

# Contra-Cyclical Capital Buffering Solutions for Banks

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**Abstract:** *In the cusp of Basel III scenario in Banking, importance of capital adequacy measurements has reached centre stage. In the volatile world of global banking, building Capital buffers as a contra-cyclical measures in consonance with the risk assumed by the bank, to capture and evaluate the potential vulnerability to some unlikely but plausible events or movements in financial variables is being suggested as a remedy by global supervisors. The paper examines and explains the importance and relevance of Capital buffering solutions under Stress Scenarios. The Paper also examines, how this innovative 'Capital Assessment' tool / model/ framework is generally formulated, tested by factoring various scenarios and battery of tests. It has very high practical relevance to the practicing bankers and professionals engaged in financing (incl. Risk managers). An evaluation of the context of the Basel II and III regime and how the methodologies are getting integrated into the 'Stress Testing' framework of banks which is being adopted as an indispensable tool in the hands of Banking Regulators and Supervisors world across is also high-lighted.*

**Keywords:** Expected Loss, Un-Expected Loss, Basel II & III, Liquidity Risk, ICAAP, Stress Testing, Battery of Tests, Macro Prudential Supervision, Risk based supervision

## 1. Introduction

In the uncertain world of financial markets fraught with economic and financial stress, forward-looking capital assessment / planning processes to take care of risks is indispensable. As we know, the global financial system is evolving at a tremendous pace, fuelled by rapid innovation and cross border integration. Macroeconomic volatility, Innovation and Integration is inflicting profound impact on the behavior of the financial system. When innovations and integration has become the norm in financial markets, it is only natural that innovative practices for assessing / evaluating internal capital adequacy processes need to also come in. Obviously, these innovations can't be implemented only in few countries / pockets, but need to be at the global level as due to greater market integration, financial shocks / stresses are getting transmitted beyond borders. So the flip side of greater integration is that it may have lowered the frequency but increased the magnitude or severity of potential financial crises. The Sub-Prime Crises at the global level or the pangs in economies across the world by a stance on 'quantitative easing' by the US treasury are but just the recent examples wherein the ripple effects are felt in markets far away, geographically.

As the banking system in any country is the biggest player in the financial system continuous innovations in assessment methodologies of capital is a pre-requisite. Thus the landscape of the banking system in an integrated world underscores developing a rigorous, coherent and robust framework to analyse the resilience of the financial system to withstand stress and strain. It presents a formidable challenge. Financial system behaviour is very difficult to model, particularly under stressed conditions when strategic interactions between participants and risks of spillover and contagion come to the fore. Enhancing the capability to model the financial system under stress is the key challenge.

In recent years, many central banks and supervisory agencies, charged with the public policy goal of supporting the maintenance of financial stability, have sought to develop Capital Buffering solutions to tide over or mitigate these risks. 'Stress testing' is considered to be an effective and necessary tool that complements minimum standards based statistical models for quantifying and monitoring risk and capital adequacy in Banks. Fig 1.1 depicts how the 'Stress Testing' fits in as a Capital Buffering measure in the Supervisory Review Process of Banking Regulators.



Figure 1.1

## 2. What is Stress Testing?

Stress testing refers to “the analytical process involved in subjecting a bank’s portfolio to a battery of tests, designed to study the performance of the bank’s portfolio under extreme adverse conditions to generate the potential risk measures under plausible events in abnormal markets”. Thus, “Stress Testing” is a measurement methodology, in a sense integrated to capture and evaluate the potential vulnerability to some unlikely but plausible events or movements in financial variables. It is a test, constructed with the help of underlying variables that summarise the effects of different shocks of different magnitudes.

of Stress Testing is supposed to capture the ‘Stress Loss’ and Banks are supposed to keep a buffer for that as well. It is statistically represented by the tail-events in a frequency distribution – as depicted above.

- The process of stress testing, therefore, involves first identifying these potential movements, including which market variables to stress, how much to stress them by, and what time frame to run the stress analysis over. Once these market movements and underlying assumptions are decided upon, shocks are applied to the portfolio. Revaluing the portfolios allows one to see what the effect of a particular market movement has on the value of the portfolio and the overall Profit and Loss.

