Guidelines
on

Stress Testing

State Bank of Pakistan
Banking Supervision Department

Contents

Guidelines on Stress Testing

1. Stress Testing

- The importance of better understanding of potential vulnerabilities in the financial system and the measures to assess these vulnerabilities for both the regulators and the managers can hardly be over emphasized especially due to increasing volatilities in the financial markets. The regulators and managers of the financial system around the globe have developed a number of quantitative techniques to assess the potential risks to the individual institutions as well as financial system. A range of quantitative techniques that could serve the purpose is widely known as 'stress testing'.

- Stress testing is a process, which provides information on the behaviour of the financial system under a set of exceptional, but plausible assumptions. At institutional level, stress testing techniques provide a way to quantify the impact of changes in a number of risk factors on the assets and liabilities of the institution. For instance, a ***portfolio stress test*** makes a rough estimate of the value of portfolio using a set of exceptional but plausible assumptions. However, one of the limitations of this technique is that stress tests do not account for the probability of occurrence of these exceptional events. For this purpose, other techniques, for example VAR models etc, are used to supplement the stress tests. These tests help in managing risk within a financial institution to ensure optimum allocation of capital across its risk profile.

- At the system level, stress tests are primarily designed to quantify the impact of possible changes in economic environment on the financial system. The system level stress tests also complement the institutional level stress testing by providing information about the sensitivity of the overall financial system to a number of risk factors. These tests help the regulators to identify structural vulnerabilities and the overall risk exposure that could cause disruption of financial markets. Its prominence is on potential externalities and market failures.

2. Techniques for Stress Testing

- ***Simple Sensitivity Analysis*** measures the change in the value of portfolio for shocks of various degrees to different independent risk factors while the underlying relationships among the risk factors are not considered. For example, the shock might be the adverse movement of interest rate by 100 basis points and 200 basis points. Its impact will be measured only on the dependent variable i.e. capital in this case, while the impact of this change in interest rate on NPLs or exchange rate or any other risk factor is not considered.

- ***Scenario Analysis*** encompasses the situation where a change in one risk factor affects a number of other risk factors or there is a simultaneous move in a group

of risk factors. Scenarios can be designed to encompass both movements in a group of risk factors and the changes in the underlying relationships between these variables (for example correlations and volatilities). Stress testing can be based on the historical scenarios, a backward looking approach, or the hypothetical scenario, a forward-looking approach.

- ***Extreme Value/ Maximum Shock*** scenario measures the change in the risk factor in the worst-case scenario, i.e. the level of shock which entirely wipes out the capital.

3. Framework for Regular Stress Testing

- The stress-testing framework involves the scope of the risks covered and the process/procedure to carry out the stress test. This framework should be flexible enough to adopt advanced models for stress testing. It involves:

  - A well constituted organizational structure defining clearly the roles and responsibilities of the persons involved in the exercise. Preferably, it should be the part of the risk management functions of the bank/DFI. The persons involved should be independent from those who are actually involved in the risk taking and should directly report the results to the senior management
  - Defining the coverage and identifying the data required and available
  - Identifying, analyzing and proper recording of the assumptions used for stress testing
  - Calibrating the scenarios or shocks applied to the data and interpreting the results
  - An effective management information system that ensures flow of information to the senior management to take proper measures to avoid certain extreme conditions
  - Setting the specific trigger points to meet the benchmarks/standards set by SBP
  - Ensuring a mechanism for an ongoing review of the results of the stress test exercise and reflecting in the policies and limits set by management and board of directors
  - Taking this stress test as a starting point and developing in-house stress test model to assess the bank/DFI's specific risks

4. Scope of Stress Test

- As a starting point the scope of the stress test is limited to *simple sensitivity analysis.* Five different risk factors namely; interest rate, forced sale value of collateral, non-performing loans (NPLs), stock prices and foreign exchange rate have been identified and used for the stress testing. Moreover, the liquidity position of the institutions has also been stressed separately. Though

the decision of creating different scenarios for stress testing is a difficult one, however, to start with, certain levels of shocks to the individual risk components have been specified considering the historical as well as hypothetical movement in the risk factors.

