



Monetary Authority of Singapore

GUIDELINES ON IRB ADOPTION

**SUPERVISORY PERMISSION AND
ROLLOUT PARAMETERS**

Glossary

A-IRB	Advanced IRB for corporate, sovereign and bank exposures
Application	Process by which a bank applies for supervisory permission to adopt IRB
Asset class	As defined in Basel II, paragraph 215
Basel II	International Convergence of Capital Measurement and Capital Standards: A Revised Framework (BCBS, June 2004)
BCBS	Basel Committee on Banking Supervision
CAR	Capital adequacy ratio
F-IRB	Foundation IRB for corporate, sovereign and bank exposures and IRB for retail exposures
IRB	Internal Ratings-based Approach for calculating regulatory capital requirements
IRB adoption date	Date from which a bank begins using IRB for calculating any part of its regulatory capital requirements
Basel II implementation date	Date(s) from which banks incorporated in Singapore are to use permitted Basel II approaches for computing regulatory capital requirements
IRB rollout	Process by which a bank progressively extends the use of IRB to different asset classes, sub-classes and business units in different jurisdictions
Parallel run	Period of parallel calculation of capital requirements under IRB and under the capital rules used by the bank prior to the start of the parallel run
Sub-class	As defined in Basel II, paragraphs 215, 220 and 233
Transition	Start of use of IRB for calculating the capital requirements for a particular asset class or business unit at or after IRB adoption
Supervisory validation	Process by which MAS examines a bank's readiness for IRB and decides whether the bank may begin a recognised parallel run

Preface

On 25 Aug 2004, MAS issued a consultation paper¹ inviting comments on MAS' baseline expectations for a bank that intends to adopt IRB under Basel II.

2 The consultation period closed on 30 Sep 2004. MAS thanks all respondents for their comments.

3 MAS has considered the feedback received, and sets forth in these guidelines:

- The process by which MAS will permit a bank incorporated in Singapore to adopt IRB; and
- The parameters for a bank's IRB rollout.

¹ Consultation Paper: IRB Approach Rollout and Exclusions, August 2004.

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1 Background

1.1 Basel II prescribes the standards for the rollout of the advanced approaches to calculating capital requirements for credit and operational risks and allows national supervisors certain discretions in implementing these standards. The BCBS has recommended that A-IRB be made available from end-2007.² MAS intends to adhere to this timing. The BCBS has also recommended that the Standardised Approach and F-IRB be made available from end-2006. While these guidelines are written with the BCBS' staggered Basel II implementation dates in mind, MAS does not rule out a single Basel II implementation date at end-2007, taking into account, among other things, the implementation timelines of other jurisdictions and banks' IRB rollout plans.

1.2 This document sets out the process by which a bank may apply to MAS for supervisory permission to adopt IRB, and the parameters within which a bank is to execute its IRB rollout. Certain elements will be required of banks through statutory instruments that MAS will issue.³ Other elements are supervisory expectations, intended to guide banks within certain bounds of acceptability.⁴

2 Supervisory Permission

MAS' CONSIDERATIONS

2.1 IRB relies on a bank's internal risk assessments obtained through its rating systems to determine minimum capital requirements under Pillar 1. MAS considers that the bank has primary responsibility for validating its rating systems. The objective of the bank's internal validation is to ensure the integrity of its internal risk assessments for the purposes of determining minimum capital requirements. The bank's internal validation should

² MAS understands the term "end-2007" to mean that a bank adopting IRB at end-2007 will submit its first Solo and Group statutory CAR returns using IRB as at 31 December 2007. The terms "end-2006", "end-2008", "end-2009" and "end-2010" should be interpreted accordingly.

³ Such requirements are introduced with the phrase "A bank will be required" or similar phrases.

⁴ Such supervisory expectations are introduced with the phrase "MAS expects", "a bank should" or similar phrases.

encompass both the quantitative and qualitative aspects of its rating systems. The quantitative aspects would include using a range of statistical tests to determine whether the bank's rating systems discriminate risk⁵ and generate predictive IRB estimates. The qualitative aspects would include not only the design and theoretical underpinnings of the bank's rating systems and the development, use and monitoring of those systems, but also the broader context within which they operate. This would include an assessment of whether the bank has set up and is able to maintain a governance framework, including the appropriate organisational structures and control mechanisms, to ensure that it is able to continue to generate predictive IRB estimates.