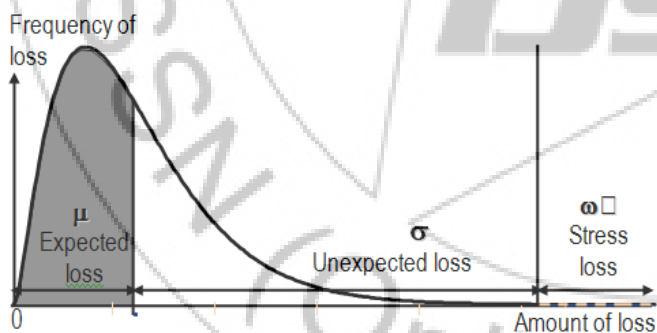


Figure 2.1: Stress Testing – Explained

- The above Figure 2.1 statistically captures the three phenomenon in a Bank’s Balance sheet risks namely the Expected Loss, Un-expected Loss and the Stress Loss scenarios:
- The **Expected Loss** is supposed to be covered in “normal pricing” itself.
- The **Un-expected Loss** in Banking business is generally covered by “Provisions”, Adjusting spread, Differential Risk weights etc.
- **Stress Loss** addresses the large moves in key market variables of that kind that lie beyond day to day risk monitoring but that could potentially occur. **The exercise**

### 2.1 Types of Stress Tests and Possible Stress Testing Scenarios

The Type of Stress Tests can take different forms like Single-factor Stress Tests or Multi-factor Stress Tests. Fig. 2.2 explains the Types of Stress Tests and the tools used.

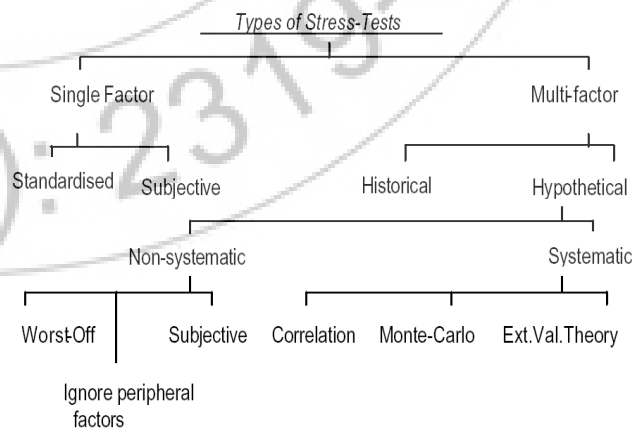


Figure 2.2

### 2.3 Possible Stress Scenarios

The following are some of the principal stress scenarios that can be visualized in a Bank's operations / portfolio:

- Sharp decline in Net Interest Income
- Spurt in NPAs
- Liquidity Crisis (e.g. significant deposit outflows, difficulty in accessing funds / Limits etc.)
- High Level of Un-availed Limits
- Credit Concentrations
- Credit Correlations.
- Downgrading / Migration of Ratings.
- Excessive Concentration of Liabilities (eg. Top 5 depositors contributing or say more than 30% of the deposits of the Bank).
- Spurt in Provisioning (Incl. Interest Earned / Paid).
- Loss in Treasury or Investment Portfolio (Both from Trading and from Investments)
- Parallel shift in yield curve.
- Impact on account of Currency appreciation / Depreciation.
- Impact on account of Interest rate movements.
- Business disruptions and system failures.
- Failures in IT assets. (eg. hardware and software failures, tele-communication problems and utility outages).
- Loss of reputation
- Re-pricing of liabilities
- Regulatory action (by RBI, SEBI etc.)
- Legal action.
- Action by Share-holders / stake-holders.
- Failure in the HR front (incl. industrial disputes)
- Inadequate Capital against Risks assumed.
- Increase in Risk weighted assets (Eg. Average risk weights going up).
- Stable / decreasing Net worth etc.

While the above stress scenarios are by no means exhaustive, it captures the essence of risks that emanate from. As explained above, Banks can formulate the stressed conditions based on its own circumstances. Similarly, in determining the level of stress to be applied to the stress scenarios, a bank can fix the "baseline" assessment as the normal or expected course of development. The mild, medium and severe scenarios, in principle, reflect an increasing level of stress compared with the "baseline" situation. Severely stressed scenarios can also be viewed as a "harder" version of the historical crises.

### 3. Stress Testing and ICAAP

Many best practices suggesting measurement methods for Internal Capital Adequacy Assessment Programmes (Often referred to as ICAAP), for internationally active banks have recognised this fact. Stress-tests can be conducted by simulating historical stress episodes (such as the Asian Economic Crisis) or by constructing hypothetical events built by stressing one or a group of risk factors. Stressing groups of risk factors together is also called Scenario Testing. Scenario testing can be conducted top-down, i.e., hypothesising the occurrence of a stressful event and then

deciding the change in risk factors to mirror the event, or bottom up, i.e., deciding the change in risk factors without hypothesising a particular event.

