



Monetary Authority of Singapore

# **GUIDELINES ON SOUND RISK MANAGEMENT PRACTICES**

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30 October 2002

## INVITATION FOR YOUR FEEDBACK

These guidelines on Sound Risk Management Practices are statements of best practices that institutions are encouraged to adopt. We welcome your feedback and comments on these guidelines. You may send your comments in writing to:

Mr Lim Phang Hong  
Director (Financial Risk)  
Specialist Risk Supervision Department  
Monetary Authority of Singapore  
10 Shenton Way, MAS Building  
Singapore 079117

Alternatively, you may submit your comments via electronic mail to [guidelines@mas.gov.sg](mailto:guidelines@mas.gov.sg) by 30 Nov 2002.

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# 1 Executive Summary

1.1 This set of guidelines aims to provide banks, merchant banks, finance companies and insurance companies (referred to collectively as “institutions” in these guidelines) under MAS’ regulatory purview with guidance on sound risk management practices.

1.2 These guidelines encompass the management of credit, market and liquidity risks and include guidelines on sound internal controls. For effective risk management and sound internal controls, the guidelines emphasise three key pillars, namely, adequate Board and senior management oversight, sound risk management policies and operating procedures, and strong risk measurement, monitoring and control capabilities commensurate with the risk taken.

1.3 The principles recommended in these guidelines, which are based on best practices, are not intended to be exhaustive or to prescribe a uniform set of risk management requirements for all institutions. Institutions should note that the sophistication of the process, and internal controls used to manage risks, depends on the nature, size and complexity of their activities. Nevertheless, in today’s world, global interdependencies and market forces result in substantial integration of functions among institutions. This gives rise to a high degree of commonality in the risk management challenges faced. As such, these guidelines are expected to have broad applicability. At the same time, institutions should also take into account relevant regulatory requirements and industry standards where applicable.

1.4 Internal controls are the policies, procedures and processes established by the Board of Directors and/or senior management to provide reasonable assurance of the soundness of an institution’s operations, and reliability of financial and management reporting. MAS encourages institutions to consider and adopt the principles set out here and in other applicable guidelines such as the “Framework for Internal Control Systems in Banking Organisations” and “Customer Due Diligence for Banks” issued by the Bank for International Settlements. Sound internal controls can also help institutions comply with corporate and regulatory requirements. Across the world, weak or ineffective internal controls have led to operational losses in some institutions and contributed to the failure of others. Effective internal controls can help institutions enhance stakeholders’ value, decrease the possibility and quantum of unexpected losses, and reduce the risk of fraudulent activities.

1.5 Credit risk is defined as the risk of loss that arises when an obligor fails to perform its obligations under a contract or when its ability to perform such obligations is impaired. These guidelines outline the policies and processes that help institutions set up a credit risk management system and

list the principles by which they can measure, monitor and manage credit risk. Robust management of credit risk will improve an institution's asset quality, which is essential for its long-term soundness.

1.6 Market risk is defined as the potential loss in on- and off-balance sheet positions in an institution's books, resulting from movements in market risk factors such as interest rates, equity prices, foreign exchange rates and commodity prices. Sound management of market risk is essential to ensure the market risk faced by institutions do not reach levels detrimental to their financial condition. It is crucial for institutions to have the necessary processes and systems in place to measure and control market risk, both under normal market conditions and under potential stress scenarios. This is especially important with the advent of new products, business lines or activities, and the modification of existing ones. Failure to understand, measure and control market risk could cause an institution to expose itself to potential losses due to market fluctuations, which could jeopardise its solvency.

1.7 Liquidity risk is the risk of financial loss to an institution arising from its inability to fund increases in assets and/or meet obligations as they fall due without incurring unacceptable cost or losses. To manage liquidity risk, institutions should properly define their liquidity strategy to meet anticipated or potential needs over the short and long-term. The strategy should enunciate specific policies on particular aspects of liquidity risk management. It is important for an institution to measure its liquidity position on an ongoing basis and estimate how much funding requirements are likely to evolve over time under both "business as usual" environments and plausible crisis scenarios. Sound risk measurement and monitoring systems and controls are also necessary to manage an institution's funding concentrations, funding capacity and intra-group liquidity. Each institution should also have a contingency plan for handling plausible liquidity crisis situations that could result in a significant erosion of its funding liquidity. A liquidity crisis can negatively impact on earnings and capital and, in a "worst case" scenario, cause the collapse of an otherwise solvent institution. Sound liquidity risk management practices can reduce the likelihood of a liquidity crisis, while a well-laid contingency plan can reduce its impact.

1.8 While the guidelines are organised by risk type, it is important to note that these risk types and risk arising from lapses of internal controls are often related. It is common for causal relationships to exist between risk types, as well as different risk types manifesting themselves concurrently in a given situation. This inter-linkage of risk is particularly pronounced in stress scenarios and systemic events. Although the overall impact of the different risk types are mitigated by the management of the different risk types separately, the Board and senior management should consider the inter-linkage of risk types at all times and manage it accordingly.

## 2 Board and Senior Management Oversight

2.1 The Board of Directors and senior management need to be fully aware of and understand the risks associated with the institution's business activities. They have to take all necessary measures to ensure that such activities are:

- conducted in a safe and sound manner and in line with high standards of professionalism and sound business practice;
- consistent with the institution's overall risk management philosophy and business strategy; and
- subject to adequate risk management and internal controls, which entails the institution having proper policies and procedures, risk measurement and reporting systems and independent oversight and control processes.

2.2 The Board of Directors and/or senior management need to establish comprehensive and adequate written policies and procedures for the institution's business activities. These should, where practicable, clearly:

- delineate the lines of authority and the responsibilities of the Board of Directors, senior management and other personnel for managing risk;
- set out the scope of activities; and
- identify pertinent risk management issues (for market, liquidity, credit, operations/systems, legal and reputational risk), including the appropriate risk and control limits, regular risk position and performance reporting, capital requirements, accounting treatment and standards, and investigation and resolution of irregular or disputed transactions.

2.3 The Board of Directors and/or senior management have to approve policies pertaining to the evaluation and management of risks related to the spectrum of business activities, in particular, a policy framework that establishes managerial oversight and structure, the degree of risk tolerance, approved activities, markets and types of instruments, overall business strategy regarding client-driven trades, market making and proprietary trading etc. and risk management methodologies. It is expected that the Board of Directors and/or senior management are regularly kept informed of the institution's risk exposures, business direction and significant transactions, and periodically re-evaluate significant risk management policies, placing emphasis on the institution's financial objectives and risk tolerance. The



overall strategy has to be reviewed by the Board of Directors and/or senior management at least once a year or more frequently, if market conditions warrant.

2.4 The Board of Directors and/or senior management should establish the risk management and control process, risk measurement and reporting systems and staff resources that are commensurate with the institution's level of activity and type of business. The Board of Directors and/or senior management have to periodically review the adequacy and appropriateness of the institution's policies and procedures, and risk management process. The review should cover the methodologies, models and assumptions used to measure risk and limit exposures, performance and capital position, as well as internal control procedures. All deficiencies are to be promptly remedied. In addition, the Board of Directors and senior management should develop and instil a strong risk culture, and exercise prudence and effective corporate governance in risk management. The Board and senior management should communicate the risk management and control policy throughout the organisation.

2.5 The Board of Directors should ensure that senior management is capable of managing the risk of the institution. Senior management should undertake the responsibility to implement the risk strategy and policy approved by the Board of Directors. As part of their executive functions, senior management should periodically review individual transactions, as well as overall portfolio profile in relation to its risk strategy and policy. Senior management should periodically review the institution's risks so that they can respond to changes in the environment in a timely manner.

2.6 It is the responsibility of the Board of Directors and/or senior management to ensure that the institution maintains sufficient capital to support the risk exposures that may arise from its business activities. To this end, the institution could devise some means by which significant changes in the size or scope of its activities act to trigger an analysis of the adequacy of capital supporting the activities.

2.7 While senior management might typically delegate some of their responsibilities to other committees/personnel, accountability cannot be delegated. Senior management should continue to exercise adequate oversight to ensure that delegated responsibilities are effectively carried out. In this regard, all committees should have written terms of reference with clearly defined objectives, roles, responsibilities and delegation criteria.

# ***SECTION 1: INTERNAL CONTROL***

# 1 Control Environment

## 1.1 Policies and Procedures

1.1.1 Institutions should have comprehensive and sound policies and procedures for prudent management of significant risks arising from their various operations. The Board of Directors and/or senior management should ensure that policies and procedures are approved and are consistent with the nature, complexity and materiality of the institution's activities. There should be clear delineation of roles, responsibilities and accountability for the implementation of consistent policies and procedures across the institution.

1.1.2 Policies and procedures should be documented and periodically reviewed to ensure that they reflect current practices and the appropriate controls are in place. There should also be adequate systems to monitor compliance with established policies and procedures. Any instances of non-compliance should be independently investigated and, where appropriate, follow-up action should be taken.

## 1.2 Code of Conduct

1.2.1 It is in the interest of institutions to conduct their activities with prudence and a high degree of integrity in order to enhance their reputation and increase customers' confidence. In this regard, institutions should establish a comprehensive code of conduct commensurate with their structure, size and complexity of operations, to promote a strong ethical corporate culture.

1.2.2 The code of conduct should prescribe a set of ethical values that institutions expect employees to observe in discharging their duties. It could, for instance, include guidelines on acceptance of gifts and entertainment, conflict of interest, personal benefits, confidentiality of information and personal investments.

1.2.3 Institutions should consider the need for additional rules to govern the conduct of personnel in functional areas such as investment banking, private banking and treasury. For instance, with regard to treasury and financial derivatives activities, the Board of Directors and/or senior management need to exercise close supervision over the conduct of trading personnel and their relationship with brokers. The back office needs to monitor brokerage activity to ensure that it is only conducted with approved brokers and that trades are distributed among a reasonable number of brokers. Institutions have to establish clear guidelines on the acceptance of entertainment and gifts by trading personnel from brokers to guard against

abuse and excesses. Brokers' statements need to be reviewed by staff independent of the trading function. Unusual trends in benefits or consideration received from brokers should, where appropriate, be reported to the Board of Directors and/or senior management and proper records should be maintained on benefits received from brokers. The guidelines should also apply to customers, especially large customers who have frequent and sizeable transactions with the institution.

1.2.4 The Board of Directors and/or senior management should periodically review the code of conduct to keep abreast of changes in the internal and external environment. Institutions should have adequate policies, systems and controls in place to ensure that personal investments or transactions undertaken by staff do not result in situations where potential conflicts of interest could arise between the employee and the institution or with the institution's customers.

1.2.5 In particular, institutions should require employees to periodically disclose situations where potential conflicts of interest could arise. Any potential or actual conflict of interest should be escalated to management for action if required, and disclosed to customers, where applicable. For instance, dealers should not be trading for their own accounts. Where this is allowed, strict written policies governing dealers trading for their own accounts have to be established, which should, among other things, emphasise the prevention of conflict of interest and avoidance of undue enrichment from any information gained in a dealing position. These policies should, as far as possible, detail clearly the actions to be taken by the Board of Directors and/or senior management against any dealer who violates such policies.

1.2.6 Institutions should ensure that all personnel understand and adhere to the code of conduct. One or more senior persons, or an appropriate unit, should be responsible for advising management and staff on the code of conduct and its enforcement. Employees should be required to acknowledge in writing that they have read, understood and would observe the code. Disciplinary action should be taken against staff who breach the code of conduct.

### **1.3 Delegation of Authority**

1.3.1 Institutions should clearly define the responsibilities and levels of authority required in relation to various types of activities and exposures for accountability purposes. Approving limits assigned to personnel should be commensurate with their seniority and responsibilities.

1.3.2 The delegation of authority needs to be clearly documented and should specify, among other things, the specific authority being delegated, the

authority of recipients to further delegate authority and restrictions placed on the exercise of delegated authority. Institutions should also have adequate monitoring systems to ensure that activities and exposures are properly authorised. Departures from guidelines on the approval limit structure should be promptly reported to management.

## **1.4 Segregation of Duties**

1.4.1 Institutions should ensure adequate segregation of duties to mitigate the risk of unauthorised transactions or fraudulent activities. Senior management is responsible for ensuring that staff are not assigned incompatible duties which may allow an institution's data to be manipulated for personal gain, or for irregularities or financial losses to be concealed. An institution should have processes in place that restrict any one staff from being able to handle the whole transactional flow.

1.4.2 Institutions should conduct periodic reviews of the responsibilities of key personnel to minimise areas of potential conflict of interest and ensure independent checks are in place. The audit scope should include checks on segregation of duties. Inadequate segregation of duties could occur in, but are not limited to, the following instances where an individual has responsibility for:

- front office and risk management functions (e.g. credit marketing and credit administration, or insurance marketing and risk underwriting);
- trade execution and operations functions (e.g. trade confirmation, trade settlement, reconciliation of front office and back office data on trades, reconciliation and accounting);
- approving disbursement of funds and the actual disbursement;  
and
- construction and release of payment instructions.

1.4.3 Smaller institutions that face staffing constraints should have compensating controls in place. Compensating controls could include, among other things, enhanced management oversight, more frequent audits and independent checks.

## **1.5 Audit Coverage**

1.5.1 Independent audit coverage of the institution's activities has to be conducted annually by competent professionals to ensure the timely

identification of internal control weaknesses and/or system deficiencies. Internal auditors should be independent of the activities audited to facilitate an objective review and evaluation of the institution's activities. Decisions on remuneration of internal audit staff, review of audit plans, evaluation of the performance of internal auditors and assessment of whether management has promptly rectified audit findings should be made independent of the institution's line or branch management. To avoid potential conflicts of interest, the internal audit function should also not have a direct reporting line to the institution's line or branch management.

1.5.2 The Board of Directors and/or senior management should try to ensure that auditors possess the necessary experience and expertise to audit the institution's activities. Auditors should also be able to communicate directly with any personnel, and to gain access to all records, files or data necessary for the proper conduct of the audit. They are expected to evaluate the overall effectiveness of the institution's risk management process and whether management oversight of the institution's activities is adequate.

1.5.3 Internal auditors are expected to audit the risk management process and internal controls periodically, and scale the audit frequency according to the level of risk. Where appropriate, the depth and frequency of internal audits have to be increased if weaknesses are found or if significant changes have been made to the risk oversight process, product lines, modelling methodologies, internal controls or the institution's overall risk profile. To facilitate the development of adequate controls, internal auditors need to be brought into the product development process at the earliest possible stage.

1.5.4 Both internal and external auditors are expected to evaluate the independence and overall effectiveness of the institution's approval process, risk management process and internal control systems, and to appraise the soundness and adequacy of the institution's accounting, operating, legal and risk controls, including compliance with risk limits and the reliability and timeliness of reports submitted to the Board of Directors and/or senior management. In addition, they need to check for proper and adequate segregation of duties and reporting lines (particularly for market-making personnel and risk management personnel) and whether adequate oversight by a competent manager without day-to-day dealing responsibilities is exercised.

1.5.5 Auditors have to include their findings and recommendations in their audit reports submitted to MAS. Internal auditors of institutions with head offices located overseas need to report their findings directly to the head offices. Auditors and the institution's Board of Directors and/or senior management have to ensure the prompt and satisfactory rectification of any adverse findings noted in the audit report. To facilitate this, institutions could

send regular reports on actions taken to address significant deficiencies to the Board of Directors and/or senior management.

