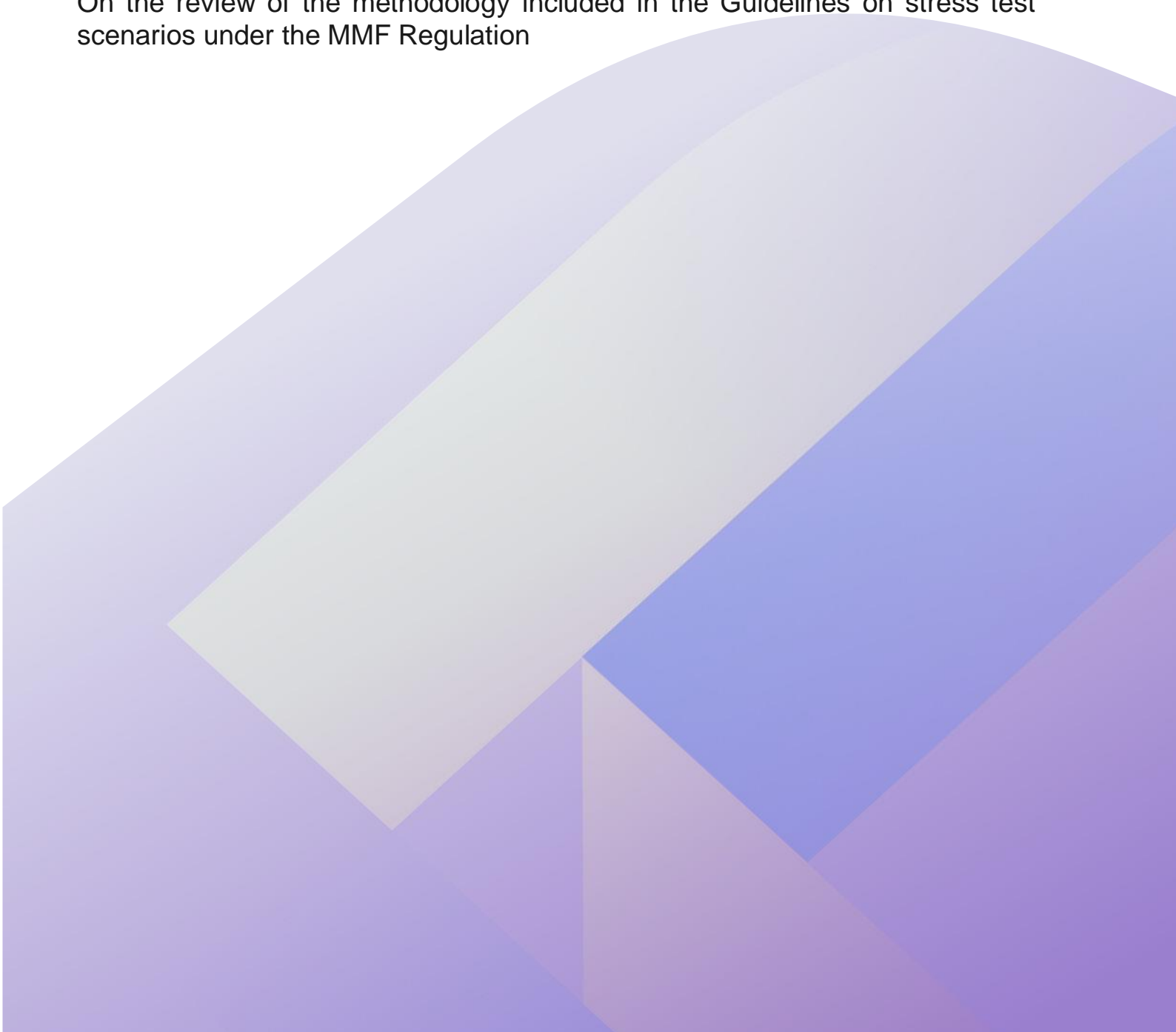


Consultation Paper

On the review of the methodology included in the Guidelines on stress test scenarios under the MMF Regulation



Responding to this paper

ESMA invites comments on all matters in this paper and in particular on the specific questions summarised in Annex 1. Comments are most helpful if they:

- respond to the question stated;
- indicate the specific question to which the comment relates;
- contain a clear rationale; and
- describe any alternatives ESMA should consider.

ESMA will consider all comments received by 28 April.

All contributions should be submitted online at www.esma.europa.eu under the heading 'Your input - Consultations'.

Publication of responses

All contributions received will be published following the close of the consultation, unless you request otherwise. Please clearly and prominently indicate in your submission any part you do not wish to be publicly disclosed. A standard confidentiality statement in an email message will not be treated as a request for non-disclosure. A confidential response may be requested from us in accordance with ESMA's rules on access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by ESMA's Board of Appeal and the European Ombudsman.

Data protection

Information on data protection can be found at www.esma.europa.eu under the heading '[Data protection](#)'.

Who should read this paper?

This document will be of interest to (i) MMF managers and their trade associations, (ii) alternative investment funds and UCITS managers and their trade associations, as well as (iii) institutional and retail investors (and associations of such investors) investing in MMF.

Table of Contents

1	Executive Summary	5
2	Background	7
3	Guidelines on stress test scenarios.....	9
3.1	Hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF	9
3.2	Macro-systemic shocks affecting the economy as a whole.....	16
3.3	Considerations on the potential climate risk scenario	21
4	Annexes	22
4.1	Annex I.....	22
4.2	Annex II.....	24
4.3	Annex III.....	25
4.4	Annex IV	35
1.	Scope.....	35
2.	Purpose.....	35
3.	Compliance and reporting obligations.....	36
3.1.	Status of the guidelines	36
3.2.	Reporting requirements.....	36
4.	Guidelines on stress test scenarios under Article 28 of the MMF Regulation (Financial market participants are not required to report results of stress tests referred to in sections 4.1 to 4.7 below).....	37
4.1	Guidelines on certain general features of the stress test scenarios of MMF	37
4.2	Guidelines on stress test scenarios in relation to hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF	40
4.3	Guidelines on stress test scenarios in relation to hypothetical changes in the level of credit risk of the assets held in the portfolio of the MMF, including credit events and rating events	40
4.4	Guidelines on stress test scenarios in relation to hypothetical movements of the interest rates and exchange rates.....	41
4.5	Guidelines on stress test scenarios in relation to hypothetical levels of redemption	41

4.6	Guidelines on stress test scenarios in relation to hypothetical widening or narrowing of spreads among indexes to which interest rates of portfolio securities are tied	42
4.7	Guidelines on stress test scenarios in relation to hypothetical macro systemic shocks affecting the economy as a whole	43
4.8	Guidelines on the establishment of additional common reference stress test scenarios (the results of which should be included in the reporting template mentioned in Article 37(4) of the MMF Regulation)	43
4.8.1	Level of changes of liquidity	43
4.8.2	Level of change of credit risk	45
4.8.3	Levels of change of the interest rates and exchange rates and levels of widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied	46
4.8.4	Levels of redemption	48
4.8.5	Macro-systemic shocks affecting the economy as a whole	50
5	Calibration	52
5.1	Common reference parameters of the stress test scenarios in relation to hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF	53
6	Appendix	57

1 Executive Summary

Reasons for publication

Article 28 of the MMF Regulation provides that ESMA shall develop guidelines with a view to establishing common reference parameters of the stress test scenarios to be included in the stress tests managers of MMFs are required to conduct. These guidelines shall be updated at least every year taking into account the latest market developments. ESMA published the first set of these guidelines on 21 March 2018 (“the Guidelines on MMF stress tests”)¹.

The Guidelines on MMF stress tests were first updated in 2019, including²:

- Principle-based guidelines on stress testing the MMF or the manager of an MMF shall regularly conduct (sections 4.1 to 4.7 of the Guidelines);
- Specifications on the type of the stress tests (section 4.8 of the Guidelines);
- The 2019 calibration (section 5 of the Guidelines).

The calibration of the common reference parameters specified in section 5 has been updated annually since.

This consultation paper (CP) aims at updating the methodology specified in section 4.8 of the Guidelines and sets out proposals on which ESMA is seeking the views of external stakeholders. The proposed revision covers the liquidity and macro scenarios: the proposed liquidity scenario aims at better taking into account the interaction between liquidity and redemption pressures, in light of the stress event experienced in March 2020. This complements the update that took place in 2020, with significant tightening of the parameters of the liquidity and redemption scenarios. As for the proposed addition to the macro scenario, it intends to better capture the macroprudential impact of the scenario, by including assumptions on the underlying markets and other market participants. In addition, this CP presents ESMA’s considerations on a potential climate risk scenario.

Stakeholder’s views are sought on the methodology, including data and the calculation of the impact.

The calibration of the stress test scenarios is not part of the consultation. In accordance with Article 28(7) MMF Regulation, stress test guidelines have to be updated at least every year taking into account the latest market development. The latest update of the calibration is included in the Final Report - Guidelines on stress test scenario under the MMF Regulation (ESMA50-164-6583, also referred to as ‘the current Guidelines’)³ published on 30 November

¹ https://www.esma.europa.eu/sites/default/files/library/esma34-49-115_mmf_guidelines_on_stress_tests.pdf (ESMA34-49-115)

² <https://www.esma.europa.eu/document/guidelines-stress-test-scenarios-under-mmf-regulation>

³ https://www.esma.europa.eu/sites/default/files/library/esma50-164-6583_final_report_guidelines_on_mmf_stress_tests.pdf

2022. Some figures are included in this document for illustration purposes only. Therefore, ESMA is not seeking the views from external stakeholders on these figures. Following this public consultation, ESMA will publish a Final Report in 2023 which will include both 1) a revised methodology on stress test scenarios and 2) the annual calibration in accordance with Article 27 (8) MMF Regulation.

Contents

Section 2 explains the background to our proposals. Sections 3 and 4 give detailed explanations on the content of the proposals and seek stakeholders' input through specific questions.

Annex I sets out the list of questions contained in this paper.

Annex II contains the legislative reference in the MMF Regulation in relation to the update of the guidelines on stress tests scenarios.

Annex III sets out the cost-benefit analysis related to the draft updated guidelines.

Annex IV contains the full text of the draft updated guidelines.

Next Steps

Responses to this consultation will help ESMA finalise the Guidelines for publication in Q4 2023. The final guidelines will also include the calibration of the 2023 stress testing scenario for implementation.

2 Background

1. The Regulation on Money Market Funds (MMFs) ('MMF Regulation') was published in the Official Journal on 30 June 2017. Article 28 of the MMF Regulation obliges each MMF to have in place sound stress testing processes that allow for the identification of possible events or future changes in economic conditions which could have unfavourable effects on the MMF. The MMF or its manager has to assess the possible impact that those events or changes could have on the MMF. The manager of a MMF must regularly conduct stress testing for different possible scenarios, and those stress tests must be based on objective criteria and consider the effects of severe plausible scenarios.
2. Article 28 of the MMF Regulation also provides that ESMA shall develop guidelines with a view to establishing common reference parameters of the stress test scenarios to be included in the stress tests managers of MMFs are required to conduct. ESMA is obliged to issue guidelines with a view to establishing common reference parameters of these stress test scenarios taking into account the following factors:
 - a. hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF;
 - b. hypothetical changes in the level of credit risk of the assets held in the portfolio of the MMF, including credit events and rating events;
 - c. hypothetical movements of the interest rates and exchange rates;
 - d. hypothetical levels of redemption;
 - e. hypothetical widening or narrowing of spreads among indexes to which interest rates of portfolio securities are tied;
 - f. hypothetical macro systemic shocks affecting the economy as a whole.
3. The Regulation specifies that they need to be updated at least every year taking into account the latest market developments (Article 28(7)).
4. ESMA published the Guidelines on MMF stress tests in March 2018⁴ and now intends to update these Guidelines and to amend the methodology used to measure the impact of the stress scenarios, whose results have to be reported in the related reporting template for MMFs as referred to in Article 37 of the MMF Regulation. Depending on the chosen

⁴ https://www.esma.europa.eu/sites/default/files/library/esma34-49-103_final_report_on_mmf_cp.pdf_stress_tests.pdf

option, the corresponding requirements of the Guidelines on MMF Reporting (ESMA34-49-173)⁵ would need to be amended accordingly.

