Appendix

Guidance on calculation of incremental risk charge ("IRC Guidance")

I. Introduction

1. The proposed guidance set out in this paper, which is based on the *Guidelines for computing capital for incremental risk in the trading book* ("IRC Guidelines") issued by the Basel Committee on Banking Supervision ("BCBS") in July 2009, will be incorporated into the technical note "*Use of Internal Models Approach to Calculate Market Risk"* (CA-G-3) issued by the HKMA under the Supervisory Policy Manual.

II. Background and application

2. In line with the Trading Book Proposals issued by the BCBS (see Annex 2), AIs using, or planning to use, the internal models approach ("IMM approach") which seek the approval of the Monetary Authority ("MA") to model an incremental risk charge ("IRC") and, if they have a correlation trading portfolio ("CTP"), a comprehensive risk charge ("CRC"), should satisfy the requirements set out in this paper. The Banking (Capital) Rules ("BCR") and CA-G-3 will be amended to implement the Trading Book Proposals, with the amendments to take effect on 1 January 2011.

III. Principles for calculating IRC

A. IRC-covered positions and risks

3. The IRC encompasses all non-securitization positions, but excludes n-th-to-default credit derivative contracts, that are subject to market risk capital charge for specific risk arising from interest rate exposures under the IMM approach, regardless of their perceived liquidity. An AI is not permitted to incorporate into

its IRC model any securitization positions, even when such positions are viewed as hedging underlying credit instruments held in the trading book.

4. Subject to the prior approval of the MA, an AI may choose consistently to include all listed equities and equity-related derivative contracts based on listed equities of a trading desk in its IRC model when such inclusion is consistent with how the AI internally measures and manages this risk at the trading desk level. If equities are included in the computation of the IRC, default is deemed to occur if the related debt securities default (as defined in section 149 of the BCR).

5. The IRC captures default risk and credit migration risk of the IRC-covered positions.

B. Key supervisory parameters for computing IRC

B1. Soundness standard comparable to internal ratings-based approach ("IRB approach")

6. The BCBS recognises that there is no single industry standard for the calculation of IRC. Thus no specific approach for capturing incremental risks (i.e. default risk and credit migration risk) is prescribed. An AI should demonstrate that its IRC model meets a soundness standard comparable to that of the IRB approach for credit risk under the BCR, using the assumption of a constant level of risk, and adjusted where appropriate to reflect the impact of liquidity, concentrations, hedging and optionality. For all IRC-covered positions, the IRC model should measure losses due to default and credit migration at the 99.9% confidence interval over a capital horizon of one year, taking into account the liquidity horizons applicable to individual positions or sets of positions. Losses caused by broader

market-wide events affecting multiple issues or issuers are encompassed by this definition.

B2. Constant level of risk over one-year capital horizon

7. For each IRC-covered position, the IRC model should also capture the impact of rebalancing positions at the end of their liquidity horizons so as to achieve a constant level of risk over a one-year capital horizon[1]. The model may incorporate correlation effects among the modelled risk factors, subject to validation standards specified in Section IV of this paper.

8. The constant level of risk assumption implies that an AI rebalances, or rolls over, its trading positions over the one-year capital horizon in a manner that maintains the initial risk level, as indicated by a metric such as value-at-risk ("VaR") or the profile of exposure by credit rating and concentration. This means incorporating the effect of replacing positions whose credit characteristics have improved or deteriorated over the liquidity horizon with positions that have risk characteristics equivalent to those that the original position had at the start of the liquidity horizon. The frequency of the assumed rebalancing should be governed by the liquidity horizon for a given position.

9. Rebalancing positions does not imply, as the IRB approach for the banking book does, that the same positions will be maintained throughout the capital

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[1] This assumption is consistent with the capital calculations under the Basel II framework In all cases (loans, derivative contracts and repos), the Basel II framework defines exposure at default in a way that reflects a roll-over of existing exposures when they mature.

The combination of the constant level of risk assumption and the one-year capital horizon reflects the MA's assessment of the appropriate capital needed to support the risk in the trading portfolio. It also reflects the importance to the financial markets of AIs having the capital capacity to continue providing liquidity to the financial markets in spite of trading losses. Consistent with a "going concern" view of an AI, this assumption is appropriate because an AI should continue to take risks to support its income-producing activities. For regulatory capital purposes, it is not appropriate to assume that an AI would reduce its VaR to zero at a short-term horizon in reaction to large trading losses. It also is not appropriate to rely on the prospect that an AI could raise additional core capital during stressed market conditions.

horizon. However, an AI may elect to use a "one-year constant position" assumption, as long as it does so consistently across all portfolios.