There are many historical stress events specific to India as well, like the Securities scam, Rupee depreciation, Balance of Payment Crisis, Inflation, Cyclicity in Industries (specifically Sugar, Jute, Textile, Cement, Steel etc.). The challenge in using historical scenarios is to choose a scenario that is appropriate for the bank's portfolio. This may be difficult because of the changing nature of financial markets or because of the introduction of new financial instruments that did not exist at the time of the historical stress events. A charge leveled against historical scenarios is that since no financial crisis has resembled any of its predecessors, there is no point in conducting such tests, since they will most probably never occur again. Despite these deficiencies historical scenarios enjoy widespread usage mainly because of the ready acceptance that they find. No questions on the plausibility of historical scenarios can be raised because they have actually taken place (though whether they will take place again is another question).

Another method requires, the greatest loss of the portfolio, over several years, is calculated and managers subsequently examine the scenarios that produced these extreme losses. This is similar to historical simulation in Value at Risk (VaR) models with the difference being that a longer time period can be chosen instead of the 1-year horizon usually selected for credit VaR computation. An important question that arises while using historical scenarios is the number of days to be considered while measuring the change in risk factors. Historical stress events may take place over a matter of days or months, so different time periods can give different changes in values of risk factors. Needless to say, that this requires clear documentation of historical facts, data and information on the portfolio. For a Bank starting these exercise now, it can build the results of stress scenarios only over a period of time.

### 3.2 Using Bank's own historical Stress Scenarios

In designing stress scenarios, Bank should review lessons from history and tailor the events, that indicate how their own major losses / stress factors have come from. Generally, portfolios of treasury, credit, capital constraints, human resources (incl., history of industrial disputes), bad publicity /image, high-cost deposits, Incidence of NPAs, Take-over threats, concentration of depositors, Succession Planning, Value creation to the share holders, regulatory actions etc. could be the attributing factors which resulted in stress scenarios.. In such cases, it shall be in the interests of the Bank that occurred events are taken cognizance of, while considering stress points / scenarios.

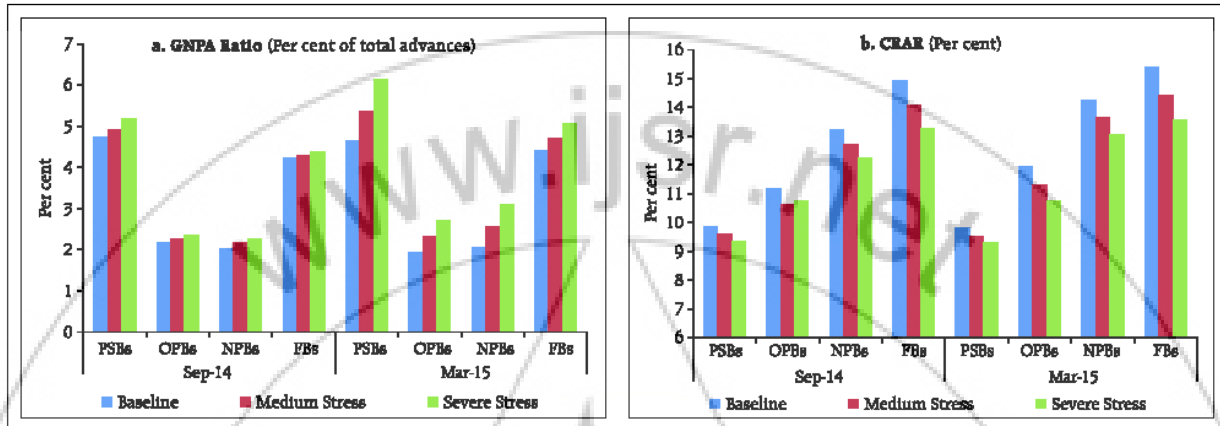
Further, the formulated Battery of Tests based on scenarios / sensitivities shall be made to capture the stress scenarios with three levels of increasing adversities reflecting stressed conditions that are Baseline or mild, medium and severe and can be derived spanning the entire operations / departmentation in vogue in Banks. Needless to say, these battery of tests need to be integrate to the Banks Risk

Management framework and then the Capital need to be set aside to take care of such stress losses.