## **1.6 Compliance**

1.6.1 Institutions should take a proactive view of their compliance function by appointing senior personnel, or an appropriate unit, to oversee compliance issues. Compliance officers should be equipped with the necessary skills and expertise, the level of which should be commensurate with the complexity of the institution's products and activities.

1.6.2 Compliance personnel should, among other things, provide advice and training on regulatory requirements and standards of professional conduct to staff, and conduct periodic reviews to assess compliance with policies, procedures and regulatory requirements where applicable. Anomalies detected or instances of staff's failure to address compliance issues in a responsible manner should be promptly escalated to senior management for action.

## **1.7 Succession Planning**

Institutions should have succession planning processes in place to ensure continuity and the smooth operation of the institutions in the event of changes in key personnel. Management of succession planning should be an active ongoing process, integrated with the institution's strategic plans.

## **1.8 Mandatory Leave**

1.8.1 Institutions should have personnel policies requiring staff in trading, risk management and risk control positions to take mandatory block leave of at least 7 calendar days each year to facilitate timely detection of unauthorised transactions and other irregularities. Any departure from this policy should be allowed only under exceptional circumstances and formally approved.

1.8.2 The staff concerned should not be allowed to transact, execute instructions or otherwise perform their assigned duties during their leave of absence. Supervisors should refrain from giving operational instructions to staff during this period. Duties, responsibilities and the corresponding authority of the staff should be fully delegated to a covering officer during his absence.

## **1.9 Handling of Complaints**

1.9.1 Complaints could be symptomatic of inadequate controls or non-compliance with existing procedures. Hence, institutions should have adequate procedures for centralising, recording, investigating and monitoring complaints from customers. Reasonable steps should be taken to ensure that complaints are handled fairly, consistently and promptly. Responsibility for addressing complaints, and rectification of system and control weaknesses arising from complaints should be undertaken by staff who are not directly involved in the subject of the complaint.

1.9.2 Senior management oversight is essential to ensure that complaints received from customers are taken seriously and adequately addressed. In this regard, periodic reports on complaints should be submitted to management for review. Reports could include information such as the source of complaints, volume and type of complaints, how complaints were addressed, whether disciplinary action was taken against staff who might have breached internal guidelines or failed to uphold the requisite standard of professionalism in discharging their duties.

## **1.10 Staff Compensation**

Institutions should ensure that reward/compensation policies are appropriate and sufficient to attract and retain competent and experienced personnel and that they do not inadvertently provide incentives for inappropriate activities. As a general policy, institutions have to, as far as possible, structure reward/compensation policies, especially in the risk management, control and senior management functions, in a way that is sufficiently independent of the performance of trading activities or sales targets. This is to avoid potential incentives for excessive risk-taking that can occur if reward/compensation is tied too closely to the profitability of business activities. The institution may wish to take into account the consistency of an individual's performance, adherence to the code of conduct, internal guidelines and regulatory requirements, as compensation packages based on short-term results may not take into account long-term risks. Institutions should maintain proper documentation of staff appraisal for future reference.

## **1.11 Recruitment**

Institutions should ensure that there is an adequate screening process in place so that their activities are managed and staffed by qualified personnel with the necessary experience and professional capabilities. Apart from considering the potential employees' qualification and experience, institutions should assess their character, integrity and track record prior to employment. New staff should be informed that any conduct that reflects



adversely on the honesty or trustworthiness, or that compromises the integrity, of the institution is unacceptable.

## **1.12 Staff Training and Education**

1.12.1 Institutions have to ensure that personnel are provided with relevant and adequate training at regular intervals to equip them with knowledge of new products, new or amendments to laws, rules and regulations, as well as to enhance their efficiency and effectiveness. In particular, as the risks of trading in treasury and financial derivatives are often complex, institutions engaging in such activities have to ensure that staff are provided with adequate training and education, and that they possess the necessary experience and expertise. This applies to trading and marketing personnel, as well as personnel involved in the risk management process (including back office and internal audit functions). Credit officers need to be trained to analyse the impact of proposed financial derivatives activities on the financial condition of the customer, the risks involved, and be able to advise the customer accordingly. Institutions should also maintain proper and adequate training records of staff to identify skill gaps and better assess their training needs.

1.12.2 Institutions should, where possible, implement periodic job rotation to help staff broaden their skills set. This may assist in providing continuity in operations in the event of staff turnover. Institutions should also be conscious of the fact that a high level of staff turnover could undermine the effectiveness of their internal control systems. This could be mitigated by ensuring that staff are familiar with policies and procedures.

## **2 Business Process Controls**

### **2.1 Dealing with Customers**

2.1.1 The complexity of some treasury and financial derivatives products increases an institution's vulnerability to reputational risk. For the institution's own protection, it needs to formulate clear written policies, approved by the Board of Directors and/or senior management, to address issues relating to the appraisal of customers and risk disclosure and to reduce the risk of misunderstandings and contractual disputes. The rationale for such policies is prudential; they are to protect an institution from the credit, reputational and litigation risks which may arise as a result of contractual disputes with customers.

2.1.2 Dealings with customers have to be conducted in good faith and in a manner consistent with the promotion of public confidence in the integrity of the market. In this regard, the institution needs to establish procedures to train and supervise the activities of personnel engaged in dealing with customers in treasury and financial derivatives transactions. The institution should, wherever possible, also review and approve written agreements and other documents used in such transactions to ensure their suitability and continued relevance in the face of changing market practices and laws.

2.1.3 Institutions should implement procedures to assess customer suitability. It is in the institution's interest to understand the financial sophistication and character of customers and the purpose of the treasury and financial derivatives activities. For customers who are market professionals, it may be sufficient to consider them sophisticated counterparties using treasury or financial derivatives products for market-making or risk management purposes. For less sophisticated customers, institutions should, to the extent possible, attempt to understand the particular risk that the customer is trying to manage and recommend, in good faith and based on their best knowledge, products that are appropriate for the customer. Where appropriate, institutions may also wish to provide risk disclosure information, taking into account the sophistication of the customer and complexity of the transaction, to enable the customer to better understand the major risks, nature and material terms and conditions of the transaction.

2.1.4 When the institution believes that a particular transaction may not be appropriate for a customer, but the customer wishes to proceed with the transaction, the institution should document its own analysis and any risk disclosure information provided to the customer. This would protect its position in the event that the customer makes a claim for indemnification against losses. In addition, it is recommended that such transactions be independently reviewed by the relevant department or personnel of

competence and, where necessary, escalated for the attention of the senior management of the institution and/or customer.

2.1.5 Where appropriate, institutions may wish to clarify with customers the nature of their relationship with them to prevent customers from incorrectly presuming that the institution has acted in an advisory or similar role in the transaction.

2.1.6 Institutions should attempt to resolve any disputed transactions with customers promptly. Operational controls, such as telephone recording of trades and proper documentation of discussions and meetings with customers on proposed transactions (including the structure and pricing of transactions and any risk disclosure information provided), have to be in place to facilitate proper and expeditious resolution of discrepancies and disputed transactions. The institution should prohibit the use of handphones in the dealing room.

2.1.7 Any disputes with customers should, wherever possible, be independently investigated and followed up on by the Board of Directors and/or senior management, and the investigations properly documented. While attempts are being made to arrive at a satisfactory resolution, the institution may consider taking measures to mitigate further losses from arising on the disputed transaction, where such action would serve the interest of the institution and its customer.

2.1.8 It would be in the interest of institutions to provide customers with a clear explanation of identifiable commissions, fees, charges and transaction costs explicitly payable, if any, to the institution.

2.1.9 Besides disputes with customers, reputational risk can also arise from many aspects of an institution's operations. For example, the failure to manage properly the other risks could result in a large market or credit loss. Even where no monetary loss is incurred, there could still be reputational damage. Institutions thus have to implement a sound and comprehensive risk management process to identify, monitor, control and report reputation-related risks.

## **2.2 Operation of Accounts/Insurance Policies**

2.2.1 Institutions should have sound know-your-customer (KYC) policies and procedures in place, which should be reviewed and updated periodically. Customer identification is an integral part of the KYC process. Institutions should thus obtain satisfactory evidence of the identity and legal existence of potential customers before establishing a business relationship with them. They should also be more cautious when dealing with unfamiliar or new

customers. Institutions should not open accounts or conduct business with a customer who insists on anonymity or uses a fictitious name. They should apply enhanced due diligence for higher risk customers.

2.2.2 Institutions should verify basic information on accounts or insurance policies to ascertain the identity of customers. This should include verifying names and mailing addresses using passports, identity cards and/or other official documents. Institutions should also conduct regular reviews of their customer database to ensure that they have up-to-date customer profiles.

2.2.3 Institutions should establish policies on the minimum information required for different types of account holders (e.g. personal, corporate, beneficial, trustee, nominee and intermediary) to guide staff during the account opening process. Outstanding account opening documents should be independently monitored and exception reports should be generated for review by management.

2.2.4 Additionally, institutions other than insurance companies should be cognisant of the increased risks associated with inactive and dormant accounts and ensure that there are appropriate controls in place. This could include, among other things, policies on the definition of inactive and dormant accounts, periodic review of such accounts and conditions under which a dormant account could be reinstated.

2.2.5 Institutions should have controls in place to ensure that opening and closure of accounts, new insurance policies and termination of insurance policies are properly authorised, with the basis and approval clearly documented.

## **2.3 Legal Documentation**

2.3.1 Institutions have to have written agreements with counterparties, where appropriate and in line with market practice, specifying the duties and responsibilities of each party. For the institution's own protection, it should have clear guidelines and policies in place to ensure that the counterparty has the legal and necessary regulatory authority to enter into a transaction, prior to engaging in the transaction. Staff would be expected to evaluate the terms of any contract or agreement governing transactions to ensure that they are legally sound and enforceable in all relevant jurisdictions, and in the event of insolvency proceedings against the counterparty. Where the institution offers or is granted indemnification against losses from treasury and financial derivatives trading, it may wish to obtain the appropriate degree of comfort as to the legality of and specific form the indemnification takes. In particular, the institution may wish to obtain comfort as to whether its indemnification against

losses is legally structured in accordance with the agreement between the institution and its counterparty.

2.3.2 The Board of Directors and/or senior management need to institute proper and adequate controls to ensure that treasury and financial derivatives contract documentation is properly executed, confirmed, maintained and safeguarded. There has to be close co-operation between the various risk departments within the institution to ensure that the intention of the various parties and their assumptions with regard to risk allocation are correctly reflected in derivatives product documentation. Credit protection also needs to be addressed in such documents, for instance, by ensuring that adequate remedies are available to parties upon the occurrence of a credit event and determining the allocation of risk arising from external events such as tax changes, force majeure and acts of sovereign states.

2.3.3 As far as possible, it should be clearly indicated on deal slips whether a transaction is for hedging or trading purposes and, in the case of hedging, details of the hedge including the underlying position being hedged. Negotiation and execution of legal documents, such as the ISDA Master Agreement, with customers need to be independent of the dealing function and reviewed by legal counsel. Trades that are executed orally should be promptly confirmed and supported by written documents.

## **2.4 Record Keeping**

2.4.1 Institutions should have in place adequate controls over its accounting and other record-keeping process with respect to on- and off-balance sheet assets and liabilities to provide reasonable assurance of the completeness, reliability and accuracy of accounting information. An effective accounting system should, among other things, be able to identify and record all valid transactions, and describe the transactions in sufficient detail to permit proper classification of transactions for financial reporting. There should also be adequate documentation and records of financial transactions for audit trail purposes.

2.4.2 Institutions are expected to adopt conservative and consistent accounting policies for the treatment of profits and losses, especially those arising from treasury and financial derivatives transactions designated as hedged or trading positions. Open trading positions have to be marked-to-market on a daily basis, with resultant losses recognised promptly in the institution's profit and loss account. Additionally, off-balance sheet transactions and transactions where the institution retains risk exposures should be properly disclosed and quantified, and provisions made where appropriate.

2.4.3 Institutions should also establish the minimum retention period for taped telephone conversations and documents, taking into account the relevant laws, rules and regulations. Financial transaction documents may be retained as originals, copies, on microfilm or in electronic form, taking into account whether such forms are admissible in court or in compliance with regulatory requirements. Such records are to be stored in a manner that is reasonably practicable to retrieve. They should also be properly kept in a safe or vault and centralised within a department, where possible, to mitigate the risk of loss of records.

## 2.5 Management Information Systems

2.5.1 Institutions should have adequate management information systems (MIS) to facilitate the effective management and control of all aspects of their operations. The sophistication of the MIS should be consistent with the complexity and diversity of the institution's operations. Institutions should consider key elements such as timeliness, accuracy, consistency, completeness and relevance when developing their MIS. The MIS should also be sufficiently flexible to cope with various contingencies and have the capability to monitor compliance with the institution's established policies, procedures and limits.

2.5.2 An accurate, informative, and timely MIS is also essential to the risk management process. The institution's risk exposures need to be reported to the Board of Directors and/or senior management using a common framework for measuring and limiting risks. Exposures and profit and loss positions should be reported at least daily to managers who supervise but do not themselves engage in position-taking activities, and to risk managers who report independently and regularly to the Board of Directors and/or senior management on the risk-taking activities of the institution. More frequent reports should be made when market conditions dictate. Reporting to other levels of senior management (including the Board of Directors) may be done at a frequency which provides them with adequate information to judge the changing nature of the institution's risk profile. It is essential that the Board of Directors and/or senior management are promptly informed of unanticipated changes, progressively deteriorating positions or other significant issues arising from the institution's positions, even when limits are not exceeded. Additionally, management reports should be prepared by a party independent of the position-taking units.

2.5.3 Institutions using different information systems for various transactions entered into by customers should ensure that all transactions of an individual customer are captured and consolidated in the MIS reports. Processes should be in place to ensure data integrity, especially if the reports generated are based on information from different source systems.

2.5.4 Institutions also have to ensure that systems support and operational capacity are adequate to accommodate the different types of treasury and financial derivatives activities being engaged in. The institution needs to have the ability to efficiently and accurately process and settle volumes transacted and update risk monitoring systems on a timely basis. The MIS must provide a snapshot of the risk inherent in all on- and off-balance sheet activities. Where an institution engages in leveraged treasury or financial derivatives transactions, its systems have to be able to reliably track collateral values. In a multi-vendor, multi-system environment, institutions should, wherever possible, ensure that a consistent system definition is applied. Where the constituent parts of a trade are booked in different locations, institutions need to have some form of centralised monitoring to ensure the proper booking and valuation of such transactions.

2.5.5 Institutions have to deploy the necessary resources (financial and personnel) to develop and maintain the operations and systems supporting their activities. Operations personnel are expected to be knowledgeable about treasury and financial derivatives products and institutions have to satisfy themselves that the personnel possess the necessary skills and experience. Institutions should also ensure that their personnel remain competent for the work they do on an on-going basis. The sophistication of the systems support and the operational capacity have to be commensurate with the size and complexity of these operations.

