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STRATEGIC RISK MANUAL
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Part 1: Definition of Strategic Risk

1.1 Definition of Strategic Risk

Strategic risk is risk that arises from formulation of strategic plan, business plan, and implementation of the plan that is inappropriate and inconsistent with internal factors and external environment that may affect earnings, capital fund or viability of the business. Therefore, the board of directors (the board) and senior management must carefully formulate the strategic plan and business plan, support corporate governance, and arrange to have internal infrastructure appropriated for implementation of the plans such as organizational structure, personnel, budget, management information system, monitoring and controlling system in order to accomplish the business goal and efficiently manage problems of a financial institution.

Strategic plan is a map indicating the operation direction and reflecting the vision or goal of a financial institution, generally for a period of 3 to 5 years. A good strategic plan must be clear, in consistent with the goal, flexible, and adjustable to changing environment.

Business plan is a plan specifying the overall operation framework of a financial institution to support successful implementation of a strategic plan and is a guideline for each business unit to set an action plan. Generally, a business plan is a short-term plan, not exceeding 1 year, comprising goal, profit, responsibility, resource to be used, work time frame, and monitoring criteria for performance, which should all be consistent with the budget of a financial institution as well.

1.2 Source of Strategic Risk

Strategic risk can arise from 2 main sources, namely, external risk factors and internal risk factors.

1.2.1 External risk factors mean external factors difficult for a financial institution to control or that a financial institution has no control over, which affect or deter the implementation of a strategic plan from meeting the goal. For example, competition, behavioral change of target customers.

1.2.1.1 Competition A financial institution must forecast and adjust in accordance with the ever changing market conditions, including establishing a strategic plan and business plan to be in line with the current and future competition. Competitors, price competition and new products must be considered.
(1) Competitors: A financial institution is exposed to risk from competitors that are the same type of financial institution or are in different business but provide services similar to a financial institution. The competitors may have advantages over cost, management system, innovation and/or expertise in new financial products.

(2) Price competition: A financial institution will be exposed to risk from competitors that have lower overall cost structure and offer services at lower cost. Such price competition will affect spreads and profit margins, which will ultimately affect earnings and capital fund of a financial institution.

(3) New products: When a rival financial institution constantly develops new products and services in an effort to attract customers, a financial institution must stay abreast of such new product offerings and may expedite its own new product offerings without following proper procedure.

1.2.1.2 Behavioral change of target customer: Change in demographic and customer profile will affect customer base, earnings, and capital fund of a financial institution. The board and senior management must monitor the process to identify potential customers and the approach to best serve these customers to mitigate the risk of losing the market share and profit margins.

1.2.1.3 Technological change: A financial institution faces risks from technology through the efforts of competitors to develop more efficient systems and/or services, with lower cost. In highly competitive markets, if a financial institution does not manage the risk from technology, it may be exposed to a loss of market share due to its inability to compete on the basis of services and prices. In less competitive markets, a financial institution may not need to follow the latest technology, but it should ensure that the level of technology employed is sufficient to keep the customer base.

1.2.1.4 Economic factors: Global, national, regional, or local level economic conditions affect the level of profits and capital fund of all financial institutions, especially during a recession. However, the severity level of the effect depends on financial institutions’ scope of operations and ability to adjust. Therefore the board and senior management should continuously assess the risk level of an organization, as well as monitor the current level and the trend of economic conditions and forecast the effect that may incur in the future.
1.2.1.5 **Regulation**  Rules and regulations of authorities such as the Bank of Thailand, the Stock Exchange of Thailand or the Anti Money Laundering Office may deter operations, affecting the implementation of a strategic plan and business to meet the goal and may require adjusting of the plan and compliance with the rules and regulations of the authorities. A financial institution should, therefore, arrange to have a unit and responsible persons to monitor the rules and regulations on a continuous basis.

1.2.2 **Internal risk factors** mean internal factors that are controllable by a financial institution but can affect or deter the implementation of a strategic plan from meeting the goal, namely, organizational structure, work process and procedure, adequacy and quality of personnel, adequacy of information, and technology.

1.2.2.1 **Organizational structure** Organizational structure is important to the implementation of a strategic plan and business plan to meet the goal and be efficient. If a financial institution is dominated by management or a group of shareholders, or does not have clear segregation of duties, management may lack independence with no checks and balance. Such may cause problems in management and lines of authority. A financial institutions should have an organizational structure that is in consistent with its strategic plan and business plan and be able to prevent conflicts of interests among insiders such as directors, managers, shareholders, and staffs.

1.2.2.2 **Work process and procedure** A financial institution that does not specify clear work process and procedure, or specify duplication of duties may cause delay and error in implementation of a business plan and action plan and make it difficult to conduct accurate and timely monitoring and reporting. A financial institution should specify a systematic work procedure and set clear scope of responsibilities, as well as have a process of review for accuracy and a process of continuous monitoring in order to prevent any deficiency in internal control.

1.2.2.3 **Adequacy and quality of personnel** Efficient strategic plan and business plan is dependent on the knowledge, experience, and vision of the board and senior management. Success of implementation of a strategic plan and business plan at all level of an organization depends on the quantity and quality of personnel. The number of staffs should be sufficient for conducting the entire amount of work and transactions. Staffs should have the necessary expertise and training to conduct their assignments in an efficient and effective manner. For
example, a financial institution that specializes in retail credits should have staffs that are professional with adequate knowledge and expertise in the issue to ensure that they meet the needs of customers. Lack of competent loan officers or insufficient level of officers the quantity of credits or number of customers will affect credit quality or operating performance and reputation of a financial institution.

1.2.2.4 Adequacy of information. A financial institution must have receive adequate information for managing strategic risk. Inadequate, inappropriate, inaccurate and untimely access to information will hinder understanding of the market conditions, thereby affecting formulation of a strategic plan, business plan, goal setting, and organizational management. A financial institution should have information of target customers, their need, and developments of the competitors to be used in setting a business strategy and maintaining the market share and earnings.

1.2.2.5 Technology. A financial institution needs to ensure that its technology can compete and serve its customers’ need, especially, complex transactions such as cash management or derivative transactions. An information technology system should also be enhanced to enable competition and support new transactions.

1.3 Risk Mitigation Factors to Strategic Risk

Risk mitigation factors means factors that help in implementation of a strategic plan to meet the goal, namely, qualifications of the board and senior management, formulation of strategic plan and business plan, quality of personnel and proper training, risk management system, stable customer base, introduction of products or services before competitors, adequate access to information.

1.3.1 Qualification of the board and senior management. The board and senior management should be knowledgeable, with diverse and useful experience, independent, active, have clear understanding of the market, economic, and competitive conditions, and be ready to make a decision and implement it. There should be board members who are independent to serve as a check and balance on the activities of management to meet the targeted goal.

1.3.2 Formulation of strategic plan and business plan. In order to formulate clear and effective strategic plan and business plan, the board and senior management should assess the changes in internal and external factors and continuously assess how these changes may affect the
financial institution, as well as adjust the plans to minimize the impact of these changes. Furthermore, the financial institution must set a time frame for implementation of the strategic plan and establish performance evaluation system and clear compensation system.

1.3.3 Quality of personnel and proper training Knowledge, expertise, and experience of staffs will understand the market conditions, competition, and can predict the trend of products and services to offer target customers in consistent with the specified strategic plan and business plan. Particularly, adequate training on risk management will help staffs to be aware of the risks that may incur, as well as try to prevent and reduce operation errors, thus resulting in efficient implementation of the strategic plan and business plan.

1.3.4 Risk management system A financial institution must have an organization-wide risk management system. All types of related risks must be taken into account during the formulation of a strategic plan and business plan, including risk monitoring and mitigating methods, by setting a policy, procedure, and risk limit.

1.3.5 Stable customer base Preference and need of customers may change slowly or rapidly depending on the changing environment, society, or technology. A financial institution that can serve customer satisfaction well will be able to keep the customer base, although it is difficult accurately judge the need of customers.

1.3.6 Leadership in products or services A financial institution that is a leader of new products will be able to set the type and price of services, so long as there is no other financial institutions competing. However, such situation will last for a certain period of time only as competitors will eventually enter to compete for a market share.

1.3.7 Adequate access to information Adequate, accurate, and timely information will help in the understanding of competition, environment, and customers’ need, making a financial institution to be able to offer appropriate products and services tailored to their needs. Information source can be research houses, experts, consultants, correspondent financial institutions or other market information. In addition, a financial institution obtaining the technology to collect, process, and analyze various data that may affect business performance of the financial institution, both information on environmental factors and market researches, will help the financial institution in the design of products and services that better serve the needs of target customers. For example, a financial institution will be able to set appropriate pricing by
using demographic information and consumers’ credit information of the customers categorized by level of risk.
Part 2 Best Practice in Managing Strategic Risk

Strategic risk is risk from formulation of a strategic plan, business plan, and implementation that is inappropriate or inconsistent with external environment and internal factors. Such may affect setting of a direction, business plan, and action plan for each business line of a financial institution. Therefore, it is necessary that the board and senior management set a guideline in managing the risk efficiently and appropriate to the business environment to ensure that the risk level is acceptable and that the risk management system is adequate to identify, measure, monitor, and control the risk.

2.1 Oversight by the board of directors and senior management of a financial institution

In this strategic risk manual (the manual), the board means the board of directors of a financial institution who are appointed by the resolution of the shareholders’ meeting, senior management means manager, deputy manager, assistant manager or those with equivalent positions but with different names for the positions who has the top 3 managing authority in the financial institution, and management means the person with the subsequent managing authority after the top 3.\(^1\)

The board and senior management are considered to have appropriate knowledge, capability, and experience to perform the duty of managing and monitoring compliance with laws, regulations, and shareholders’ resolutions. The board should perform its duty of loyalty and care which ordinary prudent individuals in the like position and circumstance should have, and senior management should have accountability of professional persons for the maximum benefit of the organization, shareholders, and staffs. Although the duties and responsibilities of the board and senior management may differ depending on the organizational structure and authorities specified, in case of loss, the board and senior management must be personally responsible both in a commercial and criminal case. Moreover, an excuse that they do not have the duties of a director or management or lack information on a financial institution cannot be used to free themselves from being guilty of neglect to perform such duties. The detailed guideline on what duties should the board perform is in the Financial Institution Directors’ Handbook.

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\(^1\) Circular No. ThorPoThor.SorNorSor. (31) Wor. 2770/2545 dated 3 December 2545 Re: Board Structure to Promote Corporate Governance of a Commercial Bank
In practice, the board may delegate certain authority to sub-committees or management to consider and make a decision for speediness of business operation. Nevertheless, the board, delegated committees, and senior management must monitor and ensure that there is compliance with law, rules, and regulations of the associated authorities such as the Bank of Thailand, Stock Exchange of Thailand, the Anti Money Laundering Office to promote corporate governance. For example, notifications and circulars of the Bank of Thailand Re: Board Structure to Promote Corporate Governance of a Financial Institution, taking directorship positions in other limited companies of the directors or senior management of the financial institution, and guideline for financial institutions in taking deposits.

2.2 Strategic Risk Management

As market conditions constantly change and structure of each financial institution differs, the risk management system that is appropriate for different financial institutions may differ. Each financial institution should develop risk management system necessary and appropriate to the size, complexity, and scope of business. However, a good risk management system must be able to identify, measure, monitor, and control risks of the organization.

2.2.1 Identification and measurement of risk

Identification and measurement of risk are the responsibility of management to ensure that the level of risk existed and in the future are realized. A financial institution should identify and measure risk exposures continually to monitor the outcome from changing environments.

Identification and measurement of strategic risk can be determined through strategic planning, formulation process of a strategic plan, and the reasonableness of the strategic plan. Moreover, a business plan and formulation process of a business plan should be consistent with the specified strategic plan. Both the strategic plan and business plan should be consistent with the business scope, complexity, external environment, and internal factors of the financial institution so as to the business goal and to solve a problem of the financial institution.

2.2.1.1 Significant roles of the board, delegated committees, and senior management

Changes in the structure of the financial institutions system, business scope of financial institutions, technology, market volatility, increased competition and innovation have posed higher risk. Therefore, a financial institution must continuously have good planning as well as periodic review of the strategic plan as circumstances change. The board, delegated committees,
and senior management have 3 important duties, namely, strategic planning, organizing, staffing, directing, and controlling to achieve the stated objectives and goals.

1. **Strategic planning**  
The board or delegated committees and senior management must set business direction in the future of a financial institution and plan in accordance with the changing environment and circumstances. Moreover, they should formulate a business plan, target customers, target customer base, and performance evaluation against the plan, as well as risk management system, information technology system, and other support systems to control strategic risk.

2. **Organizing**  
The board or delegated committees and senior management must organize the organization and specify work procedures to facilitate implementation of the strategic plan and arrange to have appropriate checks and balances.

3. **Staffing**  
The board or delegated committees and senior management must proceed to allocate staffs to suit their qualifications and responsible duties to implement the strategic plan efficiently and in line with changes of organization structure, including specify a system of recruiting, training, and compensation that encourage staffs to comply with the strategic plan in order to achieve the goal of the financial institution.

4. **Directing**  
The board or delegated committees and senior management must direct to have operation of a financial institution achieve the goal by clearly and explicitly specify the line of authority to help with quick and efficient decision making, feedback, measurement, and evaluation.

5. **Controlling and monitoring**  
The board or delegated committees and senior management must arrange to have an effective mechanism to control implementation of the strategic plan, which can be observed in case of deviation from the plan, and introduce timely corrective actions. There should be a system to report the detailed progress of implementation of the plans and objectives, including comparison of actual performance against the business plan and budget, and the business continuity plan\(^2\) for unusual circumstances to facilitate unexpected changes in the environment.

\(^2\) Business continuity planning means “a process to ensure that a financial institution can maintain or revive the operating system and provide services to the customers when there is a unexpected crisis such as natural disaster, failure of information technology system, operating errors, or terrorism. The objectives are to reduce financial loss and to enable the financial institution to provide services to its customers and counter parties
2.2.1.2 Strategic planning process

Setting future business direction is the responsible duty of the board or delegated committees and senior management. If the planning process is not appropriate, the assumptions are not reasonable, or strategic plan is flawed, a financial institution may encounter failure as in the case of inadequate granting of credits. Therefore, the financial institution must encourage to have an appropriate strategic planning process and implementation as follows:

(1) Support or participation of the board, delegated committees, and senior management

The board or delegated committees and senior management has direct duty and responsibility for strategic planning and implementation of the strategic plan, so they must fully participate and carefully decide on the basis of information from staffs within the organization and market researches to ensure that such plan is feasible and appropriate. The strategic plan and performance evaluation method should be approved and reviewed by the board or delegated committees and senior management regularly in order to determine appropriateness and consistency between the strategic plan, business plan, and various analyses.

(2) Participation of staffs from various departments

The board or delegated committees and senior management responsible in strategic planning process should comprise members from different departments both the core and supporting functions to set a framework or guideline that the core functions and supporting functions can operate together to achieve the overall goal of an organization, without dominance by any one or department in the strategic planning process. Therefore, cooperation is vital as different departments have to work together in the implementation of the plan. For example, when the board or delegated committees and senior management set the goal to increase the loans by 20% from previous year, the core functions such as a treasury department must identify a source of fund and capital allocation to satisfy the increased credits; the supporting functions such as an accounting department should participate in the planning to prepare for the increased transactions; and most importantly, all staffs must be aware of the importance of the plan and cooperate or continuously, and reduce adverse effects on the strategic plan, reputation, operation, liquidity, credit quality, and compliance with laws.

Risk Assessment and Information and Technology System Department
Financial Institutions Supervision, Bank of Thailand
involve in giving their opinions so that the management has a chance to give and receive information supporting the strategic planning more efficiently.

(3) Adequacy of information in forming assumptions

Supporting data used in forming assumptions must be reliable and sufficient for making a decision in order to support an analysis and forming of reasonable assumptions. The data can be from assessment of economic factors, position of the financial institution compared to its competitors, competitive environment at present and future market trends, and customer needs. That is,

(3.1) Economic factors Current economic conditions and future trends are fundamental data in forming assumptions and strategic planning. If a financial institution does not collect and thoroughly analyze market data, other internal and external factors, it will not be able to form the assumptions for the planning in a comprehensive and realistic manner. Such may lead to failure to achieve the goal. For example, no specification of appropriate credit growth, no analysis of potential responses by competitors, no estimation of loan loss in proportionate to increased credits.

(3.2) Position of the financial institution compared to competitors to identify strength and weakness, opportunity and threat, by considering environment changes and future trends that may affect a financial institution. For example, a financial institution may have strength in leadership in new products or services but may not be able to find cost of fund or transaction lower than the market so that the pricing of a new product or service is not as attractive. Nevertheless, the financial institution may be able to make profit from unsaturated market but its profit will decline once new competitors enter the market and set a more attractive price.

(3.3) Current competitive position and future market trend namely, detail of market competitors such as asset size, structure, nature of growth, core business, strength and weakness of competitors, as well as market share by type of product and business line. A financial institution should assess the market conditions regularly especially when there are major changes such as new product offering or merger.

(3.4) Customers’ need by considering demographic, income, and customers’ behavior to understand the current market condition and target customer group, timing of the need for product and future market trend. Researches should be conducted periodically to ensure that a
A financial institution is prepared and can timely respond to any changes of competitors and the market. Such researches can be done by the financial institution or external research houses.

(4) Consistency of the business plan and the overall objective of a financial institution

The goal of operation should be consistent with the strategic plan and overall objective of a financial institution. Formulation of the business plan should also be consistent with allocation of budget and funding source. For example, when a strategic plan sets to have retail credit growth of 20 percent, a financial institution may specify a business plan to extend its customer base to a new group of customers, as well as promoting sale of new product or using pricing strategy to attract customers from competitors. Budget and existing source of fund should be taken into account as well. In addition, a criteria to assess actual performance against the plan should be established to help evaluate success of the plan, as well a clear operating time frame for each procedure. When the evaluation result deviates from the expectation, the business plan should be adjusted in consistent with the changing environment or circumstances. For example, if a financial institution aims to be the leader in retail credits market, the plan should specify the evaluation method, the market share, number of customers, number of credit applications, or survey of customer satisfaction.

(5) Feasibility of a strategic plan

A financial institution should set the goal to be consistent with its capacity, potential, current market share and competitive environment such as quality of credits or debtors in the credit portfolio. A strategic plan that sets too broad a goal or has no clear direction can make it difficult to specify a business plan and action plan, and to adequately assess the operating performance. For example, if a financial institution’s goal in a strategic plan is merely to increase income from previous year, without clearly specifying the marketing goal by type of business.

(6) Assessing actual performance against a strategic plan

The board or delegated committees and senior management should periodically evaluate actual performance against the strategic plan in order to monitor and adjust a business plan appropriately and in consistent with the changes. The criteria in performance evaluation should be measurable and evaluation frequency should be adequate, with an alternative that is consistent with each different circumstance. For example, the board or delegated committees and senior management can assess the success of e-banking services by comparing to the weekly or monthly
target, number of users, daily transactions, speed of each transaction, number of errors, and problem remedy time period so that the data can be used to adjust the business plan in the future.

2.2.1.3 Business planning process and budget

The board or delegated committees and senior management is responsible for formulating the overall business plan and budget, while each department’s duty is to establish a business plan and budget, by month, quarter or year, to be in consistent with the overall business plan and budget. The business plan and budget can be done by a top down approach or bottom up approach or a mix of the 2 approaches.

(1) The top down approach is a strategic planning process where the board or delegated committees and senior management delegate and allocate the operating targets to each department as appropriated. The advantage of this approach is it is convenient in the planning and controlling the budget. However, the disadvantage is the strategic plan may not be realistic or not consistent with the potential of each department or difficult to implement according to the strategic plan.

(2) The bottom up approach is a strategic planning process where a business plan and budget from each department are put together to become the strategic plan. The advantage is each department sets its target and allocates its resource with an aim to achieve the strategic plan set by its own. The disadvantage is it is more difficult to apply the bottom up approach than the top down approach since there may be shortage of resource in each unit and the business plan and budget of each department may not be consistent both at the overall and departmental level.

In determining appropriateness of strategic planning process of a financial institution, the board or delegated committees and senior management must review the business plan together with the budget to help understanding the plan for future business and other important issues such as capital adequacy, liquidity, source and use of fund, level and quality of earnings, and management efficiency. The following issues must be considered when assessing appropriateness of the business plan and budget:

(1) Business plan and budget

A financial institution can use the budget to forecast and control the overall or part of the operation, as well as assess management efficiency in decision making, planning, and
implementing by comparing the budget with actual performance, for example, budgeting and forecasting over 4 or 5 years. Comparing the actual performance with the long term projection will differ more than comparing with the short term projection due to the changing environment such as market interest rate, competition, economic factors and other environmental factors. The long term projection should therefore be reviewed at least annually in order to adjust the plan to the changes appropriately and to be able to closely monitor the operations and make an adjustment quickly. The financial institution should review the short term projection at least monthly or quarterly to submit the information to the board or delegated committees and senior management. Performance evaluation to set compensation should depend on the budget and projection formally and originally approved by the board or delegated committees and senior management before the projection review so as to reflect actual potential. Moreover, the financial institution should prepare the projection under different assumptions, using different level of unusual circumstances in line with an analysis of economic trend and business experience.

(2) Consistency of the business plan and budget with the strategic plan

The business plan and budget of each department should be consistent with the overall strategic plan and budget. When inconsistency is detected, the management of each department should clarify to the board or delegated committees and senior management the problem and difficulty in implementing the plan, as well as contingency measures in order to set the overall business contingency plan. For example, if a financial institution with the goal to increase credits to SMEs, the credit department should prepare the data to support the business plan and budget as follows:

(2.1) the quantity of credits increase by type of debtors and SMEs credits growth trend

(2.2) projection of loan loss and provision to be increased to support the loan loss

(2.3) projection of funding as well as source of fund and financial instruments to be used

(2.4) increase of staffs to be appropriate to the work load, both the staffs in the marketing and sales department and in the credit review and audit department.

(2.5) problems and difficulties to make credit approval not in accordance with the target.
(3) Reasonableness of the assumptions used in formulating the business plan and budget

In determining reasonableness of the assumptions used, the data used as a basis in formulating the assumptions must be reliable, sufficient, and updated and be consistent with the data used in strategic planning process. Example of unreasonable assumptions is a rapid increase of credit quantity while an economy is in recession, or growth while a financial institution faces with more intense competition, or increase of credit quantity while loss or provisioning rate is unchanged.

(4) Adequacy of budget allocated for management and supporting function

The board or delegated committees and senior management should place as much importance to the supporting functions and allocate adequate budget as to the core functions, and should improve the risk management system, information technology system and reporting on a regular basis.

(5) Monitoring of actual performance against the business plan and budget

The board or delegated committees and senior management has the duty to monitor actual performance compared to the business plan and budget regularly, as well as analyze the reason for significant deviation and set a guideline to remedy the problem. Such comparison can be used to assess the overall success of the organization and each department very well.

(6) Adequacy of compensation

The board or delegated committees and senior management should set a compensation policy that is appropriate and consistent with the actual performance compared with the established business plan and budget, as well as compliance with the authorities’ notifications such as the circular of the Bank of Thailand re: Payment of cash or other assets as compensation to staffs or employees.

