

Liquidity Stress Testing for Maltese Retail Investment Funds (2025)

By Stephanie Gauci and Francesco Meglioli

with contributions from
Tony Farrugia

FINANCIAL STABILITY

March 2026

26/01

Disclaimer

The report is principally based on data submitted to the Malta Financial Services Authority (MFSA) by the managers of the investment funds under analysis. While every effort has been made in order to ensure that the information contained in this report is reliable and accurate at the time of publishing, no express or implied guarantees, representations or warranties are being made regarding the accuracy and/or completeness of the information contained in this report and any other material referred to in this report. The views expressed in this report are those of the authors and do not necessarily reflect the views of the MFSA. The MFSA and the authors of this report do not accept any liability: (i) for any loss or damage whatsoever which may arise in any way out of the use of any of the material contained in this report; (ii) for any errors in, or omissions from, the material contained in this report; or (iii) for any inaccuracy in any information contained in this report. The contents of this report are not to be relied upon as professional, legal and/or investment advice. The MFSA shall have no liability for any loss or damage as a result of the use of, or reliance on, any of the information contained in this report. If you have any doubt about a legal or other provision, or your rights and responsibilities, or other relevant requirements, you should seek appropriate advice from your legal or financial advisers.

Table of Contents

Disclaimer.....	2
Table of Contents	3
List of Figures	4
List of Tables.....	4
Abbreviations	4
Executive Summary	5
Funds Sample Composition.....	6
Methodology and results	6
Calibration of Redemption Shocks Using the Historical Approach.....	7
Measuring Asset Liquidity and Liquidation of Assets.....	8
Second-round Effects	13
Conclusion.....	16
Assumptions and Limitations	17
Appendix.....	19

List of Figures

Figure 1: Extreme redemption shocks at the 10%, 5% and 1% level as a % of NAV.....	7
Figure 2: Extreme redemption shock at the 1% level by strategy.....	8
Figure 3: Liquidity shortfall and redemption coverage ratio for the 1% worst case scenario...	9
Figure 4: Liquidation of assets under the waterfall approach.....	10
Figure 5: Losses suffered to meet the 1% worst redemption under the waterfall approach..	11
Figure 6: Liquidation of assets using the slicing approach.....	11
Figure 7: Losses suffered to meet the 1% worst redemption using the slicing approach	12
Figure 8: Impact of extreme redemptions on the NAV by strategy.....	12
Figure 9: Second-round redemptions following liquidation under the waterfall approach	13
Figure 10: Liquidation of assets due to second-round redemptions under the waterfall approach.....	14
Figure 11: Liquidation of assets due to second-round redemptions under the slicing approach	14
Figure 12: Impact of the second-round extreme redemptions on the strategy NAV (in sand redemption and in red liquidation losses)	15

List of Tables

Table 1: NAV and number of funds in the sample	6
Table 2: Funds with a liquidity shortfall	9
Table 3: Bayesian coefficients' prior distribution parameters.....	13
Table A.1: Summary statistics.....	19
Table A.2: GPD parameter estimates.....	20
Table A.3: Simulated worst redemptions and liquidity shortfall at the 10%, 5% and 1% levels	21
Table A.4: Expected second-round redemptions	23

Abbreviations

AIF	Alternative Investment Fund
GPD	Generalised Pareto Distribution
HQLA	High Quality Liquid Assets
MFSA	Malta Financial Services Authority
NAV	Net Asset Value
OLS	Ordinary Least Squares
RCR	Redemption Coverage Ratio
STIFF	Stress Testing for Investment Funds Framework
UCITS	Undertakings for the Collective Investment in Transferable Securities

Executive Summary

The Maltese investment fund industry maintained its growth trajectory in 2025, with total net asset value reaching €23.8 billion as at June 2025, representing a 9.3% year-on-year increase. This growth was driven primarily by a strong 18.9% growth in the net asset value of Alternative Investment Funds, alongside a more modest 4.1% increase in UCITS funds, which is consistent with trends observed across other European jurisdictions.

Although no immediate systemic risk appears to stem from the Maltese investment fund industry, its growing size, complexity, and heterogeneity, combined with heightened geopolitical tensions, including the ongoing conflict in the Middle East, and early signs of potential market overvaluation linked to the rapid rise of artificial intelligence, warrant continued close monitoring of these entities.

The escalation of geopolitical risks, including tensions between the new US administration and European countries, together with the potential bursting of an AI-driven market bubble, could trigger widespread redemption pressures. Specific fund segments require close monitoring due to their potential to amplify stress and transmit shocks to the wider financial system. In particular, open-ended funds with substantial exposure to illiquid or less liquid assets could struggle in this scenario, forcing managers to sell at depressed prices (incurring losses), or fail to raise timely liquidity for redemptions. To address these risks, managers may be required to activate Liquidity Management Tools (LMTs), such as redemption suspensions, gates, or anti-dilution measures, to mitigate the impact of sudden liquidity shortfalls.

This report presents the updated results of the liquidity stress testing framework for investment funds (STIFF), based on data up to June 2025. The shift in the study's reference date from year-end 2024 to June 2025 is justified, as it allows the inclusion of extreme redemption scenarios and makes the results more reflective of the heightened geopolitical risk observed in 2025.

Compared to the previous exercise (end-2023), holdings of highly liquid assets¹ varied significantly across funds, and although several funds strengthened their liquidity position, a larger number now exhibit liquidity gaps under stressed redemption scenarios, especially under the more severe assumptions. Overall, 21 funds are expected to experience a liquidity shortfall in a 10% worst-case scenario, increasing to 32 for the 5% scenario and to 50 in the 1% worst-case scenario, with bond, diversified, and equity funds being the most affected. A few funds would fail to meet redemptions entirely, largely due to large significant exposures to other collective investment schemes (treated as illiquid) or, in one case, lower-rated corporate bonds. Second-round effects arising from asset liquidations remain contained, with only modest additional impacts on NAV at the strategy level.

The report is structured as follows: the first section gives an overview of the sample of investment funds included in the stress testing exercise. The second presents an updated assessment of each of the four steps of the micro-level STIFF framework, as originally defined in the 2021 study.

¹ Cash and short-term deposits

Funds Sample Composition

The sample consists of 72² Malta-domiciled retail investment funds, of which 63 are licensed as UCITS and the remaining nine as retail AIFs. Together, these funds hold a combined net asset value (NAV) of €5.9 billion, representing 92.1% of the total NAV of Maltese retail funds as at end June 2025. The NAV of the sampled funds ranges from €4.5 million to €2.0 billion, with an average NAV of €81.3 million. One new fund has been added to this year's stress testing exercise, while two funds have been excluded following the surrender of their licence during 2024 and 2025.

In terms of investment strategies, equity funds account for the largest share of the sample's NAV (44.6%), followed by diversified funds³ (25.1%), bond funds (21.7%), mixed funds⁴ (6.8%), and other funds⁵ (1.8%).

Table 1: NAV and number of funds in the sample

Type of fund	NAV (€ bn)	% share	Number of funds	% share
Equity	2.6	44.6%	17	23.6%
Diversified	1.5	25.1%	19	26.4%
Bond	1.3	21.7%	20	27.8%
Mixed	0.4	6.8%	11	15.3%
Other	0.1	1.8%	5	6.9%
Total	5.9	100%	72	100%

The number of weekly redemption observations per fund ranges from 119 to 966, with an average of 517 observations. Average weekly historical redemptions, expressed as a percentage of the funds' NAV, range between 0.03% and 1.27%, with a mean of 0.32% across all funds. Summary statistics for the historical weekly redemptions and net flows of the sample are provided in Table A.1 of the appendix.

Methodology and results

This micro-level liquidity stress test applies the methodology set out in the 2021 *Stress Testing for Investment Funds Framework* (STIFF).⁶ The results for each of the four stages of the framework are presented in the following sections.

² Only investment funds which have been in operation for at least two years are included in the sample.

³ Diversified funds invest in a broad set of assets.

⁴ Mixed funds invest in both equity and bonds.

⁵ Other funds is a residual category.

⁶ 2021 report outlining the methodology used can be found [here](#).

