INVESTMENT COMPANY INSTITUTE®
ICI Global

Annotated Bibliography of Research on Open-Ended Fund Liquidity Dynamics

AS OF MAY 2023

WASHINGTON, DC • BRUSSELS • LONDON • HONG KONG • WWW.ICI.ORG

Annotated Bibliography of Research on Open-Ended Fund Liquidity Dynamics

Do open-ended mutual funds pose unique risks to financial stability? The selected papers summarized below present differing viewpoints on the crucial and interlinked questions of first mover advantage, liquidity mismatch, and the advantages and disadvantages of swing pricing. As the Financial Stability Board and IOSCO update the recommendations on liquidity management, this brief compendium of the existing literature, including counterpoints to the often cited academic literature, can help to inform policymaker and stakeholder approaches.

	TITLE	AUTHOR	KEY RESULTS
	Is there a unique first mover advantage in open-ended funds?		
	Widely cited papers		
1	Payoff complementarities and financial fragility: Evidence from mutual fund outflows	Chen, Goldstein, and Jiang, *2010, Journal of Financial Economics*	The authors argue that the "on demand" feature of open-ended mutual funds is responsible for market fragility, with this "fragility" closely linked to the underlying liquidity of a fund's portfolio. Suggests that outflows are higher in mutual funds that hold illiquid assets and experience poor performance.
2	Investor flows and fragility in corporate bond funds	Goldstein, Jiang, and Ng, 2017, *Journal of Financial Economics*	Suggests that corporate bond fund outflows are more sensitive to poor past performance than inflows are to positive past performance, and the sensitivity of outflows to bad performance increases when funds' assets are less liquid assets and when overall market illiquidity is high. Although this paper is frequently cited as direct evidence of a first-mover effect, the authors are circumspect, stating in their paper that mutual fund structures "*may* generate a first-mover advantage among investors in corporate bond funds."
3	Sitting bucks: Stale pricing in fixed income funds	Choi, Kronlund, and Oh, 2022, *Journal of Financial Economics*	Argues that stale NAV pricing in bond mutual funds create an opportunity for fast-moving investors to redeem from overvalued funds, exacerbating the risk of fund runs, diluting returns of buy-and-hold investors. The paper finds some dilution, but it varies across fund type, and it is quite modest even for less liquid funds. See Recent ICI research for a similar conclusion that dilution is small.

	TITLE	AUTHOR	KEY RESULTS
	Alternative perspectives		
4	Strategic Complementarity among Investors with Overlapping Portfolios	Stahel, 2022, *SSRN Working Paper*	When mutual funds (indirect investors) are compared to similar direct investors in separately managed accounts (SMAs), the SMAs exhibit the same selling behaviour as mutual fund investors. If mutual funds pose unique "run risk," outflows from mutual funds should be much more pronounced than those from SMAs, especially during market stress. The paper finds no such evidence. This suggests that the findings in papers one through three likely arise not because of the structure of mutual funds, but from more general concerns by all investors to sell during a market downturn before market liquidity dries up.
	Does liquidity transformation in open-ended funds lead to forced asset sales during stressed markets?		
	Widely cited papers		
5	Asset fire sales (and purchases) in equity markets	Coval and Stafford, 2007, *Journal of Financial Economics*	Results suggest equity funds that experience large outflows tend to reduce existing positions, which creates price pressure in the securities held in common by these funds. However, the authors point out that the economic significance of its results could be trivial overall.
6	Financial fragility in the COVID-19 crisis: The case of investment funds in corporate bond markets	Falato, Goldstein, and Horta, 2021, *Journal of Monetary Economics*	Takes the methodology and results of paper 2 above as given and finds that corporate bond mutual funds experienced significant outflows in March 2020. The authors interpret this as evidence that funds were "fragile," but that is not the same as saying funds had difficulties meeting redemptions. They also conclude that "fund illiquidity" was a determining factor in the level of outflows experienced by funds.
7	Mutual fund liquidity transformation and reverse flight to liquidity	Ma, Xiao and Zeng, 2022, *The Review of Financial Studies*	Authors argue that selling pressure from fixed-income mutual funds during the COVID-19 crisis pushed bond prices down, even among liquid asset classes such as Treasuries. However, their results for Treasuries are actually mixed. They find statistically significant effects only for Treasury securities of a maturity of 20 years or more, and then only for off-the-run Treasuries. Moreover, even for longer-dated off-the-run Treasuries, the economic significance appears small (for a critique, see ICI comment letter to SEC on its swing pricing proposal, Appendix page 34, footnote 53).
8	When Selling Becomes Viral: Disruptions in Debt Markets in the COVID- Crisis and the Fed's Response	Haddad, Moreira and Muir, 2021, *Review of Financial Studies*	Argues that mutual funds' sales of securities in March 2020 may have amplified market stress. The paper finds a statistically significant relationship between mutual funds sales of corporate bonds in March 2020 and yields on corporate bonds (relative to Treasuries). Under the assumption that bond mutual funds sold vertical slices of their portfolios, their analysis suggests mutual fund sales of investment grade corporate bonds might account for 31 basis points of the 313-basis point overall increase in yield spreads over Treasuries. ICI research estimates that the effect is smaller, only 7 basis points, because, in fact, funds sold smaller-than-vertical slices of their corporate bond holdings.

