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Banking Regulation and Risk Management: An Assessment of the BASEL Market Risk Framework

Emmanuel M. Abolo
Nigerian Export-Import Bank (NEXIM), Abuja

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*Emmanuel M. Abolo, Ph.D**

I. Introduction

Bank regulations are generally intended to subject banks to certain requirements, restrictions and guidelines and, in the process, create transparency between banking institutions, individuals and organizations with whom they interact in a business context.

Banking regulation originates from microeconomic concerns over the ability of bank creditors (depositors) to monitor the risks originating on the lending side and from micro and macroeconomic concerns over the stability of the banking system in the case of a bank crisis. In addition to statutory and administrative regulatory provisions, the banking sector has been subject to widespread "informal" regulation to influence outcomes in the sector.

Banks, in one form or another, have been subject to the following set of regulatory provisions, inter alia (Wikipedia):

- restrictions on branching and new entry;
- restrictions on pricing (interest rate controls and other controls on prices or fees);
- line-of-business restrictions and regulations on ownership linkages among financial institutions;
- restrictions on the portfolio of assets that banks can hold (such as requirements to hold certain types of securities or requirements and/or not to hold other securities, including requirements not to hold the control of non-financial companies);
- compulsory deposit insurance (or informal deposit insurance, in the form of an expectation that government will bail out depositors in the event of insolvency);
- capital-adequacy requirements;
- reserve requirements (requirements to hold a certain quantity of the liabilities of the central bank);
- requirements to direct credit to favoured sectors or enterprises (in the form of either formal rules, or informal government pressure);

* Emmanuel Abolo is the Chief Risk & Compliance Officer at the Nigerian Export-Import Bank. The usual disclaimer applies.

expectations that, in the event of difficulty, banks will receive assistance in the form of "lender of last resort";

special rules concerning mergers (e.g., liquidation, winding up, insolvency etc}

Other rules affecting cooperation within the banking sector (e.g., with respect to payment systems or shared services).

Objectives of Bank Regulation

The objectives of bank regulation which vary across jurisdictions include the following:

Prudential—to reduce the level of risk to which bank creditors are exposed (i.e. to protect depositors);

Systemic risk reduction—to reduce the risk of disruption resulting from adverse trading conditions for banks causing multiple or major bank failures;

Avoid misuse of banks—to reduce the risk of banks being used for criminal purposes, e.g. laundering the proceeds of crime and financing of terrorism;

Protect banking confidentiality;

Credit allocation—to direct credit to favored sectors; and

Provide the best customer service in the face of increasing competition.

Instruments and Requirements of Bank Regulation

Capital requirement: the capital requirement sets a framework on how banks must handle their in relation to their assets. Internationally, the Bank for International Settlements' Basel Committee on Banking Supervision (BCBS) influences each country's capital requirements. In 1988, the Committee introduced a capital measurement system commonly referred to as the Basel I Capital Accord. The latest framework is commonly known as Basel III . This updated framework is intended to be more risk-sensitive than the previous two but is also a lot more complex;

Reserve requirement: The reserve requirement sets the minimum reserves each bank must hold to demand deposits and banknotes. This type of regulation has lost the role it once had, as the emphasis has moved toward capital adequacy, and in many countries there is no minimum reserve ratio;

Corporate governance: Corporate governance requirements are intended to encourage banks to be well managed, and is an indirect way of achieving other objectives:

Financial reporting and disclosure requirements;

Credit rating requirement: Banks may be required to obtain and maintain a current credit rating from an approved credit rating agency, and to disclose it

to investors and prospective investors. Also, banks may be required to maintain a minimum credit rating. These ratings are designed to provide color for prospective clients or investors regarding the relative risk that one assumes when engaging in business with the bank.

Large exposures restrictions: Banks may be restricted from having imprudently large exposures to individual counterparties or groups of connected counterparties; and

Activity and affiliation restrictions:

II. Bank Regulation and Risk Management

The last decade has witnessed major changes in the financial sector: New banks, new financial institutions, new instruments, new windows, and new opportunities and, along with all this, new challenges. The most prominent on our minds in the context of banking these days, perhaps, are the implications arising out of the Basel Accords.

II.1 Basel I Capital Accord

In recent years, regulation in banking has become less pervasive and has shifted from structural regulation to other more market-oriented forms of regulation.

Bank regulation is now increasingly getting risk-centric. This process had its origin in the Cooke Committee or the Basel I proposals which, for the first time, prescribed a risk-based capital adequacy framework for banks by recognizing that different counterparties had different risks and, therefore, had to be risk-weighted, differently.

These proposals were path-breaking considering the credit risk management capabilities of the banks in the 1980s. More than 100 countries implemented Basel I which indicates the widespread impact it had on bank regulation and risk management.