5. The following sections summarise the proposals of ESMA in relation to the methodology referred to in section 4.8 of the 2023 Guidelines.

Q1: Do you have comments or suggestions based on your experience of the application of the current Guidelines (including credit, FX, interest rate and redemption scenarios)?

Q1.a: Did you encounter any difficulty or challenge in understanding the requirements of the different stress tests in the current Guidelines?

Q1.b: Do you deem that further clarifications are required to ensure that the current Guidelines are being implemented correctly beyond the proposals in the present Consultation Paper? If yes, please specify which parts of the Guidelines are concerned?

⁵ [esma34-49-173_guidelines_on_mmf_reporting_en.pdf \(europa.eu\)](#)

3 Guidelines on stress test scenarios

6. This section presents options for the revision of the scenarios related to the hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF and hypothetical macro systemic shocks affecting the economy as a whole.
7. The proposed revision of the liquidity scenario which will be detailed in section 3.1 aims to better take into account the interaction between liquidity and redemption pressures, in light of the stress event experienced in March 2020. This complements the update that took place in 2020, with significant tightening of the parameters of the liquidity and redemption scenarios.
8. The proposed addition to the macro scenario which will be detailed in section 3.2 intends to better capture the macroprudential impact of the scenario, by including assumptions on the underlying markets and other market participants.
9. Finally, this consultation paper presents considerations on a potential climate risk scenario, in light of the provisions under Article 23 of ESMA founding Regulation. While ESMA has thought about the introduction of a new climate scenario, it concluded that the exposure of MMFs to climate risk was lower than other entities and it has ultimately decided not to propose such a scenario, for the reasons outlined in section 3.3.

3.1 Hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF

10. In times of market stress, liquidity risk of portfolio assets can materialise, thereby impacting the value of a security. Market liquidity can be observed and measured along several dimensions. Liquidity risk is commonly referred to as the ability to sell and/or purchase an asset without impacting its market price. The liquidity of an asset depends on a number of factors, such as the size of the issuance and the market on which it is traded.
11. The primary measure of liquidity is the difference between the bid and the ask prices i.e. the price at which a seller is ready to sell a certain quantity and the price at which a buyer is ready to buy a certain quantity. When the spread between bid and ask widens, the cost of trading increases, indicating that the asset has become less liquid. Measures of the bid-ask spread are commonly used to estimate execution costs actually paid by the trader and the premium requested by the liquidity provider.
12. In stressed market conditions, a fund may need to apply a discount factor and sell an asset at a lower bid price than in normal liquidity conditions due to the relative absence of marketability. The potential loss due to the unfavourable liquidity condition would be reflected in the asset value.
13. In the context of the current Guidelines, market liquidity impact is simulated as a widening of bid-ask spread by type of security, and particularly in the case of government bonds and corporate bonds. This is what happened during the COVID-19 related stress of March 2020 as bid-ask spreads widened significantly even for the most liquid debt securities with the

highest credit quality (as described in the ESMA Opinion on the review of the MMF Regulation⁶).

14. As is currently the case, the discount factors are calibrated by the ESRB, the ECB and ESMA by type of issuer (government, financial institutions and non-financial corporates), by rating, and by residual maturity. This level of detail reflects the distinction between CNAV, which invest primarily in short term government debt, LVNAV, which invest in short term money market instruments with a view to limit the volatility of the NAV, and VNAV, which can invest in short term market instruments or in longer term money market instruments up to 2 years.
15. In addition, some MMFs experienced large outflows triggered by a wider dash for cash during the COVID-19 related stress of March 2020. The MMF stress test Guidelines already simulate a redemption episode. However, at the moment, the interaction between asset liquidity and redemption is not taken into account.
16. To take into account the interaction between liquidity and redemption pressures, ESMA suggests introducing a price impact representing the additional cost incurred by selling large amount of securities in a market with few buyers. For each asset, this interaction depends on the MMF market footprint and the depth of the underlying market. Table 1 presents the debt securities held by MMFs and their market share. It shows that MMFs in general hold only a fraction of debt securities issued by EA members, but a large share of the short term securities that constitute the money market. This market footprint, and the size of the underlying market, will serve as a reference for the future calibration of the options presented in this CP.

Table 1

Debt securities held by EA members		
Issuer	Holder	
	MMFs	Total Economy
Financial corporate	663	8,043
<i>Long term (over 1 year)</i>	141	7,339
<i>Short term (up to 1 year)</i>	522	704
Corporate (non-financial)	89	2,490
<i>Long term (over 1 year)</i>	21	2,371
<i>Short term (up to 1 year)</i>	68	119
Sovereign	210	12,034
<i>Long term (over 1 year)</i>	24	10,405
<i>Long term with short residual maturity (up to 1 year)</i>	22	913
<i>Short term (below 1 year)</i>	165	716

Note: EUR bn, End 2021.

⁶ <https://www.esma.europa.eu/file/122874/download?token=MkpZcl2J>

Source: ECB Securities Holdings Statistics by Sector (SHSS).

17. ESMA proposes two main options:

Option 1: Price impact factor increases with volume sold:

18. In the current framework, “liquidity discount factors” are calibrated to reflect a widening of bid-ask spreads by type of security. In option 1, the liquidity discount factors apply in the same way as with the current guidelines.

19. Then, managers of MMFs should apply a stressed redemption scenario where the funds receive net weekly redemption requests from professional and retail investors, based on the assumptions of the weekly liquidity stress test scenario. The redemption requests will be calibrated according to the weekly liquidity stress test where the fund receives net weekly redemption requests from 40% of the professional investors and 30% of the retail investors.

20. In option 1, asset sales would impact asset prices (“price impact factor”). The more the fund will sell an asset, the more it will impact the price of the given asset. In addition, the less liquid the market is, the greater the impact. The liquidity of the market will be represented by a “price impact parameter”, which is the impact on the price of an asset (in bps) for a given amount of sales.

21. If this option is chosen, the calibration for the price impact factor will be of the essence. Future work can build on an existing analytical framework, such as the ESMA stress simulation for investment funds (see box 1 below). As an illustration, we use relevant empirical evidence on market liquidity⁷ and assume a “price impact parameter” of 10^{-13} in the baseline scenario (table 2), which means that a sell-off of ten billion euro of assets in a specific category would reduce the price of these assets by ten basis points, up to the extreme scenario of a 10^{-11} price impact parameter (i.e.100 times stronger than the baseline). The table illustrates how the price impact factor increases with the volume of sales: under a stressed scenario assumption (price impact parameter of 10^{-12}), an asset sale of EUR 500mn results in a price impact factor of 0.05%.

Table 2

Price impact factor (in %)			
Asset sales	100mn	500mn	1,000mn
Baseline scenario	0.00	0.00	0.01
Stressed scenario	0.01	0.05	0.10
Extreme scenario	0.10	0.50	1.00

The price impact parameters are 10^{-13} (baseline), 10^{-12} (stressed), 10^{-11} (extreme)

⁷ [No. 5 An Lonn Dubh Disentangling Market Liquidity Risk Irish Investment \(Fiedor Fragkou\) \(centralbank.ie\)](#)

22. Finally, the impact of the scenario will be the sum of the liquidity discount (unchanged from the current methodology) and the price impact. As is currently the case, the manager of the MMF should estimate the impact of the potential losses by valuing the investment portfolio, including assets sold, at the derived adjusted bid price, to determine the stressed NAV and the value of assets sold, and report the impact as a percentage of the reporting NAV.

Box 1 - Price impact in ESMA STRESI⁸

ESMA stress simulation framework (STRESI) presents a methodology to assess the price impact of asset sales during a market stress that can be used as a reference for the development of a price impact function.

ESMA follows the approach of Coen et al. (2019) who have provided estimates of price impact measures based on the following relationship for market depth, derived from Cont and Schaanning (2017):

$$MD(\tau) = c \frac{ADV}{\sigma} \sqrt{\tau}$$

The market depth (MD) over time horizon τ is a function of a scaling factor c , multiplied by the ratio between the average daily trading volumes (ADV) and the asset volatility (σ), multiplied by the square root of the time horizon. The price impact is therefore lower, when the time horizon is longer. Once the market depth has been estimated, it is possible to directly infer the price impact of trades.

In the STRESI framework, the price impact factor is derived as the ratio of sales to market depth:

$$PI(\tau) = \frac{1}{MD(\tau)} * Sale$$

Where the price impact parameter is $\frac{1}{MD(\tau)}$

The price impact parameter is different for each asset:

Asset	ADV	Volatility (%)	Market depth (EUR bn)	Price impact of sale of EUR 1bn (in %)
Sovereign	30	0.26	4,615	0.02
Corp. IG	15	0.30	2,000	0.05
Corp. HY	7	0.35	800	0.13
EM debt	2.5	0.33	303	0.33

⁸ [esma50-164-2458_stresi_report.pdf \(europa.eu\)](#)

This approach is empirically tractable, and the estimation can be updated by relying on external sources. It also provides a framework that can be used for a range of different assets, including money market instruments.

Option 2: Price impact factor increases with market footprint

23. Substantial sales can depreciate asset prices, particularly during crisis periods. This statement holds especially true when considering a systemic shock under which all MMFs face simultaneously substantial redemptions. However, in order to detect individual vulnerable funds (irrespective of their size) that may experience difficulties in case of isolated outflows, the market footprint in an individual asset is more determining than the absolute size of asset sales.
24. In the current framework, “liquidity discount factors” are calibrated to reflect a widening of bid-ask spreads by type of security. In option 2, the liquidity discount factors apply in the same way as with the current guidelines.
25. Then, managers of MMFs should apply a stressed redemption scenario where the funds receive net weekly redemption requests from professional and retail investors, based on the assumptions of the weekly liquidity stress test scenario. The redemption requests will be calibrated according to the weekly liquidity stress test where the fund receives net weekly redemption requests from 40% of the professional investors and 30% of the retail investors.
26. In option 2, the impact of the stress would depend on the market footprint of the MMF on each individual asset it holds in the portfolio:
 - If the market footprint of the individual asset is below a threshold α determined in the Guidelines, the stress has no impact.
 - If the market footprint of the individual asset exceeds the threshold α , the impact is a function of the market footprint multiplied by the value of asset sales.Where the market footprint of an MMF is the size of its holding of a certain asset compared to the size of the market for the given asset. In practice, ESMA would define the list of relevant assets by currency (based on the list of MMF eligible assets), assess the size of the underlying market, and define a threshold (in %) reflecting the liquidity of the market for each asset. Finally, for each asset the threshold α would be expressed in currency (e.g. α = EUR 100mn) and specified in the section 5 of the Guidelines.
27. The calibration of the threshold and the discount function would need to be defined based on empirical evidence. It could also be argued that the market footprint should be calculated on the asset quantity that is sold and not on the full asset. To be more conservative, ESMA would rely on the full market footprint.

28. Finally, the manager of the MMF should estimate the impact of the potential losses by valuing the investment portfolio at the derived adjusted bid price, to determine the stressed NAV and report the impact as a percentage of the reporting NAV.

