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February 8, 2010

The Chief Executive Officers of
Primary (Urban) Cooperative Banks having
AD Category I licence

Dear Sir / Madam

Prudential Guidelines on Capital Charge for Market Risks

As you are aware, the Basel Committee on Banking Supervision (BCBS) had issued an amendment to the Capital Accord in 1996 to incorporate market risks. As an initial step towards prescribing capital requirement for market risks, Urban Cooperative Banks (UCBs) were advised to assign an additional risk weight of 2.5% on almost the entire investment portfolio. These additional risk weights are clubbed with the risk weights prescribed for credit risk in respect of investment portfolio of UCBs. Further, UCBs were advised to assign a risk weight of 100% on the open position limits on foreign exchange and gold and to build up Investment Fluctuation Reserve up to a minimum of 5% of the investments held in Held for Trading and Available for Sale categories in the investment portfolio.

2. The interim measures adopted by UCBs represent a broad brush and simplistic approach. However, over a period of time, banks' ability to identify and measure market risk has improved. The Advisory Panel on Financial Regulation and Supervision to the Committee on Financial Sector Assessment (Chairman: Dr Rakesh Mohan and Co-Chairman: Shri Ashok Chawla) which looked into the present regulatory and supervisory framework for UCBs, had recommended assigning duration based capital charge for market risk for Scheduled UCBs that are systemically important and comparable in size to medium-sized commercial banks.



Accordingly, it was proposed in the Annual Policy Statement for the year 2009-10 to prescribe capital charge for market risk in respect of systemically important and large sized UCBs with effect from April 1, 2010. In this backdrop, it has been decided that UCBs having AD category I licence would provide capital for market risk with effect from April 1, 2010. The guidelines on capital charge for market risk are enclosed. UCBs are advised to restrict their exposure only to the permitted category of investments / instruments as per the extant instructions and provide capital charge for market risk as per the guidelines.

Yours faithfully

(A.K. Khound)
Chief General Manager-In-Charge

Encl: As above

Guidelines on capital charge for Market Risks

Introduction

1. Market risk is defined as the risk of losses in on-balance sheet and off balance sheet positions arising out of movements in market prices. The market risk positions subject to capital charge requirement are as under:

(i) The risks pertaining to interest rate related instruments and equities in the trading book; and

(ii) Foreign exchange risk (including open position in precious metals) throughout the bank (both banking and trading books).

2. The guidelines in this regard are organized under the following five sections:

Section	Particulars
A	Scope and coverage of capital charge for market risks
B	Measurement of capital charge for interest rate risk in the trading book
C	Measurement of capital charge for equities in the trading book (partially applicable for UCBs)
D	Measurement of capital charge for foreign exchange risk and gold open positions
E	Aggregation of capital charge for market risks

Section A

3. Scope and coverage of capital charge for market risks

3.1 These guidelines seek to address the issues involved in computing capital charges for interest rate related instruments in the trading book, equities in the trading book and foreign exchange risk (including gold and other precious metals) in both trading and banking books. Trading book for the purpose of capital adequacy will include:

- (i) Securities included under the Held for Trading category
- (ii) Securities included under the Available for Sale category
- (iii) Open gold position limits
- (iv) Open foreign exchange position limits
- (v) Trading positions in derivatives, and
- (vi) Derivatives entered into for hedging trading book exposures.

3.2 Banks are required to manage the market risks in their books on an ongoing basis and ensure that the capital requirements for market risks are being maintained on a continuous basis, i.e. at the close of each business day. Banks are also required to maintain strict risk management systems to monitor and control intra-day exposures to market risks.

3.3 Capital for market risk would not be relevant for securities which have already matured and remain unpaid. These securities will attract capital only for credit risk. On completion of 90 days delinquency, these will be treated on par with NPAs for deciding the appropriate risk weights for credit risk.

Section B

4 Measurement of capital charge for interest rate risk

4.1 This section describes the framework for measuring the risk of holding or taking positions in debt securities and other interest rate related instruments in the trading book.

4.2 The capital charge for interest rate related instruments would apply to current market value of these items in bank's trading book. Since banks are required to maintain capital for market risks on an ongoing basis, they are required to mark to market their trading positions on a daily basis. The current market value will be determined as per extant RBI guidelines on valuation of investments.

4.3 The minimum capital requirement is expressed in terms of two separately calculated charges, (i) "specific risk" charge for each security, which is designed to protect against an adverse movement in the price of an individual security owing to factors related to the individual issuer, both for short (short position is not allowed in India except in derivatives) and long positions, and (ii) "general market risk" charges towards interest rate risk in the portfolio, where long and short positions (which is not allowed in India except in derivatives and Central Government securities) in different securities or instruments can be offset.

4.4 Capital Charge for Specific Risk

The capital charge for specific risk is designed to protect against an adverse movement in the price of an individual security owing to factors related to the individual issuer. The specific risk charges for various kinds of exposures would be as applied as detailed below:

Sr. No.	Nature of Investment	Maturity	Specific Risk Capital Charge (as % of exposure)
	Claims on Government		
1.	Investments in Government Securities.	All	0.0
2.	Investments in other approved securities guaranteed by Central / State Government.	All	0.0
3.	Investments in other securities where payment of interest and repayment of principal are guaranteed by Central	All	0.0

	Govt. (This will include investments in Indira / Kisan Vikas Patra (IVP/KVP) and investments in Bonds and Debentures where payment of interest and principal is guaranteed by Central Govt.)		
4.	Investments in other securities where payment of interest and repayment of principal are guaranteed by State Governments.	All	0.0
5.	Investments in other approved securities where payment of interest and repayment of principal are not guaranteed by Central / State Govt.	All	1.80
6.	Investments in Government guaranteed securities of Government Undertakings which do not form part of the approved market borrowing programme.	All	1.80
7.	Investment in state government guaranteed securities included under items 2, 4 & 6 above where the investment is non-performing. However banks need to maintain capital at 9% only on those State Govt guaranteed securities issued by the defaulting entities and not on all the securities issued or guaranteed by that State Government.	All	9.00
	Claims on Banks		
8.	Claims on banks, including investments in securities which are guaranteed by banks as to payment of interest and repayment of principal	For residual term to final maturity 6 months or less	0.30
		For residual term to final maturity between 6 and 24 months	1.125
		For residual term to final maturity exceeding 24 months	1.80
9.	Investments in subordinated debt instruments and bonds issued by other banks for their Tier II capital.	All	9.00
	Claims on Others		
10.	Investment in Mortgage Backed Securities of residential assets of Housing Finance Companies (HFCs) which are recognised and supervised by National Housing Bank	All	4.50
11.	Investment in Mortgage Backed Securities (MBS) which are backed by housing loan qualifying for 50% risk weight.	All	4.50
12.	Investment in securitised paper pertaining to an infrastructure facility	All	4.50
13.	All other investments including investment in securities issued by SPVs set up for securitisation transactions	All	9.00
14.	Direct investment in equity shares, convertible bonds, debentures and units of equity oriented mutual funds	All	11.25
15.	Investment in Mortgage Backed Securities and other securitised exposures to Commercial Real Estate	All	13.5
16.	Investments in Venture Capital Funds	All	13.5
17.	Investments in instruments issued by NBFC-ND-SI	All	11.25

Note: Though the capital charge for specific risk in respect of various instruments has been mentioned in the table above, UCBs are not permitted to invest in many such instruments. They should invest in securities that are permitted by the Reserve Bank from time to time.

