



**Central Bank of Trinidad & Tobago**  
**Application of Market Risk Capital Charges**  
**Instruction Manual**

**Revised January, 2008**

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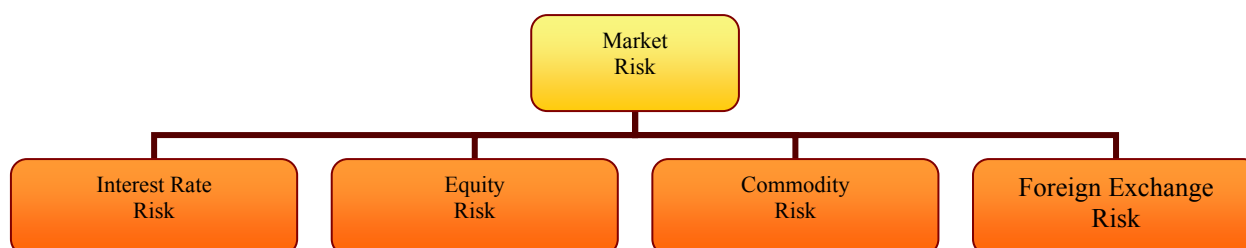
## 1. INTRODUCTION

The Central Bank wishes to advise that with effect from January 1, 2008 licensed financial institutions will be required to apply capital charges with respect to their market risks in keeping with the Basel 1 Market Risk Amendment.

Market risk is defined as the risk of losses in on- and off-balance sheet positions arising from movements in market prices.

The risks assessed are:

- the risks arising from all interest rate related instruments and equities that are marked to market;
- foreign exchange risk and commodities risk throughout the institution.



In Trinidad & Tobago, market risk capital requirements in respect of foreign exchange risk will apply to all institutions, while the capital requirements in respect of interest rate and equity risks will apply to licensed financial institutions where the value of securities and associated derivatives that are marked to market represents 10% or more of total assets.<sup>1</sup>

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<sup>1</sup> Market risk capital charges will apply to all securities and derivatives that are marked to market in both the trading and AFS (Available for Sale) books of licensed financial institutions.

The approach selected by the Central Bank of Trinidad and Tobago to measure market risk is the *Standardized Approach*. It is a building block approach where the capital charge for each risk category is determined separately and summed arithmetically.

Accordingly, the capital adequacy ratio has been adjusted to accommodate market risks as follows:

$$\frac{\text{Capital}}{\text{RWA}_C + \text{RWA}_M} \geq 8\%$$

where  $\text{RWA}_C$  = risk weighted assets for credit risk

$\text{RWA}_M$  = risk weighted assets for market risk

It is necessary to first calculate the bank's minimum capital requirement for credit risk, and only afterwards its market risk requirement. This would establish how much of Tier 1 and Tier 2 capital is available to support market risks.

### **Scope and Coverage of Market Risk Capital Charges**

Market risk charges will apply to all marked to market securities and associated derivatives that are in the trading book and the available for sale (AFS) book of an institution. It should be noted that market risk charges will also apply to non-trading instruments that are being used to deliberately hedge trading activities. Such instruments however, would not be subject to the specific risk charge under the market risk framework but would only be subject to the general market risk and credit risk capital requirements.

Marked to market instruments that are used to hedge banking book instruments<sup>2</sup>, will be excluded from the market risk measure and only be subject to credit risk capital charges.

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<sup>2</sup> For example, a derivative product such as a swap can be used to hedge a position in the banking book.

## 2. INTEREST RATE POSITION RISK

Interest rate risk arises where movements in interest rates cause an adverse effect on the financial condition of the institution.

This section describes the calculations for measuring the risk of holding or taking positions in debt securities and other marked to market interest rate related instruments. The instruments covered include all fixed-rate and floating-rate debt securities and instruments that behave like them, including non-convertible preference shares<sup>3</sup>. Convertible bonds (i.e. debt issues or preference shares that are convertible into common shares of the issuer) will be treated as debt securities if they trade like debt securities and as equities if they trade like equities.

The minimum capital requirement is expressed in terms of two separately calculated charges:

- (a) “specific risk” of each security, whether it is a short or a long position, and
- (b) “general market risk” where long and short positions in different securities or instruments can be offset.

An institution’s interest rate position risk requirement is the sum of the capital required for *specific risk* and *general market risk* for each currency in which the institution has an exposure.

### **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 charge is split into broad categories depending on the counterparty. It is calculated by multiplying the absolute values of the debt position by their respective risk factors. The risk factors, as set out in Table 1, correspond to the category of the obligor and the residual maturity of the instrument. In measuring the risk, an institution may offset matched long and short positions in an identical issue (including positions in derivatives). Even if the issuer is the same, no offsetting will be permitted between different issues since differences in coupon rates, liquidity, call features mean that prices may diverge in the short run.

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<sup>3</sup> A security which is subject of a repurchase or securities lending agreement will be treated as if it were still owned by the lender of the securities, (i.e. it would be treated in the same manner as other securities positions).

