BANGKO SENTRAL NG PILIPINAS

OFFICE OF THE GOVERNOR

CIRCULAR NO. 989
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Subject: **Guidelines on the Conduct of Stress Testing Exercises**

The Monetary Board in its Resolution No. 2092 dated 15 December 2017, approved the guidelines governing the conduct of stress testing exercises in banks. The guidelines shall be added as Section X187 to the Manual of Regulations for Banks (MORB).

Section 1. Section X187 and its Subsections are hereby added to the MORB to read, as follows:

Section X187 Policy Statement. Stress testing is an integral part of the risk management systems and capital planning process that would enable banks to effectively manage risk exposures and ultimately promote strong risk governance. In this regard, the following guidelines are issued to define minimum prudential requirements on stress testing. These guidelines shall be read in conjunction with the relevant provisions on stress testing provided under the risk management guidelines covering specific risk areas that were earlier issued by the Bangko Sentral.

Subsection X187.1 ***Stress testing.*** Stress testing shall refer to the tool to evaluate the potential effects of a set of specified changes in risk factors on a bank's financial position under a severe but plausible scenario to assist the board and management in decision making. Stress testing refers not only to the mechanics of applying specific individual tests, but also considers the wider environment within which the tests are developed, evaluated and used.

Subsection X187.2 ***Duties and responsibilities/roles and functions.***

a. Board of Directors. Consistent with the principles embodied under Subsection X143.1 of the MORB, the board of directors shall have the overall responsibility in ensuring that the stress testing framework is fully integrated into the bank's risk management framework and capital planning process, and adequately supports decision-making. In this regard, the board of directors shall:

   (1) Approve the stress testing framework. The framework shall cover the purposes for conducting stress tests, methodologies applicable to the bank, stress scenario selection process, governance and reporting structures, including the roles and responsibilities of business lines and control functions.

The stress testing framework shall provide a clear set of pre-agreed strategies or principles in determining whether remedial actions should be taken in response to stress-testing results. The level of authority (e.g., Asset and Liability Committee and/or Risk Management Committee) for determining remedial actions to be taken should also be clearly designated by the board.

(2) Ensure that stress testing exercises are linked to the risk appetite, business strategies as well as capital and liquidity plans. The results of the stress testing should also aid in the crafting of policies and setting of risk limits;

(3) Ensure that stress testing is considered in planning for business continuity management, and in the case of a domestic systemically important bank[1] (DSIB), its recovery plan. The board shall likewise ensure that risk mitigation techniques are systematically challenged; and

(4) Ensure that the stress testing framework, including scenarios and assumptions used therein, are subjected to an effective and continuous review by an independent and competent professional to ensure that the framework remains appropriate and effective in assessing the bank's vulnerabilities.

b. Senior Management. Senior management shall be responsible for the effective and consistent implementation of the stress testing framework as approved by the board of directors. In this respect, senior management shall:

(1) Translate the board-approved stress testing framework into specific policies and procedures, which shall cover, at a minimum, the following:

(a) Objectives of stress testing, and the corresponding methodology/ies and frequencies;
(b) Roles and responsibilities of business lines, control functions, and board- and/or senior management committees;
(c) Parameters in developing assumptions and scenarios as well as units that should be involved in the development;
(d) Evaluation of the continuing soundness and relevance of the assumptions and scenarios;
(e) Extent of reliance on expert judgment[2] in the stress testing process;
(f) Range of measures or actions to take considering the results of the stress testing exercises; and
(g) Documentation requirements.

[1] Systemic importance of a bank is assessed in relation to the impact of its failure on the domestic economy based on bank's size, interconnectedness, substitutability/financial institution infrastructures and complexity pursuant to Subsec. X115.5 of the MORB.

[2] An approach for soliciting informed opinions from individuals with particular expertise.

(2) Ensure that the identification of relevant stress scenarios, application of sound modeling approaches, and the appropriate use of stress testing results are done in collaboration with the different senior experts in the bank;

(3) Identify the risk drivers to be considered in the stress testing exercise and actively engage in the discussions on assumptions and scenario selection. It shall participate in the review and identification of potential stress scenarios and contribute to the development of risk mitigation strategies;

Below are some common risk factors that are relevant to the banking and trading portfolios of banks:

(a) Credit risk characterized by the increase in default probabilities (e.g., the rise in delinquencies and charge-offs) and worsening of credit spreads. Banks should be aware of the major drivers of repayment ability, such as economic downturns and significant market shocks, that will affect entire classes of counterparties or credits;