2.5.6 An effective MIS should facilitate institutions' monitoring of compliance with internal controls and provide reasonable assurance that controls are being complied with. For instance, institutions could use their MIS to establish customer profiles on the expected type and volume of transactions that a customer would generally engage in. Transactions that are inconsistent with the customer profile could be used to alert institutions to the possibility that the customer is conducting unusual or suspicious transactions.

2.5.7 As timely and accurate reports are critical elements of an effective MIS, institutions should, as far as possible, reduce the amount of manual work required to prepare management reports and take steps to minimise inaccuracies in reports. Relevant levels of management should receive reports with adequate information to facilitate effective oversight of business and operations. The frequency and the amount of detail in these reports should be geared towards the level of management reviewing the reports. Follow-up action should be properly documented and reported to management, and suspicious transactions reported to the relevant authorities.

## 2.6 Physical Controls

2.6.1 Institutions should ensure that there is adequate physical security for their place of business and cash-in-transit. Access to sensitive areas such as the dealing room, computer room and funds transfer area should also be strictly granted on a need-to basis to minimise the risk of unauthorised transactions, fraud or disruption to operations.

2.6.2 Items such as test keys, MEPS smart cards, master IDs for SWIFT, cash, securities, accounting records and legal documents should also be subject to dual control and/or their access restricted to authorised personnel. Fireproof safes and safe deposit vaults should be used for the protection of assets such as cash and securities.

## 2.7 Off-Premises and After Hours Trading

Institutions should state whether off-premises and after hours trading are permissible in their policies and procedures. If such transactions are allowed, adequate controls should be in place to ensure that transactions are executed by authorised personnel, within the approved limits, and captured in systems for processing, and confirmations are sent to customers within a reasonable period of time.

## 2.8 New Products/Business Lines/Activities

2.8.1 Proposals on new products, business lines or activities to be undertaken, that are submitted for the approval of the Board of Directors and/or senior management, need to be accompanied, where appropriate, by a product programme document that includes:

- a description of the relevant financial products and markets, and the underlying objectives of the transactions (e.g. customer service, risk management tool, trading, etc.);
- analysis of the risks that may arise from these activities, and details of any risk management procedures and systems established, including procedures for identifying, measuring, monitoring and controlling risks;
- an evaluation of the impact of the proposed activities on the institution's overall financial condition and capital level, where applicable;
- the relevant accounting guidelines and tax treatment;



- analysis of legal restrictions and whether the activities are permissible; and
- the appropriate structure and staffing for trading, as well as key risk control functions, including independent risk management and internal audit coverage to ensure timely identification of internal control weaknesses and/or system deficiencies.

2.8.2 The institution's policy should contain a definition of the term "new product", and provide for the proper review and authorisation of variations on existing products. Depending on the impact such variations would have on the institution's risk profile, approval by the Board of Directors and/or senior management may be warranted. All product programmes and the parameters used to govern product programmes should, as far as possible, be reviewed at least on an annual basis and when required, for example, when regulatory changes occur, when market conditions warrant a review or when any major underlying assumption is changed. Institutions also have to evaluate the impact of new activities on their overall financial condition and capital level after implementation.

2.8.3 As new products frequently require different pricing, processing, accounting and risk measurement systems, the institution has to ensure that knowledge and skills, staffing and technology are adequate to support the activities. The new product approval process should, if practicable, include a sign-off by all relevant personnel in areas such as risk control, operations, accounting, legal and compliance, and senior management.

## **2.9 Valuation of Assets**

2.9.1 There should be clear policies and procedures for the independent, fair and proper valuation of assets. Prices, interest rates, exchange rates and volatility factors used in the revaluation process for the financial accounting of treasury and financial derivatives transactions have to be obtained from independent sources or be independently verified, and not decided by the institution's dealers. The institution needs to exercise proper care and control to manage live data feeds from vendors if such feeds are used, to ensure the usefulness, quality and integrity of the data.

2.9.2 The institution needs to have compensating policies and controls for illiquid positions, which may be valued based on mathematical models. These may be captured under an institution-wide policy that addresses the methodologies used for valuing illiquid positions and assessing the reasonableness of the valuation methods, regular identification and reporting of illiquid positions to the Board of Directors and/or senior management, the

need for more frequent audits of such positions, and deferring compensation to traders until comfort is obtained that the valuations are sound.

2.9.3 The prices and valuation methodology used should be documented for audit trail purposes. Periodic reports on the valuation of assets should also be submitted to management for review.

## **2.10 Verification and Reconciliation**

2.10.1 Institutions should have verification and reconciliation procedures for ascertaining the accuracy of transaction details and activities. Staff performing verification must be independent of those responsible for originating the transaction or preparing the data. For instance, reconciliation of front office and back office data needs to be performed by staff independent of the dealing function. Reconciliation has to be performed regularly, even daily for institutions active in dealing, and reviewed to verify the institution's exposures, profit and loss position and transaction details. All discrepancies need to be promptly followed up on and rectified, with established procedures in place for reporting them to the Board of Directors and/or senior management. Examples of reconciliation to be performed include, but are not limited to, the following:

- subsidiary ledgers to general ledger;
- trade details against confirmations received from counterparties;
- records to tangible assets such as cash, and key documents;
- securities holdings to custodian statements; and
- nostro reconciliation.

2.10.2 Institutions should, as far as possible, require customers to indemnify them against losses for accepting instructions given verbally, via facsimile or via electronic mail. All telephone conversations, where institutions receive transaction-related instructions, should be tape recorded where practicable as they could aid in the resolution of disputes.

2.10.3 Institutions should have policies to control the creation of accounts in the general and subsidiary ledgers to minimise the risk of fictitious accounts being set up. They should also ensure that all customer transactions are processed through the customers' own accounts with the institution, and not through any other accounts such as suspense or sundry accounts, without proper authorisation.

2.10.4 Passing of entries through suspense and sundry accounts should be properly authorised and subject to close monitoring as this may be used to conceal unusual transactions and hinder effective monitoring of customer account activity. In this regard, institutions should establish policies and procedures for areas such as the purpose of suspense accounts, controls over posting entries, length of time that an item may remain outstanding, frequency of reconciliation and follow-up action required. Institutions should clear suspense items promptly. Reports on outstanding suspense items should also be periodically reviewed by management.

## **2.11 Confirmation**

2.11.1 Customer orders should be promptly processed in accordance with instructions given and on the best available terms. Institutions should ensure that controls are in place to ensure trades matching and confirmations are performed as soon as possible after execution. Early detection would help to avoid errors in recording trades, which could result in increased risks and costs.

2.11.2 Institutions should send documented confirmation promptly to all customers and obtain documented confirmation for trades done as such two-way confirmations is one of the good practices for control purposes. Where possible, institutions should automate the confirmation process. Controls should be in place to prevent unauthorised amendments to details in the confirmation document. Manual preparation of confirmation documents should be discouraged and permitted only on an exceptional basis, and subject to stringent controls.

2.11.3 Confirmation of trades with customers has to be performed independently of the dealing function. Incoming confirmation slips need to be received by a department that is independent of the dealing function, and any disputes or unconfirmed trades immediately followed up on. Where the customer is not an individual, outgoing confirmations have to be sent to a department of the customer that is independent of trading. Interim updates or ad hoc statements requested by customers should also be checked and properly authorised before transmission to customers.

2.11.4 Where institutions keep statements and records of customers' holdings and transactions under safe custody or hold mail facility, enhanced procedures for independent verification of customer activities should be in place. Institutions should ensure that only customers or authorised persons collect such statements and records. Proper acknowledgement and confirmation of receipt of these statements/records should be obtained.

2.11.5 Institutions should, as far as possible, discourage the practice of handing customer statements and records to staff holding front-line responsibilities (e.g. relationship managers) for onward transmission to customers as vital information may be withheld from customers without the institution's knowledge. If this is not practicable, compensating controls should be implemented to mitigate the risk of staff impropriety.

## **2.12 Settlement**

2.12.1 Institutions should, where possible, establish standardised settlement instructions in their systems. Changes to these instructions should be reviewed to ensure that they have been properly authorised by the customers/counterparties. Procedures should also be in place for validating funds transfer requests, which could include, among other things, telex testing, callback and signature verification. Third party payments should be discouraged and, if allowed, be subject to more stringent controls.

2.12.2 Institutions should perform periodic reconciliation of funds transfer records to correspondent banks' statements and ensure that any outstanding items are promptly investigated and reviewed. Non-receipt or non-payment of funds should also be identified and rectified within a reasonable period of time.

# ***SECTION 2: RISK TYPES***

## ***Part A – Credit Risk***

# 1 Fundamentals

1.1 Credit risk is defined as the risk of loss that arises when an obligor<sup>1</sup> fails to perform its obligations under a contract or when its ability to perform such obligations is impaired. Thus, for example, credit risk not only arises when a borrower defaults on payment of a loan but also when its repayment capability decreases (as reflected in a ratings downgrade, short of default). Credit risk could stem from activities both on and off the balance sheet and, for banks, in both the banking and trading books. Institutions are increasingly facing credit risk from diverse financial instruments such as trade finance and acceptances, interbank transactions, foreign exchange, financial futures, swaps, bonds, equities, options, commitments and guarantees, and settlement of transactions.

1.2 The credit risk that an institution is exposed to does not occur in isolation. For instance, the same source that engenders credit risk for the institution may also expose it to market risk. This is especially true for capital market products like bonds, where movements in foreign exchange markets could result in an increase in both market and credit risks. Even in the loan book, if an institution holds a large amount of an obligor's shares as collateral for loans granted, any deterioration in the obligor's credit strength would subject the institution's collateral position to market (and perhaps liquidity) risks, and thus affect the credit risk of the loan.

1.3 Institutions must therefore adopt a holistic approach to assessing credit risk and ensure that credit risk management forms a part of an integrated approach to the management of all financial risks. Institutions should establish a risk management framework to adequately identify, measure, monitor and control credit risk. Adequate capital should be held against credit risks assumed. Institutions should also comply with relevant rules, regulations and prudential conditions imposed on their credit activities.

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<sup>1</sup> The term 'obligor' refers to any party that has a direct or indirect obligation under a contract. For a loan, the obligor is the borrower who has the obligation to repay the loan. Likewise, when a bank contracts to buy a bond from a market participant, the seller of the bond as well as the issuer of the bond are obligors; the seller of the bond has the direct obligation to ensure proper fulfilment of the contract including clean delivery, while the issuer of the bond has the indirect obligation to pay interest etc., during the life of the bond.

## **2 Risk Management Policies and Procedures**

### **2.1 Strategy**

2.1.1 The first purpose of a credit strategy is to determine the level of credit risk that the institution is prepared to bear. Once this is determined, the institution should develop a strategy to maximise returns while keeping credit risk at or below the pre-determined level. In lending, the strategy should ensure an acceptable level of asset quality, while striving for earnings and growth. Institutions have to formulate strategy based on the following considerations:

- economic and business cycles, and the resulting shifts in composition and quality of overall credit portfolio;
- the institution's willingness to grant credit to specific market segments, in line with its franchise;
- portfolio mix and diversification, and tolerance for concentration risk; and
- target market within each lending segment, and associated risk and acceptance criteria.

2.1.2 The Board of Directors should periodically review the credit risk strategy and effectively communicate any changes and concerns to all relevant staff. There should be a process to identify shifts from the adopted credit risk strategy and to evaluate the resulting impact.

### **2.2 Risk Management Structure**

2.2.1 Institutions should adopt a risk management structure that is commensurate with their size and the nature of their activities. The organisational structure should facilitate effective management oversight and execution of credit risk management and control processes.

2.2.2 At the senior management level, a committee should be empowered to oversee credit risk-taking activities and the overall credit risk management framework. This would include review of business and credit risk strategy, credit portfolio and profile, approval of credit policy, delegation of lending authority and evaluation of credit process. The composition and quorum of the committee that oversees credit risk management have to provide an adequate balance between the business line and control function.

2.2.3 A separate function independent of loan origination should be established to execute the risk management and control process. Credit policy formulation, credit limit setting, monitoring of credit exceptions and exposures and review and monitoring of documentation are functions that should be performed independently of the loan origination function. There should be adequate compensating measures to maintain credit discipline and standards to address potential conflicts of interest where individuals performing the loan origination function also perform credit review and analysis.

2.2.4 Likewise, in the area of credit administration, given the wide range of responsibilities, an institution's organisational structure varies with its size and sophistication. Where individuals perform such sensitive functions as custody of key documents, wiring out funds, or entering limits into the computer database, they should report to managers who are independent of the business origination and credit approval processes. Notwithstanding the need for independent oversight, the front office or loan origination function should be cognisant of credit risk, and maintain a high level of credit discipline and standards in its pursuit of business opportunities.

## 2.3 Policies

2.3.1 Senior management should develop and establish credit policies and operational procedures as part of the overall credit risk management framework. Notwithstanding the role of senior management, the Board of Directors should also approve significant credit policies, such as lending to related parties.

2.3.2 Credit policies should lay down parameters and guidelines to govern the granting, maintenance/monitoring and management of credit, at both the individual transaction and portfolio level. Such policies should be clearly defined, consistent with prudent practices and relevant regulatory requirements, and adequate for the nature and complexity of the institution's activities. At a minimum, the policies should include the following elements:

- roles and responsibilities of units/staff involved in the granting, maintenance and management of credit;
- delegation of credit authority to various levels of management and officers, for extension of credit within guidelines. This should also include authority for approving deviations and exceptions;
- credit risk acceptance criteria;



- general terms and conditions of the facility structure, such as pricing, tenor, quantum of financing;
- acceptable types of collateral and required security documents;
- standards for credit review and monitoring; and
- guidelines on management of concentration risk, such as appropriate limits, portfolio monitoring and stress testing.

2.3.3 In order to be effective, credit policies must be communicated throughout the organisation, and should be periodically revised to take into account changing internal and external circumstances. An institution should review significant and frequent policy exceptions to determine the effectiveness of the guidelines, and any potential impact on its credit risk profile.

## **2.4 Procedures**

To implement the credit policy, institutions must establish appropriate procedures and processes. The procedural manual should detail the necessary operational steps and processes to execute the relevant credit risk controls. The manual should be periodically reviewed and updated to take into account new activities, lending approach and changes in systems. Institutions maintaining a product programme that details the necessary operational procedures should periodically review the programme for changes in process.

## **2.5 Delegation of Authority**

2.5.1 Institutions have to establish accountability for decisions taken and delegate authority to approve credits or changes in credit terms. The Board of Directors should approve the overall lending authority structure, and delegate appropriate authority to senior management and the credit committee. Lending authority should be assigned to officers based on experience, ability and personal character. Institutions may also adopt risk-based authority where lending power is tied to the credit strength of the obligor. The credit policy should spell out the escalation process to ensure appropriate reporting and approval of credit extension beyond prescribed limits.

2.5.2 Lending authority should be established for secured and unsecured credit, as well as for specific products. Authority should also be set for approving of excesses above facility and concentration limits as well as for exceptions to lending guidelines. In cases where lending authority is assigned

to the loan originating function, there should be compensating processes and measures to ensure adherence to lending standards. There should also be periodic review of lending authority assigned to officers.

2.5.3 Head offices of institutions with branches in Singapore would usually impose lending limits on the branch. There should be a process to ensure adherence to such limits. Branches should also ensure that such lending limits are current and commensurate with their activities.