The category 'claim on Government' will include all forms of Government securities including dated Government securities, Treasury bills and other short-term investments and instruments where repayment of both principal and interest are fully guaranteed by the Government. The category 'Claims on others' will include issuers of securities other than Government and banks. Certain types of investments mentioned in the above table are not applicable for UCBs.

4.5 General Market Risk

The capital requirements for general market risk are designed to capture the risk of loss arising from changes in market interest rates. The capital charge is the sum of four components:

- (i) the net short (which is not allowed in India except in derivatives) or long position in the whole trading book;
- (ii) a small proportion of the matched positions in each time-band (the "vertical disallowance");
- (iii) a larger proportion of the matched positions across different time bands (the "horizontal disallowance"), and
- (iv) a net charge for positions in options, where appropriate.

4.6 The Basle Committee has suggested two broad methodologies for computation of capital charge for market risks. One is the standardized method and the other is the banks' internal risk management models method. As banks in India are still in a nascent stage of developing internal risk management models, it has been decided that, to start with, banks may adopt the standardised method. Under the standardised method there are two principal methods of measuring market risk, a "maturity" method and a "duration" method.

A maturity / re-pricing schedule is used to evaluate the effects of changing interest rates on a bank's economic value by applying sensitivity weights to each time band. Typically, such weights are based on estimates of the duration of assets and liabilities that fall into each time band. Duration is measure of the percentage change in the economic value of a position that will occur given a small change in the level of interest rates. It reflects the timing and size of cash flows that occur before the instrument's contractual maturity. Generally, the longer the maturity or next repricing date of the instruments and smaller the payments that occur before maturity (eg coupon payments), the higher the duration (in absolute value). Higher duration implies that a given change in the level of interest rates will have a larger impact on economic value.

As "duration" method is a more accurate method of measuring interest rate risk, it has been decided to adopt standardized duration method to arrive at the capital charge. Accordingly, banks are required to measure the general market risk charge by calculating the price sensitivity (modified duration) of each position separately. Modified duration which is a standard duration divided by $1 + r$ where r is the level of market interest rates – is an elasticity. As such it reflects the percentage change in

the economic value of the instrument for a given percentage change in $1 + r$. As with simple duration, it assumes a linear relationship between percentage changes in value and percentage changes in interest rates. Under this method, the mechanics are as follows:

- (i) first calculate the price sensitivity (modified duration) of each instrument;
- (ii) next apply the assumed change in yield to the modified duration of each instrument between 0.6 and 1.0 percentage points depending on the maturity of the instrument (see Table-1 below);
- (iii) slot the resulting capital charge measures into a maturity ladder with the fifteen time bands as set out in Table-1;
- (iv) subject long and short positions (which is not allowed in India except in derivatives) in each time band to a 5 per cent vertical disallowance designed to capture basis risk; and
- (v) carry forward the net positions in each time-band for horizontal offsetting subject to the disallowances set out in Table-2.

Table 1 - Duration method – time bands and assumed changes in yield

Time Bands	Assumed Change in Yield	Time Bands	Assumed Change in Yield
Zone 1		Zone 3	
1 month or less	1.00	3.6 to 4.3 yrs	0.75
1 to 3 months	1.00	4.3 to 5.7 yrs	0.70
3 to 6 months	1.00	5.7 to 7.3 yrs	0.65
6 to 12 months	1.00	7.3 to 9.3 yrs	0.60
Zone 2		9.3 to 10.6 yrs	0.60
1.0 to 1.9 yrs	0.90	10.6 to 12 yrs	0.60
1.9 to 2.8 yrs	0.80	12 to 20 yrs	0.60
2.8 to 3.6 yrs	0.75	Over 20 yrs	0.60

Table 2 Horizontal Disallowances

Zones	Time band	Within zones	the adjacent zones	Between zones 1 and 3
Zone 1	1 month or less	40%	40%	100%
	1 to 3 months			
	3 to 6 months			
	6 to 12 months			
Zone 2	1.0 to 1.9 years	30%	40%	
	1.9 to 2.8 years			
	2.8 to 3.6 years			
Zone 3	3.6 to 4.3 years	30%	40%	
	4.3 to 5.7 years			
	5.7 to 7.3 years			
	7.3 to 9.3 years			
	9.3 to 10.6 years			
	10.6 to 12 years			
	12 to 20 years			
	over 20 years			

4.7 Capital charge for interest rate derivatives

The measurement of capital charge for market risks should include all interest rate derivatives and off-balance sheet instruments in the trading book and derivatives entered into for hedging trading book exposures which would react to changes in the interest rates, like FRAs, interest rate positions etc. The details of measurement of capital charge for interest rate derivatives are furnished in Attachment I.

Two examples for computing capital charge for market risks, including the vertical and horizontal disallowances are given in Attachment II & III.

4.8 Capital charge for interest rate risk in foreign currencies

Details of computing capital charges for interest rate risks in foreign currencies are as under:

- (i) Capital charges should be calculated for each currency separately and then summed with no offsetting between positions of opposite sign.
- (ii) In the case of those currencies in which business is insignificant (where the turnover in the respective currency is less than 5% of overall foreign exchange turnover), separate calculations for each currency are not required. The bank may, instead, slot within each appropriate time-band, the net long or short position for each currency. However, these individual net positions are to be summed within each time-band, irrespective of whether they are long or short positions, to produce a gross position figure. The gross positions in each time-band will be subject to the assumed change in yield set out in Table-1 above (Ref: para 4.6) with no further offsets.

Section C

5. Measurement of capital charge for equity risk

5.1 The capital charge for equities would apply on their current market value in bank's trading book. Minimum capital requirement to cover the risk of holding or taking positions in equities in the trading book is set out below. This is applied to all instruments that exhibit market behaviour similar to equities but not to non convertible preference shares (which are covered by the interest rate risk requirements). The instruments covered include equity shares, whether voting or non-voting, convertible securities that behave like equities, for example: units of mutual funds, and commitments to buy or sell equity.

Specific and general market risk

5.2 Capital charge for specific risk (akin to credit risk) will be 11.25% and specific risk is computed on the banks' gross equity positions (i.e. the sum of all long equity positions and of all short equity positions – short equity position is, however, not allowed for banks in India. The general market risk charge will also be 9% on the gross equity positions.

5.3 UCBs are, however not permitted to take exposure in equities, except in investments in the shares of cooperatives, subject to certain limits and therefore, not exposed to equity risk.

Section D

6 Measurement of capital charge for foreign exchange and gold open positions

Foreign exchange open positions and gold open positions are at present risk-weighted at 100%. Thus, capital charge for market risks in foreign exchange and gold open position is 9%. These open positions, **limits or actual whichever is higher**, would continue to attract capital charge at 9%. This capital charge is in addition to the capital charge for credit risk on the on-balance sheet and off-balance sheet items pertaining to foreign exchange and gold transactions.