(b) Concentration risk in terms of the exposures to individual counterparties, group of related entities, industries, market sectors, countries or regions. Banks should assess the effects and possible linkages between different markets, countries and regions as well as the potential vulnerabilities of emerging markets;

(c) Interest rate risk arising from parallel or non-parallel shifts in the yield curve, and the increase in basis risk (i.e. changes in relationships between key market rates);

(d) Market or price risk arising from adverse changes in asset prices (e.g. currencies, bonds) and their impact on relevant portfolios and markets;

(e) Liquidity risk as a result of the tightening of credit lines and market liquidity under stressed situations and the impact on funding sources and cash flow assumptions;

(f) Operational risk caused by various factors such as internal or external fraud, system failure and security risks (e.g. in respect of transactional e-banking services);

(g) Reputational risk arising from negative perception on the part of the customers, counterparties, shareholders, investors, debt holders, market analysts, other relevant parties or regulators that can adversely affect a bank's ability to maintain existing or establish new business relationships and continued access to sources of funding;

(h) Product-specific risks such as prepayment risk for debt securities, including structured products;

(i) Macro-economic factors [e.g., Gross Domestic Product (GDP) growth, change in property prices, unemployment rate and inflation or deflation rate] and their impact on other risk factors; and

(j) Various political and economic factors pertaining to industries, regions and emerging markets.

The above list is not exhaustive. Banks should identify the risk factors applicable to the circumstances specific to their institutions. They should ensure that important risk factors or relationships between these factors are not omitted from the analysis, as these factors will serve as basis when developing the stress scenarios.

(4) Ensure that the stress testing program is supported by appropriate infrastructure and adequate resources, which shall include information technology system, qualified professionals, and data of appropriate quality and granularity. The systems in place should be sufficiently flexible to allow the bank to modify methodologies and apply new scenarios as needed and to allow for targeted or ad-hoc stress tests at the business line or institution-wide level to assess vulnerabilities in times of stress;

(5) Evaluate the results of the stress test and recommend appropriate measures to the board. These measures may vary depending on the circumstances and other available information, examples of which are:

(a) Review of the set of limits;
(b) Review of capital plans;
(c) Use of risk mitigation techniques;
(d) Reduction/restructuring of portfolio exposures or business in specific sectors, countries, regions;
(e) Reconsideration of the funding policy;
(f) Review of strategy or risk appetite; and
(g) Development/Revision of contingency plan.

Subsection X187.3 *Stress testing framework*

The stress testing framework shall be governed by the following guidelines:

a. Design. The identification of relevant stress events, the application of sound modeling approaches, and the appropriate use of stress testing results require the collaboration of different experts from various business lines and control functions within a bank, and/or from the regional office, in case of branches of foreign banks. The unit responsible for implementing the stress testing program

shall organize appropriate dialogue among these experts, challenge their opinions, check them for consistency (e.g., with other relevant stress tests) and develop the design and implementation of the stress tests, ensuring an adequate balance between usefulness, accuracy, comprehensiveness and tractability.

b. Methodologies. Banks shall conduct stress tests and employ a combination of the different approaches depending on their portfolio risk and complexity of their activities. Effective methods can range from a single-factor sensitivity analysis to a more sophisticated model.

Banks are expected to adopt a combination of the following stress testing methodologies as appropriate to their portfolios or exposures in order to determine the impact of stressed conditions to capital, earnings and/or liquidity position. Stand-alone thrift, rural and cooperative banks should at a minimum, employ the stress testing approaches provided in Subsection X187.5 (c); however, they are not precluded from applying more sophisticated techniques as their board and/or senior management may deem necessary.

(1) *Sensitivity Analysis.* Sensitivity analysis assesses the impact of pre-defined movement in risk factors in the value of a portfolio, and provides a fast initial assessment of a portfolio's sensitivity to a given risk factor or closely related set of factors. In conducting sensitivity analysis, the bank shall identify the relevant risk factors or drivers for its portfolio. The risk factors or drivers should be stressed with different degrees of severity in order to help deepen management's understanding of the bank's vulnerabilities and the effect of non-linear loss profiles. Risk factor shocks that are based on historical scenarios should be supplemented with hypothetical shocks based on expert judgment to reflect the risk arising from market developments and provide a more forward looking assessment of the banks' vulnerabilities.

Single factor sensitivity analysis can be supplemented with a multi-factor sensitivity analysis. Banks should conduct sensitivity analysis at different levels, taking into account the identified relevant risk factors or drivers. This may be conducted at the product or portfolio level, business line level, or at institution-wide level. For example, sensitivity analysis may involve an assessment of the impact to the bank's solvency and liquidity in cases where: (a) the probability of default (PD) of its largest counterparty or portfolio class increases; (b) interest rates change; and/or (c) large depositors withdraw significant amount from their accounts.

