Financial fragility in open-ended mutual funds: the role of liquidity management tools

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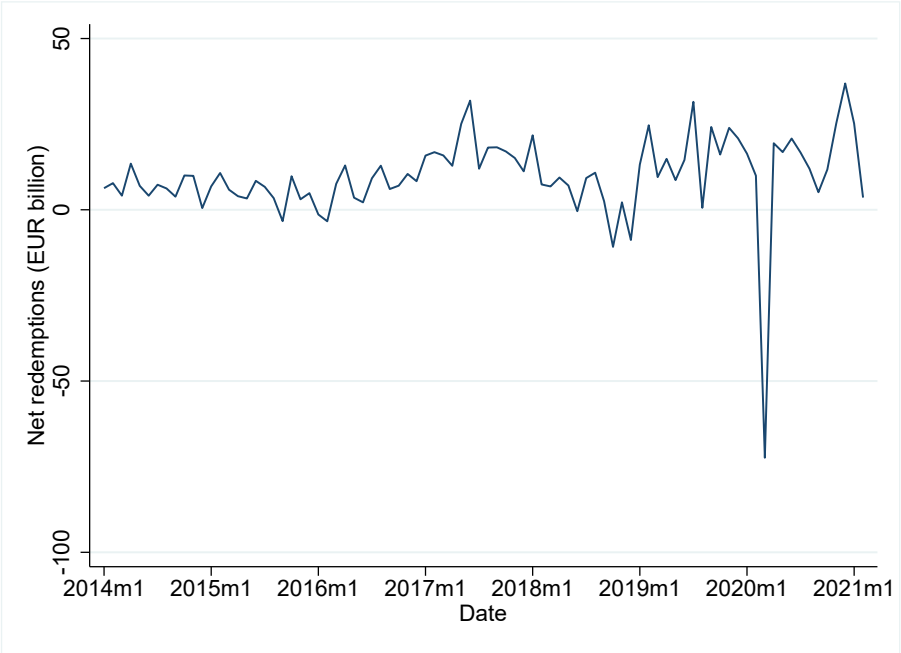
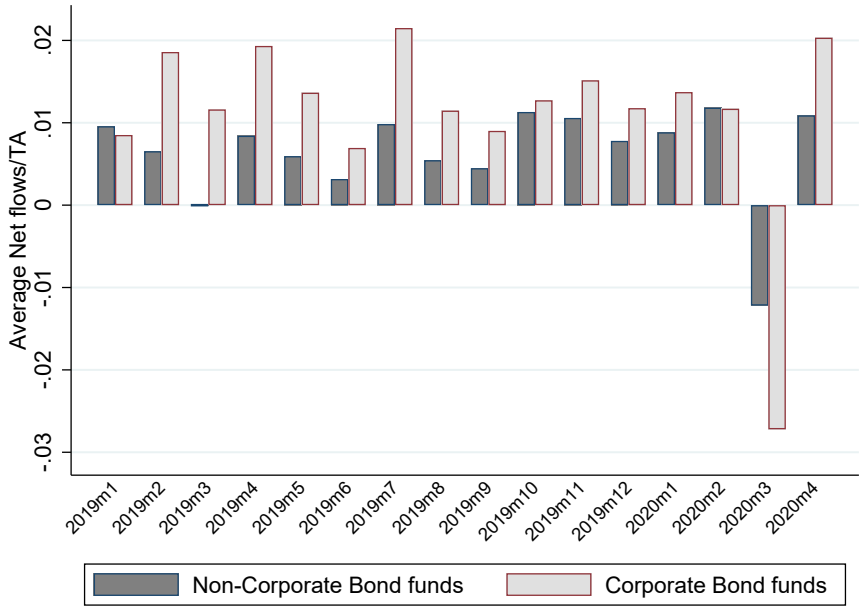
Motivation

- Open-ended structure exposes mutual funds to investor runs
- Different liquidity management tools proposed & used to contain panics
- Limited evidence on effectiveness of these tools in reducing fragility
- COVID-19 shock in March 2020 laboratory to study their effectiveness



(a) March 2020 Distress (Net redemptions of 72bn Euro)



(b) Funds holding corporate bonds more affected

What we do

- We investigate if and which liquidity management tools were effective in mitigating investor outflows in March 2020
- We use unique dataset on the availability of liquidity management tools (LMTs) collected by the Central Bank of Ireland
- We show that funds with price-based LMTs saw significantly lower net outflows in March 2020, as compared to funds with *only* quantity-based LMTs
- This effect is stronger among funds with a historically high sensitivity of net flows to performance, suggesting that these tools are effective in mitigating financial fragility, particularly among funds most prone to panic induced distress

Data

- Investment funds register in Ireland as ICAVs (Irish Collective Asset-management Vehicle)
- As of 2019 Q4:
  - 1,132 Bond funds
  - 2,018 Equity Funds
  - 920 Mixed funds
- We focus on a sample of 527 funds (bond and mixed) investing in corporate bonds
- Funds report yearly to CBI on a series of fund characteristics, including liquidity management tools

