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Revised framework for capital measurement and capital standards (Basel II)

Introduction

Over recent years the *Basel Committee on Banking Supervision*² has been working on a revised framework for capital measurement and capital standards (often termed Basel II). The first round of proposals for revising the capital adequacy framework were published in June 1999, and additional proposals in January 2001 and April 2003. Three quantitative impact studies were conducted to assess the impact of the Basel II proposals on minimum capital requirements. In June 2004 the Basel Committee published its final paper, *International Convergence of Capital Measurement and Capital Standards: A Revised Framework*. The Committee reserves the right to make revisions to the proposals when necessary.

The Basel Committee's current Accord (Basel I), dating from 1988, presented standardised approaches for calculating capital requirements against lending. Treatment of market risk was added later. Main changes to capital requirements under the revised framework include the use of a ratings-based approach (RBA), internal assessment approach (IAA) and operational risk measurement methodologies. A number of minimum requirements are proposed that banks must fulfil, especially concerning the IAA. The revised framework provides a range of options for determining the capital requirements for credit risk and operational risk to allow banks and

supervisors to select approaches that are most appropriate for their operations and their financial market infrastructure. It also stipulates that supervisors should verify its implementation by banks, including their minimum requirements.

The revised framework is designed to establish minimum levels of capital for internationally active banks. As under the 1988 Accord, national authorities will be free to adopt arrangements that set higher requirements, for example to address potential uncertainties in the accuracy of the measure of risk exposures. The Committee intends the framework to be available for implementation as of year-end 2006. Basic impact studies or parallel calculations will be available for implementation from year-end 2006, and the most advanced approaches as of year-end 2007.

This article summarises certain key aspects of the revised framework, focusing in particular on elements that differ from the current Basel I framework. It describes minimum capital requirements (Pillar 1), supervisory review process and capital requirement (Pillar 2) and market discipline (Pillar 3). Discussion of the minimum capital requirement focuses on the standardised and internal risk-based (IRB) approaches to credit exposure, as well as methodologies for measuring operational risk.

Pillar 1 – Minimum capital requirements

The broad principle is that the revised framework will be applied on a consolidated basis to internationally active banks. Thus it includes any holding company that is the parent entity within a banking group.

1. The author is employed at the Financial Department of the Central Bank of Iceland.

2. The *Basel Committee on Banking Supervision* was established by the central bank governors of the Group of Ten countries in 1975. Its work includes standards and guidelines for best practice in banking supervision. Proposals by the Basel Committee do not have legal effect.

It will also apply to all internationally active banks at every tier within a banking group.

Regulatory capital, risk exposure and capital ratio

Regulatory capital under the revised framework is calculated using the definition of regulatory capital and risk-weighted assets.

Defined regulatory capital is divided into Tier 1 capital (T1), Tier 2 capital (T2) and Tier 3 capital (T3). T1 capital comprises equity, goodwill, retained earnings and innovative capital instruments. T2 consists of revaluation, subordinated debt, hybrid instruments and general loan-loss provisions (under the standardised approach). T3 comprises short-term subordinated debt. Measurement of defined capital incorporates deductions such as holdings in financial, insurance and other companies. Such deductions of investments will be 50% from Tier 1 and 50% from Tier 2 capital.

Risk exposure comprises risk-weighted assets in connection with lending, plus market risk and operational risk. The minimum capital ratio will be 8%, as in the earlier framework.

Treatment of provisions

Under the standardised approach to credit risk, general provisions can be included in Tier 2 capital subject to the limit of 1.25% of risk-weighted assets. Banks using the IRB must compare the amount of total eligible provisions with the total expected losses (EL) amount. Where EL exceeds total eligible provisions, banks must deduct the difference. Deduction must be on the basis of 50% from Tier 1 and 50% from Tier 2. Where total EL is less than total eligible provisions, banks may recognise the difference in Tier 2 capital up to a maximum of 0.6% of credit risk-weighted assets.

Credit risk – standardised approach

In effect, the standardised approach as presented under the revised framework is a direct continuation of the current capital requirements. One of the main changes is that banks may now use credit ratings of external credit assessment institutions (ECAIs),³ which are deemed eligible by the supervisory author-

ities, to determine their credit risk weightings. The following are the main aspects of the standardised approach to credit risk assessment.