(2) *Scenario Analysis.* A scenario analysis measures the change in portfolio value by simulating scenarios (e.g., decline in gross national product or changes in central bank policy rates) that affect a number of risk factors (e.g. interest rates, credit spreads or foreign exchange rates). The scenario should incorporate the dynamics and interrelationship between different economic and financial drivers and provide a more holistic

picture of a bank's vulnerabilities, and the combined effect of such changes in risk factors to the bank's financial position. When developing their stress scenarios, banks shall be guided by the following minimum expectations:

(a) Scenarios should be forward-looking. In particular, scenarios should take into account market developments or emerging possibilities, and possible changes to the bank's risk profile as a result of new business model or strategies (e.g., deleveraging or roll-out of a major new product).

Scenarios derived from historical data/events may be used as starting point for developing forward-looking hypothetical scenarios, which highly requires expert judgment. Banks should consider their "baseline" scenarios in developing a range of severe scenarios, reflecting an increasing level of stress compared with that of the "baseline".

(b) The impact of a scenario to all material risk factors (e.g., credit risk, market risk, interest rate risk, market liquidity risk, funding liquidity risk, and reputational risk) of a bank should be taken into account.

(c) All major vulnerabilities that are specific to a bank should be covered. Among those that should be taken into account are concentration exposures, and specific product/business line exposures.

(d) When performing an institution-wide stress test, scenarios that apply to individual risks or portfolio should be internally aligned so that risk factors behave in ways consistent with other risk factors during times of stress. For example, a spike in interest rates would generally lead to mark-to-market losses, but may also result to a higher net interest margin.

(e) The time horizon/s for stress testing should be defined based on the objective for the conduct of the stress test (e.g., tactical or strategic use), as well as the characteristics/risk profile of the underlying portfolio (e.g., maturity and liquidity of positions). Nevertheless, banks should cover substantially longer periods, taking into consideration the ability of the bank (or market, in case of systemic crisis) to react to and withstand a stressed condition.

(f) Stress tests undertaken by banks to assess the viability of their capital plan in adverse circumstances should use a time horizon that is consistent with its capital planning exercise.

(g) When analyzing the potential impact of a set of macroeconomic and financial shocks, system-wide interactions and feedback effects should be taken into account. This means that apart from the best estimate of how a scenario will impact the bank's capital and liquidity, scenarios should also be developed taking into consideration the possible changes to economic and financial variables as financial institutions, households, firms and policy makers respond to the crisis. These scenarios should capture the dependencies between the different economic and financial drivers. For instance, continuous oil price hike may lead to lower disposable household income, thus affecting retail consumers' debt servicing capability. On the other hand, a prolonged decline in oil price may result in a decline in deposit placements by oil companies, which may adversely affect funding position of a bank.

(h) Banks should adequately document each stress scenario, describing and linking the movement in risk factors to economic and financial sector events/developments, such as, monetary policy, political events, natural disasters, and market liquidity. Likewise, the document should provide a qualitative picture of a plausible future state of events.

(3) *Reverse Stress Test*. Reverse stress tests may be used to determine the stress scenarios that could impair the solvency and/or liquidity of the bank. This type of analysis would help a bank consider scenarios beyond normal business expectations, and challenge common assumptions about performance and risk mitigation strategies. For instance, if a bank has a loan portfolio that is highly concentrated to real estate industry, a reverse stress test may help a bank-identify conditions or changes in key variables that would cause losses sufficient to make the capital ratios fall below regulatory minimum levels.

Reverse stress testing may also be carried out in a qualitative manner. This involves the development of a narrative report that discusses the dynamics of different risk types, risk factors, and feedback effects that would make the business unviable. Universal/commercial banks are expected to have a more sophisticated qualitative and quantitative methodology for this type of stress testing.

Upon identifying such scenarios, senior management should assess the plausibility of the scenarios, make contingency plans, and/or take other steps to mitigate the identified risks. Diagnostic support should be in place to investigate the reasons for potential failures, if the need arises.

c. *Severity of Stress Events*. Stress test should cover a range of scenarios, which are exceptional but plausible and with different level of severities, including those that reflect a severe economic downturn. Severity should be understood in the

context of the specific vulnerabilities of the bank(as may be identified through reverse stress test). Relevance of certain economic scenarios (e.g., increase in default probabilities in certain economic sectors) depends on a bank's exposure to specific economic sector.

d. Portfolio, Individual Risk, and Institution-wide Stress Testing. The stress test methodologies provided under Subsection X187.3(b), may be performed at portfolio, individual risk, and/or institution-wide levels depending on a bank's activities or business model. Stress tests should encompass all the material risks, both on- and off-balance sheet that are relevant for the bank on solo and consolidated bases. In this regard, the scope of stress test may vary from a simple portfolio-level sensitivity analysis to a comprehensive institution-wide scenario stress test.

