This module should be read in conjunction with the Introduction and with the Glossary, which contains an explanation of abbreviations and other terms used in this Manual. If reading on-line, click on blue underlined headings to activate hyperlinks to the relevant module.

Purpose

To set out the HKMA's expectations with regard to Authorized Institutions (AIs') governance, controls and risk management systems for the valuation of positions in instruments[1] that are accounted for at fair value[2], and describe the approach that the HKMA will adopt in the supervision of AIs' fair valuation processes for instruments held at fair value.

Classification

A non-statutory guideline issued by the HKMA as a guidance note.

Previous guideline(s) superseded

i) CA-S-9: Use of the Fair Value Option for Financial Instruments dated 07.11.06; and ii) CA-S-10: Financial Instrument Fair Value Practices (V.2) dated 10.12.13.

Application

To all AIs.

Structure

1. Introduction
   1.1 Background

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1 These include positions in instruments, whether they are in the banking book or the trading book, that are in scope for credit risk or market risk capital requirements under the Banking (Capital) Rules (BCR) (Cap. 155L).

2 Please refer to section 2(1) of the BCR for the meaning of "fair value".

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1. Introduction

1.1 Background

1.1.1 As the applicable accounting and financial reporting standards evolve, a wider range of the instruments and assets held by AIs are required to be measured at fair value. It is also the case that increasingly complex and less liquid instruments are required to be fair-valued. The importance of fair value measurement in the context of risk management, financial reporting and regulatory capital adequacy has therefore increased substantially and it is critical that AIs develop, implement and maintain robust risk management and control processes around the measurement of fair values and their reliability.

1.1.2 The Basel Committee on Banking Supervision (BCBS) has issued guidance (both pre and post the financial crisis which began in mid-2007) designed to strengthen, and promote transparency regarding prudent fair valuation practices.[3] The accounting and auditing standard setters and other bodies have also been active in issuing reports, guidance and standards in this area[4].

1.1.3 This module draws upon these international initiatives and a report by the Group of Thirty[5], to the extent that they are

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[3] *Supervisory guidance on the use of the fair value option for financial instruments by banks* (issued in June 2006); *Fair value measurement and modelling: An assessment of challenges and lessons learnt from the market stress* (issued in June 2008); and *Supervisory guidance for assessing banks' financial instrument fair value practices* (issued in April 2009).

[4] In October 2008, the International Auditing and Assurance Standards Board (IAASB) issued a Staff Audit Practice Alert, *Challenges in Auditing Fair Value Accounting Estimates in the Current Market Environment*. The IAASB Staff Audit Practice Alert highlights international standards on auditing that are particularly relevant for external audits of fair value estimates and related disclosures. In October 2008, the International Accounting Standards Board (IASB) Expert Advisory Panel (EAP) issued a report entitled *Measuring and disclosing the fair value of financial instruments in markets that are no longer active* (*IASB EAP Report*). The *IASB EAP Report* aims to provide useful information and educational guidance for entities applying International Financial Reporting Standards (IFRSs) on practices for measuring and disclosing financial instruments when markets are no longer active. In May 2011, the IASB issued IFRS 13: *Fair Value Measurement* which defines fair value, provides guidance on its determination and introduces consistent requirements for disclosures on fair value measurements.

[5] *Enhancing Public Confidence in Financial Reporting* issued in December 2003.

still considered relevant in the current context. It is issued in recognition of the significance of fair value measurements for regulatory capital and risk management purposes and the concomitant need to ensure prudence and reliability in fair value estimates.

1.1.4 This module also incorporates *Prudent valuation guidance (PVG)* under CAP50 of the Basel Framework[6]. The primary purpose of the PVG is to ensure that prudent valuation policies and procedures, which are the foundation upon which robust assessment of capital adequacy should be built, are adhered to at all times by banks for regulatory capital purposes. In particular, the PVG requires that valuation adjustments should be considered to reflect, among other factors, the illiquidity of positions. Where the application of the PVG would lead to a lower carrying value than actually recognised in the financial statements, the absolute value of the difference should be deducted from Common Equity Tier 1 capital in the case of an authorized institution incorporated in Hong Kong[7] (AI incorporated in Hong Kong). Nevertheless, the PVG is not intended to require banks to change their valuation practices for financial reporting purposes. Rather, it requires consideration of appropriate valuation adjustments to meet the prudential objectives of regulatory capital.

1.2 Scope of application

1.2.1 An AI is expected to establish and maintain adequate governance arrangements, and sufficient systems and controls, to ensure that its valuation estimates for all instruments measured at fair value, whether they are in the trading book or the banking book, are reliable for financial reporting purposes and are, additionally, also prudent for

[6] The Basel Framework refers to the consolidated Basel Framework launched by the BCBS in December 2019 comprising standards and the associated FAQs, as amended or supplemented from time to time (https://www.bis.org/basel_framework/).

