Swing Pricing in Mutual Funds: Indian Evidence

Priya Malhotra

Introduction

To protect investors' interests, India's capital market regulator, the Securities and Exchange Board of India (SEBI), announced on September 29, 2021, that open-ended debt mutual fund schemes would have a swing pricing structure. This paradigm does not apply to overnight funds, GILT funds, or Gilt with a 10-year maturity. Swing pricing enables an open-ended fund's net asset value (NAV) to adjust in response to significant redemptions in periods of market distress, thereby lowering the fund's liquidity risk. Swing pricing will be used exclusively in the event of scheme outflows, while a hybrid model with a partial swing will be used in normal times. Volatile times would entail a mandatory full swing. The swing factor will be between 1 and 2 percent, depending on the underlying credit and duration risk, and will take effect upon the regulator's declaration of market dislocation. However, the application of the swing factor to individual schemes has been delegated to asset management companies (AMCs) under the auspices of the Association of Mutual Funds in India (AMFI). Institutional investors are the first movers in times of market turmoil, compelling fund managers to redeem high-quality liquid securities. As a result, the remaining investors are left with a portfolio of low-quality, illiquid underlying securities. Swing pricing is similar to an exit load in that it discourages large redemptions by increasing the cost of exit.

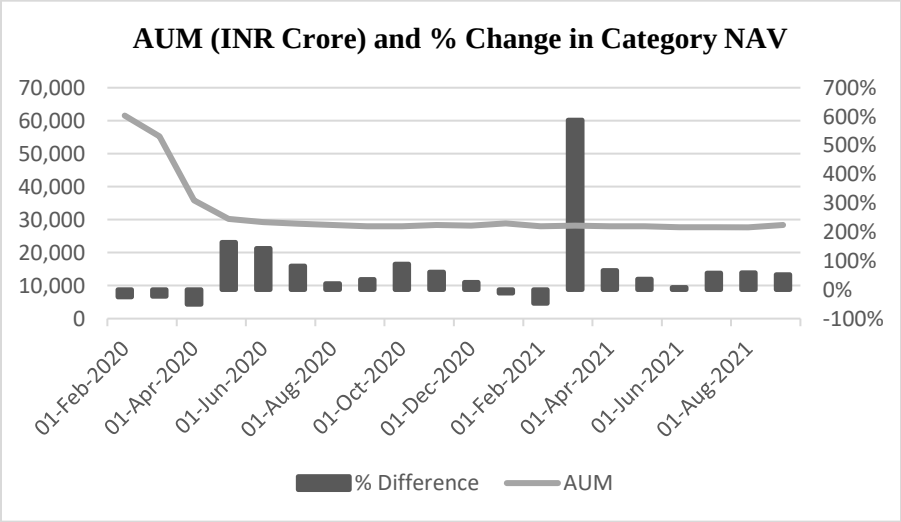
Brief Overview of the Indian Debt Market

The Indian debt market, which is one of the biggest in Asia, is divided into two segments: government securities and corporate bonds, with banks, financial institutions, insurance companies, foreign institutional investors (FIIs), and mutual funds all playing a prominent role in both. With daily average volumes of 10,000 crores and instruments spanning the maturity range, the $1 trillion G-Sec market is the segment's oldest and largest. The corporate bond market, which accounts for almost 18% of total domestic credit (the highest share among Asian peers), is active in the primary market but has a modest secondary market dominated by G-Sec turnover. The fixed income market is evolving rapidly for many reasons, including new products, increased liquidity, interest rate deregulation, enhanced settlement systems, and a quick pace of transition in rising economies such as China. After undergoing a historic transformation three decades ago as a result of economic reforms, India is now inching closer to opening its G-Sec market to more international investors through inclusion in global indices, a much-needed step given India's severe financial market access gap with peers such as South Africa and Brazil.

Mutual funds in India have become major players in equity and bond markets, providing crucial liquidity support and allocation of investible surplus. Indian debt mutual funds account for two-fifth of the entire industry's assets under management (AUM), approximately ₹14.72 lakh crores as of July 2021, as per the AMFI database. The pandemic-led crisis period witnessed a marked shift in the investors' preference from high credit risk funds to low credit risk funds. The countrywide lockdown and possibility of economic slowdown backed the investor concerns. In April 2020, Franklin Templeton announced the winding up of its six credit-focused funds.[6] The announcement came as a bitter shock to the investors leading to heavy redemptions and a net outflow of INR 19,239 crores from credit risk funds during April 2020 (See Figure 1).