2.2.2 Risk monitoring and reporting

A financial institution should monitor and report on risk regularly to ensure that the level of risk is acceptable. The board or delegated committees and senior management should receive relevant reports that are accurate, timely, and of appropriate frequency to be used as information for a decision making.
Effectiveness of risk monitoring depends on ability to identify and measure all the risks, which must be supported by appropriate, accurate and timely management information systems or model to help with an analysis and decision making. Therefore, the board or delegated committees and senior management must develop and upgrade the information system to identify and measure the risks in an accurate and reliable regularly to be consistent with the complexity and diversity of the financial institution. For example, large financial institution with many complex transactions should have a reporting system and risk monitoring system that can measure the overall risk level. In addition, the information technology of large financial institution should be able to collect internal data such as financial data, accounting data, and external data such as economic conditions, competition, technology and regulatory requirements.

2.2.2.1 **Management information system (MIS)**

An information system is a system or process that provide information necessary to make a decision and manage effectively, which will support implementation of the strategic plan, generally with the following objectives:

- Provide, Collect, and process data
- Support the strategic goals and direction of a financial institution
- Reduce operating cost
- Enhance communication among staffs
- Deliver complicate data through an organization

Effective information system must be adequately supportive of objectives, goal, and provision of services of the financial institution, be able to timely report in a desirable format, and appropriately specify information access levels, either through an automated system or processing system by staffs, or both. It is very important to appropriately define a controlling method to ensure that the data is accurate and prevent from error in retrieving data from many work systems, which may result in erroneous reporting and decision making.

The board or delegated committee or senior management must place importance on development, installment, and reviewing the MIS regularly, as well as set a policy, operation framework, and procedures on MIS, which include development, maintenance, security, repair or upgrade the system to maintain the standard. The board or delegated committee or senior management must establish an MIS system that comprises the 5 following characteristics.
(1) Timeliness – A financial institution should have a reporting system that can provide and distribute timely data to users. Such should be able to collect data, summarize results, and correct errors promptly.

(2) Accuracy – There should be a system to check input data, information system, and results to ensure accurate data processing process. An internal control, inspection and assessment by internal auditor and external auditor, as well as a regular review should be established.

(3) Consistency – Data collection and processing should be consistent and uniform for comparing performance between business line, and analyzing of data and trends. Reporting procedures and data collection may change as appropriated. The board or delegated committee or senior management should establish written process and procedure to allow for systems changes and should communicate to all appropriate employees.

(4) Completeness – The report should be complete so that the board or delegated committee or senior management have access to complete and pertinent information for making a decision or solving a problem.

(5) Relevance - Information submitted to the board or delegated committee or senior management should be relevant and appropriate to the management level and must always obtain the data necessary for a decision making process.

2.2.2.2 Monitoring report

To assess adequacy and appropriateness of risk monitoring and reports submitted to the board or delegated committee or senior management, as well the information system of a financial institution, each business unit must consider the following factors:

(1) Monitoring and reporting methods that cover all aspects of risks and are in writing.

(2) The data and procedure should be appropriate, documented, and regularly tested for reliability.

(3) The performance reports and communication within an organization should be consistent with the quantity and complexity of transactions of a financial institution.

(4) There are reports to the board or delegated committee or senior management in an accurate and timely manner, with sufficient information for assessing trends and level of risk of a financial institution.
Example of information that the board or delegated committee or senior management should receive so that they can monitor and control strategic risk is provided in Appendix 1, with contents and warning signs.

2.2.3 Risk controlling

The board or delegated committee or senior management is responsible for the overall operation of a financial institution by setting risk controlling guidelines such as policy, standard, procedure, risk management system, internal control system, risk monitoring and reporting system such as report comparing actual performance with projection, internal audit report. To control risk, financial institution should consider the following factors.

2.2.3.1 Risk controlling system

The board or delegated committee or senior management should establish a risk controlling system in accordance with international best practice. Risk monitoring and controlling unit must be independent of the risk taking function to have balance in management. Checks and balances should be maintained to prevent any loophole in the internal control system, as well as a regular test of risk controlling system by both independent units, internal and external, to ensure that the financial institution has corporate governance and appropriate risk controlling system.

To establish risk controlling system and risk management unit independent from risk taking function can be accomplished by separating the risk controlling unit. For example, setting up of a credit review function or internal audit, a risk management committee that does not directly involved in business decision or day-to-day operations, including personnel with appropriated expertise and qualifications, understanding nature of the transactions, and the impact of risk level over the specified limit.

The scope of responsibilities of a risk management committee is more than formulating a policy and establishing risk management procedures. It should cover review of compliance with risk limits, specifying frequency of review, and type of risk to be reviewed. The frequency of such review depends on the level of risk in the underlying function, for example, foreign trading transactions should be reviewed daily, credit concentration should be reviewed weekly or monthly. Moreover, the board or delegated committees and senior management should receives a variety of reports for risk review and monitoring, for example, reports on assets and liabilities.
management (ALCO), liquidity, high risk transactions, transactions concentration, credit exception, market risk, performance against the target, and exceptions to the established policy.

2.2.3.2 Policy, procedure, and risk limit

The board or delegated committees and senior management should establish clear, detailed, and written risk management policy and procedure by types of risk to be guidance for the day-to-day operation, including risk limits to contain loss within an acceptable level.

Moreover, the board or delegated committees and senior management should review the risk management policy and procedure to ensure that they are modified to respond to changes in activities of an organization and business conditions as follows:

1) risk management policy, procedure, and risk limit must include identification, measurement, monitoring, and control of risks of major activities such as lending, investment, trading, and contingent liabilities.

2) risk management policy, procedure, and risk limit should be consistent with the objective, goal, and the overall capacity of an organization. Activities not specified in the policy or strategic plan must always be approved from the board or delegated committees and senior management.

3) There should be a policy for review of new activities to ensure that the financial institution has necessary tool or system to identify, measure, monitor, and control the associated risks before initiating the new activities.

4) Clear accountability and lines of authority for risk management procedure must be established so as to have management and responsible persons for each business unit, activity, or project.

5) Clear and measurable risk limits must be set.

2.2.3.3 New product review

In undertaking a financial institution business, the board or delegated committees and senior management must monitor market changes, advance in technology, and try to offer new services or products to maintain the ability to compete and respond to customers’ need. However, offer of new services or products may increase risk of the financial institution, if careful consideration is not taken. Therefore, the financial institution must be very careful in formulating a strategic plan for new product to minimize any problems or errors, and there should be a review
process for new products or services before offering to customers by assessing the effect to 5 major risk areas of an organization, namely, strategy, credit, market, liquidity, and operation.

In addition, the financial institution may use a model to examine the effect on financial standing, earnings, and capital funds that may occur from new product offerings. Consideration and experience of an expert should be taken into account in making a decision. Although a model may have limitation and cannot cover all potential scenarios, it can be used a tool to assure analysts to a certain extent. In this respect, the financial institution should specify a comprehensive new product review process and improve an operation system and controlling systems before offering the new product or services to customers, including:

1) establishing clear accountability in a review process

A financial institution should establish a working group or sub-committee comprising senior member of each business unit associated to ensure that the financial institution can comprehensively assess the potential impact that may incur from offering new products. Moreover, core business lines such as credit department, treasury department, and risk management department and supporting business lines such as accounting department, legal department, personnel department, and internal audit department should be involved in approving new product offering. Comments of various business lines should be periodically reported to the board or delegated committees and senior management.

2) analyzing and reviewing new product

A unit responsible to analyze and review product must clearly understand the nature of the new product to ensure that the review covers all important aspects, namely

(2.1) name and description, and objective of the new product, and targeted offering period

(2.2) similarity or differences between new product and existing product or service

(2.3) target customers that are existing or new customers or new untested target market

(2.4) projected growth and profitability

(2.5) feasibility of product offering

(2.6) expected material effects on risks and related business units.

(2.7) methods to identify, measure, monitor, and control risks from new products, and responsible persons.
(2.8) limitation on applying the new product to the existing work system and information system and preparation to facilitate the new product

(2.9) knowledge, expertise, and experience of relevant staffs

(2.10) expected increase in activities

(2.11) expected default rate

(2.12) approval and comment from associated business units

2.2.3.4 Minimum standards or criteria in new product review

A financial institution should have a process and criteria in approving new product offering in a prudent and careful manner, mostly, by analyzing minimum profit and comparing with acceptable earnings, expense, and risk, for example, risk adjusted return on capital. In addition, the financial institution should have report on performance after introducing the product to determine the level of success and what to do in the next stage. For example, if the product fail, the financial institution may contemplate corrective actions or decide to terminate that product offering.

2.2.3.5 Quality and effectiveness of an internal control system

An internal control system will help promote effective operation of a financial institution and reliable reporting, safeguard assets, and ensure compliance with laws, regulations and stated policies. The financial institution should have an independent internal control auditors report the internal control audit or system review results directly to the board or an audit committees in writing to be able to expedite resolution. The financial institution should proceed or have the following items:

(1) adequate internal control system appropriate to the type and level or risks from the nature and scope of activities

(2) clear and written lines of authority and responsibility for controlling and monitoring adherence to risk management policy and procedure and risk limits

(3) clear segregating of duties between operation and controlling units, for example, in a trading room, front office reporting must be separated from middle office and back office

(4) independent and objective audit and review process for internal controls, namely scope and procedure, reporting, findings, and corrective actions, including an information and reporting system

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(5) reporting of an audit and review and reporting of non-compliance with laws and regulations, as well as reliable, timely, and documented investigations and corrective actions

(6) an audit committee or the board should regularly review the effectiveness of internal audits and other controls in order to appropriately and timely rectify any significant deficiencies

2.2.3.6 Management succession plan and training

Personnel administration function includes designing organizational structure of a department responsible for recruiting, job position and description, appropriate training and development, performance evaluation and compensation system, salary administration and effective communication network.

Objectives of personnel administration include (1) to ensure continuity of operations and consistency with the policy and standard of a financial institution (2) to have sufficient qualified staffs to fulfill their responsibilities and adequately recruit qualified staffs for replacement. Therefore, personnel administration has a vital role in preparing staffs to be consistent and supportive of strategic direction of the financial institution.

In addition, the financial institution should appropriately specify detailed job description, performance evaluation system, salary and compensation structure, and penalty so that the performance and responsibilities are consistent with the stated strategy and goal. Moreover, a management succession plan should be in place to ensure continuity of operations. One approach is to support new generation managers who have the necessary capability, knowledge, and experience for higher-level management. The management should identify minimum qualifications of persons to take the management positions in detail, as well as necessary training program.

To ensure that a financial institution can maintain experienced management, the board or delegated committees should set the following measures:

(1) Review performance of senior management against the stated goals at least annually to see whether the performance is satisfactory, capable of attaining the stated goals or not by assessing the performance, both qualitative and quantitative, against the business plan and budget, share price to book value, market share, competitiveness, and risk level.
(2) Establish policy or plan on management succession  the policy should be formulated and reviewed at least annual to be consistent with the organizational structure and job description, covering necessary training, minimum qualifications for each position in detail, career path, etc.

(3) Review employment contracts for outside management that are of materiality  In case where there are outside professional manager, consultants, or experts hired to perform special tasks, appropriateness of the employment contracts to specify clear roles, responsibilities, and performance evaluation and compensation criteria. In this respect, the board or delegated committees should have the right and authority to make important decision, as well as evaluate the performance of such persons.

The board or delegated committees should monitor and control performance of outsiders to prevent the organization from exploitation, for example,

(3.1) clearly specify scope, duty, responsibility
(3.2) develop a formal rule to cover minimum and acceptable work standards and clear time frame
(3.3) evaluate performance against the expectation
(3.4) employment contract should be reviewed by a legal department and approved by the board or delegated committees
(3.5) stipulate in a contract that the financial institution has the right to cancel the contract in case of non-compliance with the agreed goals

(4) Set compensation guidelines and methods for senior management  The board or delegated committees should take part in determination of senior management compensation to be appropriate, either in the financial or non-financial form. This should be appropriate to the financial standing of a financial institution at that time as well.

(5) Set a training plan  A financial institution should allocate adequate budget for training and put appropriate staffs who have knowledge and understanding of personnel administration to be responsible for managing training programs of an organization and are capable of arranging for a training session by internal speakers or employing a training institute or inviting external speakers.

Training is an important factor to assist an organization in developing qualified staffs, which facilitates successful operation in consistent with the goal. It is one of the channels to communicate the business plan and goal of the organization to staffs. General training is, for
example, organization’s policy on business strategy, overall risk, business nature and products, operation procedure, and personnel management policy. Specific training is, for example, treasury management or special training when new products and services are introduced. The training plan should be on going and consistent with the business goals and strategy of the financial institution. In addition, the financial institution should encourage staffs to further their education to increase their knowledge, skills, and potential to keep up with latest know-how necessary for operation in the future.

2.2.3.7 Business continuity planning

Business continuity planning is to prepare to have continuation of business operation in the event of an emergency by establishing business continuity plan for many crisis scenarios, for example, inability to accomplish the strategic plan, crisis from serious economic recession or crisis from accidents or natural disasters such as flood or fire that significantly affect an operation. Moreover, the board or delegated committees and senior management should specify the detail of management and persons to be in command and/or have signatory authority at each level, in case that certain senior managers are unable to do their duties. The business continuity plan should consist of:

(1) operation contingency planning, namely, alternate operation locations and electronic data processing (EDP)

(2) management contingency planning, namely, management of liquidity crisis from volatile market and contingency plan for failure to accomplish the strategic plan
Part 3 Examination Procedure

3.1 Examination Objectives

1. Determine if a financial institution has clearly assign units or persons to formulate a strategic plan to ensure that

   (1) the responsible units or persons comprise representatives from various business line or coordinate with the representatives from both core and supporting functions;
   
   (2) staffs are knowledgeable and understand the job they are responsible for;
   
   (3) staffs are adequately allocated;
   
   (4) resources to support the implementation are utilized efficiently.

2. Review if the strategic plan is formally approved by the board or delegated committees, and senior management, for which, directors and managers of core and supporting departments, as well as other units in the organization involve in formulating and monitoring the implementation of the strategic plan and business plan, and they regularly attend the meetings.

3. Review if the strategic plan formulation follows the specified procedure and timeframe, including the readiness of plan implementation by reviewing the business plan formulation and the budget whether the management style is top down or bottom up in the following aspects:

   (1) the clarity of monitoring methodology for the business plan implementation and the budget; and

   (2) causes and consequences of the failure to adhering to the business plan and the budget.

4. Assess key opportunities and threats, and strength and weaknesses of the organization with consideration on the strategic plan formulation if there is appropriate analysis and market research, as well as assessment of changes such as current economic conditions and trends. This should include external environment such as economic, legal, competition, technological factors, and internal environment such as resources, quality of staff, internal and information system, as well as close and continuous monitoring of their trends.

5. Review if there is thorough communication within a financial institution during and after plan formulation in the following aspects:
(1) various departments are notified of policy direction and objectives of the annual
business operation to be used in setting the goal, business plan and the budget consistent with the
overall policies and objectives of the organization; and

(2) meetings are arranged to clarify on procedure, relevant document, and forms used in
the plan formulation, including notification of clear timeframe for each procedure of operation.

6. Review if a financial institution has the strategic plan by assessing if there is any risk
that might affect its position, operating result and survival. Comments should be made on major
changes in the organizational structure or the direction of business operation such as too
aggressive growth target, focus on certain transaction with no expertise, unclear sources of fund etc.

7. Assess the overall strategic and business plans in the following key aspects:

(1) the overall strategic and business plans are consistent with the main objectives of the
organization;

(2) the business plan, the action plan and the budget are consistent with the strategic plan
and cover every level of business line, while the management should allocate adequate resources
to each department;

(3) the overall strategic and business plans are clear with specification on the goal—both
qualitative and quantitative—and implementation period, operational in practice with designation
of responsible staff; and

(4) the financial institution should formulate the strategic plan in writing and if it is not
in writing a financial institution should communicate it to all relevant departments to ensure
effective implementation.

8. Assess the feasibility of the strategic and business plans from the following factors:

(1) reliability, rationale and assumption, as well as supporting reasons such as the
difference of the strategic plan from those of its peers, the reasonableness of the business plan for
the operational survival, and the extent that the strategic and business plans will be able to solve
the problems and support the objectives of the financial institution etc;

(2) the consistency of the strategic plan with the analysis of both internal and external
environment such as the analysis of the residential credit market, to allow a financial institution to
target itself as a market follower, leader or niche service provide etc; and
3. comparison between the actual operation result and the strategic and business plans whose results are in material discrepancy and impacts on the overall position and operation such as profit lower than projected, or expenses and income or the market share below targets must be analyzed to identify the reasons for such discrepancy and impacts to be reported to the management for action.

9. Review the organization structure, personnel, and key business departments in the following aspects:

   (1) there is clear segregation of duties and complete coverage of various departments to avoid redundancy in practice;

   (2) there is specification of line of command and segregation of duties to ensure operational independence, thereby averting gaps in the internal control;

   (3) there is check and balance between departments to ensure efficiency in the internal control;

   (4) there is reporting in the line of command and operation following the designated structure;

   (5) consideration must be given to any change of structure or managerial staff in key positions that may affect operation, as well as the reasons behind such change; and

   (6) consideration must be given to the authorization whether it follows the structure and responsibility or it is influenced by the management or any shareholder.

10. Review the procedure for the introduction of new products to the market with due consideration on the following:

   (1) the introduction of new products should be consistent with the overall strategic and business plans, the organization structure, external factors and internal resources;

   (2) the procedure and guidelines on the introduction of new products should be specified formally and decided by authorized person and department based on information of the features of new products, the assessment and control of risks, and the projected operation;

   (3) various departments and business lines which are affected by new products should participate in the proposal of new products include the board or delegated committees and senior management, departments responsible for the introduction of new products, risk management unit, compliance, accounting department and legal department etc.; and
(4) the introduction of new products should take into account various categories of risk and risk management system, and effectiveness and validity testing.

3.2.2 Assessment of risk management

1. The organization structure and key positions are in place to support the strategic plan.

2. The strategic plan and business objectives are communicated to relevant staff at all levels in an effective manner to ensure consistent operation.

3. Assessment of operational control and revision of the strategic and business plans and the budget should take into account the following aspects:

   (1) departments and staff responsible for monitoring and impact assessment are clearly specified;

   (2) there are efficient methodologies and instruments in place;

   (3) there is assessment of the operational control according to the business plan to keep track of progress regularly and analysis of the causes of material discrepancies including management instruction to correct the encountered problems; and

   (4) the business plan and budget are regularly reviewed while correction measures are introduced when the plan cannot be accomplished.

4. The board or delegated committees and the senior management should consist of persons drawn from relevant multi-disciplinary occupations with qualifications in terms of experience, knowledge and expertise in financial and banking businesses or any fields that are of use to a financial institution. They should pay attention to risk management with attentive working attitude, integrity, transparency and independence—the qualities of which should be verified by the auditors by reviewing the meeting minutes, comments recorded in the minutes or reports with due consideration on the following:

   (1) participation of individual board member and executive in terms of expression of opinion or instigation by a single board member or executive or a group of them or through an agent; and

   (2) accuracy, completeness and adequacy of information submitted to the board, delegated committee and senior management, especially that for the purpose of risk administration and control.

5. The management of the board or delegated committee or the management should be assessed if they are suitable for the organization. Due consideration should be given to the
qualifications, attentiveness, responsibility and operational competency in an independent and efficient manner of various committees such as the compensation committee, the Assets and Liabilities Committee (ALCO), the Audit Committee, and the Risk Management Committee etc. This can be carried out by reviewing and verifying various risk reports at the daily, weekly or monthly frequency commensurate with the complexity and volume of transactions of a financial institution.

6. The management must have experience, knowledge, proficiency, potential for development and operation following the strategic plan, responsibility and attentiveness in the job, and of importance, integrity, transparency and independence in decision-making.

7. The procedure for human resource management must be clear and consistent with the strategic and business plans with consideration for the following key issues:

   (1) appropriate training plan that is regularly updated such as a training project specifically for new products and services;

   (2) succession plan for key management with clear selection procedure to ensure managerial continuity such as job rotation, on the job training or targeted training by specialists; and

   (3) appropriate and fair structure of compensation such as performance-based promotion or compensation plans.

8. Information and reporting system is in place to ensure accurate, complete and timely reporting to the board, delegated committees and senior management, and capable of supporting the strategies and decision making effectively. The reports should be comprehensive with sufficiently clear explanation on the following trends and factors influencing the financial position of a financial institution:

   (1) report in writing on operational results according to the strategic and business plans and budget, including explanation on causes for deviation from the plans;

   (2) reports on various categories of existing risk and those expected in the future, as well as compliance with risk limits;

   (3) reports on current financial position and its trend with explanation;

   (4) summary of current economic, financial, industry, peers and IT conditions and changes together with their trends;
(5) reports on analysis of external and internal factors that may have impacts on the operation; and

(6) reports on progress of the meetings pertinent to the business objectives and budget.

9. Efficient risk management should cover all categories of risk with due consideration on the following:

(1) effective risk policy and limits should be in place with clear and formal guidelines on correction measure and penalty to prevent gaps in the internal control and potential damage that may incur, with immediate reporting of such incidents to the board or delegated committees and senior management;

(2) there is an independent unit separated from risk-creating units and responsible for monitoring and compiling reports on management of various risks submitted to the board or delegated committees and senior management, as well as capable of gaining free access to accounting records, reports on position of various risks and reports on market value of financial instruments;

(3) the risk management system should be reviewed and improved to ensure that risk can be identified, measured, monitored and controlled regularly and efficiently; and

(4) the board or delegated committees and senior management pay attention and support the risk management system in the area of internal control, accounting and back office adequately, and instruction on correction of shortcomings should be accurate and timely.

10. There is a clear contingency plan for various risks that can be implemented and corrects the financial position, as well as regularly reviewed and tested for its efficiency, with responsible and authorized staff formally specified. The plan should cover both general management and operation in the event of failure to implement the business plan, critical events simulated with varying levels of severity impacting the capital fund and business survival. Examples of such plans are data back-up and recovery plan, EDP, the succession plan, the recovery plan for liquidity crisis and the insurance plan.
Appendix 1: Example of Reports for Monitoring Strategic Risk

1. Example of Information for the Board of Directors, Delegated Committees, and Senior Management for Monitoring Strategic

   Information and reports that the board, delegated committees, and senior management should receive or review may vary among financial institutions. Complex financial institutions require a more comprehensive reporting system to cover important issues. Information and reports are as follows.

   1. A report on operating performance compared to the goals, including a summary narrative of the past performance, continuation of the original plan, and indication whether or not to continue with the original plan, as well as detailed explanation on reasons for deviation from the goals

   2. A comparative balance sheet and a monthly profit and loss account on a monthly, quarterly, or year-on-year basis, including explanation on reasons for significant variances.