[7] Please refer to section 2(1) of the Banking Ordinance (Cap. 155) for the definition of "authorized institution incorporated in Hong Kong".

regulatory reporting purposes. This guidance is especially important for positions without quoted prices in active markets or observable inputs to valuation, as well as less liquid positions. An AI is expected to implement risk management practices and controls for fair valuation that are integrated into its overall corporate governance framework and risk management and control systems, to ensure that the effect of using fair value is understood, and that the use of the fair value measurement is managed, monitored and reported in a sound manner.

1.2.2 This module is consistent with paragraph 10 of the Seventh Schedule to the Banking Ordinance (Cap. 155) whereby AIs are required to maintain adequate accounting systems and adequate systems of control. These are essential for ensuring the prudent and efficient running of an AI's business, safeguarding the assets of the AI, minimising the risk of fraud, monitoring the risks to which the AI is exposed and complying with legislative and regulatory requirements.

1.2.3 To meet the objectives mentioned in paragraphs 1.2.1 and 1.2.2, the HKMA expects that an AI's governance, risk management and control processes around the measurement of fair values and their reliability should be designed and operated in a manner that is consistent both with applicable accounting and disclosure standards and the risk management and control guidance laid down in this module. However, the extent of application of the module should be commensurate with the significance and complexity of an AI's fair valued exposures. For instruments other than financial instruments, foreign exchange, or commodities, an AI may follow the guidance set out in this module only to the extent applicable, provided that their fair values are determined in accordance with the prevailing accounting standards.

1.2.4 This module does not purport to set out additional accounting requirements beyond those established by the financial reporting standards issued by the Hong Kong Institute of Certified Public Accountants. Rather, the supervisory guidance in this module focuses on supervisory expectations for sound practices that will promote effective risk management and controls and maintain the integrity of regulatory capital measures.

2. Supervisory approach to fair valuation process

2.1 The HKMA will, during the course of its risk-based supervision of AIs, examine the effectiveness of an AI's governance, policies, risk management and control processes around the measurement of fair values and their reliability. The HKMA will assess if the risk management and controls of the AI are sound and consistent with the risk management guidance set out in this module. The HKMA's assessment will also cover the "quality" of valuations; the liquidity, credit and other risks pertaining to instruments measured at fair value; the volatility of the fair valuations; and the impact of fair valuation on earnings and capital adequacy.

2.2 The HKMA will communicate any supervisory concerns identified in its assessment to the AI's senior management and, if the concerns are significant, to the AI's board of directors (board). The HKMA will expect the AI's board and senior management to promptly address any deficiencies identified by the HKMA's examiners or by the AI's internal and external auditors with respect to the AI's valuation policies and practices (including related corporate governance, controls, risk management and disclosure).

2.3 Failure by the AI to take timely corrective measures in a manner satisfactory to the HKMA may result in the HKMA taking such supervisory measures as it considers appropriate. Such supervisory actions may include:

- commissioning an independent special review report from the AI's external auditors under section 59(2) of the Banking Ordinance (Cap. 155) concerning the AI's valuation practices and related risk management and controls;
- factoring the valuation deficiencies into the AI's supervisory CAMEL rating; and

- in the case of an AI incorporated in Hong Kong, requiring the AI to:
  - make adjustments to fair values of instruments included in the measurement of capital adequacy;
  - discontinue use of fair value measures for capital adequacy and regulatory reporting purposes; or
  - hold additional capital above the AI's existing minimum capital requirements.

3. Guidance for prudent valuation practices for all instruments measured at fair value

3.1 Key supervisory expectations

3.1.1 The HKMA expects an AI's valuation practices for all instruments that are measured at fair value to be in line with the following principles:

- the AI's board should ensure adequate governance structures and control processes for risk management and financial reporting purposes. The structures and control processes should be (i) designed to ensure that the valuations are prudent and reliable, and (ii) integrated with other risk management systems within the AI;
- the AI should have adequate capacity, including during periods of stress, to establish and verify valuations for instruments which it holds or to which it is exposed;
- the AI's senior management should ensure that policies for categorising instruments on balance sheet are consistent, so far as possible, for accounting, regulatory and risk management purposes;
- the AI should have in place sound processes for the design and validation of methodologies used to produce valuations, including independent and rigorous validation and control processes in relation to

the use of valuation models (see subsection 4.3 for details);