**Table 1**  
**Specific Risk Categories and Weights**

<b>Category Of the Obligor</b>	<b>Remaining Maturity</b>	<b>Risk Factor (in percent)</b>
Government (own sovereign & OECD countries)	N/A	0.00
Other Governments	N/A	0.00 initially but a risk charge to be assigned based on their credit rating
Qualifying	6 months or less	0.25
	6 to 24 months	1.00
	over 24 months	1.60
Other	N/A	8.00

***Government***

The “government” category includes all forms of government paper including, but not limited to

- Bonds;
- Treasury bills;
- Other short-term instruments;
- Debt securities issued by, fully guaranteed by, or fully collateralized by securities issued by the Government of Trinidad & Tobago or the Central Bank of Trinidad & Tobago
- Debt securities issued by governments of the US, Canada, UK and other G-10 countries denominated in national currencies, as approved by the Central Bank and
- Debt securities issued by Caricom country governments denominated in national currencies, as approved by the Central Bank

*Note that national authorities have the right to apply a specific risk weight to securities issued by certain foreign governments, especially to securities denominated in a currency other than that of the issuing government.*

### ***Qualifying***

The “qualifying” category includes debt securities issued by, or fully guaranteed by, public sector entities and multilateral development banks approved by the Supervisor, plus other securities that are:

- rated investment-grade by at least two recognized credit rating agencies specified by the national authority (See Appendix 1), or
- rated investment-grade by one nationally recognized credit rating agency and not less than investment-grade by any other rating agency specified by the national authority, or
- unrated, but deemed to be of comparable investment quality by the reporting bank, *and* the issuer has securities listed on a recognized stock exchange, all subject to supervisory approval. In such a case, supervisory authority will be very stringent on the application of the monitoring criteria.

*At the discretion of the national authority, the qualifying category can also include debt securities issued by*

- *banks in countries that have implemented the 1988 Accord*
- *regulated firms that have implemented the 1988 Accord*

### ***Other***

The “other” category includes all securities issued by parties other than approved governments and multi-national development banks, that is, debt securities that qualify as neither government nor qualifying securities e.g. private sector issuers.

## **GENERAL RISK**

The capital requirements for general risk are designed to capture the risk of loss arising from changes in market interest rates. There are two main methods for calculating general market risk, the “maturity” method and the “duration” method.

In this template, the “*duration*” method is used, and the capital charge is the sum of four components:

- the net short or long position of the relevant securities<sup>4</sup>;
- a small proportion of the matched positions in each time-band (the “vertical disallowance”);
- a larger proportion of the matched positions across different time-bands (the “horizontal disallowance”); and
- a net charge for positions in options, where appropriate.

Separate maturity ladders should be constructed for each currency in which an institution has significant positions, and capital requirements must be calculated for each currency separately. Accordingly, separate worksheets for TT Dollars, US Dollars, Yen, Pound Sterling, Euros and Canadian Dollars were developed. If an institution has significant interest rate exposure in another currency not listed above the institution can contact the Central Bank of Trinidad and Tobago for advice in reporting such positions. Capital charges should be calculated for each currency separately and then summed with no offsetting between positions of opposite sign.

For positions in currencies in which business is insignificant, the reporting institution may use a single worksheet and slot, within each appropriate time-band, the net long or short position for each currency converted into domestic currency. The net positions are to be summed within each time-band, irrespective of whether they are positive or negative, to arrive at the gross position.

Opposite positions of the same amount in the same issues (but not different issues by the same issuer), whether actual or notional, may be excluded from the interest rate maturity framework, as well as closely matched swaps, forwards, futures, and forward rate agreements (FRAs).

The duration method is a more accurate method of measuring general market risk by calculating the price sensitivity of each position separately. The mechanics of this method are as follows:

### ***Step 1:***

Long or short positions in debt securities and other sources of interest rate exposures (including derivative instruments) must be multiplied by their modified duration and

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<sup>4</sup> Marked to market securities in the trading or AFS books.



slotted into the relevant time bands. Fixed and floating rate instruments are allocated based on their duration. The price sensitivity of each instrument is calculated in terms of a change in interest rates of between 0.6 to 1.0 percentage points depending on the maturity of the instrument. The resulting sensitivities are slotted into a duration –based ladder with the fifteen time bands set out in Table II.

Institutions are only required to fill out two rows (Rows 1.1. and 1.2) and the spreadsheet would automatically calculate the general market risk charge. Steps 2 to 4 below provide information on the remaining part of the spreadsheet.

**Table II: Duration Method: Time-bands and assumed changes in yield**

<b>Zone</b>	<b>Time-bands</b>	<b>Assumed changes in yield [%]</b>
1	1 month or less	1.00
	1 to 3 months	1.00
	3 to 6 months	1.00
	6 to 12 months	1.00
2	1.0 to 1.9 years	0.90
	1.9 to 2.8 years	0.80
	2.8 to 3.6 years	0.75
3	3.6 to 4.3 years	0.75
	4.3 to 5.7 years	0.70
	5.7 to 7.3 years	0.65
	7.3 to 9.3 years	0.60
	9.3 to 10.6 years	0.60
	10.6 to 12 years	0.60
	12 to 20 years	0.60
	Over 20 years	0.60

***Step 2:***

The matched positions (that is, the smaller absolute value of the weighted long or weighted short positions) are determined for each time band.

The unmatched position or remaining (open) position is determined and recorded. (Sign/direction of the position should be indicated.)

***Step 3:***

Since each band would include different instruments and different maturities, a 5% capital charge to reflect basis risk will be levied on the matched weighted position in each time band, regardless of whether it is a long or short position. The capital charge (i.e. vertical disallowance) has no sign. It is important to note that if there is only a gross long or only a gross short position in the time band, a basis risk charge is not calculated.

**Step 4:**

Time Bands are further categorized into three Time Zones:

- Zone 1 – ‘zero to one year’
- Zone 2 – ‘one year to 3.6 years’ and
- Zone 3 – ‘3.6 years and over’

Capital charges for Levels 2 to 4 in the spreadsheet relate to matched positions across time zones and are termed ‘horizontal disallowances’.