## **2.6 Credit Criteria**

2.6.1 In drawing up the business plan, institutions select the target market segment for their lending activities. Within each segment, institutions should establish specific credit criteria to define the types and characteristics of obligors they will extend credit to. These criteria would include the following:

- business track record vis-à-vis industry peers;
- relevant industry and macroeconomic trends;
- key financial indicators such as equity, turnover, leverage and debt servicing ability;
- target obligor risk grade; and
- terms and conditions under which the institution is prepared to extend credit, such as quantum of financing, maximum amount of clean exposure and acceptable collateral.

2.6.2 Institutions need to have a thorough understanding of the obligor, the source of repayment, as well as the purpose and structure of the credit, to ensure that the obligor meets the criteria. Credit should not be granted simply because the obligor or counterparty is familiar to the institution or is perceived to be reputable.

2.6.3 As credit criteria would shape the risk profile of the institution's credit portfolio, deviation from key criteria should be approved by appropriate management.

## **2.7 Risk Mitigation**

2.7.1 Credit transactions should be entered into primarily on the strength of the obligor's repayment capacity. However, institutions can utilise collateral and guarantees to help mitigate risks. Institutions should have policies

covering the acceptability of various forms of collateral. Collateral cannot be a substitute for a comprehensive assessment of the obligor, nor can it compensate for insufficient information. Potential correlation between asset values and obligor's financial condition should be considered, especially in asset-based lending business. Specific quantum of financing should be established for different types of collateral. The quantum should be set at a level that is adequate to provide sufficient cushion against decline in collateral value. Periodic reviews should be conducted to assess the appropriateness of the lending margin. Institutions should exercise caution when extending credit against illiquid securities.

2.7.2 For guarantees, institutions should evaluate the level of coverage being provided in relation to the credit quality, legal capacity and strength of the guarantor. Institutions should only factor explicit guarantees into the credit decision and not those that might be considered implicit (such as anticipated support from the government). Measures should be taken to review and ensure the enforceability of guarantee agreements.

2.7.3 Institutions may employ netting agreements to reduce credit risk, especially in interbank transactions. Such agreements should be sound and legally enforceable.

## **2.8 Limit Setting**

2.8.1 An important element of credit risk management is the establishment of exposure limits for single obligors and groups of connected obligors. The size of the limits should be based on the credit strength of the obligor, and the institution's risk tolerance. Appropriate limits should be set for respective products and activities. In certain circumstances, the obligor may be required to share its facility limits with its related companies for ad hoc transactions. Institutions should review such arrangements and impose necessary limits if the transactions are frequent and significant.

Where a branch of a foreign bank borrows limits from another branch in order to grant additional credit facilities to an obligor or group of connected obligors, proper earmarking of limits among the branches should be ensured.

2.8.2 Institutions should also establish appropriate limits for particular industries or economic sectors, as well as geographic regions to control concentration risk. Institutions should consider the results of stress testing in the overall limit setting and monitoring process.

2.8.3 Credit limits should be reviewed on a periodic basis to take into account changes in credit strength and economic conditions. All requests to increase credit limits should be substantiated.

## **2.9 Credit Extension to Related Parties**

2.9.1 All extensions of credit must be made on an arm's length basis, including credit extended to related parties of the institution and its directors. Directors or senior management with potential conflicts of interest should not be involved in the approval of credits to related companies and individuals. Such credits must be monitored with particular care and appropriate steps taken to control or mitigate the risks of connected lending. The terms and conditions of such credits should not be more favourable than credit granted to non-related obligors under similar circumstances

2.9.2 The credit policy should provide for close monitoring and reporting of lending to related parties. Material credit transactions with related parties should be subject to the approval of the Board of Directors (excluding Board members with potential conflicts of interest). Where necessary, such transactions should also be disclosed to the public. Directors, senior management and other influential parties (e.g. shareholders) should not seek to override the established credit granting and monitoring processes of the institution to accommodate related companies and individuals.

### **3 Risk Measurement, Monitoring and Control**

#### **3.1 Credit Granting**

3.1.1 Institutions should have an established process for approving new credits as well as the expansion of existing credits. Credit should be extended within the target market and lending strategies of the institution. The credit granting process should encompass the following elements:

- credit assessment of an obligor as well as related industry and macroeconomic factors;
- structuring of credit transactions;
- approval by appropriate management/authority;
- completion of legal documentation; and
- loan disbursement.

3.1.2 Institutions should conduct comprehensive assessments of the creditworthiness of the obligors. This should include analysis of the financial position via various financial and cashflow statements, past repayment record, management quality and integrity as well as relevant industry and macroeconomic data. For corporate loans, adequate checks on the shareholders and company directors should be conducted. Institutions should classify a group of obligors as connected, where appropriate, and conduct the credit assessment on a group basis.

3.1.3 Institutions should structure credit facilities by taking into account the amount and timing of the obligor's cashflow, financial position and intended purpose of the funds. Relevant terms and conditions should be laid down to protect the institution's interest. Credits should be priced to cover all of the embedded costs and compensate the institution for the risks incurred by taking into account the overall profitability of the account relationship.

3.1.4 In loan syndication, institutions should not place undue reliance on the credit analysis done by the lead underwriter or on commercial loan credit ratings. All syndicate participants should perform their own independent analysis and review of syndicate terms. When an institution purchases securities issued by an obligor that is different from the counterparty, for example when a bank purchases asset swaps, it should also analyse issuer risk. In the area of treasury and capital market activities, the structure of products and transactions should be analysed to determine the source of credit exposure.

3.1.5 While granting consumer loans, institutions must have an adequate process to screen applicants, such as reference checks with a database of rejected applications, bankruptcies, and accounts with delinquency records. For trade financing, institutions would need to process repeat utilisation of facilities granted. In approving such credit transactions, institutions should review transaction records of the obligor, such as limit utilisation, extension of due dates of bills, nature of trade being financed, obligor's trade requirements and trade cycle.

3.1.6 Evaluation and approval of the credit should be made in accordance with the institution's guidelines, and granted by the appropriate level of management. For banks, since the same obligor may be approaching several different areas of the bank for various forms of credit, it is important that the credit granting process coordinate the efforts of all of the various personnel in order to ensure that sound credit decisions are made. Where a branch serves as a booking centre for transactions initiated by other branches, there should be a proper arrangement for the assumption of credit risk.

3.1.7 Institutions must develop a corps of experienced officers who have the experience, knowledge and background to exercise prudent judgement in taking credit risks. Institutions should invest in adequate resources to help ensure that credit decisions are consistent with their credit strategy and can meet competitive time and structuring pressures. The credit granting and assessment standards should also be communicated to all staff involved in credit granting activities.

## 3.2 Monitoring

3.2.1 Institutions must have in place a system for monitoring the condition of individual credits. Off-balance sheet exposures to obligors should be treated as part of the overall credit exposure and subject to the same monitoring process. Key indicators of credit condition should be specified and monitored to identify and report potential problem credits. These would include indicators from the following areas:

- Financial Position and Business Conditions

Key financial performance indicators on profitability, equity, leverage and liquidity should be analysed. Business risk and operating environment of the obligor should also be considered. For companies whose financial position is dependent on key management personnel and/or shareholders, for example, in small and medium enterprises, institutions would need to pay particular attention to the assessment of the capability and capacity of the management/shareholder(s).

- Conduct of Accounts

Institutions should monitor the obligor's principal and interest repayment, account activity, as well as instances of excesses over credit limits. For trade financing, institutions should monitor cases of repeat extensions of due dates for trust receipts and bills. For leveraged credit facilities backed by marketable securities, institutions should also pay attention to the obligor's willingness and ability to provide timely margin top-up.
- Loan Covenants

The obligor's ability to adhere to negative pledges and financial covenants stated in the loan agreement should be assessed, and any breach detected for prompt action.
- Collateral Valuation

The value of collateral should be updated periodically because values are affected by external market conditions; for example, where the collateral is property or shares, institutions should undertake more frequent valuation in times of weak market conditions. If the facility is backed by inventory or goods purportedly on the obligor's premises, appropriate inspection should be conducted to verify the existence and valuation of the collateral.
- External Rating and Market Price

Where securities such as bonds are purchased as a form of lending or long-term investment, institutions should monitor for any deterioration in credit rating of the issuer, as well as large decline in market price. Adverse changes should trigger additional effort to review the creditworthiness of the issuer.

3.2.2 In addition to monitoring the above risk indicators, institutions should also monitor the use of funds to determine whether loans are drawn down for intended purposes. Where the obligor has utilised funds for purposes not shown in the original proposal, institutions should take steps to determine the implications on creditworthiness. Exceptions noted during the monitoring process should be promptly followed up on and reported to the appropriate level of management for approval and review.

### **3.3 Credit Review**

3.3.1 The purpose of a credit review is to ensure that credits are made in accordance with the institution's credit policies and to provide an independent judgement of asset quality, uninfluenced by relationships with the obligor.

Institutions should conduct credit review with updated information on the obligor's financial and business conditions, as well as conduct of account. Exceptions noted in the credit monitoring process should also be evaluated for impact on the obligor's creditworthiness. Credit review should also be conducted on a consolidated group basis to factor in the business connections among entities in a borrowing group.

3.3.2 At the minimum, credit review should be performed on an annual basis. However, more frequent review should be conducted for new accounts where institutions may not be familiar with the obligor, and for classified accounts that have higher probability of default. Procedures to highlight, report and approve deferment of credit review help to ensure timely performance of review. For consumer loans, institutions may dispense with the need to perform credit review for certain products. However, they should monitor and report credit exceptions and deterioration.

### **3.4 Classification and Provision**

3.4.1 Institutions have to make adequate provision for classification and provision in line with regulatory guidelines and internal policy. Institutions should also consider the general economic conditions of the countries they have exposure to while determining provision levels. Specific loan provision should be made on an individual basis. Loan classification and provisions should be subject to independent review and approval.

3.4.2 As provision levels are related to loan classification, institutions should ensure that loans are properly and promptly classified to reflect their underlying credit strength and to enable closer monitoring. In addition, the criteria for loan classification need to be sound and in line with regulatory guidelines. Institutions should put in place policies to govern upgrading of loans. A restructured loan should only be upgraded after the obligor has fulfilled its loan obligation for a reasonable period of time.

3.4.3 Where loan classification is tied to the institution's internal risk rating, there should be a process to map the rating to that of the regulator. The institution should readjust the mapping after every review of its internal risk rating. Deviations from the mapping should be identified and reported to management.

3.4.4 As the amount of provision is also dependent on the recoverable value of collateral, institutions should take necessary steps to obtain appropriate valuation of collateral. Institutions should consider the reliability and timeliness of appraisals or valuations of collateral to ensure that they reflect a realistic estimate of the fair value of collateral. Factors which should be taken into consideration include the legal enforceability of claims on



collateral, ease of realisation of collateral, and current market conditions for realising the collateral. Where appropriate, institutions should apply a haircut to the estimated net realisable value of collateral, or use the forced sale value for mortgaged properties, to provide more realistic estimates.

3.4.5 Proper procedures for the valuation of assets held for investment and trading purposes should be established. Specifically, the two groups of assets, their respective accounting treatment as well as their provisioning requirement should be properly defined to ensure that adequate provision for any potential losses are made.

### 3.5 Problem Credits

3.5.1 Institutions should endeavour to identify and recognise problem credits at an early stage via diligent credit monitoring and loan classification. Classified accounts (equivalent to 'substandard', 'doubtful' and 'loss') should be managed under a dedicated remedial process. This process should comprise the following elements:

- Review of Collateral and Security Documents

Institutions have to ascertain the loan recoverable amount by updating the values of available collateral with formal valuation. Security documents should also be reviewed to ensure the completeness and enforceability of contracts and collateral/guarantee.
- Formulation of Remedial Strategies

Depending on the stage of a problem credit, appropriate remedial strategies should be established to revive and recover the credit, such as restructuring of facility and rescheduling of payments. These strategies should take into account the specific condition of the obligor and the institution's interest, and be approved by the relevant authority.
- Negotiation and Follow-up

Proactive effort should be taken in dealing with obligors to implement remedial plans, by maintaining frequent contact and internal records of follow-up actions. However, institutions should also exercise caution and professional standards in such situations to avoid reputational damage.
- Status Report and Review

Problem credits should be subject to more frequent review and monitoring. The review should update the status and development of the loan accounts and progress of the

remedial plan. Progress reports on problem credits should also be submitted to senior management on a timely basis.

3.5.2 Where there are substantial non-performing loans, institutions should consider the establishing a separate unit to focus on problem credit management. Where appropriate, this workout function should be separate from the loan origination function to ensure independence and objectivity in managing problem credits.

## **3.6 Credit Administration**

3.6.1 Ongoing administration of the credit portfolio is an essential part of the credit process. Credit administration is defined as the back office activities that support and control extension and maintenance of credit. Institutions should ensure effective procedures for performing the following administrative functions:

- Loan Documentation  
Procedures should be put in place to ensure completeness of documentation in accordance with approved terms and conditions. Outstanding documents should be tracked and followed up to ensure execution and receipt.
- Loan Disbursement  
Proper approval should be obtained prior to loan disbursement. Disbursement should be effected only after completion of legal documentation, and receipt of collateral holdings. Exceptions should be duly approved by the relevant authority.
- Billing and Repayment  
Notices on repayment of principal and interest should be despatched to obligors on a timely basis. Measures should be taken to ensure tracking and collection of payments due. Proper records and updates should also be made after receipt.
- Maintenance of Credit Files  
Credit files have to include sufficient information necessary to ascertain the current financial condition of the obligor or counterparty. Institutions should have procedures to ensure timely procurement of information.
- Collateral and Security Documents  
Institutions should ensure that all security documents are kept in a fireproof safe under dual control. Registers for these

documents should be maintained to keep track of their movement. Procedures should also be established to track and review relevant insurance coverage for certain facilities/collateral. Physical checks on security documents should be conducted on a regular basis.

### **3.7 Internal Risk Rating**

3.7.1 A well-structured internal risk rating system facilitates accurate determination of the obligor's risk profile and likely loan loss. Institutions should put in place a proper policy to develop, review and implement the risk rating system.

3.7.2 Institutions should take adequate measures to test and develop a risk rating system prior to adopting one. Adequate validation testing should be conducted during the design phase as well as over the life of the system to ascertain the applicability of the system to the institution's portfolio. Institutions that use a judgemental rating system should ensure that each rating is unique, well defined and distinct from other ratings in the rating scale. The relevant risk factors and weights employed in the rating methodology should be appropriate for the institution's activities in different markets, such as corporate, small and medium enterprise, and financial institution segments.

3.7.3 Institutions that use sophisticated statistical models to assign ratings or to calculate probabilities of default, must ascertain the applicability of these models to their portfolios. Even when such statistical models are found to be satisfactory, institutions should not use the output of such models as the sole criteria for assigning ratings or determining the probabilities of default. It would be advisable to consider other relevant inputs as well.

3.7.4 Risk ratings should be assigned at the inception of lending, and updated at least annually. Institutions should, however, review ratings as and when adverse events occur. Risk ratings should be subject to review by a party that is independent of loan origination. As part of portfolio monitoring, institutions should generate reports on credit exposure by risk grade. Adequate trend and migration analysis should also be conducted to identify any deterioration in credit quality. Institutions may establish limits for risk grades to highlight concentration in particular rating bands.

