

EBA/CP/2016/28

18 December 2015

Consultation Paper

Draft Guidelines on stress testing and supervisory stress testing

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1. Responding to this consultation

The EBA invites comments on all proposals put forward in this paper.

Comments are most helpful if they:

- respond to the question stated;
- indicate the specific point to which a comment relates;
- contain a clear rationale;
- provide evidence to support the views expressed/ rationale proposed; and
- describe any alternative regulatory choices the EBA should consider.

Submission of responses

To submit your comments, click on the 'send your comments' button on the consultation page by **18.03.2016**. Please note that comments submitted after this deadline, or submitted via other means may not be processed.

Publication of responses

Please clearly indicate in the consultation form if you wish your comments to be disclosed or to be treated as confidential. A confidential response may be requested from us in accordance with the EBA's rules on public access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by the EBA's Board of Appeal and the European Ombudsman.

Data protection

The protection of individuals with regard to the processing of personal data by the EBA is based on Regulation (EC) N° 45/2001 of the European Parliament and of the Council of 18 December 2000 as implemented by the EBA in its implementing rules adopted by its Management Board. Further information on data protection can be found under the Legal notice section of the EBA website.

2. Executive Summary

These guidelines aim at achieving convergence of practices followed by institutions and competent authorities for stress testing across the EU. They provide detailed guidance to be complied with by institutions when designing and conducting a stress testing programme. They also provide guidance with a view to ensuring convergence for supervisory stress testing in the context of the supervisory review and evaluation process performed by competent authorities in accordance with Article 100 of Directive 2013/36/EU. The EBA issues these guidelines partly to cover and update the CEBS guidelines on institutions' stress testing (GL 32), which will be repealed and replaced by these guidelines, and partly on the basis of Article 100(2) of Directive 2013/36/EU basis to cover supervisory stress testing. These updated guidelines are drafted to ensure consistency with the EBA Guidelines on common procedures and methodologies for SREP.

The guidelines reflect lessons learned during the 2014 EU-wide Stress Test and build on the conclusions of the peer review of the implementation of the CEBS Guidelines on Stress Testing (GL32). These guidelines do not set methodologies for the stress tests conducted by the EBA in cooperation with other competent authorities; however they do describe the range of stress tests help to set the appropriate context for the consideration of future EBA stress tests as one part of the suite supervisory stress tests. It is noted that supervisory stress testing is established in Article 100 of Directive 2013/36/EU as an obligation of competent authorities independent and distinct from the official sector Union-wide stress test already foreseen since 2010 in the Article 22 of Regulation (EU) 1093/2010.

These guidelines cover: (1) institutions' stress testing; (2) supervisory assessment of the institutions' stress testing; and (3) supervisory stress testing.

The guidelines establish and develop the following concepts: the taxonomy of stress testing; the description of types of stress test exercises and the use of the outcomes when assessing capital and liquidity adequacy under SREP; the reverse stress testing process for both regular stress testing and recovery planning purposes; additional issues that have gained importance in the stress testing programme and need to be incorporated and properly defined, such as conduct risk and litigation costs, FX lending risk, business models and data aggregation.

These guidelines recognise the principle of proportionality in both the quantitative and the qualitative aspects of stress testing: small and less complex institutions may focus more on the qualitative aspects whilst larger or more complex institutions will require more sophisticated stress testing techniques. For instance, stress testing of governance aspects requires a certain frequency to be a meaningful attribute of an institution's risk management system. Such frequency should be determined having regard not only to the scope and type of the stress test but also the size and complexity of institution (proportionality principle), among other aspects. Moreover, regarding scope and coverage, stress tests should capture risks at various levels in an institution. In this regard, according to the proportionality principle, the scope of stress testing may vary from simple portfolio level sensitivity or individual risk level analyses to comprehensive institution-wide scenario stress testing.

Next steps

The guidelines are published for a three-month public consultation until 18 March 2016. They will be then finalised based on the outcomes of the consultation and translated into the official EU languages and published on the EBA website. The deadline for competent authorities to report whether they comply with the guidelines will be two months after the publication of the translations. The EBA aims to finalise the proposed guidelines during 2016, taking into account the comments received during the consultation and as currently foreseen, the application date will be in the last quarter of 2016.

3. Background and rationale

The EBA is mandated to foster sound and effective supervision across the EU arising from the requirements specified in Directive 2013/36/EU and more generally from its obligations under its founding regulation (Regulation (EU) No 1093/2010).

The relevant provisions legally supporting the issuance of the revised guidelines are the provisions of Articles 100 (2) of Directive 2013/36/EU, Article 16 of the EBA Regulation and the relevant principles set out in Regulation (EU) No 575/2013 and Directive 2013/36/EU.

Article 100(2) of Directive 2013/36/EU empowers EBA to issue guidelines to ensure that common methodologies are used by competent authorities when conducting annual supervisory stress tests. Additionally, Article 107 of the same directive stipulates that the EBA needs to assess the information provided by competent authorities for the purposes of developing consistency in the supervisory review and evaluation process.

Article 16 of Regulation (EU) No 1093/2010 provides that the EBA shall, with a view to establishing consistent, efficient and effective supervisory practices within the ESFS, and to ensuring the common, uniform and consistent application of Union law, issue guidelines and recommendations addressed to competent authorities or financial institutions.

Institutions are required to take a forward-looking view in their risk management, strategic planning, capital planning and liquidity planning as part of their internal capital adequacy assessment process required by Article 73 of Directive 2013/36/EU. One of the tools institutions can use to facilitate this forward-looking perspective in risk management is stress testing.

Since 2010, when the CEBS Guidelines on Stress Testing were issued, there have been a number of developments in stress testing with regard to its methodologies and usage. The financial crisis and several negative events in the financial sector since 2010 highlighted significant lessons in relation to stress testing practices. Supervisory expectations of institutions' stress testing practices have developed in light of the recent experience both within the EU and beyond. Several important conclusions were drawn from the 2013 EBA peer review on the implementation of the stress testing guidelines. The aim of the peer review performed by the EBA was to assess and compare the effectiveness of the supervisory activities related to the review of credit institutions' own stress testing programmes across the EU, as well as the implementation of related provisions by competent authorities¹. In particular the results of the peer review suggested that all competent authorities' organisational and resource models had benefits, however, irrespective of the model, dedicated stress testing technical experts should have been involved. Competent authorities often focused on the largest institutions in their respective jurisdictions, and devoted far less attention to other institutions. Very few competent authorities required reverse stress testing, and when they did, it was often as part of a recovery planning only. Moreover, the incorporation of the outcomes of stress testing into the supervisory review and evaluation process (SREP) and the joint decision process on institution-specific prudential requirements for cross-border groups was handled differently across

¹ <https://www.eba.europa.eu/-/eba-publishes-peer-review-on-the-implementation-of-the-stress-testing-guidelines>



jurisdictions. Many of the assessed competent authorities have shown evidence of substantial work on top-down stress testing, from both a micro- and macro-prudential perspective.

Furthermore, in many instances, competent authorities observed that stress testing was not sufficiently integrated into the institutions' risk management frameworks or senior management decision-making. In general, where stress testing was used, scenarios continued to be insufficiently severe. In other instances, competent authorities were observing that risk concentrations and feedback effects were not considered by institutions in a meaningful fashion.

These guidelines aim at addressing deficiencies identified in the EBA peer review, and will assist institutions in understanding supervisory expectations of appropriate stress testing governance and infrastructure, and also cover the use of stress testing as a risk management tool. These guidelines are designed to identify the relevant building blocks required for an effective stress testing programme from simple sensitivity analysis on single risk factors or portfolios to complex macroeconomic scenario stress testing on an institution-wide basis.

While institutions' stress testing is a risk management tool that has been used for a long time, there remains substantial ambiguity and overlap in several terms and definitions. These guidelines, therefore, provide a taxonomy.

Additionally, in recent years, some issues have gained importance in the stress testing programmes and need to be incorporated and properly defined, such as the role of reverse stress testing in recovery and resolution planning. Moreover, new individual risk categories are covered. In addition, business models, data aggregation and other concepts were updated as 2010 GL32 became outdated and did not reflect best industry and supervisory practices.

These guidelines are organised into three sections: (1) institution's stress testing; (2) supervisory assessment of the institution stress testing; and (3) supervisory stress testing.

(1) The institution's stress testing section focuses on the overarching principles of governance including: (a) stress testing governance structures and their use including the application of the guidelines on internal governance of stress testing; (b) data infrastructure, in particular data aggregation capabilities and reporting practices; (c) stress testing scope and coverage, taking into account a multi-layered approach from simple portfolio-level and individual risk level stress testing to comprehensive institution-wide stress testing; (d) possible methodologies including the importance of undertaking both simple sensitivity analyses and more complex scenario stress testing, the severity of scenarios, and highlighting the importance of qualitative and quantitative approaches to reverse stress testing; (e) a range of, non-exhaustive, individual risk categories to take into account in relation to stress testing with the aim of enhancing risk management and capital planning and liquidity processes; (f) the application of stress testing programmes, including the interaction between the outputs of stress tests and management actions and the application for recovery and resolution purposes, and the use of stress tests to assess the viability of the institution's capital plan in adverse circumstances in the context of ICAAP and ILAAP.

(2) The supervisory assessment of the institution's stress testing section provides guidelines to supervisors on particular topics ranging from challenging the scenario selection to the use of stress testing outcomes when assessing capital and liquidity adequacy under SREP.



(3) The supervisory stress testing section focuses on different forms of supervisory stress testing and objectives, the respective use for SREP purposes, the aspects related to the organisation, resources and communication, and possible methodologies.

The principle of proportionality applies to all aspects of these guidelines, including the methodology, as well as the frequency and the degree of detail of the stress tests. These guidelines also recognise the principle of proportionality by describing both quantitative and qualitative aspects of stress testing.

Furthermore, the guidelines set out an approach to dealing with the quantitative results of institutions' stress tests done for ICAAP purposes and supervisory stress tests aimed at the assessment of the institutions capital adequacy under SREP. In particular, the guidelines complement Section 7.7 of EBA Guidelines on common procedures and methodologies for SREP by further clarifying and operationalising procedure for dealing with instances, where the results of stress tests would suggest that an institution will not be able to meet its Total SREP Capital Requirement (TSCR) and/or target ratio set by the competent authorities in the context of the system-wide stress tests at a level higher than TSCR.

The proportionality principle is invoked in these guidelines to discuss the level of sophistication of the stress testing methodologies, practices and infrastructure required in relation to the size, structure and internal organisation (also taking into account the nature, scope and complexity of activities) of an institution always in connection with the SREP category where that institution belongs to.

Thus, these guidelines are applicable in their entirety to Category 1 (systemically-important) institutions. Category 2 (less or non-systemic) institutions' compliance with the guidelines is calibrated in accordance with their size and the features and complexity of their activities; particular attention is paid to their domestic or cross-border, simple or multiple business line of their activities, characteristics which need to be reflected in their stress testing.

For Category 3 and 4 institutions (small and medium institutions) calibration on the basis of proportionality dictates that the guidance provided in these guidelines is followed to the extent that they are proportionate and relevant to their activities, resources and the risk posed to the financial system. The scope of the stress testing for these institutions is therefore limited, reflecting the reduced scope of their activities and limited risk to the system overall.

Proportionality criteria should also apply to portfolio-level stress tests based on the complexity and relative size of the portfolio under consideration. For deciding which portfolios need portfolio stress tests also the overall risk situation should be taken into account. Nevertheless, no portfolio can be left out when assessing the overall risk situation or conducting a combined stress test as smaller risks in lesser important portfolios may sum up to an important risk when addressing the whole institution.

Parent institutions (including EU parents) are expected to implement these guidelines and set up stress testing programmes covering their respective consolidated level and, where applicable, material entities and/or business lines subject to the principles of proportionality, materiality and relevance.

4. Draft guidelines

In between the text of the draft RTS/ITS/Guidelines/advice that follows, further explanations on specific aspects of the proposed text are occasionally provided, which either offer examples or provide the rationale behind a provision, or set out specific questions for the consultation process. Where this is the case, this explanatory text appears in a framed text box.



EBA/GL-REC/20XX/XX

DD Month YYYY

Draft Guidelines

on stress testing and supervisory stress testing



1. Compliance and reporting obligations

Status of these guidelines

1. This document contains guidelines issued pursuant to Article 16 of Regulation (EU) No 1093/2010². In accordance with Article 16(3) of Regulation (EU) No 1093/2010, competent authorities and financial institutions must make every effort to comply with the guidelines.
2. Guidelines set the EBA view of appropriate supervisory practices within the European System of Financial Supervision or of how Union law should be applied in a particular area. Competent authorities as defined in Article 4(2) of Regulation (EU) No 1093/2010 to whom guidelines apply should comply by incorporating them into their practices as appropriate (e.g. by amending their legal framework or their supervisory processes), including where guidelines are directed primarily at institutions.

Reporting requirements

3. According to Article 16(3) of Regulation (EU) No 1093/2010, competent authorities must notify the EBA as to whether they comply or intend to comply with these guidelines, or otherwise with reasons for non-compliance, by ([dd.mm.yyyy]). In the absence of any notification by this deadline, competent authorities will be considered by the EBA to be non-compliant. Notifications should be sent by submitting the form available on the EBA website to compliance@eba.europa.eu with the reference 'EBA/GL/201x/xx'. Notifications should be submitted by persons with appropriate authority to report compliance on behalf of their competent authorities. Any change in the status of compliance must also be reported to EBA.
4. Notifications will be published on the EBA website, in line with Article 16(3).

² Regulation (EU) No 1093/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Banking Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/78/EC, (OJ L 331, 15.12.2010, p.12).

2. Subject matter, scope and definitions

Subject matter and scope of application

5. These guidelines aim at providing:
 - a. common organisational requirements, methodologies and processes for the performance of stress testing by institutions as part of their risk management processes ('institution's stress testing');
 - b. common methodologies to be used by competent authorities when conducting supervisory stress tests in the context of their supervisory review and evaluation process (SREP) ('supervisory stress testing') as referred to in Article 100(2) of Directive 2013/36/EU.
6. These guidelines do not set methodologies for the stress tests conducted by the EBA in cooperation with other competent authorities in accordance with Article 22 of Regulation (EU) No 1093/2010, however they do describe the range of stress tests help to set the appropriate context for the consideration of future EBA stress tests as one part of the suite supervisory stress tests.
7. Within the context of groups, these guidelines apply also to institutions participating in a particular stress testing exercise in accordance with the perimeter of application of that particular stress testing exercise and the level of application set out in Article 108, 109 and 110 of Directive 2013/36/EU.
8. The term 'institution' shall be deemed to refer to the individual, to the Member State consolidated, to the EU consolidated level or to any other sub-consolidated level of application set out in Articles 108 to 110 of Directive 2013/36/EU. The term "institution-specific" shall be deemed to refer to a particular institution, including the consolidated situation referred to in Article 4 (1) (47) of Regulation (EU) No 575/2013.