Calibration of Redemption Shocks Using the Historical Approach

Redemption shocks⁷ for each fund are estimated using the historical approach. Three severe but plausible redemption shocks, corresponding to the 10th, 5th and 1st percentiles of the funds' historical redemptions, are derived by fitting a Generalised Pareto Distribution (GPD) to observations exceeding the 90th percentile threshold (the parameter μ).⁸

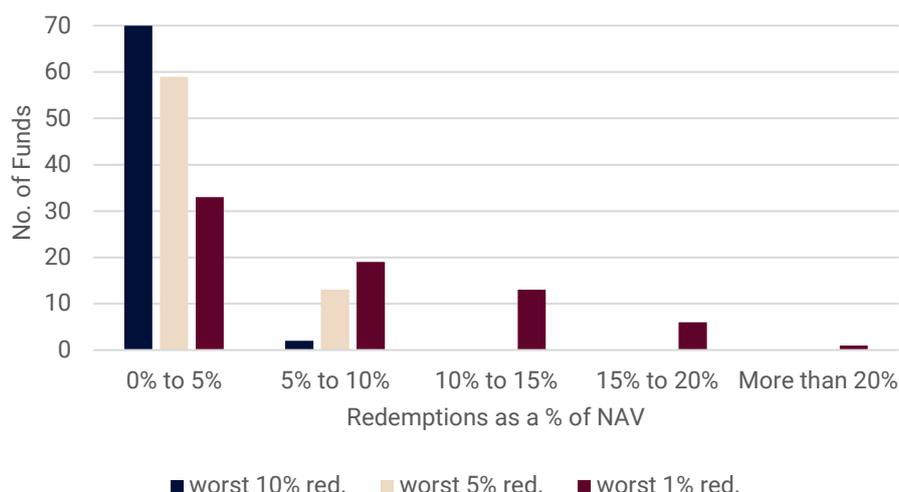
Redemptions among Maltese retail funds have generally remained low, consistent with past stress testing exercises. This is reflected in the estimated threshold parameter, where for 57 funds (79.2% of the sample), μ is below 1%, while the remaining funds display a threshold parameter at or above 1%.

To ensure that the GPD's first moment is finite, the shape parameter ξ must be statistically less than one. Of the 72 funds analysed, 42 funds (58.3%) satisfy this condition, allowing the expected worst 10% redemption to be calculated directly from the GPD. For the remaining funds, the redemption shock is computed using the composite trapezoidal rule. The full set of GPD parameter estimates is reported in Table A.2 in the appendix.

As illustrated in Figure 1, estimated redemption requests under the 10% and 5% worst-case scenarios remain modest for most funds. The vast majority (97.2% and 81.9% of the sample, respectively) would face redemptions of less than 5% of NAV, and no fund would encounter outflows exceeding 10% under either scenario.

In the most extreme 1% worst-case scenario, 45.8% of funds would experience redemptions below 5% of NAV, while 52.8% would face redemptions between 5% and 20%. Only one fund⁹ (1.4% of the sample) would see redemptions above 20%, with the maximum rate estimated at 22.1%.

Figure 1: Extreme redemption shocks at the 10%, 5% and 1% level as a % of NAV



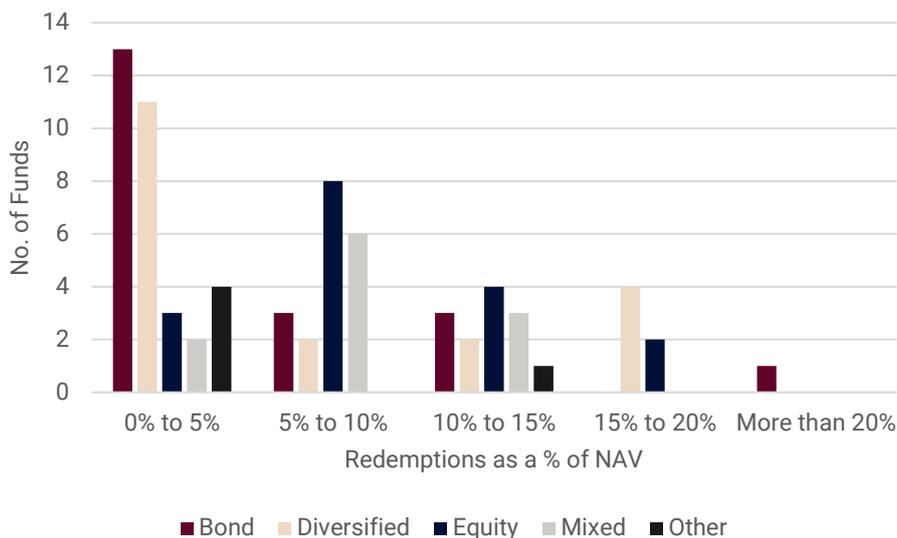
⁷ Redemptions are expressed as a percentage of NAV.

⁸ Further details on the calibration of the extreme redemptions can be found in the [2020 STIFF report](#) (Meglioli & Gauci, 2020)

⁹ Fund 38

Most funds across all investment strategies are expected to see redemptions of 0–10% in the 1% scenario. In particular, 80.0% of ‘other’ funds, 65.0% of bond funds, and 57.9% of diversified funds are projected to fall within the 0–5% range. Only one bond fund is estimated to face a redemption rate above 20%. For 72.7% of mixed funds and 64.7% of equity funds, redemptions are expected to remain below 10% in the 1% scenario.

Figure 2: Extreme redemption shock at the 1% level by strategy



Measuring Asset Liquidity and Liquidation of Assets¹⁰

This micro-level liquidity stress test applies the tiered asset liquidation framework outlined in the 2021 STIFF. Under this approach, portfolio holdings are assigned to distinct liquidity buckets, each associated with a fixed liquidity weight that determines the haircut incurred if assets in that bucket must be sold. Cash and short-term deposits, classified as highly liquid assets, contribute to the liquidity buffer either fully or partially, depending on the liquidation method adopted. As in previous stress-testing exercises, two liquidation methods are considered, namely the waterfall and slicing approaches.

Relative to the 2023 stress test exercise, 36 funds (50.7% of those included in both exercises) experienced a decline in the share of highly liquid assets relative to their June 2025 NAV, while 35 funds (49.3%) reported an increase. Table A.3 in the appendix presents the share of highly liquid assets for each fund together with the resulting liquidity shortfall calculations¹¹.

Of the 36 funds that saw a decrease in highly liquid assets, nine funds that previously had sufficient liquidity would now face a shortfall under the 10% redemption scenario, 11 funds under the 5% scenario, and seven funds under the 1% scenario. Conversely, among the 35

¹⁰ Only securities reported on a security-by-security (SbS) basis have been considered. The minimum portfolio coverage is equal to 42.5% of total assets. For 79.2% of the sample, SbS data covers more than 90% of the funds’ total assets.

¹¹ Liquidity Shortfall = Expected Redemptions_α – Highly Liquid Assets where α refers to the three levels of expected redemptions, that is, the 10%, 5% and 1% worst case redemptions and the highly liquid assets refer to cash and short-term deposits.

funds that increased their highly liquid asset share and had a shortfall in the previous exercise, six would no longer experience a shortfall under the 10% scenario, seven under the 5% scenario, and nine under the 1% scenario. Notably, two funds that previously recorded shortfalls under all three scenarios are now able to fully meet their redemption needs.

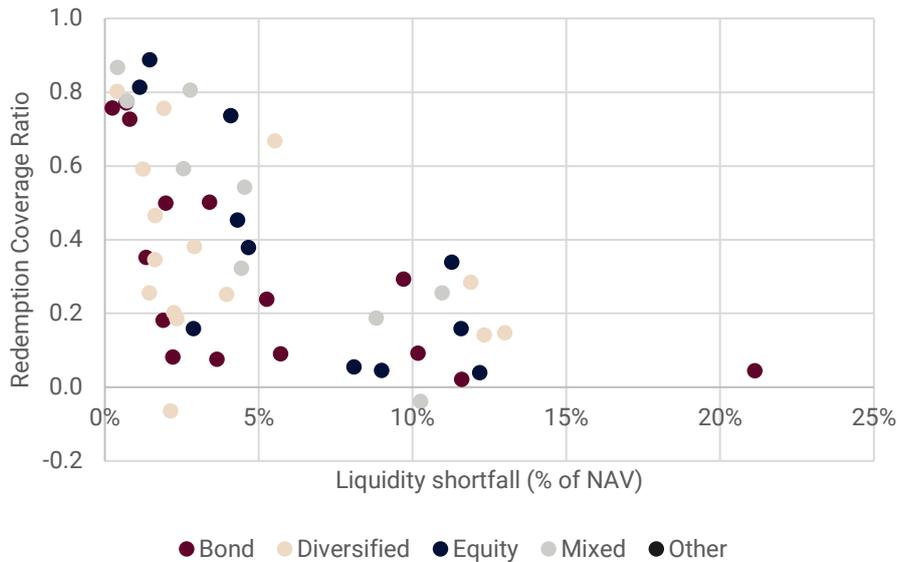
Overall, 21 funds are expected to face a liquidity shortfall under the 10% worst-case redemption scenario. This increases to 32 funds under the 5% scenario and to 50 funds under the 1% scenario. At the strategy level, a substantial share of bond, diversified, and equity funds face liquidity shortfalls across all three scenarios, as summarised in Table 2.

