



# THE SUPERVISORY TREATMENT OF BANKS’ MARKET RISKS

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## 1. Introduction

Due to the destabilizing effect that exposures to market risk factors can have on profits and cash flow, it is critical to effective planning to know not only what the exposures to such factors are, but also how to manage such exposures so as to minimize disruptions. For this reason, identifying, measuring, monitoring, and managing market risk is a critical function at financial institutions. While credit risk dominates the risk exposure of a bank, market risk exhibits some fundamentally different characteristics. Chief among these attributes is the fact that market prices can move rapidly and, occasionally, in unison. Unmanaged, unidentified, and uncontrolled exposures to market risk can result in rapid and significant declines in the value of investments held within the banking and trading books of a bank. Failure to control such exposures and set aside sufficient capital to cover such exposures can lead to unsafe and unsound banking practice.

The Market Risk is defined as the risk of losses in on-balance sheet and off-balance sheet positions arising from movements in market prices. Although a bank may be well-diversified, it is nonetheless exposed to market (i.e. systematic) risk. The magnitude and sensitivity of banks positions to these market factors is therefore an important supervisory and capital adequacy consideration. A bank with a high level of market risk exposure (i.e. concentration) to a particular currency is exposed to depreciation in that currency (assuming a long position in the currency); a bank with a large exposure to interest rate sensitive instruments increases its market risk exposure;

The assessment of market risk is based on the instability of market parameters; interest rates, stock exchange indexes and exchange rates. The instability is measured by market volatilities. To find out the mark-to-market deviations of the values of instruments, volatilities should be coupled with the sensitivities of instruments. The sensitivity captures the change of value resulting from a given change in the underlying market parameter. Using both volatilities of market parameters and sensitivities of instruments, the change in market value can be quantified.

The Market risk can be divided into several dimensions. For instance liquidity risk is an important component in all markets where the low volume of transactions makes it difficult to find counterparty. Longer delays are required to complete a transaction. Discounts might be unavoidable. There is also a “volatility risk” arising from the fluctuations over time of the instability of the market parameters. Many risk calculations are derived from these volatilities. If they change over time, volatility risk influences all derived measures of market risk.



Regulations for market risk are more complex than for credit risk. Market risk is diversifiable, and should not be counted twice whenever there are offsetting positions. In addition, sensitivities and market volatilities are observable and vary across instruments and markets.

The market risks are generally divided into two components. The general risk is the fraction of price risk which is generated by market movements. The specific risk is the other fraction of price risk which is linked to the issuer and independent of market moves. General risk cannot be diversified since it is the same across instruments. Conversely, specific risk can be diversified.




Within a given class of instruments, such as bonds, equity or foreign exchange, offsetting risk is allowed. For instance, being long and short on the same currency results in zero risk, because the gain on the long leg offsets the loss in the short leg when the currency goes up, and vice versa. However, this is acceptable only with general risk, the one correlated with the market. Such offsets are also authorized across product classes when they are considered realistic enough.

The Basel Committee on Banking Supervision introduced a Capital Accord in 1988, for defining, measuring and determining minimum levels of capital for banks. The Accord was founded on the principle that banks should hold a minimum level of capital which should be linked directly to the risks faced by banks in their operations. The scope of the Accord was initially limited to only the credit risk, the risk of loss associated with counterparty failure. The focus on credit did not deny the presence of other types of risks and it was acknowledged explicitly that market-related risks arising from the effects of changing prices (interest rates, exchange rates and equity prices) should also be taken into account by supervisors in framing prudential policy for banks. By their very nature, banks are exposed to virtually all market risks. The Capital Accord was amended in 1996 to take explicit account of market risk in trading accounts.

