



Monetary Authority of Singapore

CREDIT RISK

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1 INTRODUCTION & FUNDAMENTALS

1.1 INTRODUCTION

1.1.1 The chapter provides guidance on sound practices in credit risk management. It also articulates broad principles that should be embedded in a risk management framework covering strategy, organisational structure, policy, as well as a credit control processes for origination, monitoring and administration of credit transactions and portfolio. The guidelines are applicable to the extension of credit by financial institutions. In the case of banks, they are applicable to both the banking and trading books.

1.2 FUNDAMENTALS

1.2.1 Credit risk is the risk arising from the uncertainty of an obligor's¹ ability to perform its contractual obligations. Credit risk could stem from both on- and off-balance sheet transactions. An institution is also exposed to credit risk from diverse financial instruments such as trade finance products and acceptances, foreign exchange, financial futures, swaps, bonds, options, commitments and guarantees.

1.2.2 Credit risk often does not occur in isolation. A risk event may engender both market and credit risks. For example, a rise in interest rates could impair the creditworthiness of the bond issuer thereby increasing the credit risk to an institution holding those bonds. At the same time, the fall in the value of the bond raises the market risk for the institution. Similarly, if an institution holds a large number of an obligor's shares as collateral for loans granted, a deterioration in the obligor's credit standing could result in lower share prices, causing an increase in both market and credit risks.

1.2.3 An institution should therefore adopt a holistic approach to assessing credit risk and ensure that credit risk management is part of an integrated approach to the management of all financial risks. The institution

¹ 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. When an institution 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 (also called the counterparty) has the obligation to ensure proper fulfilment of the contract including clean delivery, while the issuer of the bond has the obligation to pay interest during the life of the bond and repay the principal on maturity.

should establish a risk management framework to adequately identify, measure, monitor and control credit risk. Adequate capital should be held against credit risks assumed. The institution should also comply with all relevant rules, regulations and prudential requirements.

2 RISK MANAGEMENT POLICIES AND PROCEDURES

2.1 RISK MANAGEMENT STRATEGY

2.1.1 An Institution should determine the level of credit risk that it can bear. It should develop a risk management strategy that is consistent with its credit risk tolerance and business goals. In formulating this strategy, the institution should consider the following:

- the business cycle stage it is operating in;
- the nature of its business franchise and its relevant credit market segments;
- the portfolio mix that balances its willingness to bear concentration risk with sufficient diversification; and
- the business targets it has set for particular lending segments.

2.1.2 The Board of Directors (Board) should periodically review the credit risk strategy and any changes and concerns should be effectively communicate to all relevant staff. Shifts from the approved credit risk strategy should be subjected to appropriate review and endorsement.

2.2 RISK MANAGEMENT STRUCTURE

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

2.2.2 A senior management committee should be formed to establish and oversee the credit risk management framework. The framework should cover areas such as approval of business and credit risk strategy, review of the credit portfolio and profile, approval of credit policy, delegation of credit approving authority and evaluation of the credit processes. This committee

should comprise senior management from the business line and control functions.

2.2.3 An institution should also establish risk management and control functions, independent of the credit originating function. Such functions include policy formulation, limit setting, exposure and exception monitoring and reporting, custody and monitoring of documentation, and input of credit limits. Staff performing sensitive functions such as custody of key documents, funds transfer and limit inputs should report to managers who are independent of business origination and the credit approving process. There should be adequate measures to address potential conflicts of interest where individuals performing the loan origination function are also involved in credit reviews and analyses. While there may be separate departments responsible for credit origination and credit risk control, the credit origination department should also be mindful of credit risk in its pursuit of business opportunities.

2.3 CREDIT POLICIES

2.3.1 The Board should approve credit policies, including concentration limits and lending to related parties. It should also be the approving authority for changes and exceptions to such policies. Senior management should operationalise the credit policies approved by the Board by setting out operational processes and procedures.