Section E

7 Aggregation of the capital charge for market risks

As explained earlier capital charges for specific risk and general market risk are to be computed separately before aggregation. For computing the total capital charge for market risks, the calculations may be plotted in the following table:

Proforma 1

	(Rs. in crore)
Risk Category	Capital charge
I. Interest Rate (a+b)	
a. General market risk	
i) Net position (parallel shift)	
ii) Horizontal disallowance (curvature)	
iii) Vertical disallowance (basis)	
iv) Options	
b. Specific risk	
II. Equity (a+b)	
a. General market risk	
b. Specific risk	
III. Foreign Exchange & Gold	
IV. Total capital charge for market risks (I+II+III)	

Calculation of total risk-weighted assets and capital ratio

a) Arrive at the risk weighted assets for credit risk in the banking book (i.e., all exposures other than those specified in paragraph 3 of the guidelines) as per the extant guidelines on capital adequacy.

b) Convert the capital charge for market risk to notional risk weighted assets by multiplying the capital charge arrived at as above in Proforma-1 by $100 \div 9$ [the present requirement of CRAR is 9% and hence notional risk weighted assets are arrived at by multiplying the capital charge by $(100 \div 9)$]

c) Add the risk-weighted assets for credit risk as at (a) above and notional risk-weighted assets of trading book as at (b) above to arrive at total risk weighted assets for the bank.

d) Compute capital ratio on the basis of regulatory capital maintained and risk-weighted assets.

Computation of capital available for market risk:

Capital required for supporting credit risk should be deducted from total capital funds to arrive at capital available for supporting market risk. This is illustrated below:

		(Rs. in Crore)	
1.	Capital funds		
	* Tier I capital -----	55	105
	* Tier II capital -----	50	
2.	Total risk weighted assets		
	* RWA for credit risk -----	1000	1140
	* RWA for market risk -----	140	
3.	Total CRAR		9.21
4.	Minimum capital required to support credit risk (1000*9%)		
	* Tier I - 45 (@ 4.5% of 1000) -----	45	90
	* Tier II - 45 (@ 4.5% of 1000) -----	45	
5.	Capital available to support market risk (105 - 90)		
	* Tier I - (55 - 45) -----	10	15
	* Tier II - (50 - 45) -----	5	

8. Disclosure and Reporting requirements

The following section set out in tabular form is the disclosure requirement for the banks:

Market risk in trading book

Qualitative disclosures (a) The general qualitative disclosure requirement for market risk including the portfolios covered by the standardized approach	
Quantitative disclosures (b) The capital requirements for: <ul style="list-style-type: none"> • Interest rate risk; • Equity position risk; and • Foreign exchange risk: 	

Reporting

Banks should furnish data in the above format as on the last day of each calendar quarter to the Regional Office of the RBI. The reporting format for the purpose of monitoring the capital ratio is given as Annex 1.

I. Reporting format for the purpose of monitoring the capital ratio is given hereunder :

Name of bank : _____ Position as on : _____

A. Capital Base

(Amount in Crores of Rupees)		
Sl. No.	Details	Amount
A1.	Tier I Capital	
A2.	Tier II Capital	
A3.	Total Regulatory Capital	

B. Risk Weighted Assets

B1.	Risk Weighted Assets on Banking Book					
	(a)	On-balance sheet assets				
	(b)	Contingent Credits				
	(c)	Forex contracts				
	(d)	Other off-balance sheet items				
	Total					
B2.	Risk Weighted Assets on Trading Book		AFS	Other trading book exposures	Total	
	(a)	Capital charge on account of Specific Risk				
	(i)	On interest rate related instruments				
	(ii)	On Equities				
		Sub-total				
	(b)	Capital charge on account of general market risk				
	(i)	On interest rate related instruments				
	(ii)	On Equities				
	(iii)	On Foreign Exchange and gold open positions				
		Sub-total				
		Total Capital Charge on Trading Book				
		Total Risk weighted Assets on Trading Book				
		(total capital charge on trading book * (100/9))				
B3.	Total Risk Weighted Assets (B1 + B2)					

C. Capital Ratio

C1	Capital to Risk-weighted Assets Ratio (CRAR) ($A3/B3*100$)	
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D. Memo items

D1	Investment Fluctuation Reserve	
D2	Book value of securities held in HFT category	
D3	Book value of securities held in AFS category	
D4	Net unrealised gains in HFT category	
D5	Net unrealised gains in AFS category	

Banks should furnish data in the above format as on the last day of each calendar quarter to the Regional Office of the RBI

Measurement of capital charge for market risks in respect of interest rate derivatives and options (Vide paragraph 4.7)

A. Interest rate derivatives

The measurement system should include all interest rate derivatives and offbalance-sheet instruments in the trading book, which react to changes in interest rates, (e.g. forward rate agreements (FRAs), other forward contracts, bond futures, interest rate and cross-currency swaps and forward foreign exchange positions). Options can be treated in a variety of ways as described in B.1 below. A summary of the rules for dealing with interest rate derivatives is set out in the Table at the end of this section.

1. Calculation of positions

The derivatives should be converted into positions in the relevant underlying and be subjected to specific and general market risk charges as described in the guidelines. In order to calculate the capital charge, the amounts reported should be the market value of the principal amount of the underlying or of the notional underlying. For instruments where the apparent notional amount differs from the effective notional amount, banks must use the effective notional amount.

(a) Futures and forward contracts, including forward rate agreements

These instruments are treated as a combination of a long and a short position in a notional government security. The maturity of a future or a FRA will be the period until delivery or exercise of the contract, plus - where applicable - the life of the underlying instrument. *For example, a long position in a June three-month interest rate future (taken in April) is to be reported as a long position in a government security with a maturity of five months and a short position in a government security with a maturity of two months.* Where a range of deliverable instruments may be delivered to fulfill the contract, the bank has flexibility to elect which deliverable security goes into the duration ladder but should take account of any conversion factor defined by the exchange.

(b) Swaps

Swaps will be treated as two notional positions in government securities with relevant maturities. *For example, an interest rate swap under which a bank is receiving floating rate interest and paying fixed will be treated as a long position in a floating rate instrument of maturity equivalent to the period until the next interest fixing and a short position in a fixed-rate instrument of maturity equivalent to the residual life of the swap.* For swaps that pay or receive a fixed or floating interest rate against some other reference price, e.g. a stock index, the interest rate component should be slotted into the appropriate repricing maturity category, with the equity component being included in the equity framework. Separate legs of cross-currency swaps are to be reported in the relevant maturity ladders for the currencies concerned.

2. Calculation of capital charges for derivatives under the standardized methodology

(a) Allowable offsetting of matched positions

Banks may exclude the following from the interest rate maturity framework altogether (for both specific and general market risk);

- Long and short positions (both actual and notional) in identical instruments with exactly the same issuer, coupon, currency and maturity.
- A matched position in a future or forward and its corresponding underlying may also be fully offset, (the leg representing the time to expiry of the future should however be reported) and thus excluded from the calculation.

When the future or the forward comprises a range of deliverable instruments, offsetting of positions in the future or forward contract and its underlying is only permissible in cases where there is a readily identifiable underlying security which is most profitable for the trader with a short position to deliver. The price of this security, sometimes called the "cheapest-to-deliver", and the price of the future or forward contract should in such cases move in close alignment.