- the AI should maximise the use of relevant and reliable inputs (see subsection 4.2 for details) and incorporate all other important information so that fair value estimates are as reliable as possible;
- the AI must undertake independent price verification (IPV) (see subsection 3.4 for details) regularly so that market prices or model inputs used in the valuation process are verified for accuracy;
- the AI should have a rigorous and consistent process to determine valuation adjustments (see subsection 4.5 for details) for risk management, regulatory and financial reporting purposes, where appropriate;
- the AI should have valuation and risk management processes that explicitly assess valuation uncertainty (see subsection 4.4 for details) and which ensure that assessments of all material valuation uncertainty are communicated to the board (or a specialised committee of the board tasked, inter alia, with oversight of valuation policies and processes) and senior management; and
- the AI's external reporting should promote transparency by providing timely, relevant, reliable and decision-useful information (see section 6 for details).

3.1.2 For regulatory capital purposes, fair values should only be applied to instruments (both in the banking book and the trading book) for which the AI is able to reliably estimate fair values.

3.2 Governance

3.2.1 The board of an AI has the ultimate responsibility for understanding the risks run by the AI and putting in place adequate governance, senior management oversight, risk management and controls to ensure that the risks are properly managed. Supervisory expectations with regard to an AI's corporate governance and general risk management and controls are specified in SPM modules CG-1 and IC-1 respectively. Within the overall framework provided by CG-1 and IC-1, an AI should ensure adequate governance and control processes for the designation and valuation of instruments to be measured at fair value for financial reporting, risk management and regulatory capital purposes. The valuation governance structure and related processes should be embedded in the overall governance framework of the AI, and consistent for both risk management and reporting purposes.

3.2.2 The valuation governance structures within an AI should include:

- ensuring adequate capacity and capability within the AI to understand thoroughly, and establish and verify valuations for, instruments which the AI holds or to which it is exposed, including during stressed market conditions (see paragraphs 4.2.1 and 4.2.2). Where actual valuation processes are performed centrally by one central function for the whole banking group or are outsourced to a specialised valuation function, outside of the AI but within the same banking group, this intra-group structure will be acceptable provided that, within the AI, there is adequate understanding of the valuation results produced by this function and adequate governance over the policies, procedures, monitoring and reporting used;
- developing, establishing and regularly reviewing written policies related to fair valuations;
- ongoing review of significant valuation model performance, escalation of issues to appropriate levels of management and mechanisms for approval of changes;
- ensuring adequate resources are devoted to the valuation process;
- articulating the AI's tolerance for exposures subject to valuation uncertainty and monitoring compliance with

the board's overall policy settings at an aggregate firm-wide level;

- ensuring independence in the valuation process between risk-taking and control units;
- ensuring appropriate internal audit and external audit coverage of fair valuations and related processes and controls;
- ensuring accounting and disclosures are consistent with the applicable accounting framework and supervisory expectations; and
- ensuring significant differences, if any, between accounting and risk management measurements are well documented and monitored.

3.2.3 The board plays an important role in the valuation governance structure and is ultimately responsible for the AI's valuation process. While the board may delegate some of the responsibilities mentioned in paragraph 3.2.2 to senior management, the board or a specialised committee of the board should:

- approve the AI's fair valuation policies and any significant adjustments to them;
- regularly review the fair valuation policies to ensure that they are working as intended;
- ensure senior management implements effective valuation processes and procedures in accordance with policies approved by the board;
- review reports produced by financial control and risk management functions that discuss any significant valuation issues that may have arisen. Any fair valuation issues that the board or its specialised committee has raised with management should be followed up to ensure that questions or concerns expressed by directors are properly addressed; and
- review the governance structure regularly to ensure it remains appropriate, especially if major acquisitions/disposals or business changes have occurred.

3.2.4 The fair valuation policy of an AI should be adequately documented and generally cover the following areas:

- the roles and responsibilities of the various parties involved in the valuation processes including those of the board;
- the accepted valuation processes and pricing sources to be used for each type of instrument which the AI holds or to which it is exposed and the tolerance levels for variances between the sources;
- for more complex instruments or instruments for which marking-to-market is not possible, the accepted methodology or procedure for arriving at a fair valuation;
- an outline of the approval process for the use of pricing models;
- the escalation or resolution process for situations in which tolerance levels for variances between sources of valuation are breached or where the degree of subjectivity or uncertainty in valuation is such that the senior management, the board or its specialised committee should review; and
- the methods by which the AI will review and test fair value estimates to evaluate whether its valuation procedures are working as intended.

3.2.5 The valuation processes enshrined in the AI's valuation policy should be designed to ensure clear segregation of duties between the parties responsible for investment decisions and trading (front office) and those responsible for the determination of fair valuation (see paragraph 3.3.1).