- Stress test shall be carried out assuming three different hypothetical scenarios:

    - **Minor Level Shocks**: These represent small shocks to the risk factors. The level for different risk factors can, however, vary.
    - **Moderate Level Shocks**: It envisages medium level of shocks and the level is defined in each risk factor separately.
    - **Major Level Shocks**: It involves big shocks to all the risk factors and is also defined separately for each risk factor.

- Assumptions behind each Scenario: The stress test at this stage is only a single factor sensitivity analysis. Each of the five risk factors has been given shocks of three different levels. The magnitude of shock has been defined separately for each risk factor for all the three levels of shocks.

5. Methodology and Calibration of Shocks

- **Interest Rate Risk**:

    - Interest rate risk is the potential that the value of the ***on-balance sheet*** and the ***off-balance sheet*** positions of the bank/DFI would be negatively affected with the change in the interest rates. The vulnerability of an institution towards the adverse movements of the interest rate can be gauged by using **duration GAP analysis**.

    - The banks and DFIs shall follow the following steps in carrying out the interest rate stress tests.

        - Estimate the market value of all on-balance sheet rate sensitive assets and liabilities of the bank/DFI to arrive at market value of equity
        - Calculate the durations of each class of asset and the liability of the on-balance sheet portfolio
        - Arrive at the aggregate weighted average duration of assets and liabilities
        - Calculate the duration GAP by subtracting aggregate duration of liabilities from that of assets
        - Estimate the changes in the economic value of equity due to change in interest rates on on-balance sheet positions along the three interest rate changes

- Calculate surplus/(deficit) on off-balance sheet items under the assumption of three different interest rate changes i.e. 1%, 2%, and 5%
- Estimate the impact of the net change (both for on-balance sheet and off-balance sheet) in the market value of equity on the capital adequacy ratio (CAR)

- Market value of the asset or liability shall be assessed by calculating its present value discounted at the prevailing interest rate. The outstanding balances of the assets and liabilities should be taken alongwith their respective maturity or repricing period, whichever is earlier.

Duration GAP & Price Sensitivity

- Duration is the measure of a portfolio's price sensitivity to changes in interest rates. Longer the duration, larger the changes in the price for a given change in the interest rates. Larger the coupon, lower would be the duration and smaller would be the change in the price for a given change in the interest rates. The duration is measured as:

$$D = \frac{\sum_{t=1}^{n} \frac{CF_t(t)}{(1+y)^t}}{\sum_{t=1}^{n} \frac{CF_t}{(1+y)^t}} = \frac{\sum_{t=1}^{n} \frac{CF_t(t)}{(1+y)^t}}{Pv(Security)}$$

Where

CF_t = cash flow at time t,

t = the number of periods of time until the cash flow payment,

y = the yield to maturity[1] of the security generating the cash flow, and

n = the number of cash flows

Examples:

1) The duration of a Rs100 bond with the maturity of 3 years, 10% coupon and the effective YTM at 8% will be calculated as follows:

$$D = \frac{\frac{10\times1}{(1.08)} + \frac{10\times2}{(1.08)^2} + \frac{10\times3}{(1.08)^3} + \frac{100\times3}{(1.08)^3}}{\frac{10}{(1.08)} + \frac{10}{(1.08)^2} + \frac{10}{(1.08)^3} + \frac{100}{(1.08)^3}} = \frac{288.37}{105.15} = 2.74 \text{ years}$$

[1] *The yield to maturity for zero coupon bonds and for other interest earning assets and liabilities would be the current market interest rates thereon.*