In Sri Lanka the capital adequacy framework until recently captured only the credit risk. The Central Bank of Sri Lanka (CBSL) has introduced a capital charge for market risk with effect from 31.03.2006. The objective in introducing this significant amendment to the Capital adequacy framework is to provide an explicit capital cushion for the price risks to which banks are exposed, particularly those arising from their trading activities. Introducing the discipline that capital requirements impose is seen as an important further step in strengthening the soundness and stability of the Sri Lankan banking system and of financial markets generally. With effect from 31 March 2006, all Licensed Banks are required to maintain a minimum capital adequacy ratio of 10 per cent in relation to risk weighted assets (for credit risk and market risk) with core capital constituting not less than 5 per cent.

## **2. Classification and Valuation of Banks' Investments**

A direction on the prudential norms for valuation and operation of the Banks' investment portfolio also has been issued by the CBSL, effective from 31.03.2006, with a view to making the implementation of the capital charge for market risk effective. As per this direction banks are required to classify their investments under 2 categories, namely 'Investment' and 'Trading'. The



investments classified under the 'trading' category need to be marked to market. The Shifting of investments between categories, valuation, booking profits/loss on sale and provisioning for the fall in value shall be in accordance with this direction. The classification of investments shall be based on facts and the Management's intent at the time of purchase. All securities acquired with 'positive intention' and wherein the bank has the 'ability to hold till maturity' shall be classified as 'Investment category'. The Securities in the Investment category shall be carried and reported at acquisition cost and any permanent fall in value of these securities are to be fully provided for in the Profit & Loss Account.

On the other hand, all securities acquired for the specific purpose of trading, to take advantage of the short-term changes in market prices and yields shall be classified under the Trading category. When a bank's actions cast doubt on its intent or ability to hold investments to maturity, the CBSL retains the right to reclassify all or part of the 'Investment category' as 'trading'. The transfers between categories after initial recognition and the sale of securities classified as 'Investment' are restricted. All unlisted securities are to be classified under the Investment Account.

The securities in the 'Investment portfolio' do not attract any capital charge on account of market risk and these securities are continue to be subjected to a capital charge for credit risk. On the other hand the 'Trading portfolio' of interest bearing securities and equities that are subject to market risk are to be excluded from the computation of capital charge for Credit Risk

The interest /currency derivatives are excluded from the computation of the capital charge for market risk for the time being. However, these instruments will continue to attract a capital charge for credit risk.

### **3. Market Risks**

The following three types of market risks are subjected to the capital charge for market risk as per the new directive of the CBSL:

- The risks pertaining to interest rate related instruments in the trading book;
- The risks pertaining to equities in the trading book and
- The foreign exchange risk (including gold positions);

#### **3.1 Interest Rate Risk**

To meet the demands of their customers and to execute business strategies, banks make loans, purchase securities, and take deposits with different maturities and interest rates. These activities may leave a bank's earnings and capital exposed to movements in interest rates. This exposure is interest rate risk. In the Sri Lankan context, of all the market sources of risk, interest rate risk is often the most significant. Although interest rate risk arises in all types of financial instruments (e.g., loans and deposits), its impact is most visible in debt instruments and other instruments that are linked to market interest rates. In general, the values of longer-term instruments are often more sensitive to interest rate changes than the values of shorter-term instruments.






As stated earlier there are two types of interest rate risks identified for capital charge, namely the Specific risk and the General market risk. The Specific risk is defined as the risk that the price of a particular financial instrument will rise and fall with changes in the creditworthiness of the issuer. The capital charge arising from Specific risk replaces the present charge under the capital requirements for credit risk. However, the basis of calculating the capital requirement varies from that adopted under the capital adequacy requirement for credit risk; the 'General market risk', of the portfolio is the risk of price movements arising from changes in the general level of interest rates.