Figure 1: AUM and Change in NAV (%) of Credit risk funds

The figure presents a trend in the Credit risk funds' AUM (primary axis) and percent change in category NAV (secondary axis) before the onset of the COVID-19 pandemic till August 2021.



Source: AMFI database

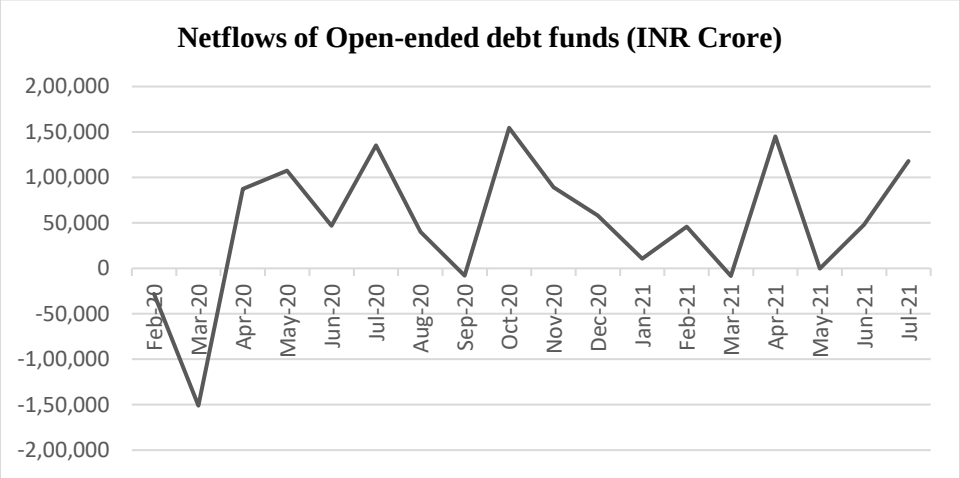
Lower-rated securities face significant liquidity constraints during market turmoil and stress, as investors become risk-averse and choose to lend only to higher-rated corporate bonds. The Franklin Templeton fund scandal damaged the faith of all debt mutual fund investors, who hurried to abandon not only the credit funds but also debt funds in general. However, quick intervention by the central bank and the SEBI minimized further damage to debt funds that gradually gained net flows after April 2020 (Refer to Figure 2). Credit risk funds, on the other

[6] These funds are Franklin India Low Duration Fund, Franklin India Dynamic India Accrual Fund, Franklin India Short Term Income Plan, Franklin India Dynamic Accrual Fund, Franklin India Credit Risk Fund, and Franklin India Income Opportunities Fund. These funds were offered under a clear strategy of having significant more exposure to A- and AA- rated instruments.

hand, have continued to lose investor interest, with AUM stagnant after a sustained decrease till June 2020.(see Figure 3).

Figure 2: Net flows of Open-ended debt funds

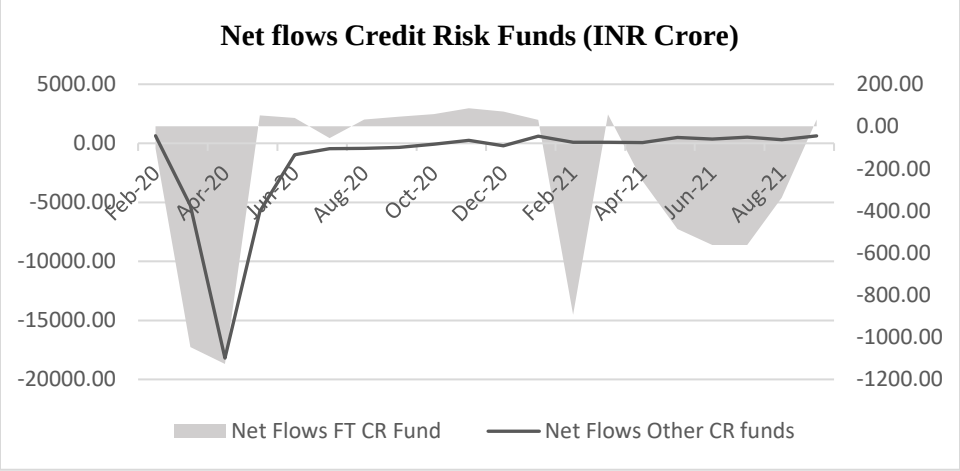
The figure presents net inflows and outflows (in Rs. crore) of the Open-ended fund category from February 2020 to July 2021.