Addressees

9. These guidelines are addressed to competent authorities and institutions as defined in point i) of Article 4(2) of Regulation (EU) No 1093/2010 and to financial institutions as defined in Article 4 of Regulation (EU) No 1093/2010.



Definitions/ Taxonomy

10. Unless otherwise specified, terms used and defined in Regulation (EU) No 575/2013 and Directive 2013/36/EU have the same meaning in these guidelines. In addition, for the purposes of these guidelines, the following definitions apply:

(1) Solvency stress test	means the assessment of the impact of certain macro- or micro-economic scenarios on the overall capital position of an institution, including on its minimum or additional own funds requirements, by means of projecting the institution's capital resources and requirements, highlighting the institution's vulnerabilities and assessing its capacity to absorb losses and the impact on its solvency position;
(2) Liquidity stress test	means the assessment of the impact of certain macro- or micro-economic scenarios or funding and liquidity shocks on the overall liquidity position of an institution, including on its minimum or additional requirements;
(3) Bottom-up stress test	means a (solvency or liquidity) stress test with all of the following characteristics: <ul style="list-style-type: none">i. it is carried out by institutions using their own internally developed models ;ii. it is based on institutions' own assumptions or scenarios, with possible conservative constrains by authorities;iii. it is based on the institution's own data and high level of data granularity, with possible use of external data for some additional information;iv. it concerns particular portfolios or the institution as a whole, producing detailed results on the potential impact of exposure concentrations, institution linkages and contagion probabilities to the institution's loss rates;



- (4) Top-down stress test means a (solvency or liquidity) stress test, with all of the following characteristics:
- i. it is carried out by competent authorities or macro-prudential authorities;
 - ii. it is based on general or systemic (macro-prudential) assumptions or scenarios designed by competent or macro-prudential authorities and applicable to all relevant institutions;
 - iii. competent authorities or macro-prudential authorities manage the process and calculate the results with less involvement of the institutions than in the case of the bottom-up stress test;
 - iv. it is based mostly on aggregate institution data and less detailed information, depending on the assumptions of the stress test, or sometimes based on more detailed institution data if decided by authorities; and
 - v. it enables a uniform and a common framework and comparative assessment of the impact of a given stress testing exercise across institutions;
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- (5) Static balance sheet assumption means a methodological assumption according to which the impact of the stress test scenarios is to be measured on the hypothesis of a 'constant balance sheet' and of an 'unchanged or stable business model' throughout the projection period, enhancing the comparability of the results across institutions. It is a methodological assumption which:
- i. prohibits from taking into account, for the calculation of the impact of the scenarios, changes in the assets and liabilities of the institution that derive, indicatively, from management actions, increases or work-outs of existing lending or difference in maturities or other characteristics of these assets or liabilities. The application of the stress test methodology might change the size and the composition of the balance-sheet, and particularly the capital base, over the projection period due to, for example, new defaults,



impairments, increase of stock or value adjustments of financial assets;

- ii. permits the inclusion of new assets and liabilities as far as these new items bear the same main characteristics (maturities, risk profiles, etc.) with the current ones;

(6) **Dynamic Balance Sheet assumption** means a methodological assumption according to which the impact of the stress test scenario is to be measured on the possibility of a 'non-constant balance sheet' and of an 'evolving business model' throughout the projection period. Under the Dynamic Balance Sheet Assumption, the outcome of the stress test reflects a combination of the scenario imposed and the responsive actions taken by the management reducing the comparability of the results across institutions. The extent of responsive actions taken by the management may be constrained or unconstrained (e.g. interventions planned from the start and independent from the scenario and/or conditional on the stress test scenario);

(7) **Portfolio level stress test** means a stress test of individual or several portfolios with the focus on the implications of the shocks from a single or multiple risk factors;

(8) **Sensitivity analysis** means a stress test that measures the potential impact of a specific single risk factor or simple multi-risk factors, affecting capital or liquidity, to a particular portfolio or to the institution as a whole;

(9) **Scenario analysis** means the assessment of the resilience of an institution or a given portfolio to a given scenario which comprises a set of risk factors, which has all of the following characteristics:

- i. aligned in an internally consistent way;
- ii. the risk factors forming the relevant set presuppose the simultaneous occurrence of forward-looking events covering a range of risks and business areas; and
- iii. the set of risk factors aims at also revealing to the maximum extent possible the nature of linked risks across portfolios and across time, system-wide interactions and feedback effects;



(10) Reverse stress test	<p>is an institution stress test which starts from the identification of the pre-defined outcome (e.g. points at which an institution business model becomes unviable, or at which the institution can be considered as failing or likely to fail in the meaning of Article 32 of Directive 2014/59/EU) and then explores scenarios and circumstances that might cause this to occur. Reverse stress testing has all of the following characteristics:</p> <ol style="list-style-type: none"> <li data-bbox="671 658 1406 853">i. It is used as a risk management tool aimed at increasing the institution's awareness of its vulnerabilities by means of the institution explicitly identifying and assessing the scenarios (or combination of scenarios) that result in a pre-defined outcome; <li data-bbox="671 898 1406 965">ii. the institution estimates the likelihood of these scenarios occurring; <li data-bbox="671 1010 1406 1205">iii. the institution decides on the kind and timing (triggering events) of management or other actions necessary both for rectifying business failures or of other problems and for aligning its risk appetite with the actual risks revealed by the reverse stress testing; <li data-bbox="671 1249 1406 1317">iv. specific reverse stress testing can be also applied in the context of recovery planning;
(11) Second round or feedback effects	<p>means the spillover effects caused by the responses of individual institutions to an external original shock, which – in aggregate – amplify such original shock, thereby causing an additional negative feedback loop;</p>
(12) Severity of scenario	<p>means the degree of deterioration of the scenario (from baseline to adverse scenario) expressed in terms of the underlying macroeconomic and financial variables (or any other assumptions). Greater severity of the scenario, in general, translates to larger impact of the stress test on the institution, thereby determining the actual severity of the stress test;</p>
(13) Plausibility of scenario	<p>means the degree to which a scenario can be regarded as likely to materialise taking into account the consistency of the relationship of that scenario with the current macroeconomic</p>



and financial variables, the support of the scenario by a coherent narrative and the backing of the scenario by probability distribution and historical experiences. Plausibility is not restricted to historical experiences, and hence expert judgments that take into account changing risk environments (e.g. observed structural breaks) and stress events that were observed in similar risk environments outside the institution's own direct historical experience should play a key role;

(14)Anchor scenario means a type of scenario usually designed by a competent authority to set the severity standard for a particular stress test, which is imposed on institutions, either as the scenario that should be applied in the stress test, or as a severity benchmark for the development of the institution's own scenarios;

(15)Risk data aggregation means defining, gathering and processing of risk data according to the institution's risk reporting requirements to enable the institution to measure its performance against its risk tolerance/appetite. This includes sorting, merging or breaking down sets of data;

(16)Data infrastructure means physical and organisational structures and facilities to build and maintain data and IT architecture to support institution's risk data aggregation and risk reporting internal policy.

3. Implementation

Date of application

11. These guidelines apply from [2 months from the date of publication of the guidelines in all EU official languages. The final factual date ('dd month year') will be inserted the day of the publication on the EBA website].

Repeal

12. The following guidelines are repealed with effect from the date of publication of these guidelines in all EU official languages.
 - *CEBS Guidelines on Stress Testing (GL 32)*

4. Institution's Stress Testing

4.1 Stress testing programme

13. Institutions should have in place a stress testing programme that should cover at least the following:
- a) the types of stress testing and their main objectives and application;
 - b) the frequency of the different stress testing exercises;
 - c) the internal governance regime with clear responsibilities and procedures;
 - d) in case of a group, the scope of the entities included and the coverage (e.g. risk types and portfolios) of the stress tests;
 - e) the methodological details, including models used;
 - f) the range of assumptions, including business and managerial, and remedial actions envisaged for each stress test; and
 - g) the relevant data infrastructure.
14. Parent institutions in a Member State and EU parent institutions should also develop a group stress testing programme to be approved and monitored by their senior management and management body in the context of their centralised risk management policy. The group stress testing programme should include and address to the extent appropriate all institutions subject to consolidation.
15. The group institutions should, when establishing their individual stress testing programme, take into account the relevant group stress testing programme.
16. Institutions should also include reverse stress testing and the respective scenarios in their stress testing programme.
17. Institutions should ensure that their stress testing programmes are workable and feasible and inform the decision making at all appropriate management levels about all existing and potential material risks.
18. Institutions should regularly assess their stress testing programme to determine its effectiveness, robustness and should update it as appropriate. The assessment should be made at least on an annual basis, on the basis both of a quantitative and a qualitative analysis and should fully reflect the changing external and internal conditions. Institutions should



ensure that the frequency of the assessment takes into account the frequency of the corresponding stress test applications.

19. Institutions should ensure that their quantitative analysis in accordance with the previous paragraph includes sound backtesting tools to validate the assumptions, parameters and results of stress testing models; institutions should ensure that their qualitative analysis in accordance with the previous paragraph has recourse to expert judgements or benchmarking assessments.
20. When assessing the stress testing programme, institutions shall consider at least the following:
 - a) the effectiveness of the programme in meeting its intended purposes;
 - b) the need for improvements;
 - c) the identified risk factors, definitions and reasoning for relevant scenarios, model assumptions and sensitivity of results to these assumptions, as well as the role of expert judgement to ensure that it is accompanied with sound analysis;
 - d) the model performance, including its performance on out-of-sample data, i.e. on data which was not used for model development;
 - e) feedback received from competent authorities in the context of their supervisory or other stress tests;
 - f) the adequacy of the data infrastructure (systems implementation and data quality);
 - g) the proper level of involvement of senior management and management body;
 - h) all assumptions including business and/or managerial assumptions, and management actions envisaged, based on the purpose, type and result of the stress testing, including an assessment of the feasibility of management actions in stress situations and a changing business environment; and
 - i) the adequacy of the relevant documentation.
21. The institution's stress testing programme should be appropriately documented. Documentation should at least cover:
 - a) the stress testing approach;
 - b) the roles and responsibilities as determined in the internal policy and processes at least for the performance of the stress testing programme;
 - c) a description of the entire process of designing, approving, performing, monitoring the performance and periodically assessing the stress testing programme and its outcomes;
 - d) a description of the processes for evaluating stress test outcomes, including details of areas with manual or judgemental parts, also of the process for using the results for informing management actions and the strategy of the institution; and



- e) a description and inventory of the relevant IT applications.
22. The stress testing programme should be challenged across the organisation. Business units not responsible for the design and application of the programme and/or non-involved external experts should play a key role in the assessment of this process.
 23. Institutions should ensure, both for the initial design and for the assessment of the stress testing programme, that an effective dialogue has taken place with the involvement of experts from all business areas of the institution and that the programme and its updates has been properly reviewed by the senior management and management body of the institution who are also responsible for monitoring its execution.

4.2 Governance aspects of stress testing

24. Institutions should ensure that their management body has the ultimate responsibility for approving the stress testing programme of the institution and monitoring its performance by the institution.
25. Institutions should ensure that their management body is able to fully understand the impact of stress events on the overall risk profile of the institution.
26. Institutions should ensure that their management body holds an understanding of the material aspects of the stress testing programme that enables it to: (a) actively engage in discussions with stress testing committees of the institutions, where applicable, or with senior management or external consultants responsible for stress testing; (b) challenge key modelling assumptions, the scenario selection and the assumptions underlying the stress tests in general; and (c) decide on the necessary management actions and discuss them with the competent authorities.
27. The execution of stress testing programme should be made in accordance with the relevant internal policies and procedures of the institution. The management body of the institutions should ensure that clear responsibilities and resources are assigned for the execution of the programme.
28. Institutions should ensure that all elements of the stress testing programme including its assessment are appropriately documented and regularly updated, when relevant, in the internal policies and procedures.
29. Institutions should ensure that the stress testing programme is also used as an effective internal communication tool across business lines and managements levels, with a view to raise awareness and instigate discussions on existing and potential risks as well as on possible management actions.
30. The stress testing programme should be an integral part of an institution's risk management framework (including in the context of ICAAP and ILAAP). Stress tests should support different



business decisions and processes as well as strategic planning, including capital and liquidity planning. The decisions should take into account the shortcomings, limitations and vulnerabilities during stress testing.

31. Institutions should ensure that their management body evaluates the outcomes of the stress tests and takes them into account, in particular with regard to identified limitations, vulnerabilities and shortcomings detected, when approving the strategic planning of the institution and when taking all relevant decisions affecting capital, liquidity, recovery and resolution planning.
32. The outputs of stress tests should be used as an input to the process of establishing an institution's risk appetite and limits. Further, they should act as a planning tool to determine the effectiveness of new and existing business strategies and their impact on the use of capital. To enable that, the essential outputs from a stress testing exercise should be implied losses, capital and liquidity requirements as well as available capital and liquidity.
33. To be a meaningful part of the risk management system of an institution, stress tests should be undertaken with appropriate frequency. This frequency should be determined having regard to the scope and type of the stress test, the size and complexity of institutions (proportionality principle), portfolio characteristics as well as changes in the macroeconomic environment or the institutions business activities.

4.3 Data Infrastructure

34. Institutions should ensure that the stress testing programme is supported by an adequate infrastructure.
35. To ensure that the proper data infrastructure has been put in place, institutions should endeavour to refer also to the extent appropriate Basel Committee on Banking Supervision principles for effective risk data aggregation and risk reporting³.
36. Institutions should ensure that their data infrastructure has the capacity to capture the extensive data needs of their stress testing programme and that they have in place mechanisms to ensure their continuing ability to conduct their stress testing as planned in accordance with the programme.
37. Institutions should ensure that the data infrastructure allows for both flexibility and appropriate levels of quality and control.
38. Institutions should ensure that their data infrastructure is proportionate to their size, complexity, risk and business profile and allows for the performance of stress tests covering all material risks where an institution is exposed to.

