esma European Securities and Markets Authority

Final Report

Guidelines on stress test scenarios under the MMF Regulation

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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 that MMFs or managers of MMFs are required to conduct. These guidelines will 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 2017 Guidelines" also referred to as ESMA34-49-115[1]).

With respect to section 4.8 of the 2017 Guidelines (*Guidelines on the establishment of 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*), ESMA indicated that "*This section will in particular be updated so that managers of MMFs have the information needed to fill in the corresponding fields in the reporting template mentioned in article 37 of the MMF Regulation. This information will include specifications on the type of the stress tests mentioned in this section 4.8 and their calibration, as well as the way to report their results in the reporting template mentioned in article 37(4) of the MMF Regulation*".

This final report contains updated guidelines, including:

- 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 and their calibration, so that managers of MMFs have the information needed to fill in the corresponding fields in the reporting template mentioned in article 37 of the MMF Regulation (section 4.8 and 5 of the Guidelines – in red in the Annex II).

Contents

Section 2 summarises the feedback received to the consultation that ESMA carried out and explains how ESMA has taken it into account.

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

Annex II contains the full text of the updated guidelines and the calibration of the scenarios for 2019.

Next Steps

MMFs and managers of MMFs are expected to measure the impact of the common reference stress test scenarios specified in the Guidelines. On the basis of these measurements, they are expected to fill in the reporting template referred to in Article 37 of the MMF Regulation and set out in Commission Implementing Regulation (EU) 2018/708[2]

and send the results to NCAs with their first quarterly reports required by Article 37, scheduled in Q1 2020.

[1] https://www.esma.europa.eu/sites/default/files/library/esma34-49-115_mmf_guidelines_on_stress_tests.pdf

[2] Commission Implementing Regulation (EU) 2018/708 of 17 April 2018 laying down implementing technical standards with regard to the template to be used by managers of money market funds when reporting to competent authorities as stipulated by Article 37 of Regulation (EU) 2017/1131 of the European Parliament and of the Council (OJ L119, 15.5.2018, p. 5).

2 Feedback on the consultation

1. ESMA's consultation on stress testing rules for money market funds ended on 1 December 2018. ESMA received 10 contributions from asset managers and asset manager associations as well as one contribution from an index provider. ESMA had also requested the advice of the Securities and Markets Stakeholders Group, which has chosen not to respond.

Introductory comments:

2. Most respondents consider that the proposed approach is too prescriptive. They prefer stress tests based on principles. They especially consider that the parameters are too granular and/or not always easily available.

3. Most respondents ask for flexibility for the asset manager to choose an appropriate methodology for its internal risk management process. In particular, the design of stress tests should be tailored to the type of MMF. Two respondents state that the reference parameters should be primarily used as an input for risk management and not calibrated for regulatory reporting purposes.

4. On a practical level, several respondents point at potential high development costs of implementation with the need to adapt or acquire calculation tools.

5. The majority of respondents are concerned about the timing and suggest performing the stress test when the reporting to competent authorities are expected to apply, in 2020.

6. Most respondents consider that the proposal is too close to bank and insurance stress test while the risks, the business and the aim (no solvency ratio) are different.

ESMA Response:

The guidelines have been revised to facilitate the implementation, improve the consistency and reduce the costs. This is the case, for example, of the "redemption scenarios" which now ties the definitions to MMFR more closely. ESMA does not share the view that having granular parameters increases the complexity: on the contrary having a comprehensive set of parameters reduces the need to extrapolate or interpret the scenarios when a data point is missing.

To facilitate the implementation, the guidelines on reporting under the MMF Regulation (article 37) provide practical details on how to implement the scenarios and complete the reporting template.

One objective of the stress test guidelines is to compare MMFs exposed to the same risks. Therefore, the guidelines need to be prescriptive and consistent, which does not allow for a tailored approach. However, the calculation of the impact will generally rely on MMF existing models thus limiting the implementation cost.

Most adverse scenarios affect the entire financial sector. Therefore, ESMA generally seeks consistency with the ESAs and the ESRB. The parameters used for the first update of the guidelines are based on a joint ESMA/EIOPA scenario transmitted by the ESRB. However, the methodology and most of the parameters consider MMFs specificities.

In particular, the Guidelines include a section on the 2019 calibration for the MMF stress tests the results of which have to be reported in accordance with Article 37 of the MMF Regulation. The ECB, in collaboration with the ESRB and ESMA, has developed the narrative and has calibrated the adverse scenario which has been approved by the ESRB General Board and transmitted to ESMA. Managers are invited to consult this adverse scenario on the ESRB website[3].

The calibration included in these Guidelines is similar to the scenario approved by the ESRB General Board with the following specificities:

(a) only relevant parameters are included in the Guidelines. For that reason, shocks applying to instruments with a maturity higher than 2 years were removed from all tables.

(b) If managers need a parameter that is not indicated in the Guidelines, they are invited to consult the adverse scenario on the ESRB website.

(c) ESMA carried out some intermediate calculation to facilitate the implementation. Especially, shocks to credit spreads are the difference between the bond yields and the swap yield curve. Certain values were adjusted by ESMA on very limited occasions, for example when the result was a negative shock.

(d) ESMA provided some additional calibration where necessary.

- The ESRB provided the liquidity discount factors for sovereign bonds from 5 countries. Based on additional data, ESMA produced the liquidity discount factors for other sovereign bonds and corporate bonds by ratings.

- ESMA produced interest rate yield shocks for countries not included in the ESRB scenario.

(e) Parameters which were adjusted or added in section 5 are underlined. In case of inconsistency between the calibration and the ESRB scenario, managers should use the values provided in the Guidelines.

[3] https://www.esrb.europa.eu/mppa/stress/shared/pdf/esrb.stress_test190402_EIOPA_insurance~c5c17193da.en.pdf?172d96eff093ab8ed90c18efd3cf979f

Feedback on individual consultation questions:

Q1: Do you agree that the impact of market stress should be primarily measured on the NAV?

Q2: Do you agree that some assets may not be stressed under all scenarios (in which case the scope of the assets that are subject to the individual stress tests will be clearly defined in the guidelines)? Or should ESMA include additional assumptions for those assets (e.g. a default by depositary banks in repaying cash holdings)?

Q3: Do you have views on the way to stress collateral in collateralised transactions (e.g. repos, derivatives)? It may especially involve increased counterparty risk or the need to post additional collateral.

Q4: Do you agree that the same market stress parameters should be used for all MMFs in order to measure the impact on NAV? Do you have views on the way to take into account the type of fund (short term and standard; CNAV, VNAV and LVNAV) to measure the impact on the fund?

7. All respondents agree with the use of NAV to measure the result of the scenarios. Two respondents introduce a nuance and suggest that, for the sake of clarity, the guidelines should refer to the portfolio rather than the NAV. Two respondents especially support the use of marked to market values for CNAV and LVNAV MMFs. One respondent considers that stress tests should focus on liquidity for VNAV MMFs which rely on asset sales to meet share redemption.

8. All respondents agree that some assets may not be stressed under all scenarios. They mention cash, deposits, collateralised transactions such as reverse repo, derivatives and short-term high quality assets such as government securities. One respondent considers that the inclusion or exclusion of an asset from the scope should be based on a case-by-case assessment without predetermined factors. One respondent suggests including additional assumptions, such as appropriate recovery rates to cover all eligible credit institutions in a Member State or in a third country, including the depositary bank. In general, respondents agree that MMF shares should be tested although the look-through approach may not always be possible.

9. Most respondents do not see the need to stress test collateral. First, this is because collateral used by MMF is generally not risky (high quality bonds, cash). Second, this is because it is already subject to comprehensive regulatory requirements. Finally, this is because it would be complex with little impact on the result.

10. Most respondents support the use of the same market stress parameters for all MMFs for better comparability of results. Several respondents nevertheless repeat their preference for a principles-based approach.

ESMA Response:
The responses generally support the draft proposal. The opportunity to add specific assumptions for the treatment of the collateral will be considered in future revisions of the guidelines.

Q5: Do you agree that a consistent approach between the ESAs should be attained? Where appropriate, which risk parameters need to be significantly different?

11. The majority of respondents consider that a consistent approach between the ESAs is not necessary. They argued that the purpose of the ESMA stress tests is different to that of the other ESA stress tests (assessing capital adequacy for instance). Therefore, they should be tailored to the risks faced by MMFs and not require the same complexity as other entities such as banks.

12. Some respondents see merit in having a consistent approach provided that it takes into account risks specific to MMFs: typically banks extensively use leverage while MMFs cannot. Similarly, respondents do not agree with using the Basel 3 Liquid Coverage Ratio approach (LCR) to measure the ability to redeem holding at the request of investors in a short period of time.