   3. Monthly statements of changes in capital fund and various reserves, including explanation on reasons for any changes

   4. Report on lending, with detail of significant pass due credits, payment history, pass due loans, pass due period, change in interest rate, non-performing credits, large credit exposure and new loans, as well as detail terms and conditions

   5. Investment reports classified by investment type and objective, indicating market value, book value, yield, and a trading summary, as well as explanation on trading reasons

   6. Monthly loan reports, indicating type and the amount of borrowing and borrowing source.

   7. A monthly analysis report of current and projected liquidity position

   8. An annual projection of capital needs.

   9. A summary report on risk positions including current and expected risks and risk management guideline

   10. Audit report, specifying guideline to prevent any deficiencies in the future. A review of the audit report and actions taken should be reflected in minutes of the board’s or delegated committees’, and senior management’s meetings.
11. An annual report on all types of insurance coverage such as cash insurance
12. Letters or information from the Bank of Thailand or other important sources necessary and related.
13. A listing of any new litigation, a status report on existing litigation, and potential losses
14. A report on any major issues that require a decision making by directors such as branch openings and closures and new building plan

2. Example of Reports and Information on Strategic Risk

A listing of reports will help financial institutions and supervisors to monitor operation of financial institutions. If the reports are periodically prepared and checked for accuracy, it will be of much benefit to the operation assessment. Warning signs will help financial institutions to realize that an event may affect financial institutions in accomplishing their goals and strategies.

1. Economic Analysis

Management information system (MIS) should include analysis of economic conditions, in a global, regional, country, industry, and local level, that may directly and indirectly affect the financial institution. The analysis should include:

- Economic indicators such as GDP, inflation rate, interest rate, exchange rate, demographic information, wages, and unemployment rate
- Market condition in each industry and provincial market such as demand, supply, and price movements
- Information on competition condition and competitors both financial institutions and non-financial institutions
- Summary of financial, banking, accounting, economic, social, political, and regulatory issues that may have a significant effect on the operation and income of the financial institution
- Data from reliable sources such as the Bank of Thailand, NESDB, various Ministries, financial magazines

Warning Signs

- Not aware or prepared for a crisis
Rationale Because performance of a financial institution depends on changes in economic conditions, the board or delegated committees and senior management should review the economic analysis which is used in the assumptions of a business plan, to help in recognition of an opportunity or threat in the business.

2. Comparative Statement of Balance Sheet and Off-Balance Sheet Items

This report presents assets, liabilities, owner equities, and material off-balance-sheet items compared to the most recent month, quarter, or same period in the previous year, including projections and variances (expressed as amount and percentage) and explanation on reasons for significant variances. There should also be an analysis of consolidated financial statements (if there are subsidiaries). Furthermore, the report should classify material off-balance-sheet items by type (such as obligations with and without recourse), the contract amount, market value, and related information.

Warning Signs

- Significant variances from prior periods or the budget
- Rapid growth or contraction

Rationale Comparative monthly balance sheets are essential in assessing the current financial condition and future trends. The board or delegated committees and senior management should monitor progress in meeting the goal and budget, and address any changing trends. Moreover, the board or delegated committees and senior management should be able to explain the reasons for any significant variances from the business plan and budget.

Rapid increases or decreases in any item on the balance sheet indicate volatility, especially material volatility when compared to the target. The board or delegated committees and senior management should find the underlying causes or reasons for the purpose of adjusting the business plan to be in line with the changes and should also assess the potential effects from credit risk, market risk, and other risks and the effect on capital fund.

3. Comparative Statement of Profit and Loss Account
This report presents income and expense present compared to the previous period and the budget, including explanation on reasons for significant changes to assess the profitability of each line of business

**Warning Signs**
- Significant variances from prior periods or the budget.
- Rapid increase or decrease in earnings.
- Too high a level of non-operating income to cover up the deteriorating operating performance.

**Rationale** As income and profit of a financial institution is an important indicator of business viability, the board or delegated committees and senior management should ensure that earnings are sufficient to maintain adequate capital fund and cushion against potential losses in consistent with the size and growth rate of a financial institution. The comparative monthly profit and loss statement will show performance, and help measure the performance compared to the projection and goal.

The board or delegated committees and senior management should assess both return and risk when evaluating earnings. Financial institutions with low risk may have stable earnings. On the other hand, if the management is acceptable to the increased risk in exchange of higher return, loss due to earnings variation may incur.

The board or delegated committees and senior management should be aware of the effect of accounting methods that may lead to misunderstanding such as short term earnings or non-operating income. Furthermore, there should be an efficient system to evaluate performance such as management by profit center will help evaluate performance of each team, division, and business line, allowing the directors and management to ensure that each unit is performing efficiently.

4. **Capital Adequacy**

This report presents the level of capital fund that a financial institution has, including an analysis of performance that may affect the capital fund, both calculated by the regulatory requirement or internal guideline of the financial institution. It should also analyze future capital adequacy, as well as estimated ratios based on the budget that projects general operating expenses
and structure of assets and liabilities for at least three years. In case of insufficient capital adequacy, there should be a report on the reasons and guideline on corrective actions.

**Warning Signs**

- A declining capital position, approaching the minimum regulatory capital requirements
- Management’s inability to meet internal capital levels targeted by the approved business plan.

**Rationale** As capital fund is a widely accepted indicator of a financial institution’s financial standing, failure to meet regulatory capital requirements may result penalties and corrective actions. The board or delegated committees and senior management should periodically monitor the capital position which depends on various factors such as credit quality, risk asset profile, interest rate risk, business growth, and operating performance.

5. **Product Pricing**

Each accounting period, the board or delegated committees and senior management should review information on the pricing and fee structure that a financial institution offers customers, including interest rates and yields compared with major competitors, and should consider the risks as well.

**Warning Signs**

- Rates or terms on deposits differ substantially from those offered by competitors or exceed the cost of other sources of funds with the same maturity
- Rates or terms on credits that do not adequately compensate for the risk involved such as credit risk, liquidity risk, or interest rate risk
- Rates or terms on assets and liabilities with same maturities
- Failure to factor in all costs (for example, operating expenses) associated with a product

**Rationale** Product pricing is essential for profitability. Competitive pressures may lead to inappropriate pricing decisions. Delegated directors or senior management should acknowledge and understand the product pricing process of a financial institution. Setting a price lower or higher than market rates can affect the size and quality of credit, liquidity risk, earnings, and deposit base.
6. Status of Credits and Investments

This report summarizes the current operating performance, standing, and financial information, including current progress on all major credits, subsidiaries or affiliated companies, securities investments, and new business lines.

**Warning Signs**

- Deviations from the goals
- Lack of progress report on major developments
- Requests for additional funding
- Absence of a firm work schedule

**Rationale** When an institution commits to funding of credits to affiliated companies, securities investment, or new line of business, the board or delegated committees and senior management should require periodic reports on use of fund and review these reports to evaluate financial performance to guard against loss, economic waste, and fraud. Certain credits and investments may pose more risk due to the size of portfolio, while others carry more risk due to the nature of the activities (for example, the development of raw land). As such, a detailed policy on credits and investments must be formulated, coupled with knowledgeable management, strong internal controls, prior approval, and close monitoring and auditing by the management.

7. **Financial Reports on Entities under Supervision of a Financial Institution**

This report provides the financial status, operating performance (balance sheet, income statement, statement indicating changes in shareholders, and cash flow statement that may directly or indirectly affects the strength of that financial institution. The report should include a detailed description of all major transactions between the financial institution and its subsidiaries, the effect of subsidiaries or affiliated companies on the financial institution, and an assessment of their compliance with applicable laws and regulations.

**Warning Signs**

- Financial weaknesses in subsidiaries (for example, operating loss, declining capital fund, asset quality problems, or difficulty in meeting the obligations)
- Immediate liquidity demands by subsidiaries
- Inter-company transactions that are not conducted at arm’s length
- Delinquent financial reporting from an equity investment unit and an internal control unit
- Lack of separation between the institution and its subsidiaries

**Rationale**  The board or delegated committees and senior management should be aware of the risks the may incur from subsidiaries with less-rigorous audit and record-keeping standards, which may lead to unauthorized or inappropriate activities. The board or delegated committees and senior management should arrange to have close monitoring of subsidiaries to guard against adverse effects on the financial institution.


The board or delegated committees should perform evaluation of management’s performance and compensation at least annually, and include such report in the meeting minutes. In addition, the board or delegated committees and senior management should review reports on employee turnover, salary adjustments, promotions, benefits adjustments, and new hires and may compare them with the compensation and benefits of other similar institutions as well.

**Warning Signs**

- Performance below target
- Adverse comments regarding management in examination reports.
- High rotation or turnover of staffs
- Increasing complaints or litigation such as litigation on equal employment opportunity, sexual harassment, or other personnel issues
- Employee profile is at various levels of the organization

**Rationale**  Capable management and personnel are important to the success of a financial institution. The most important responsibility of the board or delegated committees and senior management is selection and oversight of management and personnel, including evaluation of management performance. If the board or delegated committees and senior management do not seriously evaluate performance, it may result in performance that does not meet the goal and may result in conflicts due to dissatisfaction of compensation. Such is not good for the overall performance of an organization. The board should reward good performer but should prevent the payment of compensation, fees, and benefits that are inappropriate.
9. **New Product or Services**

This report provides comparison of actual performance against the budget.

**Warning Signs**

- Entry into a new activity or business venture without proper:
  1. Management expertise
  2. Policies and procedures
  3. Training
  4. Internal controls
  5. Independent reviews
  6. Supporting capital fund
  7. Supporting information system
  8. Integrated information system for management purpose

- Adverse impact from new products and services

**Rationale**  Entry into new business activities without proper planning, resources, and controls can result in significant losses. The board or delegated committees and senior management should determine whether the new activities are prohibited by regulations, entail excessive risks, or result in any adverse effects or not. In addition, there should be a good accounting system to assess performance of these new activities.

10. **Marketing**

The board or delegated committees and senior management should review information system for public relation in order to maintain customer base and to make customers continuously aware of the financial institution and its services. This information should include an analysis of the market share for major activities.

**Warning Signs**

- Excessive marketing costs, not worth the benefits received
- Marketing efforts that present a negative image of the organization, or adverse results from marketing efforts
- A decline in market share
**Rationale** The increasing competition in financial services industry makes a financial institution to distinguish itself from competitors. The board or delegated committees and senior management should be marketing effort and the market share of its major services and should perform evaluation of new products or marketing programs.
Appendix 2: Assessment Scope for Corporate Governance

Introduction

According to the Bank for International Settlement (BIS) standards, supervisors should understand the importance of corporate governance and the impact on lack of corporate performance. They should encourage financial institutions to have appropriate organizational structures and appropriate checks and balances. Supervisors should place much importance on transparency and accountability (both as individualism and professionalism) of the board, delegated committees, and senior management.

The board or delegated committees and senior management should be responsible for the operation of a financial institution. Therefore, supervisors should check to ensure that a financial institution is properly managed and pay attention to various warning signs of management not met the target or of adverse impact to a financial institution. Supervisors should encourage the management to be attentive to implement corrective measures in accordance with the examiners’ instruction. When the financial institution cannot assess or control its risks, supervisors must ask for clarification from the board, delegated committees, and senior management, as well as require that corrective actions be taken in a timely manner.

Part 1 Assess if a financial institution has sound corporate governance practices

Examiners must assess whether a financial institution has sound corporate governance or not by observing its practices. Supervisors shall review the following practices:

1. Establishing of strategic objectives and a set of corporate values that are communicated throughout an organization by
   1.1 Determining whether the board has established a strategy for ongoing activities of the financial institution
   1.2 Determine whether the board has established a vision, policy, and corporate value for the organization, for the senior management, and for employees
   1.3 Determine whether the corporate values recognize the importance of having timely and frank discussions of problems. Such values should also prohibit corruption and bribery in any corporate activities, both in internal dealings and external transactions.
1.4 Determine whether the board has ensured that the senior management set a policy to prevent transactions that may diminish the quality of corporate governance as follows:

1.4.1 transactions not regarding the interests of a financial institution
1.4.2 clear guidelines on lending to staffs and employees and reporting to the board, including a review by internal and external auditors
1.4.3 preferential treatment for related parties and/or any other forms of favorable treatment shall have a process that allows the board to inspect, for example, lending on highly favorable terms, covering trading losses, waiving commissions.

2. Setting of clear lines of responsibility and accountability throughout an organization. Supervisors shall:

2.1 Determine whether the board clearly defines the authorities and key responsibilities for themselves, as well as senior management.

2.2 Determine whether the management is aware of lines of accountability that are unclear, confusing, and duplicated, which may cause a problem of omission of duties.

2.3 Determine whether the senior management is accountable for setting line of authority and aware of the performance results.

3. Ensuring that the board members are qualified for their positions, have a clear understanding of their role in corporate governance and are not dominated or influenced by the management or related parties outside. Supervisors shall:

Examiners have to:

3.1 Determine whether the board receives sufficient information on a timely basis in order to assess the performance of management

3.2 Determine whether the board is capable of exercising judgment, and is free from any influence of the management and major shareholders.

3.3 Determine whether the board has qualified directors that are not members of the financial institution’s management, and that can bring in new perspectives from other businesses to improve the strategic direction for the management.

3.4 Determine whether an audit committee or those with similar function are not members of the management board; such can enhance independence and objectivity.

3.5 Determine whether the board or delegated committees periodically assess their performance, determine their weaknesses, and take appropriate corrective actions.
3.6 Determine whether board strengthens the corporate governance of a financial institution by assessing whether the board:

3.6.1 understands their oversight role and their “duty of loyalty” to the financial institution and the shareholders;

3.6.2 employs a “checks and balances” function to the day-to-day management;

3.6.3 is empowered to question the management and can verify the summary or comments of the board from the clarifications of management;

3.6.4 recommends sound practices collected from various situations;

3.6.5 provides unbiased advices;

3.6.6 does not impose too much control;

3.6.7 acts to the benefits of the financial institution;

3.6.8 meets regularly with senior management and internal audit department to establish and approve policies, establish communication channels, and monitor progress toward corporate objectives;

3.6.9 does not involve in a decision process where it is incapable of providing concrete advices, except the case that it is its duty and responsibility;

3.6.10 do not interfere in day-to-day operation of the management.

3.7 Determine whether the board has given importance to setting up of specialized committees to take care of various assignments such as:

3.7.1 risk management committee to be accountable for oversight of risk management of the financial institution by obtaining information from the senior management that involves in management of credit risk, market risk, liquidity risk, operational risk, and other risks of the financial institution.

3.7.2 audit committee to play the role of supporting operation of both internal and external auditors, approving, appointing and dismissing, reviewing and approving scope and frequency of audit, as well as receiving various reports to ensure there is proper management, appropriate to a situation for the benefit of taking appropriate corrective actions, non-compliance with policies, laws and regulations, and acknowledgement of problems.

3.7.3 compensation committee to oversee remuneration consideration for senior management and staffs and ensure that compensation is consistent with the organization’s culture, objectives, strategy and internal environment.
3.8 Determine if the board involve in discussions or voting on important issues such as compensation, legal contracts with related companies.

3.9 Determine if the board acts on the basis of professionalism, integrity for the interest of the organization, shareholders, and staffs.

3.9.1 Has the board taken appropriate actions to prevent any loopholes in internal control function by assessing

- Has the board established an early warning system to prevent any actions that are not of best interests to the financial institution by the board, delegated committees, senior management, or major shareholders?
- Is the organizational structure or delegation of duty to prevent loopholes restraint by the policy, for example, is the best practice publicized throughout the organization?
- Does the financial institution require the management and staffs to fully disclose all insider information?
- Are transactions, which are subject to the authorities’ guidelines, between the financial institution and the board, senior management, and major shareholders subject to prior review and approval by the board or delegated committees?
- Are transactions between the financial institution and the board, senior management, and major shareholders that are subject to the authorities’ guidelines, disclosed in accordance with the specified guidelines?

3.9.2 Are meeting minutes and information to be given to the board complete and adequate to support the supervision function?

3.10 Determine if the board establish a framework to ensure that its decision is independent from the management. Examiners must consider and assess the following:

3.10.1 Does the board exercise sufficient monitoring over senior management?
3.10.2 Is the overall remuneration structure for the management appropriately and periodically reviewed?
3.10.3 Has the board developed a system of management appointment, evaluation and compensation by establishing
O Selection criteria, such as job descriptions and minimum qualifications,
O Performance benchmarks,
O Monitoring guidelines,
O Compensation packages in consistent with potential
O Criteria for replacing key executives.

3.11 Determine if all executive positions clearly define the responsibilities and performance evaluation criteria by reviewing a sample of job descriptions and related performance evaluation criteria for selected positions and assess if the job descriptions clearly specify the scope of duties and compensation is based on the overall corporate objectives, not short-term profits.

3.12 Determine if there is management succession plan.

3.13 Determine if the process for nominating new management is transparent, and free from dominance.

3.14 Determine if the board members meet their key responsibilities.

3.15 Determine if the board has clearly specified, and delegated responsibility and decision making authority?

3.15.1 Does the reporting line cover all affiliated companies and are duties and responsibilities on the affiliated companies specified?

3.15.2 Is the line of authority established?

3.15.3 Are exceptions to the established policy and procedures required prompt reporting to the board or delegated committees?

3.16 Determine if the board establishes and approves the strategic guideline for the organization, supporting business plan, and budget, and other objectives, including

3.16.1 Does the board monitor the organization operation to be in line with the objectives?

3.16.2 Do all major activities, such as use of capital fund, investment in affiliated companies, approval of large credits, and large securities investment, receive prior approval from the board?

3.17 Determine if the board has established adequate and effective accounting and financial reporting systems and risk management system.
3.18 Determine if the board has established a system to ensure compliance with law, regulation, and notifications of the supervisory authority and if such system is independent and effectively functioning.

4. Ensuring that there is appropriate oversight by senior management by

4.1 Determine if the board arranges checks and balances for senior management as the senior management is key component of corporate management and has the oversight role with respect to business line managers such as directors and department managers.

4.2 Determine if key management decisions are made by only one person or not, including any inappropriate actions as follows:

   4.2.1 manager is delegated to be the sole decision maker in a business line;
   4.2.2 delegated manager does not have adequate skill and knowledge;
   4.2.3 manager does not control over staffs or key personnel that are associated with risky transactions (such as traders).

4.3 Determine if senior management has the management authority, the necessary management skill and expertise, and adequate responsibility.

5. Does the board effectively utilize the work of the internal and external auditors by

5.1 Determine if the board or delegated committees:

   5.1.1 recognize the importance of the audit process and communicate this importance throughout the organization;
   5.1.2 establish measures that enhance the independence, knowledge, skills, and status of internal auditors;
   5.1.3 utilize, in a timely and effective manner, the findings of auditors;
   5.1.4 ensure the independence of the head auditor by his reporting directly to the board or the audit committee;
   5.1.5 engage external auditors to assess the effectiveness of internal controls;
   5.1.6 require timely corrective actions taken by management to the problems identified by auditors.

5.2 Determine if the board recognizes and acknowledges that the internal and external auditors are important agents and support them adequately.
5.3 Determine if whether the board utilizes the work of the auditors as an independent check on the operations of the management, separate from the information received directly from the management.

6. Ensuring that the compensation system is consistent with the organization’s objectives, strategy and overall environment by:

6.1 Determine if compensation to senior management and staffs is consistent with the policy approved by the board or delegated committees and is in line with the organization culture, objectives, strategy, and overall environment. Such will help ensure that the senior management and key personnel are motivated to act in the best interests of the financial institution

6.2. Determine if the salary scales are within the scope of general business policy so as to avoid of undertaking excessive risk-taking transactions. Compensation must not tie to short-term performance such as short-term speculations.

7. Conducting corporate governance in a transparent manner.

7.1 Determine if the board or delegated committees and senior management are accountable for their actions and performance. To accomplish this, there must be transparency of information, whereby everybody receives adequate information on a timely basis.

7.2 Determine if the board or delegated committees and senior management have established a process to control and monitor and established accurate and effective communications by

7.2.1 review written policies and procedures of such function.

7.2.2 review disclosure of information covering several financial reporting periods.

7.3 Determine if the shareholders, investors in the market, and the general public receive sufficient information on the structure and objectives of the financial institution to be able to assess the effectiveness of the board, delegated committees and senior management.

7.4 Determine if there is sufficient and meaningful disclosure to the public (e.g. the most recent annual report, media reports, and authorities reports) in the following areas:

7.4.1 Major shareholders and voting control,

7.4.2 Board structure (size, membership, qualifications and committees);

7.4.3 Members of the boards of directors, delegated committees, senior management, as well as remuneration,
7.4.4 Senior management structure (responsibilities, reporting lines, qualifications and experience);

7.4.5 Organizational structure and affiliated companies;

7.4.6 Objectives of the financial institution and progress in meeting the stated objectives;

7.4.7 Information on incentive compensation structure of the financial institution (policies, executive compensation, bonuses, stock options);

7.4.8 Financial and operating performance of the financial institution;

7.4.9 Material risk factors,

7.4.10 Nature of transactions and growth trend of transactions with affiliated companies and related parties.

7.4.11 Transactions with major shareholders, the board, delegated committees, and senior management, insiders, or staffs.

7.4.12 Key governance and operating policies.

7.5 Determine if financial statements and disclosure comply with the accounting standards.
Part 2 - **Ensure that the environment is supportive of sound corporate governance**

Supervisors should determine if a financial institution operates in accordance with good corporate governance, including regulations or rules of supervisory authorities and related authorities, namely.

1. Governments – through associated laws;
2. The Securities and Exchange Commission – through registration and disclosure of information;
3. Auditors – through the audit standards, reporting to the board, delegated committees, and senior management, and supervisory authorities;
5. Legal issues, such as the protection of shareholder rights; the enforceability of contracts, clarifying role of the government, to ensure that corporation functions in an environment that is free from corruption and within the legal and regulatory framework. Such can help promote business and legal environments that facilitate supervision and sound corporate governance.

Examiners should be careful when issuing any comment regarding corporate governance. Examiners should be aware that there are external factors that are not controlled by a financial institution and do not facilitate adequate corporate governance.
Unofficial Translation prepared by The Foreign Banks' Association

This translation is for the convenience of those unfamiliar with the Thai language.
Please refer to the Thai text for the official version

Market Risk

Audit Manual
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Section 1 Definition of Market Risk

1.1 Definition of Market Risk

Market risk refers to risk arisen from movements of interest rate, foreign exchange rates and prices of instruments in the money and capital markets which negatively affect the earning and capital of the financial institution. Market risks can be classified into 3 types which are interest rate risk, foreign exchange risk, and price risk.

1.2 Types of Market Risks

1.2.1 Interest Rate Risk

It is a risk that earnings or capital may be negatively affected from changes in interest rates of assets, debts, and off-balance sheet items, all of which are rate sensitive items. It can also affect net interest income, market value of the trading account, incomes and other expenses associated to interest rates such as loan fees, deposit service fees, and provision expenses, etc.

Sources of interest rate risks are as follows:

*Repricing Risk* is a risk occurred from timing mismatch in fixing new interest rates (for floating interest rate contracts), and contract terms (for fixed interest rate contracts) of assets, debts and off-balance sheet items, such as when the financial institution lends long-term loans with fixed interest rates funded by short-term deposits. Where market interest rate is inclined to increase, the financial institution will be at risk of receiving lower future incomes if the deposit rate increases in the short term while the lending rate is fixed till the end of the contract which is long term.

*Basis Risk* occurs from the changing in market interest rates causing the interest rates received and paid of assets, debts and off-balance sheet items, each linked to a different interest rate or being a different type of financial tools, to change differently. For example, when the short...
term interest rate increases by 50 bps, deposit interest rate linked to 3-month LIBOR rate may increase by 50 bps while lending rate may increase by only 25 bps.