³ <http://www.bis.org/publ/bcbs239.pdf>



39. Institutions should ensure that they devote adequate human, financial and material resources at each management level, including at the level of the senior management and management body, to guarantee the effective development and maintenance of their data infrastructure, IT systems included.
40. Institutions should consider stress testing data infrastructure also as part of their overall IT infrastructure and should give adequate consideration in business continuity planning, identification of long term investments and other IT processes.

Data aggregation capabilities for stress testing purposes

41. In order to conduct reliable stress tests, institutions should maintain and keep up to date accurate and reliable risk data. Institutions should also have in place a dedicated process for aggregating and producing such data.
42. Institutions should ensure that their risk data aggregation is characterised by accuracy and integrity, completeness, timeliness, and adaptability.
43. Institutions should ensure the accuracy and integrity of the risk data. They should also ensure that data are aggregated on a largely automated basis so as to minimise the probability of error. In particular, a thorough reconciliation and controls system should be in place.
44. Institutions should have the capacity to guarantee the completeness of risk data. For that purpose, institutions should ensure that risk data also fully captures off-balance sheet risks and are easily attainable at any level of the institution. Materiality, in terms of current and potential risk should be factored in.
45. An institution's risk data aggregation capabilities should ensure that is able to produce aggregate risk information on a timely basis to meet all reporting requirements throughout the process following different quality assurance and challenge stages, institutions should develop an efficient structure that ensures timeliness.
46. Institutions should be able to generate aggregate data to meet a broad range of on-demand requests both arising from internal needs in the institution and externally from supervisory queries.

Reporting practices for stress testing purposes

47. Institutions should ensure that their risk reporting process: (a) is completely supported by data aggregation capabilities; (b) accurately and precisely conveys aggregated risk data and reflects risk in an exact manner; (c) covers all material risks and, in particular, that it allows the identification of emerging vulnerabilities that could be potentially further assessed even in the same stress testing exercise; (d) offers or is able to offer additional information regarding main assumptions, tolerance levels, or caveats; (e) communicates information in a



clear and concise manner including meaningful information tailored to the needs of the recipients.

4.4 Stress testing scope and coverage

4.4.1 General Requirements

48. Stress tests should take into account all the material risk types and cover both on- and off-balance sheet assets and liabilities of an institution including relevant structured entities.
49. Stress tests should capture risks at various levels in an institution. In this regard, according to the proportionality principle, the scope of stress testing may vary from simple portfolio level sensitivity or individual risk level analyses to comprehensive institution-wide scenario stress testing.
50. Stress tests should take into account changes in correlations between risk types and risk factors, at individual entity and at a group-wide level. They should also take into account that correlations tend to increase during times of economic or financial distress.

4.4.2 Portfolio and individual risk level stress testing

51. Institutions should perform stress tests on an individual portfolio basis, covering all risk types that affect these portfolios, using both sensitivity and scenario analysis. Institutions should also identify risk factors and their adequate level of stress, wherever possible, at the level of an individual portfolio.
52. Institutions should ensure that they stress test portfolios and business lines or units to identify intra- and inter-risk concentrations – i.e. of common risk factors within and across risk types (including contagion effects).
53. In particular, when considering inter-risk concentrations, institutions should aggregate across risk types notably market and credit risk, to gain a better understanding of their potential risk concentrations in a stress. Institutions should identify potential links between exposures which could be risky during economic or financial distress as well as question assumptions about dependencies and correlations between risk types in a stress situation.

4.4.3 Institution-wide stress testing

54. In order to deliver a complete and holistic picture of the institution's risks, in addition to stress tests on the level of single entities, stress testing should be conducted also on a group level and across portfolios and individual risk types.
55. It should be taken into account that (a) risks at the institution-wide level may not be well reflected by simple aggregation of stress tests on portfolios, individual risk areas or business units of the group; (b) correlations, offsetting of individual exposures and concentrations may either lead to double counting of risks or to an underestimation of the impact of stressed risk



factors; and (c) specific group risks may arise at the institution-wide level. Therefore, institutions should ensure that all material risks and their respective risk factors are also to be identified at an institution wide level. When looking at risks at an institution-wide level particular attention should be paid to risk concentrations on a holistic basis.

56. A group or an institution which is internationally active should also perform stress tests at the level of business units in specific geographic regions or business sectors or business lines to account for differing risk factors in different businesses and regions.

4.5 Stress testing types

4.5.1 General requirements

57. The specific design, complexity and level of detail of the stress test methodologies should be appropriate to the institutions size and complexity and should take into account the strategy and business model as well as models and portfolio characteristics of the institution.
58. Institutions should take into account the stage within the economic cycle when designing stress test methodologies, including the scenario and the need for possible management actions.
59. Institutions should identify appropriate, meaningful and robust mechanisms for translating risk factors into relevant internal risk parameters (e.g. PD, LGD, write-offs, fair value haircuts etc.) that provide an institution and group view of risks.
60. The link between stressed risk factors and the risk parameters should not only be based on institutional historical experience and analysis, but should be supplemented by benchmarks from external sources and when possible from supervisory guidance.
61. Due to the complexity involved in modelling hypothetical and macro-economic based risk factors/scenarios, institutions should be aware of the model risk involved and ensure that the following have been performed when setting those factors/scenarios:
- a) a regular and sufficiently conservative expert review of the model's assumptions and mechanics has been performed and a conservative modelling approach to account for model risk has been followed;
 - b) a sufficient degree of conservatism as appropriate has been applied when making assumptions that are hard to measure in a quantitative way (e.g. diversification) but may have an impact on the model's outputs; and
 - c) the dependencies of the results on the assumptions have been acknowledged and their impact is assessed on a regular basis.
62. Shortcomings of models and mechanisms which link risk factors with losses or increased risk parameters should be understood, communicated clearly and taken into account when interpreting results. Where possible, results for different modelling approaches should be



compared. The links should be based on robust statistical models. However, if data availability or quality or structural breaks in historical data do not allow for meaningful estimates, quantitative analyses should be supported with qualitative expert judgements.

63. Institutions should assess possible non-linear interactions between risk factors and stressed risk parameters.

4.5.2 Sensitivity analysis

64. Institutions should conduct sensitivity analyses at the level of individual exposures, portfolios or business units, institution-wide, and for specific risk-types as proportionate to their complexity.
65. Institutions should identify relevant risk factors at various levels of application of prudential requirements and across different portfolios, business units and geographical location. Institutions should ensure that all relevant types of risk factors are covered, including macro-economic and macro-financial variables, statistical aspects of risk parameters (such as volatility of PDs) and idiosyncratic factors such as operational risks.
66. The institutions should stress the identified risk factors using different degrees of severity as an important step in their analysis to reveal nonlinearities, threshold effects, i.e. critical values of risk factors beyond which stress responses accelerate.
67. Where there are uncertainties about the robustness of estimated dependency between macro-economic/macro-financial risk factors and risk parameters or a need to validate the results of more comprehensive scenario analyses, institutions should endeavour to ensure that sensitivity analyses is also carried out by stressing statistical aspects of portfolio risk parameters according to historical distributions supplemented by hypothetical assumptions (e.g. with respect to future volatilities).
68. Single risk factor analysis should be supplemented by simple multi-risk factor analyses, where a combined occurrence is assumed, without necessarily defining a scenario.
69. Institutions should maintain a list of identified risk factors.

4.5.3 Scenario analysis

70. Institutions should ensure that the scenario analysis is a core part of their stress testing programme.
71. The design of the stress test scenarios should not only be based on historical events, but should also consider hypothetical scenarios, also based on non-historical events. Institutions should ensure that scenario designs are forward-looking and take into account systematic and institution-specific changes in the present and foreseeable future. For that purpose, institutions should endeavour to have recourse to external data from similar risk environments relevant for institutions with similar business models.



72. A range of scenarios should be considered encompassing different events and degrees of severity.
73. Institutions should ensure that their stress test scenarios meet at least the following requirements:
- a) address the main risk factors which the institution may be exposed to. In this regard the results obtained from single risk factor analyses, which aim at providing information about the sensitivity towards single risk factors, should be used to identify scenarios that include a stress of a combined set of highly plausible risk factors. No material risk factor should be left unstressed or unconsidered;
 - b) address major institution-specific vulnerabilities, deriving from the regional and sectoral characteristics of an institution, as well as its specific product or business line exposures and funding policies: concentration and correlation risks, both of an intra- and of an inter-risk type, should be identified a priori;
 - c) include a coherent narrative for the scenario, covering all relevant risk factors as well as their (forward-looking) development on the basis of multiple trigger events (i.e. monetary policy, financial sector developments, commodity prices, political events and natural disasters). Institutions should ensure that the narrative scenario is plausible and non-paradoxical when assuming the co-movement of risk factors and the corresponding reaction of market participants. Where certain risk factors are excluded from the narrative scenario, institutions should ensure that this exclusion is fully justified and documented;
 - d) are internally coherent, so as to ensure that the identified risk factors behave consistently with other risk factors in a stress and that they contain explicit estimates and assumptions on the dependence structure among the main underlying risk factors;
 - e) take into account innovation and more specifically technological developments or sophisticated financial products without disregarding their interaction with more traditional products; and
 - f) ensure that stressed risk factors translate into internally consistent risk parameters.
74. Institutions should determine the time horizon of stress testing in accordance with the aim of the exercise, characteristics of the portfolio of the institution such as maturity and liquidity of the stressed positions, where applicable, as well as the risk profile.
75. Institutions should ensure that:
- a) stress tests explicitly take into account dynamic interdependences, e.g. among economic regions and among economic sectors, including the financial sector;
 - b) the overall scenario takes into account system-wide dynamics, e.g. closure of certain markets, risk concentrations in a whole asset class (e.g. mortgages);



- c) adverse feedback dynamics caused by factors such as interactions among valuations, losses, and margining requirements are covered.

76. Institutions should make qualitative assessments of second round or feedback effects of stress, where appropriate and in particular if no robust quantitative estimates can be established.

4.5.4 Severity of scenarios

77. Institutions should ensure that stress testing is based on exceptional but plausible events with an adequate degree of severity. For that purpose stress tests should be:

- a) meaningful in terms of providing the appropriate type of information with a view to promoting the stability of the institution and, when relevant, the financial system at all points in the economic cycle and over market fluctuations including funding markets; and
- b) consistently applied across the institution, recognising that identical scenarios are not necessarily severe for all business lines.

78. Institutions should ensure that various degrees of severity are considered for both sensitivity analysis and scenario stress testing covering at least one severe economic downturn for the assessment of capital adequacy and capital planning purposes.

79. Institutions should ensure that severity is set taking into account the specific vulnerabilities of each institution to a given scenario on the basis of its business model (e.g. exposed to international markets). Institutions should develop own scenarios and not be dependent on scenarios from the supervisors. When assessing the severity of a scenario the institution should be aware of the dynamics of risk environments and of experiences of institutions with similar business models.

80. Institutions should ensure that their scenarios assess absolute or relative changes of risk factors. In an absolute scenario the degree of severity should not depend on the current economic situation (e.g. GDP growth is set to -2%). In a relative scenario the degree of severity should depend on the current economic situation (e.g. GDP growth decreases by 2%). In that case, the worse the current economic situation the more severe the stress of a relative scenario. Institutions should ensure that their choice of the scenario is sufficiently severe in both relative and absolute terms. Both the choice and its impact on the degree of severity should be justified and documented.

81. For assessing the appropriate degree of severity of scenarios, institutions should also compare them with the scenarios outlined in their reverse stress testing.

4.5.5 Reverse stress testing

Requirements



82. Institutions should perform adequate reverse stress tests as part of the stress testing programme, sharing the same governance and quality standards and to complement other types of stress testing, taking into account the nature, size, scale, and complexity of their business activities and risks. Reverse stress testing should be carried out regularly by all types of institutions and at the same level of application as ICAAP and ILAAP (e.g. institution-wide and covering all relevant risk types).
83. Institutions should include scenarios identified through the reverse stress tests to complement the range of stress tests scenarios they undertake and for comparison purposes in order to assess the overall severity, allowing the identification of severe but still plausible scenarios. The reverse stress testing should be useful to set the severity of scenarios for ICAAP and ILAAP stress tests. The severity of reverse stress testing scenarios can be also assessed by comparing it inter alia to historical or other supervisory and publically available scenarios.
84. In carrying out its reverse stress test, an institution should also consider whether failure of one or more of its major counterparties or a significant market disruption arising from the failure of a major market participant (in a separate or combined manner) would cause the pre-defined outcome.

Use of reverse stress testing

85. Institutions should use reverse stress testing as a regular risk management tool in order to improve their awareness of current and potential vulnerabilities, providing added value to an institution's risk management. However institutions should also consider that the pre-defined outcome of reverse stress testing can be produced by some other circumstances different that the one analysed in the stress test.
86. As part of their business planning and risk management, institutions should use reverse stress test to understand the viability and sustainability of their business model and strategies, as well as to identifying situations where they might be in the situation considered as failing or likely to fail in the meaning of Article 32 of Directive 2014/59/EU. It is important that institution identify measures that provide alerts when a scenario turns into reality. To that end, institutions should:
- a) identify the pre-defined outcome to be tested (e.g. of business model becoming unviable);
 - b) identify possible adverse circumstances which would expose them to severe vulnerabilities and cause the pre-defined outcome;
 - c) assess depending on the institution's size as well as the nature, scale, complexity and riskiness of its business activities the likelihood that events included in the scenarios leading to the pre-defined outcome; and
 - d) adopt effective arrangements, processes, systems or other measures to prevent or mitigate identified risks and vulnerabilities.