3.7.5 To promote consistency in the assignment and review of risk grades, the credit policy should explicitly define each risk grade. It should explain the criteria to be fulfilled while assigning a particular grade, as well as the circumstances under which deviations from criteria can take place. The credit policy should also define the roles of different parties involved in the

rating process. The institution must ensure that adequate training is imparted to staff to ensure uniform ratings.

3.7.6 For consumer lending, institutions may adopt credit-scoring models for processing loan applications and monitoring credit quality. Institutions should apply the above principles in the management of scoring models. Where the model is relatively new, institutions should continue to subject credit applications to rigorous review until the model has stabilised.

3.7.7 Risk rating models must be back-tested on a regular basis. Since the paucity of data may hinder the conduct of back-tests, the institution must use other methodologies including review of output by credit experts, comparison of model output with other models and comparison of model output with market data (such as credit spreads), wherever applicable.

### **3.8 Credit Portfolio Risk Management/Concentration Risk**

#### **3.8.1 Portfolio Management Approach**

3.8.1.1 Institutions should manage credit risk on a portfolio basis. One of the benefits of a portfolio management approach is that it addresses concentration risk, which could arise from direct or indirect exposure to the following:

- a single counterparty or group of connected counterparties;
- a particular industry or economic sector;
- an individual country or a group of countries with inter-related economies; or
- a specific type or related types of credit products and/or collateral.

3.8.1.2 Institutions should identify and measure concentration risk in their overall credit portfolio. Effort should be made to monitor areas of significant concentration, such as the economic direction of industry or political situation of certain countries. The impact of such developments on the obligor and therefore the overall credit quality of the portfolio should also be assessed.

3.8.1.3 Institutions should establish appropriate limits to cap concentration risk to a tolerable level. Significant concentration risk should be reported to senior management for review and deliberation. Stress tests are also a way to assess the extent of inherent risk in a particular market segment under

adverse conditions. Appropriate measures should be taken to mitigate undue concentration risk, such as pricing for additional risk, increasing capital or reserves, securitisation, and credit risk hedging.

3.8.1.4 Branches that operate to serve a particular client segment or region as part of an institution's overall global strategy are likely to have high credit exposure to certain obligors or countries. Such concentration risk may have been captured under the respective limits and control mechanism at the head office. Nonetheless, branches should perform close monitoring of such exposure, and report to head office for further action where necessary.

3.8.1.5 Besides analysing concentration risk, institutions should also monitor trends in loan growth, collateral values and asset quality to detect any potential weakness in the portfolio. For consumer loan portfolios, trends in deviation, delinquency and loan volume should be tracked and analysed. Such analysis should be reported to senior management for their review and deliberation.

### 3.8.2 Credit VaR Models

3.8.2.1 The overall credit risk of a portfolio can be quantitatively measured using credit value-at-risk (Credit VaR) models. These models are similar to market VaR models and generate a single VaR number that estimates the credit loss that is likely to occur for a portfolio, at a certain confidence level, over a given period of time.

3.8.2.2 Portfolio credit VaR models use the probability of default of individual obligors and, crucially, the correlations between default events, to arrive at the credit VaR number. The credit VaR is a useful measure of composite portfolio credit risk.

3.8.2.3 Credit VaR models can also be used to identify risk concentrations (which in the absence of correlations may be difficult to detect), conduct portfolio credit stress tests, allocate risk (economic) capital, set provisions, and calculate risk adjusted returns.

3.8.2.4 As with quantitative obligor rating models, a rigorous validation test should be conducted at the time that the credit VaR system is first installed. Following its installation, the credit VaR model must be regularly back-tested to ensure its continued validity. The expertise of external organisations may be tapped for the purpose of validation and back-testing.

### 3.8.3 Country Risk

3.8.3.1 Institutions that engage in granting credit internationally must have adequate policies and procedures for identifying, measuring, monitoring and controlling country risk and transfer risk in their international lending and investment activities. Monitoring of country risk factors should incorporate the potential default of foreign private sector obligors arising from country-specific economic, social and political factors. Institutions should also be cognisant of the impact on an obligor's ability to obtain foreign exchange required for repayment of cross-currency debt as well as enforceability of contracts across jurisdictions.

3.8.3.2 Institutions should monitor country risk by paying attention to any downgrade in internal or external country risk ratings and adverse developments in the economic, social and political environments of the foreign country. Risk exposure should be aggregated for all business activities that involve elements of country risk. Country risk limits could be managed centrally by the head office, or allocated to different branches and/or business lines. In both cases, institutions should ensure that country exposures are reported and monitored against limits. Appropriate measures should be taken to address situations where adverse developments occur in a particular country, such as closer analysis of the obligor's capacity to repay and provisioning, and development of contingency plans to mitigate adverse impact from country risk.

3.8.3.3 Country risk should also be considered at the individual transaction level. While submitting an application for credit extension, due consideration should be given to the institution's existing exposure to a particular country. Credit proposals should also assess any significant country risk for informed decision-making by management.

## 3.9 **Stress Testing**

3.9.1 An important element of sound credit risk management involves considering what could potentially go wrong with individual credits and various credit portfolios, and factoring this information into an analysis of the adequacy of capital and provisions. Institutions should perform adequate stress testing to determine potential credit risk due to adverse market conditions. This analysis should consider the linkages between different risk factors that are likely to emerge in times of crisis.

3.9.2 Stress testing should involve identifying possible events or future changes in economic conditions that could have unfavourable effects on an institution's credit exposures and assessing the institution's ability to withstand such changes. Areas that institutions could examine include:

- economic or industry crises;
- decline in asset and collateral values;
- market-risk events; and
- tight liquidity conditions.

3.9.3 As income prospects and asset values rise in the ascending portion of the business cycle, credit analysis may incorporate overly optimistic assumptions. As such, institutions should also factor in the product and business cycle as part of the stress test methodology.

3.9.4 Whatever the method of stress testing used, senior management should review the output of the tests and take appropriate action where the results exceed agreed tolerances. Stress test analyses should also include contingency plans and pre-emptive actions that management might take if certain scenarios seem likely to occur. These can include such techniques as hedging against the outcome or reducing the size of the exposure.

### **3.10 Credit Risk in the Trading Book**

3.10.1 Most of the provisions outlined so far are also applicable to the management of credit risk in the trading book. In addition to the above, policies and procedures should be formalised to address areas such as significant obligor<sup>2</sup> exposures and concentrations, pre-settlement and settlement risks, credit exceptions, obligor ratings, non-performing contracts and the necessary provisions to be set aside. Procedures also need to be established to ensure that credit and concentration limits are not exceeded without proper approval from authorised personnel. In addition, institutions need to establish approved lists of intermediaries such as electronic communication networks (ECNs), exchanges and brokers with whom its trading personnel can deal.

3.10.2 The Board of Directors and/or senior management have to establish limits that are prudent in light of the institution's capital resources, financial condition and management expertise, as well as approve credit lines, where appropriate. Credit and concentration limits with respect to a single obligor or related group of obligors, including exchanges, ECNs and clearing houses, have to be set by taking into account all extensions of credit by the institution to the obligor or related group of obligors. A robust system to monitor utilisation of limits to a single obligor or related group of obligors has to be established to derive at aggregate group exposure in a timely fashion. The

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<sup>2</sup> The term 'obligor' includes both counterparties and issuers.

system should include reporting mechanisms to the appropriate personnel to ensure that limits are adhered to. Credit limits also need to be set, taking into consideration both settlement and pre-settlement exposures.

3.10.3 Credit reviews, undertaken by an independent department not involved in the trading of financial and financial derivatives instruments, have to be performed before the institution establishes a relationship with the obligor, and should, wherever possible, include an analysis of the obligor's financial statements, capitalisation, business profile, management, earnings, business reputation and any other relevant factors. The institution also has to periodically assess the creditworthiness of obligors throughout the life of the transaction, and clearly document ad hoc approval given for transactions initiated with customers without existing lines.

3.10.4 Pre-settlement risk is measured as the sum of the replacement cost of the position plus an estimate of the institution's potential future exposure (PFE) from the instrument as a result of market changes. PFE is often assessed through simulation analysis, though less sophisticated methods may be used. The method used to measure pre-settlement risk has to be commensurate with the volume and complexity of the institution's treasury and financial derivatives activities, and the assumptions used in deriving PFE have to be reasonable. The time horizon used to calculate PFE can vary depending upon the contract residual maturity, collateral protection and the institution's ability to terminate its credit exposure. A time horizon equal to the life of the contract may be inappropriate in the case of collateralised exposures. In such cases, the horizon has to reflect the time it would take for an institution to terminate the contract and liquidate existing collateral once a obligor fails to meet a collateral call.

3.10.5 On settlement day, the exposure to obligor default may equal the full value of any cash flows or securities the institution is to receive. There has to be clear understanding of all aspects of settlement risk within the institution and the sources of such risk. The institution needs to set limits to control settlement exposures to a obligor and to have, if possible, the ability to aggregate institution-wide settlement exposures.

3.10.6 Institutions need clear policies on establishing collateral arrangements with obligors. The policies should, wherever possible, lay out guidelines on the type of collateral arrangements required based on criteria such as the rating of the obligor, quality of information, types and limits of acceptable collateral and their respective haircuts, correlation of the collateral to the obligor and the conditions under which margin requirements are to be imposed. Institutions are expected to understand the liquidity characteristics of the collateral under normal and stressed market conditions as well as the correlation between the value of the collateral and the value of the underlying transaction. Credit exposures increase when the current mark-to-market of a



position becomes more favourable to the institution and/or the collateral falls in value.

3.10.7 Institutions need to have, as part of sound credit risk management, a clear understanding of the effectiveness of any netting arrangements in place with their obligors.

3.10.8 Stress testing of obligor credit exposures should, wherever feasible, be performed to identify individual obligors or groups of obligors with positions that are particularly vulnerable to extreme or one-way directional market movements.

3.10.9 Historical rate rollovers, i.e. the use of non-current rates for the extension or rollover of maturing forward foreign exchange contracts and other derivatives contracts, should be discouraged as they may be used to conceal losses or to perpetrate fraud. Where customers have reasons to rollover maturing contracts or structure transactions using non-current rates, such transactions should be done with the express approval of both the senior management of the institution and the customer. Substantial marked-to-market losses must be escalated to the Board of Directors and/or senior management of both the institution and the customer. Additionally, the credit exposure and funding costs must be recognised. Unrealised gross losses must also be included as part of the credit facilities provided by the institution to the customer.

# ***SECTION 2: RISK TYPES***

## ***Part B – Market Risk***

# 1 Fundamentals

1.1 Market risk is defined as the potential loss in on- and off-balance sheet positions, in an institution's books, resulting from movements in market risk factors such as interest rates, equity prices, foreign exchange rates and commodity prices. Often, market risk is propagated by other forms of financial risk, in particular, credit and market-liquidity risks. For example, a downgrading of the credit standing of an issuer could lead to a drop in the value of securities issued by that particular issuer. Likewise, a major sale of a relatively illiquid security by another holder of the same security could force down the price of the security.

1.2 Sound management of market risk is essential to ensure the market risk faced by institutions does not reach levels detrimental to their financial condition.

## **2 Risk Management Policies and Procedures**

### **2.1 Strategy**

2.1.1 The first element of a market risk strategy is to determine the level of market risk the institution is prepared to assume. The level should be set with reference to the amount of market risk capital set aside by the institution. The institution should ensure that its risk appetite is within the capital buffer at all times.

2.1.2 Once the market risk appetite is determined, the institution should develop a strategy for market risk-taking in order to maximise returns while keeping exposure to market risk at or below the pre-determined level.

2.1.3 The market risk strategy should be set with the following considerations:

- economic and market conditions, and the resulting effects on market risk;
- whether the institution has the expertise to profit in specific markets and is able to identify, monitor and control the market risk in those markets; and
- the institution's portfolio mix and diversification.

2.1.4 The market risk strategy should be periodically reviewed and effectively communicated to the relevant staff. There should be a process to identify any shifts from the approved market risk strategy and target markets, and to evaluate the resulting impact. The Board of Directors should periodically review the financial results of the institution and, based on these results, determine if changes need to be made to the strategy.

### **2.2 Policies**

2.2.1 All institutions should formulate market risk policies which are approved by the Board of Directors (or head office).

2.2.2 Policies should be applied on a consolidated basis and, where appropriate, to specific affiliates or units within the institution (e.g. if there are legal distinctions among subsidiaries and affiliates). The policies should, where practicable, clearly:

- delineate the lines of authority and the responsibilities of the Board of Directors, senior management and other personnel responsible for managing market risk;
- set out the scope of activities; and
- identify pertinent market risk management issues, including defining the appropriate market risk control limits, delegation of approving authority for market risk control limit setting and limit excesses, capital requirements, and investigation and resolution of irregular or disputed transactions.

## **2.3 Procedures**

2.3.1 The institution must establish appropriate procedures and processes to implement the market risk policy and advance the market risk strategy. The procedural manual should address the necessary operational steps and processes to execute the relevant market risk controls. The manual should also be periodically reviewed and updated to take into account new activities, changes in systems and structural changes in the market.

### ALL INSTITUTIONS EXCEPT INSURERS

2.3.2 All activities that take on market risk need to be addressed. These include those specific to treasury and financial derivatives activities, such as off-premises and after hours trading, and the proper conduct of staff involved in these activities in general.

### INSURERS

2.3.3 In setting out risk management policies and procedures, life insurers should draw reference to the principles on the oversight of the asset management process as laid down by MAS.

## **3 Risk Measurement, Monitoring and Controls**

### **3.1 Processes and Systems**

3.1.1 Institutions should establish a sound and comprehensive risk management process and data management system for their business activities. These could, among other things, comprise:

- a conceptual framework to identify the underlying risks (the framework should not be limited to market risk. Liquidity, credit, operations, legal and reputational risk could be considered in the framework as well);
- a detailed structure of limits;
- guidelines and other parameters used to govern market risk-taking;
- a strong MIS for controlling, monitoring and reporting market risk, including transactions between an institution and its affiliates; and
- policies on the accounting treatment.

Institutions need to incorporate, to the fullest extent possible, their market risk management process with their overall risk management system. Adopting a common conceptual framework across all businesses would facilitate integration and enable the institution to understand and manage its consolidated risk exposure more effectively. Where the institution is part of a financial services group, the risk management process should also be integrated with that of the financial services group where practicable.

3.1.2 The risk management system should be commensurate with the scope, size and complexity of the institution's trading and other financial activities and the market risks assumed. It should also enable the various market risk exposures to be accurately and adequately identified, measured, monitored and controlled. All significant risks need to be measured and aggregated on an institution-wide basis, to the fullest extent possible.

3.1.3 At a minimum, the risk management system should be able to quantify risk exposures and monitor changes in market and price factors (such as changes in interest rates, foreign exchange rates, equity and commodity prices and other market conditions) on a daily basis. Institutions whose risk levels fluctuate significantly within a trading day should regularly monitor their risk profiles on an intra-day basis. The risk management system should, wherever feasible, also be able to assess the probability of future

losses in positions. Institutions need to also establish limits for market risks that are consistent with maximum exposures authorised by the Board of Directors and/or senior management. The risk management system has to facilitate stress testing and enable the institution to identify risks promptly and initiate immediate remedial action in response to changes in market factors that have an adverse impact on its earnings and capital funds position. Liquidity of markets and products should also be considered when establishing the holding period for market risk measurement.

