Signaling of ETF Flow: A Decomposition of Fundamental and Non-Fundamental Demand Shocks

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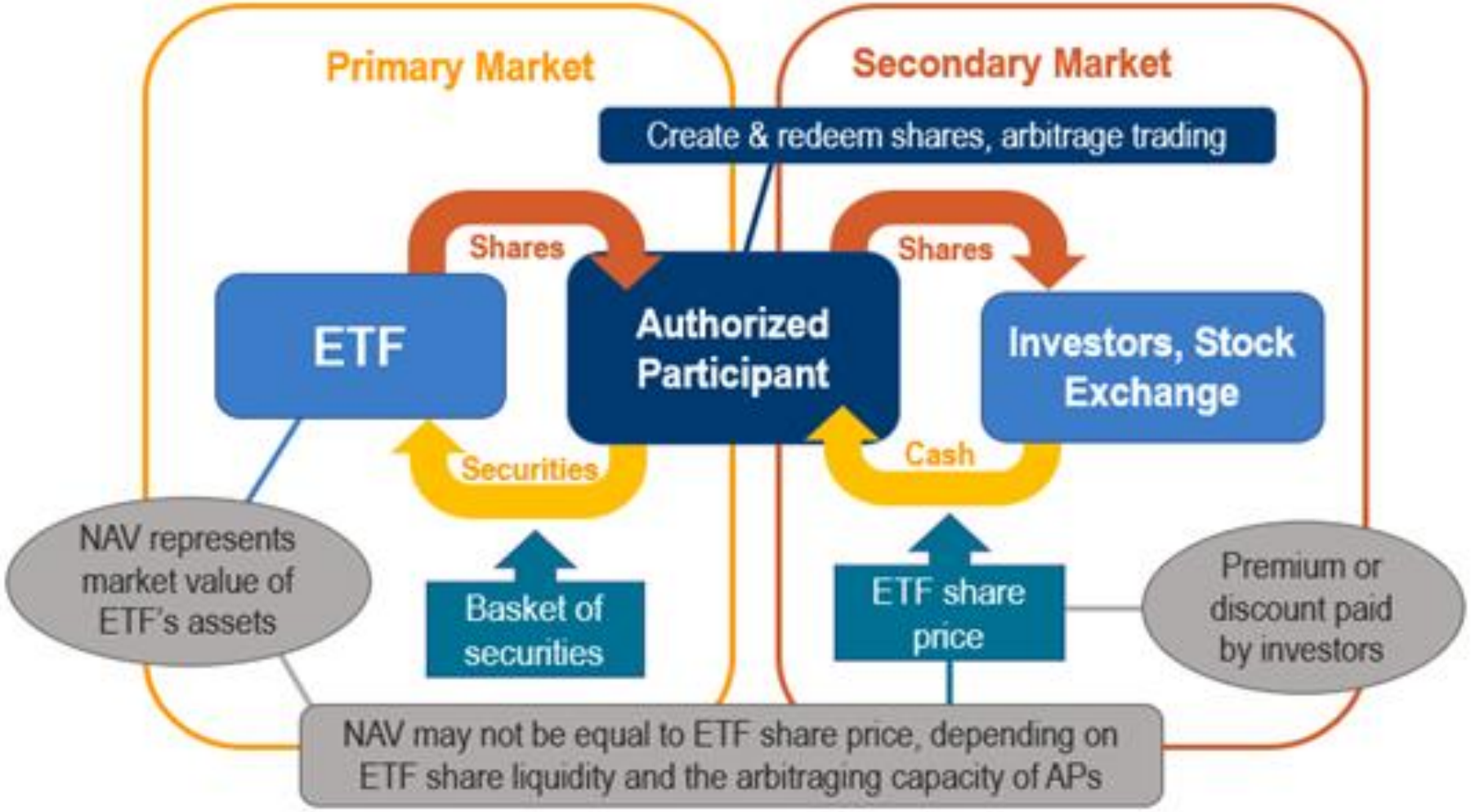
Introduction

- The unique structural characteristics of ETFs create a close relationship between ETFs and their underlying asset markets, with information flow between the two even observable at the intraday level (Bhattacharya and O'Hara, 2018; Box et al., 2021).

- ETF flows capture important information about demand shocks in the underlying asset markets.
  - While fund flows in mutual fund, often considered an alternative to ETF, also reflect information about demand shocks (Kamstra et al., 2017), they are influenced by the skill of the fund managers (Chen et al., 2000; Wermers, 2000; Berk and Green, 2004).

- Despite the growing importance of ETF flows in understanding the dynamics of underlying asset markets, research on the informational content embedded in ETF flows remains limited.

ETF structure



Source: https://www.ultimusfundsolutions.com/blog/etf-structure/

Demand Shocks

- Among the two types of demand shocks that occur in asset markets—fundamental and non-fundamental demand shocks—non-fundamental demand shocks play a crucial role.

- Non-fundamental demand shocks induce temporary mispricing relative to the fundamental value, and over the long term, they exhibit predictability as prices revert to their fundamental values.

- Despite their significance, non-fundamental demand shocks are difficult to observe directly, making their estimation a key, yet unresolved, challenge.

Motivation

- Brown et al. (2021, *Review of Finance*) are the first to suggest that ETF flows could serve as an observational tool for detecting non-fundamental demand shocks.

- The basic idea is that ETFs and their underlying assets respond differently to non-fundamental demand shocks, which results in mispricing between the ETF's net asset value (NAV) and its market price.

- This mispricing triggers ETF flows, which signal the presence of non-fundamental demand shocks.

Research question 1 (flow decomposition)

- Brown et al. (2021) assume that fundamental demand shocks affect both ETFs and their underlying asset markets equally.
  - Therefore, these shocks are not reflected in ETF flows and they do not consider fundamental demand shocks in their analysis.
  - **However**, when fundamental demand shocks occur, both ETFs and the underlying asset markets may overreact or underreact (Shiller, 2003).

- If ETFs and their underlying assets differ in their sensitivity to fundamental demand shocks, ETF flows may indirectly capture information about fundamental demand shocks.
  - Ben-David et al.'s (2018) price discovery hypothesis supports this idea.

- Can the influence of fundamental-driven flows truly be disregarded? If not, how can we disentangle fundamental-driven flows from aggregate ETF flows?

Research question 2 (ETF flow commonality)

- Our second research question arises from the findings in the prior literature regarding the return predictability of ETF flows.
  - Brown et al. (2021) demonstrate a negative correlation between ETF flows and future asset returns at the **monthly level**.
  - In contrast, Xu et al. (2022) present empirical evidence showing a positive correlation between ETF flows and future returns over a short-term, one- to four-day horizon at the **daily level**.

- The noise introduced by factors such as APs' private information, liquidity constraints, and various costs, can distort high-frequency ETF flow signals.

- **Consequently**, the empirical findings may vary depending on the frequency at which ETF flows are measured and whether periods of market instability, such as financial crises, are included in the analysis.

Research question 2 (ETF flow commonality)

- It is essential to examine flow dynamics across multiple ETFs that track the same or similar indices.
  - While previous studies are limited by the lack of multiple ETFs tracking the same indices, the current ETF markets provide a more suitable environment for such analysis.

- If ETF flows effectively capture information about demand shocks, then ETFs tracking the same or similar indices should exhibit **common fluctuations**.

- Whether there is a common movement among fund flows of ETFs that track the same index? Whether this commonality varies depending on the frequency at which flow is measured?

Main findings

- We decompose ETF flows into fundamental and non-fundamental components.
- Non-fundamental components show low commonality across ETFs tracking the same index at the daily level but higher commonality at the monthly level.
  - In contrast, fundamental components exhibit high flow commonality even at the daily level.
- Non-fundamental components exhibit significant return predictability over long horizons – at daily, weekly, and monthly intervals.
  - In contrast, fundamental components show return predictability only over short horizons at the daily level.
- Non-fundamental components exhibit more pronounced negative return predictability over long horizons than aggregate ETF flows.

Contribution

- This is the first study to separate information related to fundamental demand shocks from aggregate ETF flows.
- We theoretically and empirically suggest that both fundamental and non-fundamental demand shocks can be observed through ETF flows.
- This study enhances the overall understanding of flow commonality in ETF markets.
- Through the ETF flow decomposition, we address key research gaps in the term structure of non-fundamental demand shocks and the speed of price reversals, as highlighted by Brown et al. (2021).