**Table IV: Horizontal Disallowances**

Zones	Time-band	Capital Charges Required		
		Matched Position within each Zone	Matched Position between Adjacent Zones	Net Open Position in Portfolio
1	1 month or less 1 to 3 months 3 to 6 months 6 to 12 months	40%	40%	100%
2	1.0 to 1.9 years 1.9 to 2.8 years 2.8 to 3.6 years	30%		
3	3.6 to 4.3 years 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	30%	40%	

Banks will be allowed to conduct two rounds of ‘horizontal offsetting’, first between the net positions in each of three zones and then between the net positions in the three different zones. The offsetting will be subject to a scale of disallowances expressed as a fraction of the matched positions.

Horizontal disallowances within the zones

*Zone 1*

From residual unmatched positions (Row 1.6) in Zone 1 (e.g. Compare unmatched positions for Time Bands ‘0-1 month’, ‘1-3 months’, ‘3-6 months’ and ‘6-12 months’), the matched position is determined (e.g. the lower of the aggregate of all short positions vs. the aggregate of all long positions). This value is seen under Zone 1 in Row 2.1. The

remaining unmatched position is seen under Zone 1 in Row 2.2. A capital charge of 40% is calculated against the residual matched position for the Time Zone.

#### *Zone 2*

A similar process as in Zone 1 is repeated for Zone 2. Note however that there are 3 Time Bands to be compared within Zone 2 and that the capital charge taken is 30% of the residual matched position.

#### *Zone 3*

A similar process to that followed in Zones 1 and 2 is repeated for Zone 3. There are 8 time bands for which positions must be compared. The capital charge taken on the matched position is 30%.

The three capital charges calculated for Zone 1, Zone 2 and Zone 3 respectively, are summed to give '**Capital Charge 2**' in the 'Capital Charges' column – Row 2.3

#### ***Step 5: (Capital Charge Level 3)***

##### Horizontal disallowances between adjacent zones (Charge across Zone 1 and 2)

The *residual unmatched positions* in Zones 1 and 2 are compared and the matched position is determined (i.e. the lower of a long and short position, or 'zero' if both positions are in the same direction). The matched position is seen in Row 3.1. The unmatched position is determined and this is seen in Row 3.2. A capital charge of 40% is calculated on the matched position and recorded in Row 3.3.

The *residual unmatched positions* in Zones 2 and 3 are compared and the matched position is determined (i.e. the lower of a long and short position, or 'zero' if both positions are in the same direction). The matched position is seen in Row 3.1. The unmatched position is determined and seen in Row 3.2. A capital charge of 40% is calculated on the matched position and recorded in Row 3.3.

The total horizontal disallowance between adjacent zones is the sum of the matched weighted positions between Zones 1 and 2 and between Zones 2 and 3.

#### ***Step 6: (Capital Charge Level 4)***

##### Horizontal disallowances between Zone 1 and Zone 3

The residual unmatched position from Zone 1 (Row 2.2) is compared against the unmatched position resulting from comparing Zone 2 and 3 (Row 3.2). The matched position is found and this is seen in Row 4.1. The unmatched position is seen in Row 4.2. A capital charge of 100% is taken against the matched position, and recorded in Row 4.3.

### ***Step 7: (Capital Charge Level 5)***

The remaining unmatched or overall net open position is recorded in Row 5.1.

### ***Step 8:***

The total capital charge in relation to general market risk in interest rate instruments is equal to the sum of the five capital charges determined. This total is carried forward to Row 5.0 of Sheet 'IRR\_SPEC' and it is summed with the capital charges in relation to specific risk for interest rate related instruments.

## **INTEREST RATE DERIVATIVES**

The measurement system should include all marked to market interest rate derivatives and off-balance sheet instruments 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). The derivatives should be converted into positions in the relevant underlying instrument and should become subject to specific and general market risk charges. In order to determine the capital charge under the standard method, the amounts reported should be the market value of the principal amount of the underlying or the notional underlying.

### ***Futures and forward contracts, including FRAs***

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 maturity or duration ladder but should take account of any conversion factor defined by the exchange. In the case of a future on a corporate bond index, positions will be included at the market value of the notional underlying portfolio of securities.

### ***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. The separate legs of cross-currency swaps are to be reported in the relevant maturity ladders for the currencies concerned.

***Calculation of capital charges for derivatives under the standardized Methodology - Allowable offsetting of matched positions***

Banks may exclude 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, 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:

**(i) 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;

**(ii) 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

**(iii) 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 maturity or duration ladder. One method would be to first convert the payments required by the swap into their present values. For that purpose, each payment should be discounted using zero coupon yields, and a single net figure for the present value of the cash flows entered into the appropriate time-band using

procedures that apply to zero (or low) coupon bonds; these figures should be slotted into the general market risk framework as set out earlier.

### ***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 the rules identified earlier.

### ***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. The various categories of instruments should be slotted into the maturity ladder and treated according to the rules identified earlier.

### 3. EQUITY POSITION RISK

This section sets out the minimum capital standard to cover an institution's risk of holding or taking positions in equities. An institution which holds equity positions (whether long or short) is exposed to the risk that the value of individual equity positions relative to the market may move against the institution – specific risk – and that the equity market as a whole may move against it – general risk.

Equity risk capital requirements will apply to positions and exposures on the following instruments:

- common shares, whether voting or non-voting;
- convertible preference shares or securities that behave like equities;
- convertible debt securities which convert into equity instruments and are trading as equities;
- any other instruments exhibiting equity characteristics; and
- equity derivatives or derivatives based on above securities.