3.2.6 To ensure effective oversight, senior management should ensure:

- the availability of adequate resources, with appropriate experience, training and reward, to ensure that risk management and controls are performed and implemented to the highest standards;
- the consistent application of valuation policies and

pricing sources;

- the preparation of proper and complete documentation for their regular review for all processes involved in the determination and verification of fair values;
- the preparation of documentation setting out policies and processes related to IPV; and
- the strict adherence to, and the documentation of the implementation of, the escalation or resolution processes enshrined in the AI's valuation policy.

3.2.7 Senior management should also establish appropriate control policies and practices for initial classification of instruments on the balance sheet (and any subsequent reclassification) to ensure that:

- the classifications of instruments are in accordance with the applicable accounting standards and regulatory reporting requirements;
- the classifications for accounting, regulatory and risk management purposes are consistent so far as possible;
- any significant differences in classification for the purpose of measurement and management of risk and from that required by the applicable accounting framework are well documented and approved by senior management and advised to the board or the appropriate board level committees; and
- documentation supporting the initial classification and any subsequent reclassification between financial asset categories is maintained.

3.3 Valuation controls

3.3.1 AIs should establish controls and procedures to ensure that the valuations of all instruments measured at fair value are reliable for financial reporting purposes and are, additionally, also prudent for risk management and regulatory reporting purposes, and that the processes for their production, assignment and verification are clear and robust. The controls and procedures must be integrated with other risk management systems within the AI (such as credit analysis) and should include:

- appropriate segregation of duties for the determination of fair value, such that:
  - the risk-taking units are functionally separate at all times from the units by which market prices or inputs are verified for accuracy; and
  - the financial control function is ultimately responsible for the determination of value included in the financial statements and ensuring adherence to the AI's policies and relevant accounting standards;
- documented policies and practices approved by the senior management covering:
  - all significant valuation methodologies (which should be reported to the board as frequently as necessary and at least annually); and
  - the range of acceptable practices for the initial pricing, marking-to-market/model (e.g. describing the sources of market information and how their appropriateness is reviewed), valuation adjustments, observability and reliability of inputs (e.g. with guidelines for the use of unobservable inputs reflecting AIs' assumptions of what market participants would use in pricing the position), timing of closing prices, end of the month and ad-hoc verification procedures and periodic independent revaluation depending on the nature of the instruments and sources of independent prices.
- the information feeds and thresholds for determining that model-based valuations may be challenged (e.g. objective thresholds when IPV, test trades or other cross-checks indicate significant differences with model-based valuations).

3.3.2 In addition, AIs should have documented procedures for new transaction types, products and markets and the related controls and risk management. The relevant approval processes should include all internal stakeholders relevant to risk measurement, risk control and financial reporting. The assignment and verification of valuations of instruments should be supported by a transparent, well-documented inventory of acceptable valuation methodologies that are specific and relevant to products and businesses.

3.3.3 Valuation controls should be applied consistently across similar instruments (risks) and across business lines (books). These controls should be subject to regular review by an internal audit function with adequate resources and expertise to identify and provide an effective review of practices.

3.3.4 For fair valuations where changes in fair value are reflected in the profit and loss statement, the profit and loss attribution processes should take place no less frequently than the risk management horizon and with a priority given to portfolios with significant valuation risk. This is to ensure that management understands the reliability and sources of profit and loss in a timely manner. The results of these processes should be fed back into periodic processes such as IPV and model validation.

3.4 Independent price verification

3.4.1 As part of the control process, AIs should put in place a periodic and robust IPV process through which market prices and model inputs used for marking-to-market and marking-to-model purposes are regularly verified for their appropriateness and accuracy.

3.4.2 Elements of an effective IPV process include:

- the conduct of IPV by personnel (or by a group of personnel) who are independent of the risk-taking function[8], with appropriately experienced staff (e.g. product controllers, risk managers, valuation experts, qualified accountants, etc.) who should have significant "on the job" experience and specialist training;

- the assignment of responsibilities for the fair values used in the financial statements to the IPV group which forms part of the financial control; and
- the undertaking of a rigorous IPV process at least monthly (or, depending on the nature of the market or trading activity, more frequently[9]) to verify fair values. The results should be reported to senior management. Where fair value is a critical component of reported results, the board or its specialised committee should satisfy itself that the reported results are supported by satisfactory IPV results.

3.4.3 IPV may not be applicable where independent pricing sources are not available or pricing sources are more subjective (for example, only one available broker quote). In such cases, prudent measures such as valuation adjustments may be appropriate. See also "Valuation adjustments" in subsection 4.5 below.