Liquidity Management (LM) tools

Price-based LMTs

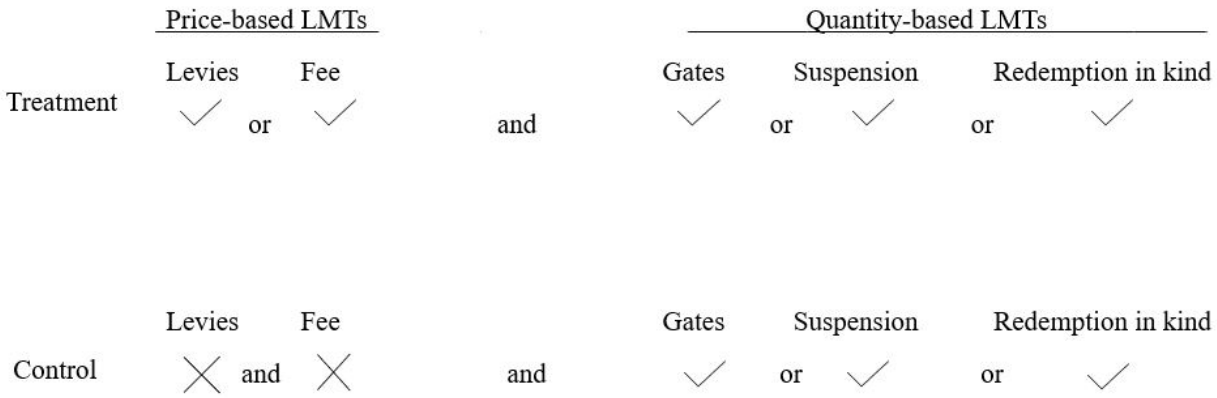
1. Anti-dilution levy
   - the costs (transaction costs, taxes and stamp duties...) corresponding to the sell of underlying assets in case of redemption (or acquisition in case of new subscription) are charged to the investors executing the redemption/subscription. This ensures that investors executing these transactions do not adversely affect the performance of the fund and thus other existing shareholders.
2. Redemption fees
   - typically charged as a percentage of the NAV of the shares being redeemed

Quantity-based LMTs

3. Redemption gates
   - Irish asset management companies can only gate redemptions once redemption requests received on any one dealing day amount to 10% or more of the NAV or total number of shares
4. Temporary suspension of dealing/calculation of NAV
5. Redemption in kind
   - transfer of an underlying asset to a redeeming investor

Treatment definition

- "Tougher" or quantity-based tools like suspensions, gates, and redemption in kind are widely available, but hardly used due to reputational concerns
- Main investigation looks at the "add-on effect" of price-based LMTs such as redemption fees or levies:
  - Treatment group: funds that report employing either redemption fees or levies and *at least one* of the tougher tools: suspensions, gates, and redemption in kind.
  - Control group: neither fees nor levies, but have at least one of the tougher tools



Empirical strategy

$$\frac{\text{Net Flow}_{i,t}}{\text{Total Assets}_{i,t-1}} = \alpha_i + \mu_t + \beta \text{Treat}_i \times \textit{March2020} + \theta' X_{i,t-1} + \gamma' X_{i,t-1} \times \textit{March2020} + \epsilon_{i,t}$$

where

- $\textit{Treat}_i$ is a dummy equal 1 if fund i reports as having either redemption fees or levies as a LM tool in 2019M12
- March2020 is a dummy equal 1 in March 2020 and zero from 2018M1-2020M2
- $X_{i,t-1}$ is a vector of lagged controls ▸ Controls definitions
- Time and fund fixed effects

Baseline results

Dependent variable: Net flow/TA	High sensitivity		Low sensitivity		Full sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat × March 2020	0.050***	0.066***	-0.023	-0.002	-0.023	-0.004
	(0.020)	(0.018)	(0.018)	(0.021)	(0.198)	(0.020)
Treat × High Sensitivity × March 2020					0.067**	0.066**
					(0.011)	(0.026)
High Sensitivity × March 2020					-0.062***	-0.057**
					(0.009)	(0.023)
Treat × High Sensitivity					0.033*	0.035**
					(0.058)	(0.017)
Treat	0.007	0.010			-0.027*	-0.025*
	(0.011)	(0.010)			(0.059)	(0.014)
Fund-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund-level controls X March 2020	No	Yes	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,065	5,049	4,354	4,338	9,387	9,387
R-squared	0.288	0.300	0.209	0.220	0.262	0.262

Robust standard errors in parenthesis. *** p<0.01, ** p<.05, * p<0.1

Size of effect (column(1)): Treated funds have 5% higher net flows to total assets as compared to control funds (average in March 2020 is around -3%)

Outflow vs inflows

	High flow-to-performance sensitivity			Low flow-to-performance sensitivity		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Outflows/TA	Inflows/TA	Dummy Negative net flows	Outflows/TA	Inflows/TA	Dummy Negative net flows
Treat × March 2020	-0.033*	0.042***	-0.307***	-0.006	-0.020	0.050
	(0.093)	(0.003)	(0.001)	(0.814)	(0.455)	(0.563)
Fund Controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls X March 2020	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,049	5,049	5,049	4,338	4,338	4,338
R-squared	0.212	0.313	0.332	0.187	0.220	0.440