29. Updates **in red** indicate additional text added which constitutes the revision of the scenarios.

Draft Guidelines

<i>Guideline</i>	<ul style="list-style-type: none"> • With respect to the level of changes of liquidity of the assets mentioned in Article 28(1)(a) of the MMF Regulation: <p><u>Option 1: Price impact factor increases with volume sold:</u></p> <ul style="list-style-type: none"> • Managers of MMFs should apply the discount factors specified in section 5 of the guidelines⁹ to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario. • At the same time, managers of MMFs should assume redemption requests and simulate the sale of a vertical slice of the fund portfolio whereby the same percentage of each asset is sold to meet redemptions. The redemption requests are calibrated according to the redemption scenario specified in section 5 of the guidelines. • Asset sales would impact asset prices. The “price impact parameter” is the impact on the price of an asset for a given amount of sales. The more the fund sells an asset, the more it impacts the price of the given asset (“price impact factor”). For each asset, MMFs should apply the price impact parameter specified in section 5 of the guidelines: <p style="text-align: center;">Price impact factor = Price impact parameter * Sale</p> <ul style="list-style-type: none"> • For each relevant transferable security, managers of MMFs should apply the discount factors and the price impact factors to the price used for the valuation of the fund at the time of the reporting (VPrice) in accordance with Article 29(3)(a), according to their type and maturity, to derive an adjusted price (VPrice_{adj}): <p style="text-align: center;">VPrice_{adj} = (1 – liquidity discount – price impact factor) * VPrice</p> <ul style="list-style-type: none"> • The impact of the liquidity discount should be evaluated for all assets including the following (non- exhaustive list of) eligible assets: Sovereign
------------------	--

⁹ The discount factor is calibrated on bid-ask spreads.

Bonds, Corporate Bonds, Commercial Papers, **Certificates of deposit**, ABCPs and eligible securitisations.

- The manager of the MMF should estimate the impact of the potential losses by (a) valuing the **remaining** investment portfolio at the derived adjusted price, $VPrice_{adj}$, to determine the stressed NAV; (b) **valuing assets sold at the derived adjusted price, $VPrice_{adj}$** ; and (c) **calculating calculate** the impact as a percentage of the reporting NAV:

$$= \frac{\text{Asset liquidity risk impact (\%)}}{\text{Reporting NAV} - (\text{Stressed NAV} + \text{Assets Sales})} \times \text{Reporting NAV}$$

Option 2: Price impact factor increases with market footprint

- Managers of MMFs should apply the discount factors specified in section 5 of the guidelines¹⁰ to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario.
- **At the same time, managers of MMFs should assume redemption requests and simulate the sale of a vertical slice of the fund portfolio whereby the same percentage of each asset is sold to meet redemptions. The redemption requests are calibrated according to the redemption scenario specified in section 5 of the guidelines.**
- **Asset sales would impact asset prices, based on the MMF market share of each asset. The “market footprint discount” is the impact on the price of an asset for a given amount of sales. The higher the market footprint of an asset, the more it impacts the price of the given asset. For each individual asset, MMFs should apply the market footprint discount that will be specified in section 5 of the guidelines:**
 - **If the market footprint of an individual asset is below a threshold α specified in the section 5 of the Guidelines, the stress has no impact.**
 - **If the market footprint of an individual asset exceeds the threshold, the applied discount is a function f of the market footprint, calibrated by ESMA, multiplied by the value of asset sales.**
- For each relevant transferable security, **managers of MMFs should apply the discount factors and the market footprint discounts** to the price used for the valuation of the fund at the time of the reporting ($VPrice$) in accordance with Article 29(3)(a), according to their type, maturity and **market footprint**, to derive an adjusted price ($VPrice_{adj}$):

¹⁰ The discount factor is calibrated on bid-ask spreads.

	<p style="text-align: center;">VPrice_{adj} = (1 – liquidity discount – market footprint discount) * VPrice</p> <ul style="list-style-type: none"> • The impact of the liquidity discount should be evaluated for all assets including the following (non- exhaustive list of) eligible assets: Sovereign Bonds, Corporate Bonds, Commercial Papers, Certificates of deposit, ABCPs and eligible securitisations.. • The manager of the MMF should estimate the impact of the potential losses by valuing the investment portfolio at the derived adjusted price, VPrice_{adj}, to determine the stressed NAV and calculate the impact as a percentage of the reporting NAV: $= \frac{\text{Asset liquidity risk impact (\%)}}{\text{Reporting NAV} - (\text{Stressed NAV} + \text{Assets Sales})} \text{Reporting NAV}$
--	--

Q2: Do you agree that the price impact of asset sales should be taken into account?

Q3: What are your views on the different options? Option 1: Price impact factor increases with volume sold; Option 2: Price impact factor increases with the market footprint of the MMF for each individual instrument it holds in its portfolio.

Q4: Do you have views on:

- the calculation of the size and market depth of the money markets MMFs invest in (eligible money market instruments)?
- the threshold in option 2 (e.g. the threshold regarding the individual asset market footprint) above which the cost of liquidating positions may increase?

Q5: Do you have views on the price impact factor, i.e. the impact on the price of an asset (in bps) for a given amount of sales under option 1 and 2?

Q6: Do you have views on any other options which would allow to take into account the interaction between liquidity and redemption pressures?

3.2 Macro-systemic shocks affecting the economy as a whole

30. The current scenario is the combination of the consistent shocks specified in the macro scenario designed by the ESRB and the ECB, and the redemption shock calibrated by ESMA. A macro systemic shock causes an abrupt and sizeable repricing of risk premia in global financial markets characterised by a sharp increase in short term interest rate including swap rate, government bond yields and corporate bond yields and an adverse FX shock.

In the wake of the market shock, liquidity demand rises sharply, and investors ask for redemption. Outflows are calculated similarly to the redemption scenario by differentiating professional and retail investors.

To meet the redemption requests, the fund sells assets in a stressed environment characterized by a widening of bid-ask spread as characterized in the liquidity stress test. For the purposes of the stress test, the loss is entirely borne by remaining investors (and not by redeeming investors).

31. However, the scenario does not specifically capture the macroprudential dynamics (esp. impact to and from other market participants). This is reflected in the ESMA Opinion on MMFR review (point 80 on page 30).

- *“the hypothetical macro systemic shock specified in Article 28(1)(f) should include relevant features to allow for the possibility to assess the systemic vulnerabilities of MMFs. It should explicitly require making assumptions (therefore also in the implementing guidelines on MMF stress tests) on other MMFs, financial entities and non-financial counterparties behavior”¹¹.*

32. A revision of the stress-testing methodology could take this issue into account. However, managers of MMFs may in any case not be the best placed to assess systemic risk, including potential contagion effects to other market participants.

33. Therefore, ESMA suggests two options to use the stress-testing results to monitor the risk of contagion stemming from a shock affecting the EU MMF sector. The current MMF stress testing framework is an assessment of the resilience of MMFs with a view to informing regulators. This requirement would not change and the current Guidelines will continue to apply, with no consequences for the way MMF managers implement and report the results of the scenario. However, ESMA would use the information reported and simulate potential spillovers to the financial system, thus capturing financial stability risks beyond the individual fund level. The primary objective would be to improve ESMA monitoring and to identify and measure systemic risk, in line with its mandate.

34. Since the two options address different issues of equal relevance and are not mutually exclusive, they could both be implemented.

Option 1: Systemic impact on the money market

35. In option 1, managers of MMFs should first apply the scenario in the same way as in the current Guidelines, as described above. ESMA would then use the information reported as an input to assess the systemic impact on the money market, without changing the Guidelines. ESMA would apply the following assumptions to the data reported in order to model the systemic impact:

¹¹ [ESMA opinion on the review of MMFR](#)

- ESMA would use the outflows reported by MMF managers in the macro scenario (the “input factor”) and the portfolio information reported by MMF managers, to estimate and aggregate the asset sales in response, assuming a vertical slicing of fund portfolios whereby the same percentage of each asset is sold to meet redemptions.
- ESMA would assess the impact on asset prices. The more the fund will sell an asset, the more it will impact the price of the given asset (“price impact factor”). Considering the heterogeneity of liquidity in the market, the price impact factor may differ for each market. The price impact factor will be based on the best available estimates of price impact parameter, where the price impact parameter is the impact on the price of an asset (in bps) for a given amount of sales¹².

36. Table 2 in section 3.1 above illustrates how the price impact factor increases with the volume of sales. In comparison with option 2 of the liquidity stress test (Section 3.1), the impact of sales on prices is likely to be much more substantial at system level than at fund level.

37. Finally, ESMA would use the results to assess the impact on (1) money market instruments and (2) MMFs. Especially, it may allow to identify funds which are more impacted by a systemic stress than an idiosyncratic stress (e.g. because they are exposed to a money market instrument more affected by the aggregated sales).

Option 1: Systemic impact on the money market

- In option 1, ESMA would aggregate asset sales reported by MMF managers by asset, to estimate the impact on asset prices.
- Similarly to option 1 of the liquidity scenario (Section 3.1), the “price impact parameter” is the impact on the price of an asset for a given amount of sales. The more the fund sells an asset, the more it impacts the price of the given asset (“price impact factor”). For each asset, MMFs should apply the price impact parameter specified in section 5 of the guidelines:

$$\text{Price impact factor} = \text{Price impact parameter} * \text{Sale}$$

- ESMA would evaluate the price impact for the following assets: Sovereign Bonds, Corporate Bonds, Commercial Papers, ABCPs and eligible securitisations.

$$\text{Total impact} = \text{Price impact factor} * \text{total asset}$$

¹² Considering that the level of redemptions that MMFs need to use for stress-testing purpose is calibrated on extreme individual events, it is implausible that the same level of redemptions could apply to all MMFs simultaneously, unless ESMA wants to assess risks that go much beyond the MMF’s market. Therefore, when relevant, ESMA’s analysis may also include an initial step of retreatment of the raw outcome of individual MMF’s stress-tests results.

- ESMA would then estimate the individual impact on MMFs by estimating the potential losses on their portfolio.
- Objective: assess the impact on (1) money market instruments and (2) MMFs. In comparison with the liquidity stress test, the impact of sales on prices (price impact factor) is likely to be much more substantial at system level than at fund level. Moreover, it may allow to identify funds which are more impacted by a systemic stress than an idiosyncratic stress (e.g. because they are exposed to a money market instrument more affected by the aggregated sales).
- Inputs: The type of money market instrument (MMI), eligible securitisations and asset backed commercial papers is reported under item (A.6) of MMF Reporting “Information on the assets held in the portfolio of the MMF”.

Option 2: Spillovers to short-term issuers

38. In option 2, managers of MMFs should apply the scenario in the same way as in the current Guidelines. ESMA would then use the information reported as an input to assess the systemic impact on the money market, without changing the Guidelines. ESMA would apply the following assumptions to the data reported in order to model the systemic impact:

- ESMA would use the outflows reported by MMF managers in the macro scenario (the “input factor”) and the portfolio information reported by MMF managers, to estimate and aggregate the asset sales in response, assuming a vertical slicing of fund portfolios whereby the same percentage of each asset is sold to meet redemptions.
- ESMA would aggregate asset sales of all MMFs by issuer category, reported under item (A.6.7) of MMF Reporting “Information on the assets held in the portfolio of the MMF”. For each issuer, this would represent a potential reduction in short-term funding.

39. The result would be an aggregation of asset sales for each issuer category. While issuers may not be directly affected by asset sales, they may be affected by the reduction in the supply of funding by MMFs (e.g. new issuance, rollover at maturity issuance). ESMA would compare this reduction in the supply of funding with the funding needs of each issuer category (based on external data) and identify potential funding gaps.¹³

Option 2: Spillovers to short-term issuers

¹³ For instance, in light of the size of the short-term funding provided by banks through traditional channels.

- In option 2, ESMA would aggregate asset sales of all MMFs by issuer category. For each issuer, this would represent a potential reduction in short-term funding:

$$\begin{aligned} & \textit{Reduction in ST funding (in EUR)} \\ & = \textit{Asset sales (in EUR)} * \% \textit{ Issuer category} * \% (1 - \textit{rollover}) \end{aligned}$$

- For each category, ESMA would compare the reduction in ST funding with the issuer category reliance on ST funding.
- Objective: outflows result in a reduction of MMF assets and subsequently a reduction of MMF contribution to the short-term financing of institutions issuing money market instrument. Assuming that issuers cannot rollover their short-term debt they may experience a funding gap. The MMF stress could then spill over to other entities.
- Inputs: The issuer category, is reported under item (A.6.7) of MMF Reporting “Information on the assets held in the portfolio of the MMF”. The assessment of the impact on each issuer category will depend on the use of external data (e.g. EU bank short-term funding).