3.1.4 An independent risk management unit should be established, with responsibility, among other things, for defining risk management policies, establishing procedures for market risk identification, measurement and assessment, monitoring the institution's compliance with established policies and market risk limits. It should also ensure that market risk exposures are reported in a timely manner to the Board of Directors and/or senior management. Personnel responsible for the risk management function need to be separate and independent from position-taking personnel, up through senior levels of the institution. Depending on the scope, size and complexity of the institution's business activities, the unit may be part of the general operations or compliance unit.

#### ALL INSTITUTIONS EXCEPT INSURERS

3.1.5 Institutions have to ensure that the process and methods used to value their treasury and financial derivatives positions are independent of the dealing function, appropriate and consistently applied, and that the underlying assumptions are reasonable. Critical/significant models and supporting statistical analyses used in stress tests and valuations need to be validated by persons who are qualified and independent of the trading function prior to their deployment. Periodic reviews of the models and analyses may be required to ascertain the completeness of position data, accuracy of volatility, valuation and risk factor calculations, as well as validity of the correlation and stress test assumptions. Such reviews may be warranted as a result of prevailing market conditions, changes in the model or any major underlying assumptions.

3.1.6 Institutions typically have a unit dedicated to the management of interest rate risk called the Asset Liability Management Committee (ALCO). Ideally, the ALCO should include senior management from each major section of the institution that assumes and/or manages interest rate risk unless the institution uses a funds transfer pricing system to centralise interest rate risk management in the treasury unit.

3.1.7 The Board of Directors and/or senior management need to establish effective risk management processes for the trading liquidity exposure arising from treasury and financial derivatives activities. Where

feasible, management of the trading liquidity exposure resulting from such activities should be an integral part of day-to-day operations. Trading liquidity risk is the risk that an institution cannot easily unwind or offset a particular position at or near the previous market price because of inadequate market depth or because of disruptions in the marketplace. When establishing limits, the Board of Directors and/or senior management have to be aware of the size, depth and liquidity of the particular market and establish guidelines accordingly. The guidelines need to take into account the institution's ability to turn to alternative markets in times of market stress, or to provide sufficient collateral or other credit enhancements to continue trading under a broad range of scenarios, including the risks associated with early termination of treasury and financial derivatives contracts.

## INSURERS

3.1.8 An insurer's risk management system should document clearly the investment decision-making framework, and include information on processes for monitoring, controlling and reporting investment exposures (e.g. asset allocation, liability portfolio matching criteria, limit structures and dealing authority, and performance analysis).

## **3.2 Risk Measurement**

### ALL INSTITUTIONS EXCEPT INSURERS

3.2.1 Market risk measurement systems and models should be appropriate for the purpose at hand; the institution may have one set of models for capital calculation and another set for internal market risk management. The systems and models should use generally accepted financial concepts and market risk measurement techniques.

#### 3.2.2 Interest Rate Risk

3.2.2.1 Measurement of interest rate risk needs to incorporate re-pricing risk (arises from differences between the timing of rate changes and the timing of cash flows), yield curve risk (arises from changing rate relationships across the spectrum of maturities), basis risk (arises from changing rate relationships among yield curves that affect the institution's activities) and optionality risks (from interest rate related options embedded in the institution's products) and assessment of the impact on an institution's earnings and economic value. Of particular importance is optionality risk, where behavioural maturity differs from contractual maturity, for example, due to the option granted to an institution's customers to withdraw deposits or prepay loans at any time, or the option for insurance policyholders to surrender or cancel their policies. Measurement techniques can range from simple maturity/re-pricing schedule analysis to static simulation to more sophisticated dynamic simulation, which can better capture interest rate risk in



complex instruments and those with options attached. The institution should also consider fee income that is sensitive to changes in interest rates.

3.2.2.2 Interest rate risk in each currency ought to be calculated separately, although the yield curves (population and construction methodology) used should as far as possible be consistent across currencies. Yield curves should be divided into various maturity segments in order to capture variation in the volatility of rates along the yield curves. Appropriate proxies for the interest rates should be used in cases where the cashflows have maturity dates beyond the last data point on the yield curve. For each currency, the number of yield curves should reflect the diversity of the credit quality of the institution's holdings in that currency. There should be additional risk measures to capture credit/swap spread risk.

### 3.2.3 Structural Interest Rate Risk

3.2.3.1 Much of an institution's interest rate risk may arise from its structural (e.g. non-trading) position. Such institutions should be cognisant of the points raised in earlier sections on interest rate risk management, in addition to the points considered here.

3.2.3.2 An institution should implement systems and models appropriate for its structural interest rate risk profile. When measuring the interest rate risk from an institution's structural position, the following considerations should be taken into account.

3.2.3.3 Institutions differ in the level and degree of interest rate risk they are willing to assume. Each financial transaction that an institution completes may affect its interest rate risk profile. An institution can alter its interest rate risk exposure by changing investment, lending, funding, and pricing strategies and by managing the maturities and repricing of these portfolios to achieve a desired risk profile. Where off-balance sheet derivatives, such as interest rate swaps, are used to adjust an institution's interest rate risk profile, management should understand the cash flow characteristics of the instruments that will be used and have adequate systems to measure and monitor their performance in managing the institution's risk profile.

3.2.3.4 Institutions will differ on which portfolios or activities they allow position-taking in. Whenever position-taking is allowed, the institution should ensure that the risk is appropriately measured and managed.

3.2.3.5 From an earnings perspective, an institution should consider the effect of interest rate risk on net income and net interest income in order to fully assess the contribution of non-interest income and operating expenses to

the interest rate risk exposure of the institution. In particular, an institution with significant fee income should assess the extent to which that fee income is sensitive to rate changes. From a capital perspective, an institution should consider how intermediate (two years to five years) and long-term (more than five years) positions may affect the institution's future financial performance. Since the value of instruments with intermediate and long maturities can be especially sensitive to interest rate changes, it is important for an institution to monitor and control the level of these exposures.

3.2.3.6 Finally, an institution should consider the fit of its interest rate risk profile with its strategic business plans. An institution that runs significant long-term interest rate exposures (such as long-term fixed rate assets funded by short-term liabilities) may be less able to respond to new business opportunities because of depreciation in its asset base.

#### 3.2.4 Equities Risk

There should be separate risk factors corresponding to each of the equity markets in which the institution has positions. The institution's measurement of equities risk should include both price movements in the overall equity market (e.g. a market index) and specific sectors of the equity market (for instance, industry sectors or cyclical and non-cyclical sectors), and individual equity issues.

#### 3.2.5 Foreign Exchange Risk

There should be risk factors corresponding to individual foreign currencies. The risk corresponding to the exchange rate between the domestic currency and each foreign currency should also be captured. Institutions engaging in non-deliverable foreign exchange trading should be cognisant of the unique risk characteristics of these currencies, particularly liquidity, event and settlement date mismatch risks, and impose limits accordingly.

#### 3.2.6 Commodities Risk

In addition to directional risk arising from changes in the spot price, measurement of commodities risk should take into account basis risk (the risk that the relationship between prices of similar commodities alters through time), interest rate risk (the risk of a change in the cost of carry for forward positions and options) and forward gap risk (the risk that the forward price may change for reasons other than a change in interest rates). Institutions that are active in trading may take account of variation in the "convenience yield" between derivatives positions, such as forwards and swaps, and cash positions in the commodity. All significant levels of commodity exposures should be properly managed.

3.2.7 Liquidity of markets and products should be considered in market risk measurement. This consideration should influence the choice of holding period to be used in the calculation of market risk. Ideally, price sensitivities should be measured over the entire holding period, instead of extrapolating a one-day price movement over the number of days in the holding period. Increased risk in emerging markets should call for additional safeguards. Institutions need to understand these markets well and be able to measure risk exposures to them. All significant market risks, as determined by the institutions' policy on what constitutes material risk, need to be measured and aggregated on an institution-wide basis to the fullest extent possible. The aggregate risk measure should include risks that are not captured by the institution's quantitative models.

3.2.8 The system needs to provide, at the minimum, information on the outstanding positions and unrealised profit/loss as well as, to the extent practicable, the accrued profit/loss of the institution on a daily basis. This information is to be retained by the institution for audit and investigation purposes. As far as possible, the institution should be able to provide and maintain information on the positions of customers. An institution that is active in treasury and financial derivatives needs to have the ability to monitor trading positions, market movements and credit exposures daily, and preferably on a real-time basis. The institution's market risk management systems have to take into account current exposures (for trading, either marked-to-market or to a theoretical price based on valuation models) as well as potential market risks due to possible future changes in market prices. For instruments where market prices are less easily available and no proxies can be found, institutions are encouraged to independently revalue such instruments (by obtaining values from other institutions or using market-accepted models or models independently approved and validated by an independent quantitative risk group to derive values) regularly and more often if market conditions warrant a revaluation. The risk management system should be able to easily accommodate increased volumes, new valuation methodologies and new products.

3.2.9 Institutions should consider correlations between markets and between categories of risk when evaluating their risk positions. One way to do this is to include this consideration as one of the scenarios in stress testing. Correlations between markets and between categories of risk could result in the transmission of shocks from stressed conditions in one market to other markets or may significantly increase the overall risk to the institution, although individual risks, such as market and credit risks, may appear manageable when viewed independently. Due to correlated risks, an institution's aggregate risk tolerance (based on combinations of market, liquidity, credit and operations risks) could be exceeded. Institutions, whose trading and other financial activities are limited in volume, scope and complexity, may use less sophisticated methodologies. However, they are

expected to at least assess vulnerabilities to linkages between markets and between categories of risk.

3.2.10 Correlation between various market risk-types in different countries for distinct product tenors should be recognised in risk aggregation, provided the correlation computation method is empirically sound and periodically validated. Where correlation cannot be accurately determined, institutions should not simply assume zero correlation. Market risk measurement systems should also allow dis-aggregation of market risk by type, customer, instrument or business unit.

3.2.11 Risk measurement systems should accurately capture market risks associated with options; explicit options face non-linearity in prices while embedded options (e.g. those in mortgage loans or non-maturity deposits) create uncertainty in cashflow timing.

3.2.12 Institutions are increasingly using more sophisticated measurement methods, for example, VaR models, to measure market risk in the aggregate. Institutions are encouraged to regularly re-evaluate market risk measurement models and assumptions to ensure they provide reasonable estimates of market risk, perform independent validation and back-testing of these models and, where necessary, re-calibrate them. Validation should take place regularly and address issues such as the verification of the consistency, timeliness, reliability and completeness of data sources used to run risk measurement models, including the independence of such data sources, the accuracy and appropriateness of volatility and correlation assumptions, and the accuracy of valuation and risk factor calculations. A back-testing programme should also be conducted regularly. The results of an institution's back-testing of its risk measurement model should ensure that the model provides a reliable measure of potential losses over time. These should be done at both individual and consolidated levels to ensure that exceptional losses are not concealed in the aggregation. Such reviews may be warranted as a result of prevailing market conditions, or changes in the model or any major underlying assumptions. In addition, the Board of Directors and/or senior management have to receive sufficient information to understand and assess the strengths and limitations of their market risk measurement systems, in order to determine the appropriate risk limits. They should also try to ensure that material limitations of the models are well understood at appropriate levels within the institution. Reserves for potential weaknesses in market risk measurement models may have to be taken.

3.2.13 A good data screening process should be in place. Data used should be appropriate (e.g. marked-to-market for trading activities), accurate, complete (covers all on- and off-balance sheet positions), timely, frequently updated and sourced independently of the position-taking units. While the market data used may be obtained from reputable sources, institutions should

consider how to integrate the data to better reflect their individual operating scenarios. An appropriate length of historical data should be used in the calculation of correlations and/or any other quantitative parameters, with the same observation period employed for all instruments as far as possible. Any weighting of data needs to be justified. As a form of check, a separate data source could be used to calculate parameters, with the results compared to those from the main data source. Missing data and “outliers” ought to be addressed by employing one of the commonly used methods. The institution should automate data feed to its market risk management system to reduce incidence of manual error. There should be sufficient documentation of data sources used. Management should be alert to common data problems (e.g. incomplete data, lack of information on off-balance sheet positions, optionality embedded in loans and deposits). Data adjustments (e.g. to account for one-off events) should be documented, and the nature and reasons should be understood.

3.2.14 The institution could devise some means by which significant changes in the size or scope of its activities act to trigger an analysis of the adequacy of capital supporting the activities. In fact, institutions are encouraged to have an internal capital allocation system that meaningfully links identification, monitoring and evaluation of market risks to economic capital.

## INSURERS

3.2.15 Unlike other institutions, insurers do not engage heavily in trading activities. For insurers, the primary focus is to ensure the solvency of the insurance funds, taking into account the impact of market and other risks on assets and liabilities in the future. Therefore, the guidelines on risk measurement may not apply to insurers.

## **3.3 Risk Limits**

### ALL INSTITUTIONS EXCEPT INSURERS

3.3.1 Risk limits for business units, compatible with the institution’s strategies, risk management systems and risk tolerance, should be established, where appropriate, and approved and periodically reviewed by the Board of Directors and/or senior management, with changes in market conditions or resources prompting a re-assessment of limits. Limits should preferably be integrated with the institution’s and/or group-wide limits for each major type of risk as they arise in all other activities of the institution and/or group. Institutions need to ensure consistency between the different types of limits. Institutions also need to set limits including operational limits for the different trading desks and/or traders which may trade different products, instruments and markets such as industry and region. Limits need to be

clearly understood by, and any changes clearly communicated to, all relevant parties.

3.3.2 Compliance with limits has to be monitored by an independent risk management unit. Adequate procedures prescribing the course of action necessary in the event limit excesses occur, including those for excesses to be promptly investigated, reported to and ratified by the Board of Directors and/or senior management, have to be in place. Temporary excesses should, where practicable, be ratified by, and approval for an increase in limits sought if necessary from, the Board of Directors and/or senior management. In addition, procedures have to be put in place to ensure that the necessary margin calls are made, in a timely manner, for customers whose trading positions fall below margin requirements.

### **3.4 Scenario Analysis and Stress Testing**

3.4.1 The market risk management process should, where appropriate, include regular scenario analysis and stress tests. Scenarios can be arbitrarily determined, or statistically inferred from either analysing historical data on or using empirical models of changes in market risk factors. However, these tests should assess the effects of a sufficiently wide range of change in the value of market risk factors, to encompass market risks attendant to the institution's holdings. These include unlikely but possible adverse scenarios that could cause extraordinary losses or make the control of market risk difficult. Scenario analysis and stress tests should be both quantitative and qualitative in nature.

3.4.2 Scenario analysis and stress testing should, as far as possible, be conducted on an institution-wide basis, taking into account, inter alia, the effect of unusual changes in prices or volatilities, market liquidity, changes in historical correlations and assumptions in stressed market conditions, the institution's vulnerability to historically worst case scenarios or the default of a large counterparty and maximum cash inflow and outflow assumptions. For all institutions except insurers, such a default would be across the derivatives, cash trading, loan and funding portfolios. The assumptions used in each scenario should be consistent with the particular change in the value of the market risk factor used.

