South African Reserve Bank
From the Office of
the Registrar of Banks

G9/08

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To: Banks and controlling companies

Guidance note 9/2008 issued in terms of section 6(5) of the Banks Act, 1990 – Stress testing

Executive summary

The Regulations relating to Banks (the Regulations), require banks and controlling companies to undertake a range of stress tests. It is the responsibility of each bank and controlling company to ensure that the stress tests it undertakes are appropriate for its business and are in line with the requirements outlined in the Regulations.

Based on research conducted by this Office during 2007 and 2008, several gaps in banks and controlling companies' understanding of what is expected in terms of their stress-testing processes were identified. As a result, this Office was approached to provide some high-level guidance in terms of section 6(5) of the Banks Act, 1990, to assist banks and controlling companies in undertaking appropriate stress testing during 2008.

Key areas where immediate high-level guidance was requested were in the following components.

- **Differentiating stress tests for internal rating based (IRB) approaches to credit risk from Internal Capital Adequacy Assessment Process (ICAAP) scenario based stress tests in terms of: objectives; impact results; severity; time horizon; management actions; and the process of submission.**
- **Characterising the severity of stress scenarios that should be considered and the detail required in outlining those scenarios.**
- **The role of the board of directors and senior management in stress testing.**

This guidance note is intended to assist banks and controlling companies[1] to better understand the requirements of the Regulations and this Office's expectations of stress testing.

This guidance note will not seek to prescribe what stress tests should be undertaken. Banks and controlling companies must continue to take responsibility for determining the stress tests that are appropriate for their businesses.

This guidance note only addresses the most pressing issues in stress testing identified as requiring urgent attention in 2008. It is not a comprehensive guide to stress testing. Additional guidance may be forthcoming at a later date.

1. Introduction

1.1 Stress testing is a key aspect of the new capital regime as outlined in the Regulations and will be an important input into this Office's Supervisory Review and Evaluation Process (SREP). Banks and controlling companies are required to undertake a wide range of stress tests, including single-factor stresses, stress tests on individual risk parameters and scenario stress tests across the bank. This guidance note is directed at all banks, although IRB credit-risk stress testing is of relevance only for banks that adopted the IRB approach for calculating their minimum required capital related to credit risk.[2]

1.2 During 2007 this Office undertook research to understand banks' approaches to stress testing under pillar 1 (IRB credit) and pillar 2 (ICAAP) based on the requirements in the Regulations. During the course of this research, it became apparent that some specific issues required further guidance. This view was confirmed by requests from banks and discussions held at a symposium on stress testing in October 2007. The key questions raised and issues addressed in this guidance note focus on this Office's expectations in relation to the following components.

1.2.1 <u>Component 1</u> – The differences between stress testing under pillar 1 (IRB credit[3]) and pillar 2 (overall capital-adequacy stress testing) in particular in relation to:

- Objectives;
- Impact analysis;
- Differences in severity;
- Time horizon;
- Management actions;
- Single factor vs economic scenario stress tests: and
- Process for submission.

1.2.2 <u>Component 2</u> – The appropriate severity of a relevant stress scenario.

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[1] Banks and controlling companies are hereafter referred to as banks.

[2] For ease of reference IRB credit stress tests will at times be referred to as pillar 1 stress tests and ICAAP stress tests as pillar 2 stress tests.

[3] Although stress testing is required for credit, market and operational risks, the main areas of uncertainty related only to IRB credit risk stress tests. Operational risk stress testing for advanced model approaches (AMA) focuses on operational events while market risk has a clearly delineated time frame much shorter than that required for stress testing in IRB credit and ICAAPs.

1.2.3 Component 3 – The role of senior management in the stress-testing process.

1.3 This guidance note does not purport to contain information on all aspects of stress testing and banks' stress-testing activities should not be limited to the areas covered in this guidance note. Additional guidance or directives regarding stress testing may be issued at a later stage.