Basel I proposals forced banks to look at credit risk and regulatory capital more closely than they had done earlier. As banks found ways to arbitrage regulatory capital, some of the provisions of Basel I became less relevant. Simultaneously, banks in the G-10 countries developed newer approaches to manage credit risk by building portfolio models for pricing, provisioning and allocating economic capital for the credit portfolios.

These developments made the weaknesses in the Basel I framework more apparent which set the stage for the creation of "International Convergence of Capital Measurement and Capital Standards: A Revised Framework", popularly known as Basel II.

Concurrently, there has been a realization that the traditional supervisory practices were out of step with the sophisticated risk management techniques being employed by the complex financial institutions and a risk-based approach to supervision was required to capture the various risks that the firms were undertaking and the controls built for addressing these risks.

Although there are key differences in the design and methodology of risk-based supervision framework in countries like America, Canada, UK and Australia, yet the underlying principles remain the same: the supervisory processes and tools are reoriented in accordance with the risks in the supervised firms; specific tools of supervision are targeted to the areas of greatest risk and concern in individual firms and this resulted in a cost-effective allocation of the finite supervisory resources across the regulated entities.

II.2 Basel II Capital Accord

The Basel Committee on Banking Supervision (BCBS) noted that the fundamental objective in revising the 1988 Accord was "to develop a framework that would further strengthen the soundness and stability of the international banking system while maintaining sufficient consistency that capital adequacy regulation will not be a significant source of competitive inequality among internationally active banks. The (Basel) Committee believes that the revised Framework will promote the adoption of stronger risk management practices by the banking industry, and views this as one of its major benefits".

Basel II has brought regulation and risk management to the centre stage: the regulatory capital is more closely aligned to the risks in banks; and there is a trend towards convergence of the regulatory and economic capital, especially in the advanced approaches.

Basel II rests on three pillars: Pillar I - minimum capital requirements; Pillar 2 - supervisory review process; and market discipline as Pillar 3.

Pillar 1 has to do with the calculation of the minimum capital requirements. There are different approaches:

The standardised approach to credit risk: banks rely on external measures of credit risk (like the credit rating agencies) to assess the credit quality of their borrowers.

The Internal Ratings-Based (IRB) approaches to credit risk: banks rely partly or fully on their own measures of counterparty's credit risk, and determine their capital requirements using internal models.

Banks have to allocate capital to cover the operational risk (risk of loss because of errors, fraud, disruption of IT systems, external events, litigation etc.).

The Basic Indicator Approach links the capital charge to the gross income of the bank. In the Standardised Approach, the bank is split into 7 business lines, and with 7 different capital allocations, one per business line. The Advanced Measurement Approaches are based on internal models and years of loss experience.

Pillar 2 covers the Supervisory Review Process. It describes the principles for effective supervision. Supervisors have the obligation to evaluate the activities, corporate governance, risk management and risk profiles of banks to determine whether they have to change or to allocate more capital for their risks.

Pillar 3 covers transparency and the obligation of banks to disclose meaningful information to all stakeholders. Clients and shareholders should have a sufficient understanding of the activities of banks, and the way they manage their risks.

II.3 Basel III Capital Accord

In November 2010, the member states of the Group of Twenty (G20) officially endorsed Basel III, representing a marked departure from the philosophy and substance of Basel I and II. Basel III aims to increase the quality and quantity of capital that banks must hold. Alongside this development is the BCBS's extensive reassessment of risk coverage assumptions and guidelines. The overarching objectives of the Basel III Accord is to strengthen global capital and liquidity regulation with the goal of promoting a more resilient banking sector.

The Accord has four main components as follows:

1. Quality, consistency and transparency of the capital base
   - Greater emphasis placed on the common equity component of Tier 1 capital;
   - Simplification of Tier 2;
   - Elimination of Tier 3; and
   - Detailed regulatory capital disclosure requirements.
2. Enhancement of risk coverage through enhanced capital requirements for counter party credit risk
   - Enhanced risk coverage will address issues that arise in connection with the use of derivatives, repos, and securities financing arrangements
3. Changes to non-risk adjusted leverage ratio
   - This ratio will supplement the Basel II risk capital framework
4. Measures to improve countercyclical capital framework

What may prove to be the most innovative (and controversial) component of

Basel III, however, pertains to the creation of a set of system-wide macroprudential measures. While the reforms introduced in Basel I and II were almost exclusively made at a microprudential or bank-specific level, Basel III introduces a set of tools and standards at the macroprudential level—such as a countercyclical buffer and a universal leverage ratio—to address systemic risk within the global financial system.