4. Elements of a sound valuation process

4.1 General

4.1.1 AIs should put in place sound processes for the design and validation of valuation methodologies to ensure that all fair value estimates are reliable, prudent and determined in accordance with accounting and supervisory standards and guidance, as applicable.

8 In the case of the trading book positions, while daily marking-to-market may be performed by dealers, verification of market prices and model inputs must be performed by a unit independent of the dealing room.

9 More frequent IPV should especially be performed if the result of other procedures identifies potential or actual significant problems or inaccuracies in AIs' valuation processes or results respectively.

4.1.2 Evaluation of the soundness of an AI's fair valuation process includes consideration of the factors set out in paragraphs 4.2.1 to 4.5.9 below. More specifically, an AI incorporated in Hong Kong reporting fair valued instruments for regulatory capital purposes must follow the standards set out in subsections 4.3 to 4.5. Where an AI fails to satisfy the HKMA that it meets these standards (and other standards in the module), this may result in supervisory requirements for adjustments in the calculation of regulatory capital (e.g. the exclusion from, or the making of adjustments to, Common Equity Tier 1 capital in respect of the unrealised gains of the fair valued positions concerned, or a requirement to hold additional capital).

4.2 Use of relevant and reliable inputs

Thorough understanding of the instrument being valued

4.2.1 AIs must have a thorough understanding of the instrument being valued and the relevant markets where the instrument is traded. This allows an AI to identify and evaluate the relevant market information available about identical or similar instruments so that it can make use of such information to measure the fair value of its instruments.

4.2.2 AIs should be able to identify when active markets become inactive (for instance, under stressed market conditions) and put in place appropriate procedures for valuing instruments under such circumstances. Where any exposures involved represent material risks to an AI, the AI should ensure that it has the capacity to produce valuations using alternative methods in the event that primary inputs and approaches become unreliable, unavailable or not relevant due to market discontinuities or illiquidity. An AI should test and review the performance of the alternative methods under stress conditions so that it understands the limitations of these methods under stress conditions. At a minimum, such valuations may be the result of a best-efforts estimation (to the extent possible based on empirical observations or values and accompanied by written reasoned justifications) by the risk management function of an AI which has sufficient expertise and which is independent of the AI's front office or business lines. The AI's valuation procedures (or alternative valuation methods) should be well documented and approved by the board.

Selection of inputs

4.2.3 Under HKFRS 13, the objective of fair value measurement is to estimate the price at which an orderly transaction to sell an asset or transfer a liability would take place between market participants at the measurement date under current market conditions. A forced liquidation or distressed sale (i.e. forced transaction) at the measurement date is not an orderly transaction.

4.2.4 To meet the objectives of a fair value measurement, AIs should consider all relevant market information and other factors likely to have a material effect on an instrument's fair value when selecting the appropriate inputs to use in the valuation process. HKFRS 13 establishes a fair value hierarchy that categorises into three levels the inputs to valuation techniques used to measure fair value. The fair value hierarchy gives the highest priority to quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1 inputs), followed by other inputs that are observable either directly or indirectly (Level 2 inputs), and the lowest priority to unobservable inputs (Level 3 inputs). The quoted prices (preferably in active markets for identical assets and liabilities) must therefore be used when available. When such quoted prices are not observable, fair value has to be determined using a valuation technique[10].

4.2.5 When estimating fair values using a valuation technique, AIs should maximise the use of relevant and reliable (observable) inputs and minimise the use of unobservable

[10] Three widely used valuation techniques are the market approach, the cost approach and the income approach. AIs should use valuation techniques that are appropriate in the circumstances and for which sufficient data are available to measure the fair value.

inputs. However, observable inputs or transactions may not be relevant, such as in a forced liquidation or distressed sale, or transactions may not be observable, such as when markets are inactive. In such cases, the observable data[11] should be considered but may not be determinative[12]. The chosen valuation technique should incorporate all risk factors that market participants would consider in setting a price, minimising entity-specific inputs, and should be consistent with accepted economic methodologies for pricing instruments. In all cases, AIs should document the reliability of the valuation in the process for estimating fair value.

Quality and verification of inputs

4.2.6 Where AIs obtain fair values directly from observable market prices they should ensure that the market in question is reasonably liquid and that the observable prices are representative of actual trades.

4.2.7 In assessing whether a source is reliable and relevant, AIs should consider the following factors:

- the frequency and availability of the prices/quotes and whether those prices represent actual regularly occurring transactions on an arm's length basis, including whether a price/quote is an indicative price or a binding offer;
- whether the available prices are relatively consistent with available market information and if the prices vary significantly across market participants;
- whether prices are transparent and generally available to market participants;

[11] Examples include where there exists a very similar instrument that trades in a liquid market, or where an illiquid instrument can be rigorously decomposed into components for which prices can be obtained from liquid markets or from appropriate valuation approaches.