Yield Curve Risk occurs from the changing of shape and gradient of the yield curve from previous prediction, which has a negative impact on earning or economic value, e.g. value of the hedge from holding an asset which is 10-year government bond (long) by selling 5-year government bond (short). If the long term interest rate changes more than the rise of short term interest rate, the yield curve will be steeper. This will cause a decline in economic value as the value of asset, the 10-year bond, will decrease more than the value of debt from the 5-year bond.

Option Risk occurs from the changing of market interest rates causing the volume or the cash flow period to be received from a financial tool with an underlying option to change which in turn produces negatively impact on the earnings or capital of the financial institution. For example, a financial institution buys a callable debenture issued at the time that the market interest rate was equal to 10 percent, with coupon rate of 10 percent and a term of 30 years. If the market interest rate decreases to 8 percent, the issuer may redeem the debenture before the maturity date. This causes a change in the cash inflow projected by the financial institution which has a negatively impact on the financial institution as they have to re-invest at a lower market interest rate. Alternatively, bank’s customers with overdraft accounts may withdraw from the accounts without prior notice.

Loans and deposits also have option risk in the case that the debtor is able to repay the loan before maturity, either partially or entirely at any time without having to pay any fees to the financial institution, known as prepayment risk, or in the event the customer may withdraw their deposits before due date. Both events affect the financial institution’s cash flow estimate and may have negatively effect if reinvested is at a lower market interest rate or if funded at a higher interest rate. Option risk is, therefore, crucial and must be considered in evaluating the interest rate risk.

1.2.2 Foreign Exchange Risk

It is a risk that earning or capital may be negatively affected from the fluctuation of exchange rate, due to a transaction in a foreign currency or from holding an asset or debt in a foreign currency. The assessment of foreign exchange risk can be classified into 2 categories, transaction risk and translation risk.
1.2.3 Price Risk

It is a risk that earning or capital may be negatively affected from the changes in the price of debt or equity instruments. This causes the value of the investment in the trading portfolio and profit of the financial institution to diminish.
Section 2 Recommended Market Risk Management Practical Guidelines

Risk Management Factors

In managing market risks, financial institutions need to have four fundamental management factors as follows:

1. Appropriateness of the roles for the board of directors and senior management as well as suitability of the organizational structure
2. Sufficiency of policy and practical guidelines for risk management
3. Appropriateness of the specification, measurement, monitoring and reporting.
4. Effective internal control and audit independence

The financial institutions need to adjust these 4 components to suit their characteristics, complexity of their transactions and their existing risk levels. Therefore the suitability of the method of risk management may vary for each financial institution. For example, for a small financial institution, where the senior management level is involved with the daily operation, it can use basic risk management. However for a large financial institution, where the business involves various complex transactions, it will need a more formal and comprehensive risk management to assist the senior management in obtaining adequate information in order to monitor and manage its operations.

Complex risk management process needs sufficient internal control and audit, as well as adequate supervision mechanism. This is to ensure that the senior management receives reliable information to monitor compliance with the set policy and risk level. Moreover, there must be segregation of duties in measuring, monitoring and controlling risk to be independent from decision makers and those who transact [the business] such that duties may be performed with the best interest of the financial institution.

In managing risks, the financial institutions should consider the overall picture of risks or consolidated risk management and should bear in mind that the accounting practice which permits offsetting risk positions of the affiliated companies within the group will decrease the

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3 Definition of senior management in accordance with the Notification No.: ThorPorTor. SorNorSor. (31) Wor. 2770/2002 Re: Structure of Good Governance Committees of Commercial Banks dated 3rd December 2002.
4 Definition in accordance with the Notification No.: ThorPorTor. SorNorSor. (31) V. 2770/2002 Structure of Good Governance Committees of Commercial Banks, 3rd December 2002.
consolidated risk for the group. However, the said method may cause assessed risk to be lower than actual risk if there is any legal limitation or constraint in actual practice which obstructs the adjustment of risk level.

**Good Risk Management Process**

Good market risk management process must have an efficient and concise method covering the specification, measurement, monitoring, reporting and controlling of risk in a timely manner. Each financial institution may have a different process varied by its complexity and sizes. Risk management principles and process should be documented to allow an effective control and communication over the entire organization.

An effective risk management process should have the following characteristics:

**2.1 Appropriateness of the Roles for the Board of Directors of the Financial Institution and Senior Management and Suitability of the Organizational Structure**

The board of directors and senior management of the financial institution should have an effective way of controlling risks and should understand the characteristics and existing levels of risks that befit the business strategies and mechanisms for risk management. Effective risk management must have reporting to the board of directors and capable managers and effective staff.

**2.1.1 Roles of the Board of Directors of the Financial Institution**

The board of directors of the financial institution should consist of people with diverse experiences, possessing a basic understanding of the business and market risk management, being independent and participating in meetings - regularly contributing opinions or useful suggestions. In addition, it should have the following duties.

- To establish strategies and risk tolerance levels
- To appoint senior management with authority to be responsible for risk management
- To monitor performance and overall market risk of the financial institution to ensure that it is manageable and have a sufficient supporting capital
- To ensure that the financial institution develops basic guidelines in specifying, measuring, monitoring and reporting market risks.
• To arrange to have suitable and sufficient educated staff with capability in market risk management

2.1.2 Roles of Senior Management

Senior management must arrange to have market risk management both short-term and long-term comprising of these activities:

• Improving and developing procedures and various operating processes in conformity with the objectives and an appropriate risk tolerance as approved by the board of directors of the financial institution by setting operating standards and communicating with the staff to ensure proper understanding.
• Overseeing that operation follows the prescribed line of authority and responsibilities enabling timely measurement, monitoring and reporting of market risk as well as ensuring that staff responsible for analysis and market risk management is knowledgeable, capable and experienced in line with the characteristics and scope of transactions of the financial institution. There also must be an adequate number of staff and they should have the ability to perform work of one another.
• Overseeing that information technology and other systems are utilized to facilitate market risk management.
• Establishing a system for internal control and an effective verification process of market risk management.
• Stipulating adequate segregation of duties in risk management process to circumvent any conflict of interest, including establishing various security measures.
• Stipulating adequate and appropriate risk tolerance ceiling.

Standards for the assessment of position, performance, and report of market risk must be set. Management reports should give overall information of risks and a sufficient amount of details, enough to evaluate changes or effects to financial institution and enable decision making.

2.1.3 Organizational Structure of Market Risk Management

The organizational structure should allow verification, check and balance system, possess line of supervision and specify responsibilities in line with the development strategies and the procedures for measuring, monitoring and reporting of market risk. The senior management should ensure that these jobs are included in market risk management system.
The financial institution should have sufficient numbers of relevant committees. There should be units that are responsible for verification of compliance with laws and internal control including teams that control and monitor market risks.

The policy should clearly state the responsibilities of the management staff and risk control team. These staff should be independent from both front and back offices.

### 2.2 Sufficiency of Policy and Practical Guidelines of Risk Management

The financial institution should clearly state the policy and practical guidelines in managing market risks by containing the following importance characteristics:

- Standards of assessment of status and performance as well as market risk report must be set. Report to the management should present overall information of risks and a sufficient amount of details, enough to evaluate changes or effects on the financial institution and enable decision making process.
- It should be clear and documented with approval from the board of directors of the financial institution. Moreover, it should be re-evaluated by board of risk management or other related committees at least once a year.
- Consolidated risk of the financial institution and its affiliated companies should be considered.
- Responsibilities for risk management must be stipulated.
- Types of financial tools offered, policies on risk deterrence and maintenance of position must be prescribed.
- Estimated factors are to be specified. Risk tolerance of the financial institution should be stipulated which may be in accordance with the type of financial tools, type of portfolios, and type of transactions. In the event of an action which is exceptional or deviated from the policy, risk ceiling or approval authority, procedures and approval process should be clearly stated in written document.
- For any new service or work plan, risks must be specified. Establishment of procedures, checking process and adequate control must be made prior the commencing the service or new transaction.
- The initiation of risk deterrence strategies or important risk management methods shall require approval from the board of directors of the financial institution or other related committees. This is to ensure that the financial institution understand the risk factors of
those services or transactions and to offer them in conjunction with the current process of risk management.

- Business Continuity Plan (BCP) and systems to handle emergency situations which may affect operations and capital must be established.

The financial institution should communicate their policies and practical guideline to related divisions to allow correct understanding and practice.

2.3 Appropriateness of Risk Specification, Measurement, Monitor, Report and Control

2.3.1 Risk Specification

The financial institution should be able to specify the market risks currently facing and which may occur in the future by understanding which types of market risks are important and must able to identify the sources of the said risks. This is especially applied to risk from interest rate which may develop from various sources. Risk specification should be undertaken on a continuous basis in order to follow the changing situation. Moreover, various factors, either quantitative or qualitative, which trigger market risks, should be specified.

2.3.2 Risk Measurement

Measuring market risk is one of an importance step in risk management process. Risk measuring system should fit the type and complexity of transactions. This is to enable assessment of the effect on income, economical value and capital of the financial institution. The method should also identify risks which may increase in the future.

The appropriate risk measurement system in this case shall detail the measurement system for interest rate risk since it is significant to Thai financial institutions and its measurement systems are complex and varied.

2.3.2.1 Good risk measurement system should contain the following characteristics:

- Ability to measure all important market risks of the assets, liabilities and off-balance sheet items as well as covering all risks from both trading and non-trading items.
• Sources of all type of interest rate risks, exchange rate risk, and pricing risk should be included.

• Possessing underlying financial theory and being a generally accepted measuring tool. There are many ways to measure market risks, each have its benefits and restrictions depending on the factors of the market risks. Different financial institution may use different methods to measure different risks from different sources. Examples of tools or models employed to measure market risks are Repricing Gap Report, Net Income Simulation, Economic Valuation Model and Stress Test. (See Appendix for details of the various models).

• Information employed must be current, accurate, reliable and timely. It is an important factor in the risk measuring process, regardless of whether it is the information of the position in the balance sheet or off-balance sheet and information on cash flow or various return rates from financial tools or related agreements. If there is any adjustment in the information such as adjustment in estimated cash inflow from loan prepayment, redemption of a debt instrument before maturity that may affect the valuation of the instrument, such shall be clearly documented specifying the detail and the rationale of the adjustment for verification.

• Assumptions and factors used in assessing negative effects on the system should be derived from reliable sources. Risk manager and management of the financial institution must fully understand the said assumptions, in particular the technique of simulation, as it employs many assumptions and is complex. Otherwise, the “tool” shall produce data which appears to be correct but in fact may be incorrect which may lead to a wrong decision. The assumptions should get tested and evaluate at least once a year as well as must be documented as evidence.

2.3.2.2 Appropriate risk measuring system for financial institution

Any risk measuring system regardless of type or complexity, must consists of information gathering, input of information into the system, establishment of assumptions on possible future interest rate, assumption on customer's behavior including computer system and an appropriate risk calculation method. Therefore, the method of measuring interest rate risk should have the following 3 crucial steps which are 1) Information gathering 2) Simulation and assumption of the situation 3) Calculations of risk level,
1) Compilation of Information

The compilation of information to reflect the current financial status (or for Economic Valuation Model will need composite information of the current balance sheet), the gathering of information in the simulation model sometimes called current position inputs; such collected information must be reliable in order to benefit the risk measurement. The financial institution should then possess a Management Information System (MIS) in order to retrieve information that is appropriate, adequate and well-timed. It should have vital resources for the risk measurement system. Problems that can occur from the information for interest rate risk are: incomplete information on operations, on portfolio and branches; lack of status information on off-balance sheet items, caps and floors of lending and deposits or insufficient amount of collected information, etc.

The financial institution must have information of the offered financial tools or all significant types of portfolios. The collected information should consist of the followings:

- Outstanding balance of the account and interest rate as specified in the agreement of the financial tool or portfolio.
- Conditions for principal repayment, date of fixing a new interest rate and the term of the agreement of the financial tool or portfolio.
- For variable interest rate, there must be information on the rate used as reference for the new rate (e.g. prime, LIBOR) including contractual interest rate ceiling or floors.
- The financial institution may have to gather additional information for other types of financial tools in order to observe the complete picture of interest rate risk. For example, for interest rate risk, the additional information required is seasonal factor of some types of credits which may affect prepayment. The financial institution may need to have information on the originating date, interest rate of the financial tool, geographic or local conditions of lending or deposit site. Such information may help to evaluate the speed of repayment or withdrawal before maturity. As the interest rate risk of financial institution expands from risk of on-balance sheet items to off-balance sheet items and fee generating items that are sensitive to interest rate, therefore the system of interest rate risk measurement for financial institution must include such items.
The financial institution must have a system to tap or extract information from the database, which keeps information on terms, interest rates, and conditions for repayment of various items, in order to obtain necessary data for the risk measurement. The financial institution must be able to access any relate information of various related database including information on commercial credits, household credits, information on securities investment, deposit system and general ledger system which are necessary to verify the accuracy of the balance that was extracted from these database. (Normally general ledger system is unable to furnish adequate information on the terms and interest rates of the portfolio of the financial institution.)

2) Simulation and Assumption

This step is to estimate the future value of interest rate and to measure risks under the predicted changes of interest rate. In this step the financial institution must formulate assumptions on the future situation. Such assumptions must be reasonable.

Risks from interest rate for most financial institutions usually depend on the sensitivity of the financial tools to the change of interest rate, the magnitude and direction of the change. Therefore simulation and assumption must take into accounts the two said factors. Nevertheless, problems may occur during this step, such as:

- Inability to measure the potential risk exposure in order to understand the vulnerabilities or stress point in the event when there is a substantial changes in interest rate.
- Inability to adjust or change the assumptions of the financial tools with underlying derivatives to correspond with the interest rate in each simulation.
- Assumptions that are based solely on the behaviors and operating history of the customers without consideration of the ability to compete of the financial institution in the market including the customers' status that may change in the future.
- Failure to periodically evaluate the justification and the accuracy of the new assumptions.

Assumptions on the Interest Rate

The financial institution must consider the rate of changes for the interest rate. The managements must be confident that risk measurements during interest rate movement are
logical and that it selects a simulation model that renders a meaningful estimation. There must be an evaluation of the effect of changes of interest rate for changes that are sudden as well as gradual including stress test scenarios under drastic interest rate changes. This will enable the management to understand the underlying risks in the financial tools and transactions.

In order to set simulation of interest rate, all appropriate related factors must be considered such as current term structure of interest rate, historical volatility and implied volatility. Specific risk characteristics of the financial institution must also be considered, as well as unwind unfavorable risk position and losses from repositioning.

Financial institutions with significant option risks should set a simulation that includes these risks in order to estimate how the risk level of the financial institution would change. Moreover, since the value of derivative changes with volatility and change of the interest rate, the assumptions must be developed to assess the risk from fluctuation changes.

**Interest Rate Simulation Methodology**

Each financial institution may have different simulation methodologies. Nevertheless, the important point that the financial institution must specify is the current term structure of interest rate and the relationship between yield curve and the various referenced rates such as spread between LIBOR and the rate of certificate of deposit, etc. Moreover, the administered rates of the financial institution such as rate for premium customers, some types of deposit rates must be evaluated as they may change due to the influence of market rate; however, such administered rates usually move slower than the market rate.

Financial institutions generally conduct interest rate simulation by using these two methodologies:

**Deterministic Approach**

It is a method to pre-determine the magnitude and period of interest rate fluctuation. Then it is evaluated by presetting the standard base case scenario. Further, the worst possible case of interest rate movement is considered. There should also be periodical stress testing. The number of simulations used may ranged from 3 (flat, up, down) to 40 or more simulations. Sometimes it may include “rate shocks” simulation (assuming that the interest rate suddenly changes to another level). This approach measures the comparative risks of the
difference of net incomes in each scenario with the standard scenario. In general it is expressed as a risk matrix by separating into base case scenario, high risk scenario and low risk scenario.

**Stochastic Approach**

It is a method that uses randomly generated scenarios which will calculate the result of each random variable (there are thousands of random variables) and distribute the dispersion of the results. Then it will determine the likelihood and confidence level, such as 95%, to calculate net incomes for the next 12 months that will not be less than a fixed amount (such is the lowest net incomes under the 95% confidence level).

**Assumptions on Customer’s Behaviors**

The financial institution must exercise its judgment and set assumptions based on the actual maturity or from re-pricing behavior which may be different from the term in the contract of the financial tool e.g. debtor may prepay, withdraw the deposit or close account at any time. The financial institution has to determine the probability that the customer will exercise the option. These probabilities will vary in each interest rate simulation, geographical regions, competition, pricing, as well as business strategy of each customer base.

The assumptions on customer’s behavior is crucial especially for financial tools that do not stipulate new repricing date such as current accounts, saving accounts and credit card loans, etc. The management must estimate the dates that these balances will be repriced, withdrawn or closed at any time. The management must consider various factors such as the current market rates, spreads between the rates of the financial institution and market rate, competition situation, location, and demography of the customer base.

The assumptions must be reasonable and be consistent in each simulation. For example, the assumption on the prepayment of housing credit should fluctuate with the interest rate assumption and reflect the incentives for prepayment under various interest rate scenarios. It is to avoid selecting of any assumptions by basing on sentiment and unable to prove its suitability based on experience and past operations. Sources of information that are generally used to set assumptions are:

- Analysis of the trends of previous portfolios and movements of each account.
- Repayment simulation that the financial institution develops or purchases.
- Various estimated values from the simulation of the seller.
• Information related to business strategies and pricing of commercial unit.

Important assumptions should be verified in order to assess its validation at least once a year since the market situation, competition environment, and change of strategy could render the existing assumptions inappropriate. For example, the market competitiveness changes lowering cost for customer’s refinancing thus, triggering faster repayment rate.

The review of important assumptions should include the evaluation of the effect of the assumptions to the risk assessment of the financial institution. The assessment may be conducted under “if it happens according to the assumptions, what will be the effect?” or as sensitivity analysis. This is to assist the management to consider which critical assumptions must be closely monitored. Such analysis is also considered as a type of stress test which will ensure the management that the financial institution will be stable in unexpected events.

The management should arrange for documented analysis of factors using critical assumptions. This will help in the review of the assumptions and in the understanding of the sources of the assumptions. The amount and details of the document should correspond with significance of the risk as well as the complexity of the analysis.

3) Calculation of Risk Level

Calculation of risk level uses information of the current position of the financial institution in conjunction with the assumptions of future interest rate, customer’s behavior and transactions of the financial institution to calculate either the period to maturity of the expected term, cash flow or estimation of incomes, or all 3 items. Nevertheless, some financial institutions using risk measuring simulation may encounter some problems such as simulation may not entirely cover all sources of crucial interest rate risks; the management does not understand the method and assumptions of the simulation model in particular purchased simulation; or there is few personnel who can understand the simulation well and the financial institution cannot find a replacement in the event that the particular staff who understands the simulation is absent or resigns.

Calculation of Earning-at-Risk

The financial institutions should have a system to measure interest rate risk on earnings. This earning-at-risk calculation which is a widely used simulation emphasizes on:
1) Net interest income by considering the risk to earnings on accrual accounts. This simulation is similar to the budget or forecasting model which is calculated from the product of the projected average rate and the projected average balances derived from the current position, the assumption of future interest rate, terms, and the calculation of new interest rate on the current position as well as the assumption on new businesses.

2) Gains or losses from mark-to-market of trading book items. The calculation is normally done by the separate values from interest rate risk simulation model. This involves estimating the future cash flow of every item and converting them to present values. The risk is the present values that change in accordance with the interest rate scenarios.

3) Fees incomes that are sensitive to interest rate such as fees from mortgage securitization and credit card fees.

**Calculation of Risk to Capital Funds**

The financial institutions that maintain positions consisting of large number of medium terms and long terms should evaluate the effect of changes in interest rate on incomes and economical value of equity (EVE), which is a long term effect. The appropriate method in calculating long term risk depends on the terms and the complexity of the on and off-balance sheet items of the financial institutions. Gap Report, EVE model or simulation model may be used.

To select a system to evaluate the effect on its capital funds, the financial institution must consider the structure of its balance sheet and the existing option risk. The financial institutions with the following characteristics should use economic value of equity simulation to measure the risks.

- Possessing long-term assets with fixed interest rates in excess of 25% of the total assets
- Holding deposits at call in large portion compared to total sources of funds
- Having a high ratio of credits and investments with embedded options (such as caps, floors, or assets that can be recalled before maturity, etc.)
- Using risk hedging derivatives
Financial institutions can calculate the fluctuation of long-term interest rate in several ways. Nonetheless, to measure the risk on business value, the Duration-Based Model or Market Valuation Model is generally used. These simulations are compilations of present values of future cash flows for each interest rate scenarios.

2.3.3 Risk Monitoring and Reporting

Market risks occur from risk factors that are constantly changing or are dynamic. Therefore, measuring only market risks of current business may not be sufficient. There also should be an evaluation of risks in the future. In monitoring market risks, financial institutions should evaluate their strategies periodically to see whether it is still appropriate with the risk profile or not. The boards of directors and the senior management of the financial institutions should receive reports to ensure that the existing market risks are still appropriate to a level that it can accept.

In evaluating its strategies, financial institutions must consider risks from future growth of the business. Therefore establishing assumptions about future business is essential. For example, in analyzing risk to income, assumptions may be set on types and proportion of the transactions and businesses undertaken, estimated changes of the interest rate and terms by using market strategy plan, budget, and trend analysis of the past to help determining the assumptions. Some financial institutions may include assumption on future business in analyzing risk on commercial value. For example, to calculate EVE, the risk on EVE at present has to be calculated prior to calculating the sensitivity of future EVE from estimation of balance sheet.

The assumptions on new product lines can help in managing risks in the future. To include the assumptions on the business line in the consideration, the management should be confident that such assumptions are likely to occur and should avoid any assumption that is too optimistic. For example, to increase income under rising interest rate situation, the management must increase credits with floating rate float and reduce credits with fixed interest rates. Such action must take into account the credit strategy, customer base and the needs of the customers.

Normally large financial institutions will monitor market risk regularly and adjusting its strategies in order to adjust the risk by deciding on buying or selling specific financial tools, adjusting terms, prices or using derivatives. Moreover, interest rate risk simulation may be tested or evaluated on strategies prior to actually being implemented. Alternatively, mini simulation may be used especially to analyze financial tools or specific strategies such as trading.
deal or derivatives by inputting the results into the simulation model which analyzes consolidated risks.

Financial institutions should have suitable reporting systems. The appointed committees or the senior management should receive, at the minimum, monthly risk reporting. In the event that there is material change in risk level or trend, the reporting should be more frequent. Such reporting should provide information to the committees and the senior management that will enable them to determine the followings:

1) Able to measure the level and trend of risk in general.
2) Able to gauge the sensitivity of the interest rate, exchange rate, or price under significant assumptions.
3) Balancing between risks on returns and the selection of strategy.
4) Reviewing the practice according to the set risk limits including the ones that differ from the set policy.
5) Able to assess whether the level of capital funds is sufficient to bear the existing risk level.
6) Report to the committee and senior management should be clear, precise and timely. Information provided should be relevant to the decision making process and cover supervision activities. It should also include auditing report, appraisal report of financial tools used in risk management by an independent person and report of test on simulation models.