Basel III will require banks to hold 4.5% of common equity (up from 2% in Basel II) and 6% of Tier I capital (up from 4% in Basel II) of risk-weighted assets (RWA). Basel III also introduces additional capital buffers, (i) a mandatory capital conservation buffer of 2.5% and (ii) a discretionary countercyclical buffer, which allows national regulators to require up to another 2.5% of capital during periods of high credit growth.

In addition, Basel III introduces a minimum 3% leverage ratio and two required liquidity ratios. The Liquidity Coverage Ratio requires a bank to hold sufficient high-quality liquid assets to cover its total net cash outflows over 30 days; the Net Stable Funding Ratio requires the available amount of stable funding to exceed the required amount of stable funding over a one-year period of extended stress.

Overall, the proposed changes of the Basel III Accord are:

First, the quality, consistency, and transparency of the capital base will be raised.

- Tier 1 capital: the predominant form of Tier 1 capital must be common shares and retained earnings
- Tier 2 capital instruments will be harmonized
- Tier 3 capital will be eliminated.

Second, the risk coverage of the capital framework will be strengthened.

- Promote more integrated management of market and counterparty credit risk;
- Add the (credit valuation adjustment) CVA risk due to deterioration in counterparty's credit rating;
- Strengthen the capital requirements for counterparty credit exposures arising from banks' derivatives, repo and securities financing transactions;
- Raise the capital buffers backing these exposures;
- Reduce pro-cyclicality;
- Provide additional incentives to move over-the-counter (OTC) derivative contracts to central counterparties (probably clearing houses);
- Provide incentives to strengthen the risk management of counterparty credit exposures; and

- Raise counterparty credit risk management standards by including wrong-way risk

Third, the introduction of a leverage ratio as a supplementary measure to the Basel II risk-based framework.

- Introduce a leverage ratio requirement that is intended to achieve the following objectives:
  - Put a floor under the build-up of leverage in the banking sector; and
  - Introduce additional safeguards against model risk and by supplementing the risk based measure with a simpler measure that is based on gross exposures.

Fourth, introduction of a series of measures to promote the build-up of capital buffers in good times that can be drawn upon in periods of stress.

- Introduce a series of measures to address procyclicality:
  - Dampen any excess cyclicality of the minimum capital requirement;
  - Promote more forward looking provisions; and
  - Conserve capital to build buffers at individual banks and the banking sector that can be used in stress; and
- Achieve the broader macro-prudential goal of protecting the banking sector from periods of excessive credit growth.
  - Requirement to use long term data horizons to estimate probabilities of default;
  - Downturn loss-given-default estimates, recommended in Basel II, to become mandatory;
  - Improved calibration of the risk functions, which convert loss estimates into regulatory capital requirements; and
  - Banks must conduct stress tests that include widening credit spreads in recessionary scenarios.
- Promoting stronger provisioning practices (forward-looking provisioning):
  - Advocating a change in the accounting standards towards an expected loss (EL) approach (usually, *EL amount* = loss given default (LGD)*probability of default (PD)*exposure at default (EAD)).

Fifth, introduction of a global minimum liquidity standard for internationally active banks that includes a 30-day liquidity coverage ratio requirement underpinned by a longer-term structural liquidity ratio called the Net Stable Funding Ratio.

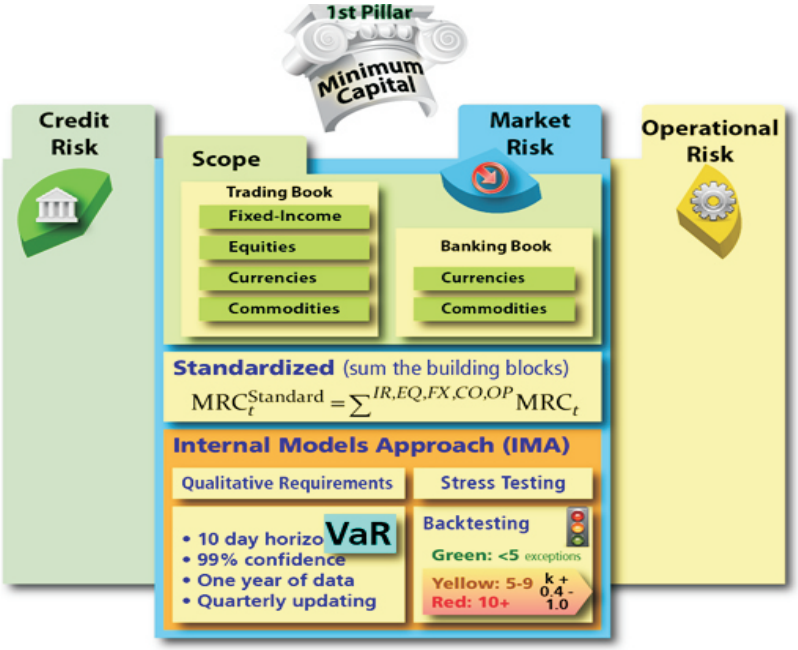
The Committee also is reviewing the need for additional capital, liquidity or other supervisory measures to reduce the externalities created by systemically important institutions.