2. References in the Regulations

2.1 There are a wide range of references to stress testing in the Regulations, covering all risks areas under both pillars 1 and 2. Some selected excerpts are as follows:

2.2 In terms of pillar 1 IRB stress testing regulation 23(11)(b)(ix) of the Regulations states

(ix) Stress testing
As a minimum, a bank that adopted the IRB approach for the measurement of the bank's exposure to credit risk shall have in place a stress-testing process in respect of the bank's exposure to credit risk, which stress-testing process

A) shall include an identification of possible events or future changes in economic conditions that may have an unfavourable effect on the bank's risk exposures and an assessment of the bank's ability to withstand such events or changes, which events or changes may include

(i) economic or industry downturns;
(ii) market-risk events;
(iii) liquidity constraints; and
(iv) mild recession scenarios

(C) shall be meaningful, based on the environment in which the bank conducts business;

(D) shall assess the effect of a recession on the bank's probability of default (PD) ratios, loss given default (LGD) ratios and exposure at default (EAD) amounts;

(E) shall make provision for an internal ratings migration in respect of at least some of the bank's exposure to credit risk; and

(F) shall appropriately evaluate evidence of rating migration in respect of external ratings.

2.3 In terms of regulations relating to corporate governance regulation 39 contains a number of references such as:

2.3.1 regulation 39(6), which states

(e) Banks shall, on a periodic basis, conduct relevant stress tests, particularly in respect of the bank's main risk exposures, in order to identify events or changes in market conditions that may have an adverse impact on the bank.

2.3.2 regulation 39(8), which states

(f) shall have in place a routine and rigorous process or programme of stress testing-

(i) the results of which stress-testing-

(A) shall periodically be reviewed by the senior management of the bank;
(B) shall be used in the bank's internal assessment of capital adequacy;
(C) shall be compared against the bank's measure of expected positive exposure and the related impact on the bank's capital adequacy;
(D) shall be duly reflected in the bank's policies and counterparty limits set by management and the bank's board of directors;

3. Other relevant references

3.1 There is a significant amount of guidance from other relevant sources including the Committee on the Global Financial System, the Basel Committee on Banking Supervision (BCBS) and the Committee of European Banking Supervisors. For example:

- http://www.bis.org/publ/cgfs24.htm is a synthesis of observations illustrating the wide range of practices and risk management frameworks at firms.
- http://www.c-ebs.org/documents/GL03stresstesting.pdf sets out guidelines relating, inter-alia, to: relevance; coverage; calibration; type of scenario; severity; level; frequency and time horizon; data quality and IT requirements; the role of senior management; resulting actions; documentation; and review.

3.2 In addition, the text contained in position papers issued through the structure of the Accord Implementation Forum in South Africa during the process of formulating the revised Regulations contains background information that may be helpful to banks. For example, Position Paper 230 states that *"both stress tests and scenario analyses should be undertaken by banks to further a better understanding of the vulnerabilities that they face under extreme conditions. They are based on the analysis of the impact of unlikely but not impossible events*".

3.3 This Office is also aware that guidance on stress testing may be forthcoming from international regulatory committees such as the BCBS. Consequently it has, through its own interaction with such committees and to the extent possible, endeavored to ensure that the guidance in this note will enhance, and not contradict, international guidance as it becomes available.

4. Factors influencing the final decision

4.1 The Regulations outline detailed requirements for conducting stress testing while placing the onus on banks to determine stress scenarios that are appropriate for their businesses.

4.2 In this regard, it should be noted that this guidance:

4.2.1 In no way alleviates the responsibility of banks to determine relevant scenarios that are appropriate for the profile of their business;

4.2.2 Does not limit the requirement on banks to continue to pursue stress testing that is appropriate for their businesses to its fullest extent;

4.2.3 Does not imply that uniformity of stress test scenarios or stress test outcomes is required or desirable between banks.

4.3 To this end, this guidance note is not prescriptive and does not substitute for the efforts that banks' senior management are expected to make in determining appropriate stress testing for their businesses. At the same time, it endeavours to avoid placing any additional burden on banks over and above the requirements in the Regulations.

4.4 The benefits of this guidance note focus on addressing areas of common concern that banks have raised in taking forward the requirements in the Regulations. In the absence of guidance there is a risk that banks will be unable to effectively fulfill the requirements in the Regulations and the expectations of this Office in relation to stress testing.