No offsetting will be allowed between positions in different currencies; the separate legs of cross-currency swaps or forward foreign exchange deals are to be treated as notional positions in the relevant instruments and included in the appropriate calculation for each currency.

In addition, opposite positions in the same category of instruments can in certain circumstances be regarded as matched and allowed to offset fully. To qualify for this treatment the positions must relate to the same underlying instruments, be of the same nominal value and be denominated in the same currency. In addition:

- for futures: offsetting positions in the notional or underlying instruments to which the futures contract relates must be for identical products and mature within seven days of each other;
- for swaps and FRAs: the reference rate (for floating rate positions) must be identical and the coupon closely matched (i.e. within 15 basis points); and
- for swaps, FRAs and forwards: the next interest fixing date or, for fixed coupon positions or forwards, the residual maturity must correspond within the following limits:
 - less than one month hence: same day;
 - between one month and one year hence: within seven days;
 - over one year hence: within thirty days.

Banks with large swap books may use alternative formulae for these swaps to calculate the positions to be included in the duration ladder. The method would be to calculate the sensitivity of the net present value implied by the change in yield used in the duration method and allocate these sensitivities into the time-bands set out in Table 2 in Section B.

(b) Specific risk

Interest rate and currency swaps, FRAs, forward foreign exchange contracts and interest rate futures will not be subject to a specific risk charge. This exemption also applies to futures on an interest rate index (e.g. LIBOR). However, in the case of futures contracts where the underlying is a debt security, or an index representing a basket of debt securities, a specific risk charge will apply according to the credit risk of the issuer as set out in paragraphs above.

(c) General market risk

General market risk applies to positions in all derivative products in the same manner as for cash positions, subject only to an exemption for fully or very closely matched positions in identical instruments as defined in paragraphs above. The various categories of instruments should be slotted into the maturity ladder and treated according to the rules identified earlier.

Table - Summary of treatment of interest rate derivatives

Instrument	Specific risk charge	General Market risk Charge
Exchange-traded future - Government debt security - Corporate debt security - Index on interest rates (e.g. MIBOR)	No Yes No	Yes, as two positions Yes, as two positions Yes, as two positions
OTC forward - Government debt security - Corporate debt security - Index on interest rates (e.g. MIBOR)	No Yes No	Yes, as two positions Yes, as two positions Yes, as two positions
FRAs, Swaps	No	Yes, as two positions
Forward Foreign Exchange	No	Yes, as one position in each currency
Options - Government debt security - Corporate debt security - Index on interest rates (e.g. MIBOR) - FRAs, Swaps	No Yes No No	

B. Treatment of Options

1. In recognition of the wide diversity of banks' activities in options and the difficulties of measuring price risk for options, alternative approaches are permissible as under:

- those banks which solely use purchased options* will be free to use the simplified approach described in Section I below;
- those banks which also write options will be expected to use one of the intermediate approaches as set out in Section II below.

2. In the **simplified approach**, the positions for the options and the associated underlying, cash or forward, are not subject to the standardised methodology but rather are "carved-out" and subject to separately calculated capital charges that incorporate both general market risk and specific risk. The risk numbers thus generated are then added to the capital charges for the relevant category, i.e. interest rate related instruments, equities, and foreign exchange as described in Sections B to D. The *delta-plus method* uses the sensitivity parameters or "Greek letters" associated with options to measure their market risk and capital requirements. Under this method, the delta-equivalent position of each option becomes part of the standardised methodology set out in Section B to D with the delta-equivalent amount subject to the applicable general market risk charges. Separate capital charges are then applied to the gamma and vega risks of the option positions. The **scenario approach** uses simulation techniques to calculate changes in the value of an options portfolio for changes in the level and volatility of its associated underlyings. Under this approach, the general market risk charge is determined by the scenario "grid" (i.e. the specified combination of underlying and volatility changes) that produces the largest loss. For the delta-plus method and the scenario approach the specific risk capital charges are determined separately by multiplying the delta-equivalent of each option by the specific risk weights set out in Section B and Section C.

· Unless all their written option positions are hedged by perfectly matched long positions in exactly the same options, in which case no capital charge for market risk is required

I. Simplified approach

3. Banks which handle a limited range of purchased options only will be free to use the simplified approach set out in Table A below, for particular trades. As an example of how the calculation would work, if a holder of 100 shares currently valued at Rs.10 each holds an equivalent put option with a strike price of Rs.11, the capital charge would be: Rs.1,000 x 18% (i.e. 9% specific plus 9% general market risk) = Rs.180, less the amount the option is in the money (Rs.11 – Rs.10) x 100 = Rs.100, i.e. the capital charge would be Rs.80. A similar methodology applies for options whose underlying is a foreign currency or an interest rate related instrument.

Table A *Simplified approach: capital charges*

Position	Treatment
Long cash and Long put Or Short cash and Long call	The capital charge will be the market value of the underlying security ¹ multiplied by the sum of specific and general market risk charges ² for the underlying less the amount the option is in the money (if any) bounded at zero ³
Long call Or Long put	The capital charge will be the lesser of: (i) the market value of the underlying security multiplied by the sum of specific and general market risk charges ³ for the underlying (ii) the market value of the option ⁴

1. In some cases such as foreign exchange, it may be unclear which side is the "underlying security"; this should be taken to be the asset which would be received if the option were exercised. In addition the nominal value should be used for items where the market value of the underlying instrument could be zero, e.g. caps and floors, swaptions etc.
2. Some options (e.g. where the underlying is an interest rate or a currency) bear no specific risk, but specific risk will be present in the case of options on certain interest rate-related instruments (e.g. options on a corporate debt security or corporate bond index; see Section B for the relevant capital charges) and for options on equities and stock indices (see Section C). The charge under this measure for currency options will be 9%.
3. For options with a residual maturity of more than six months, the strike price should be compared with the forward, not current, price. A bank unable to do this must take the "in-the-money" amount to be zero.
4. Where the position does not fall within the trading book (i.e. options on certain foreign exchange or commodities positions not belonging to the trading book), it may be acceptable to use the book value instead.

II. Intermediate approaches

(a) Delta-plus method

4. Banks which write options will be allowed to include delta-weighted options positions within the standardised methodology set out in Section B - D. Such options should be reported as a position equal to the market value of the underlying multiplied by the delta.

However, since delta does not sufficiently cover the risks associated with options positions, banks will also be required to measure gamma (which measures the rate of change of delta) and vega (which measures the sensitivity of the value of an option with respect to a change in volatility) sensitivities in order to calculate the total capital charge. These sensitivities will be calculated according to an approved exchange model or to the bank's proprietary options pricing model subject to oversight by the Reserve Bank of India¹.