III. Basel Accord and Market Risk Framework

The 1988 Basel Accord (otherwise known as Basel I) did not account for market risk. Market risk was only marginally recognized as a magnifier of credit risk (risk weight of 100% for foreign exchange-denominated claims on central governments, e.g. eurobonds). In 1993, two alternative approaches were proposed by the Basel Committee:

Standardised approach (SA)
Internal-models approach (IMA)

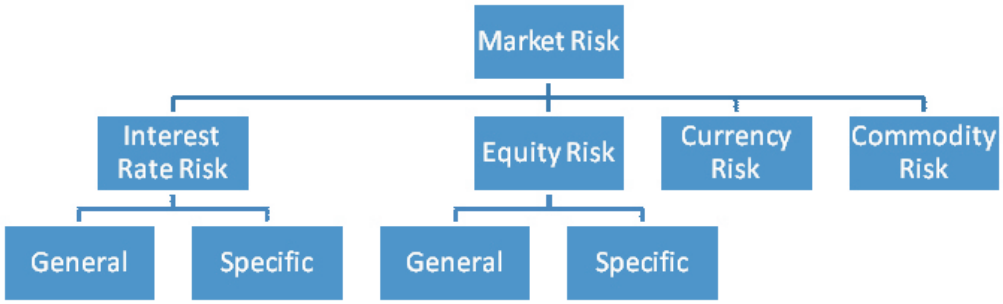
Figure 1: The Framework at a Glance



In 1996, the Amendment to the Basel Capital Accord led to the adoption of both SA and IMA by the Basel Committee in order to incorporate market risk . In 1998, implementation of SA and IMA commenced in G-13 countries.

Market risk refers to the risk of losses in a bank's trading book due to changes in equity prices, interest rates, credit spreads, foreign exchange rates, commodity prices and other indicators whose values are set in a public market (Amit Mehta, Mckinsey & Coy)

III.1 Standardised Approach



For interest rate, equity positions and their derivatives, the minimum capital requirement is expressed in terms of two separately calculated charges:

Specific risk of each security. 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 approach involves computation of marked-to-market values, V, and percentages, F, thereof: C = F*V.

General market risk on offset positions. The capital requirements for general market risk are designed to capture the risk of loss arising from changes in market factors.

For the foreign exchange, two processes are needed:
measure the exposure in a single currency position.
measure the risks inherent in a bank's mix of long and short positions in different currencies.

For commodities, the methodology used encompasses:
Directional risk, to capture the exposure from changes in spot prices arising from net open positions;

Forward gap and interest rate risk, to capture the exposure to changes in forward prices arising from maturity mismatches; and

Basis risk, to capture the exposure to changes in the price relationships between two similar, but not identical, commodities.

8 Specific risk represents the potential move in prices/rates due to events particular to that underlying issuer (also known as idiosyncratic risk).
9 General risk represents the potential move in prices/rates due to a move in the market as a whole, as represented by market index or government yield curves.

- Capital requirements for market risks only apply to the trading book
- Building block approach: individual requirements are added

Equity positions

Specific risk: 8% of the *gross general position*, (except for portfolios that are liquid and well diversified) i.e. the sum of all long and all short positions in equities and similar securities.

Generic risk: 8% of the net overall position (NOP), computed as the difference between the sum of the long positions and the sum of the short positions.

Interest Rates Specific Risk: The standard model calculates the general market risk charge arising from the impact on debt instruments of interest rate volatility. In principle, rising interest rates are the primary concern since it is these that cause mark-to-market (MTM) losses. A specific risk capital charge factor must first be determined based on the type of issuer and issue. Long and short positions in instruments may be netted for identical maturities, coupon rates and call features. The factor is applied to the market value of the instrument. The charge for portfolio of interest rate instruments is simply the sum of the charges applied to the instruments in the portfolio.

Foreign Exchange requirement

$$k_{FX} \quad 8\% \quad Max \quad \sum_j NP_j \, , \left| \sum_j NP_j \right|$$

Example of net exchange positions

Currency	*US dollar*	*British pound*	*Japanese yen*	*Swiss franc*	*Australian dollar*	*Canadian dollar*	*Total*
NP_j (€ mns)	30	-15	25	-30	5	-3	12
NP_j^+	30		25		5		60
$\lvert NP_j^- \rvert$		15		30		3	48

$$k_{FX} = 8\% \cdot Max(60,48) = 4.8$$

SA-Main points of criticism

"Building blocks" approach - summing of the capital requirements computed separately for the different risk categories;

Break down of risk by type of financial instrument rather than by type of underlying risk; and

No recognition of internal models developed by banks: two different measures of risk.

