



Guiding Principles on Developing Stress Testing Methodologies to Assess Financial Sector Risks

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Preface

Stress tests are among the important tools used to determine the ability of the financial sector to withstand systemic risks, as well as to identify the significant systemic risks at the banking sector level as a whole. Previous crises proved that it is not sufficient to manage risks based on normal banking conditions, given that sudden internal or external changes in the markets may expose banks to significant losses, which may have a negative impact on economic growth and may require costly public bailout programs to save the banks.

Stress tests refer to the bank's use of different techniques or methods to assess its ability to face risks under the assumption of adverse, but potentially expected, economic and financial conditions, by measuring the impact of these risks on the bank's financial indicators, in particular, the impact on profitability, capital adequacy and liquidity, meaning, it is used to assess the banks' ability to withstand, and survive in the event of economic and financial crises that may lead to high risks.

In this context, stress tests in recent years - especially after the global financial crisis of 2007 - have become one of the most important tools of prudential policy at the micro and macro level in the banking sector. These tests provide a perspective of the banks' financial positions by developing assumptions of different degrees, starting from the baseline scenario that is expected to occur, then the moderate scenario, to the severe scenario. These tests measure the banks' ability to pass these various hypotheses, allowing central banks to assess the financial indicators and to what extent banks are able to withstand economic and financial crises and to take the necessary measures such as strengthening capital, raising liquidity level, and activating risk mitigation tools, such as hedging and acceptable guarantees, in addition to developing advanced contingency plans to contain risks.

In addition, stress tests results can be used in the capital planning process through the Internal Capital Adequacy Assessment Process (ICAAP) to face all risks of material impact and any potential financial crises and estimate the amount of future needed in the coming years. Stress tests also contribute to strengthening the public opinion confidence in the banking sector stability by publishing the main results of the tests at the sector level.

Various types and methodologies for stress testing are applied to measure risks such as credit, concentration, market, liquidity, and operational risk. Some Arab countries apply these tests at the banking sector level through the Central Bank (Top-down Approach), or through (Bottom-up Approach), based on unified assumptions defined by the Central Bank. The levels of disclosure of stress tests vary between Arab countries, as some countries publish the results in their financial stability reports, while several other countries only disclose the methodology. It is worth noting that the Basel Committee on Banking Supervision (BCBS) had previously issued in 2009 a paper on “Principles for Sound Stress Testing Practices and Supervision” which has been revised later in 2018. The Islamic Financial Services Board (IFSB) also issued a paper directed to Sharia-compliant banks on stress tests in 2012. Additionally, In 2013, the Arab Committee on Banking Supervision (ACBS) - Arab Monetary Fund - issued a paper titled "Principles of Stress Testing for Banking Institutions". However, with the rapid and massive development of financial institutions' business models, the continuous development of stress tests has become a necessity in a manner that – takes into account the growing complexity of financial operations.

In light of the above, and in light of the Arab Monetary Fund efforts to support economic, financial, and monetary reforms aimed at enhancing financial stability in the Arab region, and based on the discussions at the meetings of the Working Group on Financial Stability in the Arab Countries and the Arab Committee on Banking Supervision, and in consultation with central banks and Arab monetary institutions, the following guiding principles were issued on "**Developing Stress Testing Methodologies to Assess Financial Sector Risks**", noting that the application thereof is subject to the state of each Central Banks separately, the objectives contained in its articles of association and the governing financial system in each country. The Arab Monetary Fund issued a "**Policy Guide on the Application of Micro and Macro Stress Testing**". The guide aims to explain the guiding principles in a manner that assists central banks and the banking and financial sector in strengthening the risk management system and adopting advanced methods to measure the financial sector's ability to face crises in accordance with the best international standards and practices. The guide provides a theoretical and practical analysis framework on how to apply micro and macro stress tests, whether applied by central banks and/or the financial sector, in a manner that contributes to strengthening the banking crisis management system (the guide is available on the Arab Monetary Fund website).