5. Delta-weighted positions with *debt securities or interest rates as the underlying* will be slotted into the interest rate time-bands, as set out in Table 2 of Section B, under the following procedure. A two-legged approach should be used as for other derivatives, requiring one entry at the time the underlying contract takes effect and a second at the time the underlying contract matures. For instance, a bought call option on a June three-month interest-rate future will in April be considered, on the basis of its delta-equivalent value, to be a long position with a maturity of five months and a short position with a maturity of two months². The written option will be similarly slotted as a long position with a maturity of two months and a short position with a maturity of five months. Floating rate instruments with caps or floors will be treated as a combination of floating rate securities and a series of European-style options. For example, the holder of a three-year floating rate bond indexed to six month LIBOR with a cap of 15% will treat it as:

- (i) a debt security that reprices in six months; and
- (ii) a series of five written call options on a FRA with a reference rate of 15%, each with a negative sign at the time the underlying FRA

takes effect and a positive sign at the time the underlying FRA matures³.

1. Reserve Bank of India may wish to require banks doing business in certain classes of exotic options (e.g. barriers, digitals) or in options "at-the-money" that are close to expiry to use either the scenario approach or the internal models alternative, both of which can accommodate more detailed revaluation approaches.

2. A two-months call option on a bond future, where delivery of the bond takes place in September, would be considered in April as being long the bond and short a five-months deposit, both positions being delta-weighted.

3. The rules applying to closely-matched positions set out in paragraph 2 (a) of this Annex will also apply in this respect.

6. The capital charge for *options with equities as the underlying* will also be based on the delta-weighted positions which will be incorporated in the measure of market risk described in Section C. For purposes of this calculation each national market is to be treated as a separate underlying. The capital charge for *options on foreign exchange and gold positions* will be based on the method set out in Section D. For delta risk, the net delta-based equivalent of the foreign currency and gold options will be incorporated into the measurement of the exposure for the respective currency (or gold) position.

7. In addition to the above capital charges arising from delta risk, there will be further capital charges for *gamma* and for *vega risk*. Banks using the delta-plus method will be required to calculate the gamma and vega for each option position (including hedge positions) separately. The capital charges should be calculated in the following way:

(i) for **each individual option** a "gamma impact" should be calculated according to a Taylor series expansion as:

$$\text{Gamma impact} = \frac{1}{2} \times \text{Gamma} \times \text{VU}^2$$

where VU = Variation of the underlying of the option.

(ii) VU will be calculated as follows:

- for interest rate options if the underlying is a bond, the price sensitivity should be worked out as explained. An equivalent calculation should be carried out where the underlying is an interest rate.
- for options on equities and equity indices; which are not permitted at present, the market value of the underlying should be multiplied by 9%¹;
- for foreign exchange and gold options: the market value of the underlying should be multiplied by 9%;

(iii) For the purpose of this calculation the following positions should be treated as **the same underlying**:

- for interest rates² each time-band as set out in Table 2 of the guidelines;³
- for equities and stock indices, each national market;
- for foreign currencies and gold, each currency pair and gold;

(iv) Each option on the same underlying will have a gamma impact that is either positive or negative. These individual gamma impacts will be summed, resulting in a net gamma impact for each underlying that is either positive or negative. Only those net gamma impacts that are negative will be included in the capital calculation.

(v) The total gamma capital charge will be the sum of the absolute value of the net negative gamma impacts as calculated above.

(vi) For **volatility risk**, banks will be required to calculate the capital charges by multiplying the sum of the vegas for all options on the same underlying, as defined above, by a proportional shift in volatility of $\pm 25\%$.

(vii) The **total capital charge** for vega risk will be the sum of the absolute value of the individual capital charges that have been calculated for vega risk.

1. The basic rules set out here for interest rate and equity options do not attempt to capture specific risk when calculating gamma capital charges. However, Reserve Bank may require specific banks to do so.

2. Positions have to be slotted into separate maturity ladders by currency.

3. Banks using the duration method should use the time-bands as set out in Table 3 of the guidelines.

(b) Scenario approach

8. More sophisticated banks will also have the right to base the market risk capital charge for options portfolios and associated hedging positions on *scenario matrix analysis*. This will be accomplished by specifying a fixed range of changes in the option portfolio's risk factors and calculating changes in the value of the option portfolio at various points along this "grid". For the purpose of calculating the capital charge, the bank will revalue the option portfolio using matrices for simultaneous changes in the option's underlying rate or price and in the volatility of that rate or price. A different matrix will be set up for each individual underlying as defined in paragraph 7 above. As an alternative, at the discretion of each national authority, banks which are significant traders in options for interest rate options will be permitted to base the calculation on a minimum of six sets of time bands. When using this method, not more than three of the time-bands as defined in Section B should be combined into any one set.

9. The options and related hedging positions will be evaluated over a specified range above and below the current value of the underlying. The range for interest rates is consistent with the assumed changes in yield in Table 12 of Section B. Those banks using the alternative method for interest rate options set out in paragraph 8 above should use, for each set of time-bands, the highest of the assumed changes in yield

applicable to the group to which the time-bands belong¹. The other ranges are $\pm 9\%$ for equities and $\pm 9\%$ for foreign exchange and gold. For all risk categories, at least seven observations (including the current observation) should be used to divide the range into equally spaced intervals.

¹ If, for example, the time-bands 3 to 4 years, 4 to 5 years and 5 to 7 years are combined, the highest assumed change in yield of these three bands would be 0.75.

10. The second dimension of the matrix entails a change in the volatility of the underlying rate or price. A single change in the volatility of the underlying rate or price equal to a shift in volatility of $+ 25\%$ and $- 25\%$ is expected to be sufficient in most cases. As circumstances warrant, however, the Reserve Bank may choose to require that a different change in volatility be used and / or that intermediate points on the grid be calculated.

11. After calculating the matrix, each cell contains the net profit or loss of the option and the underlying hedge instrument. The capital charge for each underlying will then be calculated as the largest loss contained in the matrix.

12. In drawing up these intermediate approaches it has been sought to cover the major risks associated with options. In doing so, it is conscious that so far as specific risk is concerned, only the delta-related elements are captured; to capture other risks would necessitate a much more complex regime. On the other hand, in other areas the simplifying assumptions used have resulted in a relatively conservative treatment of certain options positions.

13. Besides the options risks mentioned above, the RBI is conscious of the other risks also associated with options, e.g. rho (rate of change of the value of the option with respect to the interest rate) and theta (rate of change of the value of the option with respect to time). While not proposing a measurement system for those risks at present, it expects banks undertaking significant options business at the very least to monitor such risks closely. Additionally, banks will be permitted to incorporate rho into their capital calculations for interest rate risk, if they wish to do so.