	TITLE	AUTHOR	KEY RESULTS
	Alternative perspectives		
9	Corporate Bond Mutual Funds and Asset Fire Sales	Choi, Hoseinzade, Shin, and Tehranian, 2020, *Journal of Financial Economics*	This paper finds little evidence that bond fund redemptions drive fire sale price pressures. These results are consistent with ICI's own research, which shows that the actual sales of US corporate bond funds were only a fraction of their outflows and had little impact on investment grade corporate bond markets during March 2020.
10	Measuring Mutual Fund Flow Pressure as Shock to Stock Returns	Wardlaw, 2020, *Journal of Finance*	This paper shows that many papers on asset fire sales and price pressure suffer from a design flaw in that price pressures *attributed* to funds' portfolio sales are due to fundamental market pressures that those studies failed to account for.
11	"Smoke without fire?" - Reassessing empirical evidence for fire sales	Bidder, Coen, Lapore, and Silvestri, *2023, Preliminary Working Paper*	Authors find little evidence that mutual funds' portfolio sales amplify market price pressures; sales by other market participants matter more. They challenge much of the literature on asset fire sales, pointing out that papers often fail to account for obvious correlations, for example measuring price pressure via bid-ask spreads but failing to adjust for the correlation between bid-ask spreads and market volatility. Additionally, proxies for funds' forced sales do not capture actual sales or market fundamentals (*a point raised in ICI's own research and recent comment letter on the SEC's swing pricing rule*).
12	ETFs, Illiquid Assets, and Fire Sales	Shim and Todorov, 2023, *SSRN Working Paper*	Shows that Authorised Participants (APs) act as a buffer between fixed-income ETFs and the underlying bond market and avoid fire sales. Additionally, costs of creating and redeeming share baskets by the APs are paid for by liquidity-demanding ETF investors. Some of the results are also consistent with previous ICI research on ETFs.
13	Mutual Fund Trading Style and Bond Market Fragility	Anand, Jotikasthira, and Venkataraman, 2021, *Review of Financial Studies*	Some funds, even in stress periods, supply liquidity mitigating market fragility. While some papers suggest funds generally demand liquidity when trading (potentially resulting in bond market fragility), this paper suggests that some funds actual supply liquidity, even during market stress, potentially alleviating fragilities. This is consistent with ICI's own research, which indicates that bond mutual funds' US Treasury sales in March 2020 were not correlated with the onset of stress in that market and bond mutual fund trading was relatively small in the US investment grade corporate market.
14	Bond Mutual Funds' Role in the Fixed-Income Markets	Collins and Antoniewicz, 2022, ICI Staff Research	A series of ICI work relating to liquidity mismatch and forced asset sales found (based on detailed proprietary daily data on funds' portfolio transactions) that bond mutual fund sales had little price impact on Treasuries and or investment grade corporate bonds during the events of March 2020.