It applies to long and short positions in all instruments that exhibit market behaviour similar to equities, but not to non-convertible preference shares, as these are covered by the interest rate risk requirements. Long and short positions in identical equity issues may be reported on a net basis.

The long and short position must be calculated on a market-by-market basis, and so a separate worksheet should be done for each national market in which the reporting institution holds equities. Equity securities listed in more than one country must be allocated to either the country where the issuer is incorporated and listed or the country where the security was purchased or sold, but not both. Calculations should be expressed in the domestic currency equivalent of the denomination of the equity, converted at spot rates at the reporting date.

The capital charge for both specific and general market risk will be 8%.

#### ***Columns A and B: 'Gross Long' / 'Gross Short'***

The net position in each equity should be summed and the total value of all relevant equity securities entered into either Column A 'Gross Long' if it is a long position or Column B 'Gross Short' if it is a short position. Note that long and short positions in each equity may be reported on a net basis for the purposes of calculating open positions. However, positions in different equities are not offsettable in this fashion.

#### ***Column C – Gross Equity Position***

The value of Column A is added to the value of Column B, with the signs (direction of position) ignored.

### ***Column D – Net Open Position***

The value of Column A is subtracted from the value of Column B to derive the net open position which is an absolute value.

### ***Column E – 8% of Gross Position***

The capital charge to cover specific risk, (defined as the bank's gross equity positions i.e., the sum of all long equity positions and of all short equity positions) is calculated as 8% of the gross position (8% of the total of Column C).

### ***Column F – 8% of Net Open***

The capital charge to cover general market risks (defined as the difference between the sum of the long vs. the sum of the short positions i.e., the overall net position in an equity market) is calculated as 8% of the net open position (8% of Column D).

### ***Capital Required Against Specific Risks***

This represents 8% of the Gross Position.

### ***Capital Required Against General Risks***

This represents 8% of the Net Open Position.

### ***Total Capital Requirement against Equity Position Risk***

Capital charges calculated in respect of specific risks and general market risks are summed together.

## **Equity Derivatives**

Equity derivatives and off-balance-sheet positions which are affected by changes in equity prices should be included in the measurement system. This includes futures and swaps on both individual equities and on stock indices. The derivatives are to be converted into positions in the relevant underlying.

Matched positions in each identical equity or stock index in each country may be fully offset, resulting in a single net short or long position to which the specific and general market risk charges will apply.

### **Calculation of Positions**

In order to calculate the specific and general market risk, positions in derivatives should be converted into notional equity positions as follows:

(a) futures and forward contracts relating to individual equities should be reported at current market prices



(b) futures relating to stock indices should be reported as the mark-to-market value of the notional underlying equity portfolio

(c) equity swaps are to be treated as two notional positions

(d) equity options and stock index options can be 'carved out' together with the associated underlying assets (that is, the options and their associated hedges are excluded from the calculations performed for all other equity positions and a separate risk charge is obtained using the simplified approach under the Section 'Treatment of Options').

**Risk in relation to an Index**

Besides general market risk, a further capital charge of 2% will apply to the net long or short position in an index contract comprising a diversified portfolio of equities. This capital charge is intended to cover factors such as execution risk. This risk factor is to be applied specifically to well-diversified indices and not for example, to sectoral indices.

## 4. COMMODITIES POSITION RISK

A commodity is defined as a physical product which is or can be traded on a secondary market, e.g. agricultural products, minerals (including oil) and precious metals. This section establishes a minimum capital standard to cover the market risk of holding or taking positions in commodities, including precious metals (except gold, which is treated as a foreign currency)<sup>5</sup>.

Each long and short commodity position (spot and forward) is expressed in terms of the standard unit of measurement (such as barrels, kilos or grams).

### ***Columns A and B:***

The net position in each commodity should be converted at current spot rates into domestic currency and the total of all commodity positions is entered into column A 'Gross Long' if it is a long position or Column B 'Gross Short' if it is a short position. Long and short positions in each commodity may be reported on a net basis for the purposes of calculating open positions. However, positions in different commodities are not offsettable in this fashion.

### ***Column C – Gross Position***

The value of Column A is added to the value of Column B, with the signs (direction of position) ignored.

### ***Column D – Net Open Position***

The value of Column A is subtracted from the value of Column B to derive the net open position which is an absolute value.

### ***Column E – 15% of Net Open***

The capital charge to cover directional risk (risk of change in spot prices) is calculated as 15% of the net open position (15% of the total of Column D).

### ***Column F – 3% of Gross Position***

The capital charge to protect the bank against basis risk, interest rate risk and forward gap risks is calculated as an additional 3% of the bank's gross position, long and short, in that particular commodity (3% of the Total of Column C).

### ***Capital Required Against Directional Risk – Row 21***

This represents 15% of the Net Open Position.

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<sup>5</sup> Taken from the 1996 Market Risk Amendment – Section A.4 Commodities Risk

***Capital Required Against Basis, Interest Rate and Forward Gap Risks – Row 22***

This represents 3% of the Gross Position.

***Total Capital Required Against Commodity Position Risk – Row 23***

This is the total capital charge calculated in respect of directional risks and basis, interest rate and forward gap risks.

## 5. OPTIONS

Option contracts and related hedging positions in the associated underlying instrument, commodity or index, cash or forward are subject to capital requirements as calculated in this section.

The capital requirements calculated in this section should then be added to the capital requirements for debt securities, equities, foreign exchange and commodities risk.