Table 2: Funds with a liquidity shortfall

	Average redemption shock (% NAV)			% of funds with a liquidity shortfall		
	worst 10% redemption	worst 5% redemption	worst 1% redemption	worst 10% redemption	worst 5% redemption	worst 1% redemption
Bond	1.4	2.2	5.7	40.0	55.0	75.0
Diversified	2.2	3.2	7.2	36.8	57.9	78.9
Equity	2.6	3.9	9.0	29.4	35.3	64.7
Mixed	1.7	2.8	8.3	9.1	36.4	81.8
Other	1.3	1.9	4.3	0.0	0.0	0.0

Figure 3 presents the liquidity shortfall under the 1% worst-case redemption scenario together with the Redemption Coverage Ratio (RCR)¹², which measures the extent to which highly liquid assets cover expected redemptions. For all funds with an RCR below one, a redemption shock would require managers to begin liquidating portfolio assets. As shown in the figure, most of these (78.0%) face a liquidity shortfall of less than 10%.

Figure 3: Liquidity shortfall and redemption coverage ratio for the 1% worst case scenario



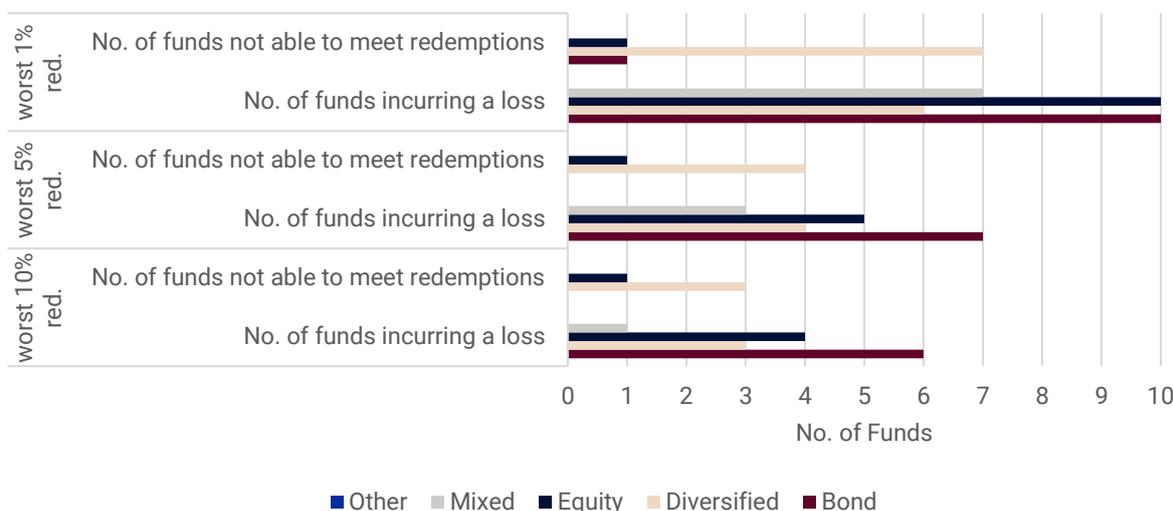
¹² A redemption coverage ratio less than one would imply a liquidity shortfall.

Under the slicing approach, more funds incur losses from asset sales than under the waterfall approach, since the slicing approach requires funds to sell a proportional share of their holdings to meet redemptions in order to keep the portfolio’s strategic allocation unchanged, unlike the waterfall approach where the most liquid assets are sold first. Moreover, the slicing approach reduces the likelihood of breaching investment restrictions defined in a fund’s investment policy.

Initial results indicate that nine funds would be unable to meet redemption requests in at least one scenario. Four¹³ of these funds fail under all three redemption scenarios, one¹⁴ fails under both the 5% and 1% scenarios, and the remaining four¹⁵ only under the 1% worst case scenario. Of these funds, eight¹⁶ primarily invest in other collective investment schemes. Since this analysis does not apply a look-through approach, and since non-ETF fund investments are assigned a liquidity weight of zero, these positions significantly limit available liquidity. This conservative treatment reflects the uncertainty surrounding whether target funds might themselves be under stress or adopt liquidity management tools such as redemption suspensions.

The remaining fund¹⁷, which fails only under the 1% worst-case scenario, allocates 57.6% of its portfolio to corporate bonds rated BB+ or lower. These below investment grade securities offer higher yields but also carry greater credit and liquidity risk, particularly at lower sub-investment grade levels.

Figure 4: Liquidation of assets under the waterfall approach



¹³ Fund 49, Fund 50, Fund 54, Fund 55

¹⁴ Fund 57

¹⁵ Fund 23, Fund 24, Fund 38, Fund 51

¹⁶ Fund 23, Fund 24, Fund 49, Fund 50, Fund 51, Fund 54, Fund 55, Fund 57

¹⁷ Fund 38

Figure 5: Losses suffered to meet the 1% worst redemption under the waterfall approach

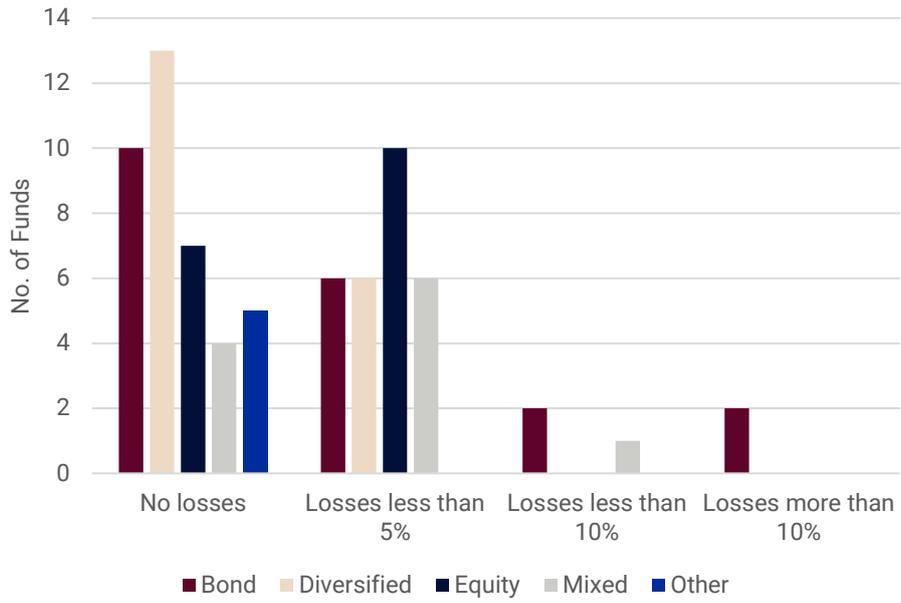


Figure 6: Liquidation of assets using the slicing approach

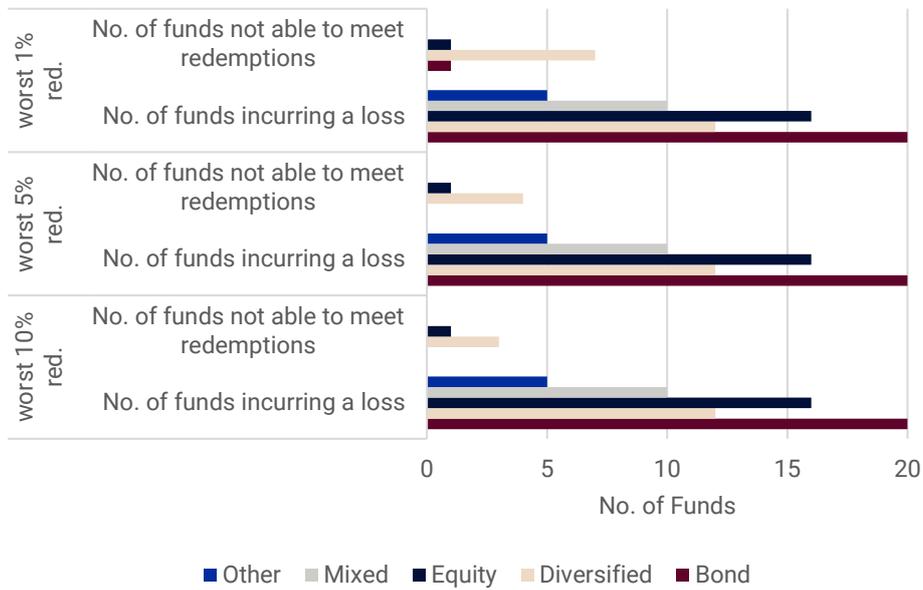


Figure 7: Losses suffered to meet the 1% worst redemption using the slicing approach