ESMA Response:
See response in the introductory comments. For the first revision of the guidelines the ESRB and the ECB have produced a single scenario for MMFs and pension funds. However, the list of risk factors which are considered in the two stress tests is different. In particuilar, the MMF exercise focuses on short maturities (between 1 month and 2 years) while the pension funds' focuses on long maturities (beyond 10 years). As previously mentioned, future revisions of the guidelines will focus on improving the consideration of MMFs specificities.

Q6. Do you have views on which factors are relevant for the determination/calibration of shocks?

Q7. Do you have a preference between the two proposed options: calibrated discount factor on bid prices; multiple quoted bid-ask spread?

Q8. What is your view on how to stress underlying assets not mentioned above (i.e. assets other than corporate and government bonds)? In your opinion are there asset classes not mentioned above that should be excluded from a quantitative assessment?

Regarding the relevant factors for the determination/calibration of shocks

13. Two respondents propose to simplify the model by using a fixed parameter (e.g. a fixed factor of 2) to widen the shocks. Other respondents evidence that the market practice is to stress all assets with a parallel shift in liquidity spread. Two respondents argue that the proposals should be taken as examples and not as an obligation. One respondent advocates for a more dynamic approach to option 1.

Regarding the proposed options

14. Only two respondents provide an explicit preference, one for option 1 and one for option 2. The other participants express reservation for both options. Two respondents evidence a possible cliff-edge effect for instruments with maturity close to 365 days for option 1. More granularity is requested both in terms of maturity and of countries for government bonds.

15. As regards option 2, most respondents argue that bid ask spread observed in the markets do not reflect market liquidity. Moreover, respondents point out data availability constraints, database cost and the discretion left to managers. One respondent considers that both option are not suitable for a standard MMF investing in primary offering of instruments and with very low trading activity on secondary markets. As a general remark, the respondents evidence a preference for the use of the market price instead of the valuation price.

Regarding assets other than corporate and government bonds

16. Respondents consider that highly liquid and non-transferable securities (cash, repos, deposits) should not be subjected to the quantitative assessment. Only one respondent believes that non-bond money market instruments should be stressed, subject to data availability.

ESMA Response:
ESMA will proceed with option 1 which limits the risk of inconsistency compared to option 2. MMFR ask for a cautious valuation which is consistent with the use of the valuation price, in line with Article 29(3)(a). ESMA shares the view that some highly liquid and non-transferable securities may not face liquidity issues in most cases. However, in a stress test context, it seems relevant to assess the impact on assets that are generally liquid. The opportunity to include an assumption on the impact of volume will be considered in future revisions of the guidelines.

Q9. With reference to Option 2, do you think that the adoption of fixed stress factors for different asset classes is in line with practices? If so, which values for the fixed factors could be considered appropriate and plausible to capture stress on asset liquidity? Which elements should be identified and used to define the appropriate stress factor for each asset class? Is the reference to an "active market" clear enough or would you propose other criteria to define bid-ask spread observed?

Q10. Do you think that the volume of an asset held by the fund should be considered for the proposed stress factors (esp. the value of assets held compared with the underlying market)? Do you have any views on the methodology?

17. Three participants affirm that the use of fixed factors for the calibration of different asset classes is in line with market practices. On the other hand, three respondents disagree with the use of fixed factors as liquidity varies from issuer to issuer. Two respondents point out the fact that the use of historical data is misleading as a basis for a forward looking test.

18. Although most respondents identify the importance of volume to monitor liquidity, they agree that it should not be considered as part of the liquidity stress test. The main reason adduced is the need to keep the stress testing exercise simple.

ESMA Response:
See previous response to Q6, Q7, Q8.

Q11. Do you have views on which factors are relevant for the determination/calibration of shocks?

Q12. Do you have a preference between the two proposed options: spreads multiplied by a factor or ESMA credit spread parameter?

Q13. Do you see specific issues (e.g. implementation, non-standardisation, or similar) with either of the two options?

Q14. Do you agree with having an additional credit stress simulating the default of the fund's two main exposures?

Q15. The additional stress simulates the default of the fund two main exposures: when an exposure is collateralised, do you think that additional assumptions on the value of the collateral are necessary (i.e. if the defaulting counterparty is fully collateralised, and the value of the collateral is unchanged, there will be no impact)?

Q16. Do you think that additional assumptions are needed to calculate the loss given default in the additional scenario?

Regarding the factors for the determination/calibration of shocks

19. Most respondents raise concerns about using CDS to measure credit spreads because they do not reflect the short-term maturity of the MMF instruments or are not available. Some respondents suggest using the process used by Short Term money market funds that constructs sensitivity tables considering the impact of stepped changes in generic interest rates and generic credit spreads for different levels of investor redemptions.

Regarding the two options

20. There are concerns for both options and a general disagreement to choose only one calibration method. Option 1 requires calculating credit spread and rely on CDS spreads. Option 2 is considered as difficult to implement and relies on credit ratings from agencies.

21. Respondents ask to clarify which exposure is subject to the stress test (i.e. counterparty, issuer or issue exposure) and the formula to assess credit risk impact. At least one respondent suggests measuring portfolio credit risk by looking at data on yield spreads of different asset classes (bank CDs, commercial paper, asset-backed commercial paper, smaller governments and agency notes) against high quality government securities of the same term issued by the government in whose currency the MMF shares are denominated, during periods of market liquidity and periods of

market stress, and further modifying these stress test factors based on the spreads for particular issuers or issuer types held in portfolio by the particular MMF.

22. Most respondents are against using several CRA ratings and in favour of retaining only one. An option on simple credit spread widening (parallel shift) should be available. Some respondents suggest that all the factors should be provided by ESMA.

Regarding the additional credit stress simulating the default of the fund's two main exposures

23. Generally respondents do not consider that it is necessary to measure the default of the two main exposures. Defaulting the two main exposures could be a simplistic assumption because neither the waterfall effects nor the case where the MMF is authorised to invest up to 100 % of its assets in government bonds are taken into consideration.

24. Respondents do not see the need to stress test collateral. They argue that all collateralized instruments have high quality counterparties, e.g. high quality government bonds or cash. Moreover, there is extensive regulation regarding collaterals and their characteristics.

Regarding the loss given default

25. The respondents state in majority that ESMA should provide the recovery rate to apply uniformly across MMFs. One respondent stated that the quality of the collateral or guarantor should be taken into consideration and not only the size when choosing which positions to stress test.

ESMA Response:

Under option 2 ESMA is providing detailed parameters taking into account the characteristics of the MMF portfolio, including very short maturities when data are available. Details on the implementation (e.g. loss given default) have been included in the revised guidelines.

The possibility to use more granular asset classes (e.g. bank CDs, commercial paper, asset-backed commercial paper, smaller governments and agency notes) and sensitivity tables (provided the latter can be used for a stress test and in a consistent manner) will be considered in future revisions of these Guidelines. However, ESMA considers these Guidelines strike the appropriate balance at this stage. Furthermore, ESMA also takes into account implementation costs as several respondents expressed concerns about future methodology changes. Regarding the collateral, see the previous answer.

Q17. Do you have views on which factors are relevant for the determination/calibration of shocks?

Q18. Do you consider that the parameters used for the 2018 EBA scenario cover all the parameters needed for the purpose of the MMF scenario on interest rates and exchange rates, and the scenario on hypothetical widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied? If not, which parameters should be added?

26. Some respondents suggest to run a series of tests on the portfolio, assuming that all yields go up by a parallel 10bps, 20 bps, 30 bps etc. Then, revalue each asset and analyse the portfolio level results. One respondent suggested that the rating, issuer (government/corporate), residual maturity/WAL (weighted average life) could be factors relevant for the determination/calibration of shocks. There is a general remark that the calibration should reflect the maturity of the short term MMFs, and also the residual maturity rather than the original one. There is also a concern that the LIBOR-type of rate will not be used anymore in the future as new benchmarks will arise. The respondents have asked for more flexibility to account for that in the future.

27. Four respondents have argued that such stress test scenarios that were conceived for banking and insurance industry are not appropriate. The majority of the respondents agree that the parameters in the tables given as examples are sufficient. One respondent suggests using the residual maturity rather than the original one. Two respondents have argued that the widening or narrowing of spreads among indices to which interest rates are tied goes back to using parameters that are already implemented namely interest rates, exchange rates or credit conditions.

ESMA Response:
ESMA agrees with the majority of these comments. In particular, the guidelines now refer to the residual maturity. Regarding the consistency with bank and insurance stress tests, see previous responses. The possibility to run a series of tests on the portfolio is relevant from a risk management point of view but the aim of the stress test guidelines is different, i.e. assessing the impact of a common scenario across all MMFs.

Q19. Do you have views on which factors are relevant for the determination/calibration of shocks?