2) The duration of the same bond if the YTM declines to 4%

$$D = \frac{\frac{10\times1}{(1.04)}+\frac{10\times2}{(1.04)^2}+\frac{10\times3}{(1.04)^3}+\frac{100\times3}{(1.04)^3}}{\frac{10}{(1.04)}+\frac{10}{(1.04)^2}+\frac{10}{(1.04)^3}+\frac{100}{(1.04)^3}} = \frac{321.48}{116.65} = 2.76 \text{ years}$$

- The duration GAP is measured by comparing the weighted average duration of assets with the weighted average duration of liabilities (leverage-adjusted)[2]. The weighted average duration of assets and liabilities is calculated as follows:

  Weighted Average Duration of Assets (DA) = $\sum_{a}^{n} W_a D_a$

  Weighted Average Duration of Liabilities (DL) = $\sum_{l}^{m} W_l D_l$

  Where

  W_a = market value of the asset "*a*" divided by the market value of all the assets

  W_l = market value of the liability "*l*" divided by the market value of all the liabilities

  D_a = duration of the asset "*a*"

  D_l = duration of the liability "*l*"

  n = total number of assets

  m = total number of liabilities

- The duration GAP indicates how the market value of equity (MVE) of a bank/DFI will change with a certain change in interest rates. If the weighted average duration of assets exceeds the weighted average duration of liabilities (leverage-adjusted), the duration GAP is said to be positive. A positive duration gap signifies that the assets are relatively more interest rate sensitive than liabilities. Hence if the interest rates rise, the value of assets will fall proportionately more than the value of liabilities and the market value of equity will fall accordingly and vice versa. Duration Gap will be calculated as under:

$$DGAP = DA - \frac{(MVL)}{(MVA)} \times DL$$

The change in market value of equity shall be calculated as:

[2] *The leverage adjustment takes into account the existence of equity as a means of financing assets.*

$$\Delta MVE \cong (-DGAP) \times \frac{\Delta i}{(1+y)} \times \text{Total Assets}$$

where

Δi = The change in the interest rate

y = The effective yield to maturity of all the assets

- The impact of interest rate change on interest bearing off-balance sheet contracts shall be separately calculated. As a first step, the actual market price of each contract shall be determined which should represent the actual price of the contract if sold immediately. The second step involves calculating the market price again by marking to market each contract separately assuming a change in interest rate. The difference between the two market prices would determine the amount of revaluation surplus or deficit. The revaluation surplus would arise if the actual market price of the contract is less than the price calculated after assuming a change in the interest rate and revaluation deficit would result in, if otherwise. The revaluation surplus/deficit arising due to the change in the interest rates of the off-balance sheet contracts should be subtracted/ added to the fall in market value of equity derived by the DGAP approach to arrive at the net change in the market value of equity.

- The impact of this net change in the market value of equity will then be calibrated in the CAR. The tax-adjusted impact of this net fall in the MVE shall be adjusted from the regulatory capital and the risk-weighted assets. And the revised CAR shall be calculated under each of the above scenarios.

- **Exchange Rate Risk**

  - The stress test for exchange rate assesses the impact of change in exchange rate on the value of equity. To model direct foreign exchange risk only the overall net open position of the bank/DFI including the on-balance sheet and off-balance sheet exposures shall be given an adverse shocks of 5%, 10% and 15% for minor, moderate and major levels respectively. The overall net open position is measured by aggregating the sum of net short positions or the sum of net long positions; whichever is greater regardless of sign. For example, the bank may have net long position of Rs500 million in Yen, Euro and USD and the net short position in GBP and Australian dollar of Rs600 million. The total exposure will be the greater of the two i.e. sum of the short positions of Rs600 million. The impact of the respective shocks will be calibrated in terms of the CAR. The tax-adjusted loss arising from the shocked position will be adjusted from the capital. The revised CAR will then be calculated after adjusting total loss from the risk-weighted assets of the bank/DFI.