5. Guidance

5.1 <u>Component 1</u> – Differences between pillar 1 stress testing in relation to credit risk in IRB banks and pillar 2 stress tests

5.1.1 Research by this Office identified some specific areas of uncertainty amongst banks in differentiating between pillar 1 IRB and pillar 2 stress testing. The issues identified included:

- banks' understanding of the <u>objectives</u> of the stress testing requirements under pillar 1 and pillar 2;
- supervisory expectations of the <u>impact analysis</u> of the stress scenarios;
- the appropriate <u>severity</u> of relevant stress tests;
- the <u>time horizon</u> of the stress scenarios for pillar 1 and pillar 2;
- the extent to which <u>management actions</u> should be considered;
- whether <u>single factor or economic scenario stresses</u> are required for pillar 1 stress testing;
- the <u>process for submitting</u> pillar 1 stress tests.

5.1.2 Each of these issues is outlined separately below.

5.1.3 Objectives

5.1.3.1 The Regulations state clearly that the high level objectives of pillar 1 and pillar 2 stress testing is to understand a bank's ability to withstand changes in the economic environment.

5.1.3.2 Discussions between this Office and banks point to a need for some further guidance in outlining supervisory expectations of stress testing, in particular in relation to pillar 1 IRB stress testing.

5.1.3.3 Whilst pillar 2 is clearly understood as being a test of the extent to which banks' regulatory capital requirement will be affected by changes in the economic environment, this Office's expectations of banks' IRB stress tests rest on three core objectives:

- Understanding the pro-cyclicality of the IRB estimates;
- Risk analysis at an asset class[4] level; and
- As a potential tool for cross-checking a bank's capital adequacy in the face of stress, in particular in relation to key portfolios.

5.1.3.4 The first objective of pillar 1 IRB stress testing objective is to understand the **pro-cyclicality** of the IRB rating estimates.

5.1.3.4.1 Banks use probability of default (PD) estimates that vary between capturing the PD at a particular point in time and capturing the true long run PD through an economic cycle. Loss Given Default (LGD) estimates are required to reflect economic downturn conditions.

5.1.3.4.2 The extent to which these parameters accurately capture a regular economic cycle and an economic downturn respectively is of interest to regulators and banks in considering the extent to which risk weighted assets, and regulatory capital requirements, may move during a normal economic cycle. A pro-cyclicality stress test on the IRB parameters should allow regulators and banks to have a meaningful debate about the extent to which parameter estimates are appropriate for all stages of a regular economic cycle.

5.1.3.5 The second objective of pillar 1 stress testing is as an **analytical tool** to understand risks in the credit portfolio at an asset class level and across the business under a severe economic downturn which may also incorporate some aspect of general pro-cyclicality analysis regarding regulatory capital (see below for expected impact analysis in this regard).

5.1.3.6 The third objective of pillar 1 stress testing may be to serve as a useful **cross-check** on the pillar 2 stress testing results, in particular in relation to the most significant asset classes, to understand the impact of severe economic downturns on the risk weighted assets and capital requirements

[4] Asset classes are specifically defined in the Regulations. Nonetheless, stress tests submissions based on banks own definitions of asset classes (e.g. credit cards vs qualifying revolving retail exposures) are acceptable.

from both an asset class perspective and from the credit portfolio as a whole.

5.1.4 Impact analysis

5.1.4.1 The Regulations state that pillar 1 IRB stress testing is concerned with understanding the effect of various scenarios on IRB parameters and ratings migration. Pillar 2 stress testing is defined in the Regulations as an assessment of the long term capital adequacy of the bank. The Regulations also indicate the appropriate parameters expected to be stressed in each case.

5.1.4.2 Pillar 1 IRB stress testing is focused on credit risk only and requires a stress of the individual IRB parameters with an expectation this would be undertaken for at least each significant asset class. This Office would expect to see explicit stress analysis on at least PDs, including ratings migration, and LGDs.

5.1.4.3 In particular, the following, connected areas may form part of such analysis:

- Changes in IRB parameters
  - Average parameter outcomes for each asset class
  - Changes in parameter distributions;
- The nature and extent of ratings migrations;
- Resulting concentrations in risk grades;
- Resulting changes in risk weighted assets and losses.