(1) Portfolio and Individual Risk Level Stress Testing. Stress tests on an individual portfolio basis may be performed using sensitivity or scenario analysis, or both. Banks should identify severe stress with respect to a specific portfolio. For instance, in the case of a mortgage portfolio, high unemployment rate and huge spike in interest rates provide a severe scenario. Other portfolios, such as investments in emerging market bonds, expose a bank to different risk drivers and therefore a different stress scenario should be applied.

Portfolios and business units should be stressed to identify risk concentrations that may arise across their book. For example, a credit risk stress across asset classes and portfolios may identify potential concentrations in retail and corporate exposures.

Stress tests should also take into account changes in correlations between risks recognizing interactions between risk types, such as market and credit risk, particularly in times of stress.

(2) Institution-wide Stress Testing. Stress testing on an institution-wide basis should cover a range of risks in order to deliver a complete and holistic picture of the bank's risk profile. This entails identification of all material risks. Once identified, banks should derive material risk drivers and integrate the same in the institution-wide stress.

Depending on the organizational structure and business model of a particular bank, a complete evaluation of all the risks affecting it would require the performance of stress test exercises both at consolidated and at material entities levels within the group. Furthermore, a bank that is internationally active is also expected to perform stress tests at the level of business units in specific geographic regions, business sectors or business lines. The added value is that a severe stress scenario differs for different businesses and different geographic regions.

When looking at risks at an institution-wide level, particular attention should be paid to risk concentrations on a holistic basis. Bank should also note that risks at the institution-wide level may not be well reflected by simple aggregation of stress tests on individual risk areas or business units. Correlations and offsetting of individual exposures should be adequately captured. Thus, banks should ensure that there is neither double counting of risks or underestimation of the impact of a stress scenario.

e. Impact Assessment. Senior management and relevant business line managers should be closely informed of the results of stress-testing, drawing their attention to potential risks and vulnerabilities identified and making recommendations for possible courses of remedial action.

The impact of stress tests should be evaluated against one or more measures, depending on the specific purpose of the test, the risk exposures, and particular issues being analyzed. A range of measures may be needed to provide comprehensive perspectives on identified vulnerabilities and the impact of the stress scenarios. Typical measures include, but are not limited to the following: (1) asset values, (2) accounting profit or loss, (3) economic profit or loss, (4) regulatory capital requirements, (5) regulatory liquidity requirements, (6) economic capital measures, and (7) liquidity and funding gaps.

The board of directors should be presented with a holistic view of the effect of stresses so that they can take an aggregated view of the implications. Where formal aggregation is not possible, an informal assessment of the totality of institution-wide effects will still be useful.

Subsection X187.4 *Supervisory expectations and independent review.*

a. Supervisory Expectations on the Use of Models for Stress Testing. Due to the complexity involved in modeling hypothetical and macro-economic based scenarios, banks should be cognizant of the model risk involved. In this respect, the board should ensure that an effective model risk management is in place. This includes ensuring that stress test models are subjected to appropriate standards for model development, implementation and use, model validation, and model governance. An effective challenge process by independent and competent parties should be in place for all models prior to use. There should also be sufficient documentation of all models, including assumptions, as well as limitations. Banks should ensure that the assumptions and parameters used in models hold during periods of stress. These minimum expectations apply to models that are either internally developed or acquired from a vendor.

Senior management should provide information to the board of directors that is sufficient to allow the latter to adequately assess and critique the methodologies and results.

b. Independent Review of Stress Testing. Regular and independent review and assessment of stress testing policies, procedures and processes should be carried out to ensure the quality and effectiveness of the stress testing program. Such review should be undertaken at least once a year, or more frequently if this is warranted by significant changes in the business strategies and risk characteristics of the bank, or in the external environment in which it operates. The review should be undertaken by independent professionals, who may either be internal or external to the bank, but possess the relevant knowledge and expertise.