Q20. Do you agree with the proposed approaches: a self-assessment on the maximum size of outflows the fund can face without distorting portfolio allocation; a comparison of stressed outflows with available weekly liquid assets? Do you need additional guidance for performing the self-assessment?

Q23. Do you have views on the weights that should be attributed to weekly liquid assets?

28. Generally, respondents agree that simulating asset sales to meet shareholder redemptions is an appropriate way to stress test MMF liquidity.

29. Nevertheless, the majority of respondents express concerns regarding the weekly stress test:

    - Four respondents highlight the redundancy of the weekly liquidity stress test with the provisions of Articles 24 and 25 of the MMF Regulation and the potential confusion with the weekly maturing assets requirements. One respondent considers that a simple comparison between the weekly maturing assets and the potential weekly outflow could be used to stress test redemptions.

- Regarding the “bucketing” approach, several respondents highlight that it was a structural choice of the MMF Regulation to deal with the issues of liquidity in another manner than a banking bucketing approach. Three respondents are disappointed with the use of CRA ratings. One respondent considers that the bucketing approach does not consider the tradable amount of each asset over a certain time horizon and limits the types of asset to be considered to the weekly liquid assets. Similarly, one respondent considers that reintroducing factors like credit quality or maturity that are stress tested independently does not bring clarity.

- Three respondents consider that the methodology may induce unnecessary costs, potentially leading to outsourcing the calculation to third parties.

30. Regarding the reverse liquidity stress test:

    - Four respondents criticize the pro-rata approach as unjustified or undesirable. For example, one respondent explains that the slicing is not as critical a point as when the fund follows a benchmark and has to replicate its composition. This respondent considers that portfolio managers will in practice distort their portfolios to an extent acceptable by the intended overall risk-reward profile of the fund.

    - The self-assessment triggers diverging views: one respondent considers that it is inappropriate to use a subjective view as an input for a quantitative stress test; another respondent considers that distortion criterion is to be interpreted globally and with a dynamic view and subject to judgement and not quantitative measures.

    - One respondent indicates that requiring a MMF to meet requirements in Article 24(1) after the redemption outflow stress would be a double counting as the “buffer” is already included and funds should not be expected to still hold a buffer after already experiencing severe outflows.

31. Finally, at least two respondents criticise the alleged weekly frequency of the stress test, as it is for the Board of Directors of the MMF or the manager of the MMF to decide the appropriate frequency, which shal be at least twice a year, according to the MMF Regulation.

ESMA Response:

The methodology of the weekly liquidity stress test has been revised to be more consistent with existing provisions (e.g. by using definitions from Articles 24 and 25 of the MMF Regulation) to facilitate the implementation and consistency of the stress test. Improving consistency with existing definitions should also reduce the implementation cost.

However, the objective of the stress test is not to duplicate what already exists in Articles 24 and 25. From that perspective, it is worth recalling that the stress focuses on assets that can be sold within a week to meet redemption requests while Articles 24 and 25 refer to “maturing” assets (with a limited possibility to include highly liquid assets). The stress test will thus remain fundamentally different from the requirements of the MMF Regulation: it is harmonized

between CNAV, LVNAV and VNAV; it considers the entire portfolio (e.g. no cap on the highly liquid assets); it includes an additional rating requirement for redeemable assets (the so-called "bucketing"), thus reducing the room for self-assessment.

The reverse stress test was adjusted to make it more flexible and in line with the real scenarios. For that reason, ESMA removed the requirement for MMFs to keep the composition of their portfolio intact and request that they only distort their portfolios "to an extent acceptable". To do so, a manager will assess their capability to comply with the regulatory requirements, including diversification (Article 17), concentration (Article 18) and portfolio rules for short-term MMFs (Article 24) and portfolio rules for standard MMFs (Article 25). Regarding the latter, ESMA considered the "double-counting" argument. However, the aim of the stress test is to assess the capacity of the fund to comply with the rules under adverse conditions. Therefore, it should include the portfolio rules requirement.

Finally, the stress tests will be conducted at least twice a year according to the MMF Regulation and not on a weekly basis.

Q21. Reverse stress test: do you have views on how to assess the capacity to comply with the weekly liquid assets requirements specified in Article 24(1)?

32. Several respondents do not agree with the proposal and consider that the requirements of Articles 24(1) and 25(1) are sufficient, that the proposed stress test does not add value or can lead to confusion. Another respondent considers that definitions should at least be aligned with the definitions applicable to the Level 1 requirements. Three respondents explicitly consider that the MMF Regulation does not make reverse stress testing mandatory and, therefore, that such stress test should not be included in the Guidelines. Another respondent suggests that the methodology should be aligned with the current industry practice of short-term money market funds that constructs sensitivity tables gauging the impact of stepped changes in generic interest rates and credit spreads for different levels of investor redemptions.

33. More specifically, one respondent is in favour of a stress test exercise that takes into consideration: i) all assets, and not only those complying with Article 24(1) or Article 25(1); and ii) an estimate of the tradable amount and the impact on the price. The same respondent considers that a limit on transaction costs should be specified. Otherwise, almost any amount can be liquidated. One respondent reiterates that the slicing approach is not relevant, as the manager should have the discretion to distort its portfolio. On the contrary, another respondent agrees with the pro-rata approach, provided that there is some flexibility which allows funds to change the proportion by a negligible amount to avoid that a small illiquid position becomes the bottleneck.

34. Regarding the implementation, three respondents consider that the approach is in practice too complex to implement. One respondent fears a duplication of effort for managers already stress testing redemption risk by type of investor.

35. Regarding the scope, one respondent asked about the inclusion of standard MMFs in the stress test.

ESMA Response:
The reverse stress test has been revised (see response to question 20). Standard MMFs are in scope of this scenario.

Q22. Do you think there should be differentiated outflows assumptions for retail and institutional investors (e.g. higher outflows from institutional investors)? What is your view on the outflow factors calibrated by ESMA?

36. Half of the respondents agree with the assumption that retail and institutional investors differ under stressed market conditions, with higher outflows for institutional investors. Some respondents disagree and ask for more evidence to support this assumption. One respondent considers that the stress test should focus on the units held by the largest investors, irrespective of whether they qualify as retail or institutional.

37. In terms of feasibility, one respondent considers that the manager should be able to establish the percentage in each of the two categories. On the contrary, another respondent considers that this is a substantial administrative burden.

38. In terms of calibration, views expressed are mixed: one respondent considers that the proposed figures are higher than the historical record; another respondent considers that a stress as high as 30% can be considered in a reporting context. At least two respondents consider that the outflows should be tailored to each fund taking into account past experience and investor base.

39. Finally, one respondent advocates the adoption of the current industry practice of short-term money market funds that construct sensitivity tables gauging the impact of stepped changes in generic interest rates and credit spreads for different levels of investor redemptions.

ESMA Response:
Several respondents confirmed that retail and professional investors have different behaviours. The Guidelines thus include assumption by investor type (retail and professional) calibrated on market data. Among the alternative approaches proposed by the respondents, ESMA considers that there is already a scenario focusing on the units held by the largest investors. Finally, sensitivity tables (provided the latter can be used for a stress test and in a consistent manner) will be considered in future revisions of these Guidelines.

Q24. Do you agree with the additional stress test scenario simulating outflows from the two main investors

40. Three respondents explicitly support the proposal to simulate outflows from the two largest investors. While some respondents explicitly disagree, other respondents express reservations.

41. Two respondents highlight the potential redundancy with the other stress test scenario, depending on the calibration of the outflow figures.

42. Three respondents consider that the assumptions are too simplistic. One respondent considers that the stress would not be meaningful if MMF clients are investors of the same group. One respondent calls for more discretion granted to the MMF in defining this scenario.

43. In terms of implementation, two respondents consider that some AM may not have a sufficient knowledge of its investors to perform the scenario.

ESMA Response:
ESMA believes that a concentrated investor base is a risk that should be tested. It differs from other scenarios which only consider investor nature (retail or professional). ESMA agrees that some assumptions may be more granular. However, the methodology is purposefully kept simple to minimise inconsistency and implementation costs, which may not be negligible according to the response received.

Q25: Do you agree that for the first update of the Guidelines, MMF managers could be asked to combine the impact of the different risk scenarios, including the liquidity shock?

44. The majority of respondents agree with the proposal to combine the impact of the different risk scenarios. However, at least two respondents consider that market stress tests and liquidity stress tests should be treated separately and independently.

45. Several respondents highlight the complexity of this exercise and suggest postponing this scenario (for example in order to benefit from several iterations of the other scenarios) or to give very detailed specification and enough time to perform the stress tests. One respondent considers that ESMA should communicate the reported results, so that these figures could be used in future by the MMF manager for identifying the effect of macro-systemic shocks affecting the economy as a whole. As long as these figures do not exist, the stress test should not be mandatory.