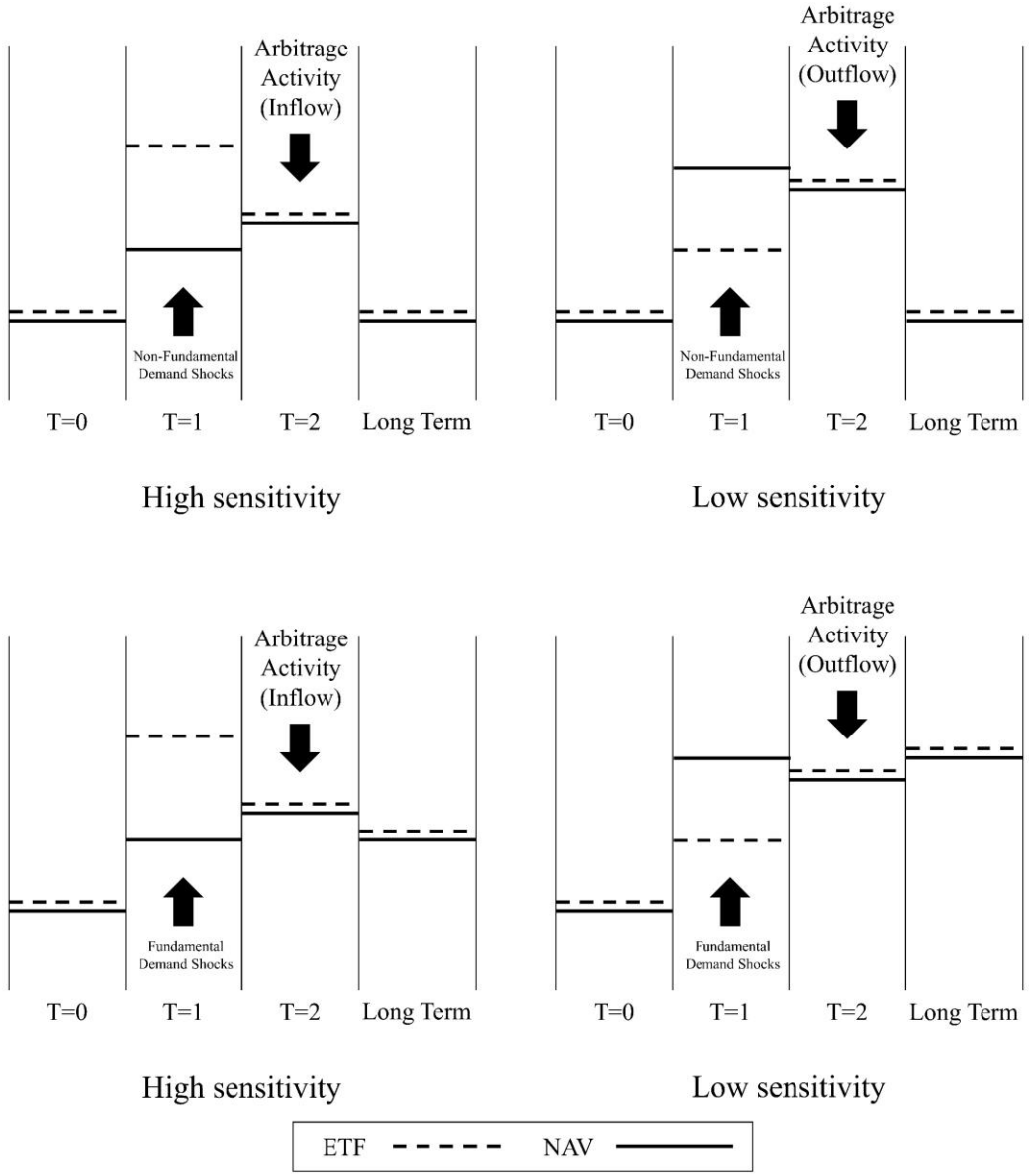
ETF trade model

- We modify the ETF trading model of Brown et al. (2021) (BDR model).

- The primary distinction between our model and the BDR model is that we incorporate information from fundamental demand shocks, in addition to non-fundamental shocks.

- We construct a four-period model where $T = 0$, $T = 1$, $T = 2$, and $T = Long\ Term$ represent different time points.
  - At $T = 0$, both the ETF price and NAV are aligned with the initial fundamental value.
  - At $T = 1$, both a non-fundamental demand shock and a fundamental demand shock are realized.
  - At $T = 2$, arbitrage activity by APs occurs due to the mispricing between the ETF price and NAV.
  - Finally, at $T = Long\ Term$, the NAV converges to a new fundamental value.

Mechanism of ETF flow



Model construction

- At $T = 0$, the ETF price, NAV, and fundamental value satisfy the following equation.

$$p_0 = \pi_0 = \Omega_0$$

where p_t, π_t, and Ω_t are indicate the ETF price, NAV, and fundamental value at time t, respectively.

- The ETF price and NAV at time $T = 1$ are governed by the following equations.

BDR model

$$\Omega_1 = \Omega_0 + w^f, \quad w^f \sim N(0, \sigma_f^2)$$

Our model

$$p_1 = \Omega_1 + \varepsilon^{etf} + \gamma^{etf} w^f, \quad \varepsilon^{etf} \sim N(0, \sigma_e^2)$$

$$\pi_1 = \Omega_1 + \varepsilon^{nav} + \gamma^{nav} w^f, \quad \varepsilon^{nav} \sim N(0, \sigma_n^2)$$

where w^f is the fundamental demand shock, while ε^{etf} and ε^{nav} are the non-fundamental demand shocks affecting the ETF and NAV, respectively. The parameters γ^{etf} and γ^{nav} capture the over- or under-reaction of investors to the fundamental demand shocks.

Model construction (continued)

- w^f is independent of both ε^{nav} and ε^{etf} ($Cov(w^f, \varepsilon^{nav}) = Cov(w^f, \varepsilon^{nav}) = 0$).
- The mispricing between the ETF price and NAV at $T = 1$, denoted as μ_1, and the fundamental mispricing between the NAV and the fundamental value, denoted as φ_1, are defined as follows.

$$\mu_1 = p_1 - \pi_1 = \varepsilon^{etf} - \varepsilon^{nav} + (\gamma^{etf} - \gamma^{nav})w^f$$

$$\varphi_1 = \pi_1 - \Omega_1 = \varepsilon^{nav} + \gamma^{nav} w^f$$

- Due to the arbitrage activity of APs at $T = 2$, ETF flows are generated.

- We define the ETF flow driven by $\varepsilon^{etf} - \varepsilon^{nav}$ as the non-fundamental flow and the ETF flow driven by $(\gamma^{etf} - \gamma^{nav})w^f$ as the fundamental-induced flow.

Return predictability

- NAV price converges to the latent fundamental value at $T = Long\ Term$.

- The relationship between decomposed flow and fundamental mispricing is that,

$$Cov\left(-\varphi_1, \varepsilon^{etf} - \varepsilon^{nav}\right) = Cov\left(-\left(\varepsilon^{nav} + \gamma^{nav} w^f\right), \varepsilon^{etf} - \varepsilon^{nav}\right) = -Cov\left(\varepsilon^{nav}, \varepsilon^{etf}\right) + \sigma_n^2 = \sigma_n(\sigma_n - \rho\sigma_e)$$

$$Cov\left(-\varphi_1, \left(\gamma^{etf} - \gamma^{nav}\right) w^f\right) = Cov\left(-\left(\varepsilon^{nav} + \gamma^{nav} w^f\right), \left(\gamma^{etf} - \gamma^{nav}\right) w^f\right) = -\gamma^{nav}(\gamma^{etf} - \gamma^{nav})\sigma_f^2$$

- We find that when the condition $\sigma_n < \rho\sigma_e$ holds, the non-fundamental flow exhibits negative return predictability (ρ represent the correlation coefficient between ε^{nav} and ε^{etf}).
- The direction of return predictability for fundamental-induced flows is determined by the coefficients γ^{nav} and γ^{etf}.

Flow decomposition

- The basic idea is to utilize the common term w^f and conventional understanding that ε^{nav} is relatively small.

- Following equation expresses the observable value of NAV returns, denoted as $\Delta\pi$.

$$\Delta\pi = \pi_1 - \pi_0 = \Omega_1 + \varepsilon^{nav} + \gamma^{nav} w^f - \Omega_0 = \varepsilon^{nav} + (1+\gamma^{nav}) w^f$$

- First, we estimate the portion of the aggregate flow that can be explained by NAV returns.

$$\frac{Cov\left(\varepsilon^{etf} - \varepsilon^{nav} + \left(\gamma^{etf} - \gamma^{nav}\right) w^f, \varepsilon^{nav} + (1+\gamma^{nav}) w^f\right)}{Var(\varepsilon^{nav} + (1+\gamma^{nav}) w^f)} = \frac{(1+\gamma^{nav})\left(\gamma^{etf} - \gamma^{nav}\right)\sigma_f^2 + \sigma_n(\rho\sigma_e - \sigma_n)}{(1+\gamma^{nav})^2\sigma_f^2 + \sigma_n^2} = \gamma$$

- Second, we multiply the estimated value, γ, by the NAV return.

$$\gamma\Delta\pi \approx \frac{\left(\gamma^{etf} - \gamma^{nav}\right)}{(1+\gamma^{nav})}\left\{\varepsilon^{nav} + (1+\gamma^{nav}) w^f\right\} = \boxed{\left(\gamma^{etf} - \gamma^{nav}\right) w^f} + \frac{\left(\gamma^{etf} - \gamma^{nav}\right)}{(1+\gamma^{nav})}\varepsilon^{nav}$$

ETF sample 1 (ETF flow commonality)

- In commonality test, we collect data on global ETFs listed on exchanges worldwide that track five major indices: S&P 500, NASDAQ 100, EUROSTOXX 50, FTSE 100, and DAX using Bloomberg.
  - S&P 500 index: ‘SPX,’ ‘SPXT,’ ‘SPTR,’ ‘SPTR500N’
  - NASDAQ 100 index: ‘NDX,’ ‘XNDX’
  - EUROSTOXX 50 index: ‘SX5T,’ ‘SX5E’
  - FTSE 100 index: ‘UKX,’ ‘TUKXG,’ ‘UKXNUK’
  - DAX index: ‘DAX,’ ‘DAXNR.’

- We collect daily NAV and shares outstanding for these global ETFs from January 1, 2014, to December 31, 2023.

ETF sample 2 (return predictability)

- In analysis of return predictability, we focus on non-leveraged passive equity ETFs listed on the US market. We collect data from January 1, 2014, to December 31, 2023.
  - We collect daily ETF prices, shares outstanding, and NAVs from Bloomberg.
  - We obtain ETF inception dates and CUSIP numbers from Bloomberg.
  - The daily AUM for each ETF is calculated as the product of daily NAV and daily shares outstanding.
  - We collect data on the daily buy value, sell value (both in dollars), and the dollar value-weighted percent effective spread from the NYSE Trade and Quote (TAQ) Millisecond Tools.
  - The daily dollar trading volume is calculated as the sum of the daily buy value and sell values.

- We merge the Bloomberg data with TAQ data by using the ‘Daily TAQ CRSP Link’ provided by Wharton Research Data Services.

ETF filtering

- We apply the data filtering procedure outlined by Xu et al. (2022).
  - We exclude all ETFs with a survival period of less than 2.5 years (504 trading days).
  - We remove flow data from the first six months following each ETF's inception (Broman and Shum, 2018).
  - We only include ETFs where non-zero fund flows account for more than 20% of their trading history.

- The final number of ETFs used for analysis of ETF flow commonality is **34** for the S&P 500 index, **13** for the NASDAQ 100 index, **10** for the EUROSTOXX 50 index, **five** for the FTSE 100 index, and **seven** for the DAX index.

- In analysis of return predictability, our final sample consists of **336** actively traded, non-leveraged passive equity ETFs listed on the US market.