Guiding principles on Developing Stress Testing Methodologies to Assess Financial Sector Risks

Principle (1)

Stress tests must be an integral part of the corporate governance and risk management framework in financial institutions, including enhancing the role of the financial institution's Board of Directors and its Executive Management in ensuring the successful implementation of stress tests, formulating and approving a written policy governing these tests, and considering the results of stress tests when making strategic decisions and determining the risk appetite level.

It is appropriate that stress testing frameworks include a clear, comprehensive, effective, and documented governance structure. This framework defines the roles and responsibilities of the Board of Directors, senior management, and related parties of the bank (or financial institution) in supporting, implementing, and supervising these tests. Responsibilities start with the process of assumption design and approval, model development and validation, results reporting and analysis, how the test outputs are used, the responsibility to address any weaknesses or deficiencies demonstrated by these tests, the roles of risk management and compliance, and internal audit. The procedures should cover all aspects of the stress testing framework and should be clearly documented and updated, including approval of the testing framework by the bank's Board of Directors and/or senior management. The stress test framework should also ensure all necessary stakeholders' cooperation and appropriate communication on the design of stress test assumptions

In this context, bank boards have ultimate responsibility for and supervision of the stress testing framework. The development and implementation of a stress tests framework may be delegated to executive management or a stress testing committee. Also, periodic meetings that include discussions with senior management or senior experts responsible for testing stressful situations and the challenges that the bank may face in choosing assumptions shall be organized. Here, it is important to document all the meetings and governance arrangements that define the roles of all the responsible. It is important to establish a clear and documented mechanism that explains how stress test results are communicated to the Board of Directors to consider the

impact on the Bank's strategy, performance, and financial conditions. In addition, these arrangements should stress the importance of interaction between the bank's stress testing committee and all other committees formed at the bank and banking group level, such as the Assets and Liabilities Committee, the Risk Committee (credit, market, and operational risks), the new products/activities committee, and the Information Technology and Cyber Security Committee, through holding periodic meetings that include exchanging views on the selection of assumptions. It is also important to use the results of stress tests in designing and determining the bank's risk tolerance level and planning process for strengthening capital and liquidity.

Regarding the role of supervisory authorities, there are two important aspects in this context. The first is to ensure that there are clear instructions on the governance of financial institutions in general, are existed in line with best practices and international standards and the continuous development thereof. The second aspect is related to the development of instructions for stress tests, including their governance, defining the roles and responsibilities of the financial institution's Board of Directors and Executive Management, and enhancing risk management culture among employees of the financial institution. In this context, the integration of stress tests in the governance system should take into account the general stress tests framework issued by the supervisory authorities, according to what will be mentioned in principle (4).

Principle (2)

Providing the necessary infrastructure to implement stress tests, including qualified risk management staff who have at least the skills to design, conduct and analyse stress tests. In addition to developing continuous programs to build the capabilities of the responsible staff, and providing appropriate statistical programs, as well as accurate and comprehensive historical data to ensure the successful and effective implementation of these tests.

Stress testing governance procedures include providing high-quality data. It also requires the availability of the necessary infrastructure for the optimal implementation of these tests. It is also important that the information technology systems be commensurate with the bank's size, nature, and complexity, allowing technicians to apply these tests.

Financial and human resources, in addition to statistical software programs, must be available as well. The bank's management should provide training and capacity-building programs for the bank's employees and adopt effective succession and knowledge transfer plans among the bank's employees. It is necessary to attract specialists in stress testing with the appropriate skills and experience in risk management, liquidity, credit, market risk, capital adequacy instructions, financial accounting, and modelling as well as comprehensive knowledge of international standards for stress testing. Their experience shall also include skills and capabilities in linking economic risks with financial risks (business cycle and financial cycle). It is possible to use expertise from outside financial institution to carry out stress tests in a manner that do not conflict with the regulatory legislations. The availability of reliable statistical data is also a basis for the reliability of the stress test results. In this context, a sufficient historical data time series is used, the necessary statistical processing is performed, and the appropriate model is selected in the overall tests based on standard models such as The Satellite Model to ensure the model's suitability and scientific credibility. It must be noted that Principle (2) applies, whether the tests are carried out by the Central Banks or the supervisory authority (Top Down), or through the financial institution (Bottom Up).