Robust standard errors in parenthesis. *** p<0.01, ** p<.05, * p<0.1

Conclusion

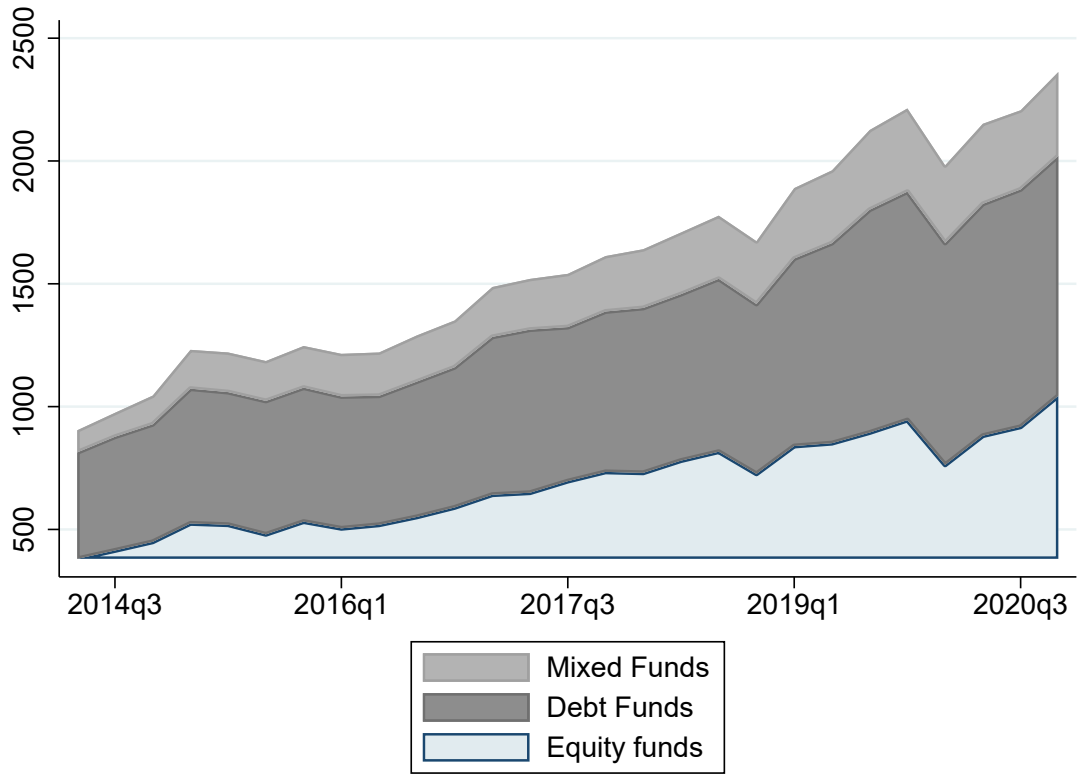
- We provide the first evidence that price-based liquidity management tools mitigate fragility particularly of funds susceptible to panic induced distress
- We show that fragile funds that had both price-based and quantity-based liquidity management tools available experienced lower net outflows during the COVID-19 shock, as compared to similar funds that only have quantity-based LMTs available
- Our results suggest that price-based liquidity management tools help to mitigate financial fragility in open ended-funds

Appendix

IF's AUM in Ireland

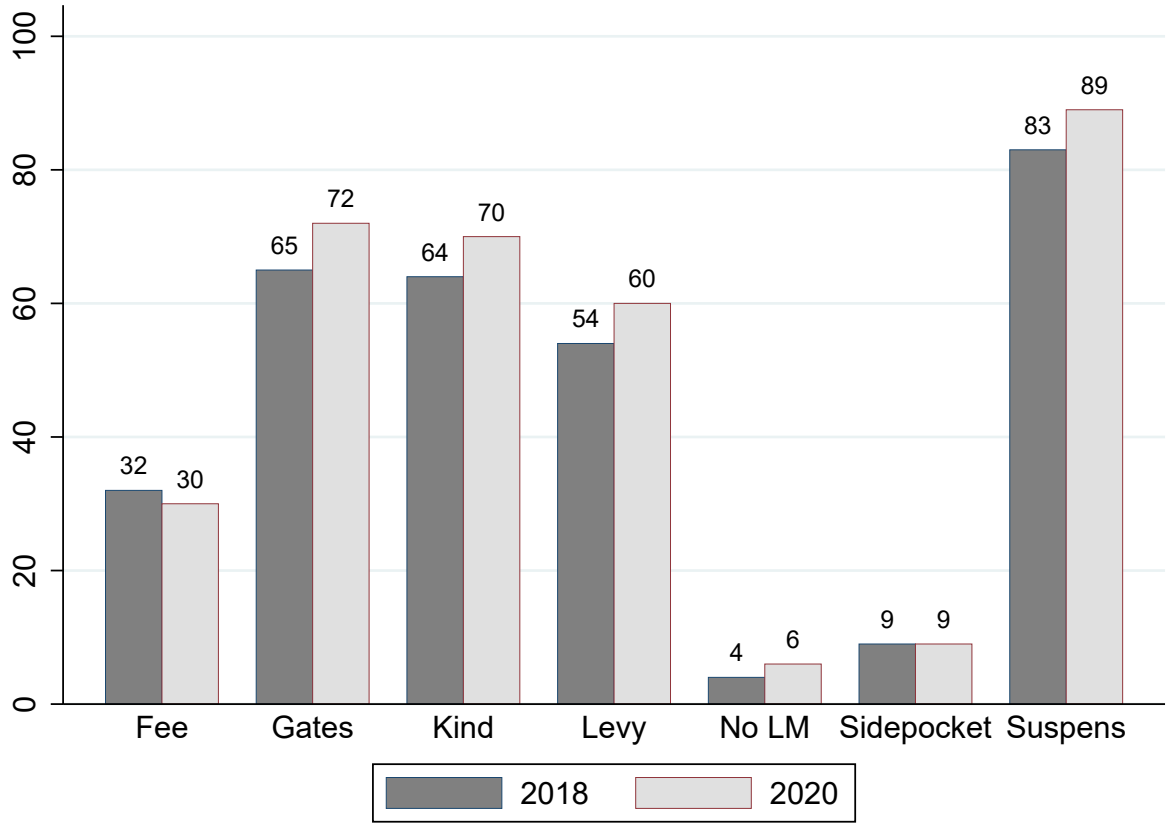
- Dramatic growth of assets under management of investment funds poses financial fragility concerns