Attachment-II**Worked out examples for computing capital charge for market risks**

Example indicating computation of capital charge for market risks – without equities and interest rate related derivative instruments is given below:

A bank may have the following position:

Sl. No	Details	Amount Rs. Crore
1.	Cash & Balances with RBI	200.00
2.	Bank balances	200.00
3.	<u>Investments:</u>	
	Held for Trading	500.00
	Available for Sale	1000.00
	Held to Maturity	500.00
4.	Advances (net)	2000.00
5.	Other Assets	300.00
6.	Total Assets	4700.00

In terms of counter party, the investments are assumed to be as under:

Government - Rs.1000 crore
Banks - Rs. 500 crore
Others - Rs. 500 crore

For simplicity sake let us assume the details of investments as under:

Government securities

Date of Issue	Date of reporting	Maturity Date	Amount Rs. in crore	Coupon(%)	Type
01/03/1992	31/03/2003	01/03/2004	100	12.50	AFS
01/05/1993	31/03/2003	01/05/2003	100	12.00	AFS
01/03/1994	31/03/2003	31/05/2003	100	12.00	AFS
01/03/1995	31/03/2003	01/03/2015	100	12.00	AFS
01/03/1998	31/03/2003	01/03/2010	100	11.50	AFS
01/03/1999	31/03/2003	01/03/2009	100	11.00	AFS
01/03/2000	31/03/2003	01/03/2005	100	10.50	HFT
01/03/2001	31/03/2003	01/03/2006	100	10.00	HTM
01/03/2002	31/03/2003	01/03/2012	100	8.00	HTM
01/03/2003	31/03/2003	01/03/2023	100	6.50	HTM
Total			1000		

Bank Bonds

Date of Issue	Date of reporting	Maturity Date	Amount Rs. in crore	Coupon(%)	Type
01/03/1992	31/03/2003	01/03/2004	100	12.50	AFS
01/05/1993	31/03/2003	01/05/2003	100	12.00	AFS
01/03/1994	31/03/2003	31/05/2003	100	12.00	AFS
01/03/1995	31/03/2003	01/03/2006	100	12.50	AFS
01/03/1998	31/03/2003	01/03/2007	100	11.50	HFT
Total			500		

Other securities

Date of Issue	Date of reporting	Maturity Date	Amount Rs. in crore	Coupon(%)	Type
01/03/1992	31/03/2003	01/03/2004	100	12.50	HFT
01/05/1993	31/03/2003	01/05/2003	100	12.00	HFT
01/03/1994	31/03/2003	31/05/2003	100	12.00	HFT
01/03/1995	31/03/2003	01/03/2006	100	12.50	HTM
01/03/1998	31/03/2003	01/03/2017	100	11.50	HTM
Total			500		

Overall Position

(Rs. in crore)				
Break-up of Total Investments				
	Government Securities	Bank Bonds	Other Securities	Total
HFT	100	100	300	500
AFS	600	400	0	1000
Trading Book	700	500	300	1500
HTM	300	0	200	500
Total	1000	500	500	2000

As per the extant instructions to arrive at the risk-weight for the above position the following table would be helpful:

(Rs. in crore)			
Details of Assets	Book Value	Risk Weight (%)	Risk weighted Assets
Cash & balances with RBI	200	0	0
Bank balances	200	20	40
<u>Investments:</u>			
Government	1000	2.5	25

Banks	500	22.5	112.5
Others	500	102.5	512.5
Advances (net)	2000	100	2000
Other Assets	300	100	300
Total	4700		2990

Assuming that the bank has a capital of Rs.400 crore, the CRAR works out to 13.38%.

Computation of risk weighted assets as per proposed method

A. Risk weighted assets for credit risk

As per the guidelines, held for trading and available for sale securities would qualify to be categorized as Trading Book. Thus trading book in the instant case would be Rs.1500 crore. While computing the credit risk, the securities held under trading book would be excluded and hence the credit risk based risk-weights would be as under:

(Rs. in crore)				
Sl. No.	Details of Assets	Book Value	Risk Weight (%)	Risk Assets weighted
1.	Cash & balances with RBI	200	0	0
2.	Bank balances	200	20	40
3.	<u>Investments:</u>			
	Government	300	0	0
	Banks	0	20	0
	Others	200	100	200
4.	Advances (net)	2000	100	2000
5.	Other Assets	300	100	300
6.	Total	3200		2540

B. Risk weighted assets for market risk

Computation of capital charge for Trading Book:

a. Specific Risk

(i) Government securities: Rs.700 crore – Nil

(ii) Banks :

(Rs. in crore)			
Details	Capital charge	Amount	Capital charge
For residual term to final maturity 6 months or less	0.30%	200	0.60
For residual term to final maturity between 6 and 24 months	1.125%	100	1.125
For residual term to final maturity exceeding 24 months	1.80%	200	3.60
Total		500	5.325

(iii) Others : Rs.300 crore @ 9% =Rs. 27 crore

(i)+(ii)+(iii) = Rs.0 crore+Rs.5.325 crore + Rs.27 crore = Rs. 32.325 crore

Therefore, capital charge for specific risk in trading book is Rs.32.33 crore.

b. General Market Risk

Modified duration is used to arrive at the price sensitivity of an interest rate related instrument.

For all the securities listed below, date of reporting is taken as 31/3/2003.

(Rs. in crore)				
Counter Party	Maturity Date	Amount (market value)	Coupon (%)	Capital Charge for general market risk
Govt.	01/03/2004	100	12.50	0.84
Govt.	01/05/2003	100	12.00	0.08
Govt.	31/05/2003	100	12.00	0.16
Govt.	01/03/2015	100	12.50	3.63
Govt.	01/03/2010	100	11.50	2.79
Govt.	01/03/2009	100	11.00	2.75
Govt.	01/03/2005	100	10.50	1.35
Banks	01/03/2004	100	12.50	0.84
Banks	01/05/2003	100	12.00	0.08
Banks	31/05/2003	100	12.00	0.16
Banks	01/03/2006	100	12.50	1.77
Banks	01/03/2007	100	11.50	2.29
Others	01/03/2004	100	12.50	0.84
Others	01/05/2003	100	12.00	0.08
Others	31/05/2003	100	12.00	0.16
	Total	1500		17.82

c. Adding the capital charges for specific risk as well as general market risk would give the total capital charge for the trading book of interest rate related instruments. **Therefore, capital charge for Market Risks = Rs.32.33 crore + Rs.17.82 crore, i.e., Rs.50.15 crore.**

d. To facilitate computation of CRAR for the whole book, this capital charge needs to be converted into equivalent risk weighted assets. In India, the minimum CRAR is 9%. Hence, the capital charge could be converted to risk weighted assets by multiplying the capital charge by $(100 \div 9)$.

Thus risk weighted assets for market risk is $50.15 \times (100 \div 9) = \text{Rs.}557.23$ crore.

Computing the capital ratio:

		(Rs. in Crore)
1.	Total Capital	400
2.	Risk weighted assets for Credit Risk	2540.00
3.	Risk weighted assets for Market Risk	557.23
4.	Total Risk weighted assets (2+3)	3097.23
5.	CRAR $[(1 \div 4) \times 100]$	12.91 %

Example 2.

Example indicating computation of capital charge for market risks – with equities and interest rate related derivative instruments. Foreign exchange and gold open positions also have been assumed.

A bank may have the following position:

Sl. No.	Details	Amount Rs. Crore
1.	Cash & Balances with	200.00
2.	Bank balances	200.00
3.	<u>Investments:</u> Held for Trading	500.00
	Available for Sale	1000.00
	Held to Maturity	500.00
	Equities	300.00
4.	Advances (net)	2000.00
5.	Other Assets	300.00
6.	Total Assets	5000.00

In addition,

- a) foreign exchange open position limit is assumed as Rs.60 crore and
- b) Gold open position is assumed at Rs.40 crore.
- c) Let us also assume that the bank is having the following **positions in interest rate related derivatives**:
 - i) Interest Rate Swaps (IRS), Rs.100 crore - bank received floating rate interest and pays fixed, next interest fixing after 6 months, residual life of swap 8 years, and
 - ii) Long position in interest rate future (IRF), Rs.50 crore, delivery after 6 months, life of underlying government security 3.5 years.