2.2 Notwithstanding that validation is primarily the responsibility of the bank, before MAS permits a bank to adopt IRB, MAS will need to be satisfied that the bank's internal validation of its rating systems is robust and that there is no reason to doubt that the bank will be able to continue using its rating systems to calculate minimum capital requirements under Pillar 1. To this end, a Singapore-incorporated bank that intends to adopt IRB **will be required** to undergo a supervisory validation process, i.e. a supervisory review of the bank's internal validation and other relevant areas with the objective of forming a view on the bank's readiness for IRB and deciding whether the bank may begin a recognised parallel run. **MAS expects** this process to involve a thorough review of the bank's documentation of its internal validation, discussions between MAS and the bank's key management personnel, on-site examinations, and other methods MAS may identify as appropriate for evaluating the bank's readiness to adopt IRB.

PRE-CONDITIONS

2.3 A bank **will be required** to meet the following conditions when applying to MAS for supervisory permission to adopt IRB:

- To have completed its internal validation and satisfied itself that it has met MAS' expectations and that it is able to adopt and continue to use IRB;⁶

⁵ A rating system is generally considered to discriminate risk if exposures with worse ratings exhibit a higher risk of loss.

⁶ In areas where a bank does not fully meet MAS' expectations, it should conduct in-depth self-assessments to identify the key shortcomings and develop comprehensive action plans to address them before supervisory validation begins. Such action plans should include identifying the personnel responsible for specific actions, resource needs and a schedule for

- To submit a formal application to adopt IRB, which must include a report to MAS on its internal validation⁷ and an IRB rollout plan that is consistent with the IRB rollout parameters set out in this document.

APPLICATION

2.4 The supervisory validation process begins with the bank submitting to MAS a formal application to adopt IRB. The bank should submit its formal application to MAS at least 6 months prior to the expected start of its parallel run.

SUPERVISORY VALIDATION

2.5 During the supervisory validation process, MAS will evaluate the bank's readiness to adopt IRB. This process will end with MAS' decision on whether the bank may begin a recognised parallel run.

PARALLEL RUN

2.6 A bank adopting IRB **will be required** to conduct a recognised parallel run prior to its IRB adoption date. The recognised parallel run **should** last one year for banks adopting F-IRB and two years for banks adopting A-IRB. MAS will recognise a parallel run only if it is based on rating systems examined during supervisory validation and found sufficiently satisfactory for the parallel run, i.e. the bank can address any outstanding issues speedily so that the meaningfulness of the parallel run is not compromised.

2.7 During the parallel run, MAS will continue to evaluate the bank's readiness to adopt IRB in order to reach a decision towards the end of the parallel run, whether to grant or withhold supervisory permission for the bank to adopt IRB. MAS may withhold such permission if, during the parallel run, it becomes aware of information that materially affects its assessment of the bank's readiness or if the outstanding issues identified prior to the start of the parallel run have not been addressed. MAS may also require the bank to extend the parallel run to allow more time for the bank to take corrective actions.

completion.

⁷ The report should demonstrate how the bank has determined that it has met MAS' expectations. Where applicable, the report should also include relevant supporting documentation of the bank's rating systems.

AFTER IRB ADOPTION DATE

2.8 A bank that has been granted supervisory permission to adopt IRB **will be required** to execute its IRB rollout according to the plan submitted to MAS at the point of application to adopt IRB, subject to any changes agreed with MAS.

2.9 MAS may conduct further examinations after a bank has been granted permission to adopt IRB. These examinations may be dedicated ones covering the bank's risk assessment and management systems, controls and practices; or form part of the wider ongoing examinations conducted by MAS. In such examinations, MAS may review the bank's fulfillment of any conditions attached to the supervisory permission. MAS may also examine whether the bank's risk assessment and management systems, controls and practices remain adequate for IRB. As part of these subsequent examinations, MAS may require the bank to undertake corrective actions.

3 Rollout Parameters

IRB COVERAGE

3.1 A bank that intends to adopt IRB **will be required** to adopt IRB across the entire banking group, except for asset classes excluded under permitted exclusions (see paragraphs 3.10 to 3.16 below).