Assets under management (bil euro) of Irish-domiciled IF



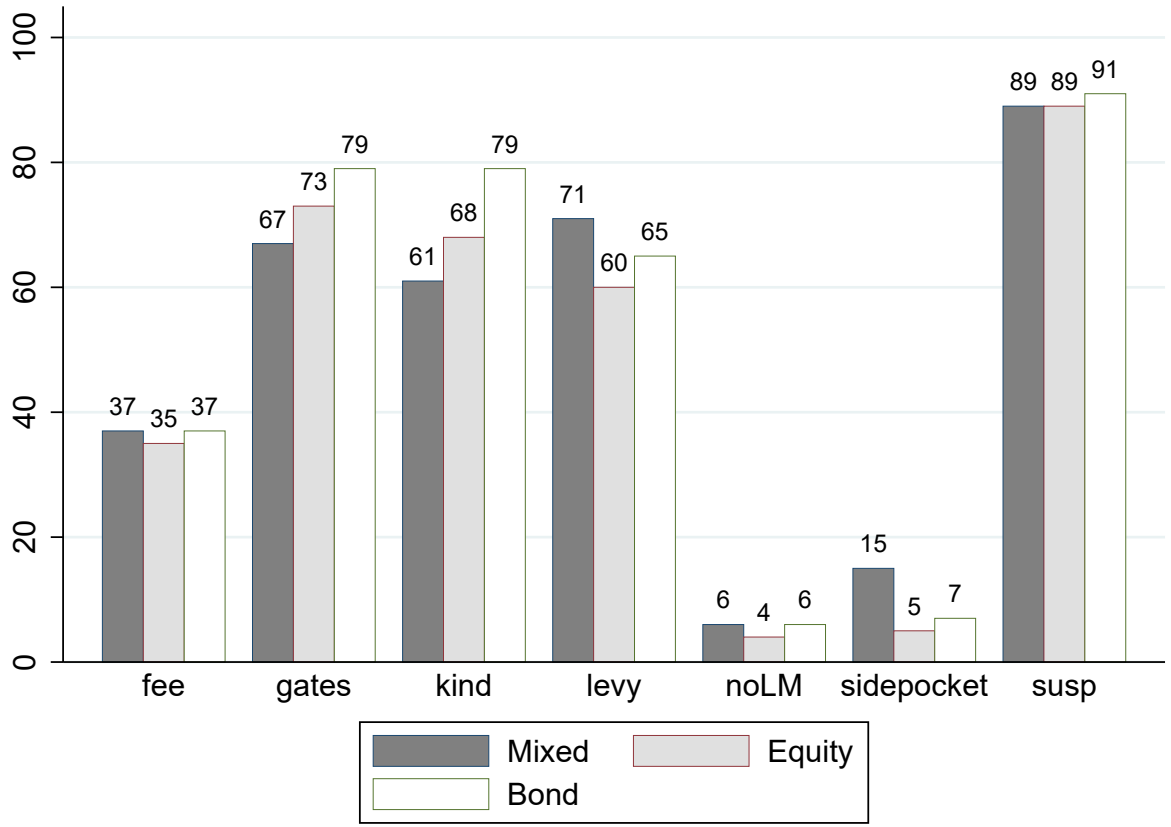
Availability of liquidity management tools

Percentage of funds with different LMTs (overall sample)*



*Out of 5,506 funds in 2018m12 and 5,869 in 2020m12 (changes reflect both entry of new funds and switchers)

Percentage of funds with different LMTs (as of 2019m12)



- Sample is: 1,132 Bond funds, 2,018 Equity Funds, 920 Mixed
- Funds employ 4 liquidity tools, on average.

Pairwise correlations (sample of equity, bonds, mixed funds)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Levy	1						
(2) Gates	0.16	1					
	(0.000)						
(3) Redemption in kind	0.097	0.587	1				
	(0.000)	(0.000)					
(4) Suspension	0.205	0.512	0.45	1			
	(0.000)	(0.000)	(0.000)				
(5) Redemption fees	-0.021	0.095	0.086	0.14	1		
	(0.119)	(0.000)	(0.000)	(0.000)			
(6) Side pocket	0.01	0.112	0.092	0.022	-0.13	1	
	(0.477)	(0.000)	(0.000)	(0.111)	(0.000)		

- The use of gates, suspensions and redemption in kind is highly correlated across the sample of equity, bonds and mixed funds.

Definitions of control variables (all in lag)

- $Netflow/TA_{t-1}$
- $Return_{t-1} = ln\left(\frac{NAV_{t-1}}{NAV_{t-2}}\right)$
- Number of funds in fund family
- Liquidity: ratio of cash & equivalents + US & DE gov bonds to TA
- Ln of Net Assets$_{t-1}$
- Past flow volatility = standard deviation of flows to TA over the past 12 months
- Leverage dummy=1 if fund uses leverage (self reported)
- Fund share ownership measured as the percentage of shares owned by: households (sHH), banks and investment funds (sBanksIF) and pension and insurance corporations (sPFIC)
- Fund age
- BHC belong= a dummy if the fund asset management company belongs to a bank holding corporation (based on ultimate ownership data in Orbis Bureau Van Dijk) Back