Principle (3)

Stress tests should be based on scientific and logical assumptions, using gradual intensity assumptions based on historical data. In this framework, it is possible to use the Standard Score to build test assumptions. Also, all the applied tests shall be forward-looking, and support contingency and recovery plans and risk management policy¹.

Stress tests are a forward-looking tool with a futuristic and predictive aspect, so they should provide at least three years of expectations. The assumptions of stress tests should be designed on a scientifically sound basis, where the assumptions are meaningful, and formulated according to the opinions of experts and specialists in cooperation with the concerned officers within the institution (such as the officers responsible for Risks, research, treasury, credit and

¹Please refer to the Policy Guide on the Application of Micro and Macro Stress Tests regarding the gradual assumptions building for stress tests published on the website of the Arab Monetary Fund: www.amf.org.ae

financial facilities, investments, compliance, etc.), so that these tests contribute to tracking the financial institution's achievement of the strategic objectives. Stakeholders should have a clear understanding of - risk drivers, the suitability of the assumptions, and the coverage of all risks. It is also necessary to specify the type and details of the used assumptions in stress tests, and the objective of the assumptions design, and evaluate the assumptions used annually or when new developments occur. The results of the assumptions evaluation and the details of the methodologies used in defining the assumptions and the purpose thereof should be documented.

In this context, it is important to test all the likely-to occur assumptions, not just the assumptions - based on historical data, as the bank's Stress Testing Committee can also make harsh (but likely to occur) assumptions about the overall risk framework. These assumptions should consider the unusual risks (such as the risks associated with the bank's new products or activities, such as opening subsidiaries or foreign branches) that may lead to unprecedented future risks.

Micro stress tests, whether based on a single variable (sensitivity analysis tests) or several variables (multiple assumptions tests), allow the assessment of the following risks to be assessed as a minimum: Credit risk (including the risk of insufficient collateral for credit facilities), market risk (which includes the interest rate, exchange rate, equity, shares risk, and derivative risks), liquidity risk, operational risk, concentration risk, reputation risk, financial contagion risk, and off-balance sheet assessment risks, including the expected impact on commercial bank's financial soundness indicators, such as Capital adequacy, liquidity, and profitability.

Finally, stress test assumptions are designed in a manner of gradual intensity based on historically occurred stressful events or assuming unexpected crises, such as the global financial or economic crisis. The standard score based on historical data can be used to design assumptions of gradual intensity.

It is worth noting that it is possible to benefit from the standard models used in stress tests to develop early warning systems, calculate expected credit loss models in IFRS 9, forecast models for weak banks, and develop contingency plans. It is also important to use stress test results to update and reassess recovery plans, not just contingency plans, business continuity, and internal capital and liquidity assessments.

Principle (4)

The Central Banks or the regulatory authority should issue a general framework on stress tests, including the requirements for formulating the assumptions, methodologies used, periodic conduct thereof, and the mechanism for dealing with the test results. It is convenient to allow financial institutions to define some of their own assumptions according to their risk's specificity.

As the Central Bank is the supervisory authority responsible for the robustness and safety of the banking and financial sector financial positions in the country, its issuance of a general framework on stress tests is a starting point towards the successful and effective implementation of stress tests and ensuring a prudent risk management culture in financial institutions.

The framework includes minimum requirements related to the application of stress testing, including Determining the main risks, testing objectives, - governance, - policies, internal procedures and documentation, infrastructure requirements for conducting tests, their design and frequency (it is appropriate that the periodicity of tests during normal times should be at least once a year, and semi-annually during stressful conditions), testing design requirements, the types of required testing, the role of the Central Banks in this regard, mechanism and frequency of reviewing the test, the methods of dealing with the outputs and tests results, the requirements of communication between the central banks, and the financial institution regarding the test results.