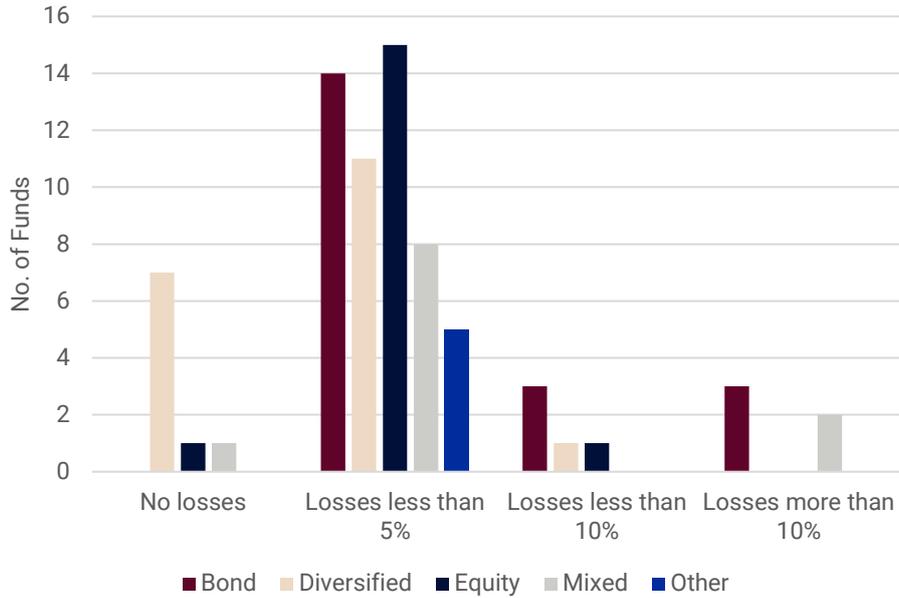
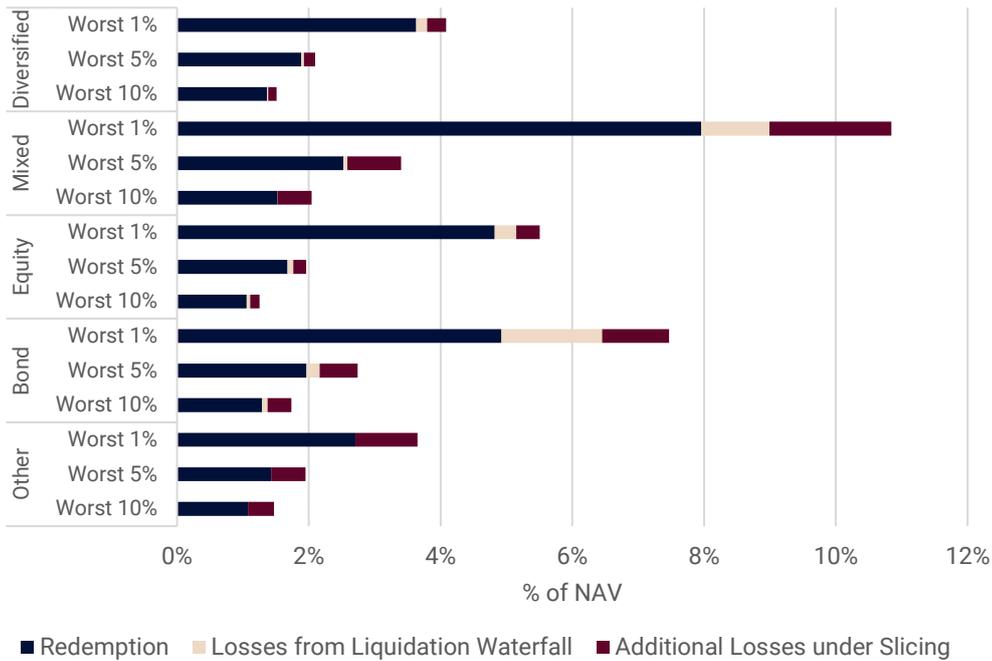


Figure 8 shows that mixed funds face the highest losses across all three scenarios. If all mixed funds were hit simultaneously by the 1% worst-case redemption shock, their combined NAV would decline by 8.0%. Additional losses from asset liquidation would reduce NAV by a further 1.0% under the waterfall method and by an additional 1.9% under the slicing approach. Bond funds are the next most exposed, whereby their combined NAV would fall by 4.9% under the 1% scenario, with liquidation losses adding 1.5% under the waterfall approach and an additional 1.0% under the slicing approach.

Figure 8: Impact of extreme redemptions on the NAV by strategy



Second-round Effects

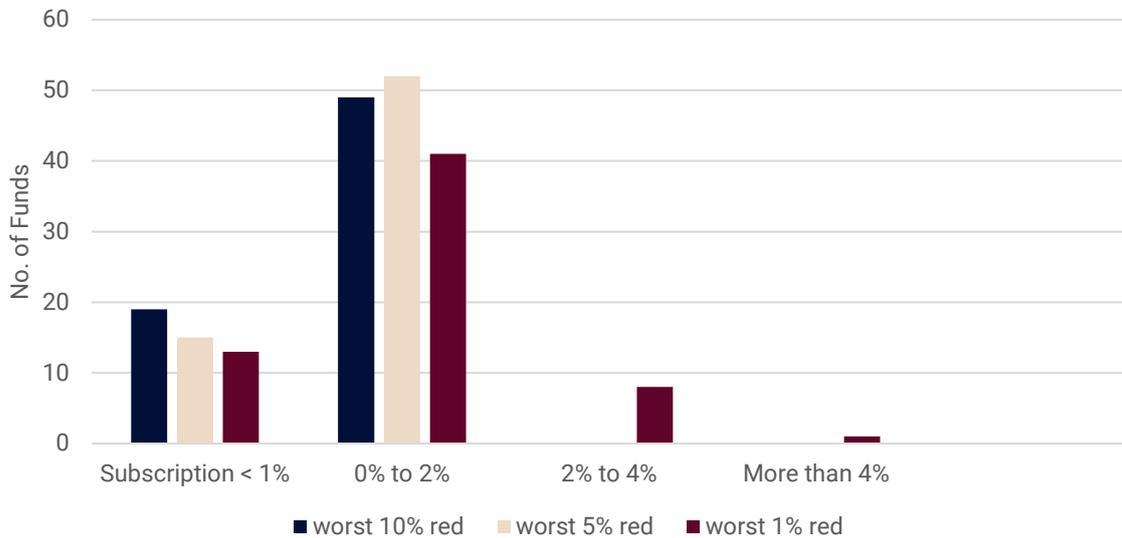
To estimate the second-round redemptions, we use a Bayesian approach. First, an Ordinary Least Squares (OLS) regression is applied to the lagged net flows and lagged log returns to predict current net flows for each fund. The resulting coefficients are then grouped by strategy, and the mean and standard deviation of these coefficients are calculated for each strategy. These values provide the prior distributions for our Bayesian regression model. Table 3 summarises the mean and standard deviation for each parameter, categorised by strategy.

Table 3: Bayesian coefficients' prior distribution parameters

	Mean			Standard Deviation		
	α	β_1	β_2	α	β_1	β_2
Bond	0.0185	0.1897	0.0274	0.1274	0.2326	0.0724
Equity	0.1550	0.0821	0.0103	0.2378	0.1579	0.0285
Mixed	0.0427	0.1513	-0.0283	0.2889	0.2192	0.2490
Other	0.0375	0.0846	-0.0059	0.0949	0.1326	0.0134

After fitting a Bayesian model to each sampled fund, we incorporate the first-round redemptions and liquidation losses into the regression to forecast the expected second-round redemptions. Figure 9 shows the chart for the waterfall method only since the expected second-round redemptions are similar for both the waterfall and slicing methods following the first liquidation round.

Figure 9: Second-round redemptions following liquidation under the waterfall approach



In line with previous stress test results, the expected second-round redemptions are generally contained and estimated to be below 2% in all three worst-case scenarios. Only one fund is expected to experience a second-round redemption of just above 4% of its NAV under the 1% worst-case scenario.

The occurrence of liquidation losses from asset sales during the second round of redemptions continues to depend on the selected liquidation method. However, under both approaches, losses as a percentage of a fund’s NAV would remain limited. In the 1% worst case scenario, eleven¹⁸ funds would now fail the stress test. Nine of these had already failed due to the first round of redemptions, while two¹⁹ funds managed to meet the first round of redemptions under all of the three scenarios and under both the liquidation approaches, having sufficient liquidity coverage. Additionally, four²⁰ of these funds would fail the stress test under all three redemption scenarios. As previously explained, most of these funds follow a fund-of-funds strategy, and under the weighted HQLA methodology, their investment portfolios are assigned a liquidity weight of zero due to their exclusive investment in other funds.