Source: AMFI database

Figure 3: Net inflows/ outflows of Credit Risk funds

The figure presents a comparative view of net flows of the Franklin Templeton Credit risk fund vs. the rest of the funds in the category pre-pandemic till August 2021. Net flows of Franklin Templeton Credit risk fund are measured on the secondary axis (’000 crore).



Source: AMFI Database

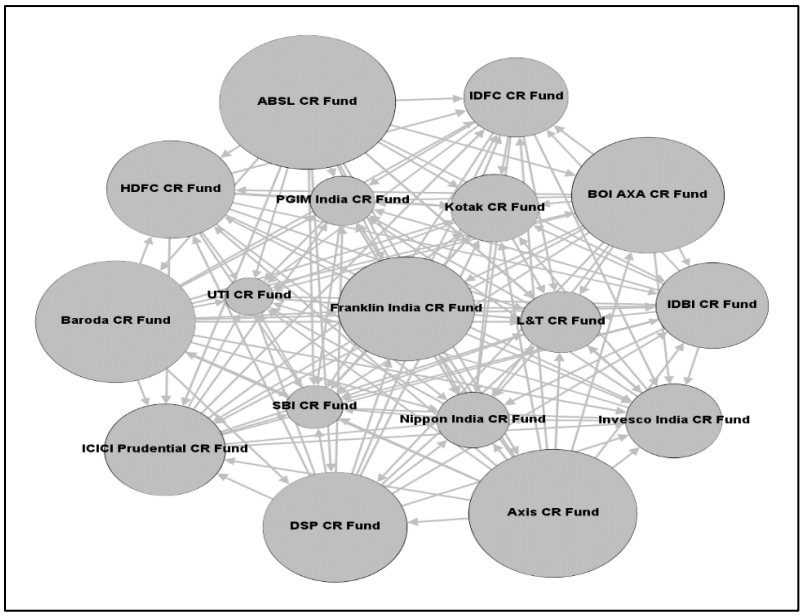
Why is Swing Pricing required?

Infrastructure Leasing & Financial Services (IL&FS), a non-bank financial corporation (NBFC) and shadow bank, defaulted on an INR 450 crore inter-corporate deposit with the Small Industries Development Bank of India (SIDBI) in June 2018. Soon after, it defaulted on an INR 1000 crore term loan, prompting rating agencies such as ICRA, CARE, and Brickwork to downgrade the company to the 'Junk' or 'Default' category. The sudden downgrade of one of the largest NBFCs sparked panic in the banking sector, which provides a significant portion of the short-term financing for shadow banks' long-term lending base. As a result, banks increased their caution regarding lending to NBFCs, resulting in a severe liquidity crunch in the market. In June 2019, Dewan Housing Finance Limited (DHFL) missed interest payments, prompting credit rating agencies to downgrade the company's entire short-term debt, paving the way for a classic financial market contagion. The stock market's panic selling exacerbated redemption pressure on mutual funds carrying NBFCs in their folio. The impending concerns of an ensuing debt crisis were exacerbated when the Covid-19 emerged, wreaking havoc on the Indian and global financial markets.

A similar and unwelcome crisis occurred in the Indian fixed income market when one of the largest mutual funds, Franklin Templeton Mutual Fund, experienced an avalanche of redemptions in six fixed-income funds exposed to a variety of credit instruments. The paranoia generated by the economic shutdown increased investor redemptions, making it even more difficult for fund houses to meet concerted redemption obligations amid a liquidity crunch. Franklin Templeton wound down six fixed-income funds to protect investor value while allowing for a gradual payout, freezing their immediate redemptions and allowing payouts contingent on asset liquidation. This action resulted in fund outflows from other AMCs' credit risk schemes, necessitating the intervention of the central bank and the provision of an INR 50,000-crore special liquidity facility to mutual funds. The degree of interconnection among credit risk funds illustrated in Figure 4 below explains the house of cards effect observed in panic-driven redemptions of credit risk funds.