3.2 MAS recognises that a simultaneous rollout across all material asset classes may not be practicable in all circumstances. As such, MAS may permit phased rollouts in certain cases. Notwithstanding this, MAS will generally not permit a banking group to adopt IRB unless it is able to do so meaningfully from its IRB adoption date. This means that the initial rollout should account for the banking group's most significant portfolios in terms of size and risk profile. At minimum, **MAS expects** exposures that attract at least 60% to 70% of the capital requirements for credit risk to transition to IRB on the IRB adoption date. This percentage is to be computed based on the bank's exposures and under the approach(es) in use as at the start of the parallel run.⁸

⁸ By way of example, a bank adopting F-IRB at end-2006 will compute this threshold by dividing the IRB RWA of exposures transitioning to IRB at end-2006 by the sum of (a) the IRB RWA of exposures transitioning to IRB at end-2006, (b) the Standardised Approach RWA of

3.3 In addition, to avoid giving incentives for banks to arbitrage capital requirements across sub-asset classes or legal entities, **MAS** would **expect that**:

- All corporate exposures (including SME and specialised lending, but not necessarily sovereign, bank and non-bank financial institution exposures) of the bank within a given jurisdiction should transition to IRB simultaneously;
- All retail exposures of the bank within a given jurisdiction should transition to IRB simultaneously;
- Asset classes across jurisdictions in which the bank operates, where arbitrage opportunities may be created by phased IRB rollout (e.g. large corporates), should transition to IRB simultaneously; and
- Across a banking group, if market risk is significant, the Internal Models Approach (“IMA”) should be adopted together with or before the adoption of A-IRB (see paragraph 3.5 below).⁹

SPEED OF ROLLOUT

3.4 While MAS may permit a phased rollout, it should not be prolonged or patchy. A prolonged or patchy rollout would suggest that the bank’s risk management capability has not reached sufficient sophistication on a group-wide basis, and will blur the delineation between capital and provisioning requirements as intended under IRB.¹⁰ Therefore, when it permits a phased rollout, **MAS expects**:

exposures that are permitted to be excluded from IRB, and (c) the RWA under current CAR computation rules for exposures that will transition to IRB after end-2006 (see paragraphs 3.18 to 3.20).

⁹ It was proposed in the consultation paper that corporate exposures should always transition before retail exposures. Some respondents felt that this was unnecessary given the capital floors imposed in Basel II. This proposal has been dropped.

¹⁰ Under IRB, margin income and provisions cover expected losses (EL) and capital is intended to cover unexpected losses (UL). The Standardised Approach does not make such a conceptual distinction.

- The bank to provide reasonable assurances that all remaining exposures, except those that are permitted to be excluded from IRB (see paragraphs 3.10 to 3.16), will be brought onto IRB steadily; and
- The bank to complete IRB rollout across the entire banking group within 2 years, save in exceptional circumstances such as a significant merger or acquisition.

IRB ROLLOUT RELATIVE TO ADVANCED APPROACHES FOR OTHER RISKS

3.5 A bank's use of more-sophisticated credit risk management cannot be considered in isolation from the broader context of improvements in the management of all significant risks. Therefore, **MAS expects** that a banking group's adoption of or transition to A-IRB should be made together with or after:

- The adoption of IMA for market risk, if market risk is significant for the bank; and
- Demonstrable progress towards eventual adoption of an Advanced Measurement Approach (AMA) for operational risk.¹¹

MINIMUM DATA AND RATING SYSTEM USE REQUIREMENTS AT IRB

ADOPTION DATE

3.6 A bank adopting IRB **will be required** to demonstrate that its internal rating and default and loss estimates play an essential and pervasive role in the bank's operations. This entails demonstrating that it has been using its rating systems and employing IRB risk components that are broadly in line with the minimum requirements articulated in Basel II for at least 3 years prior to its IRB adoption date, with the proviso that refinements to a rating system do not render the bank non-compliant.¹²

¹¹ In the consultation paper, MAS proposed that transition to A-IRB should be accompanied by the adoption of AMA. Respondents felt that as AMA methods are still evolving, a bank should not have to delay transition to A-IRB. In the light of the consultation feedback, MAS would instead expect a bank seeking to transition to A-IRB to show progress towards adopting AMA. At the minimum, the bank should have begun collecting data across the banking group in a way consistent with AMA requirements.

¹² Basel II, paragraph 445.

3.7 Under Basel II, a bank adopting IRB **will be required** to meet minimum data requirements for IRB, i.e., 5 years for all PD estimates, 5 years for retail LGD and EAD estimates, and 7 years for LGD and EAD estimates for corporate, sovereign and bank exposures.

3.8 MAS **will require** banks to comply with these requirements from end-2011. In the interim, a bank adopting F-IRB at end-2006, end-2007 or end-2008 **will be required** to have at least two years of data for each asset class when that asset class transitions to IRB.¹³ A bank adopting F-IRB at end-2009 **will be required** to have 3 years' data and a bank adopting F-IRB at end-2010 **will be required** to have 4 years' data.