5.1.4.4 Pillar 2 stress testing is focused at a higher level on overall capital adequacy, and banks would be expected to identify the impact of a scenario on all relevant risk areas. In this way they should draw a holistic conclusion of the effects of changes in the economic environment in terms of their solvency. (See Regulation 39 and position paper 230 for further information in this regard).

5.1.5 Severity

5.1.5.1 The Regulations state the minimum levels of scenario severity that banks need to stress, noting that at least a mild recession is required. Such a scenario is likely to be appropriate for the pro-cyclicality stress test under pillar 1 as its objective is to assess the extent to which IRB parameters capture the elements of a normal economic cycle.

5.1.5.2 However, the Regulations also make it clear that this is a minimum and that the stress scenarios under pillar 1 and pillar 2 should be “meaningful based on the environment in which the bank operates”.

5.1.5.3 To that end banks should use a range of plausible but severe stresses to fulfill the other objectives of pillar 1 stress testing, and such stresses are expected to be of a similar severity to that required under pillar 2. (See below for guidance on severity).

5.1.6 Time horizon

5.1.6.1 The time horizon of pillar 2 stress scenarios are clearly defined to the extent that they are required to reflect a similar time horizon as the capital management requirements of the Internal Capital Adequacy Assessment Process (ICAAP), which is 3-5 years.

5.1.6.2 For pillar 1 stress testing such a time horizon may not always be appropriate, for example, identifying the dynamics of risk factors in each portfolio beyond one year may yield diminishing benefits.

5.1.6.3 Given that the longer term time horizon for capital adequacy is dealt with in pillar 2, and given the fairly detailed demands for analytics in pillar 1, shorter stress test time horizons are likely to be acceptable with a minimum of a one year time horizon for pillar 1 IRB stress tests.

5.1.7 Management actions

5.1.7.1 Under pillar 2 stress tests, with a 3 to 5 year time horizon and with the objective of understanding the bank's ability to meet its regulatory capital requirement, credible management actions are a key factor in understanding the true impact of stress scenarios.

5.1.7.2 The time horizon and objectives for pillar 1 IRB stress tests mean that a different approach to management actions is appropriate, and suggest there is likely to be limited scope for, and it is unrealistic to assume, mitigating management actions.

5.1.7.3 In particular under the pro-cyclicality stress test no management actions are expected to be included.

5.1.7.4 For the more severe pillar 1 stress tests, mindful that historical data may already include the effects of management actions, explicit management actions are unlikely to be considered. However, some understanding of the short term dynamism of the portfolio may be a useful consideration.

5.1.8 Single factor or economic scenario stress tests

5.1.8.1 Some banks have expressed uncertainty as to whether the requirement under pillar 1 IRB is to stress an economic scenario, as is required under pillar 2, or whether single factor stress tests are appropriate.

5.1.8.2 The Regulations are very clear in two aspects regarding the use of single factor or economic scenario stress tests:

- The first is that the stress chosen is the preserve of the bank as appropriate for the business it is running;
- The second is that the Regulations clearly outline a range of various scenarios that may be applied but in general relating to "possible events or future changes in economic conditions that may have an unfavourable effect on the bank's risk exposures".

5.1.8.3 This Office consequently expects that, amongst the range of stress tests that a bank may undertake, a relevant economic scenario should be included in IRB stress testing under pillar 1.

5.1.9 The process for submission

5.1.9.1 Pillar 2 stress tests must be submitted with a bank's ICAAP.

5.1.9.2 Pillar 1 stress test results should be incorporated into the annual cycle of IRB credit risk assessments undertaken by this Office and presented to this Office during relevant on-site reviews. The dates of these assessments are communicated to banks in advance.

5.2 Component 2 – Severity and detail

5.2.1 Severity

5.2.1.1 The Regulations spell out the minimum levels of stress severity that are required, explicitly outlining the requirement for at least a mild recession scenario. The Regulations also make it clear that the stress scenario under pillar 1 and pillar 2 should be "meaningful based on the environment in which the bank operates".

5.2.1.2 In this context, it is the opinion of this Office that at any time banks would want to stress various scenarios including those that reflect a severe economic downturn or recession[5] given that banks are required to operate above minimum regulatory capital requirements at all times including through a severe downturn or recession. Banks are thus expected to construct macroeconomic stress scenarios that are more severe than mild downturns or recessions.