87. Institutions should use reverse stress testing to challenge their business models and strategies in order to identify and analyse what could possibly cause their business model to become unviable such as assessment of both the ability to generate returns over the following months and the sustainability of the strategy to generate returns over a longer period based on strategic plans and financial forecasts.
88. Where reverse stress test reveals that an institution's risk of business model failure is unacceptably high and inconsistent with its risk appetite, the institution should plan measures to prevent or mitigate such risk, taking into account the time that the institution should have to react to these events and implement those measures. As part of these measures, the institution should consider if changes to its business model are required. These measures, including any changes to the institution's business plans, should be documented in the institution's ICAAP documentation.
89. Institutions with particular business models, e.g. investment firms, should use reverse stress testing to explore their vulnerabilities to extreme events, in particular where their risks are not sufficiently captured by more traditional ('solvency') stress scenarios based on macroeconomic shocks.
90. Institutions using internal models for credit risk, counterparty credit risk, and market risk, when carrying out reverse stress testing in accordance with Articles 290(8) and 368(1) (g) of Regulation (EU) No 575/2013, should endeavour to identify severe, but plausible, scenarios that could result in significant adverse outcomes and potentially challenge institutions overall viability. Institutions should see these reverse stress tests as an essential complement of their internal models for calculation of capital requirements and as a regular risk management tool for revealing the possible inadequacies of these internal models.
91. Institutions should perform qualitative analysis in developing a well-defined narrative of the reverse stress testing and a clear understanding of its feedback and non-linear effects.
92. Institutions should perform a quantitative and more sophisticated analysis, taking into account the institution's size as well as the nature, scale, complexity and riskiness of its business activities, in setting out specific loss levels or other negative impacts on their capital, liquidity (e.g. the access to funding, in particular to increases on funding costs) or overall financial position. Institutions should work backwards in a quantitative manner to identify the risk factors, and the required amplitude of changes, that could cause that loss or negative impact.
93. Institutions should, where appropriate, use sensitivity analysis as a starting point for reverse stress testing, e.g. shifting one or more relevant parameters to some extreme to reach pre-defined outcomes. However, institutions should not use sensitivity analysis to find the scenario relevant for the reverse stress test. The qualitative analysis should lead to the scenario, combining expert judgment from different business areas, as thinking might be the most effective way to avoid a business model failure. A joint stressing of all relevant risk



parameters using their statistical aspects (e.g. volatility of risk factors consistent with historical observations supplemented with hypothetical but plausible assumptions) should be developed. The plausibility of the required parameter shifts to reach the pre-defined outcome gives a first idea about possible vulnerabilities in the institution. To assess the plausibility historical (multivariate) probability distributions – adjusted, where deemed necessary, according to expert judgements – should among others be applied. Qualitative analyses and assessments, combining expert judgements from different business areas, should guide the identification of relevant scenarios.

94. Institutions should use reverse stress testing as a tool to gather insights into scenarios that involve combinations of solvency and liquidity stresses, where traditional modelling may fail to capture complex aspects from real situations. Where appropriate, institutions should identify and analyse situations that can aggravate a liquidity stress event and transform it into a solvency stress event, and vice-versa, and eventually to a business failure. Institutions should endeavour to apply reverse stress testing in an integrated manner for risks to capital or liquidity with a view to improve the understanding and the management of related risks in extreme situations.

Recovery actions and recovery planning

95. Institutions should develop scenarios to be used in recovery plans under EBA/GL/2014/06[1] and use specific reverse stress testing to develop ‘near-default’ scenarios and as an input to inform and test the effectiveness of their recovery actions and their recovery planning, and analyse sensitivities around respective assumptions. Such ‘near-default’ scenarios should identify and describe the point that would lead to an institution’s or a group’s business model becoming non-viable unless the recovery actions were successfully implemented. The purpose of this exercise is to test the effectiveness of the institution’s recovery options in restoring financial strength and viability when the institution comes under such severe stress.
96. Due to the different objectives of the two sets of reversed stress tests the stress tests for ICAAP and ILAAP purposes and recovery planning should not be interlinked but compared to one another.
97. Institutions should use reverse stress testing to assist with the development, assessment and calibration of ‘near-default’ scenarios used for recovery planning.
98. Institutions should use reverse stress testing to identify the risk factors and further understand and describe the scenarios that would result in ‘near default’, assessing effective recovery actions that can be credibly implemented, either in advance or as the risk factors or scenarios develop.
99. Reverse stress testing should contribute to the recovery plan scenarios by using a dynamic and quantitative scenario narrative:



- a) the recovery triggers, i.e. at which point the institution would enact recovery actions in the hypothetical scenario;
- b) the recovery actions required and their expected effectiveness, including the method of assessing that effectiveness (i.e. indicators that should be monitored to conclude that no further action is required);
- c) the appropriate timing and process required for those recovery actions;
- d) in case of further stress, points (b) and (c) for possibly required additional recovery actions to address residual risks.

4.6 Individual risk areas

100. Institutions should ensure the stress testing of individual risk is proportional to the nature, size and complexity of their business and risks.
101. Institutions should take into account the impact of second round effects in the individual risk for stress testing.

4.6.1 Credit and counterparty risk

102. Institutions should analyse at least:
 - a) the borrowers' ability to repay their obligations, e.g. the probability of default;
 - b) the recovery rate in the event of a borrower's defaulting including the deterioration of the collateral values or credit worthiness of the guarantee provider, e.g. the loss given default; and
 - c) the size and dynamics of credit exposure, including the effect of undrawn commitments from borrowers, e.g. the exposure at default.
103. Institutions should ensure that their institution-wide credit risk stress tests cover all their positions in their banking and trading book, including hedging positions.
104. Institutions should endeavour to determine specific risk factors and set out on a preliminary basis how these factors can affect its total credit risk losses and capital requirements. Institutions should endeavour to make that determination on an exposure class by exposure class basis (e.g. factors relevant to mortgages may be different to corporate asset classes).
105. Institutions should ensure that credit risk is assessed at various levels of shock scenarios from simple sensitivity analyses to institution-wide stress tests, or to group wide stress testing, in particular:
 - a) market wide shock scenarios (e.g. sharp slowdown of the economy which affects portfolio quality for all of the creditors);



- b) counterparty specific and idiosyncratic shock scenarios (e.g. bankruptcy of biggest bank creditor);
 - c) sector specific and region specific shock scenarios;
 - d) combination of the above.
106. Institutions should subject risk factors to sensitivity analyses, which in turn should provide quantitative background for the design of scenarios.
107. Institutions should apply different time horizons when applying their stress scenarios. The time horizon should range from overnight (one-off effect) up to longer terms (e.g., creeping economic downturn).
108. When stress testing financial collateral values, institutions should identify appropriate conditions which would adversely affect the realisable value of their collateral positions including deterioration in the credit quality of collateral issuers or market illiquidity.
109. In the design of scenarios, institutions should consider the impact of stress events for other risk types, e.g. liquidity risk and market risk and the possibility of spillovers between institutions.
110. Institutions should quantify the impact of the scenario in terms of credit losses (i.e., provisions), risk exposures, income and own funds requirements. Besides institutions should be able to quantify such impact by relevant segments/portfolios.
111. Institutions should consider, wherever possible, the following relevant parameters: probability of default (PD), Loss Given Default (LGD) and Exposure at Default (EAD), expected loss (EL) and risk exposure amount and the impact on credit losses and own funds requirements.
112. For the estimation of future losses in stress tests, institutions should, where appropriate, rely on credit risk parameters different from the ones applied in the calculation of capital requirements, which are usually through-the-cycle for PD and under downturn conditions for LGD. In particular, institutions should, where relevant, apply estimates based on point in time parameters in accordance with the severity of the scenario for the purpose of estimating credit losses.
113. For the computation of Exposure at Default, institutions should also consider Credit Conversion Factor (CCF) and, in particular, and the effect of the institution's legal capacity to unilaterally cancel undrawn amounts of committed credit facilities especially in stressed conditions.
114. Institutions should apply, to the extent appropriate, credit risk internal model approaches that challenge historical relations and data, and simulations of credit quality migrations among categories of exposures to provide an estimate of losses.



115. When assessing their risk to leveraged counterparties or shadow banking entities, institutions should take into account risk concentrations and they should not presume the existence of collateral or continuous re-margining agreements, which may not be available in case of severe market shocks. Institutions should endeavour to capture such correlated tail risks adequately.

4.6.2 Securitisation

116. Institutions should take into account securitisation risk that arises from structured credit products, usually created by repackaging the cash flow from a pool of assets into various tranches or asset backed securities, taking into account the different positions which institutions can have in the securitisation process, acting as originator, sponsor or investor.

117. Institutions should ensure that stress testing of securitised assets addresses the credit risk of the underlying pool of assets, including the default risk, the possibly non-linear and dynamic default correlations as well as the evolution of the collateral values. Institutions should take into account all relevant information with regard to the specific structure of each securitisation, such as the seniority of the tranche, the thickness of the tranche, credit enhancements and the granularity, expressed in terms of effective number of exposures.

118. The sensitivity to systemic market effects, impacting e.g. in liquidity dry-outs or increasing asset correlations, on all levels of the structured product should be carefully taken into account. Also the effect of reputational risks, resulting e.g. in funding issues should be assessed.

119. Stress tests should address all relevant contractual arrangements, the potential impact of embedded triggers (e.g. early amortisation provisions), the leverage of the securitisation structure and the liquidity/funding risks arising from the structure (i.e. cash-flow mismatches, prepayment conditions also in relation to interest rate changes).

120. Scenarios should consider also the default of one or more of the contractual counterparties involved in the securitisation structure, especially of those acting as guarantors of certain tranches.

121. If the institution relies on external ratings to assess the risk of securitised products, the external ratings should be critically reviewed and scenarios stressing the ratings including the rating classes' specific impairment rates should be assessed, e.g. by stressing (historical) rating transition matrices.

122. When designing the stress testing approach, institutions should consider the following: (a) the impacts of stress tests for structured credit products will materialise on the level of the asset pool in increased PDs and LGDs and hence increased expected loss/impairment rates and regulatory capital (as well as increased probabilities for downgrades) should be expected during shocks; and (b) that further impact may arise from decreases in the net-cash flow,



increases in trading losses and value adjustments or from the deterioration of regulatory metrics such as e.g. the net-stable funding ratio.

4.6.3 Market risk

123. Institutions should take into account market risk, notably risks derived from losses resulting from adverse changes in the value of positions arising from movements in market prices across commodity, credit, equity, foreign exchange and interest rates risk factors. Interest rate risk in trading book positions should be considered by institutions as a component of market risk.
124. Institutions should conduct stress tests for their positions in financial instruments in the trading and available-for-sale portfolios (i.e. respective accounting terms to classify financial assets), including securitisation instruments/positions and covered bonds. These stress tests should be undertaken as part of their institution-wide stress testing as well as for market risk management and calculation purposes.
125. Institutions should apply a range of severe but plausible scenarios for all positions referred to in the previous paragraph, e.g. exceptional changes in market prices, shortages of liquidity in the markets or defaults of large market participants. Dependencies and correlations between different markets and consequentially adverse changes in correlations should, where appropriate, also be taken into account and factored in.
126. When calibrating these stress tests, institutions should at least take into account the nature of their portfolios, their trading strategies, the possibility and time that it could take to hedge out or manage risks under severe market conditions.
127. As instruments and trading strategies change over time, institutions should ensure that their stress tests evolve to accommodate those changes.
128. Institutions should take into account that the main weaknesses of the Value at Risk (VaR) models relates to the non-capturing or the underestimation of tail risk by historical data (fat tails). To capture fat tails, institutions should apply severe hypothetical scenarios. Where risk is assessed against possible time horizons and percentile confidence levels, institutions should consider tail events beyond that confidence levels.
129. Institutions should in particular:
 - a) assess the consequences of major market disturbances and identify plausible situations which could entail extraordinarily high losses. These should, where appropriate, also include events with low probability for all main risk types, especially the various components of market risks. At portfolio level stress test, the effects of adverse changes to correlations might be explored. Mitigating effects of management actions may be taken into account if they are based on plausible assumptions about market liquidity; and



- b) have in place a list of the measures containing limits and other possible actions taken to reduce risks and preserve own funds. In particular, limits on exchange rate, interest rate, equity price and commodity price risks set by institutions should, where appropriate, be taken into account against the results of the stress testing calculations.

4.6.4 Operational risk

130. Institutions should be aware that relevant risk parameters from operational risk may derive from inadequate or failed internal processes, people and systems, including legal risks, or from external events and may affect all products and activities within the institution.
131. In order to stress relevant risk parameters, institutions should use the profits or loss (P&L) effect of operational losses as the main metric and distinguish between economic loss, near miss and loss of future earnings. Institutions under the advanced measurement approach should also take these losses into account as they flow into the internal loss database to calculate the additional capital requirements.
132. As operational losses may induce second-round effects (i.e. reputational risk) and in order to account for such effects, the operational risk stress testing programme should be thoroughly integrated in the institution-wide stress test and should include interconnections with liquidity and own funds requirements. Institutions should at least analyse:
- a) the exposure of the institution to activities and their associated risk culture and past record of operational losses, with a focus on the level and change in losses and gross income in the past few years;
 - b) the business environment, including geographical locations in which the institution operates and macro-economic conditions;
 - c) the evolution in headcount and in balance sheet size and complexity over the past few years, including structural changes due to corporate events as, for example, mergers and acquisitions;
 - d) changes to significant elements of the IT infrastructure;
 - e) the degree and orientation of incentivising in compensation schemes;
 - f) the complexity of processes and procedures, products and IT systems;
 - g) the extent of outsourcing, with a view of the concentration risk associated with all outsourcing arrangements;
 - h) the vulnerability to model risk, especially in the areas related to trading of financial instruments, risk measurement and management, and capital allocation.
133. Idiosyncratic risk factors should also be explored and used as an input for scenario design. Indicatively, institutions under the advanced measurement approach should stress their business environment and internal control factors (BEICF).



134. Institutions should consider the interactions of, and individual exposures to, such risk factors in determining their operational risk exposure.
135. Institutions should analyse carefully the possible interaction of operational risk losses with credit and market risks.
136. The analysis of the stress test events should involve expert judgement, at least to include low frequency high-severity events.
137. Institutions should design severe but plausible stress events. Assumptions may differ from assumptions used in credit and market risk stress scenarios. When an institution expands its business in the local or in the international markets through mergers and acquisitions, design of new products or development of new business line, the severe but plausible stress test scenarios should be based on expert judgment to overcome the possible lack of historical information.
138. Institutions should build their stress testing programme based on both internal and external data, while analysing carefully:
- a) the use of scaling factors (e.g. in a situation where external data were scaled down, the scaling may be reduced); and
 - b) the criteria for determining the relevance of data (e.g. large loss data considered not to be relevant may be used within the stress test).