Q7: Do you have views on the proposal that ESMA could use the information reported in the macro-systemic shock to assess systemic risk? Do you agree that the two options are not mutually exclusive and could be conducted in parallel?

Q8: Do you have views on the methodology proposed and especially:

- the proposal to measure the systemic impact on the money market, using a price impact factor;
- the data and calibration;
- the approach to assess spillovers to short-term issuers, including the assumption that the short-term funding would not be rolled-over;

Q9: Do you have views on the proposal to assess spillovers to short-term issuers? Do you have views on the data that could be used to assess short-term funding needs? Do you have views on potential rollover assumptions?

3.3 Considerations on the potential climate risk scenario

40. Following Article 23(1) of its founding Regulation¹⁴, ESMA “shall, in consultation with the ESRB, develop criteria for the identification and measurement of systemic risk and an adequate stress-testing regime which includes an evaluation of the potential for systemic risk posed by, or to, financial market participants to increase in situations of stress, including potential environmental-related systemic risk”.
41. To this end, Article 23(2) foresees that ESMA “shall take fully into account the relevant international approaches when developing the criteria for the identification and measurement of systemic risk posed by financial market participants”. In line with this, ESMA has taken stock of relevant climate-related stress testing approaches developed among relevant international and national bodies¹⁵.
42. ESMA has considered whether, in line with the growing awareness of the financial risks posed by climate change, money market fund managers could implement stress scenarios associated with climate risk. However, the exposure of MMFs to climate risks appears generally limited compared with other types of financial intermediaries already carrying out climate scenario analysis. This reflects their limited direct and indirect exposure to physical risk events (e.g. weather-related hazards), and the relatively small share of MMF holdings issued by firms in high-emitting sectors, such as oil and gas companies.¹⁶ In addition, MMFs invest in very short-term financial instruments, which are presumably less sensitive to risks with a higher probability of materialisation over a long-term horizon (such as climate-related financial risks) compared with long-term investments (e.g. 30-year bonds).
43. For the reasons considered above, ESMA believes that medium to long-term climate scenarios such as those developed by the Network for Greening the Financial System do not currently fit with the short-term, sharp shock events usually associated with MMF stress testing, given the nature of their activities. Those reasons may be reconsidered based on the evolving regulatory and analytical frameworks for stress testing.

Q10. Do you agree with the approach taken by ESMA of not including a climate scenario in the stress test methodology? And if not, please share views on how climate risks should be taken into account and calibration of parameters.

Q11: Do you see any possibility to include other environmental, social and governance, issues in a stress test scenario?

¹⁴ Regulation (EU) No 1095/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Securities and Markets Authority)

¹⁵ The Network for Greening the Financial System makes a set of [scenarios](#) available to policymakers and other stakeholders.

¹⁶ The classification of firms within high- and low-emitting sectors remains subject to limitations. One of the main issues relates to the limited availability and reliability of climate-related data, such as greenhouse gas emissions. This is especially the case for so-called Scope 3 emissions estimates, which include the emissions of firms financed by financial intermediaries such as banks (to which MMFs are particularly exposed to) but are highly inconsistent. See for example Papadopoulos, Georgios, *Discrepancies in Corporate GHG Emissions Data and Their Impact on Firm Performance Assessment* (July 2022). JRC Working Papers in Economics and Finance, 2022/12.

4 Annexes

4.1 Annex I

Summary of questions

- Q1: Do you have comments or suggestions based on your experience of the application of the current Guidelines (including credit, FX, interest rate and redemption scenarios)?**
- Q1.a: Did you encounter any difficulty or challenge in understanding the requirements of the different stress tests in the current Guidelines?**
- Q1.b: Do you deem that further clarifications are required to ensure that the current Guidelines are being implemented correctly beyond the proposals in the present Consultation Paper? If yes, please specify which parts of the Guidelines are concerned?**
- Q2: Do you agree that the price impact of asset sales should be taken into account?**
- Q3: What are your views on the different options? Option 1: Price impact factor increases with volume sold; Option 2: Market impact factor increases with the market footprint of the MMF for each individual instrument it holds in its portfolio.**
- Q4: Do you have views on**
- the calculation of the size and market depth of the money markets MMFs invest in (eligible money market instruments)?
 - the threshold in option 2 (e.g. the threshold regarding the individual asset market footprint) above which the cost of liquidating positions may increase?
- Q5: Do you have views on the price impact factor, i.e. the impact on the price of an asset (in bps) for a given amount of sales under option 1 and 2?**
- Q6: Do you have views on any other options which would allow to take into account the interaction between liquidity and redemption pressures?**
- Q7: Do you have views on the proposal that ESMA could use the information reported in the macro-systemic shock to assess systemic risk? Do you agree that the two options are not mutually exclusive and could be conducted in parallel?**
- Q8: Do you have views on the methodology proposed and especially:**
- the proposal to measure the systemic impact on the money market, using a price impact factor;
 - the data and calibration;
 - the approach to assess spillovers to short-term issuers, including the assumption that the short-term funding would not be rolled-over;

- Q9: Do you have views on the proposal to assess spillovers to short-term issuers? Do you have views on the data that could be used to assess short-term funding needs? Do you have views on potential rollover assumptions?**
- Q10. Do you agree with the approach taken by ESMA of not including a climate scenario in the stress test methodology? And if not, please share views on how climate risks should be taken into account and calibration of parameters.**
- Q11: Do you see any possibility to include other environmental, social and governance issues in a stress test scenario?**
- Q12: What are your views on the costs and benefits of the 2 options? Option 1: Price impact factor increases with volume sold; Option 2: Market impact factor.**
- Q13: What are your views on the costs and benefits of the 2 options? Option 1: Systemic impact on the money market; Option 2: Spillovers to short term issuers.**

4.2 Annex II

Legislative reference to update the guidelines on stress scenarios under article 28 of the MMF Regulation

According to the article 28(7) of the MMF Regulation “*ESMA shall issue guidelines with a view to establishing common reference parameters of the stress test scenarios to be included in the stress tests taking into account the factors specified in paragraph 1. The guidelines shall be updated at least every year taking into account the latest market developments*”.

4.3 Annex III

Cost-benefit analysis

44. The following options were identified and analysed by ESMA to address the policy objectives of the guidelines required under the MMF Regulation.

1. Guidelines under Article 28(1)(a) of the MMF Regulation (hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF)

45. The baseline scenario should be understood for this CBA as the application of the requirements in the Level 1 Regulation (i.e. the provisions of Article 28 of the MMF Regulation) and in the ESMA Guidelines without any further modification. Managers of MMFs would apply the discount factors specified in section 5 of the guidelines¹⁷ to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario. For each relevant transferable security, the discount factors should be applied to the price used for the valuation of the fund at the time of the reporting.

46. This approach is harmonised, leading to comparable results across MMFs. However, at the moment, the interaction between asset liquidity and redemption is not taken into account, which is not realistic compared to past stress episodes. Both of the proposed options suggest taking into account the interaction between liquidity and redemption pressures.

47. The CBA is mostly qualitative, due to the data limitations regarding implementation costs. However, both option 1 and 2 of the liquidity stress test only represent an adjustment of the existing framework with no additional cost on an ongoing-basis. In that context, the implementation costs were considered proportionate to the objective of better measuring liquidity risk.

48. ESMA considered the inclusion of innovation and environmental, social and governance related factors in the risk stress testing methodology. Especially climate risk has been identified as generally relevant for the asset management sector. However, due to the long term nature of the risks and the short term nature of the MMF, ESMA did not identify an impact of climate risk in the 2 scenarios considered for consultation.

<p>Policy Objective</p>	<p>Under Article 37(4), the MMF Regulation indicates that managers of MMFs should conduct common reference stress test scenarios and report the results in the reporting template mentioned in article 37(4) of the MMF Regulation. The MMF Regulation specifies that the different risk factors shall be taken in consideration in the stress test scenarios, including:</p> <p>a. hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF;</p>
--------------------------------	--

¹⁷ The discount factor is calibrated on bid-ask spreads.

	<p>Under Article 28(7) of the MMF Regulation ESMA is requested to develop guidelines:</p> <ul style="list-style-type: none"> A. that establish common reference parameters of the stress test scenarios; B. that are updated at least every year taking into account the latest market developments.
Baseline scenario	<p>Managers of MMFs would apply the discount factors specified in section 5 of the guidelines to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario. For each relevant transferable security, the discount factors should be applied to the price used for the valuation of the fund at the time of the reporting.</p> <p>This approach is harmonised, leading to comparable results across MMFs. However, at the moment, the interaction between asset liquidity and redemption is not taken into account, which is different compared to past stress episodes.</p>
Option 1	<p>Managers of MMFs should apply the discount factors specified in section 5 of the guidelines to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario.</p> <p>At the same time, managers of MMFs should assume redemption requests and simulate the sale of a vertical slice of the fund portfolio whereby the same percentage of each asset is sold to meet redemptions. The redemption requests are calibrated according to the redemption scenario specified in section 5 of the guidelines.</p> <p>Asset sales would impact asset prices. The “price impact parameter” is the impact on the price of an asset for a given amount of sales. The more the fund sells an asset, the more it impacts the price of the given (“price impact factor”). For each asset, MMFs should apply the price impact parameter specified in section 5 of the guidelines:</p> <p>Finally, the manager of the MMF should estimate the impact of the potential losses by valuing the remaining investment portfolio at the derived adjusted price to determine the stressed NAV; (b) valuing assets sold at the derived adjusted price; and (c) calculating the impact as the difference between the reporting NAV and the sum of the stress NAV and the asset sales, in percentage of the reporting NAV.</p>
Option 2	<p>Managers of MMFs should apply the discount factors specified in section 5 of the guidelines¹⁸ to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario.</p>

¹⁸ The discount factor is calibrated on bid-ask spreads.

	<p>At the same time, managers of MMFs should assume redemption requests and simulate the sale of a vertical slice of the fund portfolio whereby the same percentage of each asset is sold to meet redemptions. The redemption requests are calibrated according to the redemption scenario specified in section 5 of the guidelines.</p> <p>Asset sales would impact asset prices, based on the MMF market share. The “market footprint discount” is the impact on the price of an asset for a given amount of sales. The higher the market footprint of an asset, the more it impacts the price of the given (“market footprint discount”). For each individual asset, MMFs should apply the market footprint discount that will be specified in section 5 of the guidelines:</p> <ul style="list-style-type: none"> - If the market footprint of an individual asset is below a threshold α specified in the section 5 of the Guidelines, the stress has no impact. - If the market footprint of an individual asset exceeds the threshold, the applied discount is a function f of the market footprint, calibrated by ESMA, multiplied by the value of asset sales. <p>Finally, the manager of the MMF should estimate the impact of the potential losses by valuing the investment portfolio at the derived adjusted price to determine the stressed NAV; (b) valuing assets sold at the derived adjusted price; and (c) calculating the impact as the difference between the reporting NAV and the sum of the stress NAV and the asset sales, in percentage of the reporting NAV.</p>
Preferred Option	<p>Both options would address the interaction between liquidity and redemption pressures. Both options should have the same cost for market participants. ESMA has a preference for option 1 due to its estimated lower cost of implementation for regulators.</p>

Option 1	Description
Benefits	<p>Stress scenarios simulate severe but plausible shocks. In the case of MMFs, a severe but plausible scenario is the correlation between a liquidity shock on the asset side and redemption requests. In turn, redemption requests lead to asset sales which exacerbate the initial liquidity stress.</p> <p>To take into account the interaction between liquidity and redemption pressures, ESMA suggests introducing a price impact representing the additional cost incurred by selling large amount of securities in a</p>