[12] To consider whether observable data is not determinative of fair value, AIs may refer to the relevant accounting fair value guidance provided in the *IASB EAP Report* (see footnote 4).

- the timeliness of the pricing data relative to the frequency of valuations, considering that recent pricing data will tend to be more reliable than stale data;
- the number of independent sources that produce the quotes/prices while considering the dispersion of prices/quotes available;
- the maturity of the market;
- the similarity between the instrument sold in a transaction and the instrument held by the AI; and
- the nature of a transaction, especially in inactive markets, and whether it reflected a forced or distressed sale (which are not relevant) or otherwise involved a seller that needed to sell and one or very few buyers (which may require consideration of other information and management judgement in determining the implications for the estimate of fair value).

4.2.8 Where AIs make use of a third-party pricing service for fair valuation of instruments, the AIs' senior management should have a due diligence process in place by which they assess the third-party pricing service so that they have a sufficient basis upon which to determine the appropriateness of the techniques it uses, the underlying assumptions and selection of inputs and the consistency of application. Use of a third-party pricing service would not relieve the board of its oversight responsibility or senior management of its responsibility to ensure appropriate fair valuations and provide appropriate supervision, monitoring and management of risks.

4.3 Valuation methodologies

Marking-to-market

4.3.1 AIs should mark their fair valued positions to market whenever possible, on a regular and consistent basis. Marking-to-market is valuation of positions at observable, readily available close out prices in orderly transactions (i.e. not a price under a forced transaction or distressed sale) that are sourced independently. Examples of readily available close out prices include exchange prices, screen prices, or quotes from several independent reputable brokers.

4.3.2 If an AI uses broker quotations in determining fair values, it should understand how a quotation provided by a broker has been arrived at and whether it meets the objective of a fair value measurement. The AI should also consider to what extent the quote obtained reflects actual market transactions or is consistent with any market information that is available. In addition, it would normally not be appropriate for an AI to rely on a single broker quote[13].

4.3.3 For regulatory capital adequacy purposes, AIs incorporated in Hong Kong should use the more prudent side of the bid/offer close-out price unless the AI can demonstrate it is a significant market maker in a particular position type and has the ability to close out at mid-market price.

Marking-to-model

4.3.4 If the instrument does not have an observable, readily available price, making marking-to-market not possible, the AI can then use a valuation technique (commonly referred to as "mark-to-model"). Marking-to-model is valuation which has to be benchmarked, extrapolated or otherwise derived from a market input.

4.3.5 AIs valuing their positions by marking-to-model must be able to demonstrate that this is done in a prudent manner and reflects the economic substance of the transactions, using market-determined inputs or parameters, wherever possible. When marking-to-model, AIs should remain cognisant of the limitations of the model and apply an extra degree of conservatism.

[13] Paragraphs 58 to 63 of the *IASB EAP Report* (see footnote 4) provide detailed guidance on the use of broker quotes.

4.3.6 The HKMA will consider the following in assessing whether a mark-to-model valuation is prudent:

- the extent of senior management's understanding of the elements of the trading book (or of other fair value positions) which are subject to mark-to-model and the materiality of the uncertainty this creates in the reporting of the performance of the business of the AI and the risks to which it is subject;
- the extent to which market inputs are sourced in line with market prices (i.e. externally), the appropriateness of market inputs [14] for a particular position being valued, and whether the parameters of the model are reviewed on a regular basis;
- the extent to which generally accepted valuation methodologies for particular products, where available, are used; and
- where the model is developed by the AI itself, whether it is developed and approved independently of the risk-taking units.

Independent and rigorous model validation

4.3.7 A valuation model, including any material changes to it, must be verified by an appropriately qualified and experienced unit as part of a regular cycle of model validation to ensure that the model remains suitable for its intended use. Model validation processes should be conducted by a unit that is independent of both the risk-taking units and the model development process. Such processes should be systematically applied for both internally generated and (to the extent possible) vendor provided models.

[14] Frequently, valuation models require multiple parameter inputs. Where possible, market-determined (or observable) inputs or parameters should be used. Where observable data is not available for parameter inputs, other market information should be considered. For example, indicative broker quotes and consensus pricing information should be used to support parameter inputs where they are available. Where none of the above information is available to support parameter inputs, then other relevant sources of information such as prices for similar transactions, historic data, economic fundamentals with appropriate adjustment to reflect the terms of the actual instrument being valued and current market conditions should be used.