### 3.1.1 Specific Risk

The capital charge for Specific risk is determined based on the Credit rating and the Maturity of each instrument. It is interesting to note that the rating based regulatory capital methodology has been introduced for the first time in Sri Lanka for the determination of the capital charge for market risk. Basel II, (the new Capital Accord that is to be implemented in Sri Lanka with effect from 1<sup>st</sup> January 2008) is to use the external ratings more extensively for the determination of the regulatory capital requirements of banks. The broad methodology as per the CBSL direction for the computation of the capital charge for the Specific risk is as follows:

**Table I: Capital Charge for Specific risk**

Instrument	Capital Charge
Securities issued by Government of Sri Lanka / Central Bank of Sri Lanka	Nil
Securities issued by foreign governments / foreign Central banks (based on maturity and the rating of the instruments)	0% - 10.00%
Securities issued by Corporates (based on maturity and the rating of the instruments)	0.25% - 10.00%
Securities issued by foreign corporates- (based on maturity and rating of the instruments)	1.00% - 10.00%
All other types instruments	10.00%



The capital charge for Specific risk applies to *all* long and short trading positions. This differs from the capital adequacy framework for credit risk where only long positions (i.e. assets actually held) are subject to a capital charge. The broadening of the arrangements to include short positions recognize that the creditworthiness of an issuer can improve or deteriorate over time, and therefore the price of those particular securities can rise and fall relative to those of other issuers.

The capital charge for Specific risk differ in key respects from those applied under the capital charge for credit risk; the most significant being the introduction of a concessional risk weighting for 'qualifying' category ie; the debt issued by corporates with high credit rating. Under the capital adequacy rules for credit risk, such issues attracted a uniform 10 per cent capital charge. Since the securities classified as 'trading investments' are to be exempted from the capital charge for credit risk, the capital charge for such corporate debt instruments under the market risk framework could be considerably lower than those levied under the credit risk capital requirements. It would also open a gap between capital charges applying to banks' holdings of debt securities of high-quality corporates and loans made to them by banks. This may provide incentives for banks, at least till the introduction of Basel II in Sri Lanka with effect from January 2008, to facilitate lending via the issue of debt, rather than lend directly to these companies or institutions.

### **3.1.2 General Market Risk**

General market risk refers to the risk associated with changes in the level of interest rates. The long and short positions in different securities or instruments can be offset in the computation of the general market risk. The offsetting necessitates the introduction of 'disallowances'. A proxy Duration method, as recommended by the Basel Committee on Banking Supervision is adopted to arrive at the capital charge for General Market Interest Rate Risk .Duration is a technique used to measure the price sensitivity (i.e. risk) of a security or a portfolio.

The general market risk capital charge is computed by taking into account the price sensitivity of each instrument based on a maturity ladder made up of fifteen maturity bands as indicated in table II. The price sensitivity of each instrument is calculated in terms of a change in interest rates between 1.2 and 2.0 percentage points depending on the maturity of the instrument. This will be subjected to disallowances, if any.






Time Bands	Assumed Change in Yield
<b>Maturity Zone 1</b> 1 month or less over 1 month to 3 months over 3 months to 6 months over 6 months to 12 months	2.00 2.00 2.00 2.00
<b>Maturity Zone 2</b> over 1.0 year to 1.9 years over 1.9 years to 2.8 years over 2.8 years to 3.6 years	1.80 1.60 1.50
<b>Maturity Zone 3</b> over 3.6 years to 4.3 years over 4.3 years to 5.7 years over 5.7 years to 7.3 years over 7.3 years to 9.3 years over 9.3 years to 10.6 years over 10.6 years to 12 years over 12 years to 20 years over 20 years	1.50 1.40 1.30 1.20 1.20 1.20 1.20 1.20

**Table II: Capital Charge for General Market Risk-Time Bands and Assumed Changes in Yield**

The 'disallowance factors' are introduced to cover:

- Imperfect correlation of price between different securities within a given time band ('basis risk'- vertical disallowance) ; and
- Imperfect correlation of price across different time bands (yield curve risk- *the horizontal disallowance*)

Within any particular time band, long and short positions are offset, leaving a net open



position. However, in recognition of the fact that each time band will include positions whose maturities are not identical, a 5 per cent vertical disallowance is applied in each time band.