Rigid 'one-size-fits-all' framework

Aggregation of risks using simple summing: Non-perfect correlations inside and

across risk types are not recognized

Interest rate risk in the banking book is not covered by regulatory capital

In Summary: Standardised approach to setting market risk capital charge:

- Interest risk rate in the trading book (sum of general and idiosyncratic 'name' risk)
- Equity risk in the trading book (sum of general and idiosyncratic 'name' risk)
- Currency risk across the bank
- Commodity risk across the bank

Equity risk in the banking book is covered either through deductions from total capital (for non-consolidated equity holdings in subsidiaries) or by credit risk capital charge (100% risk weight for other equity investments)

From Standardised to Internal Models

Banks may use an internal model, typically based on value-at-risk (VaR) methodologies. Banks must receive a waiver before they are able to use a VaR model and must demonstrate that they meet certain quantitative and qualitative minimum criteria. Such models typically cover general risk and may also cover specific risk. Where specific risk is not covered, then the standard rules apply. Unlike the standard rules, these models also allow the correlation between different risk types and the resulting diversification benefits to be taken into account.

Banks which start to use models for one or more risk factor categories will be expected to extend the models to all their market risks. A bank with internal models will not be able to revert to measuring by a Standardised approach.

During a transition period, combination of internal models and the standardised methodology will be authorised before move to full internal models.

In the case of VaR models in calculating capital charge due to market risk, the preferred approach is value-at-risk (VaR) i.e. F*VaR. Banks will have flexibility in

devising the precise nature of their models, but the following minimum standards will apply for the purpose of calculating their capital charge.

"Value-at-risk" must be computed on a daily basis;
A 99th percentile, one-tailed confidence interval is to be used;
An instantaneous price shock equivalent to a 10 day movement in prices is to be used;
The historical observation period is a minimum length of one year; and
Banks should update their data sets no less frequently than once every three months.

The VaR Cushion

The Basel Committee has decided to establish a cushion of this type by requiring a multiplication factor of 3 to be applied to the VaR calculation.

Banks using proprietary models must compute VaR daily, using 99th percentile, one-tailed confidence interval with a time horizon of ten trading days using a historical observation period of at least one year.

Use of 'back testing' (ex-post comparisons between model results and actual performance) to arrive at the 'plus factor' that is added to the multiplication factor of three.

III.2 The IM Approach

Quantitative criteria Confidence level of at least 99%; 10 days holding period (2 weeks), taking the bank's trading positions as fixed for this interval; At least 1 year of historical data Volatilities & correlations updated monthly
Qualitative criteria Independent RM Unit VaR model used in day-to-day risk mgmt Board of Directors highly involved VaR model integrated by stress testing

$$MRC_t = Max\left(VaR_{t-1}; MF \cdot \frac{1}{60} \cdot \sum_{i=t-61}^{t-1} VaR_i \right)$$

MF (multiplying factor) ranges from 3 to 4 according to the internal model quality.

This is measured through **back-testing.**

- If VaR 99% = 100, then the bank should loose more than 100 only 1% of the times
- N. of exceptions (loss>VaR) in one year (250 trading days) should be approximately 2.5
- If n. of exceptions > 4, MF > 3
- If n. of exceptions > 9, MF = 4
- An accurate VaR model will produce more than 5 exceptions over a 250-day or scaling trading period 4.12% of the time i.e. the cumulative probability (%).

Basel Committee Internal Models Multiplying Factor

Area	*Number of exceptions*	*Increase*	*Multiplying factor*
Green	0	0.00	3.00
	1	0.00	3.00
	2	0.00	3.00
	3	0.00	3.00
	4	0.00	3.00
Yellow	5	0.40	3.40
	6	0.50	3.50
	7	0.65	3.65
	8	0.75	3.75
	9	0.85	3.85
Red	≥ 10	1.00	4.00

Source: Basel Committee (1996)

*Number of exceptions (out of 250 Trading Days using binomial distribution)

10 The MF is to provide a means of adjusting the VaR numbers to provide enhanced capital coverage against losses in the event of severe market movements. It is, however, not meant to substitute for regular stress testing. The MF is to be set by individual supervisors on the basis of their assessment of the quality of a bank's risk management system subject to a minimum of 3.

What does the minimum multiplier (3x) reflect?