Figure 4: Interconnected network of Credit Risk Funds

The chart illustrates the network of several credit risk funds in India. A node represents each fund. The degree of influence (out-degree) exerted on the network indicates the node's size. The arrow of the respective edge defines the direction of the influence.

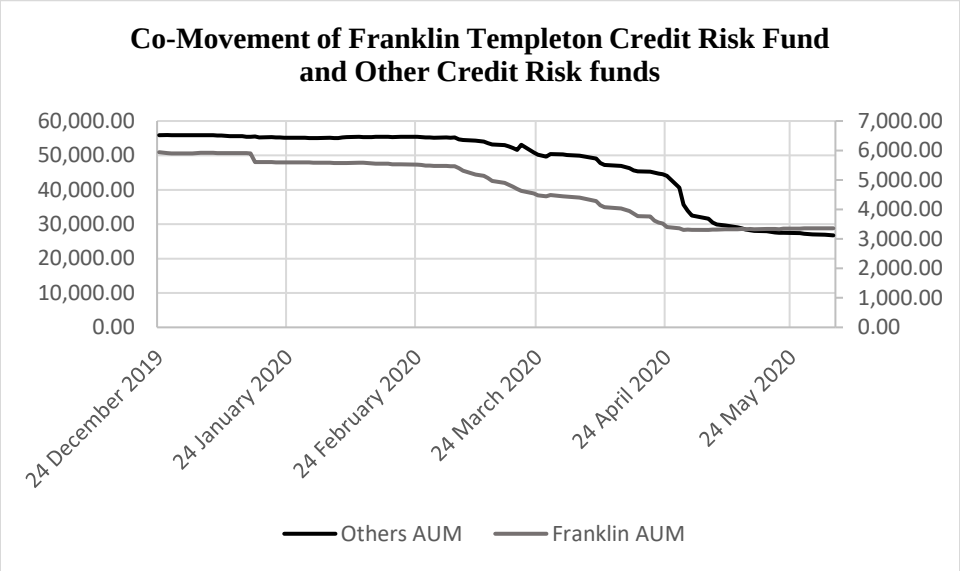


Source: The author

The illustration above depicts an overview of India's credit risk fund network. The pairwise correlation coefficient between funds' assets under management (AUM) (measured in crores) indicates the direction of influence from the source to the target nodes. Each node represents a distinct fund scheme, with the node's size determined by the extent to which it exerts influence over the rest of the network. Correlations between schemes were calculated using daily AUM data from December 2019 to July 2020. As shown in the figure above, the credit risk funds offered by Aditya Birla Sunlife, Axis AMC, Baroda AMC, BOI AXA AMC, Franklin India, DSP AMC, and HDFC AMC have the greatest influence on the rest of the network. Thus, a panic-driven redemption event in any or all of these funds could trigger a chain of redemptions in the fixed income mutual fund segment. This is demonstrated further by the co-movement of daily AUM values (Figure 5) in the aftermath of the Franklin Templeton bankruptcy, which resulted in a chain of redemptions in credit risk funds, the category most adversely affected.

Figure 5: Co-movement of Franklin Templeton Credit Risk Fund AUM and rest of the credit risk funds

The figure represents the co-movement in AUM of the Franklin Templeton credit risk fund (on the secondary axis) and the rest of the other funds in the category. The AUM values are in rupee crores.



Source: AMFI database

The funds in the credit risk fund category witnessed outflows of close to INR 20,000 crores immediately following the closure of six fixed-income and credit-risk schemes offered by Franklin Templeton India on April 23, 2020. This is also visible in a sharp downtrend in the AUM of other funds in the category. The Swing pricing tool aims to tackle the incidence of panic-led redemptions and the possible spread of contagion under extreme events of market distress.