Under the standardized approach two alternatives to measuring market risk for options activities are available:

- Institutions which solely use purchased options may use the simplified method
- Institutions which also write options must use the scenario method<sup>6</sup>

### *Simplified Approach*

Financial institutions which handle a limited range of purchased options may use the simplified approach set out in the Table 1V below for individual options positions. As an example of how the calculation would work, if a holder of 100 shares currently valued at \$10 each holds an equivalent put option with a strike price of \$11, the capital charge would be:  $\$1,000 \times 16\%$  (i.e., 8% specific plus 8% general market risk) = \$160, less the amount the option is in the money  $(\$11 - \$10) \times 100 = \$100$ , i.e., the capital charge would be \$60. A similar methodology applies for options whose underlying is a foreign currency<sup>7</sup>, an interest rate related instrument or a commodity.

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<sup>6</sup> Unless all their option positions are hedged by perfectly matched long positions in exactly the same options, in which case no capital charge is required for market risk.

<sup>7</sup> For foreign currency options where it is unclear what the underlying asset is, the asset that will be received if the option is exercised should be treated as the underlying asset.

**Table 1V**  
**Simplified approach: capital charges**

Position	Treatment
<i>Covered Position Options:</i> Long cash and Long put or Short cash and Long call	The capital charge will be the market value of the underlying security <sup>8</sup> multiplied by the sum of specific and general market risk charges <sup>9</sup> for the underlying less the amount the option is in the money (if any) bounded at zero <sup>10</sup>
<i>Naked Position Options:</i> 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 for the underlying  (ii) the market value of the option <sup>11</sup>

***Scenario Method***

Under the scenario method, an institution is required to make separate calculations of the specific risk and general market risk of options and their related hedging positions. Specific risk charges must be calculated on each issue in which the institution has a net option position that is subject to interest rate risk or to equity risk. General risk charges are calculated on portfolios of options (groups are set out below).

The scenario method uses simulation techniques to calculate changes in the value of an options portfolio for changes in the level and volatility of the prices of its associated underlying instruments. Under this approach, the general market risk charge is determined by the scenario "matrix" (i.e., the specified combination of underlying and volatility changes) that produces the largest loss. The total general market risk capital

<sup>8</sup> 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.

<sup>9</sup> Some options (e.g., where the underlying is an interest rate, a currency or a commodity) 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) and for options on equities and stock indices. The charge under this measure for currency options will be 8% and for options on commodities 15%.

<sup>10</sup> 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.

<sup>11</sup> 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

requirement for all option portfolios is the sum of the largest losses of individual option portfolios.

In addition to the general market risk of its interest rate and equity options portfolios, institutions using the scenario method are required to calculate the specific risk of these options using the same basic methodology in the preceding sections on interest rate position risk and equity risk.

### ***Calculating the General Market Risk***

An institution constructs a two-dimensional matrix for each of its options portfolios. Options portfolios include options and any related hedging positions grouped together as follows:

- for interest rates, options on underlying instruments whose residual maturity is bounded by one of at least six groups of time bands from Table V where no more than three contiguous time bands are grouped together;
- for equities and equity indices, each national market;
- for foreign currencies and gold, each currency pair and gold and;
- for commodities, each individual commodity.

The first dimension of each matrix requires the institution to evaluate the portfolio over a specified range above and below the current value of the underlying instrument, commodity, or index. For interest rates the range is consistent with the assumed changes in yield for the time bands in Table V. Institutions should use the highest of the assumed changes in yield applicable to the time bands that it groups together. The time bands and assumed changes in yield are:

**Table V**

<b>Time band</b>	<b>Assumed changes in yield</b>	<b>Time band</b>	<b>Assumed changes in yield</b>
up to 1 month	1.00	3 up to 4 years	0.75
1 up to 3 months	1.00	4 up to 5 years	0.75
3 up to 6 months	1.00	5 up to 7 years	0.70
6 up to 12 months	1.00	7 up to 10 years	0.65
1 up to 2 years	0.90	10 up to 15 years	0.60
2 up to 3 years	0.80	15 up to 20 years	0.60
		over 20 years	0.60

The other ranges are  $\pm 8$  per cent for equities,  $\pm 8$  per cent for foreign exchange and gold, and  $\pm 15$  per cent for commodities.

For all option portfolios, at least seven observations (including the current observation) should be used to divide the range into equally spaced intervals.

The second dimension of the matrix entails a change in the volatility of the underlying rate or price equal to  $\pm 25$  per cent of the current volatility<sup>12</sup>.

The application of the scenario method, particularly regarding the precise way the analysis is constructed, will be subject to review by Central Bank. An institution using the scenario method should have appropriate qualitative standards for the internal model being used.

### ***Calculating the Specific Risk of Options on Debt and Equity Securities***

The specific risk charge for options on debt securities is calculated by multiplying the market value of the effective notional amount of the debt instrument that underlies an option by:

- the option's delta; and
- by the specific risk factors in the Table 1 that correspond to the category and residual term of the underlying debt instrument.

<sup>12</sup> For example, if the underlying of an equity instrument has a current market value of \$100 and a volatility of 20%, the first dimension of the grid would range from \$92 to \$108, divided into eight intervals of \$2.00 and the second dimension would assume volatility stays at 20%, increases to 25% ( $20\% + (.20 \times .25)$ ) and decreases to 15% ( $20\% - (.20 \times .25)$ ).

The specific risk charge for options on equity securities and options on an equity index is calculated by multiplying the market value of the effective notional amount of the equity instrument or equity index that underlies an option by:

- the option's delta; and then by:
- 8%; or
- 4% if the portfolio of equities and equity derivatives including options is both liquid and well-diversified as defined in the section on equities risk; or
- 2% if the option is based on an index of equities.