As the differences in maturity are greater between time bands than within time bands, the disallowance factors applied are correspondingly higher. To cover the yield curve risk, fifteen time bands are aggregated into three time zones and horizontal disallowances are to be applied to cover opposite positions in different time bands and zones. The vertical disallowances are applied for offsetting positions within time bands. The disallowances, however, will be applicable only when the short positions exist.

To cover yield curve risk, the method aggregates the fifteen time bands into three time zones and applies horizontal disallowances to cover opposite positions in different time bands and zones. The concept of capital charges based on offsetting positions in different time bands is analogous to that described above for vertical disallowances for offsetting positions within time bands. For example, where a bank has a net long risk-weighted position in the first time band (0-1 month maturity) and a net short position in the second time band (1-3 month maturity), the two positions may not be offset without taking into consideration the lack of price correlation between positions in the two time bands. As the differences in maturity are greater between time bands than within time bands, the disallowances factors applied are correspondingly higher.

The capital charge calculated for the net open portfolio position, plus the vertical and horizontal disallowance factors calculated within and across time bands, can be added to yield a figure of the capital charge for general market risk. To that total is added the separately calculated capital charge for specific risk to give the full capital requirement for the trading book of debt instruments.

Three examples to illustrate the computation of the capital charge for interest rate risk on account of commercial papers, treasury bills and treasury bonds are given in Tables III, IV and V. It could be noted that in case of government securities the specific risk is considered nil and these instruments attract capital charge only on account of General Market Risk.

**Table III: Capital Charge – Commercial Papers****In LKR**

Issuer	Maturity Date	Face Value	Remaining days	Mkt.Int rate	Mkt Value	Assumed change in yield (plus 2%)	Mkt Value based on new rate	General Market Risk Capital Charge	Credit Rating	Percentage of Capital Charge	Specific Risk Capital Charge
<b>JKH</b>	20/01/06	100,000	20	9.45%	99,484	11.45%	99,376	108	AAA	0.25%	248
<b>Janashkthi</b>	27/01/06	50,000	27	9.45%	49,652	11.45%	49,580	72	N/A	10.00%	4,965
<b>NTB</b>	03/02/06	75,000	34	9.51%	74,341	11.51%	74,204	137	A-	1.00%	743
<b>Total</b>		<b>225,000</b>			<b>223,477</b>		<b>223,160</b>	<b>317</b>			<b>5,956</b>

**\* The date of computation - 31.12.2005****Table IV: Capital Charge – Treasury Bonds****In LKR**

No.	Face Value	Coupon Rate	Maturity Date	Yield	Market Value per 10/-	Total Market Value	Assumed change in yield (plus 2%)	Market Value based on new rate	General Market Charge
1	20,000	11.75%	01-Jan-06	9.67%	100.00	20,000	11.67%	20,000	-
2	10,000	11.75%	01-Jan-06	9.67%	100.00	10,000	11.67%	10,000	-
3	30,000	10.25%	01-Mar-06	10.24%	99.94	29,983	12.24%	29,882	101
<b>Total</b>						<b>59,983</b>		<b>59,882</b>	<b>101</b>

**\* The date of computation - 31.12.2005****Table V: Capital Charge – Treasury Bills****In LKR**

No	Maturity Date	Face Value	Days to Mature	Mkt. rate	Mkt. Value	Assumed change in yield (plus 2%)	Mkt Value based on new rate	General Market Charge
1	20.01.06	100,000	20	9.45%	99,484	11.45%	99,376	108
2	27.01.06	80,000	27	9.45%	79,444	11.45%	79,328	116
3	03.02.06	200,000	34	9.51%	198,243	11.51%	197,878	365
<b>Total</b>					<b>377,171</b>		<b>376,582</b>	<b>589</b>

**\* The date of computation - 31.12.2005**





### 3.2 Foreign Exchange Risk

Foreign exchange (FX) risk is the potential that movements in exchange open positions under the capital adequacy framework for credit risk risk-weighted at 100%. Thus, capital charge for foreign exchange and gold open position was 10%.