4.6.5 Conduct related risk and associated litigation costs

139. Institutions should take into account that conduct related risk, as part of the legal risk under the scope of operational risk, arises due to the current or prospective risk of losses from inappropriate supply of financial services and associated litigation costs including cases of wilful or negligent misconduct.
140. In their stress testing institutions should assess the relevance and significance of the following exposures to conduct risk and associated litigation costs:
- a) miss-selling of products, in both retail and wholesale markets;
 - b) pushed cross-selling of products to retail customers, such as packaged bank accounts or add-on products customers do not need;
 - c) conflicts of interest in conducting business;
 - d) manipulation of benchmark interest rates, foreign exchange rates or any other financial instruments or indices to enhance the institution's profits;
 - e) barriers to switching financial products during their lifetime and/or to switching financial service providers;
 - f) poorly designed distribution channels that may enable conflicts of interest with false incentives;



- g) automatic renewals of products or exit penalties; and
 - h) unfair processing of customer complaints.
141. When measuring conduct-related risk institutions should consider (i) the uncertainty around provisions or expected losses originating from conduct related events; and (ii) extreme losses associated with tail risks (unexpected losses). Institutions should assess their capital needs under such events and scenarios and should also take into account the reputational effect of conduct losses. In principle expected losses from known conduct related issues should be covered by provisions and included in the profit and loss account whereas the unexpected losses are quantified and covered by capital requirements from the institution.
142. In order to capture the risk that the provisions are insufficient or timely inconsistent, institutions should assess expected losses from conduct risk in excess of existing accounting provisions and factor these in their projections. Where appropriate, institutions should assess whether future profits will be sufficient to cover these additional losses or costs in the scenarios and incorporate this information in their capital plans.
143. Institutions should collect and analyse quantitative and qualitative information about the extent of their business in relevant, vulnerable areas. Institutions should also provide information to support material assumptions underlying their estimates of conduct related costs.
144. In rare cases where an institution is unable to provide an estimate for an individual conduct related risk due to the extent of uncertainty, institutions should clarify that this is the case and provide evidence and assumptions supporting their assessment as part of their ICAAP.
145. Stress testing should also, where appropriate, be used to assess extreme losses associated with tail risks (unexpected losses) and whether additional capital should be held under Pillar 2.
146. Institutions should form a view on the unexpected losses that may originate from conduct-related events based on a combination of: i) judgement; ii) historical loss experience (e.g. the institution's largest conduct loss over the past five years); iii) the level of expected annual loss for conduct related risk; iv) conduct-related scenarios where potential exposures over a shorter time horizon (e.g. five years) are considered; and v) losses experienced by similar entities or by entities in similar situations (e.g. in case of a litigation cost).

4.6.6 Liquidity risk

147. Institutions should take into account that liquidity or funding risk arises when the institution is not able to meet efficiently current and future cash flows without affecting either daily operations or the financial condition of the institution.



148. Institutions should take into account that liquidity or funding risks encompass:
- a) short to medium term liquidity risk; and
 - b) funding risk.
149. Institutions should analyse risk factors relating to both asset and liability side items, as well as to off-balance-sheet commitments and that comprise, but are not limited to:
- a) retail deposits run-offs;
 - b) secured and unsecured wholesale funding, e.g. the degree of reliance on wholesale funding as well as the extent to which an institution relies on specific types of counterparties or individual counterparties;
 - c) contingent cash flows/off-balance-sheet items, e.g. credit lines, margin calls for derivatives exposure, assets and liabilities with embedded options, liquidity support for unconsolidated special-purpose vehicles beyond contractual obligations, contingent liabilities;
 - d) encumbrance and marketability of assets, e.g. the proportion and market value of assets that would or would not be usable on an immediate basis and without strains, the impact of the concentration of assets on their marketability, the reduction in funding that could be generated with these assets due to changes in their market value. When assets are not directly marketable, they should nevertheless be incorporated as their use to generate additional funding may be feasible under specific conditions (e.g. loans under securitisation or covered bonds).
 - e) credit pipelines, e.g. a reduced capacity to securitise loans
150. Institutions' analysis of risk factors should take into account, but should not be limited to:
- a) the impact of macroeconomic conditions, e.g. the impact of interest rates shocks on contingent cash flows;
 - b) the currency of assets and liabilities including off-balance sheet items, to reflect convertibility risk and possible disruptions in the access to foreign exchange markets;
 - c) the location of liquidity needs and available funds, intragroup liquidity transactions and the risk of constraints for the transfer of funds between jurisdictions or group entities;
 - d) actions that the institution may take to preserve its reputation or franchise (e.g. the early repayment of callable liabilities);
 - e) the internalisation of risks related to specific activities, as in the case of, prime brokerage where symmetry, to a certain extent, might be required between the lending-side and the borrowing-side of securities, i.e. customer long positions are funded using the proceeds from customer short trades. Such symmetry is subject to counterparties' behaviour and is therefore sensitive to reputational risk. In the event of such risk, it may trigger the unwinding of trades that would unexpectedly leave the institution with securities on its balance sheet, along with the need to fund them;



- f) the vulnerabilities within the funding term structure due to external, internal or contractual events;
 - g) the correlation between funding markets and diversification across different markets; and
 - h) estimates of future balance-sheet growth.
151. Institutions should subject these risk factors to sensitivity analyses which in turn should provide the appropriate quantitative background for the design of scenarios.
152. Institutions should apply the following three types of stress scenarios: idiosyncratic, market-wide, and a combination of the two. The idiosyncratic stress should assume institutional specific events (e.g. rating downgrade, default of the largest funding counterparty, loss of market access, loss of currency convertibility, default of the counterparty providing largest inflows), whereas a market-wide stress should assume an impact on a group of institutions or the financial sector at all (e.g. deterioration in funding market conditions, the macroeconomic environment or rating downgrades of countries in which the institutions is operating).
153. Institutions should design different time horizons in their stress testing: the time horizons should range from overnight up to at least 12 months; there should also be separate stress tests relating to intraday liquidity risk. The time period should display, for example, a short acute phase of stress (up to 30 days in order to cover such periods without having to change the business model) followed by a longer period of less acute but more prolonged stress (between 3 and 12 months).
154. Institutions should combine the stress of the short to medium liquidity risk with a stress of funding risk, considering a time horizon of at least 12 months.
155. Institutions should design a set of adverse behavioural assumptions for customers including depositors, other providers of funds and counterparties for each different scenario and time horizon.
156. In the design of scenarios, institutions should consider the impact of stress events for other risk types, e.g. credit risk losses, reputational risk events, to their liquidity position and the possibility of spillovers between institutions.
157. The main methodology used for calculating the magnitude of the impact should be the net cash flow profile. For each scenario, at each stress level, the institution identifies cash inflows and outflows that are projected for each future time period and the resulting net cash flows. Institutions should consider the lowest cumulative point of net cash flows within the time period assessed in each given scenario.
158. Institutions should extend the analysis, if appropriate, to other metrics, such as:



- a) liquidity ratios and other metrics used in the framework should include, but may not be limited to, supervisory liquidity ratios and metrics, in particular the liquidity coverage ratio and net stable funding ratio;
 - b) their available liquidity buffer, over and above the ratios referred to above, and other counterbalancing measures, i.e. their counterbalancing capacity, for each stress scenario. Stress testing of this metric should be accompanied by an assessment of the impact on the proportion and nature of encumbered assets;
 - c) the survival horizon of the institution as derived from its counterbalancing capacity, i.e. the institution's ability to hold, or have access to, excess liquidity over short-term, medium-term and long-term time horizons in response to stress scenarios as defined in the EBA Guidelines on common procedures and methodologies for SREP, and stressed cash flows, taken jointly, before and after the impact of counterbalancing measures;
 - d) solvency and profitability.
159. When applying the different stress scenarios, institutions should assess and highlight counterbalancing effects provided by central banks (monetary policy) and adopt a conservative approach.
160. Liquidity stress test metrics should, if appropriate, include a granularity per currency to allow the analysis of for currency-specific assumptions in scenarios (e.g. volatility in exchange rates or currency mismatches).
161. Institutions should, where appropriate, integrate liquidity stress test in their institution-wide stress tests, and take into account different time periods covered in liquidity stress tests compared to institution-wide solvency stress tests. At a minimum, institutions should assess the impact of increasing funding costs on profit and loss.

4.6.7 Interest rate risk from non-trading activities

162. This section is without prejudice to EBA guidelines on interest rate risk arising from non-trading activities.
163. Stress tests should support and be an integral part of the IRRBB internal management system.
164. The interest rate scenarios used for stress testing purposes, including for the purposes of application of Article 98(5) of Directive 2013/36/EU for the interest rate risk arising from the non-trading activities, should be adequate to identify all material interest rate risks, e.g. yield curve risk, spread risk and option risk.
165. Institutions should ensure that the test referred to in the previous paragraph is not based on a simple parallel shift but that they consider movements and changes in the shape of the yield curves in their scenario analysis.



166. Institutions should consider the following elements:
- a) the spread risk, which arises from reference rates mismatching between time-matched funding and investments;
 - b) early termination risks included in contracts with an embedded option, which might the institution into a new transaction on less favourable terms.
167. Institutions should be aware of potential indirect interest rate effects triggering losses elsewhere (e.g. that a pass-through onto lending rates could trigger further credit risk losses due to deteriorating customer ability to pay).
168. Where less complex financial instruments are employed, institutions should calculate the effect of a shock using sensitivity analysis (without identification of the origin of the shock, and by means of the simple application of the shock to the portfolio). Where an institution uses more complex financial instruments on which the shock has multiple and indirect effects, it should use more advanced approaches with specific definition of the adverse (stress) situations reflecting relevant idiosyncratic risks.

4.6.8 Concentration risk

169. Stress testing should be a key tool in the identification of concentration risk, as it allows institutions to identify interdependencies between exposures, which may only become apparent in stressed conditions as well as hidden concentrations.
170. In assessing this risk in their stress testing programmes, institutions should take into account the credit risk of each exposure but also consider the additional sources of risk arising from the similar behaviour of certain exposures (i.e. higher correlation). These additional sources of risk under analysis should cover, but not be limited, to the following:
- a) the single-name concentrations (i.e. client or group of connected clients as defined in Article 4 (39) of Regulation (EU) No 575/2013);
 - b) the sectoral concentrations;
 - c) the geographical concentrations;
 - d) the product concentrations; and
 - e) the collateral and guarantees concentrations.
171. In stress testing, especially institution-wide, including group, stress testing, institutions should assess concentration risk considering on- and off-balance sheet exposures, as well as banking, trading and hedging positions.
172. Stress tests should take into account changes in the business environment that may occur which would lead to the materialisation of concentration risk. In particular, stress tests should consider unusual but plausible changes in correlations between various types of risk factors as well as extreme and unusual changes in risk parameters, going beyond single risk factors, to



look at scenarios that take account of interrelated risk factors and that feature not only first round but also feedback effects.

173. The way in which concentrated exposures perform in response to the same risk factors, where appropriate, should be factored into the stress tests, including the risk of short-term large increases in losses as a result of concentrated exposures across the retail and corporate credit books or across different entities in a group.
174. Institutions should consider the impact on trading book from exposures to a single risk factor or from multiple risk factors that are correlated.
175. In order to assess the ex-ante level of concentration risk and/or impact of the scenario on the concentration level, institutions should, where appropriate, consider more or less complex measures, for instance the Herfindahl-Hirschman Index (HHI) and Gini coefficients.
176. Institutions should consider the potential existence of overlaps between different concentration sources. Institutions should not simply sum risk impacts but also put in place aggregation methods that consider the underlying drivers instead.

4.6.9 FX lending risk

177. Institutions should take into account that FX lending risk:
 - a) may arise from the unhedged borrower's inability to service debt denominated in currencies other than the currency of the Member State that the institution has been authorised;
 - b) is related to pure credit and FX market risk;
 - c) is characterised by non-linear relationship of credit and FX market risk components;
 - d) is influenced by the general exchange rate risk; and
 - e) may arise from conduct risk.
178. In their stress testing programmes, institutions should take into account FX lending risk affecting credit facilities in the asset side of their balance sheet and its multiple sources of risk, taking into account that debtor's inability to repay his debt may originate from:
 - a) risks related to his internal source of income;
 - b) risks related to economic situation in the country which the currency is denominated in; and,
 - c) foreign exchange risk.
179. Institutions should consider, when designing or implementing their stress test scenarios, that FX lending risk impact may arise from the increase in both the outstanding value of debt and the flow of payments to service such debt, as well as an increase in the outstanding value of debt compared to the value of collateral assets denominated in the domestic currency.



180. Institutions should develop stress scenarios by changing different parameters to allow them to forecast FX credits portfolio performance in different cases, such as:
- assuming exchange rate appreciation of host currency by a predetermined percentage;
 - assuming shift in FX interest rate by a predetermined percentage points; or,
 - combining both of the above.
181. In order to assess potential vulnerability, institutions should be able to demonstrate additional credit risk losses stemming from FX lending risk separate from the credit risk losses and risk exposure amounts resulting from the impact of the scenario on credit risk factors.
182. When stress testing the FX lending risk, institutions should at least take into account:
- the type of exchange rate regime and how this could impact on the evolution of the FX rate between domestic and foreign currencies;
 - the sensitivity impact of exchange rate movements on the borrowers' credit rating/scoring and debt servicing capacity;
 - potential concentrations of lending activity in a single foreign currency or in a limited number of highly correlated foreign currencies;
 - potential concentrations of lending activity in some specific sectors of the economy in the country currency and respective evolution of such sectors highly correlated with foreign currencies; and
 - the ability to secure financing for this type of portfolio. For institutions applying internal models for the calculation of credit risk capital requirements, the additional risk related to lending in FX currencies should be reflected in higher risk weights of such assets. The non-exhaustive list of variables used in the models should include interest rates disparities, loan LTV, currency cross correlation and volatility.
183. Institutions should take into account possible significant weaknesses that may be built-in in internal models with possible underestimation of currency depreciation on the client's ability to service his debt, taking into account the following indicative elements:
- monetary policies during the crisis period are many times focused on stimulating real economy by significantly decreasing reference interest rates, with potential misleading information from internal models regarding these indirect effects;
 - currency appreciation may be partially offset by falling interest rates and this may cause underestimation of or risk related to FX lending because in zero interest rates environment such trade – off may not be possible in the long run.
184. While assessing potential impact of FX lending on profitability in a certain scenario, institutions should, where appropriate, include the legal regime and the relevant jurisdiction, that may force institutions to denominate FX lending into domestic currency at exchange rates significantly below market ones.