The review should cover, at the minimum, the following:

(1) effectiveness of the stress-testing program in meeting its intended purposes;
(2) adequacy of board and senior management oversight;
(3) adequacy of documentation for the program;
(4) integration of stress-testing into the daily risk management and decision-making processes at appropriate management levels, as well as capital and liquidity planning;
(5) approval process for the program, including the authorization for significant changes;
(6) implementation of the program, as well as its continuous development or enhancement (i.e., to take account of changes in a bank's business strategies, risk characteristics or external environment);
(7) methodologies, scenarios and assumptions used;
(8) scope of exposures captured by the program;
(9) quality of data used to run the stress tests (i.e., accuracy, consistency, timeliness, completeness and reliability of data);
(10) integrity of management information and reporting systems for the stress tests; and
(11) validation of stress testing results by benchmarking with historical scenarios (e.g., the 2008 Global Financial Crisis and the 1997 Asian Financial Crisis) and their impact on bank's portfolios.

In this respect, issues or weaknesses disclosed during the review should be adequately addressed by the bank, and any consequential changes to the stress testing program should be documented and duly subjected to the approval by the board.

Subsection X187.5 *Application of the guidelines.*

a. Banks that are part of group structures, shall conduct stress testing exercises on a consolidated basis or at the parent bank's level, covering all institutions considered as material in the banking group, and on a stand-alone basis, or at the level of each of the bank in the group.

b. Branches of foreign banks shall comply with the requirements of this Section to the extent applicable and in relation to the stress testing program being implemented by the Head Office. In this regard, stress testing exercises conducted at the branch level shall consider vulnerabilities of the Head Office that may likewise affect branch operations.

c. Stand-alone thrift, rural, and cooperative banks/ shall conduct simple sensitivity analysis covering credit, liquidity, and operational risks.

These banks shall consider, at a minimum, the following in their stress testing exercises:

(1) Twenty percent (20%) and fifty percent (50%) of the total loan portfolio turning into non-performing loans (NPL) for full provision of allowance for credit losses;
(2) Twenty percent (20%) and fifty percent (50%) deposit withdrawal; and
(3) Recognition of operational losses accounting for five percent (5%) and ten percent (10%) of total assets.

The board of directors of stand-alone thrift, rural, and cooperative banks are expected to assess the interconnectedness of the impact of the above-mentioned factors. For example, an assumption that may result in twenty percent (20%) default rate of the loan portfolio may likewise affect the liquidity position of the bank.

The board's discussion on stress testing exercises shall be adequately documented. The board shall demonstrate its understanding of the results of the stress testing exercises and how these were considered in the strategies and policies developed as well as decisions made.

Subsection X187.6 *Reporting*. Universal/commercial banks shall report the results of the stress testing that were undertaken to the Bangko Sentral on an annual basis as part of the Internal Capital Adequacy Assessment Process (ICAAP) document provided under *Appendix 90 of the MORB*. The report shall cover the results of the latest stress tests under the most severe scenario used, and shall include information on the following:

a. Description of the coverage;

b. Conditions prevailing and assumptions used over the stress test time horizon;

c. Description of the event and details of the conditions prevailing in each scenario such as, but not limited to, the level of GDP, interest rates, unemployment, or exposure concentration. Other significant assumptions used in the stress tests should be included in the list;

d. Results of stress test, which shall include, at the minimum, the impact on the financial condition at each significant balance sheet date (for example, financial half-year or financial year-end) over the stress test time horizon, absolute amounts and key financial ratios, and other indicators or ratios that the bank considers relevant;

e. Assessment of vulnerabilities as well as the key risk factor(s) affecting the vulnerable areas. A sufficient level of detail should be given in the assessment in order to provide a meaningful understanding of the vulnerable areas (for example, business line, geographical sectors, economic sectors or sub-sectors, market segments, borrower groups etc.) and the causes of stress losses; and

f. Specific decisions or actions taken and the rationale behind the measures adopted.

For other banks, results of their stress testing should be made available any time upon request of BSP.

Section 2. Transitory Provision. The following provision shall be incorporated as a footnote to Section X187 of the MORB.

Banks shall comply with the foregoing standards within a period of two (2) years from the effectivity date of this issuance. In this regard, a bank should be able to show its plan of actions with specific timelines, as well as the status of initiatives being undertaken to fully comply with the provisions of this circular, upon request of the Bangko Sentral starting June 2018.

Section 3. Supervisory Enforcement Action. The Bangko Sentral reserves the right to deploy its range of supervisory tools to promote adherence to the guidelines to bring about timely corrective actions and compliance with Bangko Sentral directives. For this purpose, the Bangko Sentral may issue directives or impose sanctions on the bank and/or its directors, officers and/or employees.

Section 4. Effectivity. This Circular shall take effect fifteen (15) calendar days after its publication either in the Official Gazette or in a newspaper of general circulation.

FOR THE MONETARY BOARD:

NESTOR A. ESPENILLA, JR.
Governor

04 January 2018