46. In relation to the complexity, one respondent asks to keep the methodology consistent over time, in order to reduce the risk of error.

47. Regarding the assumptions, two respondents suggest to make the scenario consistent with global best practices and standards. One respondent recommends to give the freedom to tailor the stress test to the type of MMF and the type of portfolio in order to make it more relevant. Another respondent suggests to invert the sequencing of events (i.e. where redemptions are followed by worsening market prices), in line with market practices.

ESMA Response:
The methodology has been be revised to address issues related to the redemption component of the scenario, including the sequencing.

For the first exercise, it is important to keep this scenario simple and to promote a consistent implementation. The delay to report the results of the first exercise will depend on the implementation of the MMF reporting and managers will not have to report the results before the rest of the reporting.

3 Annexes

3.1 Annex I

Cost-benefit analysis

1. Introduction

1. The MMF Regulation sets out a comprehensive framework for the regulation of MMFs within Europe. MMFs are AIFs or UCITS that are managed by alternative investment fund managers (AIFMs) or UCITS management companies or investment companies.

2. The MMF Regulation establishes uniform rules regarding MMFs. It mandates ESMA to develop guidelines on stress tests scenarios, to be updated at least yearly. This update is described above in this report, in relation to the stress tests the results of which shall be reported under the reporting template referred to in Article 37 of the MMF Regulation.

2. Technical options

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

4. In identifying the options set out below and choosing the preferred ones, ESMA was guided by the relevant MMF Regulation rules. In particular, Article 27(1) of the MMF Regulation requires MMFs or their managers to regularly conduct stresst testing for different possible scenarios. These stress tests shall be based on objective criteria and consider the effects of severe, but plausible scenarios. The stress test scenarios shall at least take into consideration the risk factors described further below, on which ESMA is to develop Guidelines with a view to establishing common reference parameters under Article 27(7) of the MMF Regulation. These Guidelines must be updated at least every year, taking into account the latest market developments.

2.1. 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)

Policy Objective	The MMF Regulation specifies that one of the risk factors that must be taken into consideration in the stress test scenarios is: a. hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF
Baseline scenario	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) without any

	further specification, except those mentioned in sections 4.1 to 4.6 of the published Guidelines on MMF stress tests. This would leave discretion to managers of MMF to determine the definition of risk factors, calculation methodologies and presentation of results of the stress tests in the reporting template referred to in Article 37 of the MMF Regulation. This could clearly lead to a lack of harmonisation in the application of the provisions of the MMF Regulation across the MMF industry on a potentially sensitive issue. Indeed, uncertainty on the abovementioned requirement could lead to a situation where some MMFs or competent authorities of Member States would apply a stricter approach than others on the choice of the calculation methodologies and on the presentation of results of the stress tests, leading to greater uncertainty for investors of MMFs in the different Member States and lack of comparability of results.
Options	With respect to hypothetical changes in the level of liquidity of the assets held in the portfolio, the two options that are suggested could include: **Option 1:** Calibrated discount factor • The asset manager will apply the discount factors calibrated by ESMA to reflect the increase in liquidity premia due to deterioration of market liquidity conditions in a stress scenario. • For each relevant security (i.e. corporate and government bonds), the discount factors should be applied to the bid prices used for the valuation of the fund at the time of the reporting, according to their type and maturity (see Table A and Table B), to derive an adjusted bid price ($\boldsymbol{Bid_{adj}}$): $$\boldsymbol{Bid_{adj} = (1 - liquidity\ discount) * Bid\ price}$$ • The asset managers should estimate the impact of the potential losses by valuing investment portfolio at the derived adjusted bid price, $\boldsymbol{Bid_{adj}}$, to determine the Stressed NAV and report the impact as a percentage of the reporting NAV:

	$$\textbf{\textit{Asset liquidity risk impact}}\ (\%) = \frac{\textbf{\textit{Reporting NAV}} - \textbf{\textit{Stressed NAV}}}{\textbf{\textit{Reporting NAV}}} * \mathbf{100}$$ **Option 2:** Multiple quoted bid-ask spread • For each relevant security (i.e. corporate and government bonds), the manager of the MMF should consider the quoted bid and ask prices observed in an active market at the time of the reporting. • For each security, the stressed bid-ask spread should be calculated by multiplying the quoted bid-ask spread observed in an active market at the time of the reporting, as a percentage of the actual price, by fixed stress test factor specific to each type of asset considered (e.g. corporate and sovereign bonds). $$\textbf{\textit{Stressed bid-ask}} = \textbf{\textit{Quoted bid-ask spread}} * \textbf{\textit{Asset-class stress factor}}$$ • As trading costs could become substantial in times of heightened stress and illiquidity, the asset-class specific stress factor should reflect the maximum loss due to the unfavourable liquidity condition for each relevant asset class (i.e. corporate and government bonds). • The potential loss in case of forced liquidation should be then computed as the average of the Stressed bid-ask spread weighted by the asset's proportion in the portfolio.
Preferred Option	ESMA will proceed with option 1 which limits the risk of inconsistency compared to option 2 by providing directly the discount factor. Furthermore, option 1 has been revised to improve consistency and minimise implementation costs by referring to other existing regulatory requirements. It now refers to valuation price instead of bid price. Such valuation price shall be consistent with use of the cautious valuation in line with Article 29(3)(a).

2.2. Guidelines under Article 28(1)(b) of the MMF Regulation (hypothetical changes in the level of credit risk of the assets held in the portfolio of the MMF)

Policy Objective	b. The MMF Regulation specifies that one of the risk factors that must be taken into consideration in the stress test scenarios is:hypothetical changes in the level of credit risk of the assets held in the portfolio of the MMF, including credit events and rating events;
Options	With respect 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, the two options that are suggested could include: **Option 1:** Base the stress test on credit spread to the extent possible: • For each security, managers of MMFs should apply the multiplying factor communicated by ESMA. • For each security, managers of MMFs should translate the corresponding change in spread into a haircut. • Managers of MMFs should measure the impact of the cumulated haircuts in percentage of NAV. **Option 2:** MMFs should measure the impact of an increase in credit spread, according to the following rules: • For each security, managers of MMFs should apply the increase in spread communicated by ESMA. • If no spread is available for an instrument, managers of MMFs should use the shock on the reference index given by ESMA. • For each security, managers of MMFs should translate the corresponding change in spread into a haircut. • Managers of MMFs should measure the impact of the cumulated haircuts in percentage of NAV. **Additional Option**: Managers of MMFs should also simulate the default of their two main exposures. The resulting impact on NAV would then be reported.
Preferred Option	ESMA preferred option is option 2, and the additional option, which limits the risk of inconsistency and the cost of implementation by using the same parameters communicated by ESMA.

2.3. Guidelines under Article 28(1)(c)(e) of the MMF Regulation (hypothetical movements of the interest rates and exchange rates *and* hypothetical widening or narrowing of spreads)

Policy Objective	c. The MMF Regulation specifies that one of the risk factors that must be taken into consideration in the stress test scenarios is:hypothetical movements of the interest rates and exchange rates; e. hypothetical widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied
Options	With respect to hypothetical movements of the interest rates and exchange rates, and the hypothetical widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied, managers of MMFs should apply stressed market parameters, according to the following rules: • Managers of MMFs should use the parameters published by ESMA: Interest rate yield shocks. Government bond yield shocks; FX shocks. • For fixed-rate instruments, managers of MMFs should use the same reference rate curve for all instruments denominated in a given currency, originated at the same time, and the reference rate tenor should align with the original maturity of the instrument. For floating rate instruments, instruments may be contractually linked to a particular reference rate, in which case this rate is used as the reference rate instead. • Managers of MMFs should revaluate their portfolio considering the new parameters separately: Interest rates, exchange rates, bond yields; and express the impact of each risk factor in percentage of NAV.
Preferred Option	ESMA will proceed with the proposed option. The scenario will provide granular data points by currency and maturity to facilitate the implementation. Responses to the consultation indicated that the impact of the interest rate scenario and the “widening or narrowing of spreads

	among indices to which interest rates of portfolio securities are tied" scenario may be identical.