- **Credit Risk**

  - The stress test for credit risk assesses the impact of increase in the level of non-performing loans of the bank/DFI. This involves three types of shocks:

    - The one deals with the ***increase in the NPLs*** and the respective provisioning. The three scenarios shall explain the impact of 5%, 10% and 20% increase in the total NPLs directly downgraded to loss category having 100% provisioning requirement. The tax-adjusted impact will be calibrated in the CAR of the bank/DFI for each of the scenarios.
    - The second deals with the negative ***shift in the NPLs*** **categories** and hence the increase in respective provisioning. The three scenarios shall explain the impact of 50%, 80% and 100% downward shift in the NPLs categories. For example, for the first level of shock 50% of the OAEM shall be categorized under substandard, 50% of the substandard shall be categorized under doubtful and 50% of the doubtful shall be added to the loss category. The tax-adjusted impact of the increased provisioning will be calibrated in the CAR of the bank/DFI for each of the scenarios.
    - The third deals with the ***fall in the forced sale value (FSV) of mortgaged collateral***. The forced sale values of the collateral shall be given shocks of 10%, 20% and 40% decline in the forced sale value of mortgaged collateral for all the three scenarios respectively. The tax-adjusted impact of the additional required provision will be calibrated in the CAR for each of the scenario.

- **Equity Price Risk**

  - The stress test for equity price risk assesses the impact of the fall in the stock market index. The current market value of all the on balance sheet and off balance sheet securities listed on the stock exchanges including shares, NIT units, mutual funds etc. shall be given shocks of 10%, 20% and 40% fall in their value for all the three scenarios respectively. The impact of resultant loss will be calibrated in the CAR.

- **Liquidity Risk**

  - The stress test for liquidity risk evaluates the resilience of the banks towards the fall in liquid liabilities. The ratio "liquid assets to liquid liabilities" shall be calculated before and after the shocks by dividing the liquid assets with liquid liabilities. Liquid assets are the assets that are easily and cheaply turned into cash. They include cash and balances with banks, call money lending, lending under repo and investment in

government securities. Liquid liabilities include the deposits and the borrowings. The liquid liabilities should be given shocks of 10%, 20% and 30% fall. The equivalent amount should be deducted from the liquid assets assuming the fall in liquid liabilities is met by the corresponding fall in the liquid assets. The ratio of liquid assets to liquid liabilities shall be re-calculated under each scenario.

Annex-I

Comprehensive Example

Suppose ABC bank has the following positions as of end of Dec-04 Quarter:

1. Cash of Rs80M.
2. 3-year 6% PIBs of Rs1,000M with 2 year remaining maturity held in Held-for-Trading portfolio of the bank's investment. The current market yield on these bonds is 7%.
3. 5-year 7% PIBs of Rs500M with 2 year remaining maturity held in Available-for-Sale portfolio of the bank's investment. The current market yield on these bonds is 8%.
4. 8% PIBs of 10-year maturity of Rs2,000M, categorized under Held to Maturity portfolio of the bank's investment. The bonds have the remaining maturity of 9 years.
5. Investment of Rs100m in listed shares held under trading portfolio.
6. 3-year commercial loan of Rs6,000M at 10%. The remaining life of this loan is 3 years. Interest payments are on quarterly basis and principal is payable on maturity.
7. The bank has NPLs of Rs200M of which 10%, 20% and 60% lie under substandard, doubtful and loss categories for which 20%, 50% and 100% provisioning is required respectively.

	OAEM	**Substandard**	**Doubtful**	**Loss**
NPLs	20	20	40	120
FSV of Mortgaged Collateral		10	14	20
Provision	0	2	13	100

8. Non-earning assets of Rs320M.
9. Saving deposits of Rs6,500M at 3%. The bank revises its rates on saving deposits on quarterly basis.
10. A 3-year term deposit of Rs1,000M at 5%. This reprices after every six months. The current interest rate on the same type of deposit is 6%.
11. Current non-remunerative deposits of Rs1,000M.
12. A 3-month borrowing of Rs500M at 4% from financial institutions.
13. Net open position in both on-balance sheet and off-balance sheet foreign exchange position is long by Rs150M.
14. Total RWA are Rs6,420M and the total regulatory capital Rs800m.
15. The tax rate is 41%.
16. Assumptions:
    - All the deposits including term deposits are considered as liquid.
    - The bank has marked to market its interest bearing off-balance sheet positions and/or derivatives and arrived at a revaluation deficit of Rs5m, Rs10m and Rs25m for the rise in interest rate by 1%, 2% and 5% respectively.
    - Forward purchase of shares of Rs80M.