Objective' model risk: Estimation error due to the high confidence level?
Subjective' model risk: 'Penalty' imposed to counterbalance incentives to underestimate VaR and minimize regulatory capital?
Long-run historical average ratio of stress-test results to average VaR (Monet 2001): *Capital cushion to absorb losses from sharp market movements or prolonged periods of high volatility?*
Scaling up to 1-year returns volatility? (strong mean-reversion presumed?)
Market liquidity risk?
Absent or ineffective corrective action of bank's management to reduce its exposure to market risk (e.g. missing or lax stop-loss limits)?

Is the multiplier 3x–4x too high or too low?

Kupiec and O'Brien (1997): Multiplier is redundant under the precommitment approach

Lucas (1998): Maximum multiplier should be *at least* 8 to mitigate 'gaming' incentives

Monet (2001): In the 'real-world', the multiplier should be perhaps 12

Both SA and IMA in 2004 incorporated into Basel II some technical amendments:
If specific risk on interest rate and equity positions in the trading book is not fully captured by VaR model, banks must calculate it using standardised methodology and add it to the VaR based capital charge as a surcharge (without scaling)
To capture specific risk, the model MUST (BCBS, 2006):

- Explain the historical price variation in the portfolio (e.g. in-sample R^2 ³ 90%)
- capture concentrations (magnitude and changes in composition)
- be robust to an adverse environment (e.g. full-cycle historical observation period, simulation, scenario worst-case analysis)
- capture name-related basis risk (idiosyncratic differences between similar but not identical positions)
- capture event risk (e.g. migration risk for debt, mergers/takeovers for equity)
- be validated through backtesting

Event risk beyond 99% confidence level and 10-day holding period not captured by the model must be factored in e.g. through stress-testing

Market liquidity risk must be reflected through scenario analysis and conservative proxies

New capital requirement for 'incremental' risk (regulatory capital default risk of trading book)

IV. Stress Testing

Banks that use the IMA for meeting market risk capital requirements must have in place a rigorous and comprehensive stress testing program.

Stress testing to identify events or influences that could greatly impact banks is a key component of a bank's assessment of its capital position.

Understanding and protecting against the vulnerabilities of a bank's risk-taking activities is of course one of the major responsibilities of the board of directors and senior management. Banks' stress scenarios need to cover a range of factors that can create extraordinary losses or gains in trading portfolios, or make the control of risk in those portfolios very difficult. These factors are due to low-probability events.

Stress scenarios need to shed light on the impact of such events on positions that display both linear and non-linear price characteristics (i.e. options and instruments that have options-like characteristics).

Banks' stress tests should be both of a quantitative and qualitative nature.

Quantitative criteria should identify plausible stress scenarios to which banks could be exposed. Qualitative criteria should emphasise that two major goals of stress testing are to evaluate the capacity of the bank's capital to absorb potential large losses and to identify steps the bank can take to reduce its risk and conserve capital.

This assessment is integral to setting and evaluating the bank's management strategy and the results of stress testing should be routinely communicated to senior management and, periodically, to the bank's board of directors. The Basel Committee recognises the difficulty associated with identifying standardised stress scenarios that will have a consistent impact across all banks. In general, the impact of any given set of market movements will depend crucially on the particular positions held in a bank's trading portfolio.

In this regard, the Committee has carefully considered the trade-offs between standardisation of the stress scenarios that banks would be required to evaluate and the difficulties of permitting some degree of bank-specific analysis while ensuring a common degree of rigor.

The Committee believes that the best way to address these difficulties is to combine the use of supervisory stress scenarios with stress tests developed by individual banks to reflect their specific risk characteristics. Specifically, supervisors may ask banks to provide information on stress testing in three

broad areas:

- Supervisory scenarios requiring no simulations by the bank
- Scenarios requiring a simulation by the bank
- Scenarios developed by the bank itself to capture the specific characteristics of its portfolio.

V. Basel III Supplemental Market Risk Capital Requirements

he heart of Basel III is the continuation of existing Value-at-Risk-based capital requirement plus the imposition of four supplemental capital requirements for market risk. These are:

- A Stressed Long-Term Capital Requirement (Stressed VaR focuses on high volatility periods to better capture tail or stress events);
- A Long-Term Incremental Risk Charge (closely related to marginal VaR and measures the impact of small changes in position weighting. These are meant for positions for which it will take more than 10 days to defease the default risk);
- A Comprehensive Risk Capital Requirement; and
- A Specific Risk Charge;

VI. The Basic Value-at-Risk-based Market Risk Capital Charge

The supplemental capital requirements are in addition to the existing Value-at-Risk (VaR) -based capital charge. The existing charge is based on the 99% one-tail confidence interval of potential loss from imposing the instantaneous equivalent of a 10-day move in underlying market rates or prices.