2.3.4 Risk Control

2.3.4.1 Organizational Structure for Risk Control

The financial institution should have an organizational structure that promotes internal control and risk management including suitable line of control and segregation of duties. These are important responsibilities for the management. The staff that is responsible for evaluating the risk controlling and monitoring should be independent from the work that they have to evaluate. The structure of the controlling unit has to be completely separate from the operations unit, front office and being independent from each other in various functions such as:

- Segregation of duties
- Supervisory system
• Reporting system
• Internal control system
• Performance related remuneration system

Examples of departments needed to be independent from others are risk management committee, audit committee, internal audit department or other departments which are responsible for controlling and monitoring the roles of risk management committee.

An audit committee has the following functions:

1) Supervising policies, rules, instructions to rectify any important problem. The internal audit unit must directly report to the audit committee without going through the senior management of the finance department to ensure independence.
2) Following up any urgent problem according to its priority in order to reduce any possible risk.
3) Find the cause and effect of the damage occurred in order to an approach for rectification and to monitor the implementation.

A risk management committee has the following functions:

The risk management committee is established to manage risks of the entire organization by delegating work to teams or staff to continuously supervise and monitor the risks in each area. It should be independent from the units subject to the control and monitor. The main duty of the risk management committee is to issue risk management policy in each area covering all activities or products of the financial institution, to prescribe an appropriate risk tolerance level and the frequency for verifying the suitability of the tolerance level and for reporting.

The committee must set timeframe, frequency of the evaluation and monitor of risks to suit the risk characteristics of the transactions. The financial institution should set type of reports and its frequency including special report in the case of urgency. Such should be submitted to the board of directors in writing. Information used in the review for risk control and monitor should cover information that can specify possible risks. The need of information varies from one financial institution to another depending on its size, complexity and scope of business.
2.3.4.2 Major Components of Risk Control

a. Risk Limits

The boards of directors of financial institutions should determine the highest risk tolerance level and notify the management. The management must then use this information to set an appropriate risk limit for the various interest rate scenarios. The management must focus on the cases which exceed the prescribed risk limits.

The prescribed risk limits should be in line with the risk measurement method and depends on the level of capital funds, performance and risk tolerance of the financial institution. Risk limits should match the size, the complexity of the business and the adequacy of capital funds. It should also point out the effects from the changes of interest rate, exchange rate or market price of future incomes and the financial institution’s economical value.

Financial institutions may control risks by using several types of risk limits in combinations, regardless of whether they are primary limits which determine earning level or economical value affected by the risks, for example, setting the net earning limit and economical value that change in each simulation of various interest rates or secondary limits that set the limit of the number of transactions by their terms, coupon rates\(^5\), types of financial tools or different financial markets.

Determining Earnings at Risk Limit

This is the limit used to control risk position of the financial institution regarding the expected earnings at a fixed interest rate for each situation. This limit is usually expressed as a change of earnings (as a monetary amount or as a percentage) during an interval and at a particular interest rate situation. Financial institutions usually set the limits relative to one of the following items - net interest income, net income before deducting reserve, and net income or profit per share.

The appropriateness in selecting the said item depends on the sources of normal earning of the financial institution. If the fluctuation of the earnings of the financial institution occurs in the net interest income, the appropriate item should be net interest income. To set a

\(^5\) Coupon rate could be used to set limit of the amount of business in the situation where you need to control the density of the portfolio, as it can affect the calculation of the bond price.
limit with reference to the net interest income, the management should consider and understand how the fluctuation of the interest margin affects the bottom line. For example, for financial institutions with high general expense, even a small change of margin can significantly affect the net income. At the same time, financial institutions with earnings and expenses that largely do not come from interest but are sensitive to the interest rate changes should choose items that are bottom-line earnings such as net income or profit per share.

**Economic Value Limit**

The limit should reflect the size and the complexity of the referenced position. Financial institutions that have simple financial tools, low risk and few repricing mismatches of the financial tools of both medium term and long term may choose to use simple risk limits. But in the case of financial institutions that are complex and have a large number of repricing mismatches of financial tools in both medium term and long term or have numerous complex options, they should set risk limits that will assist the damage control of both the economical value and capital funds.

**Gap Limits between Assets and Liabilities**

Gap limit between assets and liabilities is used to lessen the risks of earnings and capital funds causing by interest rate changes. This limit will control the imbalance of the repricing within the time band.

This limit usually determines the ratio of interest sensitive assets to the interest sensitive liabilities in each time band. A ratio value which exceeds one indicates that the financial institution is net sensitive on the asset side. If other factors remain constant, the earnings of the financial institution will decrease if the interest rate decreases. However, if that ratio is less than one, the financial institution is net sensitive on the liability side. Its earnings will decrease when the interest rate increases. The gap limits between other assets and other liabilities that the financial institutions use to control risk position are gap to asset ratios, gap to equity ratios, and dollar limits on the net gap.

Even though the ratios between assets and liabilities are useful method in setting risk limit of repricing, it may not be effective to render a picture of interest rate risk to the management or the board of directors of the financial institution. Since the gap limits between assets and liabilities do not show the level of net interest income that is affected by risks. Hence, if
the financial institution only uses the said method, its management and board of directors should receive further explanations on earning level and capital funds that are affected from risks ensued from the imbalance of the gaps between assets and liabilities.

b. Other Controlling Systems

The financial institutions should sufficiently have other controlling systems to ensure that the process of risk management is complete. They should support practices that are efficient and effective. In addition, they should have reliable financial and regulatory reports as well as compliance with the laws, regulations and policies.

The supervision by the boards of directors and senior management of the financial institutions is the heart of internal control system. In addition to establishing a clear line of management, job description and risk limits, the boards of directors and management should ascertain that they have allotted resources to perform the duties of monitoring, examining and controlling sufficiently. Persons or divisions, whose jobs are to monitor and control risks, are to be segregated from the front office which produces risks. This could be a unit of the audit department, compliance department, or risk management department. If the unit responsible for monitoring and controlling is a part of the treasury unit, which is responsible for implementing investment strategy and risk mitigation, the financial institutions then should have a good internal controlling system.

The boards of directors of the financial institutions may delegate to Asset-Liability Management Committee (ALCO) the responsibility of establishing the policies, rules and procedures related to market risk as well as the duty to manage the structure of assets, liabilities, market risks and liquidity primarily by managing the interest rate risks, organizing a risk measurement system that reflects the actual risks and arranging reporting systems sufficient to be informed of the levels and sources of risks of the financial institutions.

For an efficient risk management, the ALCO should consist of representatives from each division that encounters interest rate risks. For some financial institutions, ALCO will have representatives from marketing department to allow marketing strategies to be in line with the business structure set by ALCO. The committee should consist of senior executives and determine authority and responsibility in supervising strategies and risk management plan for each of the related divisions on a regular basis in order to measure the risk of conducting business in the future.
In general the ALCO will delegate to the treasury unit the responsibility of supervising the day to day operations. For a small financial institution this could be delegated to staff in investment unit. Nevertheless, prior to the delegation of responsibilities, it shall be under the responsibility of the treasury unit. The ALCO should set a clear procedure and risk limits to control the operations of the treasury unit first. The treasury unit will have the responsibility to invest and manage the structure of assets and liabilities of the financial institution in accordance to ALCO policy. The treasury unit or any other unit responsible for monitoring risk position should report the position to ALCO within a stipulated time frame.

A good internal control system for market risks should have the following characteristics.

- Having an environment that fosters good internal control such as having executives that are knowledgeable of, understand good internal control, and have set up an appropriate organizational structure.
- Having adequate procedures to specify and measure risks.
- Having established policies, procedures, and methods for supervision.
- Having adequate information technology system.
- Undertaking to comply with the stipulated policies and continuously conducting evaluations.

An important component of the internal control system is the regular assessment and verification which includes assessing whether the staff has complied with the established policies, procedures and measures set to accomplish the desired objectives. The assessment and verification should emphasize the changes that may affect the effectiveness of the supervision such as the changing market condition, personnel, technology, operating structure in accordance with interest risk limits and any transaction exceeding the limits should be adequately monitored.

The management should ascertain that the verification, when undergoing any adjustment in the internal control, has a mechanism to ensure that the adjustment is completed within an appropriate period. The verification of the market risk measurement system should include the assessment of assumptions, variables, and the methods adopted. It should be conducted to induce understanding and testing. Documents related to present assessment
process including the evaluation of the correctness of the system should be prepared. Suggestions should be given on various errors. Testing of the compatibility of the sub-systems with main system should be included as well as reporting is to be duly made to the management or various committees.

Establishing of frequency and scope of evaluation of the risk measurement methods and simulation models partly depends on the risk position, activities, changes of interest rate, exchange rate, market rate, and the complexity of the innovation related to the measurement and management of such particular risk.

The financial institution should verify the measurement, monitoring and controlling of risks on a regular basis. It is to be conducted by an independent assessor, such as the internal or external auditor, to ensure that the risk management system of the financial institution is adequate and contain every factors of market risk, on or off balance sheet.
Section 3 Audit Guidelines

3.1 Audit Objectives

1. To assess market risk profile of the financial institution to determine the negative effects on earnings and capital funds from movements of interest rates, foreign currency exchange rates and prices of the financial and capital markets.
2. To assess the adequacy of capital funds to support market risk of the financial institution.
3. To assess the quality of risk management system.
4. To evaluate the management of the financial institution whether it has specified and assessed its existing market risks.
5. To assess whether the officers and staff of the financial institution comply in accordance with the stipulated guidelines for market risk management.
6. To assess the scope and adequacy of internal audit, internal assessment, and internal control.
7. To establish appropriate measures for the financial institution to rectify any errors upon discovering that the existing market risk management has problems or upon having insufficient capital funds to support risks.

3.2 Scope of Audit

3.2.1. Guidelines for Assessing Risk Level

3.2.1.1 The verification and analysis of balance sheet of the financial institution in order to identify the sources of market risks should consider:

- Structure of the maturity terms and the setting of the new interest rate of loans, securities investments and liabilities
- Volume of products with embedded options taking into account the interest rates of such products and the market interest rates
- Indices used to establish the floating interest rates of various products (e.g. prime, LIBOR, etc.) and the level or proportion of the products that are referenced with such indices
• Asset and liability structure and off balance sheet items that are in foreign currencies
• The balance sheet structure, is consistent with the growth assumption set by the financial institution?
• Components of investment portfolio
• Volume and complexity in the employment of various derivative instruments
• Other off balance sheet items such as L/C and Loan Commitment, etc.
• Volume of mismatches of assets and liabilities
• Trends of ratio of asset and liability components on the balance sheet
• Items and volume with risk hedging
• Level of capital charge for market risks

3.2.1.2 Assessment of Interest Rate Risks by Evaluating the Vulnerability to Changes in Interest Rate.

Changes of interest rate in the market may adversely impact the financial institution in 2 ways, on its earnings and its economical value. Therefore in assessing interest rate risk, both must be considered.

**Earning Perspective**

• Changes in interest rate affecting reported earnings on accrual basis
• The volatility of earnings is crucial in analyzing interest rate risk because the sudden decline of earnings or losses affects the stability of the financial institution causing insufficient capital funds and triggering confidence to falter.
• Net interest income is the difference between interest income and interest expense which is the key item affected by the changes in interest rate as it is directly related to market interest rate and is significant to the overall earnings of the financial institution. Nonetheless, when the financial institution expands its financial activities which generate fee incomes and non-interest incomes such that the net income is composed of incomes and expenses from interest and non-interest sources. Non-interest items can be increased from many activities as well as sources of non-interest incomes such as transaction processing fees are getting closer related to interest rate. The management
and auditors must have a wider perspective related to various items that are affected by changes in interest rate.

**Economical Value Perspective**

Changes in market interest rate can affect the economical values of assets, liabilities, and off balance sheet items. Therefore the shareholders, management and auditors must take into account the relationships of those changes of the said economical values to the movement of interest rate. The economical value perspective will show the vulnerability of the net shareholders’ equity to the changes in interest rate. Economical values of various financial tools can be assessed from the present value of expected net cash flow by discounting the actual rate of return of the market.

Therefore the economical value of the financial institution can be assessed from the present value of the expected net cash flow which is an estimation of cash inflow of assets deducted by the expected cash outflow of the liabilities plus expected net cash flow of off balance sheet items.

The economical value perspective is extremely important because it takes into account the probability that the interest rate movement will affect the present value of cash flow. Hence, it is a broader perspective and includes the effects that may occur in the future rather than the earning perspective, which is a near-term earning perspective only. If only the earning perspective is considered, it is unable to render correct information regarding the effects of interest rate movement on the overall status of the financial institution in long term. In particular, it will not be sufficient in estimating the effects from financial instruments with fixed interest rate in long term or financial instruments with embedded options as the financial instruments that have not been marked to market shall produce profit or loss from the past changes in interest rate that is embedded within such instruments. Therefore to determine the tolerance level for interest rate risk, the financial institution has to consider both the movement of interest rate in the past that produces embedded losses and the effects on future performance. For example, extending credit during the low interest rate period and subsequently the interest rate increases causes the cost of fund to increase. In this case the financial institution is deemed to have an embedded loss.
To assess interest rate risk, the following factors should be considered:

- The changes of directions of interest rate will affect maturity mismatches or the repricing of assets and liabilities.
- The changes of market interest rate cause interest rates received and paid of assets, liabilities, and off balance sheet items that are referenced to different interest rates or different types of financial tools to change differently including changes in the basis risk relationship.
- The impact of changes in the yield curve on both shift and shape on the position on and off balance sheet such as it may be steeper, moderately sloped or horizontal, etc.
- Characteristics, volume and complexity of the transactions with embedded options.
- Interest rate volatility.
- The liquidity of products affected by interest rate. It should be considered that if the said products are adversely affected such that loss is incurred, how quickly is the financial institution able to sell the said products to stop the loss.
- The impact from changes of interest rate to fee incomes.
- The volatility of net interest income. The cause of volatility must be investigated whether it arises from the change of interest rate or not. In addition, the expected future circumstances both internal and external must be considered as well.
- The effects of changes in interest rate to assets and liabilities sensitive to interest rate, both on and off balance sheet separated by main currencies and all other currencies combined, to net interest income and capital funds. This can be assessed by sensitivity analysis of gap in period of 1 year regardless of whether it is obtained from repricing gap report and/or simulation model by considering the embedded option and basis risk.
- The effects from sensitivity and volatility of interest rate to assets and liabilities, which are sensitive to interest rate both on and off balance sheet separated by main currencies and all other currencies combined, and which affect the net income and capital funds. This can be assessed from value at risk (VaR).
- The effects of interest rate to economical value calculated from the difference of net present value between assets and liabilities, on and off balance sheet
adjusted by duration value which may be estimated from the economical value of equity model (EVE Model).

- The objectives and volume of derivative transactions with interest rate risk to be considered in conjunction with the knowledge and understanding of the stated tools.
- Results from stress test of interest rate.

*Remarks: Tools - 1) Re-pricing Gap Report, 2) Simulation model, 3) EVE model/Duration/Convexity and 4) VaR may be studied in details in appendices.*

3.2.1.3 Assessment of Exchange Rate Risk by considering the followings:

- Foreign currency positions
  - Net open position in each currency including on-shore and off-shore\(^6\) items. It should also be considered whether it is a currency that is at risk to incur losses when unwind or hedge position or not. For example, foreign currencies which lack liquidity in the market, etc.
  - Aggregate positions both on-shore and off-shore.

- The volatility of profit/loss from the exchange both realized and unrealized by determining the causes of the volatility whether it arises from exchange rate or not, as well as the expected future circumstances both internally and externally.

- The effects of changes of exchange rates to earnings and capital funds by conducting sensitivity analysis and the effects that take into account the changes and volatility of exchange rates which may be assessed from VaR simulation model.

- The adjustments of capital funds arisen from the changes of exchange rates will affect the proportion of capital funds that is in foreign currencies\(^7\).

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\(^6\) On-shore transaction means a transaction undertaken with domestic counter-party. Off-shore transaction means a transaction undertaken with counter-party abroad.

\(^7\) Capital funds in foreign currencies occur in the case when there is an issue of foreign currency subordinated debenture which is able to be included in the calculation of second tier capital funds.
• Risks from foreign currency translation should take into account:
  - The volume and stability of aggregate portfolios of transactions in foreign currencies,
  - Receiving and payment items which positions are in foreign currencies.
  - The correlation of assets and liabilities which positions are in foreign currencies.
  - Types of products held in foreign currencies such as credits, bonds and derivatives, etc.

• The efficiency of the hedging of currency translation risk can be considered from:
  - The correlation between structure and terms of the assets and liabilities that are in foreign currencies, both in Baht and other currencies or cross currency that excludes Baht currency
  - The effects to economical value from closing out exchange rate risk
  - The hedging of projected income
  - The uses of derivatives for hedging risk

• Result from stress test on exchange rate.
• The effects from changing business strategies related to foreign currencies.
• The volatility of market condition or other external factors such as economic situation, legal changes, changes in technology, competition, and etc.

3.2.1.4 Assessment of Pricing Risk should consider the following factors:

• The volume of investments for trading purpose and for sale purpose in debt and equity instruments and derivative instruments both on and off balance sheet with the objective of gaining a profit.
• The sensitivity of the price to market risk factors such as exchange rate, interest rate, and instrument rate.
• The characteristic of the relationship between price and market risk factors that is linear and non linear.
• Risk level expected from the changes in correlation values, which may be the correlation within the same type of risks (such as interest rate, exchange rate,
stock price, including options that is related to the said types of risks) and/or the correlation between the types of risks.

- Risk of investments in securities for trading purpose and for sale purpose including off balance sheet derivatives that is in the trading book (such as future, interest rate swap, interest rate option, etc.) and that affect the earnings and capital funds. For debt instruments is to be assessed from market value adjusted by modified duration or assessed by using VaR model.
- The volume of profit/loss from investments in securities for trading purpose and for sale purpose, both realized and unrealized, compared to profit before deducting provision.
- The density of debt or equity instruments with pricing risk including off balance sheet derivatives in the trading book and the density of option strike price.
- Market liquidity of debt and equity instruments in the investments for trading and for sale purposes and derivatives. Such can be gauged from the large disparity between purchase and selling prices, lack of purchase and selling prices, or having a low trading volume in the market.
- The stability of income from trading.
  - Proportion of income from trading with customers relative to income form proprietary trading.
  - The volatility of profit/loss from investments in securities for trading and for sale purposes, both realized and unrealized. The cause of volatility whether it occurs from price changes as well as the expected situation in the future both internal and external should be considered.
- Result from stress test of pricing risk.

3.2.2 Guidelines for Assessing the Quality of Risk Management

3.2.2.1 Supervision by the Board of Directors and Senior Management

The board of directors and senior management responsible for the market risk management must have an understanding of the characteristics of the transactions and risk level facing the financial institution.

(1) The board of directors must approve and review the business strategies related to market risks as well as the supervisory policy on market risk management with the objective of
generating income, liquidity and value to the financial institution at the acceptable risk level. The factors requiring consideration are:

- The board of directors of the financial institution must assume a crucial role in monitoring the market risk management.
- It approves policies and delegate duties and responsibilities to senior management enabling them to effectively specify, assess, monitor and control market risks.
- It has assessed the market risks which impact the asset values and the overall financial institution.
- The policies and strategies for risk management are effectively communicated. The related personnel has accurate understanding [of the said policies and strategies].

(2) The senior management is responsible for implementing the approved policies by the board of the financial institution for the management of market risks of both short and long term. The goals, objectives and policies to limit risks provided by the board must be applied by considering:

- The policies and procedures for market risk management should be documented with sufficient details as follows:
  - Specification of duties and responsibilities, line of command and decision making;
  - Clarity in the authorization for transacting [business], the approval of risk prevention and the strategy on positions taking;
  - Precise stipulation of the frequency and assessment methodology and monitoring of market risks, including planning for regular assessment and monitoring;
  - Stipulation of market risk ceiling quantitatively which reflects the level of market risk tolerance of the financial institution.
- The risk assessment system must be effective, of standard and able to affirm the existing volume of market risks of the financial institution.
- There should be procedures for reporting and monitoring risks which the senior management can employ to assess the vulnerability of the financial institution to the market changes.
- The internal control and verification procedures must be effective.
• The senior management should regularly review the policies and procedures of risk management to ensure their suitability to the business undertaking of the financial institution.

• The human resources must have potential, knowledge, understanding and experience by examining the education, training and length of time performing responsible duty.

  *Remark*: Human resources herein include executives and employees in the risk taking, risk control, risk management or other sections related to market risks.

(3) Assessing the appropriateness of the risk management organizational structure

• Structure of the market risk management of the parent company and affiliated companies;

• Establishment of responsible unit for the management and monitoring of market risks;

• Performance results of the market risk management of the parent and affiliated companies and the market risk management of the organization on a consolidation basis.

3.2.2.2 Risk Assessment System

Market risk assessment is one of the crucial steps in the risk management procedures. Hence, the auditor must under the characteristics of each type of tools employed for the assessment in order to evaluate the procedures, assessment methodology, the adequacy of the data base, the capability of the personnel, the sufficiency and suitability of the tools utilized by the financial institution in assessing risks in relation to the size and complexity of its transactions.

(1) Evaluation of the appropriateness and adequacy of the risk assessment system of the financial institution shall examine:

• The capability of the risk assessment system in specifying and assessing important market risks. If it unable to assess all market risks that occur, the financial institution must be able to declare the percentage that the said methodology is able to assess e.g. where the financial institution locates only a portion of the securities prices, it should be able to specify the volume (in monetary term) of collected data is of what proportion to the entire value of the portfolio with market risks.
• The compatibility of the size, characteristics, complexity of the transactions and the policies of treasury management with the market risk management.
• The capability in assessing risk volume with effectiveness.
• The capability in assessing the impact on income and economic value from the changes of interest rate.
• The capacity in specifying and assessing risk positions in medium and long terms.
• The capacity in assessing risks which change with the characteristics of the business, transactions and products to derive a result which would be beneficial to the financial institution.

(2) Evaluation of the reports from the risk assessment system shall examine:

• The ability to issue reports in the format that is easy to understand enabling the board of directors of the financial institution and the senior management to utilize the data to facilitate a timely decision making process.
• Reporting to provide useful information and constraints of the employed methodology as well as the risk assessment system.

(3) Evaluation of the reliability of the tools and effectiveness of the risk assessment methodology shall examine:

• The board of directors of the financial institution or the senior management grants approval to adopt the risk simulation model.
• The assessment of pricing and revaluation of the input data which the financial institution may use mark-to-market from a reliable source or mark-to-model where there is no market price, such shall examine:
  - The independence of the unit which performs the valuation.
  - The reliability and consistency of the employment of pricing sources.
  - The consistency of the applied prices and the price derivation method.
  - The accuracy of the price derivation.
• The input data is checked and reconciled to confirm the accuracy and comprehensiveness as follows:
  - The applied internal data is correctly corresponded with the data on the ledger account in accordance to the maturity of the agreement and others.
- The external data employed is reconciled with other sources to ensure accuracy and reliability.
- There is a well-defined responsible unit for examining the data that is independent from the users and developer of the simulation model.