The effective notional amount of an option is the market value of the stated underlying debt or equity instrument or equity index adjusted to reflect any multiplier applicable to the contract's reference rate(s) or, where there is no multiplier component, simply, the market value of the stated underlying debt or equity instrument or the notional amount underlying an option on an equity index.



## 6. GLOSSARY

Basis risk:	the risk that the relationship between the prices of two similar, but not identical, instruments will change. Thus, even if maturities are perfectly matched, basis risk could remain.
Duration	the sensitivity of a bond's price (as a percentage of initial price) to a change in yield or the weighted average time to maturity using the relative present value of the cash flows as weights.
General market risk:	the risk of a loss arising from adverse changes in market prices, for example, a change in interest rates or official policy.
Interest rate risk:	the risk that changes in market interest rates might adversely affect an institution's financial condition.
Investment-grade:	securities which are rated at or above Baa by Moody's Investors Services or BBB by Standard & Poor's Corporation.
Market risk:	the risk of losses in on- and off-balance-sheet positions arising from movements in market prices, including interest rates, exchange rates and equity values.
Marking-to-market:	the process of revaluing a portfolio on the basis of prevailing market prices
Matched weighted position:	the smaller of the sum of the risk weighted long positions or the sum of the risk weighted short positions within a time band or a zone or between zones.
Off-balance-sheet Activities:	banks' business that does not generally involve booking assets or liabilities. Examples include trading in swaps, options, futures and foreign exchange forwards, and the granting of standby commitments and letters of credit.
Specific risk:	the risk that the price of a given instrument will move out of line with similar instruments, due principally to factors related to its issuer.

Trading book:	It is defined as the bank's proprietary positions in financial instruments which are intentionally held for short-term resale and/or which are taken on by the bank with the intention of benefiting in the short-term from actual and/or expected differences between their buying and selling prices. (Amendment to the capital accord, Basel Committee on Banking Supervision, 1996)
Long position:	refers to a position which gives or may give the institution a right or imposes or may impose an obligation on it to receive a payment or an asset. Bought call options and sold put options shall be covered by the definition of a long position.
Short position:	refers to a position which gives or may give the institution a right or imposes or may impose an obligation on it to make a payment or deliver an asset. Sold call options and bought put options shall be covered by the definition of a short position.
Net position:	the excess of the long over the short position in identical securities and derivatives.

## 7. APPENDIX 1

**Table II: Credit Ratings Agencies and Investment Grade Ratings**

	Minimum Ratings	
	Securities	Money Market Obligations
<b>For all Issuers</b>		
Moody's Investor Services	Baa3	P3
Standard & Poors Corporation	BBB-	A3
<b>For all banks &amp; subsidiaries of banks (not eligible as qualifying securities)</b>		
Thomson Financial Bank Watch	BBB-	TBW-3
<b>For United States Issuers</b>		
Duff & Phelps Inc	BBB-	3
Fitch Investor Services Inc.	BBB-	F-3
<b>For Canadian Issuers</b>		
Canadian Bond Rating Service	B++low	A-3
Dominion Bond Rating Service	BBB low	R-2
<b>For Japanese Issuers</b>		
Japan Credit Rating Agency Ltd.	BBB-	J-2
Nippon Investor Services Inc.	BBB-	a-3
The Japan Bond Research Institute	BBB-	A-2
Mikuni & Co	BBB	M-3
Fitch Investors Services Inc	BBB-	F-3

## **8. APPENDIX 2**

### **Member Countries of the Organisation for Economic Co-operation And Development (OECD)**

Australia  
Austria  
Belgium  
Canada  
Czech Republic  
Denmark  
Finland  
France  
Germany  
Greece  
Hungary  
Iceland  
Ireland  
Italy  
Japan

Korea  
Luxembourg  
Mexico  
Netherlands  
New Zealand  
Norway  
Poland  
Portugal  
Slovak Republic  
Spain  
Sweden  
Switzerland  
Turkey  
United Kingdom  
United States

## 9. APPENDIX 3

<b>Rating Agency</b>	<b>Minimum Ratings - Securities</b>
DBRS	BBB low
Moody's	Baa3
S&P	BBB-
Fitch	BBB-
JCR	BBB-

## 10. APPENDIX 4

### *Treatment of particular instruments in long and short positions*

The following shall be divided into long and short positions:

- Bond and interest-rate futures,
- forward rate agreements (FRA),
- forward commitments to buy and sell debt instruments,
- genuine sale and repurchase transactions,
- and genuine purchase and resale transactions in debt instruments,
- options based on debt instruments etc.,
- interest-rate swaps
- Bought and sold options
- futures in individual equities,
- forward commitment to buy or sell equities, and
- other financial instruments with similar characteristics.

#### *Bond and interest-rate futures:*

A long bond future or interest-rate future position shall be divided into a long position in the underlying instrument or the underlying notional principal amount behind the relevant future, and a short position in a debt instrument maturing on the delivery date of the future.

A short bond future or interest-rate future position shall be divided into a short position in the underlying instrument or the underlying notional principal amount behind the relevant future, and a long position in a debt instrument maturing on the delivery date of the future.

#### *Forward rate agreements (FRA):*

A sold FRA shall be divided into a long position in a debt instrument with a maturity date equal to the settlement date plus the contract period, and a short position in a debt instrument with a maturity date equal to the settlement date. Similarly a bought FRA shall be divided into a short and a long position.

#### *Forward purchase of debt instruments:*

A forward purchase of a debt instrument shall be divided into a long position in the debt instrument itself and a short position in a debt instrument maturing on the delivery date. Similarly, a forward sale shall be divided into a short and long position.