Leveraging the US experience

With nearly 40% of worldwide assets (estimated at $ 23.9 trillion as of March 2022, according to World Bank Open Data) and around 8000 funds spanning a wide range of underlying asset classes, the United States is the world leader in mutual funds. The US mutual funds industry is highly consolidated, with the top three funds (Blackrock, Vanguard, and Charles Schwab) owning a significant portion of assets, totaling $16.3 trillion in assets under management. The asset management industry in the United States is also thriving, with an AUM to GDP ratio of 113 percent, much above the worldwide average of 75 percent.

On the other hand, India has a modest penetration rate, with an AUM to GDP ratio of 14%. However, the low penetration presents an opportunity, as evidenced by the industry's spectacular 300 percent growth in AUM,

which surpassed ₹30 trillion in November 2020 as per the AMFI database. India has brought structural changes such as tax incentives for institutions, formalization of the economy, and a focus on digital investments. Furthermore, the government has taken steps to increase investor awareness. These factors have boosted the availability of investible surplus from institutional and retail investors. The rapidly developing asset management business in India and quicker technology adoption create a strong rationale for drawing on US expertise for regulatory and monitoring initiatives, one of which is planned interventions to control the risk of drawdowns.

Due to the daily pricing of open-ended mutual funds, liquidity mismatches are a frequent concern. However, the assets held by these mutual funds have varying maturities and may not be immediately liquid. A crisis-like situation with multiple redemptions causes a fund to engage in distressed selling. Investor redemptions are honored at the AMCs' end-of-day net asset value (NAV). As a consequence, the fund's liquidation charges may not be fully accounted for, encouraging early withdrawals in the hope that liquidation costs will be covered later.

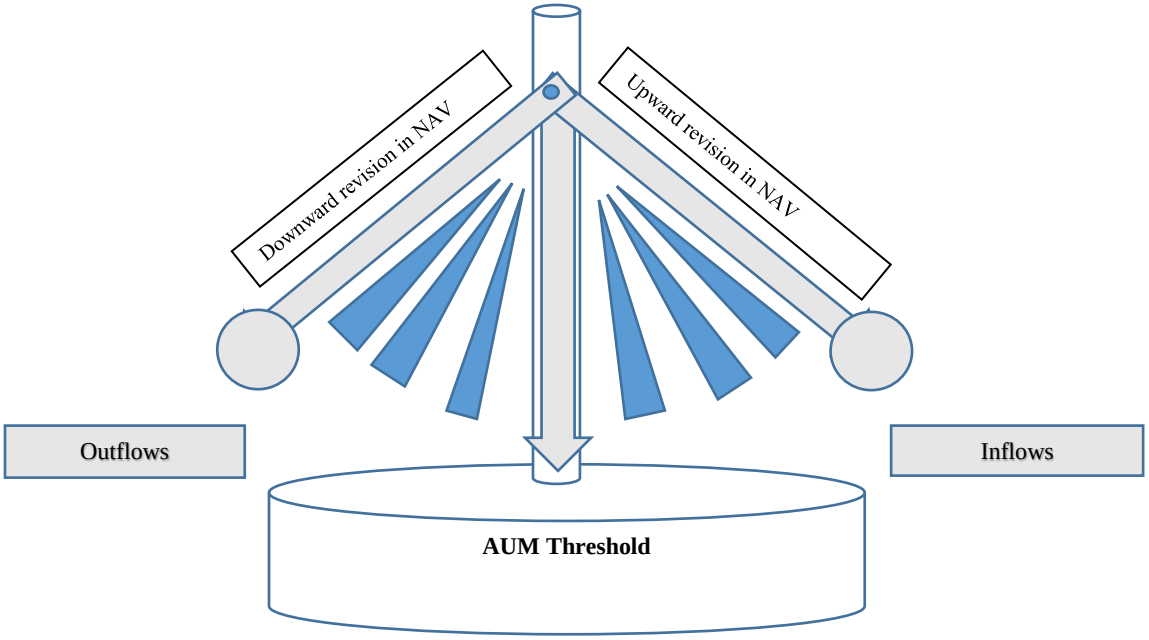
Third Avenue Focused Credit, a junk-bond fund, is a textbook illustration of how first movers create stress and precipitate a redemptions spiral. The fund lost more than half of its original market value between July and December 2015, leading the fund to cease redemptions and liquidate assets in preparation for slow payouts. To safeguard the interests of retail investors, the fund requested the market regulator, the Securities and Exchange Commission (SEC), for interim relief by infusing much-needed liquidity. In October 2016, the US Securities and Exchange Commission (SEC) recognized the impending concerns about labored liquidity management. It announced a modification to rule 22-C, which was adopted in the mid-2000s and allows mutual funds to impose and retain a redemption fee of no more than 2%, in an attempt to address the danger of market timing. The modified rule took effect on November 19, 2018, allowing mutual funds to utilize "swing pricing" under emergent situations.