2.4. Guidelines under Article 28(1)(d) of the MMF Regulation (hypothetical levels of redemption)

Policy Objective	d. The MMF Regulation specifies that one of the risk factors that must be taken into consideration in the stress test scenarios is:hypothetical levels of redemption;
Options	With respect to hypothetical levels of redemption, the two options that are suggested could include: **Option 1:** MMF faces high weekly redemption requests from both institutional investors and retail investors. The stress test will assess the ability of the fund to meet the redemption pressures in two ways: 1) Reverse liquidity stress test: self-assessment of the maximum size of outflows the fund can face without distorting portfolio allocation. $$\textbf{Result}\ (\%) = \frac{\textbf{Slice of the portfolio that can be liquidated without changing the portfolio allocation}}{\textbf{Weekly outflows}} * \textbf{100}$$ In that scenario: - Assets must be sold in a consistent proportion; - Weekly liquid assets requirements specified in Article 24(1) should be met. 2) Weekly liquidity stress test: weekly outflows derived from the monthly outflows will be compared with available weekly liquid assets, considered as the sum of highly liquid assets and weekly maturing assets. $$\textbf{Result}\ (\%) = \frac{\textbf{Weekly liquid assets}}{\textbf{Weekly outflows}} * \textbf{100}$$

	Additional option: The MMF faces net redemption of its two main investors. The impact of the stress test should be assessed according to the reverse liquidity stress test and the weekly liquidity stress test methodology.
Preferred Option	ESMA will proceed with option 1 and the additional option. Nevertheless, the methodology of the weekly liquidity stress test has been revised to be more consistent with existing provisions (e.g. by using definitions from Articles 24 and 25) to facilitate the implementation and consistency of the stress test. Based on the consultation, the reverse stress test was also adjusted to be more flexible. In particular, ESMA has removed the requirement for MMFs to keep the composition of their portfolio intact and request that they can only distort their portfolios to the extent that they respect regulatory requirements.

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

Policy Objective	e. The MMF Regulation specifies that one of the risk factors that must be taken into consideration in the stress test scenarios is:hypothetical macro systemic shocks affecting the economy as a whole;
Option	With respect to hypothetical macro systemic shocks affecting the economy as a whole, managers should: - Assess the impact of the redemption shock on weekly liquid assets; - Measure the combined impact of the different risk scenarios after redemption; - Report the result as a percentage of NAV; - Report the value of weekly liquid assets after stress as a percentage of NAV.
Preferred Option	ESMA decided to proceed with the proposed option.

	The methodology has been revised to address issues related to the redemption component of the scenario, including the sequencing.

3. Assessment of the impact of the various options

1. Hypothetical changes in the level of liquidity of the assets held in the portfolio of the MMF

Option 1	Qualitative description
Benefits	The two methods proposed are both implicitly based on the assumption that an asset can be liquidated by paying to the liquidity provider a price for immediacy, i.e. a fair discount. The liquidity discount, that is the reduction in the value of an asset by due to the worsened liquidity conditions, is an increasing function of the cost of trading and inversely related to the average holding period of an asset. However, the first factor plays a more relevant role as the MMFs and short-term MMFs portfolios are composed of short-term instruments. Under normal market conditions, it is common practice to refer to a price within the bid-ask spread as the most representative of fair value i.e. the price that would be received to sell an asset (IFRS13). Moreover, the IAS39 indicates that the price used for measuring the fair value of an asset should be adjusted in case of a significant change in economic circumstances and reflect then the amount that an entity would receive in abnormal conditions (e.g. forced transaction, involuntary liquidation or distress sale). In case of stress, the mid-market price of an instrument can remain stable even when the bid-ask widens and no transaction can occur because of the absence of a buyer and/or the lack of marketability. The potential loss would be instead reflected in a lower bid price than the one available under normal conditions in an active market. Calibrating the liquidity discount consistently with the assessment of prevailing sources of (systemic) risk for the EU financial system allows to better gauge the effects of asset liquidity risk under an extreme but plausible stress scenario. The discount would then be applied to the price used for valuation, in line with the rules set at art. 29(3)(a).

Costs	Respondents point out data availability constraints and database cost. ESMA believes this cost is more associated with option 2. Option 1 is unlikely to lead to significant implementation costs to the extent that the discount is provided by ESMA and the implementation requires little computation.

Option 2	Qualitative description
Benefits	The two methods proposed are both implicitly based on the assumption that an asset can be liquidated by paying to the liquidity provider a price for immediacy, i.e. a fair discount. The liquidity discount is an increasing function of the transaction costs and a decreasing function of the average holding period. However, the first factor plays a more relevant role as the MMFs and short-term MMFs portfolios are composed of short-term instruments. The use of the prevailing bid-ask spread considers the current market conditions, thus improving the plausibility of the scenario.
Costs	Compared to option 1, option 2 may lead to some additional costs in the form of data collection and computation based on internal models. In addition, there is a higher risk of inconsistency compared to option 1 which may incur additional cost for supervisors and reporting entities to achieve compliance.

2. Hypothetical changes in the level of credit risk of the assets held in the portfolio of the MMF, including credit events and rating events

Option 1	Qualitative description
Benefits	Credit spreads represent the price of credit risk on the market. Thus, they can measure the short-term value loss of a portfolio.

	Using a multiplying factor considers the current market conditions and thus reflect the risks prevailing at the moment of the stress.
Costs	The proposed approach may lead to some additional costs in the form of computation based on internal models, with a risk of heterogeneity of the results. Eventually, inconsistent results may incur additional cost for supervisors and reporting entities to achieve compliance.

Option 2	**Qualitative description**
Benefits	Credit spreads represent the price of credit risk on the market. Thus, they can measure the short-term value loss of a portfolio. ESMA may provide the credit spreads for a wide range of securities, thus improving the consistency of the approach.
Costs	ESMA is providing detailed parameters for governments (by country and residual maturity) and corporate (by sector and rating) assets. In terms of cost it implies that the cost of acquiring additional data should be reduced. The proposed approach may lead to some additional costs in the form of computation based on internal models. However, the scenario remains simple with only one parameter to input.

Additional option	**Qualitative description**
Benefits	Assessing the default of the two main counterparties would add a dimension of concentration risk to the scenario. It will especially assess risks related to concentration and credit risk stemming from assets which do not have a credit spread.
Costs	The proposed approach is unlikely to lead to significant additional costs due to the simplicity of the assumption.

3. Hypothetical movements of the interest rates and exchange rates. Hypothetical widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied

Option 1	Qualitative description
Benefits	MMFs are exposed to interest rates risks, exchange rate and the movement of indices to which interest rates of portfolio securities are tied. Moreover, the scenario approved by the ESRB allows testing specifically the impact of a movement in the short part of the swap curve to which MMFs are exposed. Assessing such risks is therefore relevant in the context of MMF stress tests.
Costs	The proposed approach may lead to some additional costs in the form of computation based on internal models. However, the scenarios remain simple with only one parameter to input. Moreover, when the impact of the interest rate scenario and the "widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied" scenario are identical managers will be allowed not to report the result of the "widening or narrowing of spreads among indices to which interest rates of portfolio securities are tied" scenario, thus reducing the cost of implementation.

4. Hypothetical levels of redemption

Option 1	Qualitative description
Benefits	Specifying outflows over a certain time horizon challenges MMFs capability to face redemption pressures in a short period of time. Liquidating positions without distorting portfolio allocation requires a technique known as slicing, whereby the same percentage of each asset type (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. Using a reverse stress test and a weekly liquidity stress test captures both the slicing and bucketing approaches. Finally, using a self-assessment for the reverse stress test compensate for the weights imposed in the weekly liquidity stress test, and vice-versa.
Costs	The weekly liquidity stress test is a new approach for managers, thus potentially generating implementation costs. Following the

	consultation, the methodology of the weekly liquidity stress test has been revised to be more consistent with existing provisions (e.g. by using definitions from articles 24 and 25) to facilitate the implementation and consistency of the stress test. Improving consistency with existing definitions should also reduce the implementation cost. The self-assessment of the reverse stress test may lead to some additional costs. Following the consultation, the reverse stress test was adjusted to make it more flexible and in line with the reality. For that reason, we have removed the requirement for MMFs to keep the composition of their portfolio intact and request that they only distort their portfolios "to an extent acceptable".

Additional option	Qualitative description
Benefits	MMFs may face difficulties if their investor base is concentrated. Assessing the redemption from the two main investors would add a dimension of concentration risk to the scenario
Costs	The proposed approach should not lead to significant additional costs due to the simplicity of the assumption.

5. Hypothetical macro systemic shocks affecting the economy as a whole.

Option 1	Qualitative description
Benefits	Considering that a macro systemic shock may spread to all risk factors, ESMA proposes to keep the methodology simple for the first version of the guidelines and to ask the managers to report the combined impact of the different risk scenarios, including the redemption shock. In other words, they would be asked to use the same parameters they used for the different scenarios, but in a combined fashion.

	In future version of the guidelines, ESMA may develop an ad hoc multi-variate scenario, with stressed parameters different from the individual scenarios. It may especially include a narrative, i.e. simulate the impact of a stress event.
Costs	The hypothetical macro systemic shock is the most sophisticated scenario since the combined impact is expected to be different from the sum of the stress test results of all individual risk factors. It shall rely on internal models. To minimize the cost of implementation and the risk of inconsistency, the scenario has been kept simple. Moreover, managers will have more time for the first reporting of the results.