- The assessment of the suitability of the interest rate changing simulations at various levels that are used as data for the market risk assessment by considering:
  - There is a well-defined responsible unit for examining the data that is independent from the users and developer of the simulation model.
  - The period covered is suitable in terms of past interest rate movement.
  - A simulation of drastic movement of interest rate in a one year period is conducted.
  - The ability to estimate the holding period or period for strategic risk mitigation, ability to estimate transactions, the ability of the financial institution in market penetration and the capability of the management.
  - The ability to specify risks arisen from positions related to options.

- The assessment of the principal assumptions adopted for the simulation model must examine:
  - The review of the suitability of the assumptions is conducted periodically and the assumptions should be compared with the actual data, in particular the assumption using economic conditions.
  - A verification of the principal assumptions is conducted at least once a year and is documented as well as reported to the board of directors and senior management.
  - The assumptions are appropriate with the transactions, business strategies, past experience and competitiveness of the financial institution.
  - If a simulation model is employed to create assumptions, the financial institution should conduct assessments on the said model in the same manners as conducted on the risk assessment simulation. In addition, the auditor of the financial institution must evaluate the procedures of the said assessment as well.

- In the case that the financial institution adopts purchased simulation model, it shall determine:
  - If a simulation model is employed to create assumptions, an assessment must be conducted similar to that conducted on the risk assessment simulation.
The model is upgraded to support the volume and complexity of the changing transactions as necessary.

The related personnel understand the process, the application method of the simulation model and is adequately trained to ensure that the staff is able to apply and interpret the meaning of the result derived from the model.

There is a detailed manual for the simulation model.

There is a continuous after-sale service.

In the case that the financial institution develops its risk assessment tools, it shall consider:

- A manual is prepared which provides important details such as operating methods, calculation techniques and sources of the data, etc. It should be prepared from the development, the operating and testing of the simulation model to be used for study by staff to enable them to substitute one another in their work.
- The developed simulation models or tools are constantly updated.
- The unit which develops the simulation or tools has tested and verify the accuracy of the data used in various assumptions, of the calculation, the analysis and the derived outcomes.

The assessment tools and market risk simulation models, classified in accordance with the types of tools generally employed by financial institutions are as follows:


   The Gap Report mentioned here is a tool to assess risk from interest rate (Repricing Gap Report) which occurs from the assets, liabilities and off-balance sheet items with different residual terms (for items with fixed interest rates) and the remaining terms which shall be calculated at the new interest rates (for items with floating interest rates). Such will affect the net interest income and capital funds. The said assessment tool shall consider:

   1. Items in Repricing Gap Report cover assets, liabilities and off-balance sheet items, both on the banking book and trading book, which are sensitive to interest rate.

   2. Information used must be complete, correct, up-to-date and reliable. The data base should be comprehensive, containing complete and up-to-date positions of assets, liabilities and off-balance sheet items. There must be a review of the accuracy of the data.
3. Rules and assumptions for specification of time band of the assets, liabilities and off-balance sheet items shall be suitable, accurately computed and appropriately distributing these items within each time band by considering from the days to recalculation of the new interest rate. Too narrow a time band may not be beneficial to the risk management. However, too broad time band could cause the cash flow of assets, liabilities and off-balance sheet items which are within their maturities to be within the same time band as those that will be calculated at the new interest rates. As such it reduces the accuracy in the assessment of interest risk of the Repricing Gap Report.

4. Is the Repricing Gap Report separated by the major currencies such as Baht, USD or JPY, etc.? Separation by currencies clearly distinguishes the items in Baht and foreign currencies and facilitates evaluation of the effects. In addition, the assumptions for assessing the effects from the changing of interest rates in each currency could be stipulated individually depending on the past data of interest rate of each of the currency and their magnitude of changes.

5. In setting appropriate assumptions, the factors composing the assumptions are assessed whether they reflect the actual position of the financial institution or not. For example, for the estimation of the past volume, seasonal factor or consumers’ behavior in the distribution of assets, liabilities and off-balance sheet items, estimates are made on the maturities of these items which are not due or terms till the fixing of the new interest rate such as savings, overdrafts and items with embedded options, prepayment of loans or early withdraw of deposits, etc. Furthermore, documents are prepared for these assumptions and the review of the assumptions is reported to the management or not. The management hence needs to fully understand the assumptions used.

6. Does the result from the Repricing Gap Report have any benefit? How it is utilized? To who is it reported?

7. The limitations associated in using Repricing Gap Report. In assessing the capability of the said tool, the management and the tool user must recognize its limitations as follows:

- It is simple to prepare but is a crude assessment. Wide time bands may cause the accuracy to reduce which the financial institution may repair by using weighted average of the repricing maturity in each time band or narrow down the time bands.
It is a tool with static assumptions i.e. it is assumed that for the next 12 months from the audit date the various information used in the Repricing Gap Report remain unchanged while in the real life situation, assets, liabilities and off-balance sheet items are constantly changing (dynamic).

In stipulating that the market interest rate changes by 1%, it is assumed that the short-term and the long-term interest rate change at the same rate (parallel shift in yield curve). However, the actual situation, the interest rate for each time band may changes unequally. Hence, this tool is unable to assess Yield Curve Risk.

In stipulating the interest rate of assets, liabilities and off-balance sheet items changes at 1% across the board causes the exclusion of Basis Risk from the Repricing Gap Report unless the Index of each of these items is established that if the referenced rate changes by 1%, how would each of these items change.

It does not cover Option Risk if the financial institution does not set assumptions for items with embedded options.

b. Earning Simulation Model

This is a tool to assess interest rate risk which affects the net interest income and capital funds by Simulation which creates various business plans under a variety of interest rate scenarios. It is able to assess the interest rate risk more accurately than the Repricing Gap Report since it is able to produce more accurate cash flows from different periods as each item is calculated separately and it is a dynamic assessment. Furthermore, it enables better interest rate management. In assessing the said tool, the followings should be considered:

1. Earning Simulation is utilized to assess which items of the assets, liabilities and off-balance sheet items are affected by the interest rate and to assess the risks both short and long term. If all these items are not covered, how will the financial institution assess and monitor the remainders?

2. The entirety, accuracy, timeliness and reliability of the input used in the preparation and evaluation of the data base of the financial institution that utilizes these data to build a simulation model since these data are significant and have direct effects on the output.

3. The sufficiency and the reasonableness of the assumptions used. Assumptions of any simulation model are fairly complex and sorted into groups. Each group may
consist of interest rate management plan, technique to mitigate risks and various interest rates. Factors worth considering are:

- Whether the rationale and data in making the assumptions and the preparation of documents in adjunct to the assumptions are clear or not?
- The knowledge, the capability and the know-how of the staff preparing the assumption e.g. computer skills, ability to analyze risks and know-how in the business, etc. since the simulation model involves making a vast number of assumptions.
- Is there a regular reporting of the review of the assumptions to the management? The management must understand the assumptions and have the assumptions adjusted to the changed situation.

4. Upon changing of the environment, is the scenario adjusted to accommodate the said changes? Since the various simulations must observe the business conduct of such a financial institution, it is extremely necessary that it make modifications when the business environment changes.

5. The developer, the user and the tester of the simulation model must be knowledgeable and have an understanding of the methods and the meaning of the output to ensure that such a model is not just a black box i.e. such staff should be adept in computation, computer operation as well as is averse in business and risk analysis.

6. Is the computer system of the financial institution able to support the running of a simulation since it requires the computer system to create numerous scenarios?

7. How is the output used e.g. for only risk assessment or for planning and establishing the risk management guideline and for managing interest rates. How is it useful to the financial institution? To who is the output reported? The output should be reported to the management and the management should be able to interpret the implication of the output. The reports generated from the simulation model may be numerous and in many formats.

8. Is the back testing conducted to test the simulation model or not? What is the result? Is it conducted on a regular basis or not?

9. The financial institution must be aware of the limitations of the simulation model such as:
• It may express inaccurate risk position due to being linked with several assumptions. In such a case, it may render indication or assessment with much difficulty. How does each variable affect on the changing of the value of the target item?
• Most income simulation models are used to assess risks within a period not exceeding 2 years. Longer period will yield inaccurate results. Hence, the financial institution should in conjunction uses the economic value simulation model in order to cover assessment for the long-term.
• It requires a rather long period of time to analyze the data.
• The outcomes are numerous and diverse.
• It requires constant medications to reflect the changing situations.
• Problem solving is conducted on a trail and error basis.
• It requires personnel with knowledge and expertise in computer, data analysis or risks in addition to business proficiency.

c. Economic Valuation Model or Duration Model and Convexity

These are tools for assessing interest rate risks that affect Economic Value of Equity (EVE) by assessing the changing of present values of assets, liabilities and off-balance sheet items under various interest rate scenarios. In assessing the said tool, the followings should be considered:

1. Sensitivity of the economic values affected by the interest rate should be assessed by weighting the assets, liabilities and off-balance sheet items within each time band with the modified duration, which is the percentage of the changes of the position when the interest rate changes by 1%. This type of methods is an assessment of the effects in the long term which arise from the changing of interest rate to all assets and liabilities. Hence, it is suitable to a financial institution with a larger number of mismatch positions in medium and long term and a large proportion of fixed interest rates.

2. Which assets, liabilities and off-balance sheet items are covered by the economic value simulation model?

3. Suitability of the various interest rates used as discount rates to derive the present value of the cash flow of each asset, liability and off-balance sheet item in order to assess the consistency of the interest rates used with the characteristics and types of each of the asset,
liability and off-balance sheet item as well as review of the reliability of the interest rates used and the sources of the interest rate data.

4. Duration is a tool for assessing the relationships between interest rate and values of assets, liabilities and off-balance sheet items that are linear. Where the relationship is non-linear, the Duration is unable to assess with any accuracy. The tool required is called Convexity which shall be explained as the next topic.

5. The financial institution is aware of the limitations on using Duration as a tool for assessing the sensitivity of the economic value. Limitations are Duration are, for example:;

- It is relevant for assessing value changes when interest changes slightly and equally in every time band (parallel shift in yield curve) but unable to be used for assessing value changes when interest in each time band changes differently. The accuracy will diminish if interest changes extensively.
- Duration of different financial tools will change at various rates as time passes. Therefore, in the portfolio that is hedged for duration, the effectiveness of hedging shall diminish when time passes.
- There is an assumption that the expected cash flow is constant. Hence, the said assessment may not be accurate for financial tools with embedded options, which tend to be increasingly sensitive to interest when the interest rates increase; such is a non-linear relationship.

6. Utilization of outcomes by taking into account of who are these outcome reported, how are they utilized, does the management acknowledge and understand the meanings of the outcomes or not.

7. Personnel that develops, uses and tests the simulation models have know-how, understanding in applying the simulation models and outcomes or not. Qualifications of the said personnel should include proficiency in computation, computer and capable in analyzing business data as well as risks.

8. Is back testing conducted to check the simulation models or not? What is the result? Is it conducted on a regular basis or not?
Convexity

It is a tool to assess the changes of the value of an instrument that has a non-linear relationship between the interest rate and the value of assets and liabilities in addition to the interest rate greatly fluctuates creating a chance of a big shift in yield curve. The assessment of the said tool should consider:

1. Products using Convexity for risk assessment, directive and procedure for using the said tool for risk assessment.

2. The know-how, understanding and experience of personnel in the application of the tool, procedures of risk assessment and the derived outcomes. Qualifications of the said personnel should include proficiency in computation, computer and capable in analyzing business data, in analyzing risks and understanding of the products.

3. How is the outcome report utilized? To whom is it reported? Does the management acknowledge and understand the meaning of the outcome or not? Has it been used to complement the planning and determining the direction of interest rate risk management or not? How?

4. The financial institution being aware of the limitation in using Convexity such as the assumption is that the changes of interest rates are equal in every time band (parallel shift in yield curve), what means does it have to remedy the limitation?

d. Value at Risk Simulation (VaR)

It is a tool to assess the interest rate risk, exchange risk, pricing risk by taking into account the changing of the market factors (e.g. interest rate, exchange rate, stock price, etc.) and the volatility of the said changes. Furthermore, the VaR simulation is also use to control and manage portfolios. In assessing a VaR simulation model, [the followings] should be considered;

1. Is the method of VaR calculation corresponds to the type, size and complexity of the transaction of the financial institution or not? For example, for the case that the financial institution has many non-linear transactions, the variance-covariance method which is unable to assess risk of non-linear transactions may not be suitable. The adequacy and reasonableness of the assumptions of each method [must also be considered]. There are 3 basic VaR calculation methods which are variance-covariance (Parametric VaR), historical simulation
and Monte Carlo simulation. Each method has different strengths and weaknesses. The auditor must determine if the method selected by the financial institution is appropriate or not?

2. Which product or type of risks does the financial institution use the VaR simulation to assess and which market risk factors? Risk factor means factor whose change causes the valuation of the position of the financial institution to change with it such as interest rate, exchange rate, bond price, stock price and volatility. How are such factors assessed?

3. What are the constraints of the VaR simulation? Is the financial institution aware of [them]? Has it been reported to the management or not? Since this simulation model is unable to assess all products and every risk which may be caused by the constraint of the tool or of the financial institution itself, how will the financial institution remedy and improve the said constraints e.g. constraints on data, assessment and calculation method or capability of the personnel, etc.?

4. At what values are the parameters set and what are the rationales behind setting the value of each parameter? Such parameters are:

- **Confidence Level** The confidence level in VaR calculation is the level of confidence on the outcome derived. The financial institution may use confidence level of 95%, 97.5% or 99%. Each confidence level will yield different VaR. The financial institution may specify different confidence level for each risk depending on its discretion such as specifying a confidence level of 99% for exchange risk and 95% for pricing risk, etc.

- **Holding Period** Position holding period is the period which the financial institution expects to close its various asset and liability positions e.g. 1 day, 10 days or 1 month, etc. In the trading book case, it may be able to quickly close the losses e.g. 1 day or 10 days. However, banking book may require months.

5. Is the data employed correct, complete, up to date and reliable or not? Such important data are position, market data, historical data, volatility, correlation and calculation. Historical data should be collected for no less than 250 days for the case where the data are weighted equally (unweighted) or it may be less than 250 days for the weighted data i.e. more weight is given on current data since it is deemed that further back data has less effect on the present. The amount of weight given depends on the decay factor selected by the financial institution e.g. 0.94, 0.97 or 0.99, etc. The rationale for selecting such [factor] should be given.
Moreover, it should determine the sufficiency of the collected data and whether the source of the data is reliable or not. For instance, market data should come from a reliable source such as Reuter, Bloomberg or Telerate, etc. Additionally, how frequent is the data updated?

6. How does the financial institution determine the correlations? Is it a correlation within the same type of risks (e.g. interest rate, exchange rate and stock price including options related to the said type of risks) and/or a correlation between the types?

7. How does the financial institution derive the volatility value? Is it a historical volatility derived from using Moving Average method, ARCH method or GARCH method or is it implied volatility?

8. As the Running Time for processing VaR requires considerable amount of time, is the data available in time to be of benefits? Is the computer system able to accommodate such processing or not?

9. Has the VaR simulation model been approved by the senior management or the relevant committee and the approval been documented and reviewed by an independent unit or not?

10. How is the outcome report utilized and how the management it in planning and setting the management directions? For example, to whom is risk control by establishing VaR limit reported? How well does the reporting format assist the management to understand the outcome? Does the management understand and is it able to interpret the outcome as well as able to recognize the various constraints of the simulation model?

11. Did the financial institution conduct any test on the simulation model prior to the implementation (validation) and has it there been constant revalidation? How frequent is the revalidation? It should be at least once a year or upon significant changes. There is a unit responsible for revalidation of the simulation model which is independent from the unit that develops and uses the model.

12. Does the financial institution conduct any back test to check the precision and accuracy of the calculation of the VaR simulation model?
Back testing is the number of exception occurrences (actual loss exceeds the derived VaR) when the resulted values of VaR are compared to the actual profit/loss. In assessing the back test, [the followings] should be considered:

- Confidence level used in conducting Back Test should correspond to the specification and confidence level used in assessing VaR for comparison of the results. The confidence level will be the indicator of the number of times the financial institution is willing to allow errors to occur. For example, the confidence level of 95% indicates that 5 out of 100 errors are allowed. Therefore, in the assessment of 250 days of VaR, the [number of days that] actual losses are permitted to exceed the VaR is no more than 12.5 days in 1 year (250 business days).
- Holding Period that the financial institution may select is 1 day, 10 days or 1 month. However, 1 day is normally selected for trading book by BIS standard.
- Historical period used in the consideration of outcome from Back Test should not be less than 250 business days (1 year).
- The comparison of VaR and Actual P/L or Hypothetical P/L

e. Stress Testing of Financial Institution

Stress test is method for assessing risks arisen during stress events. Since the aforementioned tools for assessing various risks are used for risk assessment under normal circumstances only and in the case there statistical assessment which specifies a confidence level e.g. 99%, the use of stress test may account for the loss events within the remaining 1%. The risks arisen during the said stress events may have a small probability but if occur may cause great losses. Stress tests may be classified into 3 types as follows:

1) Historical simulation is a simulation of the past changes including the worst case scenario of the occurrence.

2) Random simulation is a set adjustment of the yield curve causing the price scenario to be created randomly to determine the deviation from the norm. For example, a scenario is created that the yield curve shift up or down within 100 bsp., to make the yield curve steeper in the interval of + or - 50 bsp., or the shift of convexity, etc.

8 The shift of convexity occurs where the instrument has an underlying call option such as mortgage backed securities and callable bond. These instruments grant the right of early redemption to the issuer when the market interest rate is on the down side. As such, it causes the relationship between interest and pricing to
3) Improbable events are changing scenarios which cause greater deviation than 3 standard deviations. In the testing, there is a fixing of the price, foreign exchange rate and various interest rates to change within the interval of -6 and +6 standard deviations.

In assessing the stress testing of the financial institution, the following should be examined:

1) Does the financial institution conduct a stress test or not? If so, verification of rules, procedures for setting various scenarios should determine:

- How the scenarios correspond to the size, complexity and the existing risks of the financial institution by including stress event e.g. various drastic events in the past which are linear and non-linear, the quantitative and qualitative changes i.e. the shift of yield curve, the liquidity problem, the significant changes of correlations between the various markets?
- Can the financial institution explain the process and method for creating various scenarios?
- Which factors are considered upon changing of situations? Does the financial institution verify the scenarios regularly or not? Are adjustments made upon changing of situations?
- Are the various assumptions for creating the scenario appropriate or not? Are the sources of the data used to create the assumptions reliable?

2) To whom are the outcomes of the stress tests reported to? What is the frequency, regularity of the reporting? Does the management understand the outcomes? Are they used in the planning and establishment of the approach for risk management? How? Examples are the establishment of the alert trigger, the business continuity plan (BCP) or the capital charge to buffer against the said risks, etc.

**Remark:** Details of the market risk assessment tools may be further studies from the Appendix.
3.2.2.3 Risk Monitoring and Reporting

(1) Assessment of the effectiveness of the market risk monitoring system and examine if the data reporting enables the board of directors of the financial institution and senior management to assess the level and inclination of the overall market risk by considering:

- The sensitivity of the principal assumptions adopted.
- The balance between the risks incurred and the result of the performance.
- The operations of the financial institution are within the risk level stipulated by the board of directors.
- The verification of market risk policies and sufficiency of the risk assessment system as well as the development of strategies to correspond with the existing risks.
- The method used by the financial institution to compile data corresponded with the characteristics and existing market risk constraints.
- The audit conducted by the financial institution on the effectiveness of the information technology for providing past data, trends and customers' information to be used in assessing behavior assumptions of the customers such as prepayment of loans, early withdrawal of deposits, etc.

(2) Risk reports containing up-to-date and correct data are submitted to the board of directors of the financial institution as appropriate such as monthly, quarterly and in case of market volatility, the frequency may be increased. Additionally, the said reports provide comparisons between the actual risk volume of the financial institution and the stipulated policies of risk limits.

(3) The rules, procedures and monitoring process with regards to risk prevention are stipulated as follows:

- There are daily management and operating procedures regarding risk prevention.
- There are instructions for the approval procedures for the undertaking of new products, various markets and maturity extension of any financial tool.
- Authorities and line of commands of executives involved in the decision makings related to risks are stipulated, such as the override or approval of transaction exceeding the risk ceiling, etc.
• There is supervision by senior management.
• Strategies and transactions are adjusted in keeping with the market conditions.

(4) The movement of the budget in the budget report during the past 12 months is reviewed with an emphasis on earnings.

(5) The conducts of the management comply with the internal policies of the financial institution regarding the review, modification of assumptions related to pricing revaluation and risk assessment simulation models to determine whether the factors used in the setting of the assumptions and the policies are rational or not.

3.2.2.4 Risk Control and Limits

(1) The adequacy assessment of the policies regarding market risk management, operating procedures and internal control for the purpose of limiting risks to the tolerable level shall consider the followings:

• The congruity of the risk management policies, the directions and business strategies as well as restricting risks within a tolerable level.
• The appropriateness of the guidelines adopted to set the risk limits or position limits including the periodic reviewing of the said limits.
• The rationale of the rules and guidelines of approval process of the policy exceptions.
• The procedures to comply with the set risk limits and the appropriateness of the procedures for approving the exceptions.
• The quality of the accuracy control procedures, the integrity and reliability of the information.
• The appropriateness of the adjustment of risk limits in response to the changing of the market environment.
• The independence of the officers responsible for the monitoring - controlling of risks from the risk takers.
• The assessment of the response of the risk control system to the arisen errors of the internal control.

(2) The types of risk limits adopted are audit to ensure that they are suitable to the business strategies, policies, risk tolerance and capital funds.
(3) The setting of the types of risk limits for long-term positions such as position limit of each portfolio, limit of the size of gap in medium and long terms, the vulnerability limit of the economic values of the financial institution, etc., is audited.

(4) The undertaking of transactions is audited to determine if it is within the set limits as well as the reporting to the management and the approval of the exceptions related to risk limits.

(5) Does the establishment of the risk limits of the financial institution comply with the position, quality of risk management, the proficiency of the management and the capital fund or not; has it been approved by the senior management or not; are the risk limits set at too high a level or not?

(6) The verification of the structure of the risk limits related to the treasury management activities shall consider:

- The congruity between the risk limits and the strategies as well as returns.
- The appropriateness of the risk limits to the qualifications of the treasury management staff and their experience in earning profits or incurring losses.
- The risk control is sufficient during the normal and volatile market conditions.
- The risk limits reflects the liquidity differences in normal and volatile market conditions such as during the volatile situation, the financial institution may set risk limits at lower levels than it may during the normal situation.
- The suitability of the assignment of responsibilities of the dealing desks.
- Is the assessment of the risk limits reviewed continuously, in particular upon changing of strategies, personnel and market environment?
Section 4 Appendices: Market Risk Management Tools, Simulation Models, Etc.

Market risk tools and simulation models herein shall provide details of the tools and models that are generally employed by financial institutions, which in most case they are for managing risks arisen from interest rate. Examples are gap report, earnings simulation model, economic valuation model or duration model /convexity, value at risk model, and Monte Carlo simulation.

a. Gap Report

Gap report is often used in assessing and managing the position of interest rate risk arisen from mismatch of maturity and re-pricing period. In general, the basic gap report is unable to specify all interest rate risks. However, the financial institution can modify the basic gap report to be able to specify risks from the basis risk yield, curve risk and option risk.