2.3.2 Credit policies should lay down the conditions and guidelines for the granting, maintenance, monitoring and management of credit, at both the individual transaction and portfolio levels. Such policies should be documented, well-defined, consistent with prudent practices and regulatory requirements, and adequate for the nature and complexity of the institution's activities. At a minimum, the policy should document the following elements:

- the roles and responsibilities of units and staff involved in the granting, maintenance and management of credit;
- the delegation of credit authority to various levels of management and staff (including authority to approve deviations and exceptions);
- the credit risk acceptance criteria;

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

2.3.3 In order to be effective, credit policies should 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 potential impact on its credit risk profile as well as the effectiveness of guidelines.

2.4 PROCEDURES

2.4.1 To implement its credit policy, an institution should establish appropriate procedures and processes. These should be documented and set out in sufficient detail to provide operational guidance to staff. Procedures should be established for the implementation of various controls and checks within the credit process, such as completion of credit and legal documents, verification of loan disbursement, implementation of facility limits and follow-up on credit exceptions. The operational procedures should be periodically reviewed and updated to take into account new activities and products, as well as new lending approaches and changes in systems.

2.5 DELEGATION OF AUTHORITY

2.5.1 An institution should establish accountability for the different levels of approving authority of credits or changes in credit terms. Its Board should approve the credit authorisation structure. The Board could then delegate authority to senior management and the credit committee to oversee the structure. Credit approving authority should be assigned to staff based on experience, ability and suitability for the role. An institution may also adopt a risk-based approach where the lending authority levels are tied to the credit strength of the obligors, as represented by the institution's internal risk rating. In this regard, the approving authority structure should be supported by acceptable risk rating standards and processes. The credit policy should

detail the escalation process to ensure the appropriate reporting and approval of credit extension beyond prescribed limits.

2.5.2 Credit approving authority should be established for secured and unsecured credit and for specific products. Authority should also be set for the approving of excesses above the facility and concentration limits as well as for exceptions to credit guidelines. Where credit extension authority is assigned to the credit originating function, there should be compensating measures to ensure adherence to credit standards. There should also be periodic review of credit extension authority assigned to staff.

2.6 CREDIT CRITERIA

2.6.1 An institution should establish specific credit criteria to define the types and characteristics of its preferred obligors. These criteria would include the following:

- business track record vis-à-vis industry peers;
- key financial indicators such as equity, profitability, turnover, leverage and debt servicing ability;
- target obligor risk grade (where available); 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 To ensure that the obligor meets the credit criteria, the institution should have sufficient information about the obligor, the source of repayment, and the purpose of the credit. Credit should not be granted on the basis of casual familiarity or general perceptions about the obligor.

2.6.3 An institution's credit criteria shape the risk profile of its credit portfolio. As such, deviations from the criteria should be approved by the appropriate authority. Such credit criteria should be subject to periodic review to be in line with the institution's credit risk management strategy.

2.7 CREDIT LIMIT

2.7.1 An important element of credit risk management is the setting of exposure limits for single obligors and groups of related 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 the respective products and activities. There could be situations where the obligor may be required to share its facility limit with its related companies for ad hoc transactions or where the obligor credit limit is allocated between business lines or related entities for credit extension. Appropriate guidelines on approval and risk measurement should be established to govern such sharing of obligor credit limits.

2.7.2 An institution should also establish appropriate limits for certain industries, economic sectors and geographic regions to control concentration risk. The institution should consider the results of stress tests in its overall limit setting and monitoring.

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

2.8 CREDIT EXTENSION TO RELATED PARTIES

2.8.1 Extensions of credit should be made on an arm's length basis, including credit to related parties of the institution or its directors. The Board or senior management should not be involved in the decision making process for credits to companies and individuals related to them. They should declare their interests and abstain from the decision making process. Such credits should be monitored closely and appropriate steps should be taken to control or mitigate the risks of lending to related parties. The terms and conditions of such credits should not be more favourable than credit granted to non-related obligors under similar circumstances.