Interest Rate Shock

Interest rate risk shall be assessed using simple duration analysis. Duration for all the assets and liabilities shall be calculated using the formula already described. Given below is the table showing the duration of the balance sheet[3].

Balance Sheet Duration

Rs. in million

	Book Value	Coupon	Repricing Period in years	Yield to Maturity	Market Value	Duration
Assets						
Cash	80				80	
3-year PIB (Held for Trading)	1,000	6.00%	2.00	7.00%	982	1.91
5-year PIB (Available for Sale)	500	7.00%	2.00	8.00%	491	1.90
10-year PIB (Held to Maturity)	2,000	8.00%	9.00	9.00%	1,878	6.49
Investment in shares (Held for Trading)	100				100	
3-year Commercial Loan	6,000	10.00%	3.00	10.00%	6,000	2.63
Non Earning Assets	320				320	
Total Assets	**10,000**			**8.90%**	**9,851**	**3.12**
Liabilities:						
Current Deposits	1,000				1,000	
Saving Deposits	6,500	3.00%	0.25	3.00%	6,500	0.25
3-years Term Deposit	1,000	5.00%	0.50	6.00%	995	0.50
3-months Borrowing	500	4.00%	0.25	4.00%	500	0.25
Total Liabilities	**9,000**			**3.05%**	**8,995**	**0.25**
Capital	1,000				856	
Total Liab. & Equity	**10,000**				**9,851**	

The weighted average duration of assets shall be calculated as follows:

DA =1.91×(982/9,851)+1.90×(491/9,851)+6.49×(1878/9,851)+2.63×(6000/9,851) = 3.122

Similarly the weighted average duration of liabilities (leverage-adjusted) shall be calculated as follows:

DL = 0.25 × (6,500/8,995)+0.5 × (995/8,995)+0.25 × (500/8,995)=0.250

$$\frac{(MVL)}{(MVA)} \times DL = 0.250 \times (8{,}995/9{,}851) = 0.228$$

Duration GAP = 3.122 – 0.228 = 2.894 years

Here the duration of assets exceeds the duration of liabilities, which signifies that assets are more price sensitive than that of liabilities and certain rise in interest rate would cause greater fall in the value of assets leading to decline in the market value of equity. A 1-percentage point rise in interest rate would cause a fall in its market value of equity by:

[3] *For simplicity the bank/DFI can calculate the duration for their loans and deposits portfolio by taking into account the effective weighted yield to maturity on the basis of the repricing buckets.*

$$\Delta MVE \cong \quad (-DGAP) \times \frac{\Delta i}{(1+y)} \times (MVA)$$

ΔMVE = -2.894 × (0.01/(1+0.089)) × 9851 = -261.9M

For simplicity, this shock represents a parallel upward shift in the yield curve. Now the impact shall be calibrated in CAR as follows:

Fall in MVE-(on-balance sheet)	*= 261.8*
Net fall in MVE-(on-balance sheet & off-balance sheet)	*=266.8*
Tax adjusted loss	*= 266.8× (1-0.41) =157.4*
Revised Regulatory Capital	*= 800-157.4 =642.6*
Revised risk weighted assets	*= 6,420-157.4 = 6262.6*
Revised CAR (%)	*= 642.6 / 6262.6 = 10.26*
Fall in CAR (% age points)	*= 12.46-10.26 = 2.20*

The change in the MVE shall also be assessed for 2 and 5 percentage point rise in interest rates.