How does Swing Pricing work?

For more than two decades, swing pricing has been used to safeguard the interest of investors. The system allocates redemption charges among the owners who initiate the trades; thus, it reduces the dilution expenses passed on to existing shareholders. As a result, the advantage of being the first mover is lost, and the risk of larger redemptions is mitigated. Furthermore, a precipitous decline in prices is arrested, and additional economic spill-over is mitigated. Thus, it functions to safeguard the long-term (buy and hold retail) investor's interest from the cost of trading incurred by active investors. Swing pricing can be entire or partial; in full swing pricing, the fund's NAV is updated daily based on the shareholder activity, whereas in partial mode, the NAV is adjusted only when a pre-set threshold is breached. The NAV is modified upwards or downwards in response to the net value of subscriptions and redemption requests to pass on the portfolio re-adjustment cost to investors exiting the funds.

Figure 6: The mechanism of Swing Pricing

The picture above illustrates the swing pricing mechanism, which adjusts the NAV in response to changes in the fund's threshold AUM (net inflows/outflows). The SEBI announced a downward adjustment to the NAV after the Franklin debt funds scandal.



Following the US subprime crisis, the attention on liquidity risk management increased exponentially and led to the inclusion of swing pricing in asset managers' toolkits. Since then, swing pricing has been gradually implemented in the US, the UK, Singapore, France, and Switzerland to deter large redemptions.

We use the Capponi et al. (2020) model of swing pricing and subsequent redemptions to develop the following scenarios in the event of an exogenous shock, such as the COVID-19 pandemic.

$$\delta S_{all}^{sw} = \lambda\left(R_{tot,1}^{fm} + R_{tot,2}^{fm}\right) \quad (1)$$

Equation (1) represents the impact of swing pricing when all funds implement the swing pricing, as notified at the category level by the SEBI. In a hypothetical case of only two funds 1 and 2 with a common asset holding, a total adjustment in the NAV, the swing factor impact, $\delta S_{1,2}$ is given by the aggregate impact of redemptions when the first movers of each fund (1,2) redeem $R_{tot,i}^{fm}$ shares with λ measuring the asset illiquidity.

$$\delta S_{tot,1} = \delta Z \; + \lambda\left[\beta_1 \lambda Z - \frac{(\beta_1 \pi_1 \delta Z)^2}{N_{0,1} + \beta_1 \pi_1 \delta Z}\right] \; + \lambda\left[\beta_2 \lambda Z - \frac{(\beta_2 \pi_2 \delta Z)\;\; (\beta_1 \pi_1 \delta Z)}{N_{0,1} + \beta_1 \pi_1 \delta Z}\right] \quad (2)$$

Equation (2) illustrates the effect of redemptions on Fund 1's value. $\beta_1 and\ \beta_2$ denote the vulnerability of investors in funds 1 and 2 to bad performance. $\pi_1 and\ \pi_2$ denote the proportion of first movers in fund 1 and fund 2. δZ represents the impact of exogenous shock, $\lambda\left[\beta_1\lambda Z - \frac{(\beta_1\pi_1\delta Z)^2}{N_{0,1}+\beta_1\pi_1\delta Z}\right]$ assesses the value impact of redemptions initiated by fund 1's own first movers; while $\lambda\left[\beta_2\lambda Z - \frac{(\beta_2\pi_2\delta Z)\ \ (\beta_1\pi_1\delta Z)}{N_{0,1}+\beta_1\pi_1\delta Z}\right]$ measures the cross-impact exerted by redemptions initiated by first movers of fund 2.