3.9 MAS **expects** a bank to take into account all relevant and appropriate data, i.e. merely meeting the minimum data requirements in paragraphs 3.7 and 3.8 will not automatically qualify the bank to adopt IRB. In particular, the appropriate length of the data series should be assessed relative to the data source, the asset class, the risk characteristics of the exposures, and the type of rating system in question. When granting a bank permission to adopt IRB or assessing a bank under Pillar 2, MAS may require a bank to apply additional margins of conservatism if it is of the view that the bank's data series is insufficient.

PERMITTED EXCLUSIONS

3.10 A bank adopting IRB may, with MAS' permission, exclude certain exposures from IRB as described in this section. The bank **will be required** to use the Standardised Approach for calculating risk-weighted assets for such exposures from its IRB adoption date.

Exclusions for Non-equity Exposures

3.11 Beyond the end of the rollout period, a bank may exclude from IRB only business units, asset classes or sub-classes that are immaterial in size and risk profile. These have to be specifically approved for exclusion by MAS. Exclusions are concessions and may be revoked if the excluded portfolios become significant.

¹³ For avoidance of doubt, the transitional arrangement can be applied to all asset classes transitioning to IRB during the 2-year IRB rollout period. For example, a bank that transitions its corporate and retail exposures to F-IRB at end-2006 and sovereign and bank exposures at end-2007, will be permitted to have a minimum of two years' data for its corporate and retail exposures as at end-2006 as well as its sovereign and bank exposures as at end-2007.

3.12 When proposing exclusions in its rollout plan, a bank should show why it considers the business unit, asset class or sub-class to be immaterial both in terms of size and risk profile. As business unit boundaries are not specified in Basel II, the bank should also show how it defines the boundaries of a putative immaterial business unit and how it allocates exposures to that business unit on an on-going basis.

3.13 When approving exclusions, MAS will consider not only compliance with the overall limit (as specified in paragraph 3.15 below) but also risk concentrations that may be present in excluded portfolios.

3.14 Where MAS' permission is granted for a bank to exclude a business unit or an asset class or sub-class from IRB, the exclusion applies to the entire business unit, asset class or sub-class so excluded within a given jurisdiction. The bank will not be permitted to classify only some exposures within a business unit, asset class or sub-class as immaterial.

3.15 On a continuing basis, MAS **will require** the bank to ensure that the aggregate credit risk capital requirements of the asset classes, sub-classes or business units excluded from IRB do not exceed 15% of the total Pillar 1 banking book credit risk capital requirement.¹⁴ In determining compliance with this threshold, the approach(es) then in use for calculating the bank's CAR should be used. Equity holdings excluded from IRB based on materiality are to be excluded from the computation of this threshold (see paragraph 3.16 below).

Exclusions for Equity Exposures

3.16 A bank may exclude its equity exposures from IRB based on materiality. A bank **will be required** to consider its equity exposures material if their aggregate value, exceeds, on average over the prior year, 10% of the bank's Tier 1 plus Tier 2 capital. This materiality threshold will be lowered to 5% of a bank's Tier 1 plus Tier 2 capital if the equity portfolio consists of less than 10 individual holdings.

¹⁴ In the consultation paper, MAS proposed to set the threshold at 10%. Some respondents felt that this was low when compared to some other jurisdictions. The threshold is now set at 15%.

Other Exclusions

3.17 MAS will not permit any exclusions from IRB apart from those set out above. Unless they have been classified as an immaterial asset class, sovereign and bank exposures may not be excluded from IRB. MAS will adopt a more flexible approach to granting permission to banks to adopt IRB for sovereign and bank exposures to take into account the paucity of default data in these two asset classes.

TREATMENT OF PRE-TRANSITION EXPOSURES

3.18 From end-2006, a bank **will be required** to use the Standardised Approach to calculate its banking book capital requirements for asset classes or business units that have yet to transition to IRB.

3.19 However, as a concession, a bank whose IRB adoption date is end-2006 or end-2007 will be permitted to use current CAR computation rules under MAS Notice 637 up to the end of the rollout period, for asset classes or business units that have yet to, but will eventually, transition to IRB.

3.20 If a bank elects to use this concession, it **will be required** to apply it to all exposures that have yet to transition to IRB, except for asset classes that may be excluded under paragraphs 3.10 to 3.16 above.