3.4.3 Such scenario analysis and stress testing enable the Board of Directors and/or senior management to better assess the potential impact of various market-related changes on the institution's earnings and capital funds position. The Board of Directors and/or senior management should regularly review the results of scenario analyses and stress testing, including the major assumptions that underpin them. The results should be considered during the establishment and review of policies and limits. Depending on the potential losses projected by the scenario analysis and stress tests and the likelihood

of such losses occurring, the Board of Directors and/or senior management may then be better placed to consider the appropriate risk-reducing actions to be taken, which includes but is not limited to contingency plans.

## INSURERS

3.4.4 For life insurers, the scenario analysis under Dynamic Solvency Testing, required by MAS, is one systematic approach of testing the insurance fund's ability to withstand adverse economic conditions and insurance experience. The impact of exposure to market risk should be taken into consideration as part of the overall assessment of assets and liabilities.

### **3.5 Use of Investment Managers**

3.5.1 Where the institution engages the services of investment managers to conduct investment activities, the work of the investment managers should be monitored sufficiently closely to ensure that the institution's strategy is adhered to and that the systems employed are effective. These principles apply equally where an external manager or a separate legal entity within the institution's group is used (in either case, a formal agreement between the two parties should exist).

3.5.2 Where investment management is contracted out to a third party, the Board of Directors of the institution must nevertheless satisfy themselves that the controls in place are appropriate and effective. This applies not only where the entire function is contracted out but also where only a specialist element such as derivatives trading is carried out by a third party. The Board of Directors should ensure, particularly in the latter case, that the effects of their own in-house activities are considered in conjunction with the activities contracted out when monitoring aggregate exposures to certain types of investment and/or counterparty.

3.5.3 The extent of reporting by managers should enable the institution to assess whether actual operations are in line with the institution's strategy, and in particular meet the risk/reward criteria. Reporting should also provide sufficient information for the institution to determine if it is in compliance with MAS' requirements (such as an insurance company's asset admissibility limits).

3.5.4 There should be a clear contract setting out the parameters within which investment managers may operate. The contract should be tailored to take into consideration legislative constraints (e.g. an insurer's asset admissibility limits), any investment limits set by the institution and, more generally, the institution's specific circumstances. Apart from any specific

limits, the parameters need to strike an appropriate balance between risk and reward, taking due account of the nature of the institution's liabilities and (as appropriate) the interests and reasonable expectations of its stakeholders.

3.5.5 If an investment manager is to hold funds on behalf of the institution, or to be a counterparty to certain investment transactions, then the extent of capitalisation and form of regulation of the manager will need to be taken into account. These considerations would need to be regularly reassessed. Similar considerations would also apply where the institution alters its investment strategy and moves into newer forms of investment activity for which the existing investment manager may have little or no experience.



# ***SECTION 2:***

# ***RISK TYPES***

## ***Part C – Liquidity Risk***

# 1 Fundamentals

1.1 Liquidity risk is the risk of financial loss to an institution arising from its inability to fund increases in assets and/or meet obligations as they fall due without incurring unacceptable cost or losses. For an institution's trading activities, it is the risk of not being able to meet its payment obligations on settlement date. Inability to access sufficient funds to meet liabilities can necessitate liquidation of assets at short notice, which normally results in divestment at significantly discounted prices.

1.2 A liquidity crisis can have a negative impact on earnings and capital and, in a worst case scenario, cause the collapse of an otherwise solvent institution. Earnings and growth potential can be negatively affected if an institution's liquidity position constrains it from undertaking a transaction at current market prices. Personnel responsible for asset and liability management need to actively consider current and future liquidity needs.

1.3 Liquidity risk management should not be considered in isolation. The Board of Directors and senior management must understand how the institution's exposure to other financial risks such as credit, market, operational, legal and reputational risks, may affect its liquidity position. This is because financial risks are usually not mutually exclusive and liquidity risk often arises as a consequence of these other financial risks. Any business area or product may expose an institution to multiple risks, and a real or perceived problem in any key business area may restrict an institution's ability to raise funds at reasonable prices, thereby increasing liquidity risk. For instance, large credit losses due to loan defaults, could cause liquidity problems for an institution if funds providers were to become concerned about the institution's own creditworthiness.

1.4 The formality and sophistication of risk management processes deployed to manage liquidity risk should reflect the nature, size and complexity of an institution's activities. Sound liquidity risk management employed in measuring, monitoring and controlling liquidity risk is critical to the viability of any institution. Institutions should have a thorough understanding of the factors that could give rise to liquidity risk and put in place mitigating controls.

1.5 Insurers differ from other institutions in that their activities are pre-funded by premiums. Most insurance companies therefore do not rely on short-term market funding. As such, risk management practices relating to short-term market funding may not be directly applicable to most insurers. For insurers, liquidity risk relates directly to their ability to meet claims under insurance contracts as they arise. The exposure of insurers to liquidity risk

increases when policy withdrawals and/or insurance claim amounts are significantly higher than expected.

## 2 Risk Management Policies and Procedures

### 2.1 Strategy

2.1.1 It is important that institutions define properly their liquidity strategy to meet potential funding needs over the short- and long-term. There should also be an agreed strategy for dealing with potential liquidity disruptions. Since institutions vary widely in their funding needs, risk appetite, composition of assets and liabilities and competitive environment in which they operate, there is no one set of universally applicable steps to setting out a liquidity risk management strategy.

2.1.2 An institution's strategy should enunciate specific policies on particular aspects of liquidity risk management, such as:

- composition of assets and liabilities;
- diversification and stability of liabilities;
- access to interbank and other wholesale markets;
- management of liquidity in different currencies; and
- management of intra-group liquidity.

The liquidity strategy must be documented in a liquidity policy, and communicated throughout the institution. The strategy should be evaluated periodically to ensure that it remains valid.

#### 2.1.3 Composition of Assets and Liabilities

An institution's liquidity strategy should determine the mix of assets and liabilities that would be utilised to maintain liquidity. Liquidity risk management must form an integral part of asset and liability management. Often, the goal of asset and liability management is primarily to maximise returns while liquidity is managed separately. This has resulted in situations where asset and liability profiles had to be re-structured (often at a significant loss) to meet sudden liquidity demands.

#### 2.1.4 Diversification and Stability of Liabilities

##### ALL INSTITUTIONS EXCEPT INSURERS

2.1.4.1 Concentrations in funding sources increase liquidity risk. Therefore, the Board of Directors and/or senior management must carefully consider

potential funding concentrations when selecting the appropriate mix of funding. A funding concentration exists when a single decision or a single factor has the potential to result in a significant and sudden withdrawal of funds, which may cause the institution to significantly change its day-to-day liquidity risk management. An institution is able to reduce its exposure to a single external shock by diversifying its liabilities.

2.1.4.2 In addition, an institution would be more resilient to tight market liquidity conditions if its liabilities are derived from more stable sources. In examining the stability of liabilities, institutions are to identify the funding sources that are likely to:

- stay with the institution under any circumstances;
- run-off gradually if problems arise; and
- run-off immediately at the first sign of problems.

## INSURERS

2.1.4.3 For life insurers, writing within a short period a large volume of any particular type of product, especially single premium endowment plans, can affect the stability of cashflows. Therefore, life insurers should give due consideration to the impact of such activities on their liquidity. For general insurers, the concern would be a concentration of risks under policy liabilities. Insurers may employ a reinsurance management strategy to provide liquidity and stability to their liabilities.

## 2.1.5 Access to Interbank and Other Wholesale Markets

### ALL INSTITUTIONS EXCEPT INSURERS

The interbank and other wholesale markets can be important sources of liquidity. However, in formulating liquidity strategies, institutions should recognise that their ability to access funds from wholesale markets may be radically reduced or delayed in crisis conditions, due to the high volatility in these markets. While standby credit lines with wholesale fund providers are often deemed as potential sources of liquidity, institutions should be aware that they may be denied access to these facilities in a crisis or there might be calls for early repayment of drawings under these facilities triggered by defaults or breaches of material adverse change clauses.

## 2.1.6 Management of Liquidity in Different Currencies

### ALL INSTITUTIONS EXCEPT INSURERS

2.1.6.1 Liquidity in each individual currency has an impact on an institution's overall liquidity profile. Thus, an institution should undertake separate analysis of its strategy for each currency. The issues to be addressed for managing individual currency funding needs depend on the nature of the institution's business. For some institutions, reliance on foreign currency liquidity to fund local currency assets will be the main area of concern, while for others, it may be the funding of foreign currency assets with local currency via the foreign exchange and/or currency swap markets. In any case, institutions should manage and control their funding needs through the foreign exchange and/or currency swap markets to avoid over-reliance on these markets, as there is a risk that access to these markets may cease to be available.

2.1.6.2 Institutions are required to establish formal strategies and policies for their Singapore dollar liquidity management. For foreign currencies that represent a significant portion of the institution's total funding and/or are not considered easily convertible, they are expected to formulate appropriate liquidity strategies and policies on such currencies. Liquidity should also be analysed under various crisis scenarios for each individual currency.

### INSURERS

2.1.6.3 Insurers who write foreign currency denominated business and/or invest in foreign currency denominated assets should have formal strategies and policies for managing the liquidity in each individual currency. These strategies and policies should take into account factors such as the significance of foreign currency denominated business in the insurer's overall business profile and the significance of foreign currency denominated assets in relation to the insurer's total investments. There should also be due recognition of potentially higher risks associated with certain foreign currencies.

## 2.1.7 Management of Intra-group Liquidity

2.1.7.1 Intra-group fund transfers can precipitate liquidity shocks for an institution. The institution may be required to lend support to group companies experiencing liquidity problems for reputational reasons. Explicit guarantees or funding lines granted to group companies may be drawn on in the event of a liquidity crisis. On the other hand, funding provided by the wider group to the institution might be withdrawn in an emergency.

2.1.7.2 An institution's liquidity strategy should therefore incorporate assumptions on intra-group dependencies. The strategy should also address any regulatory or legal impediments to accessing liquidity on a group basis.

## 2.2 Policies

2.2.1 All institutions should formulate liquidity policies, which are recommended by senior management/ALCO and approved by the Board of Directors (or head office).

2.2.2 A separate set of liquidity policies is required for all entities based in Singapore regardless of whether liquidity is managed on a consolidated global basis at head office level. This is because managing liquidity risk on a consolidated basis does not absolve the senior management of each affiliate entity from the responsibility for ensuring the safety and soundness of the particular institution and compliance with local regulatory requirements.

2.2.3 While specific details vary across institutions according to the nature of their business, the key elements of any liquidity policy include:

- strategy - general liquidity strategy (short- and long-term), specific goals and objectives in relation to liquidity risk management, process for strategy formulation and the level within the institution it is approved;
- management's responsibilities - outline of responsibilities for the liquidity risk management functions, including structural balance sheet management, pricing, marketing, contingency planning, and management reporting, lines of authority and responsibility for liquidity decisions;
- liquidity risk management structure - systems for monitoring, reporting and reviewing liquidity;
- liquidity risk management tools - approach for identifying, measuring, monitoring and controlling liquidity risk (including the types of liquidity limits and ratios in place and rationale for establishing limits and ratios);
- liquidity risk management in individual currencies; and
- contingency plan - strategy for handling liquidity crises.

2.2.4 The liquidity policy must be communicated throughout the organisation for it to be effective. It must be reviewed at the Board (or head

office) and senior management/ALCO level at least annually and when there are any material changes in the institution's current and prospective liquidity risk profile. Changes in liquidity risk profile could be due to changes in internal circumstances (e.g. changes in business focus) or external circumstances (e.g. changes in economic conditions). Reviews provide the opportunity to re-examine and refine the institution's liquidity policies in light of the institution's liquidity experience and development of its business. The institution should also review significant and frequent policy exceptions to determine the effectiveness of its liquidity policies and any potential impact on its liquidity risk profile.

## INSURERS

2.2.5 An insurance company's liquidity policies are likely to be less detailed than that of a deposit taking institution as its primary focus is the ability to meet future claims under insurance contracts. The liquidity policies should be formulated giving due consideration to the investment policy and reinsurance management strategy.

## **2.3 Procedures**

Institutions need to establish appropriate procedures and processes in order to implement their liquidity policies. The procedural manual should detail the necessary operational steps and processes to execute the relevant liquidity risk controls. The manual should be periodically reviewed and updated to take into account new activities, changes in risk management approaches and systems.

## **2.4 ALCO/Investment Committee**

2.4.1 The Board of Directors usually delegates the responsibility for managing the overall liquidity of an institution to a specific group of senior management. For all institutions except insurers, this is usually in the form of an ALCO. Ideally, the ALCO should comprise senior management from each major section of the institution that assumes and/or manages liquidity risk. The ALCO generally meets monthly, if not on a more frequent basis. For insurance companies, the liquidity risk management responsibility rests with the Investment Committee. Both ALCO and Investment Committee are tasked with the responsibility for developing and maintaining appropriate risk management policies and procedures, MIS reporting, limits, and oversight programmes.

2.4.2 Effective liquidity risk management requires capable management personnel. It is therefore important that senior management/ALCO have a



good understanding of the nature and level of liquidity risk assumed by the institution and the means to manage that risk.

## **3 Risk Measurement, Monitoring and Controls**

### **3.1 Risk Measurement and Monitoring**

3.1.1 It is important that an institution establish a risk measurement system to ensure that liquidity requirements are identified and managed on an ongoing basis. The measurement system and associated procedures should be applicable under both “business as usual” and liquidity stress conditions. It should reflect the institution's strategy for managing its liquidity. A number of techniques can be used for measuring liquidity risk, ranging from simple calculations to sophisticated modelling.

3.1.2 An institution should track and evaluate its current and anticipated liquidity position and capacity. A monitoring system should consist of limits, guidelines and trend development that enable management to monitor compliance with approved risk tolerances and to pinpoint variances. Since institutions vary widely in their liquidity needs, no one universally applicable liquidity risk measurement and monitoring system can be applied to all institutions.

### **3.2 Funding Requirements**

3.2.1 At minimum level, liquidity risk measurement involves assessing all of an institution's cash inflows against its outflows to identify any net funding requirements going forward. This includes funding requirements for off-balance sheet commitments. Cash inflows could arise from maturing assets and liquidation of non-maturing assets, retail and wholesale liabilities and off-balance sheet activities. These must be matched against cash outflows stemming from acquisition of new assets, maturing liabilities and off-balance sheet transactions, including contingent liabilities.

#### **ALL INSTITUTIONS EXCEPT INSURERS**

3.2.2 To effectively manage and monitor their net funding requirements, institutions should have the ability to measure their near-term liquidity needs over shorter time horizons on a day-to-day basis, and longer-term liquidity positions over a series of longer time horizons on a periodic basis. Maturity mismatch analysis is a useful means for comparing cash inflows and outflows both on a day-to-day basis and over specified time periods. This approach measures an institution's liquidity by identifying cashflows from on- and off-balance sheet items. More complex institutions can incorporate as best practice realistic behavioural assumptions (rather than simply rely on contractual maturities) to gain a more accurate picture of actual cashflows. Cashflows are allocated into a series of time bands on a maturity cashflow profile and a net mismatch figure is obtained by subtracting outflows from

inflows in each time band. Accumulating the net cashflow mismatches in each successive time band yields a net cumulative mismatch figure. Thus, prospective funding requirements in each period are identified and the institution can use this information to monitor and manage its liquidity needs.