ETF flows: Aggregate, fundamental-induced, and non-fundamental flows

- We compute the daily aggregate ETF flow as follows:

$$AF_{i,t} = \frac{Shares\ Outstanding_{i,t} - Shares\ Outstanding_{i,t-1}}{Shares\ Outstanding_{i,t-1}}$$

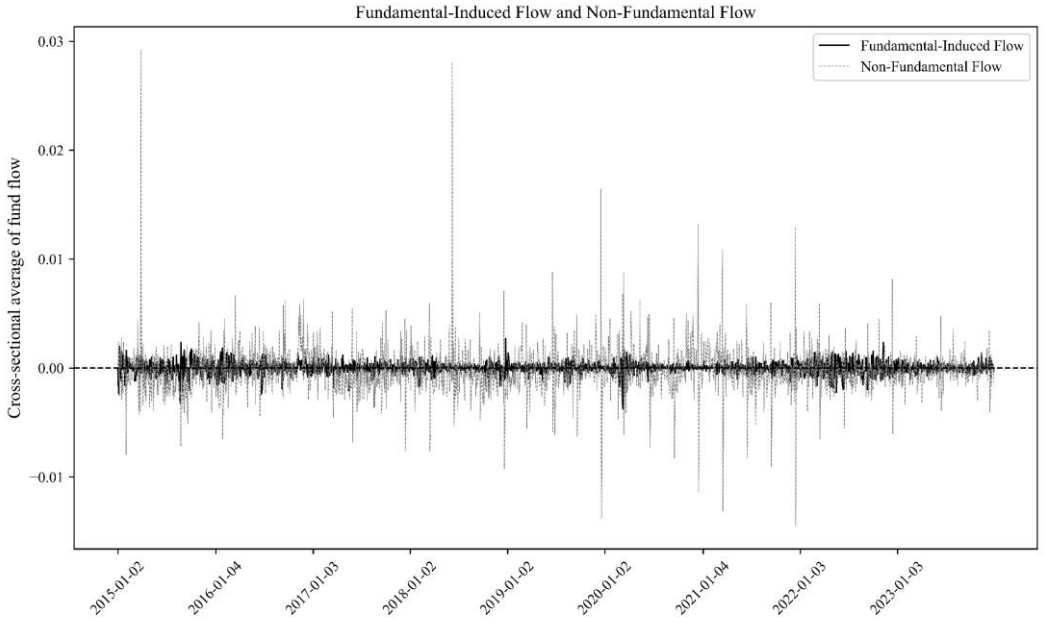
- To estimate daily fundamental-infuced flow and daily non-fundamental flow, we employ the following regression model:

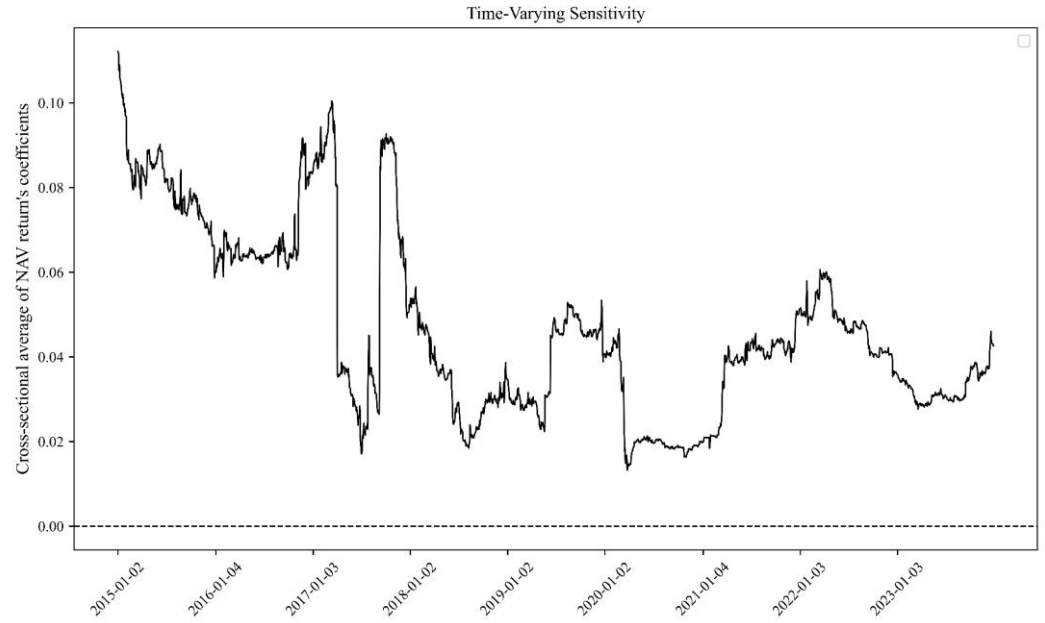
$$AF_{i,t} = \beta_{i,0} + \beta_{i,1} r_{i,t} + \varepsilon_{i,t}$$

where $r_{i,t}$ represents the NAV returns at time t.

- To avoid look-ahead bias, we apply a 1-year rolling window approach for each ETF, estimating the $\beta_{i,1}$ coefficient at each time point.
- The estimated coefficient multiplied by NAV returns defines the fundamental-induced flow.
- Non-fundamental flow is then defined as the aggregate flow minus both the fundamental-induced flow and the constant term.

Time-varying fundamental-induced flow, non-fundamental flow, and sensitivity





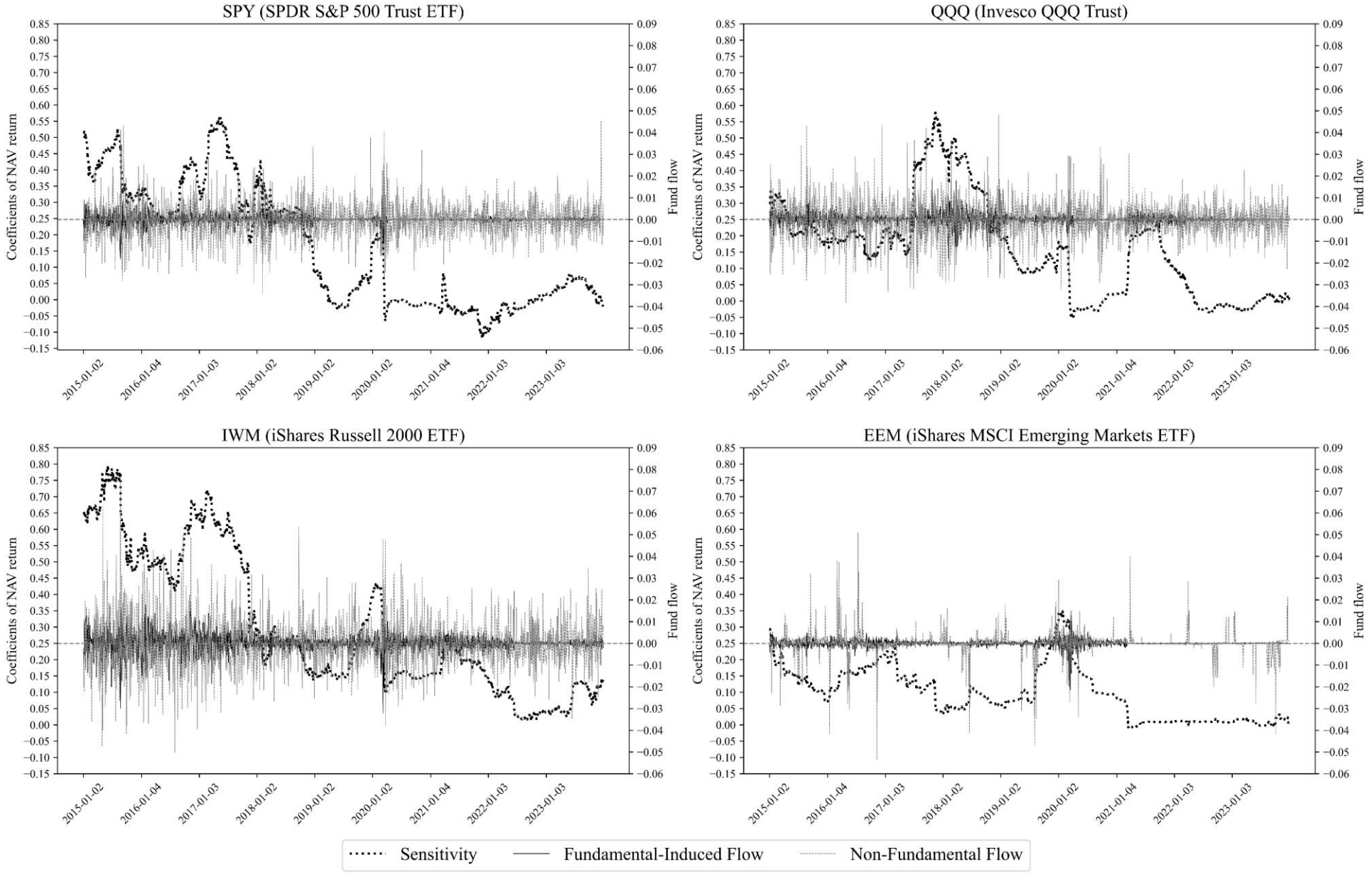
Panel A. Summary statistics

	Aggregate	*Fundamental-Induced*	*Non-Fundamental*
Number of Obs	645,775	645,775	645,775
Avg	0.061%	0.001%	-0.015%
Std	2.369%	0.358%	2.367%
Q25	0.000%	-0.019%	-0.170%
Median	0.000%	0.000%	-0.027%
Q75	0.034%	0.021%	0.102%

Panel B. Pairwise correlations

	Aggregate	*Fundamental-Induced*	*Non-Fundamental*
Aggregate	1.000		
Fundamental-Induced	0.097	1.000	
Non-Fundamental	0.983	-0.053	1.000

Time-varying fundamental-induced flow, non-fundamental flow, and sensitivity



Methodology 1: ETF flow commonality

- Following previous studies, we estimate the following regression model for each ETF and use the R-squared as a measure of flow commonality (Chordia et al., 2000; Karolyi et al., 2012; Dang et al., 2015; Brockman et al., 2023).

$$FF_{i,t} = c_0 + c_1 FF_{m,t-1} + c_2 FF_{m,t} + c_3 FF_{m,t+1} + \varepsilon_t$$

where $FF_{i,t}$ represents the ETF flow (aggregate, fundamental-induced, or non-fundamental flows) for ETF i at time t, $FF_{m,t}$ is the market ETF flow at time t.