2.8.2 The credit policy should provide for close monitoring and reporting of lending and writing-off of loans to related parties. Material credit transactions with related parties should be subject to the approval of the Board (excluding Board members with potential conflicts of interest). Where necessary, such transactions should also be disclosed to the public as part of the institution's financial reporting programme. Directors, senior management

and other interested parties (e.g. shareholders) should not override the established credit granting and monitoring processes of the institution to approve the granting of credit facilities to related companies and individuals.

3 RISK MEASUREMENT, MONITORING AND CONTROL

3.1 CREDIT GRANTING

3.1.1 An institution should have an established process for approving new credits and for the renewal of existing credits. Credit should be extended in accordance with the credit strategy 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 management with the appropriate authority;
- completion of legal documentation; and
- disbursement.

3.1.2 An institution should conduct comprehensive assessments of the creditworthiness of its obligors. These should include, where pertinent, analysis of the obligor's financial position as reflected in various financial and cashflow statements, past repayment record, management quality and integrity, as well as relevant industry and macroeconomic data. For corporate obligors, adequate checks on the shareholders and company directors should be conducted. The institution should group related obligors, where appropriate, and conduct credit assessment on a group basis.

3.1.3 When participating in loan syndications, an institution should not place undue reliance on the credit analysis done by the lead underwriter. Instead, the institution should perform its own analysis and review of syndicate terms. When an institution purchases securities issued by an obligor that is different from the counterparty (e.g. asset swaps), it should also analyse issuer risk. For treasury and capital market activities, the structure of products and transactions should be analysed to determine the source and volatility of credit exposure.

3.1.4 When granting consumer credits, an institution should have an adequate process to screen applicants, such as reference checks with a consumer credit bureau or other database of rejected applications, bankruptcies and accounts with delinquency records.

3.1.5 For trade financing, an institution should take into account repeat utilisation of facilities granted. In approving such credit transactions, the institution should review transaction records of the obligor, such as limit utilisation, extension of due dates of bills, nature of trade being financed, the obligor's trade requirements and trade cycle.

3.1.6 The evaluation and approval of credit should be conducted in accordance with an institution's guidelines and granted by the appropriate authority. Since an obligor group may seek credit from several departments of an institution, the institution should have a credit granting process that aggregates exposures to each obligor or group of connected obligors. Where a branch serves as a booking centre for transactions initiated by other branches, there should be proper coordination among the different branches on managing the credit risk.

3.1.7 An institution should have a team of officers with the experience, knowledge and background to assess credit risks. It should also allocate adequate resources to ensure that the credit decision process is rigorous, timely and efficient.

3.2 RISK MITIGATION

3.2.1 An institution may utilise collateral and guarantees, among other instruments, to help mitigate credit risks.

3.2.2 However, collateral and guarantees should not be used as a substitute, either for comprehensive assessment of the obligor or for complete obligor information. The potential correlation between collateral values and the obligor's financial condition should also be considered, especially in asset-based lending. Specific proportions of financing should be established for different types of collateral. The quantum should be set at a level that provides sufficient cushion against a decline in collateral values. There should be periodic reviews to assess the value of the collateral and the appropriateness of the lending margin. An institution should exercise caution when extending credit against illiquid assets.

3.2.3 When accepting guarantees for credit facilities, an institution should evaluate the level of coverage being provided in relation to the credit quality, legal capacity and strength of the guarantor. The institution should differentiate between explicit guarantees and implicit ones (e.g. anticipated support from the government). If implicit guarantees are taken into account, they must be adequately justified. The institution should ensure the enforceability of guarantee agreements.

3.3 MONITORING

3.3.1 An institution should have in place a system for monitoring the condition of individual credits. 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 as well as the operating environment of the obligor. When monitoring companies dependent on key management personnel or shareholders, such as small and medium enterprises, an institution should pay particular attention to assessing the status of these parties.
- Conduct of Accounts
An institution should monitor the obligor's principal and interest repayments, account activity, as well as instances of excesses over credit limits. For example, in trade financing, an institution should monitor cases of repeat extensions of due dates for trust receipts and bills. For leveraged credit facilities backed by marketable securities, an institution 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 breaches detected should trigger prompt action.