4.7 Application of stress testing programmes

4.7.1 Stress testing for ICAAP/ILAAP purposes

185. As part of their internal capital and liquidity adequacy assessment processes (ICAAP and ILAAP) institutions should ensure that they have enough capital and liquidity resources to cover for the risks institutions are, or might be, exposed to, and ensure appropriate allocation of capital and liquidity resources across the entities of an institution over the economic cycle. This assessment should be reflected in the institution's capital and liquidity plans that institutions should submit to the competent authorities as part of ICAAP and ILAAP information.
186. Furthermore, by means of stress testing, institutions should evaluate the reliability of their capital plans under stress conditions to ensure that they will meet applicable capital requirements. Institutions should also test the reliability of their liquidity plans to ensure that they can meet liabilities as they fall due under stress conditions. Institutions should assess the level of transferability of capital and liquidity resources in stressed conditions and consider any possible impediments, including legal and operational. Institutions should, where appropriate, recognise that certain elements of capital requirements, as well as the liquidity buffers, may be used in stressed conditions (e.g. elements of the combined buffer requirements as specified in Chapter 4 of Title VII of Directive 2013/36/EU).
187. In addition to the general requirements related to institution's stress testing programmes specified in these Guidelines, stress tests used for ICAAP/ILAAP purposes should meet the following specific requirements:
- a) institutions should cover all material risk categories (and sub-categories) that the institutions are exposed with regard to both on- and off-balance sheet assets and liabilities in relation to all material portfolios or sectors /geographies, including relevant structured entities;
 - b) a range of scenarios should be considered including at least an adverse economic scenario that is severe but plausible, such as a severe economic downturn and/or a market wide-wide and idiosyncratic shock to liquidity;
 - c) ICAAP and ILAAP stress testing should be performed through a comprehensive institution-wide stress testing and reflect all entities on which ICAAPs or ILAAPs are required;
 - d) ICAAP and ILAAP stress tests should cover the same forward-looking period as the institution's ICAAP and ILAAP respectively, and be updated at least as regularly as the ICAAP and ILAAP. ICAAP stress tests should cover a period of at least two years.
188. ICAAP and ILAAP stress tests should be consistent with the risk appetite and overall (i.e. including business) strategy of the institution. Institutions should demonstrate a clear link between their risk appetite, their business strategy, and their ICAAP and ILAAP stress tests. In particular, institutions should assess their capital and liquidity plans, and any internal capital



planning, including management capital buffers consistent with their stated risk appetite and strategy, and overall internal capital needs, and rebuild their liquidity positions after using liquidity buffers to meet their liabilities during a stress.

189. Furthermore, in their internal capital adequacy stress test institutions should assess their ability to stay above applicable regulatory and supervisory capital requirements (e.g. TSCR) in stressed conditions.
190. When doing solvency stress tests for the purposes of ICAAP, institutions should also consider the impact of scenario on the institution's leverage ratio as well as eligible liabilities held for the purposes of minimum requirements for eligible liabilities (MREL).
191. Supervisory stress testing conducted pursuant to Article 100 of Directive 2013/36/EU or the scenarios or assumptions prescribed to an institution as a results of supervisory challenge and assessment of institutions own stress tests, should not be seen as replacing the obligations of institutions to carry out stress tests as part of their ICAAP and ILAAP.

4.7.2 Management actions

192. Institutions should identify credible management actions addressing the outputs of stress tests and aimed at ensuring their ongoing solvency through the stressed scenario.
193. Institutions should consider a broad range of management actions (including within the liquidity contingency plans) against a range of plausible stressed conditions with a focus on at least one severe but plausible scenario.
194. To assess possible responses to a stressed situation institutions should identify the credible actions that are most relevant and when they would have to take them. Institutions should take into account that some management actions are required immediately and others are contingent on specific events happening, in which case clearly defined triggers for action should be identified beforehand. Management actions should be consistent with stated strategies and policies, for example, in the context of stated dividend policies. Institutions should be conservative about their ability to take mitigating management actions recognising the possible impact of the stressed scenarios on other markets.
195. Institutions should explain the qualitative and quantitative impact of the stress before and after mitigating management actions. The impact before management actions should include assumptions about strategy, growth and associated revenue, but exclude management actions that would not be available in a stress such as winding down a business line or raising capital.
196. Acceptable management actions will be subject to the guidance and judgement of competent authorities, and might include the following:
 - a) the review of internal risk limits;



- b) the review of the use of risk mitigation techniques;
 - c) the revision of policies, such as those that relate to liquidity and funding or capital adequacy;
 - d) the reduction of distributions to shareholders;
 - e) the changes in the overall strategy and business plan and risk appetite; and
 - f) raising of capital or funding.
197. Anticipated management actions differentiated by scenario and adjusted to the severity of scenario should be documented. Institutions should take into consideration the reduction of the efficiency as a consequence of extremely severe stressed situations. In their ICAAP and ILAALP information to be provided to the competent authorities, institutions should also explain management actions already taken based on the results of stress tests.



5. Supervisory assessment of the institutions' stress testing

198. Competent authorities review and assessment of the institutions' compliance with these guidelines should form part of the supervisory assessment of the institutions' risk management framework conducted under SREP (see Section 5.6 of EBA Guidelines on common procedures and methodologies for SREP), in particular in relation to the assessment of the stress testing programmes, governance arrangements, data infrastructure, use of stress testing in ICAAP and ILAAP and management actions as referred to in Section 4 of these guidelines.
199. Competent authorities should perform a qualitative assessment of stress testing programmes, as well as a quantitative assessment of the results of stress tests. Competent authorities should consider the outcomes of qualitative and quantitative assessments together with the results of supervisory stress tests (see Section 6) for the purposes of the assessment of an institution's capital and liquidity adequacy.
200. Furthermore, supervisory assessment of the institutions stress testing programmes, and outcomes of various stress tests would inform the assessment of various SREP elements as provided in the EBA Guidelines on common procedures and methodologies for SREP. In particular, the results of various stress tests performed by an institution as part of its stress testing programme would assist competent authorities with:
- a) the identification of possible vulnerabilities or weaknesses in risk management and controls of individual risk areas. This should be used as an additional source of information to be taken into account by the competent authorities when assessing individual risks to capital as referred to in Section 6 of EBA Guidelines on common procedures and methodologies for SREP, or risks to liquidity and funding as referred to in Section 8 of those guidelines. For example, sensitivity analyses and scenario analyses performed by an institution can be used to assess the sensitivity and adequacy of the models used and the quantifications of the individual risks;
 - b) the identification of possible deficiencies in the overall governance arrangements or institution-wide controls. This should be considered by competent authorities as an additional source of information for the purposes of the SREP assessment of internal governance and institution-wide controls referred to in Section 5 of EBA Guidelines on common procedures and methodologies for SREP. Furthermore the results of the institution's stress tests can be used for the assessment of capital planning, and in particular its time dimension;
 - c) quantification of specific quantitative liquidity requirements in the context of the assessment of liquidity adequacy, especially in the case when a competent authority has



not developed specific supervisory benchmarks for liquidity requirements, or does not apply liquidity supervisory stress testing.

5.1 Qualitative assessment of the institutions' stress testing programmes

201. To facilitate the qualitative assessment, competent authorities should require institutions to submit information regarding the organisation of their stress testing programme in all the aspects specified above. Information submitted by institutions should cover data architecture and IT infrastructure, governance arrangements, methodologies, scenarios, key assumptions, results and planned management actions.
202. Competent authorities should consider all sources of relevant information about stress testing programmes and methodologies, including the institutions' own internal assessments and validation or reviews undertaken by independent control functions, as well as information and estimations provided by third parties, where available.
203. Competent authorities should also engage in dialogue with the management body and senior management of institutions in relation to major macro-economic and financial market vulnerabilities, as well as institution-specific threats to institutions' ongoing business, to assess how institutions manage their stress testing programmes.
204. When assessing stress testing programmes, the results of stress tests and proposed management actions competent authorities should consider both idiosyncratic and system-wide perspectives. In particular, management actions should be primarily assessed from an internal perspective as to their plausibility, considering the specificities of an individual institution. Competent authorities should also consider the management actions from a system-wide perspective as other institutions are likely to consider similar actions, which in a system-wide context may make those actions implausible.
205. When assessing the management actions with an effect on the institution's capital or general financial position, competent authorities should consider the timelines for implementation of action. In particular, the management actions should be completed and implemented during the time horizon of the stress test. Competent authorities may, also consider, where relevant, management actions with the completion later than the time horizon of the stress test.
206. Competent authorities should take into account the effectiveness of institutions' stress testing programmes in identifying relevant business vulnerabilities and take this into consideration when assessing institutions business model viability and sustainability of strategy under SREP.

5.1.1 Supervisory measures based on the outcome of the qualitative review



207. Based on the outcomes of the qualitative review of stress testing programmes and in case deficiencies are identified, competent authorities should require the institution:
- a) to develop a plan of remedial actions aimed at improving the stress testing programmes and practices. In cases where material shortcomings are identified in how an institution addresses the outputs of stress tests, or if management actions are not deemed credible, competent authorities should require the institution to take further remedial actions, including requirements to make changes to the institution's capital plan (see also Section 5.2 below).
 - b) where appropriate, require institutions to run specific prescribed scenarios (or elements of those) or specific assumptions.
208. Furthermore, competent authorities may apply other supervisory measures that are provided in Articles 104 and 105 of Directive 2013/36/EU and which are more appropriate to address the identified deficiencies.
209. When applying supervisory measures, competent authorities should follow the EBA Guidelines on common procedures and methodologies for SREP (see Section 10). The considerations for such measures should be reflected in the SREP assessment of internal governance and institution-wide controls and applied based on the outcomes of the Overall SREP assessment.
210. Supervisory assessment of the outcomes of reverse stress tests should assist with the assessment of business model viability and sustainability, and assessment of scenarios used for ICAAP and ILAAP purposes, as well as in recovery planning.
211. Competent authorities should also use the outcomes of reverse stress tests performed by institutions to take into account possible systemic implications. Where several institutions identify similar reverse stress test scenarios that would expose these institutions to severe vulnerabilities such scenarios should be analysed as an alert about possible systemic implications.

5.2 Quantitative assessment of institutions' stress tests done for ICAAP purposes

212. Competent authorities in addition to the qualitative assessment specified above should assess and challenge the choice and use of scenarios and assumptions, their severity, relevance to the business model of an institution as well as the results of such stress tests, in particular for stress tests performed for ICAAP and ILAAP purposes.
213. Competent authorities should ensure that in a stressed scenario capital is negatively affected as the result, among other things, of credit rating migrations, reduction of net interest margins, or trading losses. Competent authorities should have access to the details of



the institution's main assumptions and risk drivers and should challenge these, also based on supervisory stress tests, as specified in Section 6 of these Guidelines.

214. In the supervisory review of stress tests for ICAAP and ILAAP purposes competent authorities should assess the combined impact of stress tests outcomes on capital and liquidity needs, as well as on other relevant regulatory requirements. To that end, competent authorities should assess whether the institution is able to maintain the applicable Total SREP Capital Requirement (TSCR), at all times, in an adverse scenario.
215. Competent authorities should duly challenge the scenarios, assumptions, and methodologies used by an institution. When challenging scenarios, assumptions, and outcomes of institutions' stress tests done for ICAAP purposes, competent authorities should use, where appropriate, the outcomes, scenarios and assumptions used in the supervisory stress tests, including relevant regional stress test exercises done by various authorities, including the EBA, IMF, and ESCB/ESRB, as well the qualitative assessment as specified above, to determine the extent to which reliance can be placed on the institution's stress testing programme and respective outcomes.
216. If competent authorities identify deficiencies in the design of the scenarios or assumptions used by institutions, competent authorities may require from institutions to re-run stress tests, or some specific parts of the stress testing programme, based on the supervisory prescribed or anchor scenario or assumptions.
217. Competent authorities should also consider the impact of stress tests on the institution's leverage ratio as well as eligible liabilities held for the purposes of minimum requirements for eligible liabilities (MREL) as referred to in Directive 204/59/EU.
218. In the assessment of stress testing results, competent authorities should also consider all known future regulatory changes affecting institutions within the scope and time horizon of the stress test exercise. Likewise competent authorities should also consider changes in future capital requirements (e.g. fully loaded assessments) when assessing the stress-test results and business model viability.

5.3 Application to cross-border groups

219. When assessing stress testing programmes and respective results, as specified in Sections 5.1 and 5.2 above in the case of cross-border groups, competent authorities should consider the transferability of capital and liquidity between the legal entities or business units during stressed conditions, as well as the functioning of any established intra-group financial support arrangements, taking into account funding difficulties expected in stressed conditions.
220. For cross-border groups appropriate discussions should be held between consolidating and host supervisors within the framework of colleges of supervisors to ensure coordination of supervisory activities. In particular, the results of institution-wide stress tests should be



discussed and challenged by the college of supervisors and should be taken into account in the risk assessment of the overall group, its legal entities or business units.

221. Within the framework of colleges of supervisors competent authorities should also discuss the outcomes of their supervisory assessments of institutions' stress testing, and in particular, whether institution including group-wide stress tests are undertaken at all levels necessary to ensure that material risks are addressed taking into account the geographical distribution of activities of the group and that competent authorities involved have a common understanding of group-wide risks.