Figure 10: Liquidation of assets due to second-round redemptions under the waterfall approach

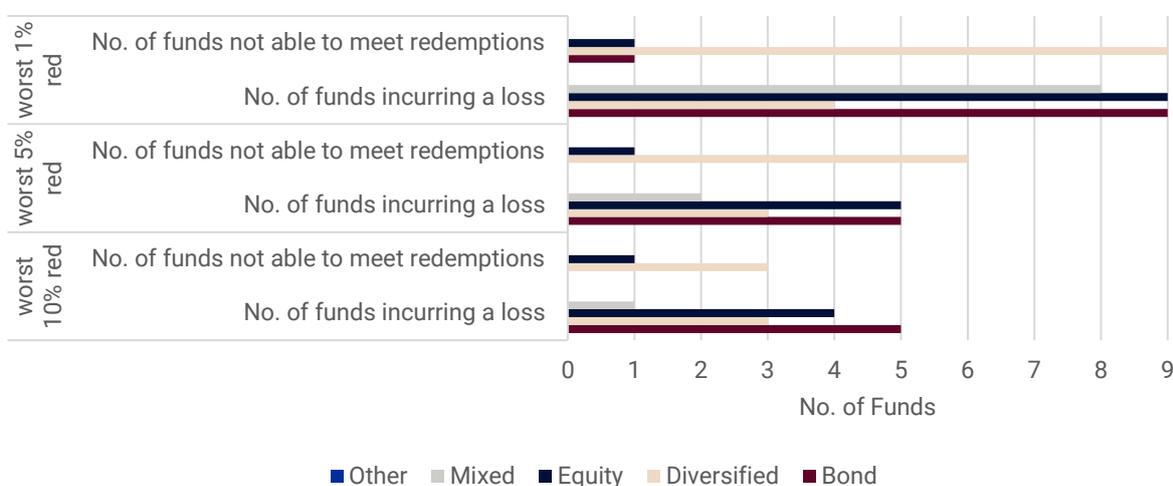
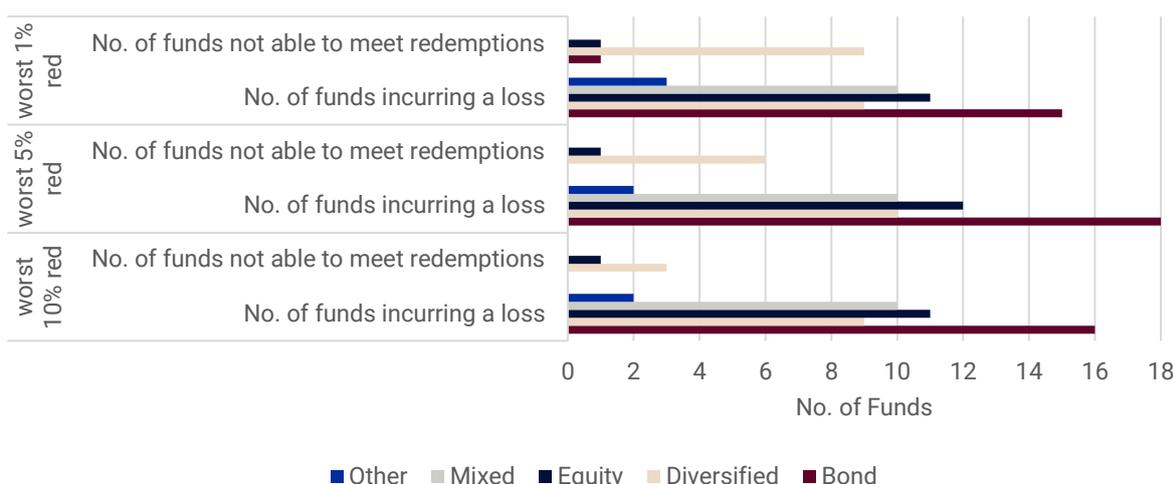


Figure 11: Liquidation of assets due to second-round redemptions under the slicing approach



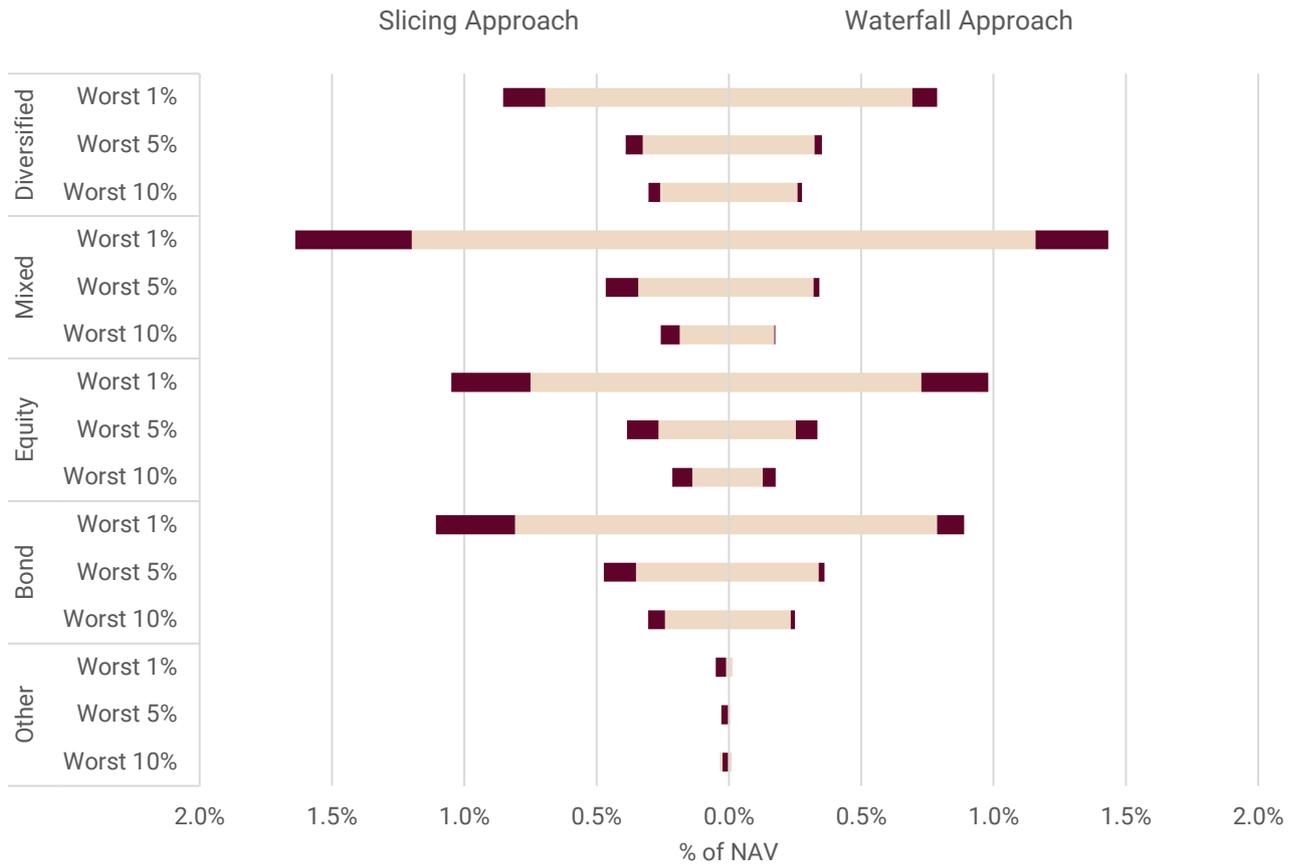
¹⁸ Fund 18, Fund 23, Fund 24, Fund 38, Fund 49, Fund 50, Fund 51, Fund 54, Fund 55, Fund 56, Fund 57

¹⁹ Fund 18, Fund 56

²⁰ Fund 49, Fund 50, Fund 54, Fund 55

When consolidating second-round redemptions and losses at the strategy level, both the waterfall and slicing methods yield very similar results. As observed in the first round of redemptions, mixed funds are most impacted under the 1% worst-case redemption scenario. However, the NAV decline due to second-round redemptions and liquidation losses is slightly less severe, ranging from 1% to 2%.

Figure 12: Impact of the second-round extreme redemptions on the strategy NAV (in sand redemption and in red liquidation losses)



Conclusion

This report presents the results of the liquidity stress testing exercise carried out on Maltese retail investment funds using the most recent available data up to June 2025. The analysis covers 72 retail funds with a combined NAV of €5.9 billion, accounting for almost the entire NAV of the retail fund market.