- Collateral Valuation
The value of collateral should be updated periodically to account for changes in market conditions. For example, where the collateral is property or shares, an institution should undertake more frequent valuations in adverse market conditions. If the facility is backed by an inventory or goods purportedly on the obligor's premises, appropriate inspections should be conducted to verify the existence and valuation of the collateral.
- External Rating and Market Price
Changes in an obligor's external credit rating and market prices of its debt or equity issues could indicate potential credit concerns. An institution should monitor these factors, and conduct a review of the obligor whenever there are adverse changes.

3.3.2 In addition to monitoring the above risk indicators, an institution should also monitor the use of funds to determine whether credit facilities are drawn down for their intended purposes. Where an obligor has utilised funds for purposes not shown in the original proposal, the institution should determine the implications on the creditworthiness of the obligor. Exceptions noted during the monitoring process should be promptly acted upon and reported to management.

3.4 CREDIT REVIEW

3.4.1 An institution should perform regular credit reviews. The purpose of a credit review is to verify that credits are granted in accordance with the institution's credit policies and to provide an independent judgement of asset quality. The institution should conduct credit reviews with updated information on the obligor's financial and business conditions, as well as the conduct of the account. Exceptions noted should be evaluated for impact on the obligor's creditworthiness. Credit reviews should also be conducted on a consolidated group basis to factor in the business connections among related entities in a borrowing group.

3.4.2 Credit reviews should be performed at least once a year. More frequent reviews should be conducted for new accounts and for classified accounts. Procedures should also be instituted to ensure that reviews are

conducted at the appropriate times. A process to approve deferment of credit review should also be put in place. For consumer loans, an institution may dispense with the need to perform credit reviews of individual obligors for certain types of products. However, it should monitor and report credit exceptions and deterioration.

3.5 CLASSIFICATION AND PROVISION

3.5.1 An institution should make adequate provisions for classified credits. In the case of banks, classified credits are loans graded substandard, doubtful and at risk of loss as defined by MAS Notice 612. The provisions should meet regulatory guidelines and internal policy. The institution should also consider the general economic conditions of the countries they have exposure to when determining provision levels. Loan classification and provisions should be subject to independent review and approval.

3.5.2 An institution should ensure that loans are properly and promptly graded to reflect its assessment of the borrower's credit strength. In addition, the criteria for loan grading should be sound and consistent with regulatory guidelines. The institution should put in place policies to govern upgrading of loans. A restructured loan should only be upgraded after the obligor has fulfilled its revised loan obligation for a reasonable period of time.

3.5.3 Where regulatory loan grading is tied to the institution's internal risk rating, there should be a proper process to map the internal rating to regulatory rating. The institution should readjust the mapping after every review of its internal risk rating methodology.

3.5.4 Since provisions are dependent on the recoverable value of collateral it holds, an institution should obtain appropriate valuations of collateral. The institution should have a reliable and timely collateral valuation system. The valuation system should include factors such as the legal enforceability of claims on collateral, ease of realisation of collateral and current market conditions. Where appropriate, the institution should apply a haircut to the estimated net realisable value of collateral or use the forced sale value of the collateral to provide more realistic estimates.

3.6 PROBLEM CREDITS

3.6.1 An institution should have processes, based on diligent credit monitoring and loan grading, to identify and manage problem credits at an early stage. Classified accounts should be managed under a dedicated remedial process. This process should comprise the following elements:

- Review of Collateral and Security Documents
An institution should 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, collateral and guarantee.
- Formulation of Remedial Strategies
Depending on the size and age of a problem credit, appropriate remedial strategies should be established to revive and recover the credit. These strategies may include restructuring of facility and rescheduling of payments. The strategies should take into account the specific condition of the obligor and the institution's interest, and should be approved by the relevant authority.
- Negotiation and Follow-up
As it implements remedial plans, an institution should monitor their effectiveness through maintaining regular contact with obligors and tracking follow-up actions.
- Status Report and Review
Problem credits should be subject to more frequent review and monitoring. The reviews should update the status of the loan accounts and the progress of the remedial plan. These reports should be submitted to senior management on a timely basis.