The exposure from an adverse change in foreign exchange rates is a function of spot foreign exchange rates and domestic and foreign interest rate levels. Consistent with the capital charge for interest rate risk, the foreign exchange capital charge attempts to measure the risks associated with banks' foreign exchange positions and apply a capital charge to cover potential losses. The foreign exchange capital charge differs from the capital charge for interest rate instruments, however, in two respects:

- I. it is simpler;
- II. it does not attempt to draw distinctions between trading and non-trading positions ie; All foreign exchange positions are captured;

The foreign exchange positions of banks will continue to attract also the capital charge for credit risk in addition to the capital charge for market risk. Gold is also treated similar to foreign exchange position rather than a commodity because its volatility is more in line with foreign currencies and banks manage it in a similar manner.

A bank's net open position in each currency shall be calculated by summing the net position of all on balance sheet and forward contracts denominated in that particular currency. Banks are required to adopt the Shorthand method for this computation. Under the shorthand method, the nominal amount of the net position in each foreign currency and in gold is converted at spot rates into the reporting currency (i.e. LKR). The overall net open position is measured by aggregating:

- The sum of the net short positions or the sum of the net long positions, whichever is the greater; plus
- The net position (short or long) in gold, regardless of sign.

The capital charge is 10% of the overall net open position of foreign currency and gold. The net position is defined as being the absolute difference between long and short positions; the gross position is the sum of all positions regardless of sign. An example to illustrate the computation of the capital charge for exchange risk is given in table VI.

**Table VI : Capital Charge –Exchange Risk**

**In LKR**

Currency	USD	GBP	JPY	SGD	CHF	EUR
Net Open Posotion	100	200	(100)	50	100	(150)
Forex Open Position	450					
Gold Position	50					
Forex & Gold Open Position	500					
<b>Capital Charge</b> (10%* 50)	<b>50</b>					



### 3.3 Equity Risk

Equities are treated as any other investments for the purpose of computing the capital charge for credit risk. Equity risk is the potential for adverse changes in the value of a Bank's equity-related holdings. Price risks associated with equities are often classified into two categories: systematic (or un-diversifiable) risk and unsystematic (or diversifiable) risk. *Systematic risk* refers to the sensitivity of an instrument's or portfolio's value to changes in the overall level of equity prices. Such sensitivity is commonly measured by the "**beta**" of a share or portfolio. As such, systematic risk cannot be reduced by diversifying one's holdings of equity instruments. *Unsystematic risk* refers to that portion of an individual equity instrument's price volatility that is determined by the firm-specific characteristics. This risk is distinct from market-wide price fluctuations and can be reduced by diversification across other equity instruments. By assembling a portfolio with a sufficiently large number of different securities, specific risk can be greatly reduced because the unique fluctuations in the price of any single equity will tend to be canceled out by fluctuations in the opposite direction of prices of other securities, leaving only general risk.

Two areas of risk are identified as arising from traded equity positions:

- I. Specific risk, which deals with the risk of a price movement confined to one particular equity; and
- II. General market risk, which concerns price movements that are unrelated to any specific equity.

#### 3.3.1 Specific Risk

It is proposed that the specific risk of a bank's portfolio is measured against the gross equities position, that is, the sum of long and short equity positions. This approach assumes the specific risk associated with any single equity instrument is unrelated to the specific risk of any other equity. A capital charge of 5 per cent is applied for equities on the Milanka Price Index. All other equities will have a specific risk capital charge of 10 per cent.

#### 3.3.2 General Market Risk

The General market risk of the portfolio is measured by the net equities position. That is, short positions in one set of equities can be used to offset the general market risk arising from long positions in other equities. The implicit assumption here is that there is perfect correlation between movements in equity prices. This assumption is acknowledged as unrealistic, but is adopted in the interests of simplicity. A capital charge of 10 per cent of the net position is proposed to cover the general market risk. The Capital charge for equities applies to all instruments that exhibit market behaviour similar to equities such as voting and non-voting shares, convertible securities that behave like equities (eg. units), commitments to buy or sell equity securities (eg. Warrants, right issues and bonus issues).