- For each underlying index, the market ETF flow for ETF i is calculated as the equal-weighted average of ETF flows, excluding ETF i.

- We estimate the pairwise correlations and R-squared values from regression model using daily, weekly, and monthly flows of the ETFs that track each underlying index.

Methodology 2: Panel regression model (return predictability)

- We estimate the following panel regression models.

$$r_{i,t+h} = \beta_0 + \beta_1 FF_{i,t} + \beta_2 X'_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t+h}$$

$$r_{i,t+h} = \beta_0 + \sum_{d=2}^{p} \beta_{1,d} QUANTILE_{i,d,t} + \beta_2 X'_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t+h}$$

$$r_{i,t+h} = \sum_{k=t+1}^{t+h} r_{i,k}$$

- $FF_{i,t}$ represents the flow variable, indicating either fundamental flow or non-fundamental flow.
- $QUANTILE_{i,d,t}$ is a decile (or quintile) dummy variable, which equals 1 if ETF i falls into the d-th decile (or quintile) group based on the fund flow at time t; otherwise, it equals 0.
- We use Driscoll and Kraay's (1998) standard errors with a lag corresponding to the return horizon.

Commonality of aggregate flows

	S&P 500	*NASDAQ 100*	*EUROSTOXX 50*	*FTSE 100*	*DAX*
Panel A. Daily aggregate flows					
N of ETFs	34	13	10	5	7
Avg of R^2	0.60%	0.50%	0.40%	0.20%	1.20%
Median of R^2	0.50%	0.10%	0.40%	0.20%	0.40%
Std of R^2	0.60%	1.20%	0.30%	0.20%	1.50%
N of Pairs	546	78	45	10	21
N of (+)	299 (56)	50 (10)	35 (9)	6 (4)	14 (6)
N of (-)	247 (31)	28 (2)	10 (1)	4 (0)	7 (0)
Avg of Abs	0.036	0.047	0.028	0.035	0.044
Panel B. Weekly aggregate flows					
N of ETFs	34	13	10	5	7
Avg of R^2	2.80%	1.60%	3.30%	1.60%	4.60%
Median of R^2	1.90%	0.60%	2.90%	1.40%	2.30%
Std of R^2	3.30%	2.10%	2.40%	0.60%	4.60%
N of Pairs	546	78	45	10	21
N of (+)	327 (61)	46 (9)	32 (12)	10 (2)	17 (7)
N of (-)	219 (21)	32 (3)	13 (1)	0 (0)	4 (0)
Avg of Abs	0.075	0.093	0.067	0.064	0.104
Panel C. Monthly aggregate flows					
N of ETFs	34	13	10	5	7
Avg of R^2	8.90%	8.70%	9.40%	10.70%	12.90%
Median of R^2	5.40%	4.60%	9.70%	10.00%	12.10%
Std of R^2	12.70%	13.90%	4.50%	5.50%	9.60%
N of Pairs	546	78	45	10	21
N of (+)	335 (58)	52 (5)	33 (10)	10 (4)	15 (6)
N of (-)	211 (31)	26 (3)	12 (1)	0 (0)	6 (1)
Avg of Abs	0.160	0.185	0.158	0.174	0.185

Commonality of fundamental-induced flows

	S&P 500	*NASDAQ 100*	*EUROSTOXX 50*	*FTSE 100*	*DAX*
Panel A. Daily fundamental-induced flows					
N of ETFs	34	13	10	5	7
Avg of R^2	2.30%	14.60%	4.90%	2.20%	9.40%
Median of R^2	0.80%	7.50%	3.20%	1.80%	7.90%
Std of R^2	3.40%	23.00%	5.90%	2.00%	6.30%
N of Pairs	546	78	45	10	21
N of (+)	287 (217)	39 (20)	21 (19)	5 (4)	11 (9)
N of (-)	259 (170)	39 (20)	24 (22)	5 (5)	10 (8)
Avg of Abs	0.195	0.211	0.285	0.302	0.258
Panel B. Weekly fundamental-induced flows					
N of ETFs	34	13	10	5	7
Avg of R^2	3.10%	14.90%	7.10%	5.60%	14.80%
Median of R^2	2.30%	3.90%	5.10%	5.10%	10.70%
Std of R^2	3.40%	25.30%	8.10%	4.00%	9.80%
N of Pairs	546	78	45	10	21
N of (+)	296 (221)	38 (31)	21 (16)	4 (4)	12 (8)
N of (-)	250 (170)	40 (26)	24 (20)	6 (6)	9 (7)
Avg of Abs	0.288	0.362	0.275	0.314	0.298
Panel C. Monthly fundamental-induced flows					
N of ETFs	34	13	10	5	7
Avg of R^2	23.80%	16.70%	10.00%	13.20%	22.80%
Median of R^2	14.80%	6.50%	8.20%	16.80%	25.50%
Std of R^2	26.80%	24.80%	8.20%	9.80%	19.70%
N of Pairs	546	78	45	10	21
N of (+)	308 (161)	40 (23)	21 (9)	4 (3)	13 (10)
N of (-)	238 (94)	38 (21)	24 (15)	6 (3)	8 (5)
Avg of Abs	0.310	0.404	0.249	0.350	0.351

Commonality of non-fundamental flows

	S&P 500	*NASDAQ 100*	*EUROSTOXX 50*	*FTSE 100*	*DAX*
Panel A. Daily non-fundamental flows					
N of ETFs	34	13	10	5	7
Avg of R^2	0.60%	0.50%	0.30%	0.30%	1.20%
Median of R^2	0.30%	0.10%	0.30%	0.30%	0.40%
Std of R^2	0.60%	1.20%	0.20%	0.20%	1.50%
N of Pairs	546	78	45	10	21
N of (+)	301 (63)	48 (12)	33 (8)	5 (4)	16 (6)
N of (-)	245 (30)	30 (2)	12 (1)	5 (1)	5 (0)
Avg of Abs	0.037	0.045	0.028	0.042	0.044
Panel B. Weekly non-fundamental flows					
N of ETFs	34	13	10	5	7
Avg of R^2	3.10%	1.90%	2.80%	2.70%	4.60%
Median of R^2	1.80%	0.90%	2.00%	1.60%	1.80%
Std of R^2	3.30%	2.20%	2.50%	2.30%	4.80%
N of Pairs	546	78	45	10	21
N of (+)	347 (79)	46 (15)	31 (12)	6 (2)	17 (6)
N of (-)	199 (14)	32 (3)	14 (1)	4 (1)	4 (0)
Avg of Abs	0.080	0.107	0.064	0.081	0.110
Panel C. Monthly non-fundamental flows					
N of ETFs	34	13	10	5	7
Avg of R^2	11.50%	11.20%	7.70%	9.30%	12.40%
Median of R^2	6.40%	7.50%	7.00%	13.10%	8.90%
Std of R^2	13.10%	12.60%	4.30%	5.90%	10.00%
N of Pairs	546	78	45	10	21
N of (+)	354 (99)	49 (10)	31 (8)	7 (2)	12 (6)
N of (-)	192 (21)	29 (1)	14 (1)	3 (1)	9 (0)
Avg of Abs	0.180	0.196	0.152	0.168	0.184

Return predictability of daily fundamental-induced flows

	h=1	*h=2*	*h=3*	*h=4*	*h=5*	*h=6*	*h=7*	*h=8*	*h=9*	*h=10*	*h=11*	*h=12*
Panel A. Daily fundamental-induced flows												
FF	-0.004*	-0.005*	-0.008*	-0.008*	-0.008	-0.007	-0.002	-0.004	-0.002	-0.001	-0.001	0.000
	(-1.87)	(-1.73)	(-1.84)	(-1.73)	(-1.55)	(-1.36)	(-0.32)	(-0.64)	(-0.24)	(-0.17)	(-0.08)	(0.05)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003
Panel B. Daily fundamental-induced flow based decile dummies												
Decile 2	-0.017**	-0.021**	-0.019	-0.030**	-0.033**	-0.040**	-0.042**	-0.044**	-0.049**	-0.050*	-0.047*	-0.045
	(-2.40)	(-2.01)	(-1.46)	(-2.04)	(-1.96)	(-2.17)	(-2.04)	(-1.97)	(-2.05)	(-1.93)	(-1.72)	(-1.56)
Decile 3	-0.008	-0.006	-0.002	-0.008	-0.004	-0.008	-0.009	-0.016	-0.017	-0.021	-0.018	-0.020
	(-1.02)	(-0.51)	(-0.15)	(-0.48)	(-0.20)	(-0.37)	(-0.37)	(-0.60)	(-0.58)	(-0.65)	(-0.52)	(-0.53)
Decile 4	-0.010	-0.008	-0.004	-0.016	-0.018	-0.026	-0.016	-0.033	-0.038	-0.040	-0.041	-0.038
	(-1.08)	(-0.63)	(-0.26)	(-0.84)	(-0.79)	(-1.03)	(-0.58)	(-1.07)	(-1.11)	(-1.10)	(-1.07)	(-0.93)
Decile 5	-0.016*	-0.021	-0.012	-0.024	-0.022	-0.024	-0.019	-0.033	-0.040	-0.043	-0.047	-0.044
	(-1.66)	(-1.46)	(-0.64)	(-1.13)	(-0.86)	(-0.85)	(-0.62)	(-0.98)	(-1.06)	(-1.09)	(-1.13)	(-0.99)
Decile 6	-0.022**	-0.029*	-0.028	-0.045**	-0.046*	-0.052*	-0.036	-0.052	-0.058	-0.058	-0.061	-0.066
	(-2.20)	(-1.86)	(-1.47)	(-2.00)	(-1.78)	(-1.78)	(-1.13)	(-1.47)	(-1.49)	(-1.42)	(-1.38)	(-1.41)
Decile 7	-0.019*	-0.023	-0.024	-0.035*	-0.037	-0.042	-0.031	-0.044	-0.047	-0.045	-0.043	-0.045
	(-1.87)	(-1.58)	(-1.34)	(-1.66)	(-1.51)	(-1.54)	(-1.03)	(-1.32)	(-1.31)	(-1.20)	(-1.06)	(-1.05)
Decile 8	-0.017*	-0.021	-0.019	-0.032*	-0.028	-0.032	-0.023	-0.038	-0.041	-0.039	-0.038	-0.043
	(-1.83)	(-1.56)	(-1.18)	(-1.71)	(-1.26)	(-1.28)	(-0.82)	(-1.28)	(-1.27)	(-1.15)	(-1.05)	(-1.12)
Decile 9	-0.019**	-0.027**	-0.031**	-0.039**	-0.041**	-0.038*	-0.033	-0.043*	-0.046*	-0.048*	-0.046	-0.053*
	(-2.29)	(-2.15)	(-2.00)	(-2.21)	(-2.10)	(-1.76)	(-1.39)	(-1.71)	(-1.70)	(-1.73)	(-1.59)	(-1.75)
Decile 10	-0.018**	-0.022*	-0.025	-0.018	-0.020	-0.017	-0.006	-0.007	-0.006	-0.010	0.003	-0.007
	(-2.05)	(-1.73)	(-1.58)	(-1.01)	(-0.98)	(-0.82)	(-0.27)	(-0.28)	(-0.23)	(-0.36)	(0.10)	(-0.25)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003