Exchange Rate Shock

The impact of change in the exchange rate shall be determined by the following procedure:
For the first level shock of 5% adverse movement in exchange rate:

Net on-balance sheet and off-balance sheet currency exposure = Rs150m

Exchange rate loss on 5% change	*= 150 × 0.05 = 7.5*
Tax adjusted loss	*= 7.5 × (1-0.41) = 4.4*
Revised Capital	*= 800-4.4 = 795.6*
Revised risk weighted assets	*= 6420-4.4 = 6415.6*
Revised CAR (%)	*= 795.6 / 6415.6 = 12.4*
Fall in CAR (% age points)	*= 12.46-12.4 = 0.06*

The same procedure shall be followed for 10% and 15% shocks to exchange rate.

Credit Shock:

Increase in NPLs:

Of the three kinds of credit shocks, the impact of the increase in **NPLs** shall be accounted for as follows:

For the first level shock of 5% increase in NPLs directly downgraded to loss category:

Total NPLs	*= Rs200M*
Increase in NPLs	*= 200 × 0.05 =10*
Increase in Provisions	*= 10 ×1.0 = 10*
Tax adjusted loss	*= 10 × (1-0.41) = 5.9*
Revised Capital	*= 800 -5.9 =794.1*
Revised risk weighted assets	*= 6420- 5.9 = 6414.1*
Revised CAR (%)	*= 794.1 / 6414.1 = 12.38*
Fall in CAR (%age points)	*= 12.46-12.38 = 0.08*

The same procedure shall be followed for 10% and 20% increase in NPLs.

***Shift in NPLs categories**:*

The impact of shift in 50% NPLs to next categories with no change in total NPLs shall be accounted for as follows:

Weighted NPLs[1]	=20×0+20×0.2+40×0.5+120×1=144
Weighted NPLs after Shift in Categories	=(20×0.5×0.2+20×0.5×0.2)+(20×0.5×0.5 +40×0.5×0.5)+(40×0.5×1+120×1)=159
Increase in Provisions	*=159-144=15*
Tax adjusted loss	*= 15 × (1-0.41) = 8.8*
Revised Capital	*= 800-8.8 = 791.2*
Revised risk weighted assets	*= 6420- 8.8 = 6411.2*
Revised CAR	*= 791.2 / 6411.2 = 12.34*
Fall in CAR (% age points)	*= 12.46-12.34 = 0.12*

The same procedure shall be followed for 80% and 100% shift in the NPLs to the respective downward category.

Fall in FSV of Mortgaged Collateral:

The impact of 10% fall in FSV of mortgaged collateral shall be calculated as:

Total FSV of Mortgaged Collateral	*= Rs44 M*
Weighted FSV of Collateral	*= 10 ×0.2+14 ×0.5 + 20 × 1 = 29*
Fall in the FSV of Collateral	*= 29 × 0.1 = 2.9*
Tax adjusted loss	*= 2.9 × (1-0.41) = 1.7*
Revised Capital	*= 800 - 1.7 = 798.3*
Revised risk weighted assets	*= 6,420 - 1.7 = 6,418.3*
Revised CAR	*= 798.3 / 6,418.3 = 12.44*
Fall in CAR (% age points)	*= 12.46 - 12.44 = 0.02*

[1] Weighted NPLs is the sum of weighted NPLs in each category of classified loans where weights being the rate of provision required against each category.

The same procedure shall be followed for 20% and 40% shocks to FSV of collateral.

Equity Price Shock:

The impact of 10% fall in stock market prices shall be calculated as:

Total exposure in stock market	*= Rs180M*
Fall in the stock prices	*= 180 × 0.1 = 18*
Tax adjusted loss	*= 18 × (1-0.41) = 10.6*
Revised Capital	*= 800 - 10.6 =789.4*
Revised risk weighted assets	*= 6,420- 10.6 = 6409.4*
Revised CAR	*= 789.4 / 6,409.4 = 12.32*
Fall in CAR (% age points)	*= 12.46-12.32 = 0.14*

The same procedure shall be followed for 20% and 40% fall in the equity prices.