6. Supervisory stress testing

6.1 Use of supervisory stress testing by competent authorities

222. Competent authorities should, also on the basis of Article 100 of Directive 2013/36/EU, use supervisory stress testing to facilitate the supervisory review and evaluation process (SREP) and, in particular, supervisory assessment of its key elements, including business model, internal governance and institution-wide controls, risks to capital, capital adequacy, risks to liquidity and funding, and liquidity adequacy. In particular, supervisory stress testing should help competent authorities with the following:

- a) to assist in the identification of possible vulnerabilities or weaknesses in risk management and controls of individual risk areas: supervisory stress testing should be used as an additional source of information to be taken into account by the competent authorities when assessing individual risks to capital as referred to in Section 6 of EBA Guidelines on common procedures and methodologies for SREP, or risks to liquidity and funding as referred to in Section 8 of those guidelines;
- b) to assist in the identification of possible deficiencies in the overall governance arrangements or institution-wide controls: supervisory stress testing should be considered by competent authorities as an additional source of information for the purposes of the SREP assessment of internal governance and institution-wide controls referred to in Section 5 of EBA Guidelines on common procedures and methodologies for SREP. In particular, if a competent authority identifies by means of supervisory stress testing, deficiencies in the institution's own stress testing programmes or supporting risk data infrastructure, these should be taken into account in the assessment of the overall governance and risk management framework of that institution;
- c) to assess the relevance, severity and plausibility of scenarios for institution's own stress tests used for ICAAP and ILAAP purposes.
- d) to assess the institution's ability to meet the respective Total SREP Capital Requirement (TSCR) and Overall Capital Requirement (OCR) in the context of the assessment of capital adequacy, as specified in Section 7.7 of EBA Guidelines on common procedures and methodologies for SREP. Depending on the coverage and type of the supervisory stress test, such assessment may be limited only to some elements of the TSCR covered by the design features of the supervisory stress testing (e.g. additional own funds requirements for individual risk categories, in case the stress test covers only such risk categories);
- e) to quantify specific quantitative liquidity requirements in the context of the assessment of liquidity adequacy, especially in the case when a competent authority has not developed specific supervisory benchmarks for liquidity requirements. Certain elements of the liquidity supervisory stress tests should, where appropriate, be used as an input into setting specific liquidity requirements to institutions (e.g. from comparative analysis,



under adverse scenarios, of net cash outflows and eligible liquid assets over a set of time horizon, assessment of stressed maturity ladder) as specified in Section 9.4 of EBA Guidelines on common procedures and methodologies for SREP; and

223. Furthermore, supervisory stress testing should help competent authorities with assessing supervisory organisational procedures and with planning supervisory resources, considering also other relevant information, in particular for the more frequent and in-depth assessment of certain SREP elements in case of non-Category 1 institutions as defined in EBA Guidelines on common procedures and methodologies for SREP, and for the purposes of determining the scope of supervisory examination programme as required by Article 99 of Directive 2013/36/EU.
224. Competent authorities should also use the scenarios and outcomes of supervisory stress tests as additional sources of information in the assessment of institutions' recovery plans, in particular, when assessing the choice and severity of scenarios and assumptions used by the institution. In this assessment, the supervisory stress tests scenarios should, where appropriate and in particular where they satisfy the conditions set out in the EBA Guidelines on the range of scenarios to be used in recovery plans⁴, be used as a reference point for the assessment of the institution's own scenarios and assumptions. If a competent authority identifies deficiencies in the scenarios or assumptions by the institution for the purposes of recovery planning, it should, where appropriate, in addition to requiring the institution to modify their own scenarios, demand that institution uses the supervisory stress testing scenarios and assumptions. When assessing the appropriateness of such a demand, competent authorities should take all relevant factors into account paying particular attention on whether institutions have failed to incorporate system-wide events into their recovery planning.
225. Competent authorities should also, where appropriate, use supervisory stress testing outcomes to support the analysis needed for the purposes of granting various permissions and authorisations required by Regulation (EU) 575/2013 or Directive 2013/36/EU, for example in relation to qualifying holdings, mergers and acquisitions, shares buy-backs.
226. Competent authorities should also use the outcomes of supervisory stress testing, where appropriate, to support thematic analysis of potential vulnerabilities of a group of institutions with similar risk profiles.
227. Competent authorities should also, where appropriate, use the outcome of supervisory stress testing to discharge their macro-prudential tasks including when assessing the overall resilience of the banking sector to shocks, identifying systemic risk, setting and/or testing macro-prudential measures and conducting impact studies and impact assessments.

⁴ EBA/GL/2014/06



6.2 Forms of supervisory stress testing

228. When deciding on the key elements of supervisory stress testing, competent authorities should consider the following:

- a) *Coverage*, in terms of covering certain risk factors (sub-categories) or multiple risk factors, certain individual portfolio or sectors/geographies, all or several portfolios.
- b) *Design*, in terms of the following: (1) sensitivity analysis (single- or simple multi-factor), (2) scenario analysis, or (3) reverse stress testing. Competent authorities should choose the design that is the most appropriate for the objective pursued by the stress test: sensitivity analysis to a single or multiple risk factors should normally be favoured when assessing individual risk to capital or risks to liquidity or funding; the scenario analysis approach should normally be favoured when the assessment of overall capital adequacy is sought; while reverse stress testing should, among others, be deemed appropriate for assessing the severity of the scenarios used in the institutions' recovery plans. However, competent authorities should make an *ad hoc* assessment of the appropriateness of the stress test design: indicatively they may use sensitivity analysis in the assessment of the individual elements of the TSCR, for example for determining how interest rate changes can affect the capital position of an institution or lead to an additional own funds requirement for IRRBB.
- c) *Scope*, in terms of covering the perimeter of cross-border groups: for the purposes of the assessment of the overall group capital adequacy, competent authorities should ensure that all relevant group entities are taken into account for such stress test.
- d) *Sample* of institutions covered by the stress tests: when considering supervisory stress testing for more than one institution, competent authorities should consider the appropriate sample for the purposes of the exercise, in particular when using supervisory stress testing for thematic assessments of certain business lines/models or macro-prudential surveillance, or impact studies/assessments.
- e) *Approach*, in terms of top-down stress test, bottom-up stress test, or combination of both.

229. When designing and conducting supervisory stress tests for SREP purposes, competent authorities should consider the outcomes of asset quality reviews (AQR), where available and not already incorporated in institutions' financial statements. Combining supervisory stress testing together with AQR may be useful for ensuring that the balance sheet positions of the institutions covered by the supervisory stress tests are reported accurately with improved and comparable starting points across participating institutions.

230. Competent authorities should also consider, where appropriate, setting pre-defined target capital ratios, especially in the context of system-wide stress tests. Such target ratios should apply consistently to the institutions under the scope of the supervisory stress tests.

6.3 Organisational and governance arrangements within competent authorities

231. Competent authorities should establish an effective programme for supervisory stress testing. This programme should be supported by appropriate organisation, governance and IT arrangements ensuring that supervisory stress tests can be conducted with appropriate frequency. The supervisory stress testing programme should support the effective implementation of the supervisory examination programme for the individual institutions. The programme should also reflect how the competent authority takes decisions regarding the choice of forms of supervisory stress testing in close connection to the objectives of each exercise.
232. The governance, organisation and IT arrangements supporting the supervisory stress testing programme should include at least the following:
- a) human and material resources, data and IT infrastructure to design and run supervisory stress tests. In particular, the supervisory stress testing programme should be supported by adequate data and an appropriate methodological approach covering all aspects, including scenarios and assumptions (e.g. templates, guidance, documentation) and ensuring both flexibility and appropriate levels of quality and controls;
 - b) quality assurance process covering stress testing design, development and execution and consistency of the results across institutions;
 - c) integration of supervisory stress testing into other relevant supervisory processes. Hence the organisation should support the sharing of information and utilisation of all aspects of the stress testing programme (e.g. both bottom-up stress test and top-down stress test results).
233. Within the governance arrangement, competent authorities should ensure that the supervisory stress testing programme is assessed regularly, both qualitatively and quantitatively to ensure that it is adequate.
234. Competent authorities should ensure that they have processes and arrangements in place for an effective dialogue with institutions regarding supervisory stress tests and their outcomes. This dialogue should reflect the intended objectives, be established in particular but not exclusively when the supervisory stress tests are run for the purposes of the assessment of the overall capital adequacy of institutions and be organised within the more general context of the SREP assessments as set out in EBA Guidelines for common methodologies and procedures for SREP. For the purposes of such dialogue both at the technical and managerial level, where relevant, the competent authorities should ensure that:



- a) adequate, sufficiently detailed and accurate explanation and guidance is provided to institutions on the application of the methodologies and assumptions for a bottom-up stress test;
 - b) adequate, sufficiently detailed and accurate instructions are given to institutions with regard to the supporting information required by them to be submitted to competent authorities along with the results of the calculation of the stress tests;
 - c) explanation is provided to institutions following discussions, where relevant, of the outcomes of supervisory stress tests that lead to the application of supervisory measures. This should be particularly considered by competent authorities especially in the context of system-wide stress tests which trigger supervisory measures.
235. When applying supervisory stress testing to cross-border groups and their entities, competent authorities should exchange information and, where practically possible, appropriately discuss the process within the framework of colleges of supervisors. In particular, the competent authorities should ensure that relevant details on the methodologies, scenarios, major assumptions as well as the results of supervisory stress testing, especially those aimed at assessing capital or liquidity adequacy, are provided and discussed.
236. Competent authorities should also identify what information regarding supervisory stress tests and their outcomes may be publicly disclosed, taking into account the intended purposes of the supervisory stress tests. When deciding on the public disclosure of the results or methodologies of supervisory stress tests, competent authorities should consider their own role in the exercise and the approach chosen (top-down stress test, bottom-up stress test) and also consider the extent of their own analysis to accompany published results.

6.4 Process and methodological considerations

237. The supervisory stress testing programme set out by the competent authorities should ensure at least the following:
- a) When designing methodologies and assumptions for supervisory stress tests, competent authorities should decide on the design and features of the exercise which are most suitable for its intended purpose, i.e. that is linked to the supervisory (or other) objectives set by the competent authority.
 - b) When conducting supervisory stress tests on a wider sample of different institutions, competent authorities may consider adopting the design of supervisory stress tests for different categories of institutions as set out in the EBA Guidelines on common procedures and methodologies for SREP, especially if the exercise is run top-down.
 - c) Competent authorities should consider the appropriate timelines for conducting supervisory stress tests, including the time horizon of the scenarios and the period over which the management actions proposed by institutions in the stress test exercise are analysed. The timelines of the exercise should also factor in the dialogue with an



institution, where relevant for the intended purpose of the exercise and the extent to which the data supplied by the participating institution will remain relevant. In terms of the design of the scenarios, when conducting supervisory stress tests for the purposes of assessing capital adequacy, competent authorities should design the scenarios covering at least two years forward-looking time horizon in consistency with requirements put for the ICAAP stress tests set out Section 4.7.1 of these guidelines.

- d) Competent authorities should consider, where relevant for the intended purpose of the exercise, all known future regulatory changes affecting institutions within the scope and time horizon of the exercise.
238. In case of a scenario analysis stress tests, competent authorities should decide whether to run a single scenario to be applied to all institutions included in the scope of the exercise, or to develop institution-specific scenarios for individual institutions (the latter should not be seen as relieving institutions from the responsibility of designing own scenarios for the purposes of ICAAP and ILAAP stress testing), or a combination of the two. Competent authorities should consider the transferability of capital and liquidity resources in stressed conditions and consider any possible impediments, including legal and operational impediments that may exist.
239. Furthermore, the following aspects should be considered when developing the methodologies for supervisory stress tests:
- a) for the purposes of the assessment of capital adequacy, competent authorities should consider the impact of the stress test on the institutions' profit and loss, balance sheet, risk exposure amount, leverage ratio, and analyse the impact of the stress test capital ratios of institutions covered by the exercise.
- b) for the purposes of bottom-up stress tests, competent authorities should consider the extent to which they prescribe the methodologies for modelling institutions' balance sheets and profit and loss. Indicatively, institutions' balance sheets may be taken as static, allowing competent authorities to assess of current risks over time. Alternatively, they may be allowed to be dynamic, permitting a more forward-looking exploration of how institutions' business plans might evolve under the stress scenario. For enhanced comparability, competent authorities should consider opting for the static balance sheet approach. Conversely, for enhanced feedback on the institutions' intended or planned reactions vis-a-vis stresses and shocks, the dynamic balance sheet approach should be favoured.
- c) competent authorities should consider how to take account of systemic feedback or second round effects in the stress tests recognising the limitation of providing ex ante assumptions in the case of bottom-up stress tests.
- d) competent authorities should aim to model the impact of the stress test exercises consistently and fairly across the institutions covered by supervisory stress tests (comparison of several institution-specific exercises or system-wide exercise) in order to minimise the extent to which stress testing results reflect differences in modelling choices



and judgements among institutions, rather than true differences in the risks to which they are exposed.

240. Competent authorities should identify model risk across stress testing exercises and have access to different types of comparative information. It is important to have a plurality of perspectives/benchmarks and at the same time recognising that all models are imperfect with the clear identification of known and potential weaknesses. Understanding these imperfections and weaknesses of individual institutions' stress testing models can inform the supervisory stress testing process and mitigate potential problems from model risk.

7. Using the quantitative outcomes of stress tests for capital adequacy assessment purposes

241. With a view to further specify, expand and clarify the guidance provided in paragraphs 358 to 368 of the SREP Guidelines (Section 7.7), this Section aims at providing to the competent authorities additional guidance on how outcomes of ICAAP stress tests and supervisory stress tests could be used to inform a forward-looking assessment of institutions' projected stressed capital needs.
242. Competent authorities should distinguish between:
- a) the use of qualitative outcomes (e.g. identified deficiencies in risk management and controls) of various stress tests and supervisory stress testing to inform the assessment of risks to capital, liquidity and funding, as well as risk management and controls, as specified in Section 5 of these Guidelines; and
 - b) the use of quantitative outcomes of relevant ICAAP stress tests and supervisory stress tests (i.e. outcomes in terms of changes in own funds ratios) and the assessment of the institution's capital adequacy, including the assessment of its ability to meet applicable own funds requirements through the cycle.
243. Competent authorities should, also on the basis of paragraphs 358 to 360 of the SREP Guidelines, assess as appropriate the impact of the quantitative outcomes on the adequacy and quality of the institution's own funds and determine whether the quantity and quality of own funds are sufficient to cover applicable capital requirements, and in particular:
- a) Overall Capital Requirement (OCR) including its combined buffer requirements under the baseline scenario over a forward looking time horizon of at least two years;
 - b) Total SREP Capital Requirement (TSCR) under the adverse scenarios over a forward looking time horizon of at least two years; or
 - c) where relevant, any other pre-defined target ratio set by the competent authority in the context of a system-wide stress test under the adverse scenarios over a forward looking time horizon of at least two years.
244. When, the quantitative outcomes of the stress tests indicate that an institution will not be able to meet its combined buffer requirements, competent authorities should, as appropriate:
- a) estimate the magnitude of that impact;
 - b) set out the extent to which buffers could be used to absorb losses under the assumed scenarios;
-



- c) determine an adequate response to ensure that an institution would be able to meet its OCR within a reasonable timeframe.
245. For that assessment, competent authorities should consider *inter alia* the types of scenarios (baseline or adverse), their severity and plausibility, including their probability of materialisation. Competent authorities should liaise with the designated (macro-prudential) authority to assess systemic risk implication and to understand any assumptions regarding macro-prudential requirements, and use all other buffers, but the capital conservation buffer under the assumed stressed conditions, also in accordance with paragraph 363 of the SREP Guidelines.
246. When, under the assessments referred to in paragraph 243 (b) and (c), the quantitative outcomes of the stress tests indicate that, under the given adverse scenarios, an institution will not be able to meet its TSCR and/or target ratio (in case of system-wide stress test), competent authorities should, also in accordance with paragraph 364 of the SREP Guidelines:
- a) ensure that an institution submit or has submitted a credible capital plan that addresses the risk of not meeting its TSCR as identified, and as referred to in paragraph 364 of the SREP Guidelines. This capital plan would differ from the capital plan prepared by an institution for ICAAP purposes, as it will need to consider also quantitative outcomes of supervisory stress tests not previously considered in ICAAP;
 - b) review the revised capital plan referred to in point (a) with a view of assessing its credibility, as appropriate, and determine, as part of their overall SREP assessment and supervisory response as per in Section 10 of the SREP Guidelines, whether and which supervisory measures, including measures specified in Section 10.3 of the SREP Guidelines, are appropriate or necessary.
247. To determine the appropriateness of supervisory measures referred to in the previous paragraph, competent authorities should have regard at least to:
- a) the types of the adverse scenarios considered, including their severity, plausibility and probability of materialization;
 - b) the criteria referred to in paragraph 366 of the SREP Guidelines;
 - c) the extent to which the existing combined buffer requirements and other applicable macro-prudential measures already cover risks revealed by the stress test;
 - d) the quality of the institution's available own funds;
 - e) the extent to which adverse scenarios applied cover all the material risks contributing to the additional own funds requirements in the TSCR: competent authorities should in particular have regard to the fact that macro-economic downturn scenarios may not entirely capture some risks, for example conduct risk, pension risk or some elements of credit concentration risk (e.g. single name concentration) which may amplify potential losses under the tested adverse scenarios.