Claims on sovereigns and central banks

Credit assessments of sovereigns and central banks are rated and the derived risk weightings of claims on them are as follows:

<i>Credit assessment</i>	<i>AAA to AA-</i>	<i>A+ to A-</i>	<i>BBB+ to BBB-</i>	<i>BB+ to B-</i>	<i>Below B-</i>	<i>Unrated</i>
Risk weight	0%	20%	50%	100%	150%	100%

At national discretion, a lower risk weighting may be applied to banks' exposures to their sovereign (or central bank) of incorporation which are denominated in domestic currency and funded in that currency.

Claims on banks

There are two options for claims on banks. National supervisors will apply one option to all banks in their jurisdiction.

Under Option 1, the risk weight of banks is derived from that of the sovereigns where they are incorporated. Thus all banks in countries with sovereigns rated above BB+ will be assigned a risk weight one category less favourable than that assigned to the sovereign. Credit assessments of sovereigns and the derived risk weights for claims on banks are as follows:

<i>Credit assessment of sovereign</i>	<i>AAA to AA-</i>	<i>A+ to A-</i>	<i>BBB+ to BBB-</i>	<i>BB+ to B-</i>	<i>Below B-</i>	<i>Unrated</i>
Risk weight under Option 1	20%	50%	100%	100%	150%	100%

Option 2 bases the risk weight on the external credit assessment of the bank itself with claims on unrated banks being risk-weighted at 50%. Under this option, a preferential risk weight that is one category more favourable may be applied to short-term claims (< 3 months), except for banks rated below B-. Credit assessments of banks and the derived risk weights for claims on them are as follows:

3. The notations in this article follow the methodology used by Standard & Poor's.

<i>Credit assessment of banks</i>	<i>AAA to AA-</i>	<i>A+ to A-</i>	<i>BBB+ to BBB-</i>	<i>BB+ to B-</i>	<i>Below B-</i>	<i>Unrated</i>
Risk weight under Option 2	20%	50%	50%	100%	150%	50%
Risk weight for short-term claims under Option 2	20%	20%	20%	50%	150%	20%

Claims on corporates

The risk weights of rated corporate claims, including claims on insurance companies, are as follows:

<i>Credit assessment</i>	<i>AAA to AA-</i>	<i>A+ to A-</i>	<i>BBB+ to BB-</i>	<i>Below BB-</i>	<i>Unrated</i>
Risk weight	20%	50%	100%	150%	100%

Unrated credit is assigned a risk weight of 100%.

Claims included in regulatory retail portfolios

Exposures included in a regulatory retail portfolio may be risk-weighted at 75%. To be included in that category, claims must meet the following criteria:

- The exposure is to an individual person or persons or to a small business.
- The exposure takes the form of a consumption (rather than investment) loan, as further defined.
- The regulatory retail portfolio is sufficiently diversified.
- The maximum aggregated retail exposure to one counterparty cannot exceed an absolute threshold of €1 million.

Claims secured by residential property or commercial real estate

Lending fully secured by mortgages on residential property will be risk-weighted at 35%, but supervisors should increase the standard risk weight where they judge that there is no substantial margin of additional security over the amount of the loan, based on strict valuation rules.

In view of the experience that commercial property lending has been a recurring cause of troubled assets in the banking industry over the past few decades, mortgages on commercial real estate, in principle, justify only a 100% weighting of the loans secured. Exceptional treatment may be made, subject to very strict conditions.

Past due loans

Qualifying residential mortgage loans that are past due for more than 90 days will be risk-weighted at 100%, net of specific provisions. If such loans are past due but specific provisions are no less than 20% of their outstanding amount, the risk weight applicable to the remainder of the loan can be reduced to 50% at national discretion.

The unsecured portion of an ordinary loan⁴ that is past due for more than 90 days, net of specific provisions, will be risk-weighted as follows:

- 150% risk weight when specific provisions are less than 20% of the outstanding amount of the loan;
- 100% risk weight when specific provisions are no less than 20% of the outstanding amount of the loan, but with supervisory discretion to reduce the risk weight to 50% when specific provisions are no less than 50% of the outstanding amount of the loan.