#### 4. RBI's evaluation of Stress Tests

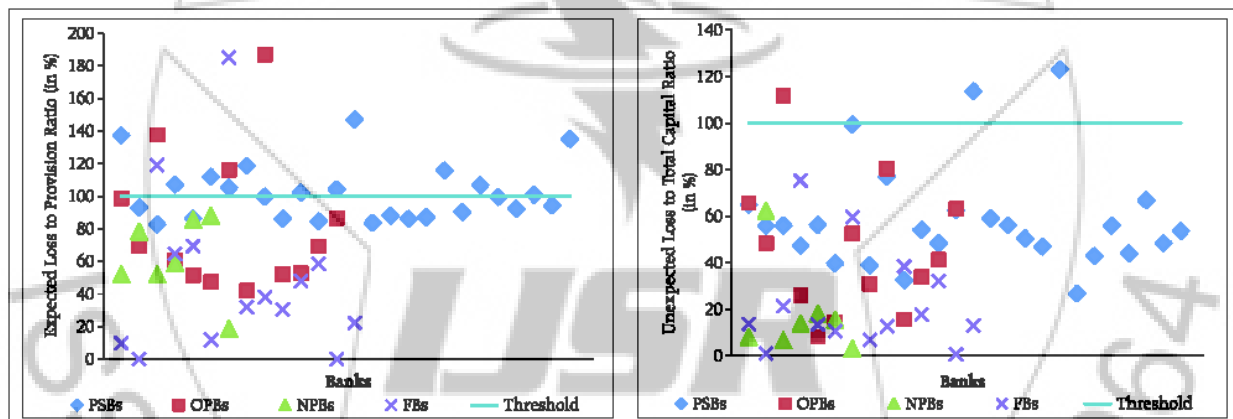
As part of Macro Prudential measurement and evaluation, the Reserve Bank of India has also started measuring and evaluating Indian Banks / banking system to the battery of Stress Tests. These have started being articulated in the

'Financial Stability Reports' which RBI has started publishing. In June 2014, RBI has come out with a Report on "Financial Institutions- Soundness and Resilience" where in the projected impact on various stress scenarios across India's banking sector and its impacts at sectoral level and at the Capital level (CRAR) were captured and codified. These is captured in Figure 4.1 to 4.3 below.



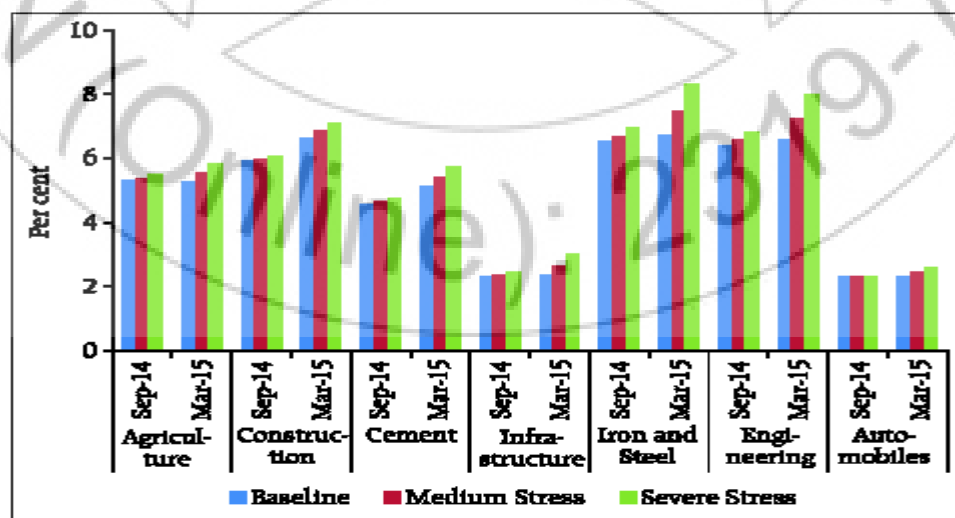
Source: RBI Supervisory Returns and Staff Calculations.

Figure 4.1: Gross Non-Performing Advances Ratio (GNPA Ratio) and Capital to Risk-Weighted Assets Ratio (CRAR)



Source: RBI Supervisory Returns and Staff Calculations.

Figure 4.2: Expected Losses and Unexpected Losses Bank-Group wise (Mar 2014)



Source: RBI Supervisory Returns and Staff Calculations.

Figure 4.3: Projected Sectoral NPA under various Scenarios (as a % of advances in the respective sectors)

## 5. Going Forward

Stress Testing by Banks and has become part of the macro prudential regulation and monitoring Going Forward, Stress Testing frameworks will continue to evolve and will become an indispensable tool in Banking System analysis. "Stress Testing" is and will be used as a tool by the regulators, under Basel II and III regimes / guidelines to understand the risk profiles of Banks and to build Capital Buffering by Banks and there by keeping a check on capital burning. In India also, the Reserve Bank brought the Stress Testing framework firmly into the remit of banking supervision, regulation and governance in that past few years and has included this as a measure of monitoring Stability in the Financial system.

has served more than a decade in Academia and nearly two decades in Industry, majorly in the Banking industry. He worked with Foreign banks, Nationalised Banks and Private sector Banks during his banking career and rose from being a 'Probationary Officer' to become the 'Senior Vice President'. Before becoming a full-time academic in 2010, he was holding top management position in Banks', by heading Treasury and Risk functions. He earned a Doctorate for his works on 'Risk management in Infrastructure Financing' from the Central University at Aligarh (AMU). He has published more than 60 papers in National and International Journals. He also consults in the areas of Banking, Risk, Treasury and General Management

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