	<p>market with few buyers. For each asset, this interaction depends on the MMF market footprint and the depth of the underlying market.</p> <p>This approach is considered to be both more severe and more plausible than the current approach. In particular, it is more appropriate to simulate the COVID-19 related stress of March 2020.</p>
Costs to regulator	<p>The impact of the scenario will depend on the calibration of the price impact factor. This will necessitate development work on the regulators' side (both ESMA and National Competent Authorities) with an impact on staff estimated as below 1 FTE before implementation.</p> <p>No additional IT resources will be involved.</p>
Compliance costs	<p>Compared with the current framework, the proposed approach would necessitate additional steps and therefore implementation costs:</p> <ul style="list-style-type: none"> • An assessment of asset sales in response to redemption requests. • An assessment of the asset sale impact on market prices. <p>On the other hand, the implementation cost would be reduced by the fact that part of the relevant information (esp. portfolio information, outflows) is already collected for the purpose of the current stress test Guidelines.</p>
ESG-related aspects	<p>Climate risk is relevant in general for investment funds. However, the specificity of MMFs make it less relevant in the context of MMF stress tests:</p> <ul style="list-style-type: none"> • MMFs are exposed to risks materialising in the short term while climate-related risks are more long term. • MMFs exposures are predominantly towards financial institutions and government, with less sectoral diversification compared to other funds.
Proportionality-related aspects	<p>The option has identified benefits, as it will improve the plausibility of the scenario, and limited costs, taking into account the framework already in place.</p>

Option 2	Description
Benefits	Stress scenarios simulate severe but plausible shocks. In the case of MMFs, a severe but plausible scenario is the correlation between a

	<p>liquidity shock on the asset side and redemption requests. In turn, redemption requests lead to asset sales which exacerbate the initial liquidity stress.</p> <p>To take into account the interaction between liquidity and redemption pressures, ESMA suggests introducing a price impact representing the additional cost incurred by selling assets with a high market footprint</p> <p>This approach is considered to be both more severe and more plausible than the current approach. Especially, it is more appropriate to simulate the COVID-19 related stress of March 2020.</p>
Costs to regulator	<p>The impact of the scenario will depend on the calibration of a threshold by asset and an impact function. This will necessitate development work on the regulator side with an impact on staff estimated as close to 1 FTE before implementation.</p> <p>No additional IT resources will be involved.</p>
Compliance costs	<p>Compared with the current framework, the proposed approach would necessitate additional steps and therefore implementation costs:</p> <ul style="list-style-type: none"> • An assessment of asset sales in response to redemption requests. • An assessment of the asset market footprint against the threshold • An assessment of the price impact based on the impact function <p>On the other hand, the implementation cost would be reduced by the fact that part of the relevant information (esp. portfolio information, outflows) is already collected for the purpose of the current stress test Guidelines.</p>
ESG-related aspects	<p>Climate risk is relevant in general for investment funds. However, the specificity of MMFs make it less relevant in the context of MMF stress tests:</p> <ul style="list-style-type: none"> • MMFs are exposed to risks materialising in the short term while climate-related risks are more long term. • MMFs exposures are predominantly towards financial institutions and government, with less sectoral diversification compared to other funds.

Proportionality-related aspects	The option has identified benefit as it will improve the plausibility of the scenario, and limited costs, taking into account the framework already in place.
---------------------------------	---

Q12: What are your views on the costs and benefits of the two options? Option 1: Price impact factor increases with volume sold; Option 2: Market impact factor.

2. Guidelines under Article 28(1)(f) of the MMF Regulation (hypothetical macro systemic shocks affecting the economy as a whole.

49. The baseline scenario should be understood for this CBA as the application of the requirements in the Level 1 Regulation (i.e. the provisions of Article 28 of the MMF Regulation) and in the ESMA Guidelines without any further modification.

50. The scenario would remain the combination of the consistent shocks specified in the macro scenario designed by the ESRB and the ECB, and the redemption shock calibrated by ESMA.

51. A macro systemic shock causes an abrupt and sizeable repricing of risk premia in global financial markets characterized by a sharp increase in short term interest rate including swap rate, government bond yields and corporate bond yields and an adverse FX shock. In the wake of the market shock, liquidity demand rises sharply and investors ask for redemption. Outflows are calculated similarly to the redemption scenario by differentiating professional and retail investors. To meet the redemption requests, the fund sells assets in a stressed environment characterised by a widening of bid-ask spread as in the liquidity stress test. For the purposes of the stress test, the loss is entirely borne by remaining investors (and not by redeeming investors).

52. However, the scenario does not specifically capture the macroprudential dynamics and systemic risk, including potential contagion effects to other market participants. Both proposed options suggest assessing the macroprudential impact on the market and contagion effects to other market participants.

53. The CBA is mostly qualitative. In both options the costs will be only borne by regulators. ESMA did not identify an impact of innovation factors or environmental, social and governance related factors on the systemic impact on the market and contagion to other market participants.

Policy Objective	<p>Under Article 37(4), the MMF Regulation indicates that managers of MMFs should conduct common reference stress test scenarios and report the results in the reporting template mentioned in article 37(4) of the MMF Regulation. The MMF Regulation specifies that the different risk factors shall be taken in consideration in the stress test scenarios, including:</p> <p style="padding-left: 40px;">f. hypothetical macro systemic shocks affecting the economy as a whole.</p>
-------------------------	--

	<p>Under Article 28(7) of the MMF Regulation ESMA is requested to develop guidelines:</p> <ul style="list-style-type: none"> A. that establish common reference parameters of the stress test scenarios; B. that are updated at least every year taking into account the latest market developments.
<p>Baseline scenario</p>	<p>The scenario would remain the combination of the consistent shocks specified in the macro scenario designed by the ESRB and the ECB, and the redemption shock calibrated by ESMA.</p> <p>A macro systemic shock causes an abrupt and sizeable repricing of risk premia in global financial markets characterized by a sharp increase in short term interest rate including swap rate, government bond yields and corporate bond yields and an adverse FX shock.</p> <p>In the wake of the market shock, liquidity demand rises sharply and investors ask for redemption. Outflows are calculated similarly to the redemption scenario by differentiating professional and retail investors.</p> <p>To meet the redemption requests, the fund sells assets in a stressed environment characterised by a widening of bid-ask spread as in the liquidity stress test. For the purposes of the stress test, the loss is entirely borne by remaining investors (and not by redeeming investors).</p>
<p>Option 1</p>	<p>In option 1, managers of MMFs should apply the scenario in the same way as in the current Guidelines.</p> <p>ESMA would then use the information reported as an input to assess the systemic impact on the money market, without changing the Guidelines.</p> <p>ESMA would use the outflows reported by MMF managers in the macro scenario (the “input factor”) and the portfolio information reported by MMF managers, to estimate and aggregate the asset sales in response, assuming a vertical slicing of fund portfolios whereby the same percentage of each asset is sold to meet redemptions.</p> <p>ESMA would assess the impact on asset prices. The more the fund will sell an asset, the more it will impact the price of the given (“price impact factor”). Considering the heterogeneity of liquidity in the market, the price impact factor may differ for each market. The price impact factor will be based on the best available estimates of price impact parameter, where</p>

	<p>the price impact parameter is the impact on the price of an asset (in bps) for a given amount of sales.</p> <p>Finally, ESMA would use the results to assess the impact on (1) money market instruments and (2) MMFs. Especially, it may allow to identify funds which are more impacted by a systemic stress than an idiosyncratic stress (e.g. because they are exposed to a money market instrument more affected by the aggregated sales).</p>
Option 2	<p>In option 2, managers of MMFs should apply the scenario in the same way as in the current Guidelines.</p> <p>ESMA would then use the information reported as an input to assess the systemic impact on the money market, without changing the Guidelines.</p> <p>ESMA would use the outflows reported by MMF managers in the macro scenario (the “input factor”) and the portfolio information reported by MMF managers, to estimate and aggregate the asset sales in response, assuming a vertical slicing of fund portfolios whereby the same percentage of each asset is sold to meet redemptions.</p> <p>ESMA would aggregate asset sales of all MMFs by issuer category, reported under item (A.6.7) of MMF Reporting “Information on the assets held in the portfolio of the MMF”. For each issuer, this would represent a potential reduction in short-term funding.</p> <p>ESMA will assess the impact on each issuer category and compare it with the funding needs of the counterpart category, based on external data (e.g. EU bank short-term funding). Assuming that issuers cannot rollover their short-term debt they may experience a funding gap. The MMF stress could then spill over to other entities.</p>
Preferred Option	<p>ESMA suggests implementing both options, which are not mutually exclusive.</p>

Option 1	Description
Benefits	<p>The current scenario does not specifically capture the macroprudential dynamics (esp. impact to and from other market participants). While a revision of MMF Regulation could eventually take this issue into account, ESMA suggests using the reported</p>

	<p>information as an input to assess the systemic impact on the money market, without changing the Guidelines.</p> <p>While the current Guidelines provide information on the individual resilience of MMFs, this would allow ESMA to assess the impact on the money market itself, and to identify funds which are more impacted by a systemic stress than an idiosyncratic stress (e.g. because they are exposed to a money market instrument more affected by the aggregated sales).</p>
Costs to regulator	The implementation cost would be borne by ESMA, less than 1 FTE including development and implementation costs.
Compliance costs	Compared with the current framework, the proposed approach would not cause additional costs to managers of MMFs.
ESG-related aspects	<p>Climate risk is relevant in general for investment funds. However, the specificity of MMFs makes climate risk less relevant in the context of MMF stress tests:</p> <ul style="list-style-type: none"> • MMFs are exposed to risks materialising in the short term while climate-related risks are more long term. • MMFs exposures are predominantly towards financial institutions and government, with less sectoral diversification compared to other funds.
Proportionality-related aspects	The option has identified benefit and limited costs, taking into account the framework already in place.
Option 2	Description
Benefits	<p>The current scenario does not specifically capture the macroprudential dynamics (esp. impact to and from other market participants). While a revision of MMF Regulation could eventually take this issue into account, ESMA suggests using the reported information as an input to assess the systemic impact on the money market, without changing the Guidelines.</p> <p>While the current Guidelines provide information on the individual resilience of MMFs, this would allow ESMA to assess the impact on issuers the funding needs of the counterpart category. Assuming that issuers cannot rollover their short-term debt they may experience a funding gap. The MMF stress could them spill over to other entities.</p>
Costs to regulator	The implementation cost would be borne by ESMA, less than 1 FTE including development and implementation costs.

Compliance costs	Compared with the current framework, the proposed approach would not cause additional costs to managers of MMFs.
ESG-related aspects	<p>Climate risk is relevant in general for investment funds. However, the specificity of MMFs makes climate risk less relevant in the context of MMF stress tests:</p> <ul style="list-style-type: none"> • MMFs are exposed to risks materialising in the short term while climate-related risks are more long term. • MMFs exposures are predominantly towards financial institutions and government, with less sectoral diversification compared to other funds.
Proportionality-related aspects	The option has identified benefit and limited costs, taking into account the framework already in place.

Q13: What are your views on the costs and benefits of the two options? Option 1: Systemic impact on the money market; Option 2: Spillovers to short term issuers.

4.4 Annex IV

1. Scope

Who?

1. These guidelines apply in relation to Article 28 of the MMF Regulation and establish common reference parameters for the stress test scenarios to be included in the stress tests conducted by MMFs or managers of MMFs in accordance with that Article.

What?

2. These guidelines apply in relation to Article 28 of the MMF Regulation and establish common reference parameters for the stress test scenarios to be included in the stress tests conducted by MMFs or managers of MMFs in accordance with that Article.

When?

3. These guidelines apply from two months after the date of publication of the guidelines on ESMA's website in all EU official languages (**with respect to parts in red** – the other parts of the Guidelines already apply from the dates specified in Articles 44 and 47 of the MMF Regulation).