4.3.8 Model validation includes evaluations of:

- the model's theoretical soundness, mathematical integrity and software implementation;
- the appropriateness of model assumptions, including consistency with market practices and relevant contractual terms of transactions;
- sensitivity analyses performed to assess the impact of variations in model parameters on fair value, including under stress conditions; and
- benchmarking of the valuation result with the observed market price at the time of valuation or with an independent benchmark model (i.e. backtesting).

4.3.9 AIs must understand and document the conditions under which the performance of the model would not be acceptable, including the weaknesses/limitations of the model used and performance of the model under possible stressed conditions. Appropriate action should be taken when performance of the model is not acceptable (e.g. making valuation adjustments to address model limitations, model risk or the uncertainty of the model valuation, or introducing appropriate changes to the model, etc.).

Integrated control processes

4.3.10 AIs should put in place policies defining a regular cycle for valuation model review that reflects the vulnerabilities of individual models. Policies should also identify specific triggers (e.g. indications of deterioration in model performance or quality) that will cause the review cycle for a valuation model to be accelerated. A secure copy of the valuation model should be held and periodically used to check valuations.

4.3.11 AIs should establish explicit links between the results of the IPV process or indicators of performance of positions and the review process for models. Whenever possible, these links should be expressed in terms of explicit quantitative thresholds, the crossing of which should trigger a review of the valuation model and/or valuation procedure. These triggers should be consistent with sound practices in risk management.

4.4 **Assessment of valuation uncertainty**

4.4.1 AIs' valuation and risk measurement systems should systematically recognise and account for valuation uncertainty. In particular, valuation processes and methodologies should produce an explicit assessment of uncertainty related to the assignment of value for all instruments or portfolios (i.e. to assess the likelihood of future values occurring) and on how the risk surrounding changes in value can be managed.

4.4.2 Many factors can give rise to uncertainty about current valuations. Some valuation uncertainties are related to the characteristics of the instruments being valued. These may include, for example, longer term maturity and the absence of readily available market prices on closely related instruments that can guide the valuation through arbitrage and comparison. Uncertainty in valuations is generally greater for products that are less standardised, less frequently traded, and more complex and opaque. Other factors that can influence valuation certainty are related to the trading environment. For instance, the depth and breadth of the market in which the instrument is traded will affect its liquidity and hence the price at which a transaction can take place.

4.4.3 Furthermore, valuation uncertainty can arise from market disruption caused by unforeseen events such as financial, macroeconomic and political crises; characteristics of either the valuation model or method used; and the degree of veracity that can be attached to the data inputs used in the valuation and their impact on the outcome. Hence, valuation uncertainty is not exclusive to any level of data inputs used for fair value measurement or any specific valuation methodology. Material uncertainty may still arise in valuation using Level 1 inputs (i.e. quoted prices (unadjusted) in active markets) due to factors such as:

- the bid/offer spread;

- unexpected changes in prices at the moment the transaction is executed due to irregular behaviour of supply and demand; and
- the quality of the sources of market information used.

4.4.4 AIs should develop methodologies that provide, to the extent possible, quantitative assessments of valuation uncertainty. Methodologies for measuring valuation uncertainty may gauge the sensitivity of value to the use of alternative models and modelling assumptions (when applicable), to the use of alternative values for key input parameters to the pricing process; and to alternative scenarios to the presumed availability of counterparties. The extent of the quantitative assessment of valuation uncertainty should be commensurate to the importance of the specific exposure for the overall solvency of the AI.

4.4.5 Assessments of valuation uncertainty should be fully integrated into the internal decision-making process of the AI. Quantitative and qualitative assessments of uncertainty should accompany all internal reports of valuation information as well as the reports containing risk information across the AI. The assessment of uncertainty should be reported to all relevant bodies involved in the AI's investment and risk management decisions, including senior management and the board, with the same frequency and at the same time as information about value of positions and associated risks is communicated to the same bodies.

4.5 Valuation adjustments

4.5.1 Valuation adjustments are an integral part of the valuation process. AIs must establish and maintain procedures for considering valuation adjustments for the purpose of risk management, and regulatory and financial reporting, where appropriate.

4.5.2 AIs should, based on prevailing facts and circumstances including changes in market conditions, exercise judgement to determine whether an adjustment to a valuation estimate or a valuation input (including valuations provided by a third-party) is needed to reflect all appropriate risks, to be consistent with a market participant view, and to be in accordance with applicable standards and guidance.

4.5.3 AIs should consider, where relevant, making valuation adjustments for the following: unearned credit spreads, close-out costs, operational risks, early termination, investing and funding costs, future administrative costs, and model risk.