Liquidity Shock:

The ratio of liquid assets to liquid liabilities after a 10% fall in the later shall be calculated as:

Liquid assets	*= Rs3,580M*
Liquid Liabilities	*= Rs9,000M*
Fall in liquid liabilities	= 9,000 × 0.1=900
Revised Liquid Assets	*= 3,580-900=2,680*
Revised Liquid Liabilities	*= 9,000-900=8,100*
Revised Ratio (%)	*=33.1*

The analysis has been summarized in the following format:

Stress Testing

ABC Bank

For the half year ended December 31, 2004

Rs. in million

Regulatory Capital	800	800	800
RWA	6420	6420	6420
CAR (%)	12.46	12.46	12.46

	Scenario 1	Scenario 2	Scenario 3
Interest Rate Risk -Increase in Interest Rate			
Magnitude of Shock	**1%**	**2%**	**5%**
Weighted Average Rate on Assets (%)	8.90	8.90	8.90
Total Assets	9,851	9,851	9,851
Duration GAP	2.894	2.9	2.9
Fall in MVE (on-balance sheet)	261.8	523.6	1,308.9
Net fall in MVE (on-balance sheet & off-balance sheet)	266.8	533.6	1,333.9
Tax Adjusted Loss	157.4	314.8	787.0
Revised Capital	642.6	485.2	13.0
Revised RWA	6,262.6	6,105.2	5,633.0
Revised CAR (%)	10.26	7.95	0.23
Exchange Rate Risk -Adverse Move in Exchange Rate			
Magnitude of Shock	**5%**	**10%**	**15%**
Net Exposure in FX	150	150	150
Loss on Exchange Rate Change	7.5	15.0	22.5
Tax Adjusted Loss	4.4	8.9	13.3
Revised Capital	795.6	791.2	786.7
Revised RWA	6,415.6	6,411.2	6,406.7
Revised CAR (%)	12.40	12.34	12.28
Credit Risk -Increase in NPLs			
Magnitude of Shock	**5%**	**10%**	**20%**
Total NPLs	200	200	200
Increase in NPls	10	20	40
Increase in Provisions	10	20	40
Tax Adjusted Loss	5.9	11.8	23.6
Revised Capital	794.1	788.2	776.4
Revised RWA	6414.1	6408.2	6396.4
Revised CAR (%)	12.38	12.30	12.14
Credit Risk-Downward Shift in NPLs Categories			
Magnitude of Shock	**50%**	**80%**	**100%**
Weighted NPLs	144	144	144
Weighted NPLs After Shift in NPLs' Categories	159	168	174
Increase in Provisions	15	24	30
Tax Adjusted Loss	8.9	14.2	17.7
Revised Capital	791.2	785.8	782.3
Revised RWA	6411.2	6405.8	6402.3
Revised CAR (%)	12.34	12.27	12.22
Credit Risk - Fall in the FSV of Mortgaged Collateral			
Magnitude of Shock	**10%**	**20%**	**40%**
Weighted Forced Sale Value of Collateral	29	29	29
Increase in Provisions	2.9	5.8	11.6
Tax Adjusted Loss	1.7	3.4	6.8
Revised Capital	798.3	796.6	793.2
Revised RWA	6,418.3	6,416.6	6,413.2
Revised CAR (%)	12.44	12.41	12.37

Equity Price Risk - Fall in the Stock Market Prices

Magnitude of Shock	**10%**	**20%**	**40%**
Total Exposure in Stock Market	180	180	180
Fall in the Value of Stock	18.0	36.0	72.0
Tax Adjusted Loss	10.6	21.2	42.5
Revised Capital	789.4	778.8	757.5
Revised RWA	6,409.4	6,398.8	6,377.5
Revised CAR (%)	12.32	12.17	11.88