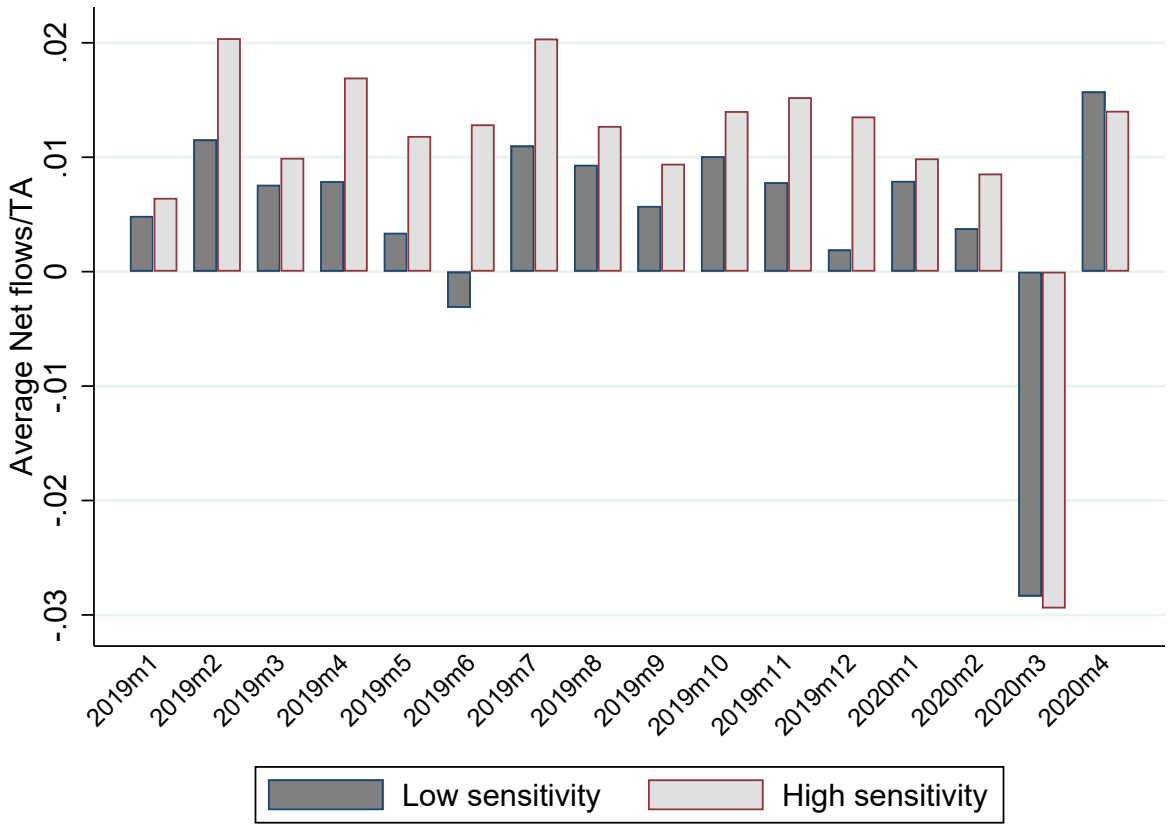
Classification of funds based on flow-to-performance regressions

- We estimate the correlation between net flows and past month's return for each fund from the beginning of the sample to 2019M1

$$\frac{\text{Net flows}_{i,t}}{TA_{i,t-1}} = \alpha + \beta R_{i,t-1} + \epsilon_{i,t}$$

- We then sort funds according to the median β_i in their fund class (bond funds, mixed funds, corporate bonds)
- High sensitivity funds are those with an above the median β_i Back