If the assumptions used in stress tests were designed by the Central Banks, it is recommended that the supervisory instructions allow the financial institutions to design at least one assumption, considering important risks from the financial institution's perspective that were not covered by the assumptions assumed by the Central Banks, given that the risks may vary from one financial institution to another. It is necessary for each bank to identify its own stress assumptions that are in line with its business model, the size of its activities, the complexity of its banking operations, the risks to which it is exposed, and the level of solvency and liquidity. If the supervisory authority were to set a unified stress assumptions on all banks, it may lead to banks preparing assumptions only for the purpose of responding to the requirements of the supervisory authority, which negatively affects the quality of tests and assessment of the overall

risk framework. Accordingly, it would be better for central banks to set unified assumptions on banks, while allowing each bank to develop its own assumptions. In this framework, it is also convenient for the Central Banks to include in its instructions that the banks should conduct stress tests on an individual and aggregate basis for banks belonging to the same banking group, to conclude a comprehensive identification and assessment of the risks that could affect the entities affiliated to the bank or the entire banking group. It is desirable that the general framework of tests be obliged to the financial institutions so that the supervisory authorities monitor the extent of compliance with it, especially in the field of designing test hypotheses and disclosing test results.

Principle (5)

Considering the specificity of the business models of Shariah-compliant banks when central banks issue any instructions or guidelines related to stress tests.

The main objective of stress tests is to enable financial institutions to enhance their ability to absorb any financial or economic shocks. Since the business models of Sharia-compliant banks differ from traditional banks, the supervisory system considers the specificity of the business models of Sharia-compliant banks, especially that the Sharia-compliant financial industry is witnessing remarkable developments. The Islamic Financial Services Board (IFSB) has indicated that the credit, market, and operational risk profile of Shariah-compliant financial instruments is inconsistent with the risk profile of conventional financial instruments. In addition to these risks, Sharia-compliant financial institutions may be exposed to other risks, such as non-compliance with Shariah instructions and principles, return rate, and the risks of investing in stocks and other equity instruments. For example, with regard to liquidity stress tests, challenges facing Sharia-compliant financial institutions in accessing short-term financing and high-quality Sharia-compliant liquid assets should be taken into consideration.

It is worth noting that the Islamic Financial Services Board (IFSB) issued a paper in 2012 titled "Guiding Principles on Stress Testing for Institutions Offering Shariah-compliant Financial Services [Excluding Shariah-compliant Insurance (Takāful) Institutions and Shariah-compliant Collective Investment Schemes] that includes all requirements for designing assumptions and methodologies for Shariah-compliant banks stress testing.

Principle (6)

Increasing the frequency of stress tests for banks of systemic importance and using assumptions that consider the specificity of these banks, for example, using assumptions to measure contagion risk and cross-border financial operations risks.

During the global financial crisis in late 2007, it was noted that the challenges faced by some large financial institutions significantly affect the financial system and the stability thereof, as these banks have great interconnections with other banks and institutions. Therefore, the failure of these banks resulted in contagion risks that are transmitted to other banks and institutions, which negatively affects the economy and financial stability and necessitates the governments' intervention to bail out these banks to ensure financial stability. Therefore, the importance of having policies aimed at limiting the failure of these financial institutions, especially Domestic Systematically Important Banks (D-SIBs), has emerged. At the beginning of the global financial crisis in 2007, the financial positions of most banks were stable. Still the failure of Lehman Brothers led to contagion risks that spread to other banks. It even exceeded the borders of the United States of America, thus, compromising the entire global financial system, which negatively affected the global economy and incurred heavy financial losses.