Return predictability of daily non-fundamental flows

	h=1	*h=2*	*h=3*	*h=4*	*h=5*	*h=6*	*h=7*	*h=8*	*h=9*	*h=10*	*h=11*	*h=12*
Panel C. Daily non-fundamental flows												
FF	-0.002	-0.008**	-0.009**	-0.007*	-0.010**	-0.012**	-0.015**	-0.014***	-0.014***	-0.014**	-0.014**	-0.017**
	(-0.89)	(-2.43)	(-2.55)	(-1.93)	(-2.32)	(-2.43)	(-2.55)	(-2.72)	(-2.63)	(-2.33)	(-2.21)	(-2.45)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003
Panel D. Daily non-fundamental flow based decile dummies												
Decile 2	-0.007	-0.019**	-0.017	-0.023	-0.020	-0.020	-0.027	-0.030	-0.037	-0.045*	-0.050*	-0.057*
	(-1.25)	(-2.18)	(-1.49)	(-1.76)	(-1.37)	(-1.25)	(-1.50)	(-1.49)	(-1.64)	(-1.85)	(-1.87)	(-1.93)
Decile 3	-0.006	-0.017*	-0.018	-0.024*	-0.025	-0.032*	-0.040**	-0.043*	-0.050*	-0.055**	-0.059**	-0.066**
	(-0.92)	(-1.81)	(-1.55)	(-1.71)	(-1.56)	(-1.82)	(-2.02)	(-1.89)	(-1.95)	(-1.99)	(-1.97)	(-2.04)
Decile 4	-0.005	-0.019**	-0.022*	-0.025*	-0.017	-0.020	-0.028	-0.026	-0.028	-0.030	-0.034	-0.036
	(-0.84)	(-2.01)	(-1.77)	(-1.73)	(-1.03)	(-1.04)	(-1.34)	(-1.12)	(-1.09)	(-1.07)	(-1.13)	(-1.11)
Decile 5	-0.006	-0.016*	-0.022*	-0.026*	-0.026	-0.028	-0.032	-0.032	-0.043	-0.047	-0.054	-0.054
	(-0.96)	(-1.70)	(-1.75)	(-1.74)	(-1.54)	(-1.45)	(-1.48)	(-1.34)	(-1.54)	(-1.56)	(-1.63)	(-1.51)
Decile 6	-0.008	-0.021**	-0.026**	-0.028*	-0.026	-0.036*	-0.038*	-0.036	-0.046*	-0.056*	-0.062**	-0.064*
	(-1.31)	(-2.22)	(-2.07)	(-1.85)	(-1.51)	(-1.87)	(-1.77)	(-1.53)	(-1.76)	(-1.92)	(-1.96)	(-1.88)
Decile 7	0.003	-0.005	-0.013	-0.020	-0.024	-0.023	-0.033	-0.030	-0.035	-0.041	-0.047	-0.050
	(0.44)	(-0.52)	(-1.01)	(-1.32)	(-1.32)	(-1.12)	(-1.43)	(-1.16)	(-1.23)	(-1.33)	(-1.38)	(-1.38)
Decile 8	-0.001	-0.007	-0.015	-0.021	-0.023	-0.031	-0.045*	-0.047*	-0.056*	-0.067**	-0.072**	-0.080**
	(-0.13)	(-0.67)	(-1.09)	(-1.22)	(-1.13)	(-1.41)	(-1.82)	(-1.72)	(-1.89)	(-2.02)	(-2.05)	(-2.11)
Decile 9	-0.004	-0.017	-0.023	-0.039**	-0.048**	-0.050**	-0.066***	-0.068	-0.078**	-0.089**	-0.098**	-0.103**
	(-0.58)	(-1.61)	(-1.58)	(-2.30)	(-2.42)	(-2.21)	(-2.63)	(-2.43)	(-2.47)	(-2.56)	(-2.57)	(-2.47)
Decile 10	-0.003	-0.019	-0.028*	-0.032*	-0.043**	-0.054**	-0.059**	-0.059**	-0.076**	-0.084**	-0.091**	-0.099**
	(-0.45)	(-1.62)	(-1.81)	(-1.71)	(-2.04)	(-2.26)	(-2.23)	(-2.00)	(-2.27)	(-2.27)	(-2.33)	(-2.33)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003

Return predictability of weekly fundamental-induced flows

	h=1	*h=2*	*h=3*	*h=4*	*h=5*	*h=6*	*h=7*	*h=8*	*h=9*	*h=10*	*h=11*	*h=12*
Panel A. Weekly fundamental flows												
FF	0.003	0.016	0.015	0.017	0.005	-0.004	-0.007	-0.009	-0.007	-0.012	-0.016	-0.022
	(0.24)	(0.83)	(0.62)	(0.67)	(0.15)	(-0.15)	(-0.27)	(-0.32)	(-0.21)	(-0.39)	(-0.51)	(-0.82)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.002	0.003	0.004	0.005	0.007	0.008	0.008	0.010	0.011	0.012	0.014	0.014
Panel B. Weekly fundamental-induced flow based decile dummies												
Decile 2	-0.014	-0.043	-0.048	-0.096	-0.087	-0.095	-0.115	-0.148	-0.126	-0.092	-0.104	-0.159
	(-0.46)	(-0.91)	(-0.81)	(-1.43)	(-1.05)	(-0.99)	(-1.05)	(-1.28)	(-0.97)	(-0.67)	(-0.72)	(-1.04)
Decile 3	-0.010	0.004	-0.029	-0.074	-0.045	-0.045	-0.074	-0.077	-0.066	-0.063	-0.113	-0.134
	(-0.26)	(0.07)	(-0.42)	(-0.94)	(-0.46)	(-0.40)	(-0.58)	(-0.56)	(-0.42)	(-0.38)	(-0.64)	(-0.72)
Decile 4	-0.037	-0.043	-0.052	-0.137	-0.118	-0.124	-0.156	-0.152	-0.147	-0.101	-0.115	-0.153
	(-0.94)	(-0.76)	(-0.71)	(-1.64)	(-1.11)	(-1.02)	(-1.18)	(-1.07)	(-0.92)	(-0.60)	(-0.63)	(-0.77)
Decile 5	-0.018	-0.030	-0.088	-0.152	-0.132	-0.168	-0.176	-0.210	-0.202	-0.184	-0.185	-0.243
	(-0.42)	(-0.45)	(-1.08)	(-1.63)	(-1.13)	(-1.23)	(-1.21)	(-1.29)	(-1.11)	(-0.94)	(-0.91)	(-1.11)
Decile 6	-0.038	-0.035	-0.078	-0.154	-0.144	-0.147	-0.172	-0.173	-0.163	-0.134	-0.124	-0.157
	(-0.83)	(-0.52)	(-0.91)	(-1.48)	(-1.12)	(-1.05)	(-1.16)	(-1.06)	(-0.88)	(-0.68)	(-0.59)	(-0.70)
Decile 7	-0.024	0.005	-0.020	-0.082	-0.098	-0.128	-0.161	-0.163	-0.173	-0.151	-0.182	-0.232
	(-0.56)	(0.08)	(-0.25)	(-0.91)	(-0.87)	(-1.03)	(-1.19)	(-1.10)	(-1.00)	(-0.83)	(-0.95)	(-1.13)
Decile 8	0.001	0.025	0.007	-0.067	-0.084	-0.114	-0.124	-0.134	-0.138	-0.121	-0.114	-0.157
	(0.02)	(0.40)	(0.09)	(-0.79)	(-0.82)	(-0.97)	(-0.95)	(-0.93)	(-0.86)	(-0.70)	(-0.63)	(-0.85)
Decile 9	-0.048	-0.069	-0.050	-0.133*	-0.178*	-0.185*	-0.223**	-0.225*	-0.233*	-0.239*	-0.277*	-0.318**
	(-1.25)	(-1.25)	(-0.72)	(-1.77)	(-1.86)	(-1.76)	(-1.97)	(-1.80)	(-1.72)	(-1.67)	(-1.87)	(-2.15)
Decile 10	0.052	0.067	0.061	0.061	-0.028	-0.043	-0.027	-0.017	-0.029	-0.043	-0.105	-0.130
	(1.21)	(1.04)	(0.81)	(0.68)	(-0.27)	(-0.36)	(-0.21)	(-0.12)	(-0.18)	(-0.26)	(-0.63)	(-0.73)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.002	0.003	0.004	0.005	0.007	0.007	0.008	0.010	0.011	0.012	0.014	0.014