5.2.1.3 This Office investigated a range of alternative options for expressing appropriate severity, including the length of historical data to which banks should give due regard, some articulation of the anticipated impact on IRB parameters that stress would result in, and articulating a stress as a one in X type event.

5.2.1.4 Having tested the various forms for expressing severity this Office is of the view that the most appropriate guidance to banks is, amongst other stresses, to consider a severe economic scenario of the type that occurs at least once in a 25 year period. The description is designed to assist banks to capture unusual events, relevant for their business, with a severity that would occur beyond a normal economic cycle and may be characterised by a severe economic downturn, whilst remaining plausible.[6]

5.2.1.5 This Office would not regard simple statistical responses to determining a one in 25 type event on their own as appropriate. Thus the guidance on appropriate severity must be qualified by the following caveats:

[5] The terms economic recession and economic downturn will be used interchangeably. Recession is often interpreted with a narrow definition of two quarters of falling Gross Domestic Product. However, this Office will not prescribe what economic scenario may be appropriate.

[6] Banks are expected to view such stresses on an absolute basis over a long time period rather than a relative basis. So for example banks would be expected to be able to articulate where they are currently in the cycle and build the stress in the context of the current situation.

- At this point, historical scenarios are unlikely to be appropriate on their own. In particular, given structural changes in the South African economy, a one in 25 event is likely to be constructed primarily as a hypothetical scenario, notwithstanding the importance of understanding the severity of historical scenarios as part of efforts to construct the appropriate severity of a hypothetical scenario.
- This Office will not be prescriptive as to whether the severity of the scenario is arrived on a qualitative or quantitative basis. It is a bank's responsibility to determine how to arrive at a one in 25 event and this Office will judge the scenario based on the quality of supporting evidence.
- The process through which the scenario is reached is important. A bank would be expected to construct hypothetical scenarios using resources from across the organisation, including consultations with the business units and economic research[7], depending on the size and complexity of the bank. At the same time the bank is expected to provide evidence that its most senior management have assessed and understood the scenario(s) in terms of appropriate severity and in terms of appropriateness for the bank's business. (See below for guidance on senior management engagement).
- Banks may be required to discuss with this Office what scenario(s) would lead to a point of failure in terms of justifying the appropriate severity of the scenario(s) they have chosen as plausible. Such a point of failure should be determined by the bank but could be seen as falling below minimum regulatory capital requirements with or without management actions.

5.2.2 Macro economic scenario detail

5.2.2.1 In terms of the detail required for economic scenarios banks are expected to:

- detail the assumptions behind the economic scenario, noting that such scenarios do not impact the bank in isolation;
- outline macro economic scenarios using, for at least the first year of the scenario prediction, quarterly data as a minimum; and
- construct scenarios using domestic and international assumptions and forecasts.

5.2.2.2 Banks are also expected to provide detailed information about, and evidence of, the modeled relationships between the macroeconomic data and relevant stressed parameters, including how these relationships are likely to behave under stress.

5.3 Component 3 – The role of the board of directors and senior management

5.3.1 This Office notes the key role that senior management is expected to play in the stress-testing process. This Office expects significant engagement from senior management in all aspects of stress testing but in particular in

[7] This Office understands that in some banking groups scenarios are set at a group level and then interpreted appropriately at the level of the relevant entity. This guidance does not prescribe an approach but does suggest that appropriate interpretation should be undertaken with the engagement of the business units and economic research as well as relevant risk and other areas.

relation to the formation and impact of macroeconomic scenario stress tests. The board of directors or its relevant designated committee will be expected to sign-off on the appropriateness of the stress test scenario(s) including the appropriate severity of the relevant stress scenario. Senior management's engagement in this process is likely to be reviewed by this Office during the SREP.

6. Acknowledgement of receipt

6.1 Two additional copies of this guidance note are enclosed for the use of your institution's independent auditors. The attached acknowledgement of receipt, duly completed and signed by both the chief executive officer of the institution and the said auditors, should be returned to this Office at the earliest convenience of the aforementioned signatories.

E M Kruger
Registrar of Banks

The previous guidance note issued was Guidance Note 8/2008, dated 17 June 2008.