B3. Liquidity horizon

10. An AI is expected to pay particular attention to the appropriate liquidity horizon assumptions within its IRC model. The liquidity horizon represents the time required to sell the position or to hedge all material risks covered by the IRC model in a stressed market. It should be measured under conservative assumptions and should be sufficiently long that the act of selling or hedging, in itself, does not materially affect market prices. The liquidity horizon for a position or a set of positions has a floor of three months[2].

11. The determination of the appropriate liquidity horizon for a position or a set of positions may take into account an AI's internal policies relating to, for example, prudent valuation and valuation adjustments[3], and the management of stale positions. Other factors that may affect the determination of the length of the liquidity horizon for a position or a set of positions may include, but are not limited to, the following:-

(a) Credit rating: In general, within a given product type, a non-investment-grade position is expected to have a longer assumed liquidity horizon than an investment-grade position. Conservative assumptions regarding the liquidity horizon for non-investment-grade positions are warranted until further evidence is gained regarding the market's liquidity during systematic and idiosyncratic stressed situations;

(b) Market liquidity and data history: An AI also needs to apply conservative

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[2] In the coming months, the BCBS will review the calibration of the market risk capital framework in the light of the results of an impact assessment being conducted. This review will include the floor of the liquidity horizon.

[3] See Section V(A) of Annex 2 on *Proposed Enhancements to Basel II Market Risk Framework* for further details.

liquidity horizon assumptions for products, regardless of rating, where secondary market liquidity is not deep, particularly during periods of financial market volatility and investor risk aversion. The application of prudent liquidity assumptions is particularly important for rapidly growing product classes that have not been tested in a downturn; and

(c) Concentration: The liquidity horizon is expected to be greater for positions that are concentrated, reflecting the longer period needed to liquidate such positions. This longer liquidity horizon for concentrated positions is necessary to provide adequate capital against two types of concentration, i.e. issuer concentration and market concentration.

12. An AI can assess liquidity by position or on an aggregated basis (i.e. by "buckets"). If an aggregated basis is used, the aggregation criteria should be defined in a way that meaningfully reflects differences in liquidity.

B4. Correlations and diversification among default risk, credit migration risk and other market risk factors

13. The IRC includes the impact of correlations between default and credit migration events among obligors, as economic and financial dependence among obligors causes a clustering of such events. An AI's IRC model should therefore include the impact of a clustering of such events.

14. For the time being, the impact of diversification between default or credit migration events and other market variables would not be reflected in the IRC[4]. Accordingly, the IRC, which represents the capital charge for incremental default and credit migration losses, is added to the VaR-based market risk capital charge.

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[4] This is consistent with the Basel II Framework, which does not allow for the benefit of diversification when combining capital requirements for credit risk and market risk.

B5. Concentration

15. An AI's IRC model should appropriately reflect issuer and market concentrations. Thus, other things being equal, a concentrated portfolio should attract a higher capital charge than a more granular portfolio (see also paragraph 11(c) above). Concentrations that can arise within and across product classes under stressed conditions should also be reflected.

B6. Risk mitigation and diversification effects

16. Within the IRC model, exposure amounts may be netted only when long and short positions refer to the same financial instrument. Otherwise, exposure amounts should be captured on a gross (i.e. non-netted) basis. Thus, hedging or diversification effects associated with long and short positions involving different instruments or different securities of the same obligor ("intra-obligor hedges"), as well as long and short positions in different issuers ("inter-obligor hedges"), may not be recognized through netting of exposure amounts. Rather, such effects may only be recognized by capturing and modelling separately the gross long and short positions in the different instruments or securities.

17. Significant basis risks by product, seniority in the capital structure, internal or external rating, maturity, vintage for offsetting positions as well as differences between offsetting instruments, such as different payout triggers and procedures, should be reflected in the IRC model.

18. If an instrument has a shorter maturity than the liquidity horizon, or a maturity which is longer than the liquidity horizon and is not contractually assured, the IRC should, where material, include the impact of potential risks that could occur during the interval between the maturity of the instrument and the liquidity horizon.

19. For trading book positions that are typically hedged via dynamic hedging strategies, a rebalancing of the hedge within the liquidity horizon of the hedged position may also be recognized. Such recognition is only admissible if an AI (a) chooses to model rebalancing of the hedge consistently over the relevant set of trading book positions; (b) demonstrates that the inclusion of rebalancing results in a better risk measurement; and (c) demonstrates that the markets for the instruments serving as hedge are liquid enough to allow for this kind of rebalancing even during periods of stress. Any residual risks resulting from dynamic hedging strategies should be reflected in the capital charge. An AI should validate its approach to capture such residual risks to the satisfaction of the MA.

B7. Optionality

20. The IRC model should reflect the impact of optionality. Accordingly, the IRC model should include the non-linear impact of option contracts and other positions with material non-linear behaviour with respect to price changes. An AI should also have due regard to the amount of model risk inherent in the valuation and estimation of price risks associated with such products.