Net flows in high versus low performance sensitivity funds



Descriptive statistics

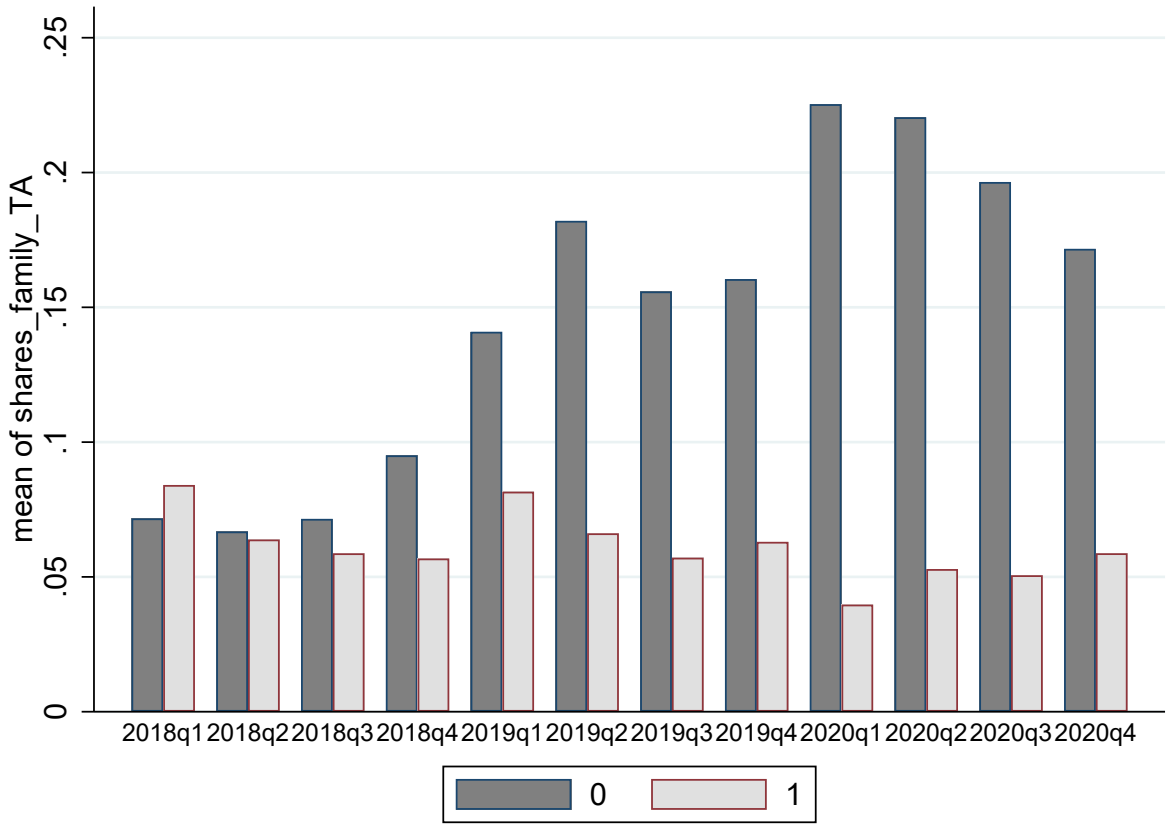
Variable	Treated				Control			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Nb Funds in family	19.327	17.165	2	68	22.168	18.518	2	64
ln Assets	18.771	1.87	0	23.413	18.209	1.682	0	22.04
Return	-0.002	0.063	-2.425	0.706	-0.002	0.078	-1.625	0.594
Fund age	5.146	4.556	0	29	5.932	6.038	-1	34
BHC belong	0.205	0.404	0	1	0.218	0.413	0	1
Volatility flows	0.048	0.048	0	0.252	0.049	0.05	0	0.252
Leverage dummy	0.569	0.495	0	1	0.588	0.492	0	1
Liquidity	0.039	0.077	0	0.545	0.074	0.166	0	0.992
Share Households	0.008	0.061	0	0.85	0.022	0.101	0	0.838
Share Banks & Funds	0.399	0.449	0	1	0.321	0.445	0	1
Share Pension &Insurance Funds	0.118	0.279	0	1	0.087	0.232	0	1

Additional Control Variables Baseline Results

Back

Dependent variable: Net flow/TA	High sensitivity		Low sensitivity		Full sample	
Net flows/TA$_{t-1}$	0.136***	0.129***	0.121***	0.121***	0.134***	0.130***
	(0.023)	(0.023)	(0.031)	(0.031)	(0.000)	(0.019)
Return$_{t-1}$	-0.015	-0.014	0.000	0.001	-0.005	-0.004
	(0.013)	(0.013)	(0.005)	(0.005)	(0.345)	(0.005)
Nb funds in family	-0.001	-0.000	0.001	0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.808)	(0.000)
Ln Assets$_{t-1}$	-0.050***	-0.047***	-0.033***	-0.030***	-0.044***	-0.041***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.000)	(0.004)
Volatility$_{t-1}$	0.033	0.046	-0.019	-0.019	0.024	0.031
	(0.044)	(0.044)	(0.075)	(0.076)	(0.542)	(0.039)
Leverage$_{t-+A34:A441}$	-0.006	-0.009	0.015	0.001	-0.001	-0.008
	(0.009)	(0.008)	(0.018)	(0.019)	(0.905)	(0.009)
sHH$_{t-1}$	0.000	0.000	0.071**	0.077**	0.159**	0.165**
	(0.000)	(0.000)	(0.030)	(0.030)	(0.035)	(0.075)
sBanksIF$_{t-1}$	0.107***	0.100***	0.045***	0.043***	0.085***	0.080***
	(0.011)	(0.013)	(0.017)	(0.017)	(0.000)	(0.010)
sPFIC$_{t-1}$	0.139***	0.138***	0.014	0.012	0.083***	0.081***
	(0.020)	(0.020)	(0.029)	(0.028)	(0.000)	(0.018)
Nb funds in family × March2020		0.000		-0.000		-0.000
		(0.000)		(0.000)		(0.000)
BHC belong × March2020		-0.009		-0.007		-0.007
		(0.013)		(0.026)		(0.012)
Ln Assets $_{t-1}$ × March2020		-0.017***		-0.018***		-0.018***
		(0.003)		(0.006)		(0.003)
Fund age × March2020		0.000		-0.000		-0.000
		(0.001)		(0.001)		(0.001)
Volatility × March2020		-0.600***		-0.282		-0.441***
		(0.184)		(0.279)		(0.168)
Leverage × March2020		0.038***		0.036**		0.038***
		(0.012)		(0.016)		(0.010)
Liquidity × March2020		-0.021		0.048		-0.006
		(0.058)		(0.045)		(0.037)
sHH × March2020		0.093		0.048		0.073**
		(0.092)		(0.035)		(0.037)
BanksIF × March2020		0.027**		0.008		0.028***
		(0.012)		(0.018)		(0.009)
sPFIC × March2020		0.057***		0.049		0.052**
		(0.019)		(0.043)		(0.023)