Standardised approach – risk weight of assets

	<i>Risk weight</i>
Sovereigns and central banks Credit assessment	
Financial companies and local authorities ¹ Option 1 or Option 2	
Corporates Credit assessment or 100%	
Regulatory retail portfolio	75%
Claims secured by residential property	35%
Claims secured by commercial real estate.....	100%
Past due loans secured by residential property	100% (50%)
General past due loans (90 days)	150%/100% (50%)
Equities	100%
Venture capital	150%
Other assets	100%

1. Whether local authorities qualify for treatment as sovereign or central government, or as corporates, depends on their specific revenue-raising powers.

Issuer versus issues assessment

Where a bank invests in a particular issue that has an issue-specific assessment, the risk weight of the claim will be based on this assessment. Where the bank's claim is not an investment in a specific

4. After allowance for qualifying collateral, in particular securities.

assessed issue, the following general principles apply:

- If the borrower has a specific assessment for another issued debt, it may only be applied to an unassessed claim that ranks *pari passu* or senior to the claim with an assessment.
- If the borrower has an issuer assessment, this will typically apply to senior claims on that issuer. Other unassessed claims of an issuer will be treated as unrated.

Credit risk mitigation

The revised framework permits the use of more financial collateral for credit risk mitigation than in the 1988 Accord. The main collateral instruments eligible for recognition in the simple approach are cash, gold, rated debt securities, listed debt securities issued by a bank, equities included in a main index and units in UCITS and mutual funds. In assessing the qualification of collateral, banks may opt for either a simple approach or a comprehensive approach. The simple approach substitutes the risk weighting of the collateral for the risk weighting of the counterparty for the collateralised portion of the exposure, but does not allow mismatches in the maturity of the underlying exposure and the collateral. In the comprehensive approach, banks are required to use haircuts to adjust both the amount of the exposure to the counterparty and the value of any collateral. In effect, the adjusted amount for the exposure will be higher than the exposure and for the collateral it will be lower. Where the adjusted exposure amount is greater than the adjusted collateral amount, banks shall calculate their risk-weighted assets as the difference between the two multiplied by the risk weight of the counterparty.

Credit Risk – The Internal Ratings-Based Approach

Banks that have received supervisory approval to use the IRB approach may rely on their own internal estimates of risk components in determining the capital requirement for a given exposure. The IRB approach is used for measures of unexpected losses (UL) and expected losses (EL). Total expected losses are compared with the total eligible provisions for the items on which the expected loss is calculated.

The capital ratio of banks using the IRB approach is as follows:

$$\frac{\text{Defined regulatory capital} + (\text{provisions} - \text{EL amount})}{\text{Risk-weighted assets (UL)} + (12.5 \times \text{capital requirements for market risk and operational risk})} \geq 8\%$$

The IRB approach for measuring the capital requirement for exposures is largely based on four elements: categorisation of exposures, formulas, risk components and minimum requirements.

Categorisation of exposures

Under the IRB approach, exposures are divided into seven categories: corporates, sovereigns, banks, retail, equities in the banking book, receivables and other assets. Classification is crucial since exposure categories are subject to different formulas, risk components and minimum requirements. Exemptions are made from the principles, and the processes for implementing them differ between exposure categories.

Formulas

Formulas are used to risk-weight assets corresponding to UL. Five formulas are used in the IRB approach: one for corporate, sovereign and bank exposures, another for SMEs and three for different types of retail exposure. Different rules apply to calculation of other categories of risk-weighted assets.

For corporate, sovereign and bank exposures not in default, the formula for calculating risk-weighted assets is:⁵

$$\text{Correlation (R)} = 0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.24 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))]$$

$$\text{Maturity adjustment (b)} = (0.11852 - 0.05478 \times \ln(\text{PD}))^2$$

$$\text{Capital requirement (K)} = [\text{LGD} \times N[(1 - R)^{-0.5} \times G(\text{PD}) + (R / (1 - R))^{0.5} \times G(0.999)] - \text{PD} \times \text{LGD}] \times (1 - 1.5 \times b)^{-1} \times (1 + (M - 2.5) \times b)$$

$$\text{Risk-weighted assets (RWA)} = K \times 12.5 \times \text{EAD}$$

5. Ln denotes the natural logarithm. N(x) denotes the cumulative distribution function for a standard normal random variable. G(z) denotes the inverse cumulative distribution function for a standard normal random variable.