3.2 Annex II (updates in red indicate additional text added which constitutes the 2019 update to the ESMA34-49-115 Guidelines)

1 Scope

Who?

1. These guidelines apply to competent authorities, money market funds and managers of money market funds as defined in the MMF Regulation[4].

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).

[4] Regulation (EU) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds (OJ L 169, 30.06.2017, p. 8).

2 Purpose

4. 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.

5. 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 2019, the section 4.8 of these guidelines is in particular updated so that managers of MMFs have the information needed to fill in the corresponding fields in the reporting template referred to mentioned in Article 37 of the MMF Regulation, as specified by Commission Implementing Regulation (EU) 2018/708[5]. This information includes specifications on the types of the stress tests mentioned in this section 4.8 and their calibration

3 Compliance and reporting obligations

3.1 Status of the guidelines

6. 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.

7. 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

8. 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.

9. 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.

10. 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

11. 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".

12. 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.

13. 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.

14. 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

15. 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.

16. 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.

17. 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.

18. 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.

19. 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

20. 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

21. 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

22. 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.

23. In that context, some hypothesis on the behaviour of the manager with regard to honouring the redemption requests could be required.

24. A practical example of one possible implementation is given in Appendix.

Stress tests in the case of CNAV and LVNAV MMFs

25. 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

26. 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.

27. 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

28. 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.

29. 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

30. 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.

31. 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.

32. 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.

33. 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.

34. 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

35. 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).

36. 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

37. 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.

38. Stress tests on redemptions should include the specific measures which the MMF has the constitutional power to activate (for instance, gates and redemption notice).

39. 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.

40. 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.

41. 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 type (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).

42. 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).

43. 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.

44. 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

45. 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

46. 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.

47. 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.

48. 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)

49. 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

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

- Managers of MMFs should apply the discount factors specified in section 5 of the guidelines[6] 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 ($\mathbf{VPrice}$) in accordance with Article 29(3)(a), according to their type and maturity, to derive an adjusted price ($\mathbf{VPrice_{adj}}$):

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

- The impact of the liquidity discount should be evaluated for the following assets: Sovereign Bonds, Corporate Bonds, Commercial Papers, 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, $\mathbf{VPrice_{adj}}$, to determine the stressed NAV and calculate the impact as a percentage of the reporting NAV:

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

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.

[6] The discount factor is calibrated on bid-ask spreads.

4.8.2 Level of change of credit risk

51. 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

52. 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.

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

2) Concentration stress test

53. 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:

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

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

54. 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

55. 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

56. 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

57. 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

58. Managers of MMFs should revaluate 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:

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

Notes:

The calibration is available in section 5 of the Guidelines.

4.8.4 Levels of redemption

59. 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

60. 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.

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

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 value[7].
- 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,

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

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%.

The calibration is available in section 5 of the Guidelines.

2) Weekly liquidity stress test:

61. 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 25% of the professional investors and 15% 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)[8] 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 without penalty.	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)		

[8] 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.

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

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

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) 2016/1799[9].

- 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 asset classes 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

62. 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.

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

Note:
The calibration is available in section 5 of the Guidelines.

[9] 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

4.8.5 Macro-systemic shocks affecting the economy as a whole

63. 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;
- 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. 15% from retail investors and 25% 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 for 2019

64. The following section includes the 2019 calibration for the MMF stress tests the results of which have to be reported in accordance with Article 37 of the MMF Regulation, and which are detailed in section 4.8 above.

65. If managers need a parameter that is not indicated in this section, they may consult the adverse scenario on the ESRB website[10].

[10] https://www.esrb.europa.eu/mppa/stress/shared/pdf/esrb.stress_test190402_EIOPA_insurance~c5c17193da.en.pdf?172d96eff093ab8ed90c18efd3cf979f

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	0.06	0.14	0.20	0.20	0.20
ES	0.23	0.44	0.70	0.72	0.75
FR	0.05	0.10	0.19	0.24	0.30
IT	0.47	0.62	0.63	0.64	0.65
NL	0.04	0.04	0.15	0.18	0.20

Table 2

Liquidity discount factor - Sovereign bonds by rating and residual maturity (in %)					
	3M	6M	1Y	1.5Y	2Y
AAA	0.05	0.09	0.18	0.19	0.20
AA	0.07	0.18	0.32	0.42	0.53
A	0.13	0.25	0.70	0.72	0.75
BBB	0.47	0.55	0.70	0.72	0.75
Below BBB or unrated	0.61	0.72	0.82	0.94	0.98

Table 3

Liquidity discount factor - Corporate bonds by rating and residual maturity (in %)					
	3M	6M	1Y	1.5Y	2Y
AAA	0.15	0.28	0.56	0.60	0.64
AA	0.23	0.56	1.02	1.35	1.69
A	0.43	0.79	2.24	2.32	2.40
BBB	1.50	1.77	2.24	2.32	2.40
Below BBB or unrated	1.96	2.30	2.91	2.95	2.99

5.2 Common reference parameters of the 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

Scope of the scenario

MMFR Eligible assets	Typical assets	Credit (credit spreads)		Credit (2 main counterparties)	
		Stressed	Parameters	Stressed	Parameters
(a) money market instruments	-Certificate of deposit (CD)	Yes	Table 5	Yes	Table 6
	-Commercial Paper (CP)	Yes	Table 5	Yes	Table 6
	-Government bonds, treasury and local authority bills	Yes	Table 4	Yes	Table 6
	-Corporate bonds	Yes	Table 5	Yes	Table 6
(b) eligible securitisations and asset-backed commercial paper (ABCPs)	-Eligible securitisations	Yes	Table 5	Yes	Table 6
	-ABCPs	Yes	Table 5	Yes	Table 6
(c) deposits with credit institutions	-Deposits, of which time deposits	No		No	
(d) financial derivative instruments	-Financial derivative instruments dealt in on a regulated market	No		No	
	-Financial derivative instruments dealt OTC	No		No	
(e) repurchase agreements	-Repos	No		No	
(f) reverse repurchase agreements	-Reverse repos	No		No	
(g) units or shares of other MMFs	-Shares issued by other MMFs	Yes	Extrapolation of the results to shares issued by other MMFs	Yes	Extrapolation of the results to shares issued by other MMFs

Table 4: Shocks to government bond credit spreads

Credit Spread by residual maturity - Government bonds (basis points)					
Geographic Area	**Country**	**3M**	**6M**	**1Y**	**2Y**
EU	**Austria**	12	13	16	20
EU	**Belgium**	11	12	14	22
EU	**Croatia**	3	3	3	4
EU	**Cyprus**	49	55	71	71
EU	**Czech Republic**	85	95	125	125
EU	**Denmark**	12	13	16	17
EU	**Finland**	8	8	9	13
EU	**France**	13	14	17	23
EU	**Germany**	5	5	5	5
EU	**Greece**	67	75	98	114
EU	**Hungary**	69	77	101	121
EU	**Ireland**	56	62	81	84
EU	**Italy**	58	65	85	102
EU	**Latvia**	3	3	3	19
EU	**Lithuania**	9	9	11	24
EU	**Malta**	24	26	33	41
EU	**Netherlands**	9	10	12	15
EU	**Poland**	85	95	125	125
EU	**Portugal**	23	25	31	66
EU	**Romania**	23	26	32	48
EU	**Slovakia**	21	23	30	34
EU	**Slovenia**	35	39	50	58
EU	**Spain**	65	73	95	113
EU	**Sweden**	42	46	60	60
EU	**United Kingdom**	38	42	54	79
EA (weighted averages)	**EA (weighted averages)**	25	27	35	42
EU (weighted averages)	**EU (weighted averages)**	30	33	42	44
EEA	**EEA (including Switzerland)**	30	33	42	44
US	**United States**	44	48	61	75
JP	**Japan**	85	95	127	141
Other advanced economies	**Other advanced economies**	42	52	77	78
Emerging markets	**Emerging markets**	50	85	161	161

Table 5: Shocks to corporate bond and ABS credit spreads (all maturities)

Rating	Corporate credit spreads (basis points)			
	Non-financial	Financial covered	Financial	ABS
AAA	39	44	57	76
AA	40	52	63	96
A	41	113	124	116
BBB	66	163	180	160
BB	78	188	204	208
B	91	213	234	238
Below B or unrated	103	237	269	270