The gap report separates assets, liabilities, and all off-balance sheet items of the financial institution into different groups according to residual periods before the next re-pricing or the maturity dates of those tools. The balance of each time period will be combined (assets and off-balance sheet items that are in long position have positive values and liabilities and off-balance sheet times that are in short position have negative values). The remainder is the net gap position of each time period. The size of the said gap in each period and the duration which the gap remains, are factors to assess the risks.

Financial institutions can use the gap report to specify and assess the imbalance of repricing both in short and long term. They can use this information to estimate earnings and economical risk under the stipulated constraints. The gap report is useful in specifying risks from repricing of the budget structure prior to making decision to invest in new business or to reinvest of the matured funds in any time band. Nevertheless, the financial institution may have a gap report that is positive, negative, or zero. By having positive gap report, when the assets have to be repriced or more reach maturity than liabilities, or so called being “asset sensitive” in that time band. Such financial institutions having more assets than liabilities will get benefits from an increase of interest rate as the assets will be repriced (interest rate) faster than liabilities.
Table 1

Sample Gap Report Schedule

<table>
<thead>
<tr>
<th></th>
<th>&lt; 1 Mo.</th>
<th>1 - 3 Mos.</th>
<th>3 - 6 Mos.</th>
<th>6 - 12 Mos.</th>
<th>1 - 2 Yrs.</th>
<th>2 - 3 Yrs.</th>
<th>&gt; 3 Yrs.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans</td>
<td>100</td>
<td>10</td>
<td>20</td>
<td>45</td>
<td>5</td>
<td>20</td>
<td>30</td>
<td>230</td>
</tr>
<tr>
<td>Investments</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>50</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Other Assets</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assets</td>
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<td>15</td>
<td>25</td>
<td>55</td>
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<td>40</td>
<td>95</td>
<td>360</td>
</tr>
<tr>
<td>Nonmaturity Deposits</td>
<td>-65</td>
<td></td>
<td></td>
<td></td>
<td>-30</td>
<td>-50</td>
<td>-145</td>
<td></td>
</tr>
<tr>
<td>CDs and Other Liabilities</td>
<td>-35</td>
<td>-35</td>
<td>-45</td>
<td>-30</td>
<td>-10</td>
<td>-10</td>
<td>-20</td>
<td>-185</td>
</tr>
<tr>
<td>Total Liabilities</td>
<td>-100</td>
<td>-35</td>
<td>-45</td>
<td>-30</td>
<td>-40</td>
<td>-10</td>
<td>-70</td>
<td>-330</td>
</tr>
<tr>
<td>Equity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-30</td>
</tr>
<tr>
<td>Net Periodic Gap</td>
<td>5</td>
<td>-20</td>
<td>-20</td>
<td>25</td>
<td>-15</td>
<td>30</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Cumulative Gap</td>
<td>5</td>
<td>-15</td>
<td>-35</td>
<td>-10</td>
<td>-25</td>
<td>5</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

Financial institutions possessing a negative gap are called “Liability Sensitive” meaning that they have liabilities to be repriced during such period more than assets. The financial institutions having assets equal to their liabilities are called “Neutral Gap”. In any case, this group of financial institution is without any risk when interest rate changes in any situation because even though they have low repricing risks, but they are still subject to the risk from interest rates changing at different rates (basis risk). Moreover, changes in the relationship of various interest rates cannot be assessed from the basic gap report in this example.

From the example in Table 1, it can be seen that the financial institution is “Asset Sensitive” in the time bands of less than 1 month, 6-12 months, and more than 2 years. If the interest rate in the said time band increases, it will receive higher net interest income. Vice-versa, when the interest rate decreases, its net interest income will also decrease.

Normally financial institutions will use information in gap report to assess how the imbalance of the repricing of the financial institution affects the vulnerability of net interest income when interest rate changes. Moreover, the repricing information can also be used to assess the vulnerability of net economical value to changes of interest rates.
1. Creating Gap Report

In creating gap report, the following factors should be included:

1.1 Various Items in the Gap Report

(1) Assets, debt and off-balance sheet items that are rate sensitive, must be all included in the gap report.

(2) Financial institutions should consider all of the assets and liabilities, including those that are not sensitive to interest rate as well. Since the assets with such characteristics may change in their conditions and become assets that require repricing, While the liabilities without interests such as current deposits should also be included in the report, even though there is no apparent payment of the interest since upon their maturities, the financial institution may incur interest rate risks (such as when the financial institution may need to find sources of funds to replace the current deposits through using new sources that may contain interests such as certificates of deposit).

(3) If the financial institutions largely book transactions in currencies other than Baht, they should have a gap report for each currency, as the interest rates in different countries may move in opposite directions and have different volatilities. Nonetheless, if a financial institution has a policy to not take any position or disparity in repricing of foreign currency items (zero gaps); it may not need to prepare any gap report for foreign currencies.

1.2 Time Band

The financial institutions must decide how many time bands they should have in the report. The narrower a time band, the more accurate the risk assessment. When assessing earning risk, the report should, at least, divide the time into monthly bands for the first year and into quarterly bands in the second year. If the reports are for long-term assessment of risk position and risk to economical values, the time band should be extended to the last period of maturities of the assets and liabilities.

The time bands that are further away such as after 10 years may be set to be wider such as 5 years because the vulnerability to interest rate does not change significantly for maturities which exceed 10 years. In other words, the use of a wide gap after 10 years will not cause any error in the estimation of risk positions from rates during such periods.
1.3 **Report of Off-Balance Sheet Items**

The gap report should include all off-budget positions which values change with the interest rates such as forward interest rate contracts, forward exchange rate contracts, options, etc.

Off-balance sheet tools usually are reported by separating them into 2 components that can offset one another upon interest rate change. In other words, one component is the notional amount of the contract that will be reported as a positive value. Another is the offset component which will be reported as a negative value. If the off-balance sheet position increases in its value when the interest rate decreases (e.g. holding a forward contract, holding a floating interest rate swap contract, purchasing a call option and selling a put option, etc.), the first component will be a negative value and the second will be positive. Vice-versa, of the position increases in its value when the interest rate increases (e.g. selling a forward contract, holding a fixed interest rate swap contract, selling a call option and purchasing a put option, etc.), the first component will be positive and the second will be negative. As such, they will reflect the effects of the off-balance sheet tools on the due date of the assets on the balance sheet.

For example, the financial institution has an interest rate swap contract of 5 years, with a value of USD 100 millions, receiving a fixed interest rate and paying an interest referenced to the 3-month LIBOR rate, the financial institution will report a positive position of USD 100 millions in the 5-year time band and negative USD 100 millions in the 3-month time band. Such treatment will reflect the fact that the financial institution long a fixed income (since holding an asset with a fixed rate) and short payment at a floating rate (since having a floating rate liability).

Holding a forward purchase contract will increase the age of the asset for financial institution, while the selling of a forward contract will decrease the age of the asset. Therefore, by having a forward contract of 10 years that will mature in 5 months, it will be reported as a negative value in the 5-month time band and a positive value in the 10-year time band.

Derivatives such as caps and floors will have problems in gap report because most of the reports will assume static interest rate so there will be no records of caps and floors until the interest rate reaches the strike rate. Assuming the financial institution holds an interest rate cap with the term of 10 years, before the interest rate reaches the strike rate; the gap report will state a floating rate liability position and will not state the cap option, which converts debt to at
a fixed interest rate for 10 years. If the interest rate reaches the strike rate stated at cap but when the interest rate is equal to the strike rate, the position will turn to a fixed rate liability of 10 years.

1.4 Report of Positions Related to Instruments with Embedded Options

Many types of products with options that the investors (or the buyers) of such products is able to exercise the rights to effect the conversion of the asset in accordance with the stipulated conditions which may affect the value of the asset to fluctuate with the volatility of the interest rate. Therefore, the financial institution should include these products into the report as well.

The cash flow of the products with options will depend on the direction of the movement of the interest rate. Therefore, the different movements of the interest rate should also be kept in mind because the exercise date will change with the said movement and will affect the cash flow. A gap report only will give an incomplete picture of the option products, as the report consists of only one repricing date.

There are 3 widely used methods of consolidating risk positions of option instruments in the gap report as follows:

Method 1 Setting the cap to be fully affected from the residual period of the particular product or without regards to the cap during such period by selecting one method. An example of the cap in floating interest loan, the financial institution extends credit of USD 100 thousand with a 10-years term, floating interest rate and repricing every 6 months but capping at 12% throughout the term of the contract (interest rate of the loan will not be higher than 12%). Using method 1, if the market interest rate is lower than 12%, this method will consider the loan as having a floating interest rate of 6 months but if the market interest rate is equivalent to or exceeds 12%, the loan will convert to a fixed interest rate which will be due for repricing in 10 years.

This method has some limitations which are: 1) it does not accurately reflect the risk position of net interest income to the changes of future interest rate. For example, if the loan is an asset subject to reprice every 6 months and the source of funds is 6-month certificates of deposit. The gap report between assets and liabilities will not express the interest rate risk but if the interest rate exceeds 12%, the loan cannot be repriced but the source of fund from certificates of deposit continues to increase, causing a decrease in the spread; 2) it does not suggest how to protect the risk position against the risks. Regardless of whether to deem the asset as being 6-
month floating rate or the 10-year fixed rate, the protection of the asset against the risks are both inappropriate.

**Method 2** A better methods as the financial institution should have 2 sets of gap reports. The first set is for high interest rate situation. The other is for low interest rate situation. In the case of high interest rate, the cap will be included as fixed interest rate loan. In the case of low interest rate, the report will express it as a floating interest rate loan.

The financial institution should use a similar method to assess risks from the prepayment option for property loans with fixed interest rates. In the events of high interest rate, the weighted age of these property loans with fixed interest rates will increase in report, reflecting slower repayment. In the events of low interest rate, the weighted age will be shorter, reflecting faster prepayment. The comparison of these two gap reports will indicate the numbers of risks from option instruments that the financial institution is facing.

Although the second method can assess that the embedded options may change the reprice disparity under various interest rates, it also has a limitation that it gives specific values to the options when consolidated or when they are in the money. In reality, the options possess values throughout their terms and their values depend on other factors such as residual time, difference from the strike price and the volatility of interest rate, etc.

**Method 3** Consolidation of options in a report will allow the options to have different values according to the underlying instruments. It is accomplished by combining the options of delta-equivalent in the report. The derived values of delta-equivalent of the weights between 0 to 100% will reflect the possibility that the options will be in the money.

In the above example of the loan having a cap of 12% throughout its term, the financial institution can separate the cap from loan and treat the cap and loan as 2 separate tools. The financial institution will report the loan as having 6-month floating rate and report the cap as an off-balance sheet with value equivalent to delta value. This value will be equal to delta of cap times the notational amount of the cap (in this example, it is USD 100 thousand).

The cap in this example will have the delta value between 50% and 100% when the interest rate exceeds 12%. A high delta value indicates the possibility of the cap option will be exercised during the term of the loan. If the market interest rate is 8%, the delta will decrease significantly, reflecting decreasing possibility that the cap option will be exercised during the term.
The limitation of this delta method is the delta of option will change in relations to the time and the interest rate with non-linear characteristic. Therefore, the value of delta-equivalent of options is applicable only when the changes in interest rate are small, where the value of delta-equivalent changes constantly.

2. **Assessment of Interest Rate Risks by Using Gap Report**

2.1 **Assessment of Net Interest Income at Risk**

After the financial institution categorizes the assets, liabilities, and off-balance items into groups according to their time bands and sets the procedures for options, the financial institution must assess the net interest income at risk. The formula for converting the gap between assets and liabilities to net interest income upon risk events for the assessment of risk positions during different time bands are:

\[
\text{Change in Net Interest Income} = (\text{Periodic Gap} \times \text{Change in Interest Rate} \times \text{Period that Periodic Gap is in Effect})
\]

From the example of the gap report shown in Table 1, if the interest rate increases instantly 2% (200 basis points), the calculation of changes in net interest income will be as shown. During the 1-3 month time band, the financial institution will have more liabilities than assets by the amount of USD 20 millions (Liability Sensitive) which means that there are more liabilities needed to be repriced or matured more than assets. Therefore, for the residual period of 10 months from the 12-month period, the financial institution will be liability sensitive to the amount of USD 20 millions that must be repriced at 200 basis points higher as shown in Table 2. The increase of interest rate will cause the financial institution’s earnings during 10-month period to decrease by approximately USD 333,000. The accumulated difference for every time band in the period of 12 months will have an impact on the earnings which is a decrease in the net interest income by approximately USD 362,500.
The above method of estimating the effects to net interest income is a rough method of estimation with the following assumptions.

- The repricing and maturities in each time band occur concurrently such as at the beginning, middle or the ending.
- All matured assets and liabilities are reinvested at the overnight interest rate.
- No new transaction.
- The overnight interest rate changes instantly as a fixed rate.
- All types of interest rates change uniformly. The sensitivity of the outcome to this assumption can be tested by using a simulation model.

### 2.2 Assessment of Risks to Economical Value

Gap report may use to assess risk position of the economical value of the financial institution to changes in interest rate by multiplying the net balance of each time band with the sensitivity of the price to changes in interest rate to estimate the changes of the present values of financial tools with similar cash flows and maturity dates. For example, the financial institution records government securities with a term of 2 years, value of USD 10 millions in the time band of 2-3 years of the report. It will multiply the balance of that value with the estimated present value of the said securities. When the interest rate changes by 200 basis points, the present value of the instrument having a coupon of 7.5% will be decreased by 3.6%. Hence, the
market value of the instrument of USD 100 millions with 2-year term will decrease by approximately USD 360,000 (USD 10 millions multiplies by negative 3.6%).

This price sensitivity can be applied with other financial tools and for other time bands. The risk position for the net economical value of the financial institution will be equal to the sum of the weighted balances.

3. Limitations of Gap Report

3.1 Basis Risk

Gap report will focus on the level of net repricing by assuming that in each time period, the changes of the interest rates of assets and liabilities will completely offset each other. However in practice, assets and liabilities will be valuated from different return curves or indices and do not always move together in terms of volume and directions.

The financial institution should adjust gap report in order to rectify above problems of basis risk\(^9\) by having the following guidelines.

1. For the ease of interpretation of the meaning of the risk from unequal changes in interest rates, the financial institution may group the tools with similar basis together and report the interest rates as well as the average rates of returns of each group such as in the 30-60 day time band, the unevenness from the repricing for accounts referenced to the return rates of the certificates of deposit will be reported in one group, separated from the accounts that reference to the rate of returns of government bonds. This method will roughly estimate the value of risk from uneven changes of interest rates on the balance sheet.

2. Some financial institution will prepare a beta-adjusted gap report to assess risk from uneven changes of interest rates. In such report the balance which is repriced for each account will be multiplied by a correlation between the pricing behavior of such item and the referenced interest rate. For example, the report is able to compare the pricing behavior of every item with the official reference rate. If the analysis indicates that the setting of deposit rate will change by 50 basis points for every change of the official rate by 100 basis points. 50% of the

\(^9\) The values of assets and liabilities used for the calculation in each time band in the gap report are not tied to the same interest rate causing the movement of the values of the assets and liabilities to be disproportionate i.e. it does not have a relationship of 1 to 1 or have basis risk.
said balance will be expressed as a short-term rate-sensitive and the rest of the balance will be deemed as having longer maturity.

Nonetheless, beta-adjusted gap report does not always portray the complete picture of risk arisen from uneven changes of interest rates because the correlation between the setting of price and market interest rate when the interest increases and decreases differently and yet different in each time band. The financial institution must estimate the correlation value or beta in each situation.

From the aforementioned limitations of the gap report, the analyst must understand the limitation in using the said report to assess the risk positions of earnings upon interest rate changes.

3.2 Yield Curve Risk

In assessing accumulated risks from repricing in many time bands, the majority of the users of the report will compile the gaps of every time band to find the accumulated position of all the gaps of assets and liabilities. This method will assume that the interest rate in every time band will change in a correlated manner and change at the same rate. This assumption can be adjusted by weighting each time band with a different rate such as for the gap between assets and liabilities in a shorter period will weigh more than that of a longer period because the short-term interest will fluctuate more and change in a larger number than long-term interest.

The configuration of the gaps between assets and liabilities will be the indicator of the risk position of the financial institution to the changes in the shape of yield curve. If the financial institution has a negative gap in both short and long term but positive in medium term, it will have a flat risk in relations to the yield curve when the short-term interest rate increases and a stable long term rate. The gap of net interest will decrease because interest of the liabilities in short term will increase. Nevertheless, because long term interest rate is stable, the market price of the long term liabilities will be stable. Hence, the financial institution will not benefit from decrease of the future value of long-term obligation.

3.3 Option Risks

Assessing option risks by using gap report is difficult because the underlying options will cause imbalance and non-linearity in the risk characteristics of the financial institution.
Even though there are various techniques that attempt to remedy this point such as employing many sets of reports or reporting the value of the option compared to the delta value. Such techniques are still unable to fully assess the risks. The financial institution possessing a high risk of this type must use gap report with an income simulation model or an option price simulation model.

### 3.4 Gap in a Time Band

Even though the gap report will reference to balance separated into time bands but the said report does not disclose the imbalance in those time bands. Some financial institutions attempt to rectify this weak point by reporting the weighted matured values in each time band or reducing the width of the time bands.

### 3.5 New business

Most gap reports of most financial institutions will examine only the present financial position of the financial institution. Hence, these reports are static because they only assess risks arisen from the current balance sheet structure without including assumptions on new businesses. Some financial institutions may prepare dynamic reports which create from income simulation model and express the future gap for the financial institution after incorporating the assumptions about new businesses in the risk assessment.

Other than the using gap report, most financial institutions also like to assess risk by using tools like models to simulate general situations, i.e. statistic tools used to estimate variables which values are not definite. The estimation then must involve the probability and the assigning of accepted confidence level. Risk is also one of the variables that we do not know its definite value such as market risk which means changing of different market risk factors e.g. interest rates, exchange rates, prices of debt instruments and equity instruments, including prices of commodities traded in the financial market that affect earnings or capital funds of financial institutions.

Therefore, the simulation model used in assessing market risk is a statistical tool in estimating the highest possible value of losses that may occur under a certain level of confidence. Models for assessing the amount of other types of risks are simulation models of credit risk that mainly have similar line of thoughts and methods of preparation. The financial institutions can use the estimated risks assessed from this model in the risk management to keep them below the acceptable levels.
Earning simulation model is a tool to assess interest rate risk that occurs from business situation in both present and future. The model can simulate risk position of the financial institution under various assumptions so it can be used to separate the sources of risks or to assess some types of estimated risks. Normally the financial institutions will prepare models for many scenarios under various assumptions and situations that are different in each scenario.

In general, earning simulation model will be more dynamic than the analysis of the gap and market price simulation model because these two types will present pictures of risks at a certain time. However, earning simulation model will assess risk positions throughout the duration by considering changes in the balance sheet, prices, time, relationships between maturity periods and assumptions about possible new businesses.

Financial institutions usually use the earning simulation model to analyze its options in decision making or to test the effects of the decision on risks of the financial institutions before actual implementation. Above all, it can also be used to plan budgets and profits.

1. Creating Net Earnings Simulation Model

Most simulation models will link with computer programs that calculate in series under difference scenarios and assumptions. The data used comprises of the current data of the financial institution, the assumptions of the management about future changes in interest rate, consumer’s behavior and new businesses. The model will estimate cash flows, earnings, and future expenses. The assumptions adopted to set the expanding rate of credits, funding plans and others related to replacing different assets and liabilities (the main component of the simulation model is shown in the table below).
In general, information from the accounting ledgers and accounting entries will provide information about the current position of the financial institution of each portfolio in the accounting chart of the simulation model. This information hence is similar to the one used in the gap report which is composed of information related to the current balances, interest rates, repricing of products and the terms till maturities. The information regarding new businesses and re-investment plans are employed to create assumptions by the management. Such assumptions may come from the past trends, business plans or economic simulation model by assuming market interest rates and the composition of the businesses. To forecast the interest rate will be a of conjecture in the directions of the interest rate, the characteristics of the future rate of return curve in the future and the relationship between the indices employed to set the prices of the products.

Possible risk positions are estimated by calculating how the changes in interest rate will affect the values, earnings, and the expensed of the financial institution.

The outcomes of the earnings simulation model consists of 1) future balance sheets and income statements under various interest and business composition scenarios, 2) Analyses of various scenarios that affect the values of target items and 3) Visual presentations of the analyses used to communicate the outcomes to the management and the board.

2. Assessing Risks by Using Earning Simulation Model
The volatility of interest rate will impact the derived outcomes, in particular the net interest income or net income. Most earnings simulation models can assess the effects to market values of the capital funds, if there is any change in market interest rate and business strategies.

The table below shows the report of income generated by an earnings simulation model. This report expresses the fluctuation of net interest income under various interest scenarios by assuming that the interest rate has a flat rate of changes. The same types of reports usually are generated to indicate how the net interest income will alter according to business composition and strategies.

<table>
<thead>
<tr>
<th>Net Interest Income Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(In millions of dollars)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Nil Flat</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Qtr 1</td>
</tr>
<tr>
<td>Qtr 2</td>
</tr>
<tr>
<td>Qtr 3</td>
</tr>
<tr>
<td>Qtr 4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

The financial institution may institute risk limits to limit the interest income losses in various situations in the stated periods such as in the above table, it may restrict the annual net interest income losses from interest rate change of 2% (200 basis points) at 10% of the net interest income.

3. **Attributes and Limitations of Earnings Simulation Model**

3.1 **Attributes of the Earnings Simulation Models**

Utilization of the earnings simulation models allows flexibility in the gap report analysis because the various assumptions as well as variables used for the calculation may be modified. For example, the gap report assumes that the interest rate changes only once, while the earnings simulation models can incorporate dynamic changes and such changes need not be flat. Moreover, the gap report tends to assume that the all current assets and liabilities are reinvested...
at the overnight rate upon maturity while the earnings simulation models are able to employ the
business forecast that is closer to the reality as they are able to carry many types of simulated
scenarios. Thus they allow more flexibility than the sensitivity analysis of the interest rate
changes.

The crucial attribute of the earnings simulation models is that it can show
risks in a clear and meaningful format to the management and the board of directors. The
outcomes of the earning simulation models express risks and returns at various interest rates in
the form of net interest income, net income and present values (economic value of the capital
fund) which are the basic financial information understood by the management of the financial
institutions.

The earnings simulation models may differ according to the complexity and
accuracy. The modern development in technology reduces the construction cost of the simulation
models and enables faster computation.

- The earnings simulation model can support the gradual repayment of the
  principal such as instalment payments.
- The cap and floor of the adjustable rate loans or property loans which allow
  prepayment under various interest rate scenarios (with embedded options) can
  be accommodated.
- Swaps and forward contracts are supported.
- The relationship between interest rate and rate of return curve may be varied.
- The internal conformity of the assumptions is tested.
- The market risks and economic risks to interest income are analyzed.

3.2 Limitations of the Earnings Simulation Models

Although the earnings simulation models may be more useful than other
methodologies, they however may indicate inaccurate risk positions since they are based on the
management’s assumptions on future businesses of the financial institution. Such is the chief
limitation.