It will be recalled that in case of debt securities, full offsetting was permitted as a means of calculating the general market risk of a portfolio but disallowance factors were introduced to modify the outcome. Effectively, only partial offsetting was allowed. No such disallowance factors have been introduced in the computation of the capital charge for equities.

Sri Lankan banks' exposures to equity risk is not as significant as exposures to price risk on debt securities and foreign exchange risk, mainly as a consequence of regulatory restrictions on banks' equity holdings. However, few banks have stock broking subsidiaries whose exposures will attract a capital charge in the consolidated version of the capital adequacy. An example to illustrate the computation of the capital charge for equity risk is given in table VII.

**Table VII : Capital Charge –Equity Risk** **In LKR**

Equities	Value	General Risk		Specific Risk	
		Rate	Charge	Rate	Charge
JHK	100,000			5%	5,000
Dialog	200,000			5%	10,000
Durdans	50,000			10%	5,000
LB Finance	20,000			10%	2,000
<b>Total</b>	<b>370,000</b>	<b>10%</b>	<b>37,000</b>		<b>22,000</b>

The summary of capital charges of all instruments as indicated in tables III-VII is given in table VIII.

**Table VIII : Capital Charge for Market Risk** **In LKR**

Instrument/Item	Specific Risk Capital Charge	General market risk Capital Charge
Treasury Bills	Nil	589
Treasury Bonds	Nil	101
Commercial papers	5,956	317
<b>Capital Charge - Interest rate related instruments</b>	<b>5,956</b>	<b>1,007</b>
Capital Charge - Equities	22,000	37,000
Capital Charge - Forex & Gold	-	50
<b>Capital Charge</b>	<b>27,956</b>	<b>38,057</b>
<b>Total Capital Charge</b>		<b>66,013</b>



#### 4. Regulatory Capital for Market Risk (Tier III)

To ensure consistency in the calculation of the capital requirements for credit and market risks, an explicit numerical link will be created by multiplying the measure of market risk by 10 (i.e., the reciprocal of the minimum capital ratio of 10%) and adding the resulting figure to the sum of risk-weighted assets compiled for credit risk purposes.

Banks are permitted to employ a third tier of capital, consisting of short-term subordinated debt, (unsecured and fully paid with an original maturity of at least 2 years) for the *sole* purpose of meeting a proportion of the capital requirements for market risks, subject to the following conditions:

- Tier 3 capital will be limited to 250% of a bank's tier 1 capital that is available to support market risks.
- A minimum of 28½% of market risks needs to be supported by tier 1 capital that is available to support market risks.
- Tier 2 elements may be substituted for tier 3 up to the same limit of 250% as long as the eligible tier 2 capital does not exceed total tier 1 capital, and long-term subordinated debt does not exceed 50% of tier 1 capital.
- Tier 1 capital should represent at least half of total eligible capital, i.e. the sum total of tier 2 plus tier 3 capital should not exceed total tier 1.
- In determining the level of tier 1 capital for the purposes of determining eligible tier 3 capital, all adjustments required in arriving at the total capital should be taken into consideration.
- In calculating eligible capital, it will be necessary first to calculate the bank's minimum capital requirement for credit risk, and only afterwards its market risk requirement, to establish how much tier 1 and tier 2 capital is available to support market risk.

#### 5. Conclusion

By their very nature, banks are exposed to virtually all market risks. Although a bank may be well-diversified, it is nonetheless exposed to market (i.e. systematic) risk. The magnitude and sensitivity of banks' positions to these market factors is therefore an important supervisory and capital adequacy consideration. This is especially important when considering the rapidity with which market forces can move.



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