3.2.3 The primary advantage of using cashflow and maturity mismatch analysis for liquidity management lies in its forward-looking aspect. It allows an institution to assess whether it is able to meet immediate liquidity requirements, and assist in the identification of its medium- to long-term liquidity profile arising from the institution's projected commitments.

3.2.4 Ideally, all cashflows (including off-balance sheet items) should be captured under the maturity profile. Where certain cashflows are considered to be immaterial, the decision to exclude these cashflows from the maturity profile should be approved by senior management/ALCO. The rationale for all exclusions should be documented in the liquidity policies. Institutions should review periodically whether the exclusions remain appropriate. During each review, a one-off profiling should be undertaken to assess the materiality of the exclusions.

3.2.5 Institutions should consider the following when constructing a maturity profile for maturity mismatch analysis:

- time bands;
- behavioural assumptions;
- granularity;
- limits on net cumulative funding mismatch; and
- cashflows denominated in individual currencies.

### 3.2.6 Time Bands

3.2.6.1 The maturity profile should have adequate time bands to effectively monitor both an institution's near-term liquidity needs and its longer-term liquidity profile. An institution usually constructs daily time bands over a period that ranges from weeks to months for managing its near-term liquidity needs.

3.2.6.2 Generally, institutions manage their long-term liquidity profile by using wider and less granular time bands as compared to that of near-term liquidity. This is because near-term liquidity requires closer attention than long-term liquidity. As institutions allocate all the cashflows that arise from

their business activities into one of these time bands, the furthest time band of a long-term liquidity profile often spans an infinite period of time.

### 3.2.7 Behavioural Assumptions

3.2.7.1 In preparing the maturity profile, an institution should detail the assumptions underlying the behaviour of its assets, liabilities and off-balance sheet items for determining potential cashflows, if the contractual maturities of these items do not bear close relation to their actual behavioural characteristics. Assumptions regarding future cashflows from assets include (but are not limited to) the marketability of existing assets, the extent to which maturing assets will be renewed and the extent to which new assets will be acquired in reducing contractual cash inflows. Institutions experiencing asset quality problems should not assume that assets pay when due. A more realistic set of assumptions on asset roll-off should be embodied in the maturity mismatch analysis.

3.2.7.2 For liabilities with embedded optionality, such as retail deposits where the timing and amount of withdrawals are uncertain, institutions should consider conducting analyses of historical observations to determine their cashflow patterns and derive behavioural assumptions applicable to their cashflows. These will provide a more realistic picture of cashflows in a normal business environment. Historical observations include the "business as usual" level of rollovers of deposits and other liabilities, the effective maturity of deposits with non-contractual maturities, and the growth of new deposits.

3.2.7.3 Institutions should also examine the potential for significant cashflows from their off-balance sheet activities. The contingent nature of most off-balance sheet instruments increases the complexity of managing the associated cashflows. In particular, off-balance sheet activities such as letters of credit, financial guarantees, undrawn committed loans, derivatives and margin calls could lead to a significant drain on liquidity. To manage these risks, the composition of the off-balance sheet portfolio and its probable impact on funding should be evaluated. Institutions should therefore ascertain a "normal" level of net cashflows arising from such activities on an ongoing basis.

3.2.7.4 Institutions should be able to justify the behavioural assumptions used. All behavioural assumptions and their justifications should be documented and approved by senior management/ALCO. Institutions should review their behavioural assumptions periodically to ensure their continued validity. They should also specify acceptable variances from behavioural assumptions and the procedures to be followed if such variances are exceeded.

### 3.2.8 Granularity

A maturity profile should be constructed with appropriate granularity to reflect the institution's nature of business. An appropriate breakdown of the maturity mismatch analysis by account type (e.g. a breakdown of the retail deposits by type) allows for a more effective analysis to be carried out.

### 3.2.9 Limits on Net Cumulative Funding Mismatch

Institutions should specify acceptable limits for the size of the cumulative funding mismatch position for the near-term time bands. While an institution's cashflow mismatch position for medium- to long-term time bands is important in providing early warning of potential future liquidity problems, the main emphasis of mismatch analysis should be on short-term cashflows, particularly positions from sight up to one month. The net cumulative funding requirement for short-term cashflows should be limited to an amount that the institution can confidently fund in the market.

### 3.2.10 Cashflows Denominated in Individual Currencies

3.2.10.1 Institutions should perform maturity mismatch analysis of all their cashflows denominated in Singapore dollars. For foreign currencies which represent a significant portion of the institutions' total funding and/or are not considered to be easily convertible, separate maturity mismatch analysis for such currencies should be performed. Maturity mismatch limits should be imposed for foreign currencies if warranted.

## INSURERS

3.2.10.2 In assessing how to adjust for the behavioural characteristics of its liabilities, an insurer may consider the following factors:

- the type of insurance business;
- the historical volatility in the pattern of claims payments; and
- options available to policyholders and the circumstances in which they are likely to be exercised.

## **3.3 Funding Concentrations**

### ALL INSTITUTIONS EXCEPT INSURERS

3.3.1 Institutions should seek to maintain diversified and stable funding sources. It is important for an institution to assess on an ongoing basis its

exposure to funding concentration risks. At a minimum, the institution should be able to consolidate all funding that it obtains from a single provider or a related group of providers. It should also focus on identifying any reliance on individual funding sources by type of funding instruments (e.g. retail deposits, interbank borrowings, repurchase agreements and swaps), nature of the provider of funds (e.g. retail versus wholesale, industry and geographical location) and maturity profile.

3.3.2 Institutions should establish appropriate concentration limits and put in place systems for monitoring compliance with these limits. These limits should be reviewed periodically and when market conditions warrant a review.

## INSURERS

3.3.3 Insurers should seek to maintain a diversified and stable client base. For general insurers, concentration or accumulation of risks under policy liabilities is a concern. Adequate measures should be in place to address, for example, excessive writing of one risk, over-concentration of risks within a geographical region, or writing risks which can trigger claims under different types of policies due to a single event/catastrophe.

3.3.4 Insurers should establish appropriate concentration limits and put in place systems for monitoring compliance with these limits. These limits should be reviewed periodically and when market conditions or a change in the insurer's circumstance warrant a review.

## **3.4 Funding Capacity**

### ALL INSTITUTIONS EXCEPT INSURERS

3.4.1 Institutions should be able to estimate well their "normal" funding capacity in both retail and wholesale markets and to establish measures for dealing in markets against that capacity. For retail markets, institutions should consider their retail market shares, competitive pressures, economic conditions, and other factors when estimating their funding capacity. Institutions that rely heavily on wholesale funds should continuously assess their name acceptance by counterparties to detect any hint of resistance in the funding market.

3.4.2 Institutions should also monitor their current ability to raise funds in both retail and wholesale markets. Deterioration in the institutions' funding capacity can result from (but is not limited to) the following circumstances:

- adverse change in credit rating;

- difficulty in accessing the interbank and wholesale markets;
- concentration in funding sources;
- deterioration in asset quality;
- increased competition for funds;
- worsening of earnings performance; and
- negative media attention.

3.4.3 Personnel responsible for funding activities must regularly communicate market conditions to the Board of Directors and/or senior management. In turn, the Board of Directors and/or senior management must ensure that the relevant personnel are aware of any strategies or events that could affect the market's perception of the institution.

### **3.5 Intra-group Liquidity**

To ensure effective liquidity risk management, institutions should analyse and monitor their intra-group liquidity i.e. liquidity for each entity in the corporate group. Effective liquidity analysis requires a good understanding of the funding positions of all entities in the institution's corporate group that might affect the institution's liquidity. Intra-group liquidity analysis and monitoring require an integrated review of all relevant cashflows. For example, an institution providing significant funding and other liquidity support to related entities would need to ensure that such support is appropriately captured in the measurement of its liquidity position. All regulatory or legal impediments to accessing liquidity from related sources should also be addressed in the intra-group liquidity analysis and monitoring programme.

### **3.6 Scenario Analysis**

#### **ALL INSTITUTIONS EXCEPT INSURERS**

3.6.1 As institutions may become insolvent under liquidity stress situations, it is important to construct plausible, event-driven scenarios and examine the resultant cashflow needs. Scenario analysis should encompass a range of specific events and, at minimum, include the following scenarios:

- institution-specific crisis scenario; and
- general market crisis scenario.

3.6.2 Institution-specific crisis scenarios cover situations where there are some real or perceived problems at an institution, for example, operational problems, solvency concerns or adverse credit rating changes. A general market crisis scenario is one where liquidity at a large number of institutions in one or more markets, is affected.

3.6.3 An institution should detail the assumptions underlying the behaviour of the cashflows of its assets, liabilities and off-balance sheet items under plausible crisis scenarios. The timing and size of the cashflows are important factors to consider. The assumptions may differ quite sharply from scenario to scenario as cashflow timing and size can behave differently in different situations. For example, an institution may have the ability to generate liquidity from a stock of saleable assets in an institution-specific crisis. However, in a general market crisis, the capacity to sell these assets may deteriorate significantly if few institutions are willing or able to make cash purchases of them. Hence, institutions should consider assigning an appropriate liquidity discount factor to each asset to take into account the price risk when performing cashflow analysis under each scenario. Institutions should also factor in the settlement period or the expected time needed for liquidating assets in their analysis.

3.6.4 The key assumption underlying an institution-specific crisis scenario should be that many of the institution's liabilities cannot be rolled over or replaced, resulting in required repayment at maturity such that the institution would have to wind down its books to some degree. While a severe liquidity crisis at an individual institution may stem from fundamental, institution-specific problems not related to its liquidity, an institution's ability to honour its immediate commitments under such conditions could provide vital time to address the underlying problem.

3.6.5 For a general market crisis scenario, the main underlying assumption is the occurrence of severe tiering by perceived credit quality which widens the differences in funding access among institutions.

3.6.6 When performing scenario analysis, institutions may factor in the possibility of intra-group or head office support. This support would be of particular value in a crisis affecting only local operations but could prove to be ineffective if the crisis impinged upon the group as a whole.

3.6.7 Institutions should perform scenario analysis on a periodic basis. Senior management/ALCO should review the results of this analysis periodically. Institutions should also review the behavioural assumptions utilised in managing cashflows under the various crisis scenarios on a periodic basis. These assumptions are to be approved by senior management/ALCO.



## INSURERS

3.6.8 Insurers should consider plausible event-driven scenarios that might impact on their liquidity (albeit over the longer-term, unlike that for other institutions) and these should be factored into their liquidity planning. Plausible scenarios could include consideration of:

- investment risk - the risk arising from interest rate and stock price fluctuations resulting in asset proceeds being lower than expected;
- claims - a significant unexpected increase in claims, and/or inaccuracies in the forecast of incurred but not reported claims could have an impact on solvency and liquidity;
- early redemption of policies (for life insurers) - a worst case scenario should take into consideration the possibility that a substantial number of life policyholders might cancel their coverage;
- catastrophic events (especially applicable for reinsurers) - a worst case scenario should include a reasonably severe level of catastrophic loss;
- concentration risk - insurers, especially general insurers, should consider the impact on solvency and liquidity from insuring a large number of risks concentrated in a particular class of business, sector or geographical area; and
- reinsurance risk - insurers should consider the impact on solvency and liquidity from default by key reinsurers, as part of their reinsurance management strategy. This should include, but need not be limited to, an assessment of liquidity risk in the event of a timing mismatch between the payment of claims and the receipt of reinsurance recoverables.

3.6.9 Life insurers should also examine the impact on liquidity based on the scenario analysis required under Dynamic Solvency Testing.

## **3.7 Contingency Plan**

3.7.1 Each institution should have a contingency plan for handling liquidity crisis situations. The plan should be updated and reviewed on a periodic basis (at least annually) by senior management/ALCO to ensure that it remains robust over time and reflects the institution's changing operating circumstances. At a minimum, the contingency plan should:

- designate the personnel responsible for the identification of crisis and contingency management. This should include provisions for prompt notification of problems to the MAS. Responsibilities should be clearly defined so that all personnel understand their roles in a crisis situation;
- specify the early warning indicators that are used to signal an approaching crisis event. There should be mechanisms to facilitate constant monitoring and reporting of these indicators;
- contain reporting procedures to ensure that all necessary information is available for senior management to make quick decisions;
- set out procedures for making up cashflow shortfalls in crisis situations. These should clearly spell out sources of funds, their expected reliability and the priority in which those funds would be accessed;
- outline courses of action for altering asset and liability behaviour and assess the likely impact of these on the market's perception of the institution; and
- include details for handling public relations issues and media management. Astute public relations management is important to avoid the spread of rumours, which could result in a significant run-off of funds. It is also important to control the consistency of communications.

3.7.2 A comprehensive contingency plan is a complex undertaking, but it can provide a useful framework for facilitating quick action to address both temporary and longer-term liquidity disruptions. A good plan should emphasise a reliable but flexible administrative structure, realistic action plans, ongoing communication at all levels, and an adequate MIS. Institutions should have the ability to further streamline their reporting process during periods of liquidity disruptions when timely information flows embodying greater detail might be needed. Periodic testing of contingency MIS will help to ensure the availability of timely reports for rapid decision-making.

## **3.8 Limits and Ratios**

3.8.1 The Board of Directors and/or senior management/ALCO should establish limits for the nature and amount of liquidity risk that the institution is willing to assume. When limiting risk exposure, the Board of Directors and/or senior management/ALCO should consider the nature of the institution's strategies and activities, its past performance, level of earnings and capital available to absorb potential losses, and the tolerance for risk. The types of

limits should be documented in the liquidity policies and reviewed periodically (at least annually) and when conditions or risk tolerances change.

3.8.2 Senior management/ALCO should have the means to review compliance with established limits. The responsibility for monitoring limits should be assigned to a function independent of the funding areas. There should also be a defined procedure for reporting limit exceptions to senior management/ALCO and to head office. While the use of limits would not prevent a liquidity crisis, limit exceptions can be early indicators of excess risk or inadequate liquidity risk management.

3.8.3 Liquidity ratios are useful for quantifying liquidity risk. Limits can be set on these ratios. However, liquidity ratios should always be used in conjunction with more qualitative information such as funding capacity to reveal material liquidity trends.

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3.8.4 In setting limits, insurers should take into account the statutory investment limits. In particular, for a general insurance fund, due consideration should be given to the ratio of the aggregate admitted value of liquid assets to the aggregate admitted value of loss reserves and outstanding claims.

3.8.5 Claims, especially for general insurers, can be unpredictable. In setting liquidity limits, insurers are to ensure that the limits cater for unexpectedly high claims. General insurers should establish valuations for insurance policy liabilities with regard to regulatory requirements, and liquidity limits should allow for unexpectedly high claims.

## **Applicability of the Guidelines**

The guidelines are statements of industry best practices that institutions are encouraged to adopt. The guidelines do not affect, and should not be regarded as a statement of, the standard of care owed by institutions to their customers. Where necessary, institutions may adapt the guidelines, taking into account the diverse activities they engage in and the different markets that they conduct transactions in. Institutions should read the guidelines in conjunction with the relevant regulatory requirements and industry standards.