	TITLE	AUTHOR	KEY RESULTS
	What impact does swing pricing have on fund dynamics?		
15	Bank Debt, Mutual Fund Equity, and Swing Pricing in Liquidity Provision	Ma, Xiao, and Zeng, 2022, *SSRN Working Paper*	Under a swing pricing regime, funds can, *theoretically*, hold more illiquid assets and not hold as much cash to meet redemptions. As such, funds can theoretically: 1) provide more liquidity to the market, and 2) increase returns to investors. Results are derived from a model.
16	Swing Pricing for Mutual Funds: Breaking the Feedback Loop Between Fire Sales and Fund Redemptions	Capponi, Glasserman, and Weber, 2020, *Management Science*	Develops a *theoretical* model of fund flows, asset illiquidity and first mover advantage, which can be alleviated through swing pricing. Given an exogenous shock, under the model, informed investors redeem from the fund, creating a first mover advantage. With a large enough shock, the model predicts that redemptions become so large that the fund closes. By introducing a theoretical swing pricing mechanism, transactions costs are passed on to the redeeming investor and fund failure is alleviated.
17	Swing pricing and fragility in open-end mutual funds	Jin, Kacperczyk, Kahraman, and Suntheim, 2022, *The Review of Financial Studies*	Finds that in times of stress, outflows from funds increase but this effect is almost entirely negated by using "alternative pricing methods," such as swing pricing and dual pricing. Results are based on an empirical investigation on the impact of swing pricing using a confidential data set of the UK FCA.
18	Towards a Macroprudential Framework for Investment Funds: Swing Pricing and Investor Redemptions[1]	Lewrick and Schanz, 2023, *International Journal of Central Banking (Forthcoming)*	During normal market conditions, swing pricing dampens outflows following weak fund performance. However, in times of stress, it finds swing pricing *fails to contain* redemption pressures. It shows that the percentage outflows in March 2020 from Luxembourg-domiciled funds (where swing pricing is routinely used) were the same as from US mutual funds (where swing pricing, though available, is not used).
19	ICI Technical Appendix on Swing Pricing and Related Issues	ICI Staff research contribution to public comments letter, 2023.	ICI analytic work related to the response to SEC's proposed 2023 swing pricing rule demonstrates that there is no economic justification for mandatory swing pricing or universal applicability, and that any consideration of swing pricing should be as an optional tool among a wide variety of potential tools that fund managers may consider using according to their specific circumstances and investment strategies.

[1] Paper is accepted, with publication due in September 2023. The paper is a heavily revised version of a previous BIS staff working paper titled "Is *the price right? Swing pricing and investor redemptions*"

	TITLE	AUTHOR	KEY RESULTS
	Literature on the impact of other financial entities		
20	Unintended Consequences of Holding Dollar Assets	Czech, Huang, Lou, and Wang, 2022, *Bank of England Working Paper*	Shows that UK-based insurance companies and pension funds were heavy sellers of UK gilts in March 2020, contributing significantly to the observed spike in the gilt yield. Highlights that that the trading behaviour of market participants other than mutual funds affected market dynamics. This point is also discussed in ICI's technical appendix to our SEC swing pricing comment letter.
21	Regulatory pressure and fire sales in the corporate bond market	Ellul, Jotikasthira and Lundblad, 2011, *Journal of Financial Economics*	Using insurance company transactions data, the authors find that insurance companies facing regulatory constraints on their asset quality are more likely to sell downgraded corporate bonds, potentially leading to fire sale conditions.
22	Insurance companies as liquidity providers: The case of corporate-bond mutual funds	Aramonte and Mano, 2022, *SSRN Working Paper*	In the context of high yield corporate bonds, finds that insurers and mutuals funds trade in the opposite direction with insurers tending to buy when mutual funds sell.
23	Post-Crisis Regulations, Trading Delays, and Increasing Corporate Bond Liquidity Premium	Wu, 2023, *SSRN Working Paper*	Establishes a causal relationship between the major post-crisis regulations and the variation in liquidity premia in the corporate bond market. Specifically, finds that Basel II.5 contributed the most to the increase in the liquidity premium in corporate bond markets.