Proportion of fund share held by other funds in the same family



Correlation between outflow and inflows

		High sensitivity	Low sensitivity
Dependent variable: Inflows/TA	(1)	(2)	(3)
Outflows/TA	0.447***	0.310***	0.258**
	(0.000)	(0.102)	(0.118)
March 2020 x Outflows/TA	-0.139*	-0.417***	0.370
	(0.073)	(0.131)	(0.302)
March 2020 x Outflows/TA x Treat		0.312*	-0.675**
		(0.179)	(0.336)
Outflow $\times$ *Treat*		0.206*	0.174
		(0.116)	(0.140)
Treat $\times$ *March*2020		-0.019	0.021
		(0.023)	(0.018)
Fund-level controls	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes
Observations	12,062	5,538	4,732
R-squared	0.375	0.377	0.300

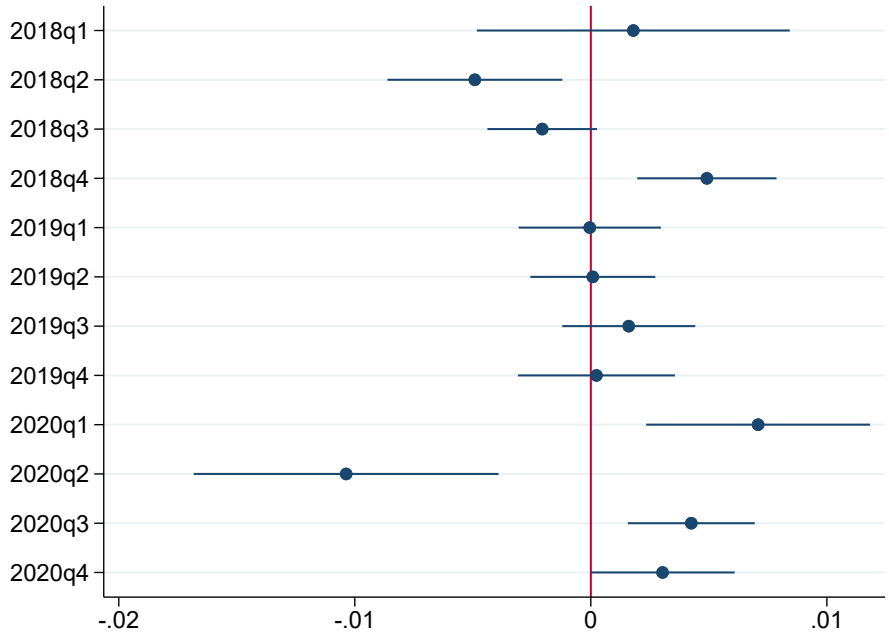
Robust standard errors in parenthesis. *** p<0.01, ** p<.05, * p<0.1

Impact on performance

$$\Delta \text{NAV}_{i,q} = \alpha + \beta \text{Treat}_i + \theta' X_{i,q-1} + \epsilon_{i,t},$$

where $\Delta \text{NAV}_{i,q}$ is the average return of fund i in quarter q.