248. To determine the credibility of the capital plans referred to in paragraph 246, the competent authorities should consider, as appropriate:
- a) whether the capital plan covers entirely the assumed time horizon;
 - b) whether the capital plan puts forward a set of credible mitigating and management actions, such as setting aside additional capital buffers, restricting dividend payments etc.;
 - c) whether the institution is willing and able to take such actions in order to address the breaches of TSCR and/or pre-defined target ratios in the system-wide stress tests;
 - d) whether those mitigating and management actions are subject to any legal or reputational constraints, for instance due to contrary or conflicting former public statements e.g. on dividend policies, business plans and risk appetite;
 - e) the probability that mitigating and management action would enable the institution to fully meet its TSCR over the time horizon set out in paragraph 243 (b) an/or pre-defined target ratio as set out in paragraph 243 (c);
 - f) whether the proposed actions are broadly in line with macro-economic considerations and with future regulatory changes affecting an institution within the scope and timeline of the assumed adverse scenarios.
249. When assessing capital plans, competent authorities should be in the position, following an effective dialogue with the institution, to require the institution to make changes to those plans, including to the proposed management actions, or require institutions to take additional mitigating actions that would become relevant given the scenarios and current macroeconomic conditions. Competent authorities should expect institutions to implement the revised capital plan, including further changes made based on the results of the supervisory assessment and dialogue with an institution.
250. When, under the assessment referred to in paragraph 243 (b) and (c), it is anticipated that based on the quantitative outcomes of the stress tests, due to the current macro-economic conditions or other reasons, the institution will not be able to meet its TSCR and/or target ratio in the next twelve months, competent authorities should, in addition to the stipulations of paragraph 246, consider also in accordance with paragraphs 367 of the SREP Guidelines, reviewing TSCR and setting additional own funds requirement for systemic or other risk purposes also in accordance with paragraph 368 of the SREP Guidelines.



5. Accompanying documents

5.1 Draft cost-benefit analysis / impact assessment

Article 16 of Regulation (EU) No 1093/2010 provides the EBA with the responsibility to establish consistent, efficient and effective supervisory practices, within the European System of Financial Supervisors (ESFS), and to ensure the common, uniform and consistent application of Union law, issue guidelines and recommendations addressed to competent authorities or financial institutions.

More specifically, the EBA is mandated by Article 100(2) of Directive 2013/36/EU to foster sound and effective supervision across the EU arising from the requirements set out, while Article 107 of the same Directive stipulates that the EBA needs to assess the information provided by competent authorities for the purposes of developing consistency in the supervisory review and evaluation process. These legal provisions empower the EBA to issue guidelines which ensure that common methodologies are used by competent authorities when conducting its annual supervisory stress testing tasks.

The following sections of the impact assessment focus on justifying the decision for the documentation of an updated version of stress testing guidelines and estimating the costs and benefits for supervisors and institutions arising from the full implementation and application the guidelines. It is noteworthy that the impact assessment quantifies the net impact from the full implementation of the guidelines, implying that the costs and benefits from the actual implementation of the guidelines will be proportionate to the level of implementation in each member state, i.e. member states which do not fully implement the guidelines will incur less costs but will also benefit less from the advantages of the full implementation.

A. Problem identification

The CEBS, the predecessor of the EBA, issued Guidelines on Stress Testing in 2010 (GL32). Since then, there have been several de facto changes in conducting stress testing which relate to its coverage, usage and methodologies. The recent financial crisis and the several negative events in banking sector highlighted significant lessons in relation to stress testing practices and triggered changes in its conduct. Aligning with the international practices, the EU supervisors **expect from the institutions to develop more advance and updated stress testing practices in light of the recent experience.**

The EBA has also derived important conclusions from the 2013 EBA peer review on the implementation of the stress testing guidelines. The aim of the peer review performed by the EBA was to assess and compare the effectiveness of supervisory activities related to the review of



credit institutions' own stress testing programmes across the EU, as well as the implementation of related provisions by competent authorities⁵. In particular, although the peer review concluded that all competent authorities' organisational and resource models exhibit benefits, **the involvement of dedicated stress testing technical experts was not sufficient, irrespective of the model in question.**

The peer review also showed that the competent authorities **often focus on stress testing the largest institutions and devote far less attention to other institutions in their jurisdictions.** On the other hand, only few competent authorities **required reverse stress testing**, and when they do so, it is often a part of a recovery planning only. Additionally, there is vast diversity across jurisdictions of the **handling of the incorporation of the outcome of stress testing into the supervisory review and evaluation process (SREP).** Furthermore, many of the assessed competent authorities have shown evidence of substantial work on top-down stress testing, from both a micro- and macro-prudential perspective. Finally, in many instances, competent authorities observed that stress testing continues to not be sufficiently integrated into institutions' risk management frameworks or senior management decision-making processes. **Wherever stress testing is used, scenarios continue to not be sufficiently severe to address extreme adverse economic and financial conditions.**

B. Policy objectives

These guidelines aim at achieving convergence of practices followed by institutions and competent authorities for stress testing across the EU. They provide detailed guidance to be complied with by institutions when designing and conducting a stress testing programme, addressing the above mentioned deficiencies identified by the EBA as part of the peer review. They also provide guidance with a view to ensuring convergence for supervisory stress testing in the context of the supervisory review and evaluation process performed by competent authorities.

To achieve this objective, the impact assessment should identify whether the relevant building blocks required for an effective stress testing programme of the different approaches (spanning from simple sensitivity analysis on single risk factors or portfolios to complex macroeconomic scenario stress testing on an institution-wide basis) provides a reasonable trade-off between the costs and benefits involved for their full implementation.

C. Baseline scenario

The best practices for achieving convergence of practices followed by institutions and competent authorities for stress testing across the EU has been discussed and put into practice since the previous guidelines in 2010, in close cooperation with CAs, through several fora and EU-wide stress test exercises. More recently, the EBA published also the Guidelines on SREP. Therefore,

⁵ <https://www.eba.europa.eu/-/eba-publishes-peer-review-on-the-implementation-of-the-stress-testing-guidelines>



these Guidelines on Stress Testing are an update of the best practices, sometimes, already in place and are drafted to also ensure consistency with the EBA Guidelines on common procedures and methodologies for SREP.

Although it is expected that, even in the absence of the regulatory intervention, the supervisors and institutions would anyway ensure this consistency in the future, the regulatory intervention (stress testing guidelines) would enhance the harmonisation of prudential supervision and will speed up the compliance of supervisors and institutions with the suggested standards, making the harmonisation feasible at an earlier stage.

D. Options considered

Option 1: to “do nothing” (i.e. to not draft updated guidelines)

This option implies that institutions and competent authorities carry out the stress tests relying on the current practices without receiving any additional guidance in written. Despite the fact that most of these practices have been agreed between the CAs and the EBA, the explicit scope of different approaches for the conduct of stress testing is missing for both supervisors and institutions. Furthermore, there are links between stress testing exercises and other forms of prudential supervision (SREP) that have not yet been completely established in order to ensure consistency and could have improved prudential supervision tasks. The use of these links and necessary consistency should be thoroughly explained to supervisors and institutions.

The ‘do nothing’ option would theoretically avoid the dedication of more EBA resources for the improvement and discussion of the current drafting on institution’s stress testing (reviewing), the supervisory assessment of the institution’s stress testing, supervisory’ stress testing and the using of the outcomes of stress tests for capital adequacy assessment purposes. Nonetheless, to refrain from drafting the guidelines would involve non-negligible operational cost, waste of EBA’s human capital for communicating the framework to the national supervisors and possible risk of inconsistent application relating to stress testing methodologies and the respective consistency with the EBA Guidelines on common procedures and methodologies for SREP.

Moreover, the reliance of the conduct of stress testing on the GL32 CEBS guidelines (2010) and the oral communication of the updates on best practices to the CAs entails a level of reputational risk for the EBA which arises from supervisors, institutions and the society as a whole.

Option 2: to review the CEBS guidelines on Stress Testing (GL32, 2010) and to provide guidance with a view to ensuring convergence for supervisory stress testing in the context of the supervisory review and evaluation process performed by competent authorities.

The main reasons to improve the guidelines are the following: i) follow up from the peer review of 2013; ii) the SREP GL need for supporting guidelines specifically on stress testing; iii) the lessons learnt from the 2014 EU-wide stress test. In particular, there is a need for a clear taxonomy on stress testing; and a need to understand the range of potential supervisory stress tests (to have



an informed discussion about where to best pitch the EBA stress tests vis a vis other supervisory stress tests).

The overall guidelines remain largely valid. However, some areas require attention, namely: data infrastructure; reverse stress testing (rewriting); new individual risks (conduct risk and FX lending risk); supervisory assessment of the institutions' stress testing; supervisory stress testing; and using the outcomes for capital adequacy assessment purposes (the general coverage of the SREP requires updating to reflect the new SREP guidelines). In addition, other areas can be also reviewed, namely: individual risk areas as part of the body of the GL (not annexes anymore; e.g. Liquidity Risk); institution techniques for assessing the impact of macro-economic scenarios; transparency in stress testing and associated outcomes.

At the same time, the guidelines won't set the detailed methodology for future EBA stress tests, but will set the context to facilitate future discussions on the future of EBA stress tests.

E. Cost-Benefit Analysis

The principle of proportionality applies to all aspects of stress testing, including methodology, frequency, discrimination between qualitative and quantitative assessment and level of details of the conduct of stress testing. The cost-benefit analysis has also followed the principle of proportionality in the conduct of the cost-benefit analysis, e.g. an institution which is currently required by the supervisor to conduct a less sophisticated approach, due to its nature of products or its small size, is assumed to be allowed to follow the same approach in the future, while institutions which do not currently apply a certain part of the stress testing practices, which is recommended by the guidelines, will be assumed to follow the approach that is more appropriate for their size, business model and the nature of its financial products.

The cost-benefit analysis assesses the net monetary impact of the operational changes proposed for implementation in relation to the current operational cost relating to the conduct of stress testing. The net impact on capital requirements, implied by the implementation of the current guidelines, cannot be precisely assessed; however, it is expected to be close to zero.

Option 1

Benefits: one-off 'opportunity' benefits from the avoidance of dedicating EBA staff for the drafting of the guidelines. Magnitude of the benefits: close to zero

Costs: on-going 'opportunity' costs arising from consuming time for oral communication of best practices and of the use of the stress testing with other tools for prudential supervision (SREP guidelines). These costs relate to the communication from EBA to supervisors and from supervisors to institutions and will further increase in the presence of miscommunications or misunderstandings. Magnitude of the costs: low

Net impact (benefits minus costs): negative (low)



Option 2

Benefits: the benefits of this option arise from the transparency of the current stress testing practices and the enhancement of the economic sentiment / confidence of institutions, depositors and investors in the EU banking system. Although these benefits are not directly observable and are spread in time, they are considered to not be negligible and cannot be ignored. Magnitude of the benefits: low

Costs: the one-off cost of dedicating EBA staff for the drafting of the guidelines dealing with the update of the current stress testing practices. There is also a cost arising from the time-consuming oral communication of best stress testing practices which have already been designed and put in practice by supervisors and institutions but needs to be thoroughly explained by the EBA to ensure consistency across supervisors and institutions. These costs will further increase in the presence of miscommunications or misunderstandings. Magnitude of the costs: close to zero

Net impact (benefits minus costs): positive (low)

F. Preferred option

The cost-benefit analysis in section (vi) indicates that option 1 should be excluded as it produces a negative net impact. The cost-benefit analysis, enhanced by the qualitative assessment in section (v), indicates that option 2 is proposed for implementation, i.e. reviewing the guidelines on stress testing (GL32) to ensure convergence of practices followed by institutions and competent authorities for stress testing across the EU, linking them with other tools for prudential supervision (SREP).

The net impact is separated amongst the stakeholders has been estimated as follows:

For the supervisors (approximation in % of the total net impact): 65%

For the institutions (separated in Categories 1, 2, 3 and 4): 35%

Following the principle of proportionality, these guidelines are applicable in their entirety to Category 1 institutions as these are the systemically important institutions. Category 2 institutions, or non-systemic medium to large size institutions, are required to follow those parts of the guidelines that are relevant for their institutions and to a level that reflects the complexity of their activities. These institutions operate domestically or have sizable cross-border activities and may operate in different business lines, which needs to be reflected in the stress testing.

For Category 3 and 4 institutions, which include small and medium institutions, the expectation is that the guidelines are followed to the extent that they are proportionate and relevant to their activities, resources and the risk posed to the financial system. The scope of the stress testing for these institutions is therefore limited, reflecting the reduced scope of their activities and limited risk to the system overall.



Nonetheless, the assessment of the cost-benefit analysis in section (vi) above assumed that category 3 and 4 institutions also conduct stress testing exercises according to the proportional (for their size and nature) implementation of the guidelines. In cases these institutions do not conduct stress tests and/or do not follow the guidelines the cost and net impact of Option 3 will be reduced proportionally, although this reduction is expected to be marginal and not expected to affect the magnitude of the net impact due to the simplicity of models these institutions would be assumed to apply.

Category 1: (approximation in % of the total net impact): 20%

Category 2: (approximation in % of the total net impact): 10%

Category 3 and 4: (approximation in % of the total net impact): 5%

Note: (% Category 1 plus % Category 2 plus % Category 3, 4) equals % for the institutions