More specifically, it is the maximum of the latest daily VaR metric for the previous business day and the average of these metrics over the previous 60 business days. This value is multiplied by a bank specific regulatory factor, with a minimum value of 3.0, to arrive at the resulting capital charge.

VI.1 A Stressed Long-Term Capital Requirement

he Stressed Long-Term Capital Requirement is structurally identical to the Basic VaR-based charge except that the underlying factor model must be calibrated to historical data from a continuous 12- month period of significant financial stress relevant to the bank's portfolio.

VI.2 A Long-Term Incremental Risk Charge

The Long-Term Incremental Risk Charge (LTIRC) *explicitly addresses the need to reflect*

default and migration risk over a longer time horizon than the 10-day holding period implicit *in charges 1 and 2*. Under Basel III, the LTIRC represents an estimate of the *default and migration risk* of unsecured credit products over a one-year capital horizon at a 99.9% confidence level. The calculation take into account the liquidity horizon (the time to liquidate or hedge a given exposure) applicable to individual positions assuming maintenance of a constant level of risk over the one-year capital horizon. The liquidity horizon is to be that which would prevail in stressed market conditions and cannot be less than the smaller of three months or the contractual maturity of the position.

In essence, calculating the LTIRC is equivalent to modeling the impact of changes in issuer specific credit spreads over each liquidity horizon and then, rebalancing the portfolio to restore the original level of risk exposure.

VI.3 A Comprehensive Risk Capital Requirement

The Comprehensive Risk Capital Requirement represents an estimate of *all price risks* of the bank's portfolio *correlation of trading positions over a one-year time horizon at the 99.9% confidence level*, again assuming maintenance of a constant level of risk over the one-year capital horizon. Correlation positions include:

> A securitisation position for which all or substantially all of the value of each of the underlying exposures is based on the credit quality of a single actively traded company, or
> A non-securitisation position that hedges a securitisation position described above. Calculation of the capital requirement of correlation positions *requires detaile analysis of the default adjusted performance of each underlying exposure*, with special attention to the degree of co-variation in such performance.

VI.4 A Specific Risk Charge

Specific risk is the risk of losses on market risk exposures caused by factors other than broad market movements, including event risk and idiosyncratic risk. If a bank applies the Internal Modelling Approach (IMA) to the derivation of its Long-Term Incremental Risk Charge (item 3 above), default risk can be excluded from its specific risk calculation. Other types of event risk may give rise to a capital charge if they are material sources of potential loss.

VI.5 Modelling Market Risk Portfolios

Under the Basel III market risk measurement framework, market risk is defined as the

risk of losses in on and off-balance-sheet positions arising from movements in market prices. The risks, subject to this requirement are the risks pertaining to interest rate related instruments and equity securities in the trading book; and foreign exchange risk and commodities risk throughout the bank on a worldwide net consolidated basis, irrespective of where the instruments are booked.

The trading book consists of positions in financial instruments and commodities held either with trading intent or in order to hedge other elements of the trading book. Positions held with trading intent are those held intentionally for short-term resale and/or with the intent of benefiting from actual or expected short-term price movements or to lock-in arbitrage profits, and may include for example, proprietary positions, positions arising from client servicing (e.g. matched principal broking) and market making.

Securitisation positions are covered by the Basel III market risk measurement framework. Securitisation positions include securitisation tranche instruments created by a securitisation transaction in which:

I. All or a portion of the credit risk of one or more underlying exposures is transferred to one or more third parties;
II. The credit risk associated with the underlying exposures has been separated into at least two tranches that reflect different levels of seniority;
III. performance of the securitisation exposures depends upon the performance of the underlying exposures;
IV. All or substantially all of the underlying exposures are financial exposures (such as loans, commitments, credit derivatives, guarantees, receivables, asset-backed securities, mortgage-backed securities, other debt securities, or equity securities); and
V. (v) for non-synthetic securitisations, the underlying exposures are not owned by an operating company. Securitisation positions also include market risk exposures that reference underlying securitisation tranche instruments.

The market risk capital requirements for securitisation positions that are correlation trading positions are addressed by the IMA. A correlation trading position is: (i) a securitisation position for which all or substantially all of the value of the underlying exposures is based on the credit quality of a single company for which a two-way market exists, or on commonly traded indices based on such exposures for which a two-way market exists on the indices, or (ii) a position that is not a securitisation position that hedges a securitisation position described in (i). Correlation trading positions may include CDO index tranches, customized CDO

tranches, and nth-to-default credit derivatives, and hedges of these positions may include standardized CDS index and single-name CDS positions.