3.6.2 An institution should consider establishing a separate unit to focus on problem credit management. This workout function should preferably be separate from the loan origination function to ensure independence and objectivity in managing problem credits.

3.7 CREDIT ADMINISTRATION

3.7.1 An essential part of the credit process is credit administration. Credit administration refers to the back office activities that support and control extension and maintenance of credit. An institution should ensure that there are effective procedures for performing the following credit administrative functions:

- Credit Documentation
Procedures should be put in place to ensure completeness of documentation in accordance with approved terms and conditions. Outstanding documents should be tracked to ensure execution and receipt.
- Disbursement
Proper approval should be obtained prior to disbursement. Disbursement should be effected only after legal documentation is completed and where relevant, collateral received. Exceptions should be approved by management with the relevant authority.
- Billing and Repayment
Notices on repayment of principal and interest should be despatched to obligors on a timely basis. There should be measures to ensure that late payments are tracked and collected. Payments received should be properly recorded.
- Maintenance of Credit Files
Credit files should include sufficient information necessary to ascertain the financial condition of the obligor or counterparty. Credit files should include documents covering the history of an institution's relationship with the obligor. The institution should have procedures in place to ensure timely procurement of information.
- Collateral Documents
An institution should ensure that all collateral documents are kept in a fireproof safe under dual control. Movement of such

documents should be tracked. Procedures should also be established to track and review relevant insurance coverage for certain facilities or collateral. Physical checks on collateral documents should be conducted on a regular basis.

3.8 INTERNAL RISK RATING

3.8.1 An institution should have a policy to develop, review and implement an internal risk rating system where appropriate. Such a system should be able to assign a credit risk rating to obligors that accurately reflects the obligors' risk profile and likelihood of loss². It should also assign risk ratings in a consistent manner to enable the institution to classify obligors by risk ratings and have a clearer understanding of the overall risk profile of its portfolio. The institution's credit policy should define the various risk grades of its rating system. It should also set the criteria for assigning risk grades and the circumstances under which deviations from criteria are permitted. The credit policy should also define the roles of different parties involved in the rating process.

3.8.2 An institution should validate its risk rating systems and ascertain their applicability to their portfolios prior to implementation. A party independent of the development process should conduct the validation. An institution that uses 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 risk profile of the obligors in different market segments such as corporations, small and medium enterprises, and financial institutions.

3.8.3 An institution that uses statistical models to assign ratings or to calculate probabilities of default should ascertain the applicability of these models to its portfolios. The institution should not use the output of such models as the sole criterion for assigning ratings. It should decide on the final obligor rating after considering other qualitative criteria not captured by the rating model.

² The risk ratings of some institutions reflect both the obligor's creditworthiness as well as the nature of the facility offered to the obligor. Other internal rating systems have separate obligor and facility ratings.

3.8.4 Risk ratings should be assigned at the inception of lending and updated at least annually. An institution should, however, review ratings as and when adverse events occur. Risk ratings assigned to various obligors should be reviewed by a party that is independent of loan origination. As part of its portfolio monitoring, the institution should generate reports on credit exposures by risk rating. Trend and migration analysis between risk ratings should also be conducted to detect changes in the credit quality of the portfolio. The institution may establish target limits for risk grades to highlight concentration in particular rating bands. The institution should note that analysis of the portfolio by risk ratings is meaningful only when the institution's rating system is able to consistently assign similar ratings to obligors with similar risk profiles.