2. Purpose

1. The purpose of these guidelines is to ensure common, uniform and consistent application of the provisions in Article 28 of the MMF Regulation. In particular, and as specified in Article 28(7) of the MMF Regulation, they establish common reference parameters of the stress test scenarios to be included in the stress tests taking into account the following factors specified in Article 28(1) of the MMF Regulation:
 - a) hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF;
 - b) hypothetical changes in the level of credit risk of the assets held in the portfolio of the MMF, including credit events and rating events;
 - c) hypothetical movements of the interest rates and exchange rates;
 - d) hypothetical levels of redemption;
 - e) hypothetical widening or narrowing of spreads among indexes to which interest rates of portfolio securities are tied;
 - f) hypothetical macro systemic shocks affecting the economy as a whole.
2. In accordance with Article 28(7) MMF Regulation, these guidelines will be updated at least every year taking into account the latest market developments. In 2022, section

5 of these guidelines was updated so that managers of MMFs have the information needed to fill in the corresponding fields in the reporting template referred to in Article 37 of the MMF Regulation, as specified by Commission Implementing Regulation (EU) 2018/708¹⁹. This information includes specifications on the types of stress tests mentioned in section 5 and their calibration.

3. Compliance and reporting obligations

3.1. Status of the guidelines

3. In accordance with Article 16(3) of the ESMA Regulation, competent authorities and financial market participants must make every effort to comply with these guidelines.
4. Competent authorities to which these guidelines apply should comply by incorporating them into their national legal and/or supervisory frameworks as appropriate, including where particular guidelines are directed primarily at financial market participants. In this case, competent authorities should ensure through their supervision that financial market participants comply with the guidelines.

3.2. Reporting requirements

5. Within two months of the date of publication of the guidelines on ESMA's website in all EU official languages, competent authorities to which these guidelines apply must notify ESMA whether they (i) comply, (ii) do not comply, but intend to comply, or (iii) do not comply and do not intend to comply with the guidelines.
6. In case of non-compliance, competent authorities must also notify ESMA within two months of the date of publication of the guidelines on ESMA's website in all EU official languages of their reasons for not complying with the guidelines.
7. A template for notifications is available on ESMA's website. Once the template has been filled in, it shall be transmitted to ESMA.

4. Guidelines on stress test scenarios under Article 28 of the MMF Regulation (Financial market participants are not required to report results of stress tests referred to in sections 4.1 to 4.7 below)

4.1 Guidelines on certain general features of the stress test scenarios of MMF

Scope of the effects on the MMF of the proposed stress test scenarios

8. Article 28(1) of the MMF Regulation requires MMFs to put in place “sound stress testing processes that identify possible events or future changes in economic conditions which could have unfavourable effects on the MMF”.
9. This leaves room for interpretation on the exact meaning of the “effects on the MMF”, such as:
 - impact on the portfolio or net asset value of the MMF,
 - impact on the minimum amount of liquid assets that mature daily or weekly as referred to in Article 24(c) to 24(h) and Article 25(c) to 25(e) of the MMF Regulation,
 - impact on the ability of the manager of the MMF to meet investors’ redemption requests,
 - impact on the difference between the constant NAV per unit or share and the NAV per unit or share (as explicitly mentioned in Article 28(2) of the MMF Regulation in the case of CNAV and LVNAV MMFs),
 - impact on the ability of the manager to comply with the different diversification rules as specified in Article 17 of the MMF Regulation.
10. The wording of Article 28(1) of the MMF Regulation should include various possible definitions. In particular, the stress test scenarios referred to in Article 28 of the MMF Regulation should test the impact of the various factors listed in Article 28(1) of the MMF Regulation on both i) the portfolio or net asset value of the MMF and ii) the liquidity bucket(s) of the MMF and/or the ability of the manager of the MMF to meet investors’ redemption requests. This broad interpretation is in line with the stress-testing framework of the AIFMD, which includes both meanings in its Articles 15(3)(b) and 16(1). The specifications included in the following sections 4.2 to 4.7 therefore apply to stress test scenarios on both aspects mentioned above.
11. With respect to liquidity, it is to be noted that liquidity risk may result from: (i) significant redemptions; (ii) deterioration of the liquidity of assets; or (iii) a combination of the two.

Historical scenarios and hypothetical scenarios

12. With respect to both stress test scenarios on i) the portfolio or net asset value of the MMF and ii) the liquidity bucket(s) of the MMF and/or the ability of the manager of the MMF to meet investors' redemption requests, managers could use the factors specified in sections 4.2 to 4.7 using historical and hypothetical scenarios.
13. Historical scenarios reproduce the parameters of previous event or crises and extrapolate the impact they would have had on the present portfolio of the MMF.
14. While using historical scenarios, managers should vary the time windows in order to process several scenarios and avoid getting stress test results that depend overly on an arbitrary time window (e.g. one period with low interest rates and another with higher rates). By way of example, some commonly used scenarios refer to junk bonds in 2001, subprime mortgages in 2007, the Greek crisis in 2009 and the Chinese stock market crash in 2015. These scenarios may include independent or correlated shocks depending on the model.
15. Hypothetical scenarios are aimed at anticipating a specific event or crisis by setting its parameters and predicting its impact on the MMF. Examples of hypothetical scenarios include those based on economic and financial shocks, country or business risk (e.g. bankruptcy of a sovereign state or crash in an industrial sector). This type of scenario may require the creation of a dashboard of all changed risk factors, a correlation matrix and a choice of financial behaviour model. It also includes probabilistic scenarios based on implied volatility.
16. Such scenarios may be single-factor or multi-factor scenarios. Factors can be uncorrelated (fixed income, equity, counterparty, forex, volatility, correlation, etc.) or correlated: a particular shock may spread to all risk factors, depending on the correlation table used.

Aggregation of stress tests

17. In certain circumstances, in addition, managers could use aggregate stress test scenarios on a range of MMFs or even on all the MMFs managed by the manager. Aggregating results would provide an overview and could show, for example, the total volume of assets held by all the MMFs of the manager in a particular position, and the potential impact of several portfolios selling out of that position at the same time during a liquidity crisis.

Reverse stress testing

18. In addition to the stress test scenarios discussed in this section, the inclusion of reverse stress testing may also be of benefit. The intention behind a reverse stress test is to subject the MMF to stress testing scenarios to the point of failure, including the point where the regulatory thresholds set up in the MMF Regulation, such as those included

in its Article 37(3)(a) would be breached. This would allow the manager of a MMF to have another tool to explore any vulnerabilities, pre-empt, and resolve such risks.

Combination of the various factors mentioned in the following sections 4.2 to 4.7 with investors' redemption requests

19. All factors mentioned in the following sections 4.2 to 4.7 should be tested against several levels of redemption. This is not to say that at first, managers should not also test them separately (without combining them with tests against levels of redemption), in order to be able to identify the corresponding respective impacts. The way this combination of the various factors mentioned in the following sections 4.2 to 4.7 with investors' redemption requests could be carried out is further specified in each of these sections.
20. In that context, some hypothesis on the behaviour of the manager with regard to honouring the redemption requests could be required.
21. A practical example of one possible implementation is given in Appendix.

Stress tests in the case of CNAV and LVNAV MMFs

22. Article 28(2) of the MMF Regulation indicates that in addition to the stress test criteria as set out in Article 28(1), CNAV and LVNAV MMFs shall estimate for different scenarios, the difference between the constant NAV per unit or share and the NAV per unit or share. While estimating this difference, and if the manager of the MMF is of the view that this would be useful additional information, it may also be relevant to estimate the impact of the relevant factors included in sections 4.2 to 4.7 on the volatility of the portfolio or on the volatility of the net asset value of the fund.

Non-exhaustiveness of the factors mentioned in the following sections 4.2 to 4.7

23. The factors set out in the following sections 4.2 to 4.7 are minimum requirements. The manager would be expected to tailor the approach to the specificities of its MMFs and add any factors or requirements that it would deem useful to the stress test exercise. Examples of other factors that could be taken into account include the repo rate considering MMFs are a significant player in that market.
24. More generally the manager should build a number of scenarios, with different levels of severity, which would combine all the relevant factors (which is to say that there should not just be separate stress tests for each factor – please also refer to the following sections 4.2 to 4.7).

4.2 Guidelines on stress test scenarios in relation to hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF

25. With respect to the level of changes of liquidity of the assets mentioned in Article 28(1)(a) of the MMF Regulation, managers could consider such parameters as:

- the gap between the bid and ask prices;
- the trading volumes;
- the maturity profile of assets;
- the number of counterparties active in the secondary market. This would reflect the fact that lack of liquidity of assets may result from secondary markets related issues, but may also be related to the maturity of the asset.

26. The manager could also consider a stress test scenario that would reflect an extreme event of liquidity shortfall due to dramatic redemptions, by combining the liquidity stress test with a bid - ask spread multiplied by a certain factor while assuming a certain redemption rate of the NAV

4.3 Guidelines on stress test scenarios in relation to hypothetical changes in the level of credit risk of the assets held in the portfolio of the MMF, including credit events and rating events

27. With respect to the levels of changes in credit risk of the asset mentioned in Article 28(1)(b), guidance on this factor should not be too prescriptive because the widening or narrowing of credit spreads is usually based on quickly evolving market conditions.

28. However, managers could, for example, consider:

- the downgrade or default of particular portfolio security positions, each representing relevant exposures in the MMF's portfolio;
- the default of the biggest position of the portfolio combined with a downgrade of the ratings of assets within the portfolio;
- parallels shifts of the credit spreads of a certain level for all assets held in the portfolio.

29. With respect to such stress tests involving the levels of changes of credit risk of the asset, it would also be relevant to consider the impact of such stress tests on the credit quality assessment of the corresponding asset in the context of the methodology described in Article 19 of the MMF Regulation.

30. The manager should, for the purpose of combining different factors, combine changes to the level of credit risk of the assets held in the portfolio of the MMF with given levels of redemptions. The manager could consider a stress test scenario that would reflect an extreme event of stress due to uncertainty about the solvency of market participants,

which would lead to increased risk premia and a flight to quality. This stress test scenario would combine the default of a certain percentage of the portfolio with spreads going up together while assuming a certain redemption rate of the NAV.

31. The manager could also consider a stress test scenario that would combine a default of a certain percentage of the value of the portfolio with an increase in short term interest rates and a certain redemption rate of the NAV

4.4 Guidelines on stress test scenarios in relation to hypothetical movements of the interest rates and exchange rates

32. With respect to the levels of change of the interest rates and exchange rates mentioned in Article 28(1)(c) of the MMF Regulation, managers could consider stress testing of parallel shifts of a certain level. More specifically, managers could consider depending on the specific nature of their strategy:
 - i. an increase in the level of short term interest rates with 1-month and 3-month treasury rates going up simultaneously while assuming a certain redemption rate;
 - ii. a gradual increase in the long term interest rates for sovereign bonds;
 - iii. a parallel and/or non parallel shift in the interest rate curve that would change short, medium and long interest rate;
 - iv. movements of the FX rate (base currency vs other currencies).
33. The manager could also consider a stress test scenario that would reflect an extreme event of increased interest rates that would combine an increase in short-term interest rates with a certain redemption rate. The manager could also consider a matrix of interest rates / credit spreads.

4.5 Guidelines on stress test scenarios in relation to hypothetical levels of redemption

34. With respect to the levels of redemption mentioned in Article 28(1)(d) of the MMF Regulation, managers could consider redemption stress tests following from historical or hypothetical redemption levels or with the redemption being the maximum of either a certain percentage of the NAV or an opt-out redemption option exercised by the most important investors.
35. Stress tests on redemptions should include the specific measures which the MMF has the constitutional power to activate (for instance, gates and redemption notice).
36. The simulation of redemptions should be calibrated based on stability analysis of the liabilities (i.e. the capital), which itself depends on the type of investor (institutional, retail, private bank, etc.) and the concentration of the liabilities. The particular characteristics of the liabilities and any cyclical changes to redemptions would need to be taken into account when establishing redemption scenarios. However, there are many ways to test liabilities and redemptions. Examples of significant redemption

scenarios include i) redemptions of a percentage of the liabilities ii) redemptions equal to the largest redemptions ever seen iii) redemptions based on an investor behaviour model.