In terms of counter party the investments are assumed to be as under:

- a) Interest rate related securities

Government -	Rs.1000 crore
Banks -	Rs. 500 crore
Others -	Rs. 500 crore

- b) Equities

Others - Rs.300 crore

For simplicity sake let us assume the details of investments in interest rate related securities as under:

Government securities

Date of Issue	Date of reporting	Maturity Date	Amount Rs.crore	Coupon (%)	Type
01/03/1992	31/03/2003	01/03/2004	100	12.50	AFS
01/05/1993	31/03/2003	01/05/2003	100	12.00	AFS
01/03/1994	31/03/2003	31/05/2003	100	12.00	AFS
01/03/1995	31/03/2003	01/03/2015	100	12.50	AFS
01/03/1998	31/03/2003	01/03/2010	100	11.50	AFS
01/03/1999	31/03/2003	01/03/2009	100	11.00	AFS
01/03/2000	31/03/2003	01/03/2005	100	10.50	HFT
01/03/2001	31/03/2003	01/03/2006	100	10.00	HTM
01/03/2002	31/03/2003	01/03/2012	100	8.00	HTM
01/03/2003	31/03/2003	01/03/2023	100	6.50	HTM
Total			1000		

Bank Bonds

Date of Issue	Date of reporting	Maturity Date	Amount Rs. crore	Coupon (%)	Type
01/03/1992	31/03/2003	01/03/2004	100	12.50	AFS
01/05/1993	31/03/2003	01/05/2003	100	12.00	AFS
01/03/1994	31/03/2003	31/05/2003	100	12.00	AFS
01/03/1995	31/03/2003	01/03/2006	100	12.50	AFS
01/03/1998	31/03/2003	01/03/2007	100	11.50	HFT
Total			500		

Other Securities

Date of Issue	Date of reporting	Maturity Date	Amount Rs. crore	Coupon (%)	Type
01/03/1992	31/03/2003	01/03/2004	100	12.50	HFT
01/05/1993	31/03/2003	01/05/2003	100	12.00	HFT
01/03/1994	31/03/2003	31/05/2003	100	12.00	HFT
01/03/1995	31/03/2003	01/03/2006	100	12.50	HTM
01/03/1998	31/03/2003	01/03/2017	100	11.50	HTM
Total			500		

Overall Position

	Break-up of total investments					
	Interest rate related instruments				Equity	Grand Total
	Govt. Securities	Bank Bonds	Other Securities	Total		
HFT	100	100	300	500	300	800
AFS	600	400	0	1000	0	1000
Trading Book	700	500	300	1500	300	1800
HTM	300	0	200	500	0	500
Grand Total	1000	500	500	2000	300	2300

As per the extant instructions to arrive at the risk-weighted assets for the bank with the above position the following table would be helpful:

(Rs. in crore)			
Details of Assets	Book Value	Risk Weight	Risk weighted Assets
Cash& RBI	200	0%	0
Bank balances	200	20%	40

Interest rate related			
<u>Investments:</u>			
Government	1000	2.5%	25
Banks	500	22.5%	112.5
Others	500	102.5%	512.5
<u>Other investments:</u>			
Equities	300	102.5%	307.5
Advances (net)	2000	100%	2000
Other Assets	300	100%	300
Total Assets	5000		3297.5
IRS	100	1% + 1% per year (Credit Conversion Factor) and 100% RW	8.00
IRF	50	1% + 1% per year (Credit Conversion Factor) and 100% RW	4.00
Forex + Gold Open position	60 + 40 =100	100%	100.00
Total RWAs			3407.50

Assuming that the bank has a capital of Rs.400 crore, the CRAR works out to 11.74%.

Computation of risk weighted assets as per proposed method

A. Risk weighted assets for credit risk

As per the guidelines, held for trading and available for sale securities would qualify to be categorized as Trading Book. Thus trading book in respect of interest rate related investments in the instant case would be Rs.1500 crore. In addition, equities position of Rs.300 crore would be in the trading book. The derivative products held by banks are to be considered as part of trading book. Open position on foreign exchange and gold also would be considered for market risk. While computing the capital charge for credit risk, the securities held under trading book would be excluded and hence the credit risk based risk-weights would be as under:

(Rs. in crore)			
Details of Assets	Book Value	Risk Weight	Risk weighted Assets
Cash & RBI	200	0%	0
Bank balances	200	20%	40
Investments in (HTM category)			
Government	300	0%	0
Banks	0	20%	0

Others	200	100%	200
Advances (net)	2000	100%	2000
Other Assets	300	100%	300
Total	3200		2540
Credit risk for OTC derivatives			
IRS	100	100% (credit conversion factor – 1% + 1% per year)	8.00
IRF	50	100% (credit conversion factor for maturities less than one year – 0.5%)	0.25
Total	3350		2548.25

B. Risk weighted assets for market risk

Computation of capital charge for the Trading Book:

a. Specific Risk

1. Investments in interest rate related instruments:

- (i) Government securities – Rs.700 crore - Nil
- (ii) Banks

(Rs. crore)			
Details	Capital charge	Amount	Capital Charge
For residual term to final maturity 6 months or less	0.30%	200	0.60
For residual term to final maturity between 6 and 24 months	1.125%	100	1.125
For residual term to final maturity exceeding 24 months	1.80%	200	3.60
Total		500	5.325

(iii) Others Rs.300 crore @ 9% = Rs.27 crore

(i)+(ii)+(iii) = Rs.0 crore+Rs.5.325 crore+Rs.27 crore = Rs.32.325 crore

2. Equities – capital charge of 9% - Rs.27 crore

Therefore, capital charge for specific risk in the trading book is Rs. 59.33 crore (Rs. 32.33 crore + Rs. 27 crore).

b. General Market Risk

1. Investments in interest rate related instruments:

Modified duration is used to arrive at the price sensitivity of an interest rate related instrument. For all the securities listed below, date of reporting is taken as 31/3/2003

(Rs. crore)				
Counter Party	Maturity Date	Amount market value	Coupon (%)	Capital charge for general market risk
Govt.	01/03/2004	100	12.50	0.84
Govt.	01/05/2003	100	12.00	0.08
Govt.	31/05/2003	100	12.00	0.16
Govt.	01/03/2015	100	12.50	3.63
Govt.	01/03/2010	100	11.50	2.79
Govt.	01/03/2009	100	11.00	2.75
Govt.	01/03/2005	100	10.50	1.35
Banks	01/03/2004	100	12.50	0.84
Banks	01/05/2003	100	12.00	0.08
Banks	31/05/2003	100	12.00	0.16
Banks	01/03/2006	100	12.50	1.77
Banks	01/03/2007	100	11.50	2.29
Others	01/03/2004	100	12.50	0.84
Others	01/05/2003	100	12.00	0.08
Others	31/05/2003	100	12.00	0.16
	Total	1500		17.82

2. Positions in interest rate related derivatives

Interest rate swap

Counter Party	Maturity Date	Notional Amount (i.e., market value)	Modified duration or price sensitivity	Assumed change in yield	Capital charge
GOI	30/09/2003	100	0.47	1.00	0.47
GOI	31/03/2011	100	5.14	0.60	(-) 3.08
					(-) 2.61

Interest rate future

Counter Party	Maturity Date	Notional Amount (i.e., market value)	Modified duration or price sensitivity	Assumed change in yield	Capital charge
GOI	30/09/2003	50	0.45	1.00	(-) 0.225
GOI	31/03/2007	50	2.84	0.75	1.070
					0.84

3. Disallowances

The price sensitivities calculated as above have been slotted into a duration-based ladder with fifteen time-bands (Attachment III). Long and short positions within a time band have been subjected to vertical disallowance of 5%. In the instant case, vertical disallowance is applicable under 3-6 month time band and 7.3-9.3 year time band. Then, net positions in each time band have been computed for horizontal offsetting subject to the disallowances mentioned in the table. In the instant case, horizontal disallowance is applicable only in respect of Zone 3. Horizontal disallowances in respect of adjacent zones are not applicable in the instant case.