Risk components

Under the IRB framework, banks must calculate risk components used in measurements of UL capital requirements for risk-weighted assets and of EL amounts. There are four risk components under the IRB framework: probability of default (PD), loss given default (LGD), exposure at default (EAD) and effective maturity (M). PD and EAD are percentages. PD (90 days) is based on one year and calculated for each of a minimum of seven risk categories.

Minimum requirements

Banks must meet minimum standards set by the supervisor in order to use the IRB approach for measurements of capital requirements. To be eligible for the IRB approach, a bank must demonstrate to its supervisor that it meets certain minimum requirements at the outset and on an ongoing basis.

It is important for the credit risk rating system to be integrated with the credit approval, risk management and corporate governance functions of banks. Documentation must be available of their rating systems' design and operational details, evidencing compliance with the minimum standards. Banks must have independent credit risk control units that are responsible for the design or selection, and the implementation and performance, of their internal rating systems. Internal audit or an equally independent function must review at least annually the bank's rating system and its operations. A review of the overall risk management process should take place at regular intervals and should address the integration of the rating system and lending processes, assess risk components and review adherence to minimum requirements.

Foundation and advanced approaches

Two broad approaches are available for calculation of capital requirements: a foundation and an advanced approach. Under the foundation approach, banks provide their own estimates of PD and rely on supervisory estimates for other risk components. Under the advanced approach, banks provide their own estimates of PD, LGD and EAD, and their own calculation of M.

For retail exposures, there is no distinction between a foundation and advanced approach. Banks using the IRB approach must provide their own estimates of PD, LGD and EAD.

The IRB approach allows the use of more types of collateral for offsetting the capital requirement than the standardised approach.

Adoption of the IRB approach

When adopting an IRB approach, a bank must produce an implementation plan that must be approved by the supervisor, specifying to what extent and when it intends to roll out IRB approaches across significant asset classes over time. Various factors such as data limitations may prevent banks from assessing risk components for some asset classes. In such circumstances, supervisors may allow the use of the IRB approach on some of the assets, and the standardised approach on others (generally exposures in non-significant asset classes that are immaterial in terms of size and perceived risk profile). The supervisor may also allow banks to use the foundation approach at first, and then the advanced approach when its conditions have been met. Banks adopting an IRB approach will not be allowed to return to the standardised approach except in extraordinary circumstances, such as divestiture of a large fraction of its credit-related business.

Under the revised framework, the foundation approach may be used from the end of 2006 and the advanced approach from the end of 2007. A year before implementation, i.e. in 2006 for the foundation approach and 2007 for the advanced approach, banks will need to calculate their capital requirements both according to the older Accord of 1988 and using the IRB approach. Until the end of 2009 a capital floor will be applied to prevent the adoption of the IRB approach from causing a substantial reduction in the risk weight.

Banks may use two years of historical data at the implementation of the framework for calculation of risk components. After three years of using the IRB approach, the historical data observation period shall be five years.

Operational risk

Operational risk is defined in the framework as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events.

The framework presents three methods for calculating operational risk capital charges: the Basic

Indicator Approach, the Standardised Approach and Advanced Measurement Approaches (AMA).

Basic Indicator Approach

Under the Basic Indicator Approach, banks must hold capital for operational risk equal to the average over the previous three years of 15% of positive annual gross income. Banks using this approach are encouraged to comply with the Basel Committee's guidance on *Sound Practices for the Management and Supervision of Operational Risk*.

Standardised Approach

In the Standardised Approach, banks' activities are divided into eight business lines: corporate finance, trading & sales, retail banking, commercial banking, payment & settlement, agency services, asset management, and retail brokerage. Within each business line, gross income is a broad indicator for proxying the likely scale of operational risk exposure. The capital charge for each business line is calculated by multiplying gross income by a factor assigned to it in the range 12%-18%. The total capital charge is calculated as the three-year average of the simple summation of the regulatory capital charges across each of the business lines in each year.