*Genuine sale and repurchase transactions etc.:*

A genuine sale and repurchase transaction in the form of a spot sale against a forward purchase shall be included in the statement as a short position in a debt instrument maturing on the expiry date of the contract.

A genuine purchase and resale transaction in the form of a spot purchase against a forward sale shall be included in the statement as a long position in a debt instrument maturing on the expiry date of the contract.

A genuine sale and repurchase transaction in the form of a forward sale against a forward purchase shall be included in the statement as a long position in a debt instrument maturing on the date of the forward sale and a short position in a debt instrument maturing on the date of the forward purchase.

A genuine purchase and resale transaction in the form of a forward purchase and a forward sale shall be included in the statement as a short position in a debt instrument maturing on the date of the forward purchase and a long position maturing on the date of the forward sale.

In the case of genuine sale and repurchase transactions and securities lending, the security repurchased or lent, respectively, shall be included in the capital adequacy statement.

In the case of genuine purchase and resale transactions and securities borrowing, the security resold or borrowed, respectively, shall not be included in the capital adequacy statement.

*Options on interest rates, debt instruments etc.:*

Options on interest rates, debt instruments, bond futures, interest-rate futures or swaps shall be divided into two positions in the same way as futures.

Bought call options and sold put options shall be divided into a long position in the underlying debt instrument and a short position in a debt instrument maturing on the expiry date of the option.

Sold call options and bought put options shall be divided into a short position in the underlying debt instrument and a long position in a debt instrument maturing on the expiry date of the option.

*Interest-rate swaps:*

An interest swap under which the institution receives variable interest and pays fixed interest shall be divided into a long position in a variable interest instrument with a maturity equivalent to the period until the next interest fixing, and a short position in a fixed interest instrument with the same maturity as the swap.

An interest swap under which the institution receives fixed interest and pays variable interest shall be divided into a short position in a variable interest instrument with a maturity equivalent to the period until the next interest fixing, and a long position in a fixed interest instrument with the same maturity as the swap.

*Unsettled spot purchases/sales of debt instruments:*

In the case of unsettled spot purchases, the positions shall be included as long positions in the relevant debt instruments, and in the case of unsettled spot sales, the positions shall be included as short positions in the relevant debt instruments.

*Currency transactions:*

Forward currency transactions, currency swaps, currency futures and similar currency transactions shall be divided into long and short positions corresponding to the payment of the transactions.

*Futures on a bond index:*

The institution may treat positions in futures on a bond index as future positions in any of the individual bonds covered by the index or as future positions in the index itself.

If the futures are treated as future positions in each of the bonds covered, these shall each be stated with the weight they carry in the index, multiplied by the future position in the overall index. The positions shall in other respect be treated as future positions in the bonds covered.

If the futures are treated as future positions in the index itself, the positions shall be stated in the calculation of the specific risk with the weight that is assigned to the bond with the highest weight in the index. In the calculation of the general risk the positions shall be stated with the duration equivalent to the weighted average of the duration of the bonds covered.

*Equity futures:*

A bought future on a single equity shall be divided into a long position in the underlying equity and a short position in a debt instrument maturing on the delivery date of the future.

A sold future on a single equity shall correspondingly be divided into a short position in the underlying equity and a long position in a debt instrument maturing on the delivery date of the future.



*Forward purchase of equities:*

A forward purchase of an equity shall be divided into a long position in the equity itself and a short position in a debt instrument maturing on the delivery date of the equity. A forward sale of an equity shall be divided into a short position in the equity and a long position in a debt instrument maturing on the delivery date of the equity.

*Genuine sale and repurchase transactions involving equities:*

Genuine sale and repurchase transactions, genuine purchase and resale transactions as well as equity borrowing and lending shall be treated in accordance with the same principles as stated above.

*Equity swaps:*

A swap under which the institution pays fixed or variable interest and receives a yield that depends on the changes in the price of an equity or an equity index shall be divided into a short position in a debt instrument and a long position in the underlying equity or equity index.

The short position shall have a maturity equivalent to the maturity of the swap (for fixed interest) or the period until the next interest fixing (for variable interest).

A swap under which the institution receives fixed or variable interest and pays an yield that depends on the changes in the price of an equity or a equity index shall be divided into a long position in a debt instrument and a short position in the underlying equity or equity index.

The long position shall have a maturity equivalent to the maturity of the swap (for fixed interest) or the period until the next interest fixing (for variable interest).

*Options on equities etc.:*

Options on equities and equity indexes shall be divided into two positions in the same way as futures, and both positions shall also be multiplied by the option's delta, according to the method set out in annex 2.

*Warrants:*

Warrants including warrants issued by another entity than the issuer of the underlying security (covered warrants), shall be treated in the same way as options.

*Unsettled spot purchases/sales of equities:*

In the case of unsettled spot purchases, the positions shall be included as long positions in the relevant equities, and in the case of unsettled spot sales, the positions shall be included as short positions in the relevant equities.

*Futures on an equity index:*

The institution may treat positions in futures on an equity index as future positions in any of the individual equities covered by the index or as future positions in the index itself.

If the futures are treated as future positions in each of the equities covered, these shall each be stated with the weight they are represented in the index, multiplied by the future position in the overall index. The positions shall in other respect be treated as future positions in the covered equities.

If the futures are treated as future positions in the index itself, the positions shall be stated in the calculations of the general risk but not in the calculations of the specific risk.

*Commodity-related instruments:*

Short and long commodity positions arising after the division of derivatives on commodities shall be included in the calculations. Positions in gold-based derivatives shall be included in the statement of the institution's currency position.