3.8.5 Statistical models should not only be validated before their introduction but also periodically back-tested after implementation, to ensure their continued accuracy and consistency. Credit scoring models used in consumer lending should also be validated and back-tested. Where paucity of data hinders the conduct of back-tests of statistical models, an institution should use other methodologies such as review of model output by credit experts, comparison of model output with other models, and comparison of model output with market data (e.g. credit spreads) to assess model accuracy and consistency. Where its model is relatively new, the institution should continue to screen and review credit applications until the model has stabilised.

3.9 CREDIT PORTFOLIO RISK MANAGEMENT

3.9.1 Portfolio Management Approach

3.9.1.1 An institution should monitor credit risk on a portfolio basis to manage concentration risk. Concentration of credit risk could arise when credit granted to the following obligors accounts for a substantial proportion of the institution's total credit portfolio or capital funds:

- a single borrower or group of connected borrowers;
- entities in a particular industry or economic sector;
- entities in an individual country or a group of countries with inter-related economies;

3.9.1.2 An institution should identify and measure the concentration risk in its credit portfolio. It should monitor areas of significant concentration such as the exposure to an industry in a particular stage of the business cycle. The impact of such developments on the obligor and therefore on the credit quality of the portfolio should then be assessed.

3.9.1.3 An institution should establish appropriate limits to cap concentration risk at an acceptable level. Significant concentration risk should be reported to the Board and senior management for review and deliberation. Stress tests could be conducted to assess the 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, unwinding of positions, increasing capital or reserves, securitisation and credit risk hedging.

3.9.1.4 Branches that serve a particular client segment or region as part of an institution's global strategy are likely to have high credit exposure to certain obligors or countries. While such concentration risk may have been captured under the respective limits and control mechanism at the head office, branches should continue to monitor and manage their concentration risk.

3.9.1.5 Besides analysing concentration risk, an institution should also monitor trends in loan growth, collateral values and asset quality to detect potential weakness in its 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.

3.9.2 The credit risk of a portfolio may be quantitatively measured using credit value-at-risk (Credit VaR) models³. These models 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. As with any statistical obligor rating models, management should ensure that appropriate validation and assurance testing are performed before using a credit VaR model. Following its introduction, the credit VaR model should be regularly back-tested to ensure its continued validity. External expert organisations may be contracted to conduct the validation exercise.

³ Some institutions refer to credit VaR models as 'Credit Portfolio Models'.

3.9.3 Country Risk

3.9.3.1 An institution that grants credit internationally should have adequate policies and procedures for identifying, measuring, monitoring and controlling country risk and transfer risk in its international lending and investment activities. Monitoring of country risk factors should include the potential for default of foreign private sector obligors arising from country-specific economic, social and political factors. An institution should also assess an obligor's ability to obtain foreign exchange to service cross-currency debt and honour contracts across jurisdictions.

3.9.3.2 An institution should monitor country risk by tracking internal and external country risk ratings and economic, social and political developments of the relevant countries. Risk exposures 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 or business lines. In either case, the institution should ensure that country exposures are reported and monitored against limits. Appropriate measures should be taken when adverse developments occur in a particular country. These measures include closer analysis of the obligor's capacity to repay, provisioning and preparation of contingency plans if the country risk continues to deteriorate.

3.9.3.3 Country risk should also be considered at the individual transaction level. When assessing an application for credit extension, the institution should take into consideration its existing exposure to a particular country. Significant country risk should be assessed and highlighted in credit proposals submitted to management for approval.

3.10 **STRESS TESTING**

3.10.1 There is a distinct difference in the nature and magnitude of credit risks faced by an institution under normal business conditions and under stress conditions, such as financial crises. Under stress conditions, asset values and credit quality may deteriorate by a magnitude not predicted by analysis of normal business conditions.

3.10.2 Stress testing is a tool that can be used to assess the impact of market dislocations on an institution's credit portfolio. It can aid the institution in estimating the range of losses that it could incur in stress conditions, and in planning appropriate remedial actions.