Calculations have implicitly incorporated the effect of endogenous shock and first movers' advantage. The effect of the underlying's credit risk value (CRV) and Macaulay Duration (MD), as mentioned in the SEBI circular dated September 2021, was also not expressly taken into account in the calculations. The following table illustrates an iterative approach based on daily changes in the AUM and NAV of the Franklin Templeton Credit risk fund:

Table 1: An illustrative iteration of the mechanism of Swing Pricing

Incidence	AUM outflows (In %)	The downward revision in NAV (%)	Scenario 1	Scenario 2	Scenario 3
Exogenous shock	4.5% and above	2%	30%	40%	50%
Round 1	3 - 4.5%	1.50%	35%	45%	55%
Round 2	1.5 - 3%	1%	40%	50%	60%
Round 3	1 - 1.5%	0.50%	45%	55%	65%

Note: Scenarios represent percentage reduction in panic withdrawals post-implementation of swing pricing

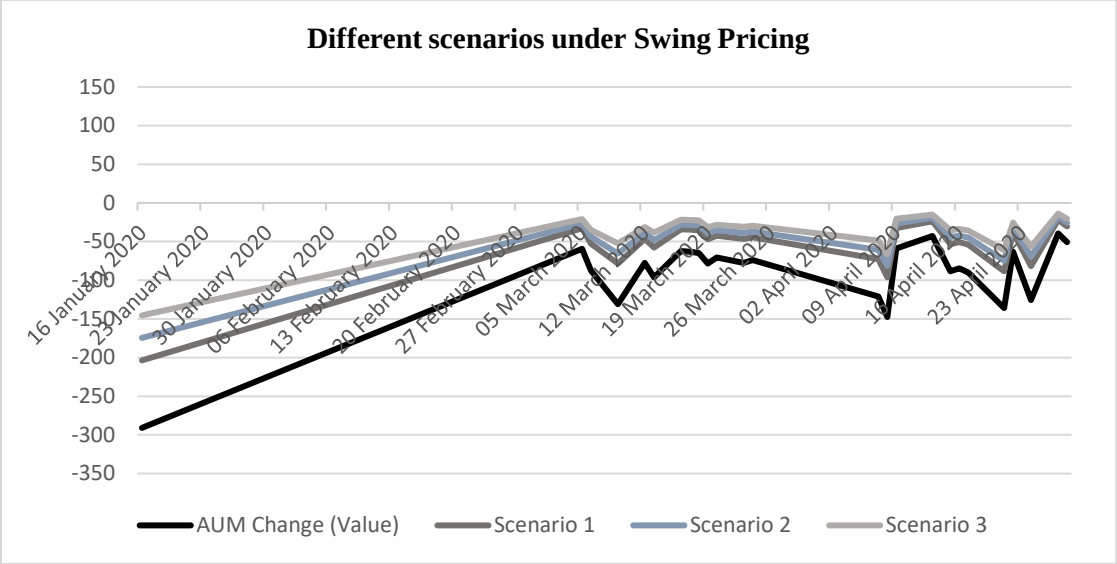
The mechanism of swing pricing has been explained in Table 1 above. The swing pricing mechanism gets activated on the breach of the threshold of a 1% reduction in the fund AUM. The Franklin Templeton Credit Risk Fund witnessed a 4.93% fall in AUM on January 16, 2020, post-pandemic out-break suggesting the first-mover advantage. The SEBI has notified an upper bound of a 2% reduction in NAV for the schemes with CRV less than 10 in the event of extreme market distress. It is assumed that an exogenous shock leading to a ~5% reduction in AUM will attract a reduction in NAV corresponding to the upper bound of the swing factor, that being 2%. The swing factor range 0.5% - 2% has been taken, corresponding to the historical incidence of a fall in Franklin Templeton Credit Risk fund AUM till June 2020. Further rounds of swing pricing have been formulated about the feedback loop model of Capponi et al. (2021), accounting for first movers and second runners. It is assumed that a large reduction in NAV to the extent of 2% post exogenous shock will act as potential feedback in

discouraging further redemptions; hence the likely withdrawal percentages under different scenarios are assumed to be a decline in subsequent rounds.