Bought and sold options and futures in commodities, forward commitments to buy or sell commodities, and other financial instruments with similar characteristics shall be divided into long and short positions in accordance with the same principles as stated for equities.

## 11. APPENDIX 5

**These guidelines for reporting foreign exchange risks were initially circulated to financial institutions in October 2000 and are appended for ease of reference.**

### **Guidelines for Reporting Foreign Exchange Risk**

#### **Part 1**

1. Data on foreign currency assets and liabilities, both resident and non-resident, should be reported. Where applicable, the data provided in the **Total** column should correspond with the foreign currency data presented in the CB 20 Monthly Statement of Condition.
2. The TT dollar equivalent in thousands should be provided under each currency type.
3. The Guidelines for Reporting on the CB 10 Weekly Foreign Position are applicable, with the exception of those pertaining to Ratings (Column 2) and Non-collateral (Column 3).
4. Interest accrued should be included in Item 17 – Accounts Receivable.
5. Memo Items

#### Item 20

Include the following:

- All amounts to be **received** under forward foreign exchange transactions, including currency futures and currency swaps.
  - Future income not yet accrued but already fully hedged.
6. Accrued Expenses should be included in Item 2605 – Accounts Payable.

#### Item 28

Include the following:

- All amounts to be **paid** under forward foreign exchange transactions, including currency futures and currency swaps.
- Future expenses not yet accrued but already fully hedged.

## 7. Other Currency Column

Currency type should be specified.

### Part II

The long or short position reported in Part II must correspond to the long or short position reported under each currency in Part 1 of the return as the Net Position.

### Part III

The Foreign Currency Exposure reported as item E must be the same as that reported in Part II of the Return.

The data reported pertain to the foreign currency assets and liabilities with both residents and non-residents. This data should correspond with the foreign currency data presented in the CB20 Monthly Statement of Condition. The guidelines for reporting are outlined below.

### Assets

11. Liquid funds as outlined in the CB20 guidelines represent all those foreign currency assets in the form of cash and those that can be easily converted into cash. It includes foreign currency cash, foreign currency deposits at the Central Bank, foreign balances due from banks and foreign currency cash items in the process of collection. See CB20 guidelines for further details of each account. The total balances due from banks must be reported under the heading labeled foreign currency. In addition, the portion of the balances due from prime banks must be reported under the heading labeled **rated**. **Prime banks refer to foreign banks that are rated P2 or better by Moody's Investor Services (Moody's) or A2 or Standard & Poor's Corporation (S&P).**
12. Inter-bank funds sold (foreign currency) should be reported as reflected in the CB20 guidelines. Includes all foreign currency transactions with commercial banks involving immediately available funds for one to fifteen calendar days. The transactions with prime banks must be reported separately under the heading labeled **rated**.
13. Investments refer to investments denominated in foreign currency. This also holds for the sub-components highlighted. The total investments denominated in foreign currency must be reported under Account 13 on the CB10 form and should correspond with Account 13 of the CB20 form. The total holdings of government treasury bills and securities with maturity of one year and less must be reported under the heading labeled foreign currency. The portion of these securities, which are, **rated Aa3 or better by Moody's or AA- by S&P should be included under the heading labeled rated**. **Similarly, corporate securities rated Aa1 or better**

**by Moody's or AA+ or better by S&P should be reported under the heading labeled rated.**

14. Loans refer to foreign currency loans to residents and non-residents and should be consistent with foreign currency loans reported in the CB20 under Account 85, memoranda accounts. Discount loans should be shown as a separate sub-item.
15. Customers' liabilities should correspond with the foreign currency portion of Account 15 of the CB20 report form. The portion of the sub-account Letters of Credit not covered by collateral should be reported separately under the heading **non-collateral**. The other sub-accounts should be treated similarly.
16. Equity in subsidiaries and affiliates (foreign currency) should be reported as outlined in the CB20 guidelines.
17. Accounts receivable (foreign currency) should be reported as outlined in the CB20 guidelines.
18. Foreign currency fixed assets should be reported as outlined in the CB20 guidelines.
19. Prepaid expenses and other assets (foreign currency) should be reported as outlined in the CB20 guidelines. Inter-office account denominated in foreign currency is a sub-account of Account 19, and should correspond with the foreign currency portion of Account 1902, due from Head Office.

### **Liabilities**

20. Deposits refer to foreign currency deposits (demand, savings and time) of both residents and non-residents and should correspond with Account 84, memoranda accounts of the CB20 form.
21. Inter-bank funds bought refers to all foreign currency transactions with other commercial banks involving the purchase of immediately available funds for one to fifteen calendar days at a specified rate of interest. It should be reported as specified in the CB20 guidelines.
22. Central Bank Funds refers to all foreign currency borrowings from the Central Bank for periods of one (1) to fifteen (15) days and should be reported as in the CB20 form.
23. Borrowings refer to short-term borrowings with maturity up to one year as outlined in the CB20 guidelines. It should correspond with Account 24 of the CB20 call report form.
24. Account 25, acceptances executed is the contra account to Account 15.

25. Other Current liabilities refer to the foreign currency portion of Account 26 of the monthly CB20 form. Accounts payable refers to the foreign currency portion of sub-account 2605. Inter-Office Accounts refer to the foreign currency portion of Account 2606 that is due to Head-Office.
26. Long-term liabilities refer to all long-term foreign currency borrowings and should correspond with the foreign currency data reported in Account 27 of the CB20 form.
27. Capital refers to that portion of the owners' investment in the institutions that is denominated in the foreign currency.