3.10.3 An important component of stress testing is the identification and simulation of stress conditions or scenarios an institution could encounter. The stress events and scenarios postulated should be plausible and relevant to the institution's portfolio. These scenarios could include:

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

3.10.4 An institution should document its stress testing policy, which should be approved by the Board and senior management. The stress testing policy document should include the following:

- the frequency and procedure for convening periodic meetings to identify the principal risk factors affecting the portfolio;
- the methodology for constructing appropriate and plausible single and multi factor stress tests;
- the procedure for setting stress loss limits and the authority for setting these limits;
- the stress loss limit monitoring process; and
- the remedial actions to be taken if stress test results show losses in excess of limits.

4 CREDIT RISK IN THE TRADING BOOK

4.1 An institution should formalise additional policies and procedures for managing credit risk in the trading book. These should cover areas such as significant obligor⁴ exposures and concentrations, pre-settlement and settlement risks, credit exceptions, obligor ratings, non-performing contracts and provisioning. Procedures should also be established to ensure that credit and concentration limits are not exceeded without proper approval from authorised personnel. In addition, the institution should establish the lists of approved intermediaries such as electronic communication networks (ECNs), exchanges and brokers with whom its dealers can transact.

4.2 The Board and senior management should establish limits that are prudent in light of the institution's capital resources, financial condition and management expertise. Credit lines should be approved by the appropriate authority. Credit and concentration limits for a single obligor or related group of obligors, exchanges, ECNs and clearing houses, should be set after considering the aggregate credit extended 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 should be established to derive the aggregate group exposure in a timely manner. The system should include reporting mechanisms to the appropriate personnel to ensure that limits are adhered to. Credit limits should also be set, taking into consideration both settlement and pre-settlement exposures.

4.3 A department independent of the front-office trading function should undertake credit reviews. Such reviews should be performed, where possible, before the institution establishes a relationship with the obligor. The institution should periodically assess the creditworthiness of obligors throughout the tenure of the transaction. It should also clearly document ad hoc approval for transactions with customers without existing lines.

4.4 Potential future exposure (PFE) is a measure for pre-settlement risk arising from a financial instrument as a result of market changes. Both simulation analysis as well as analytical tools may be employed to measure PFE. The method used to measure pre-settlement risk should be commensurate with the volume and complexity of an institution's treasury and financial derivatives activities. The assumptions used to calculate PFE should be reasonable and consistent. The time horizon used can vary depending

⁴ The term "obligor" in this section includes both counterparties and issuers.

upon the contract residual maturity, collateral protection and the institution's ability to terminate its credit exposure. A time horizon equal to the tenure of the contract may be inappropriate in the case of collateralised exposures. In such cases, the horizon should reflect the time required for the institution to terminate the contract and liquidate existing collateral when an obligor fails to meet a collateral call.

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

4.6 An institution should establish clear policies on collateral arrangements with obligors. These policies should lay out guidelines on the type of collateral arrangements required. The criteria used could include 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. The institution should 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.

4.7 An institution may use credit derivatives or credit insurance as means to manage their credit exposures to an obligor. Where such credit mitigants are used, the credit exposure to the obligor should accurately reflect the extent of credit protection bought. While the use of credit derivatives or credit insurance transfers the credit risk from one obligor to another, it does not eliminate credit risk altogether. The institution should also be cognizant of situations where such credit mitigants are not enforceable.

4.8 An institution should, as part of sound credit risk management, have a clear understanding of the effectiveness of any netting arrangements in place with their obligors.

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

4.10 Historical rate rollover refers to the use of non-current rates for the extension or rollover of maturing forward foreign exchange contracts or other derivatives contracts. Such practice should be discouraged as it may be used to conceal losses or to perpetrate fraud. Where customers have reasons to roll over maturing contracts or structure transactions using non-current rates, such transactions should be approved by senior management of the institution and the customer. Substantial marked-to-market losses should be reported to the Board and senior management of 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.