A supervisor can choose to allow a bank to use the Alternative Standardised Approach (ASA), under which the operational risk capital charge/methodology is the same as for the Standardised Approach except for retail banking and commercial banking. For these business lines, loans and advances are used as the exposure indicator.

Certain minimum criteria are set to qualify for using the Standardised Approach for measuring operational risk. These address issues including the operational risk management framework, quality of assessment systems and regular review by external auditors and/or supervisors.

Advanced Measurement Approaches (AMA)

Under the AMA, banks use an internal risk measurement system. They must track internal loss data to tie risk estimates to actual loss experience. Qualitative and quantitative criteria are set for the use of internal risk measurement systems. Examples of the former are an independent operational risk management function that is responsible for the design and imple-

mentation of the bank's operational risk management framework; an internal operational risk measurement system that is closely integrated into day-to-day risk management processes; and a routine for ensuring compliance with a documented set of internal policies, controls and procedures concerning the system. Furthermore, internal and/or external auditors must perform regular reviews of the operational risk management processes, measurement systems and management function. Supervisory approval is required for the use of AMA.

Pillar 2 – Supervisory review process and capital requirement

The key aim of Pillar 2 of the framework is to ensure that banks have adequate capital to support all the risks in their business. It also aims to encourage banks to develop and use better risk management techniques in monitoring and managing their risks, and to serve as a framework for communications between supervisors and banks.

Internal capital assessment

Banks need processes for assessing total risk and subsequent capital requirements. Assessment of total risk exposure must consider risks that are not fully captured or comprehensively taken into account by the Pillar 1 process. The main risks involved in this respect are credit concentration risk, operational risk, market risk, interest rate risk in the banking book and liquidity risk. Stress testing shall be one method used in evaluating capital adequacy. Banks must be able to demonstrate that the capital targets set are commensurate with their risk profile. Board and senior management oversight is emphasised in risk management, along with internal control review.

Supervisory review

Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and to ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the result of this process.

Capital and prudential supervision

Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum. Furthermore, supervisors should seek to intervene at an early stage to prevent capital from falling below necessary minimum levels and should require rapid remedial action in such cases.

Pillar 3 – Market discipline

The purpose of Pillar 3 – market discipline is to complement the minimum capital requirements (Pillar 1) and the supervisory review process (Pillar 2). As pointed out above, the IRB approach gives banks more scope in assessing their capital requirements. The Basel Committee aims to encourage market discipline by developing a set of semi-annual disclosure requirements which will allow market participants to assess key pieces of information on the scope of application, capital, risk exposures, risk assessment processes, etc. Such disclosures enable market participants to make better assessment of a bank's exposure to risks and enhance comparability. In selecting its requirements, the Committee aimed to strike an appropriate balance between the need for meaningful disclosure for assessment and comparison, and the protection of proprietary and confidential information.

This information can be presented in a variety of forms, e.g. in annual financial statements, a publicly accessible Internet website or under a different disclosure regime, as decided by the supervisory author-

ities. When information is presented in annual financial accounts, banks should explain differences between accounting disclosures and Basel II disclosures.

Concluding remarks

Financial companies operating in Iceland are subject to capital adequacy rules set by the Financial Supervisory Authority (FME). The FME rules are based on two EU directives addressing capital issues: Directive 2000/12/EC of the European Parliament and of the Council of 20 March 2000 relating to the taking up and pursuit of the business of credit institutions, and Council Directive 93/6/EEC of 15 March 1993 on the capital adequacy of investment firms and credit institutions. The capital adequacy provisions of both directives are largely based on the Basel I framework.

Alongside the Basel Committee's work on the revised capital framework, the EC Commission has been reviewing the capital adequacy provisions of Directives 2000/12/EC and 93/6/EEC with a view to harmonising them with the Basel II framework. Thus the substance of the revised Basel framework will be valid for Icelandic financial companies, even though the framework itself will not have legal effect in Iceland.

The Basel Committee's *Revised Framework for International Convergence of Capital Measurement and Capital Standards* (Basel II) has been published on the BIS website: <http://www.bis.org>.