growth fund managers typically engage in style-level positive feedback trading, whereas value funds engage in style-level negative feedback trading. Similar results also hold at the stock level (see e.g., Badrinath and Wahal (2002)). As I mentioned earlier, a potential concern with inferring style-level demand aggregated from individual stock holdings is that it is very difficult to rule out stock-level explanations. In contrast, ETFs provide a unique setting for examining the determinants of style-level demand without any confounding stock-level effects.

To assess whether style-level feedback trading in ETFs differs based on institutional style orientation, I re-estimate Equation (5) with institutional demand measured separately for value-, blend- and growth-oriented institutional investors (as defined by Bushee and Goodman (2007)). In contrast to earlier studies, I find that value- and blend-oriented institutions engage the most strongly in short-term style momentum trading: a one Std. Dev. increase in one-quarter lagged returns is associated with a 0.11 to 0.12 Std. Dev. increase in institutional demand (see Table IA6). Growth-oriented institutions also appear to trade on short-term style momentum trading, although the effect is only marginally significant. This may partly be a result of noisy measures of institutional demand since growth-oriented institutions own only 6 percent of outstanding ETF shares compared to 23 and 10 percent for blend and value-oriented institutions.

Table IA6: Institutional style orientation and style-level feedback trading

This table reports the results from regressions of quarterly institutional demand separately for institutions based on their style orientation on lagged quarterly returns, flows and control variables. Institutional demand is calculated separately for investors based on their style orientation (value, blend or growth) following Bushee and Goodman (2007). In specifications (1) to (3), institutional demand is measured by the net institutional buying during a quarter scaled by the number of shares outstanding at the beginning of the quarter. In (4) to (6), institutional demand is measured by the fraction of institutions increasing portfolio weights to an ETF. Control variables include the net expense ratio, age, assets under management (AUM), the average quarterly premium and an index of ETF liquidity. For variable definitions see Appendix 1. All variables are standardized across the full sample to ease the interpretation of coefficients across specifications. All specifications include calendar time and style fixed effects. */**/*** denotes statistical significance at the 10, 5 and 1 percent levels. Standard errors are double clustered by fund and calendar time (*t*-statistics in brackets).

	Y = %ΔINST_SHARES			Y = %ΔINST_WGHT		
Variables	(1) Value institutions	(2) Blend	(3) Growth institutions	(1) Value institutions	(2) Blend	(3) Growth institutions
RET, *q*-1	0.114***	0.112***	0.046	0.094***	0.122***	0.048*
	(4.95)	(4.95)	(1.66)	(3.51)	(3.56)	(1.85)
RET, *q*-2	-0.036	-0.005	-0.003	0.003	-0.007	0.004
	(1.12)	(0.22)	(0.13)	(0.12)	(0.25)	(0.18)
RET *q*-3	-0.011	-0.022	-0.009	0.025	-0.017	-0.027
	(0.47)	(1.30)	(0.47)	(1.24)	(0.69)	(1.36)
RET, *q*-4	0.005	-0.050***	-0.014	-0.048***	-0.025	0.000
	(0.23)	(2.82)	(1.37)	(2.88)	(0.99)	(0.02)
Y, *q*-1	-0.071**	-0.080**	-0.073**	0.062***	0.060***	0.068***
	(2.39)	(2.35)	(2.17)	(3.43)	(3.13)	(3.90)
Y, *q*-2	-0.002	-0.004	-0.026	0.022*	0.043***	0.057***
	(0.08)	(0.12)	(1.66)	(1.76)	(2.76)	(3.46)
Y, *q*-3	-0.006	0.004	-0.008	0.022	0.059***	0.067***
	(0.24)	(0.13)	(0.54)	(1.63)	(4.89)	(5.06)
Y, *q*-4	-0.007	0.048*	0.003	0.038***	0.035***	0.029**
	(0.34)	(1.94)	(0.48)	(2.96)	(3.07)	(2.26)
Control variables	YES	YES	YES	YES	YES	YES
Fixed effects						
Time	YES	YES	YES	YES	YES	YES
Style (21)	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.100	0.072	0.145	0.107	0.163	0.106
Observations	10,418	10,536	9,788	9,915	10,373	8,775