4.5.4 The policy for identifying the need for, and the type of, valuation adjustments to be applied to estimated valuations should form part of an overall governance and control framework. The approval and subsequent monitoring of valuation adjustments and any changes to the method of determining such adjustments should be reported to senior management.

4.5.5 AIs incorporated in Hong Kong must establish and maintain procedures for judging the necessity for, and calculating, an adjustment to the current valuation of less liquid positions or complex products for regulatory capital purposes. Such adjustments should where necessary be in addition to any adjustments to the value of the positions required for financial reporting purposes and should be designed to reflect current illiquidity whether the position is marked-to-market or marked-to-model. Less liquid positions could arise from both market events or institution-related situations e.g. concentrated positions and/or stale positions, complex products including, but not limited to, securitization exposures [15] and n^{th}-to-default credit derivative contract[16].

4.5.6 For complex products, AIs must explicitly assess the need for valuation adjustments to reflect the model risk associated with using a possibly incorrect valuation methodology and the risk associated with using

[15] Please refer to section 2(1) of the BCR for the meaning of “securitization exposure”.

[16] Please refer to section 2(1) of the BCR for the meaning of “n^{th}-to-default credit derivative contract”.

unobservable (and possibly incorrect) calibration parameters in the valuation model.

4.5.7 When determining the appropriateness of the adjustment for less liquid positions, AIs should consider all relevant factors, such as the amount of time it would take to hedge out the position or the risks within the position, the average volatility of bid/offer spreads, the availability of independent market quotes (number and identity of market-makers), the average and volatility of trading volumes (including trading volumes during periods of market stress), market concentrations, the aging of positions, the extent to which valuation relies on marking-to-model, and the impact of other risks not included in paragraphs 4.5.5 and 4.5.6 above.

4.5.8 For regulatory capital adequacy purposes, the adjustment to the current valuation of less liquid or complex product positions made in accordance with paragraphs 4.5.5 to 4.5.7 should impact Common Equity Tier 1 capital.

4.5.9 AIs must review the appropriateness of the valuation adjustments for less liquid or complex products on an ongoing basis.

5. Audit

5.1 Internal audit and external audit are expected to devote considerable resources to reviewing the control environment for, and the availability and reliability of information or evidence used in, the valuation process as well as the reliability of estimated fair values. This includes the price verification processes and involves the testing of valuations for significant transactions. Audit programmes should also evaluate whether the disclosures about fair values made by an AI are in accordance with the applicable accounting standards.

5.2 In addition, internal audit should play an active role in the development and ongoing assessment of the risk management programme. At a minimum, internal audit should review the valuation procedures and control processes annually. Based on its risk assessment, internal audit should conduct periodic reviews of the appropriateness of an AI's valuation practices against the applicable accounting standards. AIs should promptly address any deficiencies identified in their valuation practices by internal or external auditors.

6. External reporting

6.1 AIs incorporated in Hong Kong are required to provide timely, relevant, reliable and decision-useful disclosures specifically related to fair value measurement in accordance with the Banking (Disclosure) Rules (BDR) (Cap. 155M) and applicable accounting standards,[17] including HKFRS 13.

6.2 In terms of decision-useful information related to fair value measurement, the following information, some of which is already covered in existing accounting standards or guidance, is relevant:

- description of valuation governance and controls processes;
- description of valuation techniques used to determine fair values and the instruments to which they are applied;
- explanations of the valuation inputs and assumptions used in the fair value measurements; and
- sensitivity of fair value measurements to reasonably possible alternative valuation inputs/assumptions that would significantly affect the valuation.

6.3 As part of the supervisory review process, the HKMA may review the adequacy and accuracy of fair value disclosures, including those relating to an AI's policies and practices for using fair value. In this respect, the HKMA expects an AI to ensure that relevant fair value disclosures:

- are made in accordance with the applicable accounting standards and disclosure requirements;

[17] Section 29B and section 35 of the BDR requires AIs incorporated in Hong Kong to make interim and annual financial disclosures in compliance with the prevailing accounting standards applicable to them. AIs may also make reference to Part 2 of the *IASB EAP Report*, where relevant (see footnote 4).

- are consistent with management's approach to risk management; and
- are properly balanced between qualitative disclosures (e.g. description of the framework for the management of various risk factors and the key risk metrics used in risk management) and quantitative information (e.g. information around each risk factor and the performance of risk estimates) with a view to providing a well-balanced view of the AI's overall risk profile.

If necessary, the HKMA will discuss any issues relating to these fair value disclosures with the AI's senior management and external auditor.