3.1. Calculation of Vertical Disallowance

While calculating capital charge for general market risk on interest rate related instruments, banks should recognize the basis risk (different types of instruments whose price responds differently for movement in general rates) and gap risk (different maturities within timebands). This is addressed by a small capital charge (5%) on matched (off-setting) positions in each time band ("Vertical Disallowance")

An off-setting position, for vertical disallowance, will be the either the sum of long positions and or the short positions within a time band, whichever is lower. In the above example, except for the time band 3-6 months in Zone 1 and the time band of 7.3-9.3 years, where there are off-setting positions of (-) 0.45 and 2.79, there is no off-setting position in any other time band. The sum of long positions in the 3-6 months time band is + 0.47 and the sum of short positions in this time band is (-) 0.45. This off-setting position of 0.45 is subjected to a capital charge of 5% i.e. 0.0225. The sum of long positions in the 7.3-9.3 years time band is + 2.79 and the sum of short positions in this time band is (-) 3.08. This off-setting position of 2.79 is subjected to a capital charge of 5% i.e. 0.1395. It may be mentioned here that if a bank does not have both long and short positions in the same time band, there is no need for any vertical disallowance. Banks in India are not allowed to take any short position in their books, except in derivatives. Therefore, banks in India will generally not be subject to vertical disallowance unless they have a short position in derivatives.

3.2 Calculation of Horizontal Disallowance

While calculating capital charge for general market risk on interest rate related instruments, banks must subject their positions to a second round of off-setting across time bands with a view to give recognition to the fact that interest rate movements are not perfectly correlated across maturity bands (yield curve risk and spread risk) i.e matched long and short positions in different time bands may not perfectly off-set. This is achieved by a "Horizontal Disallowance".

An off-setting position, for horizontal disallowance, will be the either the sum of long positions and or the short positions within a Zone, whichever is lower. In the above example, except in Zone 3 (7.3 to 9.3 years) where there is an off-setting (matched) position of (-) 0.29 , there is no off-setting position in any other Zone. The sum of long positions in this Zone is 10.81 and the sum of short positions in this Zone is (-) 0.29 . This off-setting position of 0.29 is subject to horizontal disallowance as under:

With in the same Zone (Zone 3) 30% of 0.29 = 0.09
 Between adjacent Zones (Zone 2 & 3) = Nil
 Between Zones 1 and Zone 3 = Nil

It may be mentioned here that if a bank does not have both long and short positions in different time zones, there is no need for any horizontal disallowance. Banks in India are not allowed to take any short position in their books except in derivatives. Therefore, banks in India will generally not be subject to horizontal disallowance unless they have short positions in derivatives.

Total capital charge for interest rate related instruments is shown below :

For overall net position	16.06
For vertical disallowance	0.15
For horizontal disallowance in Zone 3	0.09
For horizontal disallowance in adjacent zones	Nil
For horizontal disallowance between Zone 1 & 3	Nil
Total capital charge for interest rate related instruments	16.30

(4) The total capital charge in this example for general market risk for interest rate related instruments is computed as under :

Sl. No	Capital charge	Amount (Rs.)
1.	For the vertical disallowance (under 3-6 month time band)	1,12,500
2.	For the vertical disallowance (under 7.3-9.3 year time band)	13,95,000
3.	For the horizontal disallowance (under Zone 3)	9,00,000
4.	For the horizontal disallowances between adjacent zones	0
5.	For the overall net open position (17.82 - 2.61 + 0.84)	16,06,00,000
6.	Total capital charge for general market risk on interest rate related instruments (1 + 2 + 3 + 4 + 5)	16,30,07,500

(5) Equities

Capital charge for General Market Risk for equities is 9%. Thus, general market risk capital charge on equities would work out to Rs.27 crore.

(6) Forex / Gold Open Position

Capital charge on forex / gold position would be computed at 9%. Thus the same works out to Rs.9 crore

(7) Capital charge for market risks in this example is computed as under :

(Amount in Crores of Rupees)			
Details	Capital Charge for Specific Risk	Capital Charge for General Market Risk	Total
Interest Rate Related instruments	32.33	16.30	48.63
Equities	27.00	27.00	54.00
Forex / Gold	-	9.00	9.00
Total	59.33	52.30	111.63

Computing Capital Ratio

To facilitate computation of CRAR for the whole book, this capital charge for market risks in the Trading Book needs to be converted into equivalent risk weighted assets. As in India, a CRAR of 9% is required, the capital charge could be converted to risk weighted assets by multiplying the capital charge by $(100 \div 9)$, i.e. $\text{Rs.}111.63 \times (100 \div 9) = \text{Rs.}1240.33$ cr. Therefore, risk weighted assets for market risk is Rs.1240.33 cr.

(Amount in Crores of Rupees)		
1	Total Capital	400.00
2	Risk weighted assets for Credit Risk	2548.25
3	Risk weighted assets for Market Risk	1240.33
4	Total Risk weighted assets (2+3)	3788.58
5	CRAR $[(1 \div 4) \times 100]$	10.56 %

Attachment-III

**Example for Computing the Capital Charge Including the Vertical
and Horizontal Disallowances on Interest Rate Related Instruments**

(Para No 3 of Example 2 above)																
	** 0.22 x 5%=0.01				@ 2.79 x 5%=0.14			# 0.29 x 30%=0.09								
	Zone 1				Zone 2			Zone 3								
Time-band	0-1 month	1-3 month	3-6 month	6m - 1y	1-1.9y	1.9-2.8y	2.8-3.6y	3.6-4.3y	4.3-5.7y	5.7-7.3y	7.3-9.3y	9.3-10.6y	10.6-12y	12-20y	Over 20y	Capital Charge
Position		0.72		2.51		1.35	1.77	2.29		2.75	2.79		3.63			17.82
Derivatives (long)			0.47					1.07								1.54
Derivatives (short)			(-)0.22								(-)3.08					(-)3.30
Net Position		0.72	0.25	2.51		1.35	1.77	3.36		2.75	(-)0.29		3.63			16.06
Vertical Disallowance (5%)			0.01**								0.14 @					0.15
Horizontal Disallowance 1 (under Zone 3)											0.09 #					0.09
Horizontal disallowance 2																
Horizontal Disallowance 3																