The said crisis has increased the supervisory authorities' awareness of how global financial stability can only be achieved by linking financial and economic risks, coordination between economic policies and adopting prudential policies, strengthening the financial crisis management system, and intensifying the supervision of Systematically Important Banks.

Many central banks have been making stress tests a major part of the governance system and risk management culture of banks in general and Systematically Important Banks in particular.

According to - Basel Committee on Banking Supervision instructions, the supervisory authorities should analyze the results of stress tests that banks carry out, as they affect the strategic decisions of these banks, especially the Domestic Systematically Important Banks (D-SIBs). The application of stress tests on Domestic Systematically Important Banks should abide by the considerations shown in the below table:

Stress Tests Framework for Systematically Important Banks	
Methodology and Framework	Inclusion of economic variables in stress assumptions.
	Adhering to the stress assumptions approved by the supervisory authority and considering additional assumptions that consider the bank's risk profile.
	Considering the decrease in provisions and in the capital as a result of applying stress tests.
Capital valuation and reporting system	Stress tests include sensitivity analysis and analysis of various assumptions.
	Assessment of capital strength and its exposure to declining as a result of applying stress tests.
	Monitoring loss mitigation measures.
	Internal and external supervisory reports.
	Monitoring key performance indicators (KPIs).
Systems and infrastructure	A standardized methodology or environment for carrying out stress tests for different types of risks.
	The infrastructure should be able to aggregate all risk outcomes.
	Integration of information and data so that the infrastructure can read and integrate data from various sources.
Governance of stress tests	Involve senior management and the Board of Directors in developing the methodology and framework for stress tests.
	The governance framework includes a systematic review of stress tests and the results thereof.
	Availability of adequate expertise in stress test subjects at all functional levels.

It is possible to measure - interconnected risks or contagion through the commercial bank, assuming the occurrence of losses at the banks with which it is connected via deposits and loans as a result of the occurrence of a specific crisis, and measuring the impact of this on its financial solvency, or by the Central Banks assuming the occurrence of substantial risks in the solvency of a bank, or Systematically Important Banks, to the banking system as a whole, and the use of certain assumptions related to the variables used in the methodology of D-SIBs, for example, the volume of operations in the national payment system, the volume of overnight interbank loans and deposits, the volume of customer deposits (considering the volume of the guaranteed portions under the Deposit Insurance Scheme). It is important that the assumptions used in stress tests for DSIBs are built to include shocks that are more severe than those used for other banks.

Finally, the importance of cooperation and coordination between the supervisory authorities will emerge if a commercial bank has branches outside the country borders. A Memoranda of

Understanding may be required, covering all cross-border risk assessment requirements for a Domestic Systematically Important Bank.

Principle (7)

The Use of stress test results in the capital planning process through the Internal Capital Adequacy Assessment Process (ICAAP) and Internal Liquidity Adequacy Assessment Process (ILAAP).

As previously mentioned, stress tests are among the most important risk management tools that can be used to predict risks and shocks that the banking or financial sector may face. In general, the application of stress tests is not only limited to analysing the results, as it also includes the use thereof in a way that enhances the bank's ability to face all the potential risks and estimates the needed capital and liquidity for the coming years. Therefore, using these tests leads to strengthens the financial positions of banks and ensures that they have adequate capital and liquidity levels that enable them to withstand any potential financial risks. It should be noted that stress tests play an integral part with other risk management tools, such as the Value at Risk (VaR), which measures market risks, for example, whether the historical simulation methodology is applied, or the methodology of simulating changes in the value of the current portfolio through random market assumptions that simulate historical changes in the value of the portfolio during a certain period (Monte Carlo simulation Methodology)

As for central banks, stress test results are examined as part of the review of the internal capital adequacy assessment (ICAAP) and liquidity risk management for banks. Stress tests capture physical risks that the bank may face so that it is sufficiently effective in assessing the adequacy of the bank's capital and liquidity. The importance of reviewing other aspects of stress tests conducted by banks arises in whether tests are compatible with banks' stated objectives and governance arrangements. The central banks should ask the Executive Management of the commercial bank to address any material deficiencies identified in the framework of stress tests, including cases where the results of those tests are not sufficiently considered in the banks' decision-making process.