37. Redemptions of a percentage of the liabilities could be defined based on the frequency of calculating the net asset value, any redemption notice period and the type of investors.
38. It is to be noted that liquidating positions without distorting portfolio allocation requires a technique known as slicing, whereby the same percentage of each asset (or each liquidity class if the assets are categorised according to their liquidity, also known as bucketing) is sold, rather than selling the most liquid assets first. The design and execution of the stress test should take into account and specify whether to apply a slicing approach or by contrast a waterfall approach (i.e. selling the most liquid assets first).
39. In the case of redemption of units by the largest investor(s), rather than defining an arbitrary redemption percentage as in the previous case, managers could use information about the investor base of the MMF to refine the stress test. Specifically, the scenario involving redemption of units by the largest investors should be calibrated based on the concentration of the fund's liabilities and the relationships between the manager and the principal investors of the MMF (and the extent to which investors' behaviour is deemed volatile).
40. Managers could also stress test scenarios involving redemptions equal to the largest redemptions ever seen in a group of similar (geographically or in terms of fund type) MMFs or across all the funds managed by the manager. However, the largest redemptions witnessed in the past are not necessarily a reliable indicator of the worst redemptions that may occur in the future.
41. A practical example of one possible implementation is given in Appendix.

4.6 Guidelines on stress test scenarios in relation to hypothetical widening or narrowing of spreads among indexes to which interest rates of portfolio securities are tied

42. With respect to the extent of a widening or narrowing of spreads among indexes to which interest rates of portfolio securities are tied as mentioned in Article 28(1)(e) of the MMF Regulation, managers could consider the widening of spreads in various sectors to which the portfolio of the MMF is exposed, in combination with various increase in shareholder redemptions. Managers could in particular consider a widening of spreads going up.

4.7 Guidelines on stress test scenarios in relation to hypothetical macro systemic shocks affecting the economy as a whole

43. With respect to the identification of macro-systemic shocks affecting the economy as a whole mentioned in Article 28(1)(f) of the MMF Regulation, guidance on this item should not be prescriptive because the choice of hypothetical macro systemic shocks will depend to a large extent on the latest developments in the market.
44. However, ESMA is of the view that managers could use an adverse scenario in relation to the GDP. Managers could also replicate macro systemic shocks that affected the economy as a whole in the past.
45. Examples of such global stress test scenarios that the manager could consider are provided in Appendix.

4.8 Guidelines on the establishment of additional common reference stress test scenarios (the results of which should be included in the reporting template mentioned in Article 37(4) of the MMF Regulation)

46. In addition to the stress tests managers of MMFs conduct taking into account sections 4.1 to 4.7 of these guidelines, managers of MMFs should conduct the following common reference stress test scenarios. the results of which should be included in the reporting template mentioned in Article 37(4) of the MMF Regulation.

4.8.1 Level of changes of liquidity

47. With respect to the level of changes of liquidity of the assets mentioned in Article 28(1)(a) of the MMF Regulation:

[Option 1: Price impact factor increases with volume sold]

- Managers of MMFs should apply the discount factors specified in section 5 of the guidelines²⁰ to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario.
- At the same time, managers of MMFs should assume redemption requests and simulate the sale of a vertical slice of the fund portfolio whereby the same percentage of each asset is sold to meet redemptions. The redemption requests are calibrated according to the redemption scenario specified in section 5 of the guidelines.
- Asset sales would impact asset prices. The “price impact parameter” is the impact on the price of an asset for a given amount of sales. The more the fund sells an asset, the more

²⁰ The discount factor is calibrated on bid-ask spreads.

it impacts the price of the given (“price impact factor”). For each asset, managers of MMFs should apply the price impact parameter specified in section 5 of the guidelines:

$$\text{Price impact factor} = \text{price impact parameter} * \text{asset sales}$$

- For each relevant transferable security, managers of MMFs should apply the discount factors and the price impact factors ~~should be applied~~ to the price used for the valuation of the fund at the time of the reporting (VPrice) in accordance with Article 29(3)(a), according to their type and maturity, to derive an adjusted price (VPrice_{adj}):

$$\text{VPrice}_{\text{adj}} = (1 - \text{liquidity discount} - \text{market impact factor}) * \text{VPrice}$$

- The impact of the liquidity discount should be evaluated for all assets including the following (non-exhaustive list of) eligible assets: Sovereign Bonds, Corporate Bonds, Commercial Papers, Certificates of deposit, ABCPs and eligible securitisations.
- The manager of the MMF should estimate the impact of the potential losses by (a) valuing the remaining investment portfolio at the derived adjusted price, VPrice_{adj}, to determine the stressed NAV; (b) valuing assets sold at the derived adjusted price, VPrice_{adj}; and (c) calculating the impact as a percentage of the reporting NAV:

$$\text{Asset liquidity risk impact (\%)} = \frac{\text{Reporting NAV} - (\text{Stressed NAV} + \text{Assets Sales})}{\text{Reporting NAV}}$$

Option 2: Price impact factor increases with market footprint

- Managers of MMFs should apply the discount factors specified in section 5 of the guidelines²¹ to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario.
- At the same time, managers of MMFs should assume redemption requests and simulate the sale of a vertical slice of the fund portfolio whereby the same percentage of each asset is sold to meet redemptions. The redemption requests are calibrated according to the redemption scenario specified in section 5 of the guidelines.
- Asset sales would impact asset prices, based on the MMF market share. The “market footprint discount” is the impact on the price of an asset for a given amount of sales. The higher the market footprint of an asset, the more it impacts the price of this asset (“market footprint discount”). For each individual asset, MMFs should apply the market footprint discount that will be specified in section 5 of the guidelines:

²¹ The discount factor is calibrated on bid-ask spreads.

- If the market footprint of an individual asset is below a threshold α specified in the section 5 of the Guidelines, the stress has no impact.
- If the market footprint of an individual asset exceeds the threshold, the applied discount is a function f of the market footprint, calibrated by ESMA, multiplied by the value of asset sales.
- For each relevant transferable security, **managers of MMFs should apply** the discount factors **and the market footprint discounts** to the price used for the valuation of the fund at the time of the reporting (**VPrice**) in accordance with Article 29(3)(a), according to their type, maturity and **market footprint**, to derive an adjusted price (**VPrice_{adj}**):

$$\mathbf{VPrice_{adj}} = (1 - \mathbf{liquidity\ discount} - \mathbf{market\ footprint\ discount}) * \mathbf{VPrice}$$

- The impact of the liquidity discount should be evaluated for **all assets including** the following (**non-exhaustive list of**) **eligible** assets: Sovereign Bonds, Corporate Bonds, Commercial Papers, **Certificates of deposit**, ABCPs and eligible securitisations.
- The manager of the MMF should estimate the impact of the potential losses by valuing the investment portfolio at the derived adjusted price, **VPrice_{adj}**, to determine the stressed NAV and calculate the impact as a percentage of the reporting NAV:

$$\mathbf{Asset\ liquidity\ risk\ impact\ (\%)} = \frac{\mathbf{Reporting\ NAV} - (\mathbf{Stressed\ NAV} + \mathbf{Assets\ Sales})}{\mathbf{Reporting\ NAV}}$$

Notes:

The following assets should be stressed:

- Sovereign bonds, with a break down at country level;
- Corporate bonds, distinguishing at least between investment grade and high yield instruments;
- Commercial Papers, ABCPs and eligible securitisations, using the corporate bond parameters.

The calibration is available in section 5 of the Guidelines.

4.8.2 Level of change of credit risk

48. With respect to the levels of change of credit risk of the assets held in the portfolio of the MMF, including credit events and rating events, in accordance with Article 28(1)(b) of the MMF Regulation:

1) Credit spread stress test

49. Managers of MMFs should measure the impact of an increase in credit spread, according to the following specifications:

- For each security, the increase in spread specified in section 5 of the guidelines should be applied.
- For each security, the corresponding change in spread should be translated into a haircut.
- The impact of the cumulated haircuts in percentage of reporting NAV should be calculated.

$$\text{Credit risk impact (\%)} = \frac{\text{Reporting NAV} - \text{Stressed NAV}}{\text{Reporting NAV}}$$

2) Concentration stress test

50. Managers of MMFs should also simulate the default of their two main exposures. The resulting impact on NAV should then be calculated, expressed as a percentage:

$$\text{Concentration risk impact (\%)} = \frac{\text{Reporting NAV} - \text{Stressed NAV}}{\text{Reporting NAV}}$$

Notes:

The concentration risk scenario depends on the characteristics of the exposure. The collateral (or any other mitigant, e.g. credit derivatives) received should be considered. If there is no collateral, or if the collateral is insufficient to cover the exposure, the following loss given default should apply:

- Senior exposures: 45 %;
- Subordinated exposures: 75 %.

The calibration is available in section 5 of the Guidelines.

4.8.3 Levels of change of the interest rates and exchange rates and levels of widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied

51. With respect to the levels of change of the interest rates and exchange rates referred to in Article 28(1)(c) of the MMF Regulation, managers of MMFs should apply the following stressed market parameters using the parameters specified in section 5 of the guidelines in respect of (a) interest rate yield shocks which correspond to movements of the interest rates; and (b) FX shocks which corresponds to movements of the exchange rates.

1) Levels of change of the interest rates

52. With respect to the levels of change of the interest rates, managers of MMFs should use the same reference rate curve for all instruments denominated in a given currency and the reference rate tenor should align with the residual maturity of the instrument. For floating rate instruments, instruments may be contractually linked to a particular reference rate, in which case this rate is considered moving in parallel with the reference rate curve. If the table does not provide the tenor corresponding to the residual maturity of the instrument, managers of MMFs should use the most appropriate parameter in the table (e.g. the closest).

2) Levels of change of the exchange rates

53. With respect to the levels of change of the exchange rates, two scenarios should be used in the calculations: appreciation of the EUR against the USD; depreciation of the EUR against the USD.

3) Levels of widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied

54. With respect to the levels of widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied referred to in Article 28(1)(e) of the MMF Regulation, managers of MMFs should apply stressed market parameters, according to the following specifications:

- Managers of MMFs should use the parameters specified in section 5 of the guidelines.
- For instruments not tied to a specific index, managers of MMFs shall use the reference rate curve provided for the change of the interest rates scenario.
- If the table does not provide the tenor corresponding to the residual maturity of the instrument, managers of MMFs should use the most appropriate parameter in the table (e.g. the closest).

4) Results

55. Managers of MMFs should reevaluate their portfolio considering the new parameters separately: interest rates, exchange rates, benchmark rates. They should express the impact of each risk factor as a percentage of NAV by calculating the following:

$$\text{Risk factor impact (\%)} = \frac{\text{Reporting NAV} - \text{Stressed NAV}}{\text{Reporting NAV}}$$

Notes:

The calibration is available in section 5 of the Guidelines.

4.8.4 Levels of redemption

56. With respect to the levels of redemption referred to in Article 28(1)(d) of the MMF Regulation, managers of MMFs should apply the following stressed redemption scenarios: a reverse liquidity stress test, a weekly liquidity stress test and a concentration stress test.

1) Reverse liquidity stress test

57. The reverse liquidity stress test comprises the following steps:

- For each asset, managers of MMFs should measure the weekly tradable amount (including maturing assets).
- Managers of MMFs should measure the maximum weekly tradable amount that can be liquidated with the portfolio allocation still being in line with all regulatory requirements of the MMF without distorting the portfolio allocation.

$$\text{Result (\%)} = \frac{\text{Maximum weekly tradable amount that can be liquidated without distorting the portfolio allocation}}{\text{NAV}}$$

Notes:

- For each asset, the weekly tradable amount shall be based on the manager's assessment of the fund's portfolio that is capable of being liquidated within one week. Such assignment should be based on the shortest period during which such a position could reasonably be liquidated at or near its carrying value²².
- The maximum size of outflows the fund can face in one week without distorting the portfolio allocation is determined by (1) the sum of the weekly tradable amounts; and (2) the fund's capacity to comply with the regulatory requirements.
- For these purposes, the regulatory requirements are not limited to but should include at least:
 - Diversification (Article 17 of the MMF Regulation);
 - Concentration (Article 18 of the MMF Regulation);
 - Portfolio rules for short-term MMFs (Article 24 of the MMF Regulation) and for standard MMFs (Article 25 of the MMF Regulation), in particular, Maximum weighted average maturity (WAM); Maximum weighted average life (WAL), daily maturing assets; and weekly maturing assets.
- For example, if 50% of a LVNAV MMF assets are tradable within a week but its WAM becomes higher than 60 days after selling 30%, the manager should report 30%.