IV. Validation

21. The following are examples of factors that should be considered by an AI in the process of validating its IRC model:-

(a) Liquidity horizons should reflect actual practice and experience during periods of both systematic and idiosyncratic stresses;

(b) The IRC model for measuring default risk and credit migration risk over the liquidity horizon should take into account objective data over the relevant horizon and include comparison of risk estimates for a rebalanced portfolio with that of a portfolio with fixed positions;

(c) Correlation assumptions should be supported by analysis of objective data in a conceptually sound framework. If an AI uses a multi-period model to compute incremental risks, it should evaluate the implied annual correlations to ensure they are reasonable and in line with observed annual correlations. An AI should validate that its modelling approach for correlations is appropriate for its portfolio, including the choice and weights of its systematic risk factors. An AI should document its modelling approach so that its correlation and other modelling assumptions are transparent to the MA;

(d) Owing to the high confidence standard and long capital horizon of the IRC, robust direct validation of the IRC model through standard back-testing methods at the 99.9% and one-year soundness standard will not be possible. Accordingly, validation of an IRC model necessarily should rely more heavily on indirect methods including but not limited to stress tests, sensitivity analyses and scenario analyses, to assess its qualitative and quantitative reasonableness, particularly with regard to the model's treatment of concentrations. Given the nature of the IRC soundness standard, such tests should not be limited to the range of events experienced historically. The validation procedures adopted by an AI for its IRC model should be subject to the satisfaction of the MA; and

(e) An AI should strive to develop relevant internal modelling benchmarks to assess the overall accuracy of its IRC model.

V. Use of internal models to calculate IRC

22. As noted above, the IRC Guidance does not prescribe any specific modelling approach for capturing incremental risks. Because a consensus does not yet exist with respect to measuring risk for potentially illiquid trading positions, it is anticipated that AIs will develop different IRC modelling approaches.

23. The approach that an AI uses to measure the IRC is subject to the "use test", in which case the AI should demonstrate to the satisfaction of the MA that it has been using the outputs of its IRC model, which is broadly consistent with the requirements set out in this paper, in its internal risk management systems for identifying, measuring, and managing trading risks prior to the use of the model to calculate IRC under the revised market risk capital framework.

24. Ideally, the supervisory principles set forth in this paper would be incorporated within an AI's internal models for measuring trading book risks and assigning an internal capital charge to these risks. However, in practice an AI's internal approach for measuring trading book risks may not map directly into the above supervisory principles in terms of capital horizon, constant level of risk, rollover assumptions or other factors. In this case, the AI should demonstrate that the resulting IRC would deliver a charge at least as high as the charge produced by a model that directly applies the supervisory principles.

VI. Additional criteria for modelling comprehensive risk measure for CTP

25. The use of the comprehensive risk model is available only to an AI that can satisfy all minimum requirements applicable to the adoption of the IRC model as set out in Sections III to V above, as well as the following additional criteria on data, modelling and stress-testing:-

(a) The AI should have sufficient market data to ensure that the comprehensive risk model fully captures the salient risks of the correlation trading exposures in its comprehensive risk measure as listed below:-

  (i) the cumulative risk arising from multiple defaults, including the ordering of defaults, in tranched products;

  (ii) credit spread risk, including the gamma and cross-gamma effects;

  (iii) volatility of implied correlations, including the cross effect between spreads and correlations;

(iv) basis risk, including both the basis between the spread of an index and those of its constituent single names; and the basis between the implied correlation of an index and that of bespoke portfolios;

(v) recovery rate volatility, as it relates to the propensity for recovery rates to affect tranche prices; and

(vi) to the extent the comprehensive risk measure incorporates benefits from dynamic hedging, the risk of hedge slippage and the potential costs of rebalancing such hedges;

(b) The AI is able to demonstrate (for example, through back-testing) that its risk measures can appropriately explain the historical price variation of the correlation trading exposures;

(c) The AI is able to separate the positions for which it holds the MA's approval to incorporate them in its comprehensive risk measure from those positions for which it does not hold this approval;

(d) The AI should regularly apply a set of specific, predetermined stress scenarios to the CTP to which the MA's approval applies. These stress scenarios will examine the implications of stresses to (i) default rates, (ii) recovery rates, (iii) credit spreads, and (iv) correlations on the correlation trading desk's P&L. The AI should apply these stress scenarios at least weekly and report the results, including comparisons with the capital charges implied by the AI's comprehensive risk model, at least quarterly to the MA. Any instances where the stress tests indicate a material shortfall of the comprehensive risk measure should be reported to the MA in a timely manner; and

(e) The CRC will be subject to a floor, which could be expressed as a percentage of the market risk capital charge applicable under the STM approach and will be set by the BCBS based on an impact study to be conducted by March 2010.