Table 6: Loss given default

Loss given default (%)	
Senior exposure	45
Subordinated exposure	75

5.3 Common reference parameters of the stress test scenarios in relation to hypothetical movements of the interest rates

Scope of the scenario

MMFR Eligible assets	Typical assets	IR (Interest rate swap)	
		Stressed	Parameters
(a) money market instruments	-Certificate of deposit (CD)	Yes	Table 6, 7
	-Commercial Paper (CP)	Yes	Table 6, 7
	-Government bonds, treasury and local authority bills	Yes	Table 6, 7
	-Corporate bonds	Yes	Table 6, 7
(b) eligible securitisations and asset-backed commercial paper (ABCPs)	-Eligible securitisations	Yes	Table 6, 7
	-ABCPs	Yes	Table 6, 7
(c) deposits with credit institutions	-Deposits, of which time deposits	Yes	Table 6, 7
(d) financial derivative instruments	-Financial derivative instruments dealt in on a regulated market	Yes	Table 6, 7
	-Financial derivative instruments dealt OTC	Yes	Table 6, 7
(e) repurchase agreements	-Repos	No	
(f) reverse repurchase agreements	-Reverse repos	Yes	Table 6, 7
(g) units or shares of other MMFs	-Shares issued by other MMFs	Yes	Extrapolation of the results to shares issued by other MMFs

Table 6: Shocks to swap rates

Interest rate yield shocks absolute changes (basis points)							
Geographic Area	**Country**	**Description**	**1M**	**3M**	**6M**	**1Y**	**2Y**
EU	**Euro Area**	Interest rate SWAP on the EUR (Euro)	53	53	60	80	71
EU	**Croatia**	Interest rate SWAP on the HRK (Croatian Kuna)	53	53	60	80	71
EU	**Czech Republic**	Interest rate SWAP on the CZK (Czech Koruna)	-4	-4	-4	-5	3
EU	**Denmark**	Interest rate SWAP on the DKK (Danish Krone)	53	53	60	80	71
EU	**Hungary**	Interest rate SWAP on the HUF (Hungarian Forint)	74	74	83	111	119
EU	**Poland**	Interest rate SWAP on the PLN (Polish Zloty)	25	25	28	37	53
EU	**Romania**	Interest rate SWAP on the RON (Romanian Leu)	153	153	172	229	217
EU	**Sweden**	Interest rate SWAP on the SEK (Swedish Krona)	26	26	30	40	55
EU	**United Kingdom**	Interest rate SWAP on the GBP (British Pound)	98	98	110	146	130
Rest of Europe	**Norway**	Interest rate SWAP on the NOK (Norwegian Krone)	20	20	22	30	39
Rest of Europe	**Russia**	Interest rate SWAP on the RUB (Russian Ruble)	122	122	137	183	184
Rest of Europe	**Switzerland**	Interest rate SWAP on the CHF (Swiss Franc)	31	31	35	46	54
Rest of Europe	**Turkey**	Interest rate SWAP on the TRY (Turkish Lira)	197	197	221	295	307
North America	**Canada**	Interest rate SWAP on the CAD (Canadian Dollar)	46	46	51	68	70
North America	**US**	Interest rate SWAP on the USD (US Dollar)	93	93	105	140	125
Australia and Pacific	**Australia**	Interest rate SWAP on the AUD (Australian Dollar)	33	33	37	50	62
South and central America	**Chile**	Interest rate SWAP on the CLP (Chilean Peso)	206	206	232	309	376
South and central America	**Colombia**	Interest rate SWAP on the COP (Colombian Peso)	162	162	183	243	276
South and central America	**Mexico**	Interest rate SWAP on the MXN (Mexican Peso)	245	245	276	368	360
Asia	**China**	Interest rate SWAP on the CNY (Chinese Yuan)	13	13	14	19	17
Asia	**Hong Kong**	Interest rate SWAP on the HKD (Hong Kong Dollar)	208	208	235	313	320
Asia	**India**	Interest rate SWAP on the INR (Indian Rupee)	263	263	296	395	394
Asia	**Japan**	Interest rate SWAP on the JPY (Japanese Yen)	9	9	10	14	19
Asia	**Korea**	Interest rate SWAP on the KRW (South Korean Won)	134	134	150	200	209
Asia	**Malaysia**	Interest rate SWAP on the MYR (Malaysian Ringgit)	90	90	101	134	153
Asia	**Singapore**	Interest rate SWAP on the SGD (Singapore Dollar)	116	116	130	173	176
Asia	**Thailand**	Interest rate SWAP on the THB (Thai Baht)	164	164	184	245	257
Africa	**South Africa**	Interest rate SWAP on the ZAR (South African Rand)	10	10	11	14	25

Table 7 Shocks to swap rates (default values for countries not included in table 6)

Interest rate yield shocks absolute changes (basis points)						
Geographic Area	**Description**	**1M**	**3M**	**6M**	**1Y**	**2Y**
EU	Default value for countries not included in table 6	59	59	66	89	88
Other advanced economies	Default value for countries not included in table 6	39	39	44	59	66
Other emerging markets	Default value for countries not included in table 6	231	231	260	346	363

5.4 Common reference parameters of the stress test scenarios in relation to hypothetical movements of the exchange rates

Scope of the scenario

MMFR Eligible assets	Typical assets	FX (Appreciation of the EUR)		FX (Depreciation of the EUR)	
		Stressed	Parameters	Stressed	Parameters
(a) money market instruments	-Certificate of deposit (CD)	Yes	Table 8	Yes	Table 9
	-Commercial Paper (CP)	Yes	Table 8	Yes	Table 9
	-Government bonds, treasury and local authority bills	Yes	Table 8	Yes	Table 9
	-Corporate bonds	Yes	Table 8	Yes	Table 9
(b) eligible securitisations and asset-backed commercial paper (ABCPs)	-Eligible securitisations	Yes	Table 8	Yes	Table 9
	-ABCPs	Yes	Table 8	Yes	Table 9
(c) deposits with credit institutions	-Deposits, of which time deposits	Yes	Table 8	Yes	Table 9
(d) financial derivative instruments	-Financial derivative instruments dealt in on a regulated market	Yes	Table 8	Yes	Table 9
	-Financial derivative instruments dealt OTC	Yes	Table 8	Yes	Table 9
(e) repurchase agreements	-Repos	No		No	
(f) reverse repurchase agreements	-Reverse repos	Yes	Table 8	Yes	Table 9
(g) units or shares of other MMFs	-Shares issued by other MMFs	Yes	Extrapolation of the results to shares issued by other MMFs	Yes	Extrapolation of the results to shares issued by other MMFs

Table 8

FX shocks (appreciation of the EUR against the USD) relative changes (%)			
Geographic Area	**Description**	**Exchange rate name**	**Shock**
EU	USDBGN represents 1 USD per x BGN (Bulgarian Lev)	**USDBGN**	-25.4
EU	EURCZK represents 1 EUR per x CZK (Czech Koruna)	**EURCZK**	-2.2
EU	EURGBP represents 1 EUR per x GBP (British Pound)	**EURGBP**	11.1
EU	EURHRK represents 1 EUR per x HRK (Croatian Kune)	**EURHRK**	0.1
EU	EURHUF represents 1 EUR per x HUF (Hungarian Forints)	**EURHUF**	-5.2
EU	USDNOK represents 1 USD per x NOK (Norwegian Krone)	**USDNOK**	-23.2
EU	EURPLN represents 1 EUR per x PLN (Polish Zloty)	**EURPLN**	-1.5
EU	EURRON represents 1 EUR per x RON (Romanian Leu)	**EURRON**	0.0
EU	EURRSD represents 1 EUR per x RSD (Serbian Dinar)	**EURRSD**	-1.9
EU	USDSEK represents 1 USD per x SEK (Swedish Krona)	**USDSEK**	-25.4
Rest of Europe	EURCHF represents 1 EUR per x CHF (Swiss Franc)	**EURCHF**	3.7
Rest of Europe	EURRUB represents 1 EUR per x RUB (Russian Ruble)	**EURRUB**	10.1
Rest of Europe	EURTRY represents 1 EUR per x TRY (Turkish Lira)	**EURTRY**	13.5
North America	USDCAD represents 1 USD per x CAD (Canadian dollar)	**USDCAD**	-13.0
North America	EURUSD represents 1 EUR per x USD (US Dollar)	**EURUSD**	25.4
Australia and Pacific	AUDUSD represents 1 AUD per x USD (Australian Dollar)	**AUDUSD**	17.5
Australia and Pacific	NZDUSD represents 1 NZD per x USD (New Zealand Dollar)	**NZDUSD**	18.0
South and central America	USDARS represents 1 USD per x ARS (Argentine Peso)	**USDARS**	-0.8
South and central America	USDBRL represents 1 USD per x BRL (Brazilian Real)	**USDBRL**	-12.2
South and central America	USDMXN represents 1 USD per x MXN (Mexican Peso)	**USDMXN**	-7.9
Asia	USDCNY represents 1 USD per x CNY (Chinese Yuan Renminbi)	**USDCNY**	-0.7
Asia	USDHKD represents 1 USD per x HKD (Hong Kong Dollar)	**USDHKD**	-0.1
Asia	USDINR represents 1 USD per x INR (Indian Rupee)	**USDINR**	-2.5
Asia	USDJPY represents 1 USD per x JPY (Japanese Yen)	**USDJPY**	-8.7
Asia	USDKRW represents 1 USD per x KRW (South Korean Won)	**USDKRW**	-2.1
Asia	USDMYR represents 1 USD per x MYR (Malaysian Ringgit)	**USDMYR**	-2.3
Asia	USDSGD represents 1 USD per x SGD (Singapore Dollar)	**USDSGD**	-10.4
Asia	USDTHB represents 1 USD per x THB (Thai Baht)	**USDTHB**	-2.3
Africa	USDZAR represents 1 USD per x ZAR (South African Rand)	**USDZAR**	-14.0