Return predictability of weekly non-fundamental flows

	h=1	*h=2*	*h=3*	*h=4*	*h=5*	*h=6*	*h=7*	*h=8*	*h=9*	*h=10*	*h=11*	*h=12*
Panel C. Weekly non-fundamental flows												
FF	-0.028**	-0.036**	-0.034*	-0.034	-0.043*	-0.043**	-0.043*	-0.035	-0.046*	-0.044	-0.048	-0.044
	(-2.43)	(-2.31)	(-1.68)	(-1.64)	(-1.89)	(-1.99)	(-1.87)	(-1.39)	(-1.71)	(-1.44)	(-1.53)	(-1.16)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.002	0.003	0.004	0.005	0.007	0.008	0.009	0.010	0.011	0.012	0.014	0.014
Panel D. Weekly non-fundamental flow based decile dummies												
Decile 2	-0.044	-0.059	-0.065	-0.120*	-0.135*	-0.171**	-0.267***	-0.293***	-0.307***	-0.323***	-0.317***	-0.364***
	(-1.45)	(-1.49)	(-1.25)	(-1.76)	(-1.81)	(-2.24)	(-3.10)	(-3.16)	(-3.04)	(-3.12)	(-2.82)	(-3.00)
Decile 3	-0.065**	-0.120***	-0.137**	-0.180**	-0.231**	-0.306***	-0.370***	-0.387***	-0.431***	-0.477***	-0.506***	-0.567***
	(-2.19)	(-2.60)	(-2.14)	(-2.30)	(-2.56)	(-3.30)	(-3.60)	(-3.57)	(-3.63)	(-3.72)	(-3.59)	(-3.62)
Decile 4	-0.049	-0.076	-0.099	-0.134*	-0.168*	-0.227**	-0.289***	-0.289***	-0.318***	-0.319***	-0.318**	-0.372***
	(-1.56)	(-1.63)	(-1.60)	(-1.70)	(-1.89)	(-2.44)	(-2.88)	(-2.83)	(-2.98)	(-2.69)	(-2.50)	(-2.69)
Decile 5	-0.049	-0.044	-0.065	-0.106	-0.162*	-0.200**	-0.252**	-0.268**	-0.288**	-0.315**	-0.360**	-0.426**
	(-1.62)	(-0.98)	(-1.09)	(-1.37)	(-1.69)	(-1.99)	(-2.26)	(-2.27)	(-2.35)	(-2.36)	(-2.37)	(-2.58)
Decile 6	-0.054*	-0.067	-0.090	-0.131	-0.155	-0.180*	-0.243**	-0.235*	-0.253**	-0.275**	-0.300**	-0.390**
	(-1.66)	(-1.41)	(-1.42)	(-1.59)	(-1.61)	(-1.71)	(-2.07)	(-1.95)	(-2.03)	(-2.02)	(-2.04)	(-2.38)
Decile 7	-0.063**	-0.093*	-0.113*	-0.167**	-0.211**	-0.251**	-0.292**	-0.291**	-0.326**	-0.344**	-0.388**	-0.463***
	(-2.02)	(-1.93)	(-1.73)	(-2.02)	(-2.18)	(-2.39)	(-2.53)	(-2.39)	(-2.46)	(-2.33)	(-2.40)	(-2.66)
Decile 8	-0.077**	-0.099**	-0.122*	-0.170*	-0.219**	-0.221*	-0.282**	-0.294**	-0.300**	-0.345**	-0.402**	-0.478***
	(-2.37)	(-1.97)	(-1.78)	(-1.88)	(-2.09)	(-1.92)	(-2.23)	(-2.17)	(-2.07)	(-2.19)	(-2.41)	(-2.62)
Decile 9	-0.066*	-0.097*	-0.151**	-0.210**	-0.255**	-0.314***	-0.382***	-0.374***	-0.401***	-0.426***	-0.469***	-0.565***
	(-1.81)	(-1.83)	(-2.04)	(-2.17)	(-2.31)	(-2.71)	(-3.04)	(-2.84)	(-2.98)	(-2.93)	(-2.99)	(-3.33)
Decile 10	-0.089**	-0.111*	-0.132	-0.190*	-0.221*	-0.243*	-0.325**	-0.314**	-0.355**	-0.374**	-0.399**	-0.453**
	(-2.17)	(-1.75)	(-1.57)	(-1.94)	(-1.92)	(-1.90)	(-2.33)	(-2.06)	(-2.18)	(-2.14)	(-2.13)	(-2.20)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.002	0.003	0.004	0.005	0.007	0.008	0.009	0.010	0.011	0.012	0.014	0.015

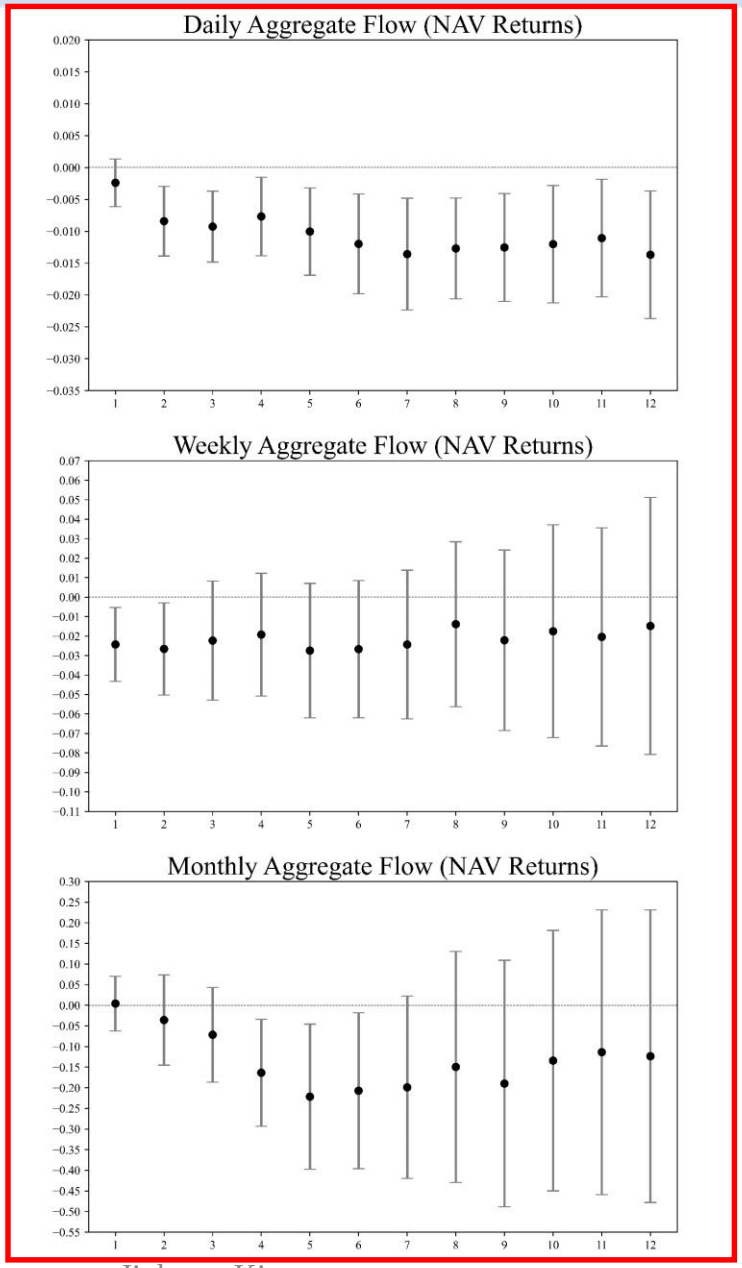
Return predictability of monthly fundamental-induced flows