In the 10% and 5% adverse redemption scenarios, most funds are expected to face low redemption requests, with no fund experiencing outflows exceeding 10% of NAV. Even under the most severe case (worst 1% historical redemptions), only one fund would experience outflows above 20% of NAV. Across the various investment strategies, redemption pressures remain generally contained, with only a small number of funds expected to face significant redemption pressures under extreme conditions.

Notwithstanding these favourable redemption dynamics, the number of funds that would need to liquidate portions of their portfolios to meet extreme redemption demands remains relatively high. This reflects the gradual decline in holdings of highly liquid assets observed in recent years. In particular, under the 1% worst case scenario, more than half of the funds would incur liquidity losses of varying magnitude stemming from the fire sales of their assets, assuming a proportional (“slicing”) liquidation strategy. Bond, diversified, and equity funds emerge as the most exposed across several stress scenarios. Nevertheless, for most funds experiencing liquidity shortfalls, the estimated gaps remain well below 10% of NAV.

The stress testing exercise identified nine funds that would be unable to meet redemption requests under at least one adverse scenario. Of these, four would fail across all the three stress scenarios, while the remaining five would only encounter difficulties under the most severe case. Most of these funds predominantly invest in foreign target funds, which are treated as illiquid under stressed conditions in the applied methodology, reflecting the potential failure of the underlying funds to liquidate assets during periods of market stress. In addition, one fund that fails only in the most severe scenario has a significant exposure to lower-rated corporate bonds, which, while offering higher yields, are associated with elevated credit risk and reduced liquidity.

Second-round effects arising from liquidation losses remain limited relative to NAV. Under the 1% worst-case scenario, a total of eleven funds would fail the stress test, most of which had already failed in the first round. One fund that initially passed the test due to ample cash buffers, would subsequently experience liquidity constraints, while another fund, having met first-round redemptions through equity sales, would struggle to absorb second-round redemptions because of its substantial exposure to other collective investment schemes. Overall, four funds, mainly pursuing a fund-of-funds strategy, fail under all redemption scenarios, as their portfolios are classified as illiquid under the weighted HQLA methodology.

Assumptions and Limitations

This stress testing framework has a number of limitations, as outlined in the 2020 stress testing report, which are replicated below for ease of reference.

- The STIFF uses an adjusted HQLA approach, which is a modified version of the standard HQLA approach developed under Basel III. The adjusted HQLA assigns different liquidity weights to asset types. However, some of these haircuts can be seen as excessive for certain asset classes. Moreover, some instruments are classified as illiquid, while they could instead be liquidated under normal circumstances.
- The STIFF does not take into account the time to liquidation of the assets within the funds' portfolios.
- The results of the second-round effects estimate only an expected redemption scenario, conditional to the previous worst-case redemption and liquidation losses. Therefore, the results give no indication with regards to the loss magnitude caused by an additional worst-case redemption, should the distressed situation persist over time.
- This liquidity stress testing exercise is assuming no spill-over effects from the funds onto the financial markets when liquidating their holdings to satisfy the redemption requests. This assumption is supported by the relatively small size of the disposed holdings compared to the normally traded quantities in the financial markets. While this can be considered as a valid assumption when dealing with a large and very liquid stock exchange, it would not be the case if the assets liquidated are traded, for example, on the Malta Stock Exchange. This risk is partially mitigated by the fact that, due to the small market capitalisation of the Maltese public companies, most of the Maltese assets would be classified under the lowest liquidity classes by the adjusted-HQLA approach used, and therefore, the probability of such holdings being disposed is very low.
- The fund categories' series are obtained by aggregating the funds according to a classification which is based on the investment policies disclosed by the fund managers in the Offering Supplement. However, these investment policies often include a wide range of instruments which the funds can invest in, while they could be targeting only one asset type. Therefore, this may create bias in the classification adopted.
- This study does not take into consideration the liquidity stress tests conducted by UCITS which they are required to undertake as part of their regulatory obligations.

Bibliography

Bouveret, A., 2017. Liquidity Stress Testing for Investment Funds: A Practical Guide. *IMF Working Paper*.

EFAMA, 2023. *Fact Book*, s.l.: s.n.

ESMA, 2019. Stress simulation for investment funds. *Economic Report*.

ESMA, 2020. Recommendation of the European Systemic Risk Board (ESRB) on liquidity risk in investment funds.

Gauci, S., 2023. Liquidity Stress Testing for Maltese Retail Investment Funds: 2022 Update. *MFSA Financial Stability Working Paper Series*, Issue 1.

Meglioli, F. & Gauci, S., 2020. Liquidity Stress Testing for Maltese Retail Investment Funds. *MFSA Financial Stability Working Paper Series*, Issue 6.

Meglioli, F. & Gauci, S., 2021. Liquidity Stress Testing for Maltese Retail Investment Funds: 2021 Update. *MFSA Financial Stability Working Paper Series*, Issue 4.

Appendix

Table A.1: Summary statistics

Fund	No. of Weekly Obs.	% of NAV				
		Average Red.	Average Net Flow	Max Red.	Max Net Outflow	Max Net Inflow
Fund 1	447	0.29	-0.23	11.19	-11.19	5.94
Fund 2	518	0.31	0.20	18.54	-18.54	104.33
Fund 3	400	0.03	20.61	3.78	-3.78	8,099.22
Fund 4	676	0.10	0.21	9.30	-9.28	7.00
Fund 5	900	0.10	4.65	4.84	-4.79	3,930.82
Fund 6	244	0.22	0.39	19.86	-19.80	28.81
Fund 7	456	0.08	0.64	4.56	-4.15	221.60
Fund 8	443	0.33	0.34	8.19	-7.99	57.26
Fund 9	527	0.27	0.12	9.15	-8.17	26.94
Fund 10	489	0.30	0.76	21.06	-21.06	121.33
Fund 11	334	0.26	0.20	10.48	-10.35	43.93
Fund 12	340	0.95	0.58	11.31	-11.09	27.04
Fund 13	483	0.20	0.20	12.76	-7.86	80.39
Fund 14	343	0.88	0.04	11.63	-7.46	12.40
Fund 15	438	0.25	0.75	4.10	-2.85	54.50
Fund 16	438	0.22	0.83	1.41	-1.16	99.62
Fund 17	438	0.26	0.87	3.30	-2.56	120.80
Fund 18	191	0.18	0.37	2.19	-2.19	26.64
Fund 19	722	0.18	0.55	9.22	-2.02	77.00
Fund 20	610	0.46	0.40	15.92	-5.98	105.07
Fund 21	119	0.05	0.51	2.50	-2.50	36.38
Fund 22	514	0.25	0.25	5.25	-5.14	9.00
Fund 23	191	0.18	0.86	3.41	-3.41	100.30
Fund 24	198	0.16	0.59	2.08	-2.08	33.04
Fund 25	429	0.17	1.29	12.07	-11.08	100.00
Fund 26	378	0.18	0.73	3.03	-2.68	18.44
Fund 27	490	0.80	0.20	10.85	-10.58	16.00
Fund 28	490	0.96	-0.21	25.83	-25.27	9.65
Fund 29	490	0.77	0.36	20.32	-15.14	19.88
Fund 30	418	0.75	0.61	34.87	-11.06	45.91
Fund 31	354	0.53	0.58	10.75	-9.02	100.00
Fund 32	966	0.17	0.13	7.06	-6.00	56.40
Fund 33	966	0.19	0.12	4.63	-4.60	53.02
Fund 34	966	0.20	-0.07	3.93	-3.68	2.62
Fund 35	914	0.24	-0.10	5.27	-5.22	0.89
Fund 36	966	0.31	-0.21	5.61	-5.51	0.66
Fund 37	410	0.70	0.55	15.46	-15.46	56.81