The market risk capital requirements for securitization positions that are not correlation trading positions are addressed under the SMM, so these securitization positions are not modelled and analyzed under the IMA.

Since VaR and LTIRC amounts are calculated in the bank's domestic currency under the Basel III IMA guidelines, any net position denominated in a foreign currency introduces foreign exchange risk. Thus all foreign currency denominated positions held in either the trading or the banking books are subject to the IMA market risk capital requirement.

A financial instrument is any contract that gives rise to both a financial asset of one entity and a financial liability or equity instrument of another entity. Financial instruments include both primary financial instruments, i.e. cash instruments, and derivative financial instruments.

A financial asset is any asset that is cash, the right to receive cash or another financial asset; or the contractual right to exchange financial assets on potentially favorable terms, or an equity instrument. A financial liability is the contractual obligation to deliver cash or another financial asset or to exchange financial liabilities under conditions that are potentially unfavorable.

Under the IMA, the consolidated collection of trading book, foreign exchange, and commodity market risk exposures is modeled as a portfolio of financial instruments where each instrument represents a market risk exposure to one or more sources of market risk.

The IMA requires that each financial instrument describing a market risk exposure be modeled in sufficient detail so that its current and future economic value, future cash

In summary, Basel III capital enhancement:

$$MRC = \max\left(k_1 \cdot \frac{1}{60}\sum_{i=1}^{60} VaR_{t-i}, VaR_{t-1}\right) + \max\left(k_2 \frac{1}{60}\sum_{i=1}^{60} SVaR_{t-i}, SVaR_{t-1}\right)$$

… subject to the following requirements:

- Same VaR-model, confidence level and holding period are used, various techniques can be used to translate the 'normal' VaR-model into a 'stressed' model (e.g. 'antithetic' data, absolute instead of relative volatilities etc.)
- Stressed VaR computed at least weekly
- Multipliers k1 and k2 are set by national supervisors subject to an absolute minimum of 3
- Backtesting of Stressed-VaR model not performed!

Specific risk interest rate and equity risk should be captured by VaR model

Default and migration risks need not be captured for positions subject to incremental risk capital charge

Event risk beyond 99% confidence level and 10-day holding period need not be captured

Incremental' risk (default & migration risk for positions with specific interest rate risk) must be captured

VI.6 Key concerns:

Both k1 and k2 are obviously NOT a long-run historical average ratio of stress-test results to average VaR (as per Monet 2001);

Restrictions on eligible model types: Marginal sensitivity-based models (e.g. delta-normal, delta-gamma, delta-gamma-vega) applied to non-linear positions are NOT suitable for calculating stressed VaR under large increments of risk factors);

Minimum value of 3 for k2 seems arbitrary and is apparently NOT well-reasoned;

Banks get incentives to select a period of financial stress with lower volatility for calculating 'stressed' VaR; and

Internal models method for calculating capital for equity risk in the banking book has NOT been changed:

$$MRC \quad \max \; VaR \; 99\%, \; r \quad rf \;, E \quad k$$

r – quarterly returns on equity

rf – long-term risk-free rate

A – exposure at risk

k – minimum risk weight (200% for publicly traded equity, 300% for other equity holdings)

VI.7 External Validation

An independent review and validation of banks' market risk measurement systems is essential if supervisors are to be assured that banks' measurement systems not only meet the required standards but also that the models are well designed and implemented with integrity. The main focus of this review should be on the adequacy of the internal validation process and of the documentation of the bank's policy and procedures.

The Committee has considered a number of ways of enhancing the ability to validate the output of banks' internal risk measurement models. This discussion has focused on determining what sort of information would be useful in understanding the factors determining a bank's estimate of its market risk exposure; and in gaining comfort that the estimates are a reasonable representation of the actual risks arising from the banks' trading activities.

It is important that the regulator should ensure that banks' models produce reasonably consistent results.

The Committee believes, it is essential that banks conduct back-testing, and that they make the results and the underlying inputs to the value-at-risk calculation available to their supervisors and/or external auditors on request.

Such comparisons would provide the supervisors with a useful tool for evaluating how accurately banks' internal models are able to measure the market risk of their portfolio over time.

The development of rigorous stress tests is a key element of a meaningful validation scheme, since it is important to ensure that the capital generated by the market risk capital charge is sufficient to withstand losses that might result from unanticipated market movements (for instance, when correlation assumptions break down). It is a deliberate objective of the Basel Committee to encourage banks to develop stress tests that are tailored to their individual risk profiles.

VII. Concluding Remarks

The Basel Framework lays emphasis on the relevance of risk management and tries to link the minimum capital requirements of internationally active banks with the amount of tail risk in their trading books. The framework is applicable to all banks, including Nigeria.

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