COMPUTATION OF CAPITAL FLOORS

3.21 A bank adopting IRB **will be required** to comply with a capital floor after its IRB adoption date. A bank **will be required** to calculate (a) the floor as defined in paragraph 3.22 and (b) the amount as calculated in Basel II, paragraph 47. If the floor amount is larger than the amount calculated in Basel II, paragraph 47, the bank must add 12.5 times of the difference to its risk-weighted assets. For avoidance of doubt, if the floor amount is lower than the amount calculated in Basel II, paragraph 47, the bank must adhere to the latter amount.

3.22 The capital floor, F, is derived as follows:

$$F = a * [(c * RWA) + \text{deductions} - T2GP]$$

where:

- “a” means the appropriate adjustment factor specified in paragraph 3.23;
- “c” means the minimum CAR prescribed pursuant to Section 10(2) of the Banking Act;
- “RWA” means risk-weighted assets based on the application of:
 - current CAR computation rules in the case of a bank whose IRB adoption date is end-2006 or end-2007; and
 - the Standardised Approach in the case of a bank adopting IRB after end-2007;
- “deductions” means the sum of deductions from Tier 1 capital and deductions from Tier 2 capital pursuant to MAS Notice 637; and
- “T2GP” means general provisions included in Tier 2 capital.

3.23 The following table set out the applicable adjustment factors for a bank adopting F-IRB or A-IRB at end-2006 or end-2007:

	From end-2006	From end-2007	From end-2008
A bank adopting F-IRB at end-2006	95%	90%	80%
A bank adopting F-IRB or A-IRB at end-2007	Not applicable	90%	80%

N.B. MAS is considering the applicable adjustment factors for a bank that adopts F-IRB or A-IRB after end-2007 and will announce its decision at a later date.

3.24 The capital floor does not preclude MAS’ discretion to impose additional bank-specific capital requirements.

Appendix A Summary of National Discretions Exercised

Basel II Reference	MAS Position
257. As such, supervisors may allow banks to adopt a phased rollout of the IRB approach across the banking group etc.	Phased rollout permitted, subject to MAS' approval
259. Some exposures in non-significant business units as well as asset classes (or sub-classes in the case of retail) that are immaterial in terms of size and perceived risk profile may be exempt from the requirements in [paragraphs 257 and 258], subject to supervisory approval.	<p>A bank shall seek MAS' approval to use this exemption.</p> <p>The sum of the credit risk capital requirements for exempted exposures is not to exceed 15% of the total banking book credit risk capital requirements. Equity holdings excluded from IRB based on materiality are to be excluded from the computation of this threshold.</p>
<p>264. The transition period starts on the date of implementation of this Framework and will last for 3 years from that date. During the transition period, the following minimum requirements can be relaxed, subject to discretion of the national supervisor:</p> <ul style="list-style-type: none"> ▪ For corporate, sovereign, and bank exposures under the foundation approach, paragraph 463, the requirement that, regardless of data source, banks must use at least five years of data to estimate the PD; and ▪ For retail exposures, paragraph 466, the requirements that regardless of the data source banks must use at least five 	MAS will implement the national discretions in respect of data only. Refer to paragraph 3.8 for details.

Basel II Reference	MAS Position
<p>years of data to estimate loss characteristics (EAD, and either expected loss (EL) or PD and LGD).</p> <ul style="list-style-type: none"> ▪ For corporate, sovereign, bank and retail exposures, paragraph 445, the requirement that a bank must demonstrate it has been using a rating system that was broadly in line with the minimum requirements articulated in this document for at least three years prior to qualification. <p>The applicable aforementioned transitional arrangements also apply to the PD/LGD approach to equity. for the market-based approach to equity.</p> <p>265. Under these transitional arrangements, banks are required to have a minimum of two years of data at the implementation of this Framework. This requirement will increase by one year for each of three years of transition.</p>	
<p>267. For a maximum of ten years, supervisors may exempt from the IRB treatment particular equity investments held at the time of the publication of this Framework.</p>	<p>MAS will not exempt any equity investments on this basis.</p>
<p>357. To promote specified sectors of the economy, supervisors may exclude from the IRB capital charges equity holdings made under legislated programmes etc.</p>	<p>MAS will not exempt equity holdings on this basis.</p>

Basel II Reference	MAS Position
358. Supervisors may also exclude the equity exposures of a bank from the IRB treatment based on materiality. The equity exposures of a bank are considered material if their aggregate value, excluding all legislative programmes discussed in paragraph 357, exceeds, on average over the prior year, 10% of the bank's Tier 1 plus Tier 2 capital. This materiality threshold is lowered to 5% of a bank's Tier 1 plus Tier 2 capital if the equity portfolio consists of less than 10 individual holdings. National supervisors may use lower materiality thresholds.	MAS will implement this national discretion.