Capital after two or more cumulative shocks

Cumulative impact of NPL and FSV	27.9	49.8	81.6
Tax Adjusted Loss	16.5	29.4	48.1
Revised Capital	783.5	770.6	751.9
Revised RWA	6,403.5	6,390.6	6,371.9
Revised CAR (%)	12.24	12.06	11.80
Cumulative impact of all Shocks	320.2	634.4	1,510.0
Tax Adjusted Loss	188.9	374.3	890.9
Revised Capital	611.1	425.7	(90.9)
Revised RWA	6,231.1	6,045.7	5,529.1
Revised CAR (%)	9.81	7.04	(1.64)

Liquidity Shock - Fall in Liquid Liabilities

Magnitude of Shock	**10%**	**20%**	**30%**
Liquid Assets	3,580	3,580	3,580
Liquid Liabilities	9,000	9,000	9,000
Fall in the Liquid Liabilities	900	1,800	2,700
Revised Liquid Liabilities	8,100	7,200	6,300
Revised Liquid Assets	2,680	1,780	880
Ratio after Shock (%)	33.09	24.72	13.97

Annex - II

Reporting Format

Stress Testing
Name of the Bank
For the half year ended ------

Balance Sheet Duration

Rs. in million

	Book Value	Coupon	Repricing Period in years	YTM	Market Value	Duration
Assets						
Cash						
Balances with Other Banks						
Lending to F. Institutions						
Investments						
Loans & Advances						
Other Assets						
Total Assets						
Liabilities:						
Bills Payable						
Borrowings from Financial Institutions						
Deposits & Other Accounts						
Sub-ordinated Loans						
Liabilities Against Assets Subject to Finance Lease						
Other Liabilities						
Total Liabilities						
Equity						
Total Liab. & Equity						

Stress Testing

Name of the Bank

For the half year ended------

Rs. in million

Regulatory Capital			
RWA			
CAR (%)			

	Scenario 1	Scenario 2	Scenario 3
Interest Rate Risk -Increase in Interest Rate			
Magnitude of Shock	**1%**	**2%**	**5%**
Weighted Average Rate on Assets (%)			
Total Assets			
Duration GAP			
Fall in MVE (on-balance sheet)			
Net fall in MVE (on-balance sheet & off-balance sheet)			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			
Exchange Rate Risk -Adverse Move in Exchange Rate			
Magnitude of Shock	**5%**	**10%**	**15%**
Net Exposure in FX			
Loss on Exchange Rate Change			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			
Credit Risk -Increase in NPLs			
Magnitude of Shock	**5%**	**10%**	**20%**
Total NPLs			
Increase in NPls			
Increase in Provisions			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			
Credit Risk-Downward Shift in NPLs Categories			
Magnitude of Shock	**50%**	**80%**	**100%**
Weighted NPLs			
Weighted NPLs After Shift in NPLs' Categories			
Increase in Provisions			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			
Credit Risk - Fall in the FSV of Mortgaged Collateral			
Magnitude of Shock	**10%**	**20%**	**40%**
Weighted Forced Sale Value of Collateral			
Increase in Provisions			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			

Equity Price Risk - Fall in the Stock Market Prices

Magnitude of Shock	**10%**	**20%**	**40%**
Total Exposure in Stock Market			
Fall in the Value of Stock			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			

Capital after two or more cumulative shocks

Cumulative impact of NPL and FSV			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			
Cumulative impact of all Shocks			
Tax Adjusted Loss			
Revised Capital			
Revised RWA			
Revised CAR (%)			

Liquidity Shock - Fall in Liquid Liabilities

Magnitude of Shock	**10%**	**20%**	**30%**
Liquid Assets			
Liquid Liabilities			
Fall in the Liquid Liabilities			
Revised Liquid Liabilities			
Revised Liquid Assets			
Ratio after Shock (%)			