Appendix

CHECKLIST OF SOUND PRACTICES TO ADOPT

[The checklist summarises the key practices only and is not meant to be exhaustive. For details, institutions should refer to the guidelines.]

Ref	Sound Practice	Yes/No
	<u>CREDIT RISK GUIDELINES</u>	
	<u>Risk Management Policies and Procedures</u> Risk Strategy Is there a process to develop a credit risk management strategy consistent with the institution's risk tolerance and business goals? Is the risk management strategy endorsed and reviewed by the Board and senior management? Risk Management Structure Is there a senior management committee that oversees the credit risk management framework and process? Are there control functions to perform credit risk measurement, monitoring and control processes, independent from the business origination function? Policies & Procedures Are there comprehensive policies to govern credit risk taking and management activities consistent with the institution's risk profile and nature of business? Are these policies endorsed and reviewed by the Board and senior management where appropriate? Delegation of Authority Are there clear directives and guidelines on delegation of authority for the granting and review of credit? Is there a process to ensure timely review of authority and reporting of exceptions? Are these directives approved by the Board?	

Ref	Sound Practice	Yes/No
	Credit Criteria Are there clear credit criteria to determine the acceptability of obligors? Credit Limit Are appropriate credit limits in place for relevant categories or groups of obligors? Do these limits address concentration risk? Are there processes for the review and reporting of exceptions to credit limits, at both the individual and portfolio level? Credit Extension to Related Parties Is there a policy and process for considering applications by related parties for credit?	
	<u>Risk Measurement, Monitoring and Control</u> Credit Granting Is there a credit granting process that provides for adequate assessment and mitigation of risk and that ensures approval by appropriate authority? Risk Mitigation Are credit transactions structured with adequate, acceptable and enforceable measures to mitigate risk? Are there guidelines on the quantum of financing against different types of collateral, and valuation of collateral and review of guarantors?	

Ref	Sound Practice	Yes/No
	Credit Monitoring & Review Is there a process to monitor the creditworthiness of obligor and the effectiveness of measures to mitigate risk? Does the process also ensure that potential concerns over repayment are reported and reviewed? Are credit reviews conducted periodically to take into account the results of monitoring and updated information? Is the frequency of reviews tied to the underlying credit risk profile of obligor and portfolio? Classification and Provision Is there an effective process to classify obligors and to provide adequate provision against potential credit losses? Is the methodology for classification and provision based on sound criteria? Problem Credits Are there processes to identify and manage problem credits, in accordance with the level of credit classification? Does the remedial management process include review of collateral and security documents, development of specific remedial strategies and timely reporting of status? Credit Administration Are there comprehensive procedures to enable the effective performance of credit administration activities, such as loan disbursement, periodic repayment, funds control and maintenance of information and documents? Internal Risk Rating Is the internal risk rating system developed, validated and implemented according to sound practice standards?	

Ref	Sound Practice	Yes/No
	Are the risk rating criteria and methodology appropriate for the obligor's risk profile and specific risks in the environment? Are there processes to ensure proper assignment of risk ratings, review of individual ratings and portfolio trends? Credit Portfolio Risk Management Is there a process to monitor credit risk at the portfolio level? Are portfolio limits used to cap concentration risk? Are stress tests used to analyze changes in credit quality due to adverse events? Is there a process whereby significant concentration risk, exceptions to portfolio limits and stress testing results are reported to the proper authority? Credit Risk in the Trading Book Are there credit risk limits for counterparties or issuers prior to transactions? Is the utilisation of such limits monitored on a timely and aggregate basis? Are there proper credit risk measurement methodologies to identify both pre-settlement and settlement risks? Are these methodologies incorporated into the trading and risk management systems? Are netting and collateral arrangements applied? Are various forms of credit risk mitigants, such as credit derivatives transaction, collateral and netting arrangement used? Are there policies and processes to ensure the effectiveness and enforceability of such mitigants, such as a proper legal review, the setting of security thresholds and the valuation of collateral?	