²² For its definition, [see the Guidelines on reporting obligations under Articles 3\(3\)\(d\) and 24\(1\), \(2\) and \(4\) of the AIFMD](#)

The calibration is available in section 5 of the Guidelines.

 2) Weekly liquidity stress test:

58. The weekly liquidity stress test assesses the fund's capacity to meet outflows with available weekly liquid assets, considered as the sum of highly liquid assets and weekly maturing assets and comprises the following steps:

- managers of MMFs should apply a stressed redemption scenario where the fund receives net weekly redemption requests from 40% of the professional investors and 30% of the retail investors.
- managers of MMFs should measure available weekly liquid assets to meet the redemption requests according to the following table:

Assets	Article	CQS
Assets referred to in Article 17(7) ²³ of the MMF Regulation which are highly liquid and can be redeemed and settled within one working day and have a residual maturity of up to 190 days.	24 (e)	1
Cash which is able to be withdrawn by giving prior notice of five working days <u>without penalty</u> .	24 (e) 25 (d)	
Weekly maturing assets	24 (e) 25 (d)	
Reverse repurchase agreements which are able to be terminated by giving prior notice of five working days	24 (e) 25 (d)	
x100% = Weekly liquid assets (bucket 1)		
Assets referred to in Article 17(7) of the MMF Regulation which can be redeemed and settled within one working week.	17(7)	1,2
Money market instruments or units or shares of other MMFs which they are able to be redeemed and settled within five working days.	24 (e) 25 (e)	1,2
Eligible securitisations and asset-backed commercial paper (ABCPs).	9(1)(b)	1
x85% = Weekly liquid assets (bucket 2)		

- Managers of MMFs should calculate the coverage of outflows by weekly liquid assets as a percentage in the following way:

$$\text{Result (\%)} = \frac{\text{Weekly liquid assets}}{\text{Weekly outflows}}$$

²³ Money market instruments issued or guaranteed separately or jointly by the Union, the national, regional and local administrations of the Member States or their central banks, the European Central Bank, the European Investment Bank, the European Investment Fund, the European Stability Mechanism, the European Financial Stability Facility, a central authority or central bank of a third country, the International Monetary Fund, the International Bank for Reconstruction and Development, the Council of Europe Development Bank, the European Bank for Reconstruction and Development, the Bank for International Settlements, or any other relevant international financial institution or organisation to which one or more Member States belong.

Notes:

- Weekly liquid assets are classified in two buckets (bucket 1 and 2) according to their category and credit quality. CQS refers to “Credit Quality Steps”, within the meaning of the COMMISSION IMPLEMENTING REGULATION (EU) 2016/1799²⁴.
- The sum of the weighted weekly liquid assets will be expressed in percentage of the redemption shock. For example, if a fund meets a redemption shock of 30% with 20% of bucket 1 liquid assets and 45% of total weekly liquid assets (buckets 1 and 2), the manager should report the ratio (Weekly liquid assets)/(Weekly outflows) as a result:
 - 20%/30% = 67% (bucket 1); and
 - 45%/30% = 150% (bucket 1 and 2).
- It is important to note that the liquidity of any assets should always be checked in an appropriate manner. If there is any doubt regarding the liquidity of a security, managers of MMFs should not include it in the weekly liquid assets.

The calibration is available in section 5 of the Guidelines.

3) Concentration stress test

59. The concentration stress test is a scenario where the MMF faces redemption requests from its two main investors. The impact of the stress test should be assessed according to weekly liquidity stress test methodology.

$$\text{Result (\%)} = \frac{\text{Weekly liquid assets}}{\text{Invested amount of the two main investors}}$$

Note:

The calibration is available in section 5 of the Guidelines.

4.8.5 Macro-systemic shocks affecting the economy as a whole

60. With respect to the identification of macro-systemic shocks affecting the economy as a whole referred to in Article 28(1)(f) of the MMF Regulation, managers of MMFs should take the following steps:

- measure the impact of a market shock combining different risk parameters in accordance with the table below;
- assess the impact of a redemption shock following the market shock. Assets sold in response to the redemption shock will result in additional losses, as defined in the liquidity stress test;
- calculate the result as a percentage of NAV;

²⁴

https://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ%3AL%3A2016%3A275%3ATOC&uri=uriserv%3AOJ.L_.2016.275.01.0003.01.ENG

- calculate the value of weekly liquid assets after market shock as a percentage of outflows.

	Risk factors	Parameters used for the calibration
Market shock	FX Rate	EUR/USD etc.
	Interest Rate Credit Spread among indices to which interest rates of portfolio securities are tied	Swap rate Gov. bond yields/ spreads Corp. bond yields/ spreads
Redemption shock	Level of Redemption Asset liquidity	% outflows Bid/ask spread (discount factor)
Results	% NAV Weekly liquid assets/ outflows	
Memo	% outflows	

Notes:

The scenario envisages the following circumstances:

- The MMF is affected by a shock combining an adverse FX shock and an increase in interest rates including swap rate, government bond yields and corporate bond yields. The credit risk is included in the yield shock. Managers of MMFs should use their internal models to measure the combined impact. The calibration of the shock is based on a macro scenario provided by ESMA and the ESRB and combining shocks from the other scenarios.
- In the wake of the market shock, investors ask for redemption. Outflows are calculated similarly to the redemption scenario by differentiating professional and retail investors, i.e. 30% from retail investors and 40% from professional investors.
- To meet the redemption requests, the fund sells assets in a stressed environment characterized by a widening of bid-ask spread as characterized in the liquidity stress test. For the purposes of the stress test, the loss is entirely borne by remaining investors (and not by redeeming investors).
- The impact on the NAV is the result of the market shock, the outflows and the liquidity shock.
- The impact on liquidity is calculated using the weekly liquidity stress test methodology.

The calibration is available in section 5 of the Guidelines.

5 Calibration

The calibration of the stress test scenarios is not part of the consultation. In accordance with Article 28(7) MMF Regulation, stress test guidelines have to be updated at least every year taking into account the latest market development. The latest updated calibration is included in the Final Report - Guidelines on stress test scenario under the MMF Regulation (ESMA50-164-6583). Some figures are included in this document for illustration purposes only. Therefore, ESMA is not seeking the views from external stakeholders on these figures.

5.1 Common reference parameters of the stress test scenarios in relation to hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF

Scope of the scenario

MMFR Eligible assets	Typical assets	Liquidity	
		Stressed	Parameters
(a) money market instruments	-Certificate of deposit (CD)	Yes	Table 3
	-Commercial Paper (CP)	Yes	Table 3
	-Government bonds, treasury and local authority bills	Yes	Table 1,2
	-Corporate bonds	Yes	Table 3
(b) eligible securitisations and asset-backed commercial paper (ABCPs)	-Eligible securitisations	Yes	Table 3
	-ABCPs	Yes	Table 3
(c) deposits with credit institutions	-Deposits, of which time deposits	No	
(d) financial derivative instruments	-Financial derivative instruments dealt in on a regulated market	No	
	-Financial derivative instruments dealt OTC	No	
(e) repurchase agreements	-Repos	No	
(f) reverse repurchase agreements	-Reverse repos	No	
(g) units or shares of other MMFs	-Shares issued by other MMFs	Yes	Extrapolation of the results to shares issued by other MMFs

Table 1

Liquidity discount factor - Sovereign bonds by residual maturity - Reference countries (in %)					
	3M	6M	1Y	1.5Y	2Y
DE					
ES					
FR					
IT					
NL					

Table 2

Liquidity discount factor - Sovereign bonds by rating and residual maturity (in %)					
	3M	6M	1Y	1.5Y	2Y
AAA					
AA					
A					
BBB					
Below BBB or unrated					

Table 3

Liquidity discount factor - Corporate bonds by rating and residual maturity	
	>1Y
AAA	
AA	
A	
BBB	
Below BBB or unrated	

[Option 1: Price impact factor increases with volume sold]

Table Option 1: Price impact parameter

Price impact parameter (%)	
Sovereign bonds	
Corporate bonds (non-financial)	
Corporate bonds (financial)	
Securitisation and ABCPs	
Shares issued by other MMFs	
Other	

[Option 2: Market footprint]

Table Option 2a: Threshold

Threshold α (EUR)	
Sovereign bonds	
Corporate bonds (non-financial)	
Corporate bonds (financial)	
Securitisation and ABCPs	
Shares issued by other MMFs	
Other	

If the market footprint of an individual asset exceeds the threshold, the applied discount is a function f of the market footprint:

With $f =$ [calibration will be provided]

6 Appendix

A.

Example of stress combining the various factors mentioned in sections 4.2 to 4.7 with investors' redemption requests

A practical example of one possible implementation of the section "Combination of the various factors mentioned in the following sections 4.2 to 4.7 with investors' redemption requests" is given below.

The table below estimates the losses incurred by the MMF in the event of redemptions or market stress (credit or interest rate shocks).

First scenario: credit premium shock of 25 bps

Second scenario: interest rate shock of 25 bps

	Three largest investors (25%) ↓									Very stable investors (15%) ↓
Redemptions	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%
Initial portfolio			2 bps	3 bps	5 bps	6 bps	8 bps	9 bps	11 bps	12 bps
First scenario	7 bps	9 bps	13 bps	18 bps	24 bps	32 bps	45 bps	66 bps	110 bps	236 bps
Second scenario	3 bps	4 bps	6 bps	9 bps	12 bps	16 bps	21 bps	28 bps	38 bps	85 bps
WAL (days)	105	117	131	149	169	192	219	249	290	320

This stress test shows that a redemption by the three largest investors (25% of net assets) would push the weighted average life (WAL) beyond the 120-day regulatory threshold (for a short-term money market fund) and cause the portfolio to lose in the region of 2-3 bps under normal conditions. The same level of cumulative redemptions with a 25 bps rise in credit premium would cause a loss of around 13-18 bps.

B.

Example of redemptions based on an investor behaviour model, in accordance with the breakdown of liabilities by investor category. This implies the simulation of the behaviour of each type of investor and establishes a simulation based on the composition of the liabilities of the MMF.

Example of investor classification and simulation of their behaviour (the figures shown are not real): Investor type Record redemptions for this investor type

	Over one day	Over one week	Over one month
Large institutional Group entity (bank, insurance, own account)	25%	75%	100%
Investment fund	20%	65%	100%
Small institutional Private banking network	10%	25%	40%
Retail investor with distributor A	15%	40%	75%
Retail investor with distributor B	5%	10%	20%
Retail investor with distributor B	7%	15%	20%

Stressed redemptions for this investor category

Large institutional Group entity (bank, insurance, own account)	75%	0%	(in agreement with the AMC)
Investment fund	65%		
Small institutional Private banking network	25%		
Retail investor with distributor A	40%		
Retail investor with distributor B	10%		
Retail investor with distributor B	15%		

In order to build such a simulation of this kind, the manager needs to make assumptions about the behaviour of each investor type, based in part on historical redemptions. In the example above, the manager has noted that the retail investors who invested through distributor A are historically slower to exit in the event of difficulty, but that they exhibit the same behaviour over one month as retail investors who invested through distributor B. This fictitious example shows a possible classification that the manager may use based on the data available on the liabilities of the MMF and the behaviour of its investors.

C.

Examples of global stress test scenarios that the manager could consider:

- i. the Lehman Brothers' event with the calibration of all relevant factors one month ahead of the failure of this firm;
- ii. A) a scenario including a combination of the 3 following factors: i) a parallel shift in interest rate (x) ii) a shift in credit spreads (y) and iii) a redemption stress (z);
- iii. B) a scenario including a combination of the 3 following factors: i) a parallel shift in interest rate (x) ii) a shift in credit spreads (y) and iii) a redemption stress (z) Variables x, y and z being the worst figures/shifts experienced by the fund, on an independent basis, for the last 12 months.