Principle (8)

The Banking Supervision and Financial Stability Departments jointly coordinate, review and evaluate the methodologies and results of stress tests- in a scientific manner, whether applied by the financial institution or the Central Banks and provide the necessary recommendations to the Central Banks management.

The internal coordination between the Banking Supervision and Financial Stability Departments regarding the evaluation of the micro and macro stress tests and the exchange of opinions on their results is an important element to enhance the strength of the tests. It is also recommended to coordinate between responsible entities regarding benefiting from both the central bank centralized risk and credit information databases when building standardized models and assessing the micro and macro risks of the financial system in stress tests. In this framework, when issuing any instructions related to micro stress tests, it is recommended to be presented to the Financial Stability Department to ask for their opinions, and vice versa regarding macro stress tests. For example, macro risks (such as economic risks) are considered when building standardized models in a commercial bank. The same applies to the standardized models for measuring the risks that the banking system may be exposed to, which considers the micro risks of each bank, especially Systemically Important Banks. Micro and macro stress tests should address the expected impact of economic risks on the main indicators of the financial institution, including, at a minimum, changes in the GDP levels.

In this context, the importance of consultations between Banking Supervision, Financial Stability, and Research Departments to explore the variables, assumptions, and methodologies used in stress tests, has emerged. The exchange of the stress tests analysis and evaluation results between these departments should be within a clear framework approved by the Central Bank management so that the roles assigned to each department are clear to ensure continuous improvement stress tests implementation. It is also recommended to exchange views on the report and recommendations related to stress tests before they are submitted to the Central Bank management, to enhance the quality of the submitted reports and recommendations. On the other hand, the Banking Supervision and Financial Stability and Research departments can discuss the hypotheses and results of stress tests with the banks if it is necessary and may also

be with the departments concerned with the supervision of non-banking financial institutions to discuss the hypotheses and results of the tests if needed.

Principle (9)

If the Central Banks discerns deficiencies or weaknesses in the financial institution through the application of stress tests, communication is made with the Board of Directors and the Executive Management of the financial institution, who shall be provided with a comprehensive written report that includes the deficiencies, provided that the financial institution is requested to develop a comprehensive schedule to address all aspects of the deficiencies discovered by the Central Banks.

Reviewing the reliability of stress tests is an integral part of the on-site and off-site supervision of central banks. If the Central Banks discerns deficiencies or weaknesses regarding the application of stress tests, such as: Deficiencies in the methodologies used, the unreliability of the results, the illogicality of the assumptions used, the lack of qualified human and financial resources, and the deficiencies in the role of the Executive Management, the Board of Directors and the Executive Management of the bank or financial institution are addressed and provided with a comprehensive report on the deficiencies in the application of these tests, and granting the commercial bank / financial institution the sufficient time to rectify the situation urgently. The matter may also require holding a meeting between the central banks, the Board of Directors and the Executive Management of the bank/financial institution to discuss the observations of the central banks. In all cases, the Executive Management of the commercial bank/financial institution shall provide the central banks with a comprehensive and clear plan with a specific time frame to address all weaknesses discerned by the Central Banks in the framework of the financial supervision process. The Central Bank may request the financial institution to use a specialized advisory body to develop stress tests, provided that the Central Bank is provided with a comprehensive report thereon.

Principle (10)

Central banks and financial institutions shall review and develop the methodologies used in stress tests periodically or whenever necessary and shall keep abreast with developments in areas of interest to the financial sector such as natural disasters, climate change, financial and economic crises, cybersecurity risks, and risks associated with third parties and others.