Fund performance

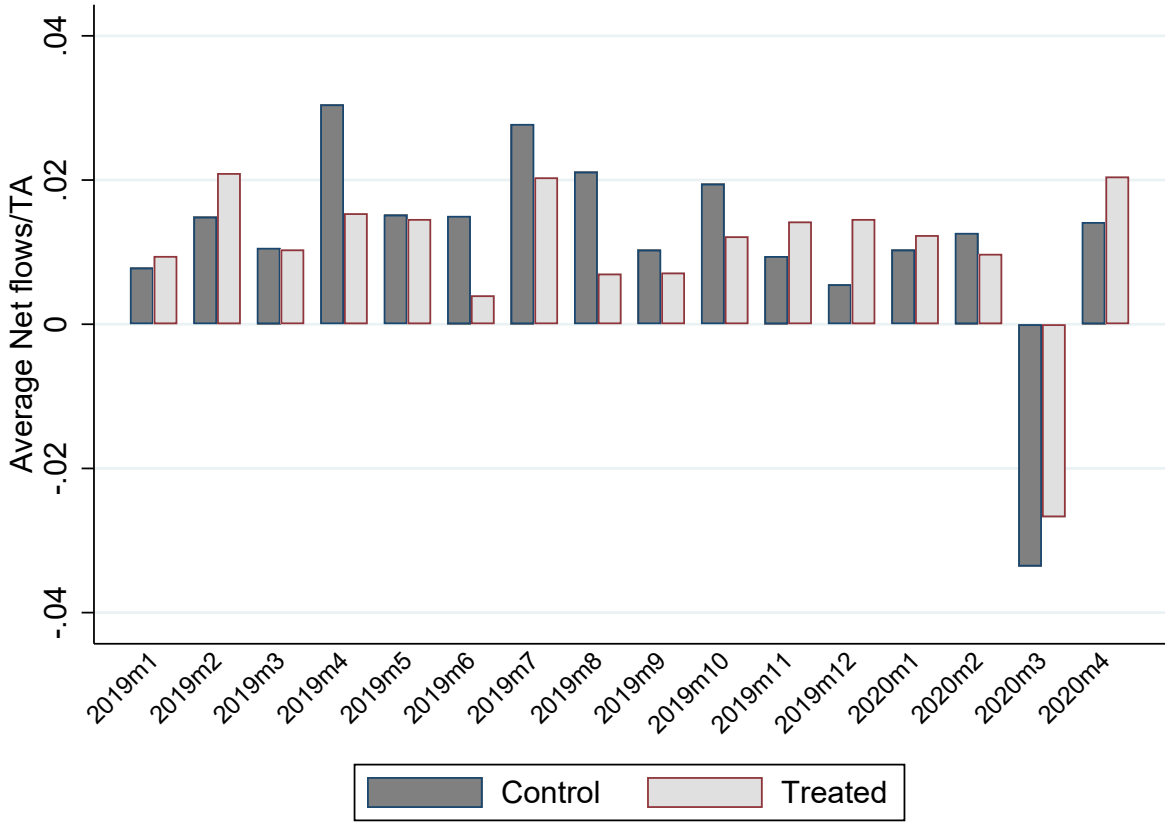


Net flows for Bond and Mixed funds separately

	Bond funds			Mixed funds		
	(1) High sensitivity	(2) Low sensitivity	(3) Full sample	(4) High sensitivity	(5) Low sensitivity	(6) Full sample
Treat × March 2020	0.075***	0.016	0.010	0.063***	-0.009	-0.009
	(0.006)	(0.579)	(0.708)	(0.000)	(0.590)	(0.517)
Treat × High Sensitivity × March 2020			0.053*			0.072***
			(0.093)			(0.003)
High Sensitivity × March 2020			-0.045*			-0.054**
			(0.074)			(0.011)
Treat × High Sensitivity			0.094**			0.003
			(0.017)			(0.442)
Treat	0.031	-0.075***	-0.068***	-0.003	-0.002	-0.005
	(0.406)	(0.000)	(0.000)	(0.444)	(0.656)	(0.252)
Fund-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund-level controls X March 2020	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,693	2,543	5,236	2,347	1,804	4,151
R-squared	0.310	0.240	0.270	0.305	0.216	0.259

The dependent variable is *Net Flow/TA*, defined as the net monthly capital flow into a fund divided by the fundâs total net assets in the previous month. Treat is an indicator variable equal 1 if a fund employ fees or levies and at least one of the tougher tools (suspensions, gates or redemption in kind) and 0 if the fund does not employ neither fees nor levies, but employs at least one of the tougher tools (suspensions, gates or redemption in kind). March 2020 a dummy variable equal to 1 in March 2020 and zero from January 2018 to February 2020. High Sensitivity is the sample of funds with an above the median sensitivity of flows to performance over the period 2014-2018. Fund-level controls include: the lag of net flows to total assets, lag of return, number of funds in family, lag of ln of assets, lag of volatility of flows, lag of leverage, the share of assets owned by households, banks and investment funds, as well as the share owned by pension funds and insurance corporations. Fund-level controls X March 2020 represents an interaction between the controls and the March 2020 dummy variable. Robust standard errors in parenthesis. *** represents significance at 1% level, ** at 5% level and, * at 10% respectively.

Average Net flows/TA



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Introduction of LM tools

- We also observe switchers in our sample, i.e., funds that change and/or introduce new LM tools in 2019 and 2020

Number of funds switching LM strategy

	2019	2020
Levy	326	183
Redemption gates	299	183
Redemption in kind	262	139
Suspensions	241	100
Redemption fees	155	172
Side pockets	15	65
Borrowings	502	119
No LM tools	38	21

Back

Introduction of LMT

- We perform a series of family level regressions of the probability of introducing any LMT tool in 2019 based on prior fund family characteristics
- Dependent variable is dummy =1 if fund family introduce a LMT in 2019
- To compute family level controls we use data on all funds in the family. Individual fund characteristics are aggregated at the family level using the share of the funds TA in the families TA as weights

- We find that family size (measured as the sum of total assets) is positively correlated with the probability of introducing LMT
- Families is a high median Liquidity to TA and with a higher share of equity funds are less likely to introduce LMT
- Ownership: Families with more banks or other IF funds owners are more likely to introduce LMT, while those with a higher share of Pension Funds or insurance companies are less likely

Probability of introducing a LM tool

	(1)	(2)	(3)	(4)	(5)	(6)	(8)	(10)	(11)	(12)	(13)	(14)
Ln(Fam Assets)	0.143***	0.161***	0.157***	0.166***	0.181***	0.163***	0.174***	0.165***	0.162***	0.166***	0.172***	0.157***
	(0.033)	(0.035)	(0.036)	(0.035)	(0.037)	(0.036)	(0.038)	(0.035)	(0.035)	(0.035)	(0.037)	(0.036)
Nb funds in Fam	0.010*	0.009	0.009	0.008	0.010	0.009	0.008	0.008	0.009	0.009	0.009	0.009
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Median Age	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	-0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fam liquidity/TA		-1.090*	-1.133*	-1.105	-1.247*	-1.109*	-1.086*	-1.257*	-1.091*	-1.114*	-1.173*	-1.094*
		(0.635)	(0.642)	(0.704)	(0.678)	(0.644)	(0.635)	(0.690)	(0.635)	(0.659)	(0.665)	(0.643)
Fam High sensitivity		0.092	0.093	0.139	-0.058	0.075	0.108	0.079	0.091	0.078	0.039	0.094
		(0.166)	(0.167)	(0.172)	(0.165)	(0.183)	(0.166)	(0.166)	(0.167)	(0.167)	(0.165)	(0.166)
Fam Share HH			-1.250									
			(0.817)									
Fam share PFIC				-0.987*								
				(0.504)								
Fam share Banks IF					0.429**							
					(0.169)							
Fam Volatility						0.562						
						(2.188)						
Share distressed							-2.066					
							(1.908)					
Share eq funds								-0.033**				
								(0.013)				
Share bond funds									-0.002			
									(0.018)			
Share mixed funds										0.019		
										(0.017)		
Share retail funds											-0.018	
											(0.011)	
Belong to BHC												0.159
												(0.189)
Observations	1,149	934	934	934	934	934	934	934	934	934	934	934

Robust SE in parenthesis

▸ Back