The mechanism of Swing Pricing: Franklin Templeton credit risk as a case in point

Figure 7: Scenarios of adjustment in NAV and AUM outflows under Swing Pricing

The figure represents expected AUM outflows and NAV revision under different hypothetical scenarios following an exogenous shock like pandemic-led panic redemptions witnessed in credit risk funds. It is hypothesized that an exogenous shock leading to ~5% AUM outflow is likely to be followed by a reduction in NAV corresponding to the upper band of 2%. For illustrative purposes, the threshold for implementation of Swing pricing is assumed at 1% of AUM.



Source: The author

The effect of swing pricing on the likelihood of AUM depletion following panic-driven redemptions is depicted in Figure 7 above. The trend line, AUM change, represents the decline in AUM of the Franklin Templeton credit risk fund following the pandemic breakout (the exogenous shock) and subsequent rounds of panic-driven redemptions in March 2020 (first movers), as well as following Franklin India's announcement of the closure of six schemes (second runners). The Appendix I contains data on the daily AUM and NAV of Franklin Templeton credit risk funds. Scenarios 1, 2, and 3 illustrate the expected impact of swing pricing on the fund's daily AUM data as we back-test the mechanism. Swing pricing (applied to withdrawals of INR 200,000 or more) may be an effective technique in deterring big redemptions, since the cost of large redemptions is passed on to investors (first movers) in the form of a drop in NAV equal to the relevant swing factor (Refer to Figure 7). The tool aids in preserving the interests of retail investors (second runners), who are likely to bear the brunt of redemption pressure-induced NAV declines.

Conclusion

The SEBI has devised various unique liquidity risk management techniques in response to the challenges posed by changing global financial market dynamics. Swing pricing is one such method for protecting retail investors' interests, who are often the second responders to market distress circumstances. Though critically needed, the Swing Pricing mechanism does not come without potential barriers to complete implementation. The first is a declaration of market distress, an event that would necessitate far more rapid action than what may occur under the current architecture. The market regulator can address this with industry stakeholders rather than leaving it to fund boards' discretion. The second issue is with the specific characteristics that affect swing pricing. At the fund level, liquidity estimation for the relevant swing factor, information exchange between funds to assess the impact of the feedback loop, fund disclosure concerning thresholds and the relevant swing factor, and the actual time of plugging in the swing mechanism all need to be carefully planned for successful implementation. Finally, integrating swing pricing into broader fund governance and accounting for contingencies in idiosyncratic market scenarios will be critical to the effectiveness of this crucial tool in protecting investors' interests.

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Appendix I: AUM and NAV data of Franklin Templeton Credit Risk fund (daily values) sorted on the percentage change in AUM.

NAV Date	NAV	FT CR Fund AUM	% Change in AUM	AUM Change (Value)
16 January 2020	19.06	5,609.08	-4.93	-290.91
21 April 2020	18.73	3,621.78	-3.62	-135.86
24 April 2020	18.62	3,400.89	-3.56	-125.66
08 April 2020	18.59	4,137.69	-3.45	-147.73
07 April 2020	18.65	4,285.42	-2.75	-121.05
09 March 2020	18.63	5,182.72	-2.46	-130.88
17 April 2020	18.67	3,772.87	-2.33	-89.98
15 April 2020	18.54	3,947.39	-2.19	-88.34
16 April 2020	18.57	3,862.85	-2.14	-84.54
13 March 2020	18.48	4,964.02	-1.90	-96.16
22 April 2020	18.71	3,558.63	-1.74	-63.15
23 March 2020	18.23	4,547.83	-1.68	-77.51
19 March 2020	18.22	4,695.80	-1.64	-78.31
24 March 2020	18.22	4,473.98	-1.62	-73.85
06 March 2020	18.92	5,313.60	-1.62	-87.67
28 April 2020	18.12	3,310.51	-1.51	-50.89
12 March 2020	18.55	5,060.18	-1.51	-77.65
20 March 2020	18.27	4,625.34	-1.50	-70.46
09 April 2020	18.55	4,078.62	-1.43	-59.07
18 March 2020	18.37	4,774.11	-1.34	-64.62
17 March 2020	18.43	4,838.73	-1.29	-63.11
16 March 2020	18.49	4,901.84	-1.25	-62.18
27 April 2020	18.40	3,361.40	-1.16	-39.49
05 March 2020	19.21	5,401.27	-1.09	-59.46
13 April 2020	18.57	4,035.73	-1.05	-42.89

Source: AMFI database

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