Table 9

FX shocks (depreciation of the EUR against the USD) relative changes (%)			
Geographic Area	**Description**	**Exchange rate name**	**Shock**
EU	USDBGN represents 1 USD per x BGN (Bulgarian Lev)	**USDBGN**	17.0
EU	EURCZK represents 1 EUR per x CZK (Czech Koruna)	**EURCZK**	2.4
EU	EURGBP represents 1 EUR per x GBP (British Pound)	**EURGBP**	-6.5
EU	EURHRK represents 1 EUR per x HRK (Croatian Kune)	**EURHRK**	-0.4
EU	EURHUF represents 1 EUR per x HUF (Hungarian Forints)	**EURHUF**	4.0
EU	USDNOK represents 1 USD per x NOK (Norwegian Krone)	**USDNOK**	17.7
EU	EURPLN represents 1 EUR per x PLN (Polish Zloty)	**EURPLN**	3.6
EU	EURRON represents 1 EUR per x RON (Romanian Leu)	**EURRON**	0.8
EU	EURRSD represents 1 EUR per x RSD (Serbian Dinar)	**EURRSD**	-1.5
EU	USDSEK represents 1 USD per x SEK (Swedish Krona)	**USDSEK**	18.4
Rest of Europe	EURCHF represents 1 EUR per x CHF (Swiss Franc)	**EURCHF**	-3.6
Rest of Europe	EURRUB represents 1 EUR per x RUB (Russian Ruble)	**EURRUB**	-9.6
Rest of Europe	EURTRY represents 1 EUR per x TRY (Turkish Lira)	**EURTRY**	-5.5
North America	USDCAD represents 1 USD per x CAD (Canadian dollar)	**USDCAD**	8.9
North America	EURUSD represents 1 EUR per x USD (US Dollar)	**EURUSD**	-17.0
Australia and Pacific	AUDUSD represents 1 AUD per x USD (Australian Dollar)	**AUDUSD**	-13.3
Australia and Pacific	NZDUSD represents 1 NZD per x USD (New Zealand Dollar)	**NZDUSD**	-13.6
South and central America	USDARS represents 1 USD per x ARS (Argentine Peso)	**USDARS**	1.3
South and central America	USDBRL represents 1 USD per x BRL (Brazilian Real)	**USDBRL**	9.1
South and central America	USDMXN represents 1 USD per x MXN (Mexican Peso)	**USDMXN**	7.1
Asia	USDCNY represents 1 USD per x CNY (Chinese Yuan Renminbi)	**USDCNY**	0.4
Asia	USDHKD represents 1 USD per x HKD (Hong Kong Dollar)	**USDHKD**	0.1
Asia	USDINR represents 1 USD per x INR (Indian Rupee)	**USDINR**	2.3
Asia	USDJPY represents 1 USD per x JPY (Japanese Yen)	**USDJPY**	4.5
Asia	USDKRW represents 1 USD per x KRW (South Korean Won)	**USDKRW**	3.0
Asia	USDMYR represents 1 USD per x MYR (Malaysian Ringgit)	**USDMYR**	1.5
Asia	USDSGD represents 1 USD per x SGD (Singapore Dollar)	**USDSGD**	6.1
Asia	USDTHB represents 1 USD per x THB (Thai Baht)	**USDTHB**	1.6
Africa	USDZAR represents 1 USD per x ZAR (South African Rand)	**USDZAR**	14.4

5.5 Common reference parameters of the stress test scenarios in relation to hypothetical widening or narrowing of spreads among indexes to which interest rates of portfolio securities are tied

Scope of the scenario

MMFR Eligible assets	Typical assets	IR (Interest rate swap)	
		Stressed	Parameters
(a) money market instruments	-Certificate of deposit (CD)	Yes	Table 6, 7
	-Commercial Paper (CP)	Yes	Table 6, 7
	-Government bonds, treasury and local authority bills	Yes	Table 6, 7
	-Corporate bonds	Yes	Table 6, 7
(b) eligible securitisations and asset-backed commercial paper (ABCPs)	-Eligible securitisations	Yes	Table 6, 7
	-ABCPs	Yes	Table 6, 7
(c) deposits with credit institutions	-Deposits, of which time deposits	Yes	Table 6, 7
(d) financial derivative instruments	-Financial derivative instruments dealt in on a regulated market	Yes	Table 6, 7
	-Financial derivative instruments dealt OTC	Yes	Table 6, 7
(e) repurchase agreements	-Repos	No	
(f) reverse repurchase agreements	-Reverse repos	Yes	Table 6, 7
(g) units or shares of other MMFs	-Shares issued by other MMFs	Yes	Extrapolation of the results to shares issued by other MMFs

5.6 Common reference parameters of the stress test scenarios in relation to hypothetical levels of redemption

Scope of the scenario

MMFR Eligible assets	Typical assets	Redemption (reverse liquidity ST)		Redemption (weekly liquidity ST		Redemption (2 main investors)	
		Stressed	Parameters	Stressed	Parameters	Stressed	Parameters
(a) money market instruments	-Certificate of deposit (CD)	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
	-Commercial Paper (CP)	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
	-Government bonds, treasury and local authority bills	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
	-Corporate bonds	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
(b) eligible securitisations and asset-backed commercial paper (ABCPs)	-Eligible securitisations	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
	-ABCPs	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
(c) deposits with credit institutions	-Deposits, of which time deposits	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
(d) financial derivative instruments	-Financial derivative instruments dealt in on a regulated market	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
	-Financial derivative instruments dealt OTC	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
(e) repurchase agreements	-Repos	Yes	Self-assessment	No	Table 10, 11	No	Table 10
(f) reverse repurchase agreements	-Reverse repos	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10
(g) units or shares of other MMFs	-Shares issued by other MMFs	Yes	Self-assessment	Yes	Table 10, 11	Yes	Table 10

Table 10

Assets	Article	CQS
Assets referred to in Article 17(7)[1] 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 without penalty	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) 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)		

Table 11

Net outflows (%)	
Professional investor	25
Retail investor	15

5.7 Common reference parameters of the stress test scenarios in relation to hypothetical macro systemic shocks affecting the economy as a whole

Scope of the scenario

MMFR Eligible assets	Typical assets	Macro	
		Stressed	Parameters
(a) money market instruments	-Certificate of deposit (CD)	Yes	Tables 1,2,3,4,5,6,7,8,10,11
	-Commercial Paper (CP)	Yes	Tables 1,2,3,4,5,6,7,8,10,11
	-Government bonds, treasury and local authority bills	Yes	Tables 1,2,3,4,5,6,7,8,10,11
	-Corporate bonds	Yes	Tables 1,2,3,4,5,6,7,8,10,11
(b) eligible securitisations and asset-backed commercial paper (ABCPs)	-Eligible securitisations	Yes	Tables 1,2,3,4,5,6,7,8,10,11
	-ABCPs	Yes	Tables 1,2,3,4,5,6,7,8,10,11
(c) deposits with credit institutions	-Deposits, of which time deposits	Yes	Tables 1,2,3,4,5,6,7,8,10,11
(d) financial derivative instruments	-Financial derivative instruments dealt in on a regulated market	Yes	Tables 1,2,3,4,5,6,7,8,10,11
	-Financial derivative instruments dealt OTC	Yes	Tables 1,2,3,4,5,6,7,8,10,11
(e) repurchase agreements	-Repos	No	Tables 1,2,3,4,5,6,7,8,10,11
(f) reverse repurchase agreements	-Reverse repos	Yes	Tables 1,2,3,4,5,6,7,8,10,11
(g) units or shares of other MMFs	-Shares issued by other MMFs	Yes	Tables 1,2,3,4,5,6,7,8,10,11

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

	Stressed redemptions for this investor category
Large institutional	75%
Group entity (bank, insurance, own account)	0% (in agreement with the AMC)
Investment fund	65%
Small institutional	25%
Private banking network	40%
Retail investor with distributor A	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.

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

67.

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.