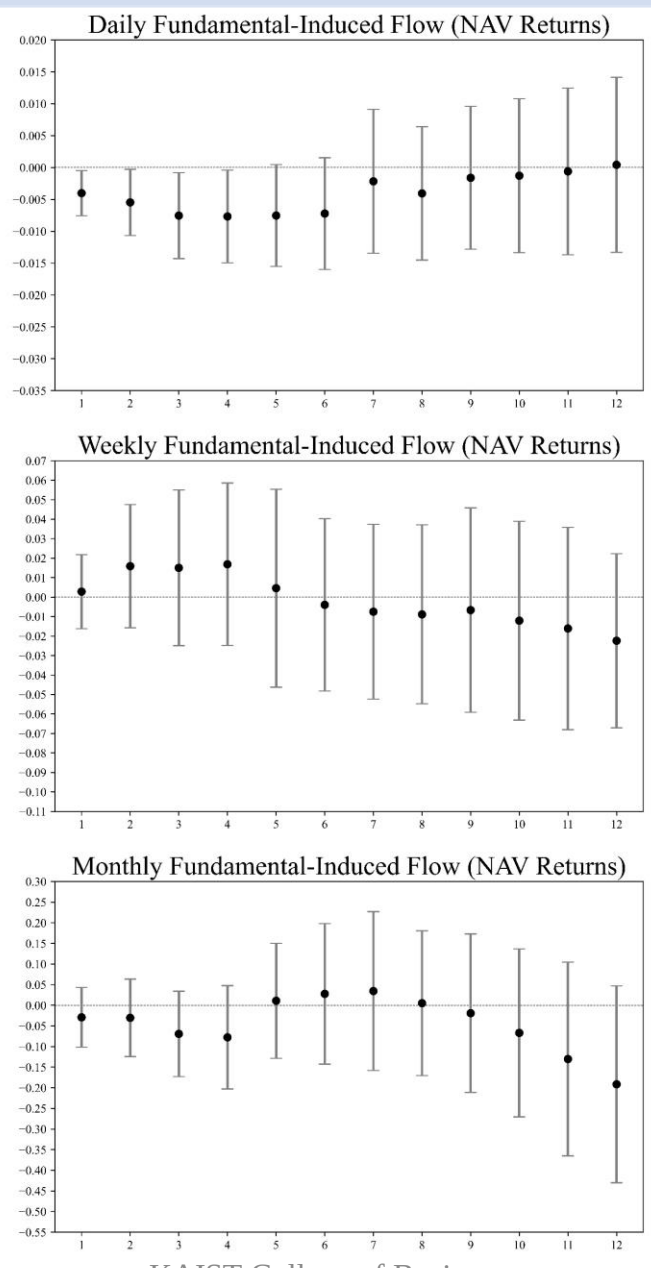
	h=1	*h=2*	*h=3*	*h=4*	*h=5*	*h=6*	*h=7*	*h=8*	*h=9*	*h=10*	*h=11*	*h=12*
Panel A. Monthly fundamental-induced flows												
FF	-0.029	-0.030	-0.069	-0.078	0.011	0.028	0.034	0.005	-0.019	-0.067	-0.130	-0.192
	(-0.66)	(-0.53)	(-1.10)	(-1.02)	(0.13)	(0.27)	(0.29)	(0.05)	(-0.16)	(-0.54)	(-0.91)	(-1.32)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.006	0.011	0.017	0.023	0.028	0.033	0.038	0.043	0.048	0.054	0.060	0.065
Panel B. Monthly fundamental-induced flow based decile dummies												
Decile 2	-0.261**	-0.312	-0.580***	-0.802***	-0.730***	-0.863***	-1.000***	-1.105***	-0.943**	-0.936**	-0.962*	-1.112*
	(-1.97)	(-1.43)	(-2.96)	(-4.30)	(-3.25)	(-3.27)	(-3.06)	(-2.84)	(-2.08)	(-2.07)	(-1.82)	(-1.85)
Decile 3	-0.210	-0.108	-0.079	-0.199	0.000	-0.100	-0.113	-0.169	-0.152	-0.327	-0.510	-0.694
	(-1.46)	(-0.49)	(-0.35)	(-0.80)	(-0.00)	(-0.25)	(-0.23)	(-0.30)	(-0.25)	(-0.52)	(-0.73)	(-0.94)
Decile 4	-0.178	-0.269	-0.327	-0.463	-0.078	-0.121	-0.050	-0.198	-0.111	-0.171	-0.390	-0.583
	(-1.09)	(-1.08)	(-1.43)	(-1.82)	(-0.23)	(-0.29)	(-0.09)	(-0.32)	(-0.16)	(-0.24)	(-0.50)	(-0.78)
Decile 5	-0.204	-0.186	-0.256	-0.316	0.039	0.035	-0.010	-0.033	-0.242	-0.398	-0.646	-0.854
	(-1.12)	(-0.65)	(-1.03)	(-1.16)	(0.12)	(0.11)	(-0.02)	(-0.07)	(-0.46)	(-0.70)	(-1.01)	(-1.26)
Decile 6	-0.286*	-0.315	-0.356	-0.473**	-0.163	-0.205	-0.083	-0.011	-0.061	-0.210	-0.413	-0.564
	(-1.84)	(-1.30)	(-1.60)	(-2.05)	(-0.69)	(-0.73)	(-0.22)	(-0.03)	(-0.12)	(-0.41)	(-0.70)	(-0.96)
Decile 7	-0.355**	-0.429*	-0.448*	-0.547**	-0.251	-0.388	-0.383	-0.384	-0.247	-0.339	-0.327	-0.566
	(-2.20)	(-1.71)	(-1.92)	(-2.07)	(-0.80)	(-1.06)	(-0.81)	(-0.73)	(-0.42)	(-0.55)	(-0.47)	(-0.76)
Decile 8	-0.270*	-0.272	-0.220	-0.394	-0.195	-0.298	-0.198	-0.296	-0.265	-0.459	-0.691	-0.772
	(-1.73)	(-1.11)	(-0.89)	(-1.38)	(-0.58)	(-0.75)	(-0.36)	(-0.50)	(-0.42)	(-0.75)	(-0.95)	(-1.10)
Decile 9	-0.229	-0.257	-0.326	-0.422	-0.281	-0.458	-0.468	-0.598	-0.593	-0.896*	-0.922	-0.995
	(-1.22)	(-1.03)	(-1.46)	(-1.44)	(-0.84)	(-1.16)	(-0.91)	(-1.07)	(-1.05)	(-1.73)	(-1.59)	(-1.61)
Decile 10	-0.292	-0.377	-0.703*	-0.451	-0.375	-0.513	-0.702	-0.678	-0.514	-0.728*	-0.719	-0.803
	(-1.34)	(-1.24)	(-1.71)	(-1.03)	(-0.78)	(-1.07)	(-1.26)	(-1.21)	(-1.08)	(-1.72)	(-1.51)	(-1.64)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.007	0.013	0.020	0.026	0.031	0.037	0.041	0.046	0.050	0.055	0.060	0.065

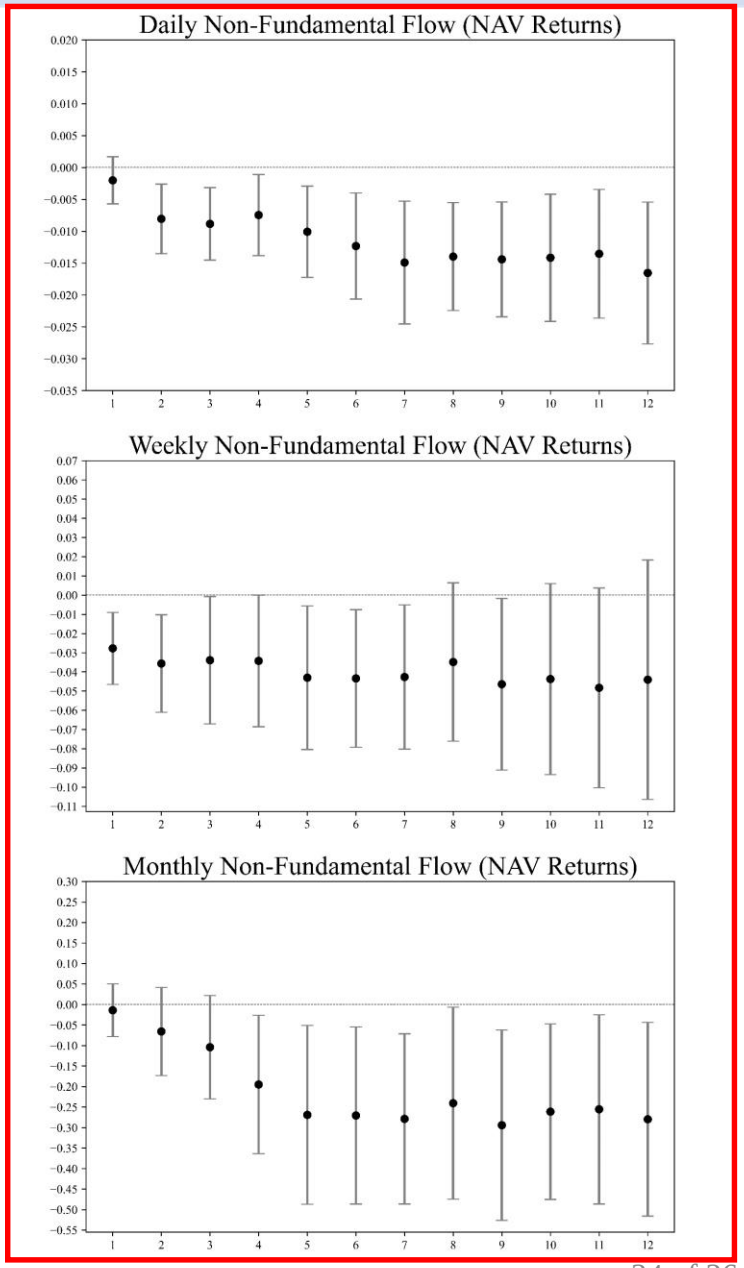
Return predictability of monthly non-fundamental flows

	h=1	*h=2*	*h=3*	*h=4*	*h=5*	*h=6*	*h=7*	*h=8*	*h=9*	*h=10*	*h=11*	*h=12*
Panel C. Monthly non-fundamental flows												
FF	-0.014	-0.066	-0.104	-0.195*	-0.269**	-0.270**	-0.279**	-0.241*	-0.294**	-0.261**	-0.255*	-0.280*
	(-0.35)	(-1.00)	(-1.36)	(-1.90)	(-2.03)	(-2.06)	(-2.21)	(-1.69)	(-2.09)	(-2.01)	(-1.82)	(-1.95)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.006	0.011	0.017	0.023	0.029	0.034	0.038	0.043	0.049	0.054	0.060	0.065
Panel D. Monthly non-fundamental flow based decile dummies												
Decile 2	-0.337**	-0.593**	-0.570*	-0.745*	-0.998**	-0.789	-0.736	-0.685	-0.749	-0.893*	-0.958*	-1.044*
	(-2.49)	(-2.56)	(-1.91)	(-1.93)	(-2.02)	(-1.53)	(-1.30)	(-1.22)	(-1.33)	(-1.75)	(-1.77)	(-1.80)
Decile 3	-0.229*	-0.480**	-0.502	-0.672	-0.966*	-0.731	-0.617	-0.692	-0.835	-0.850	-0.976*	-0.851
	(-1.76)	(-2.13)	(-1.60)	(-1.55)	(-1.82)	(-1.37)	(-1.05)	(-1.26)	(-1.51)	(-1.63)	(-1.76)	(-1.42)
Decile 4	-0.176	-0.540**	-0.711**	-1.006**	-1.332**	-1.340**	-1.321**	-1.255*	-1.435**	-1.460**	-1.561**	-1.384*
	(-1.12)	(-2.20)	(-2.34)	(-2.33)	(-2.40)	(-2.28)	(-2.09)	(-1.90)	(-2.22)	(-2.21)	(-2.33)	(-1.95)
Decile 5	-0.197	-0.467*	-0.571	-0.775*	-1.123**	-1.012	-1.034	-1.162	-1.348*	-1.328*	-1.425*	-1.455*
	(-1.19)	(-1.80)	(-1.64)	(-1.70)	(-1.97)	(-1.63)	(-1.44)	(-1.55)	(-1.82)	(-1.75)	(-1.78)	(-1.68)
Decile 6	-0.220	-0.378	-0.481	-0.749	-1.121**	-1.149*	-1.104	-1.103	-1.323*	-1.293*	-1.241*	-1.206
	(-1.37)	(-1.35)	(-1.33)	(-1.57)	(-1.97)	(-1.81)	(-1.57)	(-1.50)	(-1.74)	(-1.74)	(-1.70)	(-1.54)
Decile 7	-0.143	-0.323	-0.494	-0.762*	-1.083**	-1.023*	-1.021	-1.145*	-1.322**	-1.322**	-1.281*	-1.218*
	(-0.88)	(-1.20)	(-1.60)	(-1.75)	(-2.09)	(-1.84)	(-1.58)	(-1.70)	(-2.01)	(-2.02)	(-1.85)	(-1.65)
Decile 8	-0.181	-0.305	-0.540	-0.904**	-1.206**	-1.146*	-1.110	-1.140	-1.383*	-1.491**	-1.567**	-1.368*
	(-1.11)	(-1.13)	(-1.59)	(-2.00)	(-2.12)	(-1.86)	(-1.57)	(-1.53)	(-1.89)	(-2.05)	(-2.08)	(-1.78)
Decile 9	-0.226	-0.457*	-0.583	-0.947**	-1.232**	-1.222**	-1.201**	-1.254**	-1.529***	-1.684***	-1.759***	-1.653***
	(-1.40)	(-1.66)	(-1.64)	(-2.11)	(-2.23)	(-2.12)	(-1.99)	(-2.03)	(-2.65)	(-2.89)	(-2.90)	(-2.70)
Decile 10	-0.200	-0.483	-0.778**	-0.992**	-1.474***	-1.596***	-1.701***	-1.658***	-1.953***	-1.949***	-2.007***	-2.097***
	(-1.02)	(-1.60)	(-2.08)	(-2.23)	(-2.61)	(-2.77)	(-2.94)	(-2.81)	(-3.28)	(-3.70)	(-3.42)	(-3.23)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.007	0.013	0.020	0.026	0.033	0.038	0.042	0.046	0.052	0.056	0.061	0.066