IA 7: Investor demand and return predictability – additional results

Table IA7: Style-level demand and return predictability

This table reports the results from *style-level regressions* of abnormal returns (adjusted for the Fama-French-Carhart 4-factors) on measures of style-level demand:

$$\text{PERFORMANCE}_{S,[t+1,t+\tau]} = a + b_1\text{STYLE\_DEMAND}_{S,t} + b_2\text{CONTROLS}_{S,t} + \text{FE} + \varepsilon_{i,t}$$

where τ is the return horizon in months (Panel A) or quarters (Panel B). Specifically, [0] denotes the current time-period, while [1, τ] denotes return horizons from 1 to τ periods in the future. The left- and right-hand-side variables correspond to equal-weighted averages of the corresponding variables in Equation (7). Style-level demand is measured by i) the equal-weighted net flow of ETFs in the same style (OWN_STYLE_FLOW), ii) the expected style-level net flow (i.e., the expected part from a Fama-MacBeth regression as in Table 3), iii) the difference between own- and distant style flows (OWN_DIST_STYLE_FLOW), or iv) the difference between expected own- and distant-style flows. The distant style refers to ETFs in the opposite style(s). In Panel B, investor demand is measured by the equal-weighted net institutional demand of ETFs in the same style (based on net institutional buying or the fraction of institutions increasing portfolio weights to an ETF) at the quarterly horizon. All specifications include control variables (log(AUM), ETF returns) and calendar time fixed effects. To ease the interpretation of coefficients across specifications, all explanatory variables are standardized to mean zero, variance one across the full sample. The *t*-statistics are calculated using standard errors that are adjusted for serial and cross-sectional correlation based on Driscoll and Kraay (1998), with the maximum lag for autocorrelation determined by the number of overlapping periods per return horizon. */**/*** denotes statistical significance at the 10, 5 and 1 % levels respectively.

Panel A: Equal-weighted Style-level Net Flows

	[0]	[1,1]	[1,3]	[1,6]	[1,12]
OWN_STYLE_FLOW	0.521***	-0.113*	-0.214**	-0.385**	-0.597**
	(8.36)	(1.93)	(2.15)	(2.45)	(2.43)
R^2	0.119	0.071	0.067	0.071	0.060
Observations	2,635	2,636	2,635	2,633	2,629
E(OWN_STYLE_FLOW)	0.409***	-0.035	-0.260*	-0.469**	-0.639**
	(5.05)	(0.56)	(1.90)	(2.68)	(2.77)
R^2	0.094	0.068	0.068	0.073	0.060
Observations	2,635	2,636	2,635	2,633	2,629
OWN_DIST_STYLE_FLOW	0.395***	-0.131**	-0.220**	-0.425***	-0.665***
	(7.38)	(2.41)	(2.55)	(3.66)	(3.65)
R^2	0.103	0.074	0.071	0.075	0.060
Observations	2,499	2,500	2,499	2,497	2,493
E(OWN_DIST_STYLE_FLOW)	0.251***	-0.064	-0.285**	-0.528***	-0.711***
	(3.77)	(1.07)	(2.29)	(3.15)	(3.45)
R^2	0.083	0.072	0.073	0.078	0.061
Observations	2,499	2,499	2,498	2,496	2,492

Panel B: Equal-weighted Style-level Net Institutional Demand				
	[0]	[1,1]	[1,2]	[1,4]
OWN_STYLE %INST_WGHT	0.910***	-0.373**	-0.547**	-0.948**
	(4.62)	(2.48)	(2.83)	(2.39)
R^2	0.112	0.079	0.064	0.057
Observations	901	880	878	878
OWN_DIST_STYLE %INST_WGHT	0.584***	-0.310**	-0.527***	-0.817**
	(3.02)	(2.69)	(3.52)	(2.47)
R^2	0.100	0.083	0.067	0.054
Observations	818	799	797	797
E(OWN_STYLE %INST_WGHT)	0.261	-0.380**	-0.523**	-1.037**
	(1.31)	(2.15)	(2.27)	(2.47)
R^2	0.076	0.078	0.062	0.057
Observations	901	880	878	878
OWN_STYLE %INST_SHARES	0.815***	-0.336*	-0.468**	-0.949***
	(2.92)	(1.98)	(2.32)	(3.08)
R^2	0.108	0.079	0.063	0.058
Observations	901	880	878	878
OWN_DIST_STYLE %INST_SHARES	0.553*	-0.389**	-0.459**	-0.959***
	(2.07)	(2.53)	(2.23)	(3.18)
R^2	0.098	0.087	0.065	0.058
Observations	818	799	797	797
E(OWN_STYLE %INST_SHARES)	0.382	-0.271**	-0.537*	-1.006***
	(1.37)	(2.10)	(1.94)	(3.34)
R^2	0.079	0.076	0.063	0.056
Observations	901	880	878	878