Fund 38	214	0.20	0.26	9.18	-9.15	4.84
Fund 39	214	0.35	-0.07	7.93	-7.68	6.68
Fund 40	329	0.26	0.86	14.25	-14.25	98.56
Fund 41	326	0.23	0.66	7.41	-6.97	14.33
Fund 42	451	0.57	0.23	13.27	-10.76	37.45
Fund 43	564	0.25	0.47	7.92	-7.46	13.06
Fund 44	628	0.29	0.45	3.33	-2.75	13.32
Fund 45	467	0.08	0.04	3.62	-3.62	33.33
Fund 46	431	0.11	0.39	3.28	-1.67	22.90
Fund 47	431	0.13	0.46	2.55	-1.34	18.65
Fund 48	490	0.10	0.18	13.95	-3.31	5.90
Fund 49	231	0.52	0.93	58.78	-58.78	159.21
Fund 50	231	0.07	0.30	1.80	-1.42	2.36
Fund 51	231	0.19	-0.04	2.71	-1.41	1.02
Fund 52	540	0.45	-0.03	16.27	-16.27	8.01
Fund 53	540	0.20	-0.06	23.84	-23.84	9.76
Fund 54	231	0.31	-0.06	3.63	-2.30	0.62
Fund 55	231	0.27	-0.02	2.17	-1.68	1.28
Fund 56	231	0.55	-0.27	5.92	-5.91	6.41
Fund 57	231	0.58	-0.23	8.18	-5.65	1.49
Fund 58	390	0.59	0.09	21.83	-21.83	29.18
Fund 59	713	0.34	0.09	18.00	-17.99	35.95
Fund 60	713	0.24	0.28	8.81	-8.81	35.91
Fund 61	392	0.14	-0.10	18.34	-18.34	1.52
Fund 62	902	0.17	0.24	3.45	-3.43	2.84
Fund 63	831	1.27	-0.36	21.99	-21.99	22.16
Fund 64	831	0.27	0.07	11.13	-2.79	7.68
Fund 65	831	0.25	-0.05	10.27	-10.24	51.79
Fund 66	831	0.30	-0.12	21.25	-11.68	3.05
Fund 67	831	0.14	0.05	3.41	-0.80	3.03
Fund 68	902	0.38	0.04	11.83	-10.88	35.88
Fund 69	590	0.24	0.34	2.61	-2.59	17.81
Fund 70	831	0.24	0.02	4.35	-4.07	2.40
Fund 71	831	0.29	0.06	4.34	-1.51	2.82
Fund 72	831	0.31	0.09	13.44	-11.78	23.34

Table A.2: GPD parameter estimates

Fund	μ	σ	ξ	Fund	μ	σ	ξ
Fund 1	0.69	1.03	0.46	Fund 37	1.64	2.87	0.19
Fund 2	0.31	1.53	0.48	Fund 38	0.11	0.30	1.48
Fund 3	0.05	0.04	1.03	Fund 39	0.64	1.55	0.10
Fund 4	0.19	0.09	1.16	Fund 40	0.36	0.56	0.85
Fund 5	0.23	0.11	0.77	Fund 41	0.41	0.33	1.14
Fund 6	0.19	0.10	1.75	Fund 42	1.50	1.06	0.28

Fund 7	0.02	0.20	1.17	Fund 43	0.63	0.36	0.53
Fund 8	0.87	0.97	0.47	Fund 44	0.72	0.58	0.04
Fund 9	0.74	1.27	0.20	Fund 45	0.04	1.82	-0.46
Fund 10	0.50	1.38	0.43	Fund 46	0.25	0.50	0.12
Fund 11	0.51	0.80	0.70	Fund 47	0.35	0.20	0.43
Fund 12	2.24	0.77	0.63	Fund 48	0.16	0.15	0.91
Fund 13	0.23	0.84	0.62	Fund 49	0.75	0.87	0.74
Fund 14	2.16	1.61	0.16	Fund 50	0.12	0.11	0.85
Fund 15	0.73	0.38	0.14	Fund 51	0.42	0.40	0.11
Fund 16	0.59	0.23	-0.12	Fund 52	1.29	1.16	0.31
Fund 17	0.72	0.23	0.53	Fund 53	0.41	0.26	0.72
Fund 18	0.61	0.46	-0.05	Fund 54	0.84	0.51	0.10
Fund 19	0.34	0.20	0.48	Fund 55	0.57	0.38	0.05
Fund 20	1.10	0.48	0.60	Fund 56	1.12	0.93	0.05
Fund 21	0.02	0.28	0.86	Fund 57	1.35	0.59	0.93
Fund 22	0.68	0.59	0.11	Fund 58	1.47	0.92	0.63
Fund 23	0.59	0.45	0.25	Fund 59	0.96	1.01	0.34
Fund 24	0.52	0.24	0.41	Fund 60	0.74	0.79	0.27
Fund 25	0.42	0.62	0.47	Fund 61	0.02	1.00	0.78
Fund 26	0.45	0.32	0.28	Fund 62	0.33	0.22	0.28
Fund 27	1.76	1.01	0.44	Fund 63	3.04	1.74	0.24
Fund 28	1.97	1.13	0.63	Fund 64	0.47	0.28	0.56
Fund 29	1.70	1.25	0.50	Fund 65	0.40	0.28	0.78
Fund 30	1.95	1.87	0.34	Fund 66	0.51	0.15	0.76
Fund 31	1.28	1.99	0.04	Fund 67	0.29	0.11	0.31
Fund 32	0.34	0.27	0.76	Fund 68	0.77	0.29	0.58
Fund 33	0.46	0.27	0.38	Fund 69	0.45	0.20	0.26
Fund 34	0.45	0.17	0.37	Fund 70	0.42	0.18	0.64
Fund 35	0.48	0.17	0.73	Fund 71	0.53	0.20	0.45
Fund 36	0.64	0.28	0.42	Fund 72	0.51	0.28	0.85

Table A.3: Simulated worst redemptions and liquidity shortfall at the 10%, 5% and 1% levels²¹

Fund	Worst 10% Red.	Worst 5% Red.	Worst 1% Red.	Liquid Assets	Shortfall Worst 10%	Shortfall Worst 5%	Shortfall Worst 1%
Fund 1	2.58	4.04	9.88	-0.39	2.96	4.42	10.26
Fund 2	3.24	5.39	14.28	11.51	-8.26	-6.12	2.78
Fund 3	0.36	0.61	2.33	5.28	-4.92	-4.67	-2.95
Fund 4	0.95	1.64	6.26	3.71	-2.76	-2.07	2.55
Fund 5	0.65	1.00	2.94	2.14	-1.49	-1.14	0.80
Fund 6	1.97	3.76	17.05	5.78	-3.81	-2.02	11.28

²¹ Red figures indicate a liquidity shortfall.

Fund 7	1.38	2.69	10.86	2.04	-0.66	0.65	8.82
Fund 8	2.71	4.13	9.92	5.38	-2.67	-1.25	4.54
Fund 9	2.32	3.49	6.92	1.65	0.67	1.84	5.27
Fund 10	2.91	4.75	11.85	0.25	2.66	4.50	11.60
Fund 11	2.62	4.46	13.16	38.34	-35.71	-33.87	-25.18
Fund 12	4.07	5.63	12.68	0.50	3.57	5.13	12.18
Fund 13	2.18	3.83	11.21	1.04	1.14	2.79	10.17
Fund 14	4.08	5.48	9.42	0.42	3.65	5.06	8.99
Fund 15	1.17	1.49	2.35	3.46	-2.29	-1.97	-1.11
Fund 16	0.80	0.93	1.20	2.06	-1.26	-1.13	-0.86
Fund 17	1.21	1.62	3.36	4.31	-3.10	-2.69	-0.95
Fund 18	1.05	1.35	2.01	-0.13	1.18	1.48	2.14
Fund 19	0.73	1.05	2.35	4.00	-3.28	-2.96	-1.65
Fund 20	2.30	3.18	7.51	2.84	-0.54	0.34	4.67
Fund 21	1.09	2.06	7.40	18.00	-16.92	-15.94	-10.60
Fund 22	1.34	1.82	3.07	2.66	-1.32	-0.85	0.41
Fund 23	1.19	1.64	3.04	1.80	-0.61	-0.16	1.24
Fund 24	0.93	1.26	2.48	0.86	0.08	0.40	1.62
Fund 25	1.59	2.51	6.27	0.57	1.02	1.94	5.71
Fund 26	0.89	1.23	2.32	0.42	0.47	0.81	1.90
Fund 27	3.58	4.99	10.51	11.43	-7.85	-6.44	-0.91
Fund 28	4.58	6.82	16.65	11.13	-6.55	-4.31	5.52
Fund 29	4.18	6.01	13.77	2.19	1.99	3.82	11.58
Fund 30	4.78	6.93	14.37	2.04	2.74	4.89	12.33
Fund 31	3.36	4.82	8.38	9.90	-6.54	-5.08	-1.52
Fund 32	1.21	1.99	6.03	4.90	-3.69	-2.91	1.13
Fund 33	0.89	1.23	2.47	2.64	-1.75	-1.41	-0.17
Fund 34	0.72	0.95	1.72	4.82	-4.09	-3.87	-3.09
Fund 35	1.05	1.52	4.03	4.62	-3.58	-3.10	-0.59
Fund 36	1.13	1.53	3.03	2.34	-1.20	-0.81	0.69
Fund 37	5.20	7.84	15.51	11.42	-6.22	-3.59	4.09
Fund 38	2.65	5.22	22.12	0.99	1.66	4.22	21.13
Fund 39	2.36	3.60	6.82	3.42	-1.06	0.18	3.40
Fund 40	2.29	4.03	13.07	11.61	-9.32	-7.58	1.46
Fund 41	2.29	4.07	14.73	3.77	-1.48	0.30	10.96
Fund 42	2.98	4.10	7.74	8.84	-5.86	-4.74	-1.10
Fund 43	1.40	2.02	4.71	1.80	-0.40	0.22	2.91
Fund 44	1.33	1.76	2.81	0.57	0.76	1.19	2.24
Fund 45	1.29	2.03	3.06	1.42	-0.13	0.61	1.63
Fund 46	0.81	1.22	2.31	2.71	-1.90	-1.49	-0.40
Fund 47	0.70	0.98	2.06	0.73	-0.03	0.26	1.34
Fund 48	0.87	1.51	5.28	1.33	-0.46	0.19	3.96
Fund 49	3.14	5.24	15.25	2.25	0.89	2.99	13.00
Fund 50	0.59	1.01	3.43	0.54	0.04	0.46	2.88