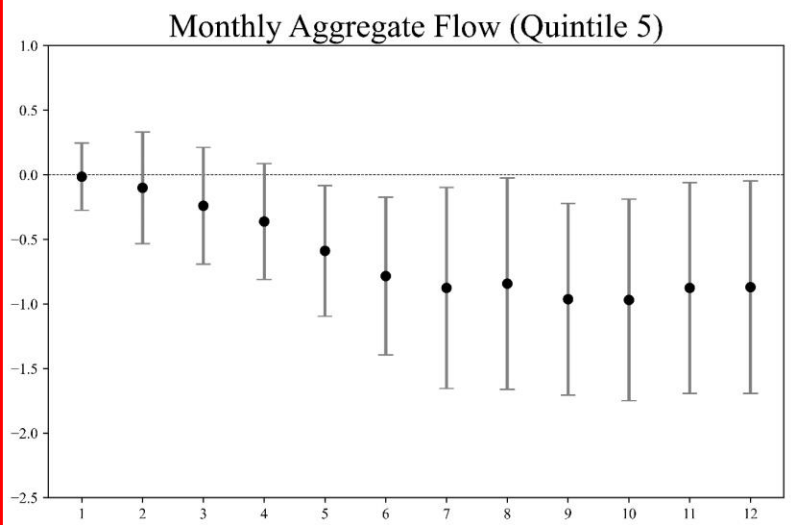
Visualization (vs. aggregate flows)

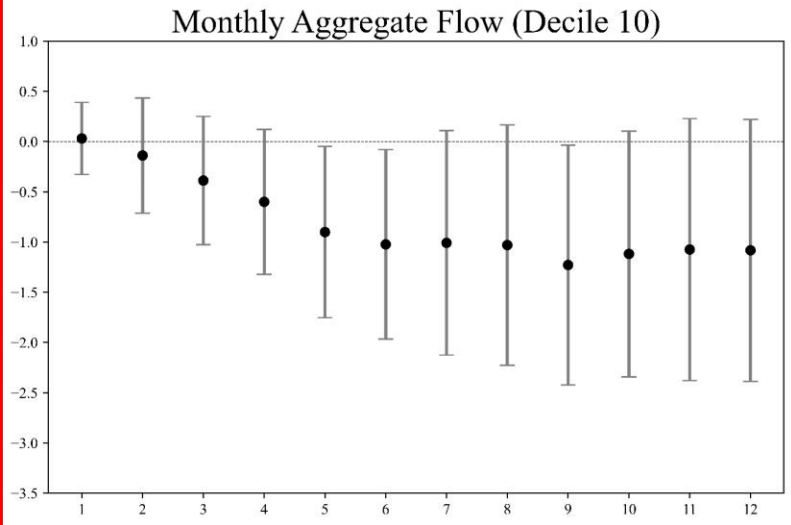


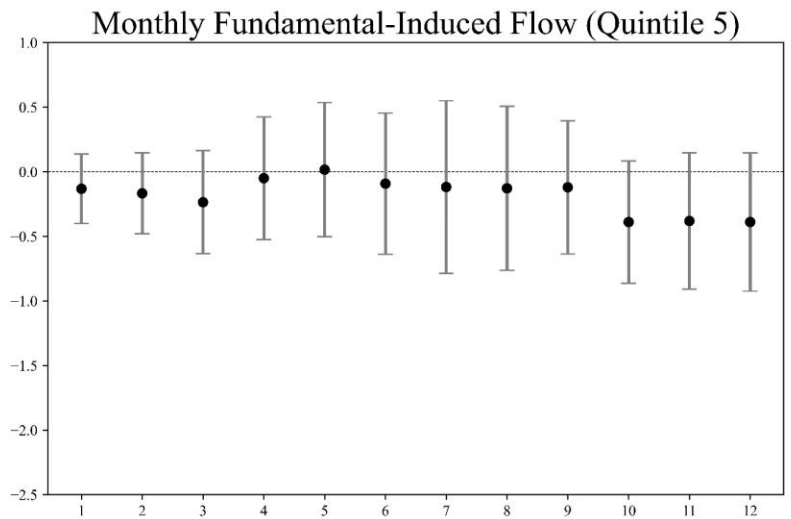


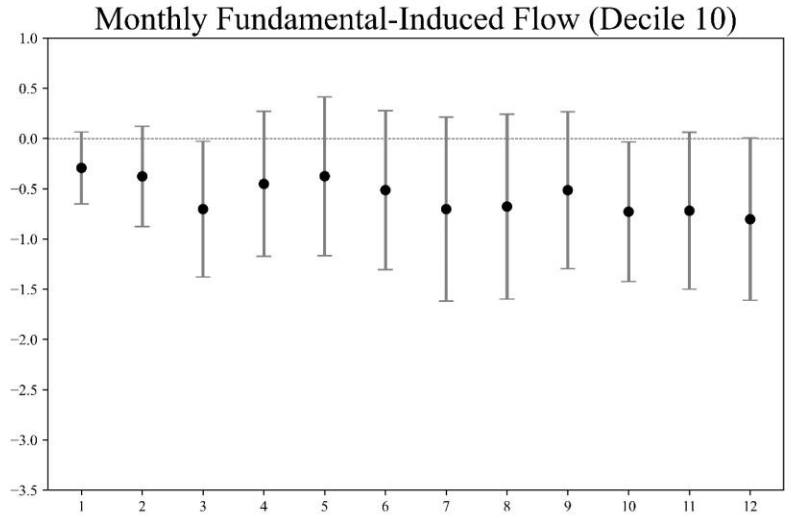


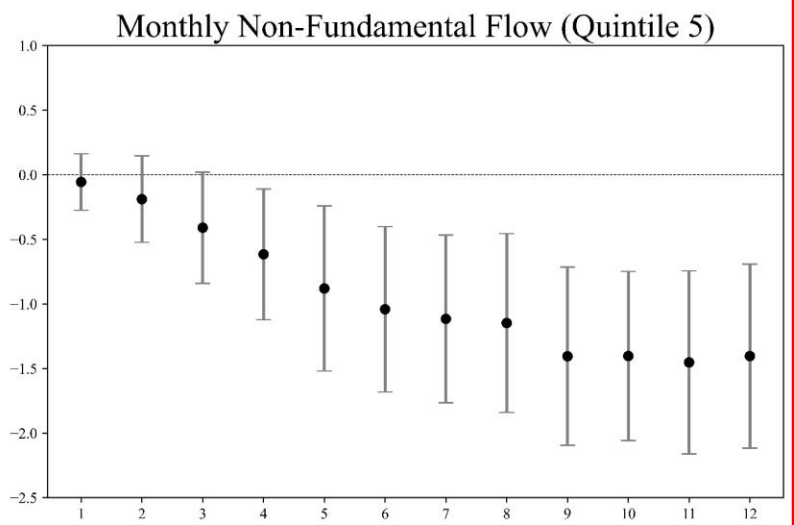
Visualization 2 (vs. aggregate flows)

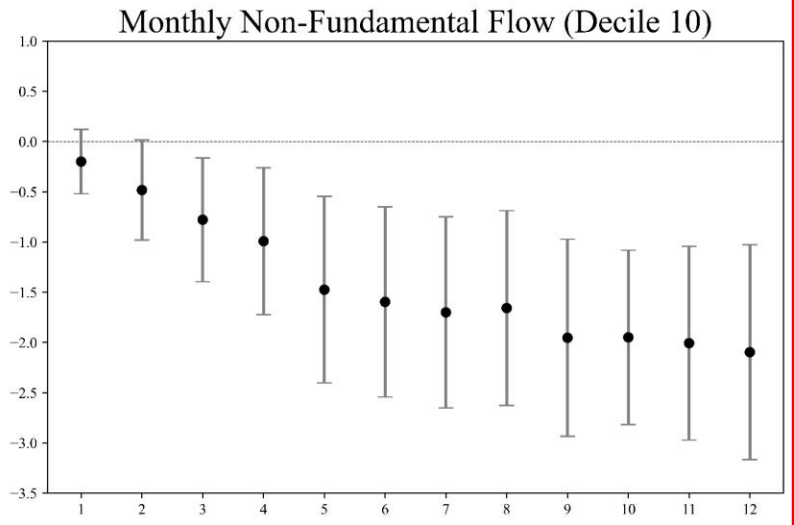












Conclusion

- ETF flows can serve as a valuable tool for detecting demand shocks in underlying asset markets.
- Both fundamental-induced and non-fundamental flows exhibit greater commonality at weekly and monthly levels compared to daily flows.
- We suggest that low-frequency flows can more effectively capture information from demand shocks.
- We theoretically and empirically suggests that fundamental-induced and non-fundamental flows exhibit distinct return predictability, necessitating separate consideration.
- We clarify and enhance the overall understanding of the term structure of non-fundamental demand shocks and the speed of reversal, as highlighted by Brown et al. (2021).
    - The price reversals driven by non-fundamental demand shocks occur over a long horizon, typically one year or more, with the speed of reversal gradually decreasing.