The process of systematically reviewing stress test assumptions is an important aspect and a key step in the risk management system, as central and commercial banks constantly strive to develop stress tests and improve the reliability thereof. This includes the methodologies and assumptions used, as well as using stress test results in a consistent manner with the objectives of the framework. It is also important to hold periodic meetings, or whenever necessary, between the Central Bank and commercial banks to discuss challenges or any other aspects related to the process of developing these tests, as it is important to consider the comments of financial institutions regarding the challenges they face when applying stress tests. It is also convenient to present a draft of any instructions or updates related to the instructions for stress tests conducted on financial institutions / banks and / or associations of banks, to express an opinion on the draft of instructions or updates.

On another note, it is appropriate for central banks to issue a guide or instructions to financial institutions regarding the application of Reverse Stress Tests, which allow the financial institution to identify the causes of the decline in the main supervisory ratios at the bank from the minimum limits established by the instructions of the Central Bank. The Central Bank and the financial institution are given an opportunity to use the results of these tests and compare them with the results of the stress tests applied in order to review their reliability.

It is also important to keep abreast with the latest developments, updates, changes in terms of financial institutions' business models, the complexity of their financial operations and the high financial risks, leading to the design of stress tests that measure these risks, for example: Natural disasters and climate change risks, including measuring the impact of physical risks, transition risks, cyber risks, third party risks, abandonment of LIBOR and IBOR benchmark interest rate, money laundering and terrorist financing risks, risk of changes to oil and other raw materials prices, and the risk of a particular crisis (such as the emerging Coronavirus, and the global

financial crisis of 2007). For example, the emerging Coronavirus crisis revealed the importance of adopting stress tests by the Central Bank and commercial banks that measure the risks of economic sectors individually (each sector separately). In this regard, it is important to apply tests based on events similar to historical crises, whether inside or outside the country, for example: The occurrence of a specific economic crisis in the country, the occurrence of a crisis due to a significant decline in the local currency exchange rate, the global financial crisis of 2007, the emerging pandemic of the Coronavirus in 2020, ... etc.

Another example of the risks that the financial sector may face, which must be considered when applying stress tests, is the risks of natural disasters and climate change, as it requires the Central Bank and the financial sector to develop stress tests that include the assumption of gradual intensity, and the potential impact of natural disasters and climate changes on the banking and insurance sectors. Among the assumptions that can be considered, including but not limited to, the occurrence of material losses to the assets of the financial sector and the investment portfolio, and the occurrence of losses to the properties of clients, individuals and companies, and the occurrence of natural disasters in the country of the mother bank or in the countries of bank branches outside the borders of the state or correspondent banks in other countries, and the expected impact of natural disasters and climate change on credit risk, operational risk, and market risk.

On another note, it is desirable for the Central Bank to issue a general framework on the requirements for applying stress tests on the non-banking financial sectors, taking into account the specifics of each one. As for the financial sectors that are not subject to the supervision of the Central Bank, it is recommended to coordinate with other regulatory authorities on the issuance of this framework, including all the requirements necessary to implement stress tests.

Principle (11)

The Central Bank shall issue requirements for disclosure of the methodologies and results of stress tests, whether applied by the Central Bank (Top-down Approach) and/or applied through financial institutions (Bottom-up Approach).

Disclosure of the results of stress tests according to the requirements of the Central Bank, whether disclosure by financial institutions and/or from central banks, contributes to improving

market discipline, enhancing confidence in the banking sector's ability to face potential shocks, and reducing inaccurate conclusions regarding the flexibility of banks/financial institutions. However, at the same time, the disclosure should be carefully thought out to consider the levels of financial awareness of the non-specialist audience, and the disclosure can also include the results of the tests, the assumptions on which the tests are built, the objectives of the tests, and methodology thereof. It is convenient that central banks publish a summary of the results of these tests in their financial stability reports, as a matter of transparency, and to enhance public confidence in the financial sector. However, and in all cases, any disclosure of stress tests is subject to requirements issued by the regulatory authority in this regard, to achieve the desired objective of these tests, and that the names of the financial institutions are not disclosed so as not to cause a reputational risk for them.