Fund 51	0.86	1.19	2.04	1.64	-0.77	-0.45	0.40
Fund 52	2.97	4.26	8.57	0.47	2.49	3.78	8.09
Fund 53	1.19	1.87	5.34	10.12	-8.93	-8.25	-4.78
Fund 54	1.40	1.81	2.87	0.53	0.87	1.28	2.34
Fund 55	0.97	1.25	1.95	0.50	0.47	0.75	1.45
Fund 56	2.09	2.78	4.48	5.30	-3.21	-2.52	-0.82
Fund 57	3.59	5.64	16.62	4.73	-1.14	0.91	11.89
Fund 58	3.63	5.48	13.73	4.02	-0.39	1.46	9.71
Fund 59	2.50	3.70	7.87	5.95	-3.45	-2.25	1.92
Fund 60	1.83	2.65	5.29	7.13	-5.30	-4.47	-1.84
Fund 61	2.85	5.37	17.45	44.11	-41.26	-38.74	-26.66
Fund 62	0.63	0.86	1.61	3.65	-3.02	-2.79	-2.05
Fund 63	5.33	7.05	12.33	28.57	-23.24	-21.52	-16.24
Fund 64	1.11	1.63	3.96	1.98	-0.86	-0.35	1.98
Fund 65	1.34	2.17	6.55	2.12	-0.78	0.05	4.44
Fund 66	1.05	1.50	3.94	0.30	0.75	1.20	3.64
Fund 67	0.46	0.60	1.02	0.77	-0.32	-0.17	0.25
Fund 68	1.45	1.98	4.46	4.93	-3.49	-2.96	-0.48
Fund 69	0.72	0.94	1.58	4.36	-3.64	-3.43	-2.78
Fund 70	0.92	1.31	3.26	2.53	-1.61	-1.22	0.73
Fund 71	0.90	1.21	2.41	0.20	0.71	1.02	2.21
Fund 72	1.59	2.57	7.88	3.57	-1.98	-1.01	4.31

Table A.4: Expected second-round redemptions

Fund	2 nd Round Redemptions - Waterfall Approach			2 nd Round Redemptions - Slicing Approach		
	Worst 10% Red.	Worst 5% Red.	Worst 1% Red.	Worst 10% Red.	Worst 5% Red.	Worst 1% Red.
Fund 1	0.28	0.27	0.23	0.28	0.27	0.23
Fund 2	0.38	0.47	0.87	0.45	0.58	1.14
Fund 3	-0.01	0.04	0.32	0.00	0.04	0.32
Fund 4	0.09	0.17	0.75	0.09	0.19	0.81
Fund 5	0.20	0.28	0.72	0.21	0.30	0.77
Fund 6	-0.82	-1.22	-4.12	-0.81	-1.20	-4.08
Fund 7	0.12	0.25	1.27	0.18	0.34	1.33
Fund 8	-0.07	-0.06	0.06	0.02	0.08	0.31
Fund 9	0.24	0.38	0.77	0.37	0.50	0.87
Fund 10	-0.16	-0.23	-0.46	-0.14	-0.20	-0.42
Fund 11	0.41	0.73	2.24	0.41	0.72	2.21
Fund 12	1.24	1.82	4.46	1.24	1.82	4.47
Fund 13	0.02	0.00	-0.10	0.03	0.01	-0.09
Fund 14	0.95	1.28	2.23	0.95	1.28	2.23
Fund 15	-0.22	-0.24	-0.28	-0.22	-0.24	-0.29
Fund 16	0.07	0.08	0.10	0.07	0.08	0.10

Fund 17	-0.02	-0.02	0.02	-0.03	-0.02	0.02
Fund 18	0.71	0.93	1.41	0.71	0.93	1.41
Fund 19	0.13	0.16	0.27	0.14	0.17	0.30
Fund 20	0.06	0.09	0.23	0.06	0.09	0.23
Fund 21	-0.23	-0.21	-0.14	-0.23	-0.21	-0.14
Fund 22	0.66	0.92	1.60	0.67	0.93	1.63
Fund 23	0.12	0.23	0.56	0.12	0.23	0.56
Fund 24	0.47	0.66	1.38	0.47	0.67	1.38
Fund 25	-0.04	0.03	0.29	-0.04	0.03	0.30
Fund 26	0.22	0.35	0.79	0.25	0.39	0.86
Fund 27	0.49	0.67	1.35	0.53	0.71	1.44
Fund 28	0.32	0.44	1.12	0.45	0.63	1.42
Fund 29	0.29	0.56	1.72	0.31	0.58	1.74
Fund 30	0.85	1.30	2.86	0.77	1.21	2.72
Fund 31	-0.25	-0.27	-0.32	-0.23	-0.25	-0.28
Fund 32	-0.05	-0.01	0.23	-0.05	0.00	0.25
Fund 33	0.43	0.61	1.27	0.43	0.61	1.26
Fund 34	0.00	0.02	0.10	0.00	0.03	0.12
Fund 35	0.68	0.99	2.61	0.68	0.99	2.65
Fund 36	0.81	1.06	2.04	0.81	1.06	2.05
Fund 37	0.44	0.82	1.92	0.45	0.84	1.95
Fund 38	0.13	0.41	2.50	0.14	0.44	2.50
Fund 39	0.23	0.33	0.59	0.26	0.38	0.70
Fund 40	-0.45	-0.42	-0.21	-0.45	-0.41	-0.19
Fund 41	0.02	0.40	2.64	0.03	0.40	2.66
Fund 42	0.57	0.67	0.99	0.58	0.68	1.01
Fund 43	-0.07	-0.05	-0.01	-0.08	-0.06	-0.02
Fund 44	0.43	0.54	0.80	0.42	0.53	0.79
Fund 45	0.08	0.07	0.06	0.08	0.08	0.08
Fund 46	0.02	0.11	0.36	0.02	0.11	0.36
Fund 47	0.08	0.17	0.52	0.08	0.17	0.53
Fund 48	-0.02	0.03	0.28	-0.02	0.02	0.27
Fund 49	-0.68	-1.04	-2.76	-0.68	-1.04	-2.76
Fund 50	-0.25	-0.22	-0.10	-0.25	-0.22	-0.10
Fund 51	0.09	0.11	0.16	0.09	0.11	0.16
Fund 52	0.80	1.15	2.31	0.80	1.15	2.32
Fund 53	0.31	0.45	1.13	0.32	0.45	1.14
Fund 54	0.13	0.15	0.20	0.13	0.15	0.20
Fund 55	0.59	0.76	1.17	0.59	0.76	1.17
Fund 56	0.58	0.70	1.00	0.58	0.70	1.00
Fund 57	0.80	1.16	3.07	0.80	1.16	3.07
Fund 58	0.02	0.09	0.47	0.03	0.10	0.50
Fund 59	0.00	-0.01	-0.05	-0.06	-0.11	-0.29
Fund 60	-0.23	-0.29	-0.48	-0.24	-0.30	-0.51

Fund 61	0.03	0.05	0.15	0.03	0.05	0.15
Fund 62	-0.13	-0.11	-0.07	-0.12	-0.10	-0.04
Fund 63	1.09	1.36	2.18	1.09	1.36	2.18
Fund 64	0.17	0.22	0.46	0.16	0.21	0.44
Fund 65	-0.01	0.00	0.07	0.01	0.04	0.15
Fund 66	0.21	0.21	0.23	0.21	0.21	0.23
Fund 67	0.02	0.01	-0.01	0.02	0.01	-0.01
Fund 68	0.03	0.02	-0.01	0.03	0.03	-0.01
Fund 69	0.23	0.28	0.43	0.23	0.28	0.43
Fund 70	0.19	0.23	0.47	0.19	0.24	0.49
Fund 71	0.51	0.66	1.22	0.51	0.66	1.22
Fund 72	0.00	0.02	0.14	0.00	0.03	0.15