There are numerous assumptions in an earnings simulation model which
makes it more difficult to estimate how much a variable affect the values of the target items.
Hence, many financial institutions supplement the model by separating risks on the balance sheet
by using the gap report or the assessment of risk on economic value of the capital fund.
In assessing earnings upon risk occurrence, the financial institutions often limit the risk assessing period to 2 years because the interest rates and estimated business assumptions after 2 years have high uncertainty. Hence, the financial institutions employing an earnings simulation model for 1-2 year periods are unable to capture all the long-term risks. Such financial institutions should supplement the derived outcomes from the model with the gap report or the simulation model on the economic value of the capital fund which assesses the long-term risk positions of repricing.

C. Economic Valuation Model or Duration Model and Convexity

Similar to the earnings simulation model, the economic valuation model is a tool to assess risks from interest rates arisen from the present and future business situations that are dynamic and able to simulate the risk positions of the financial institutions under various assumptions.

The economic valuation model can show the sensitivity of the economic value (shareholders’ equity) to the changes of the market interest rate by utilizing the concept of present values of assets and liabilities.

1. Creating Economic Valuation Model

The net economic value of a portfolio is derived from:

\[
\text{Net Economic Value of Portfolio} = \text{Present Value of Net Cash Flow from Assets} - \text{Present Value of Net Cash Flow from Liabilities} + \text{Present Value of Net Received Cash Flow from Options or Off-Balance Sheet Contracts Held}
\]

This method utilizes the information of the portfolios during a time band to estimate its base value and the value of the portfolios at 6 various interest rates (-300, -200, -100, +100, +200, +300 basis points). The information employed is all the assets, liabilities and off-balance sheet items in conjunction with the rate of returns in each time band (Term Structure) at the end of period.
The derivation of the economic value may be accomplished by many methods. However, most apply discounted cash flow analysis. This method estimates the cash inflow and receiving time of each type of the financial tools, and then multiplies the said cash flow by an appropriate discount factor.

The basic formula to derive the present value is:

\[ PV = CF_1 \left[ \frac{1}{(1+Z)} \right] + CF_2 \left[ \frac{1}{(1+Z)^2} \right] + \ldots + CF_t \left[ \frac{1}{(1+Z)^t} \right] \]

The accuracy of the method depends on the precision in estimating the cash flow and discount factor used in the analysis. The discount factor should be the rate of return that the investor desires in holding such financial tool, which is equivalent to the risk free interest rate and risk premium that compensate the risk of such tool to the investor including the credit risk and liquidity risk.

This discount rate will increase or decrease according to the general interest rates. If the interest rate increases, the investor will want a higher rate of return which causes the rate to increase and the present value of the cash flow and asset price to decrease.

Moreover, the size and timing of the cash flow will change according to the changes in interest rate. For example, if the interest rate decreases causing the more prepayment of loans or in the case of cap and floor, the value will change when the interest rate is equal to the strike rate.

There are two techniques in deriving the present value based on cash flow. These are the static discounted cash flow method normally utilized with financial tools without any embedded options such as consumer loans, corporate loans, fixed deposits, current deposits, interest rate swaps, etc. and option-based pricing approach used with tools with embedded options such as property securitized loans. Since this type of instruments allows the borrowers to prepay before due, it causes high uncertainty in the cash flow.

Therefore, the option-based pricing using the concept of the Monte Carlo simulation will be able to better estimate the sensitivity of the property securitized assets than the static discounted cash flow because it takes into account the changes of interest rate in conjunction with the prepayment simulation in order to estimate the cash flow from the securitized
loans or, in other words, the optioned based pricing is several executions of the static discounted cash flow in various interest rate directions.

2. Assessing Risks by Using Economic Valuation Model

This method of risk assessment may be classified into 6 scenarios, which are interest rate decreases by 300, 200 and 100 basis points and increases by 100, 200 and 300 basis points and the base case is shown in the example below:

<table>
<thead>
<tr>
<th>Change in Rates</th>
<th>$ Amount</th>
<th>$ Change</th>
<th>% Change</th>
<th>NPV Ratio</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>+300 bp</td>
<td>34,152</td>
<td>-140,007</td>
<td>-90%</td>
<td>1.32%</td>
<td>-500 bp</td>
</tr>
<tr>
<td>+200 bp</td>
<td>99,110</td>
<td>-65,129</td>
<td>-40%</td>
<td>3.30%</td>
<td>-296 bp</td>
</tr>
<tr>
<td>+100 bp</td>
<td>135,149</td>
<td>-30,060</td>
<td>-22%</td>
<td>4.60%</td>
<td>-133 bp</td>
</tr>
<tr>
<td>0 bp</td>
<td>174,239</td>
<td></td>
<td></td>
<td>6.32%</td>
<td></td>
</tr>
<tr>
<td>-100 bp</td>
<td>201,330</td>
<td>27,090</td>
<td>+10%</td>
<td>7.20%</td>
<td>+68 bp</td>
</tr>
<tr>
<td>-200 bp</td>
<td>213,431</td>
<td>39,192</td>
<td>+22%</td>
<td>7.56%</td>
<td>+124 bp</td>
</tr>
<tr>
<td>-300 bp</td>
<td>222,071</td>
<td>47,832</td>
<td>+27%</td>
<td>7.80%</td>
<td>+147 bp</td>
</tr>
</tbody>
</table>

**Denotes rate shock used to compute interest rate risk capital component

The value of the portfolio at the interest rate level as at the reported date is equivalent to USD 174,239,000. On the various levels of the interest rate changes, the impact on the total value of the portfolio differs. When the interest rate increases, the value of the portfolio will diminish and will increase when the interest decreases.

For example, the ratio used to assess the impact of the interest rate changes to the value of the portfolio based on net present value (NPV) may be derived from 2 cases:

Pre-shock NPV ratio is the NPV of the fixed interest rate base shown as the ratio of the shareholder's equity to the total assets (leverage ratio) of the present value.
Pre-Shock NPV Ratio = \( \frac{NPV_{Base}}{PVA_{Base}} = \frac{174,239}{2,735,760} = 6.32\% \)

PVA (Present Value of Assets) is the value at present of the total assets at the present level of interest rate.

Post-shock NPV ratio indicates the strength of the capital fund and the sensitivity to the interest rate change. For example, if the interest rate increases by 200 bps, how will the ratio of the shareholders’ equity (in the net present value format) to the present value of total assets changes? If this ratio diminishes significantly, the financial institution may consider reducing the positions sensitive to the interest rate or build up a more secured capital funds.

\[
\text{Post-Shock NPV Ratio} = \frac{NPV_{After\,Adverse\,Shock}}{PVA_{After\,Adverse\,Shock}} = \frac{NPV_{+200}}{PVA_{+200}} \text{ (or } NPV_{-200} \text{)} \quad \text{whichever is lower}
\]

\[
= \frac{89,110}{2,650,131} = 3.36\% \quad \text{or} \quad \frac{213,431}{2,823,480} = 7.56\%
\]

The sensitivity measure can be assessed from the differences of pre-shock and post0shock NPV ratios by expressing the net present value ratio (as basis points) to the changes in interest rate.

In general, financial institutions having sensitive positions (such as duration of the assets, etc.) that is great imbalance between the assets and liabilities will likewise have high ratios. Nonetheless, this ratio does not always reflect interest rate risk because such depends on the strength of the particular financial institution’s capital funds and other factors.

<table>
<thead>
<tr>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-shock NPV Ratio</td>
</tr>
<tr>
<td>Post-shock NPV Ratio</td>
</tr>
<tr>
<td>Sensitivity Measure</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-shock NPV</td>
<td>6.32</td>
</tr>
<tr>
<td>Post-shock NPV</td>
<td>3.36</td>
</tr>
<tr>
<td>Sensitivity Measure</td>
<td>2.96</td>
</tr>
</tbody>
</table>
In assessing the sensitivity of the position of economic risk to the interest rate changes, the simulation model calculates the conversion of cash flow by various interest rates in the same fashion. The levels and durations of the cash flows of products with options will often change with the rate used to assess such as the rate of prepayment will increase when the interest rate decreases.

The outcome of the risk assessment by using economic valuation model is that the ratio of the present value of the portfolio to the net present value of the total assets under the scenario of changes interest rate on various levels. When the economic value changes in the case where the position indicates sensitivity of the economic value to the interest rate, the more the economic value changes the riskier is the position of the financial institution.

**Calculation of Duration**

Most sensitivity simulation models will calculate the duration value in the sensitivity assessment of the assets and liabilities held by the financial institution. It is derived by using weighted average cash flows to be received from the products in the future (weighted average time to maturity). The weight assigned is the age of the cash flow in each period which is equivalent to the proportion of the present value of the amount of cash flow discounted by the rate of return to the price of the product, the so-called “Macaulay Duration”.

However, if the value of the products changed due to the interest rate change is required, it is necessary to calculate the “modified duration” derived from dividing the Macaulay duration with \((1 + \text{Present rate of interest})\). The modified duration will mean that if the interest rate changes by 1%, the value of the product will change equally to the modified duration.

The table below demonstrates the calculation of the Macaulay duration and modified duration of an instrument with 2-year term, value of USD 100,000, paying interest semi-annually and has a coupon of 7.5% purchased when the face value yields a rate of return of 7.5% which this instrument has a modified duration of 1.82%. Hence, if the interest rate increases by 1% (100 basis points), the value of the instrument is expected to decreased by 1.82% (182 basis points).
The calculation on the Table does not adjust the cash flow with the interest rate changes. Hence, the modified duration calculation is not serviceable. In some instruments, the cash flow of the option will change upon interest rate change such as debt instruments with early redemption options, instruments backed by properties. To rectify this problem, many financial institutions employ effective duration derived from using simulation techniques to calculate the changes in the prices upon interest rate change by 100 basis points.

An example is, from the above Table, the debenture with a 30-year term. Upon calculating the present value of the instrument when the interest rate changes either up or down by 100 basis points, it appears that when it increases by 100 basis points, the present value of the instrument diminishes by 4.4%. Vice-versa, if the interest rate decreases by an equal amount, the value of the instrument will increase 3.75%. This is the same method shown in the EVE model. When both rates of changes are averaged, the effective duration of 4.08% is achieved or it may be derived from the formula:
Effective Duration = \[
\left[ \frac{PV_{100} - PV_{100}}{2 \times PV_{\text{Base case}}} \right] \times 100
\]

Effective Duration = \[
\left[ \frac{189,819 - 174,869}{2 \times 182,941} \right] \times 100 = 4.08
\]

Characteristics of Duration

In general, duration has the following characteristics:

1) The higher the duration value, the more sensitive is the value of such instrument to the changes in market interest rate.

2) Of the two products with the same residual terms, the one with higher coupon rate will have lower duration and its price will be less sensitive due to the majority of cash flow of the said product will receive faster interest causing a reduced average cash receiving period.

3) The duration of the fixed return that has one time cash flow (such as zero coupon bonds) will be equal to the residual term of such instrument. Therefore, the zero coupon bond with a residual term of 5 years will have a duration of 5 years. If there is a coupon payment before maturity, the duration will be reduced reflecting cash receipt before the due date e.g. a 5-year coupon bond paying a coupon rate of 100% has a duration of 4.2 year when the market interest is equivalent to 10%.

4) The fixed return instrument will have high duration if the market interest rate is low.

5) Duration may be positive or negative. The fixed return instrument will have a positive duration and its market value will diminish upon interest rate increase. However, the mortgage servicing rights and interest-only mortgage-backed securities will have negative durations because the increased interest rate will reduce the pace of the prepayment of mortgage-back loans and will enhance the market value of such instrument.

6) Duration can be added together when weighted by the number of contracts. For example, if the portfolio has investments in 2 instruments with the same market values. One has duration of 6 and the other of 2. Hence, the duration of this investment portfolio is 4. Consequently the duration is able to assess the position of economic value risk of one contract or of the portfolio which consists of several contracts at the market price. Duration of the portfolio is calculated by weighting all the cash flows of the portfolio with the residual terms.
Nevertheless, since duration of each tool is easily obtained, the financial institutions often calculate the duration of the portfolio by weighting the duration of each contract and sum up all the values. Many financial institutions use the duration to assess and limit risks in the portfolio with fixed return contracts. Such assessment will yield a more accurate result than limiting the number of instruments with residual terms held by financial institutions during some of the periods. Duration will also assist the portfolio manager in consolidating the risks of various contracts together by linking with the price sensitivity and help to prevent risks in the portfolio.

**Duration is Able to Assess the Economic Value of Equity**

Some financial institutions use duration to assess or prevent risks related to the sensitivity of the economic value of the portfolio equity to the interest rate changes. Duration of equity may be derived from duration of all assets, liabilities and off-balance sheet items.

To understand how duration of capital is used to assess risks, the economic value of the portfolio equity may be deemed as the position of the debt instruments held. Assets are deemed as holding bonds with positive durations and liabilities are deemed as selling bonds with negative durations. Duration indicates that the net economic value of the bonds (or portfolio equity) will increase or decrease upon interest rate changes.

In normal circumstances, financial institutions holding long-term assets while their sources of funds are from short-term debts will have positive equity duration. The economic value of the portfolio equity of the financial institutions will decrease upon interest rate increase. Financial institutions holding short-term assets which sources of funds are from long-term debts will have negative equity duration. The economic value of the financial institutions will increase upon interest rate increase. The higher the equity duration (regardless of positive or negative) the more sensitive is the economic value to the changes of interest rate.

3. **Attributes and Limitations**

3.1 **Attributes of the Economic Valuation Model or Duration Model**

Duration is a useful tool for establishing risk limits on net economic value of the financial institution or on some portfolio such as investment portfolio which better reflects risks in particular the sensitivity of the market price to the changes of interest rate. Some financial institutions try to limit risk positions by establishing simple position limits which tie to the residual...
terms of the bonds. Such limits are unable to assess the risk from the movement of interest rates as good as the limits that tie to Duration.

3.2 Limitation of Duration

Duration as a tool to assess the sensitivity of the economic value has some limitations. The Macaulay Duration, Modified Duration and Effective Duration can accurately assess the changes of values when the interest varies moderately and equally in every time-band. However, they are unable to assess the value changes when the interest in each period changes unevenly. The error which increases in proportion with the change of the interest rate is called convexity.

Duration of the different tools will change at different rates when duration drifts. In other words, the effectiveness of hedging of the portfolio hedged for duration shall diminish as time passes.

The Macaulay Duration, Modified Duration and Effective Duration assume that the expected cash flow from an instrument is constant. Hence, the duration assessment is unsuitable for tools with embedded options which tend to be more vulnerable to interest as the rate increases.

4. Convexity

The financial institution can adjust the limitation of the aforementioned Duration by finding the Convexity value to supplement the Duration value for the assessment of the response of product value to the interest rate at the present level as the Convexity can be utilized for the assessment of the value changes of an instrument in the non-linear fashion because the relationship between the price and return is not linear. The calculation formula is as follows:

Convexity of the instrument with constant return and without embedded option may be assessed by the following formula:
Convexity = \sum_{t=1}^{n} \frac{t(t+1)PVCF_t}{(1+Y)^2PVTCF_t} \]

Given:

- \( PVCF_t \) = Present value of the cash flow during \( t \)
- \( t \) = Duration of cash inflow
- \( n \) = Number of periods of cash inflow
- \( Y \) = Yield to Maturity
- \( PVTCF \) = Present value of the aggregate cash flow

The size of the price change which is the result of the relationship between price and interest rate is non linear, can be calculated as follows:

\[
\text{Estimated Value Change (Percentage)} = (0.5) \times \text{Convexity Value} \times \left(\text{Rate of Change of Interest}\right)^2 \times 100
\]

Example:

The table below calculates the Convexity of a debt instrument with coupon rate of 1% carried from the calculation of Modified Duration which expresses the changes of price of the debt instrument under the heading of duration calculation.

The above calculation of the change of bond price that is the result from the change of interest rate by 1% can be calculated from adding the Modified Duration and Convexity values. For debt instruments without embedded options, the Convexity shall always have a positive effect with the price while the Duration will have a negative effect due to the converse relationship between the price and interest rate. Hence, the value of the change of a debt instrument with coupon rate of 7.5% shall reduced by 1.84% (Duration - 1.82% + 0.02% Convexity). Conversely, if the interest rate decreases by 1%, the price of the debt instrument shall increase 1.84% (Duration of 1.82% + 0.02% Convexity).
D. **Value at Risk Simulation Model**

The Value at Risk Simulation is an acceptable tool for assessing market risks in addition to other tools e.g. Duration and Convexity, etc. The computed VaR means the maximum loss that the financial institution shall sustain under at a specific level of confidence during a specific period upon the changes of interest rate, the rate of exchange, price of debt and equity instruments as well as price of financial products.

1. **Important Variables**

   From the above definition, it can be seen that the calculation of VaR must stipulate two significant values, which are:

   (1) The Confidence Level indicated the probability of the maximum loss calculated by a simulation. Most financial institutions use the 95% or 99% Confidence Level which BIS prescribes 90%.

   (2) The Holding Period meaning the period which the financial institution required to liquidate/close out position depended on the structure of its portfolio. If it consists of government bonds which have liquid/deep market, it shall be able to close out the position easily and quickly, for example, in 1 day. However, in the event of an economic crisis such as Russian Crisis, even the Russian government bonds are difficult to sell in the international market, etc. The Holding Period in this case can then be longer.

   Therefore, the \( \text{VaR} = 300 \text{ million Baht} \) calculated from the 99% confidence level and the Holding Period of 1 day means that for the minimum 248 of 250 days (99%) that the Trading Port of the financial institution shall sustain a maximum loss of no greater than 300 million Baht.

2. **Risk Assessment**

   VaR may be calculated in 3 main methods as follows:

   (1) Parametric or Variance-Covariance is a method for calculating VaR from equation, volatility and correlation of various factors of market risk under the assumption that the
relative change of these factors has a Normal Distribution. An example for the calculation of this method is shown in the next section.

(2) Historical Simulation is a method for calculating VaR by valuating the present position of the financial institution using daily market price at no less than 250 days or 1 previous year. Then the maximum possible damage under the specific confidence level is calculated.

(3) Monte Carlo Simulation is method for calculating VaR by simulating various scenarios with regards to the Portfolio value and the distribution of the relative change of the various factors of market risk.

Each method has advantages and disadvantages shown in the table below. The financial institution should select a method appropriate to the type of financial tools held in its Portfolio such as Variance-Covariance method may not be suitable for a financial institution holding options since [the method] is unable to deal with the non-linear market risk.

Table of Advantage and Disadvantage of Methods for the Calculation of VaR

<table>
<thead>
<tr>
<th>Method</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance-Covariance</td>
<td>Simple to use</td>
<td>Inappropriate for Non-linear products e.g. Option. Calculated from historical data under the assumption that the relative change of market risk factors has a normal distribution.</td>
</tr>
<tr>
<td>Historical Simulation</td>
<td>Fairly accurate(^{10}) for nearly all types of financial products</td>
<td>Calculation using historical data may not be accurate for high confidence level.</td>
</tr>
</tbody>
</table>
| Monte Carlo Simulation  | Most accurate for nearly all types of financial products  
Able to stipulate various assumptions | Time consuming. Utilize large computer capacity. |

\(^{10}\) Accurate measurement by using Back Test, detail is in the section G Back Testing of the Appendix.
### Table of Relationships between VaR Calculating Methods and Types of Products

<table>
<thead>
<tr>
<th>Type of Product</th>
<th>Suitable Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Products</td>
<td></td>
</tr>
<tr>
<td>Debt instrument (Debenture),  &lt;br&gt;equity instrument (Share),  &lt;br&gt;financial instrument related to  &lt;br&gt;foreign currency e.g. Spot,  &lt;br&gt;Forward, Swap and products traded in the financial market</td>
<td>Variance-Covariance</td>
</tr>
<tr>
<td>Non-linear Products</td>
<td></td>
</tr>
<tr>
<td>Option type of products</td>
<td>Historical Simulation, Monte Carlo Simulation</td>
</tr>
</tbody>
</table>

### 3. Calculation of VaR by Variance-Covariance Method

This section shall explain the calculation of VaR by Variance-Covariance as well as showing an example of foreign exchange risk as it is the most simple. The calculation of VaR by Historical Simulation and Monte Carlo Simulation shall not be included in the manual.

The Variance-Covariance method of VaR calculation may be obtained from 3 main components, which are:

- Portfolio position separated into various market risk factors such as long position in USD equal to USD 100 (foreign exchange risk) or investing in 2,000 shares of the Siam Cement Company (risk from share price), etc.

- The estimation of the sensitivity of the value of the position to the changes of market risk factors such as the change of the value foreign exchange position when the exchange rate of Baht to USD moves (1%) or the value of the securities investment when the price of such share changes (1%), etc.

- The estimation of the volume of the changes of market risk factor per day calculated from the standard deviation (S.D.) and Z-score which will correlate with the specified confidence level under the normal distribution assumption of the relative change of the market risk factors. For example, the exchange rate of Baht to USD has the probability to change in one day equal to 1% with 99% level of confidence, etc.
Therefore, calculation of VaR is summarized in the diagram below.

\[
\text{VaR} = \text{Marked to Market Position} \times \text{Product of the standard deviation of the market risk factor per day and the Z-score which depends to the specified confidence level}
\]

**Formula for the Calculation of VaR (In the case that the financial institution has market risks in only 2 factors)**

\[
\text{VaR}_i = (\text{Market Value of Portfolio } i) \times (\text{S.D. Value}) \times (\text{Z-Score Value})
\]

Provided:
- \( \text{VaR}_i \) = VaR of Portfolio at \( i \) (where \( i \) depends on the number of market risk factors that the financial institution has)
- \( \text{S.D. Value} \) = Standard Deviation of the risk factor per day calculated from the following formula:

\[
\text{S.D. } x = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}
\]

Provided:
- \( x \) = Change of risk factor per day e.g. change of exchange rate of Baht to USD per day, change of share price per day
- \( \bar{x} \) = Average of the changes of risk factor per day e.g. during the past 250 business days, share price of Company A increases on the average of 5 Baht per day
\( n \) = Number of all past data used in the calculation e.g. in the case using daily information of all business days in 1 year, it shall equal to 250 business days

The Z-score is a value the correlates the specified confidence level with normal distribution such as if specify the confidence level at 95% and 99%, the Z-score is equivalent to 1.645 and 2.346, respectively.

The VaR including for the case that there are more than 1 risk factor, shall be equivalent to the sum of VaR from each portfolio which related to each of the risk factor, adjusted by correlation or covariance matrix called Diversification Benefits.

When the Portfolio has 2 risk factors, the Total VaR can be derived from the formula below:

\[
\text{Total VaR} = \sqrt{[\text{VaR1}^2 + \text{VaR2}^2 + (2 \times r \times \text{VaR1} \times \text{VaR2})]}
\]

Provided:

- \( \text{VaR1} \) = VaR of the portfolio arisen from risk factor 1
- \( \text{VaR2} \) = VaR of the portfolio arisen from risk factor 2
- \( r \) = Correlation between the two said risk factors

Provided the correlation between factor \( x \) and factor \( y \): Correlation \( (r_{x,y}) \) can be derived from the following formula:

\[
\text{Correlation} \ (r_{x,y}) = \frac{\text{Covariance} \ (x, y)}{\text{S.D.} \ x \ \text{S.D.} \ y}
\]

\[
\text{Covariance} \ (x, y) = \frac{\sum (x - \bar{x})(y - \bar{y})}{n-1}
\]
Provided that the correlation of value between -1 and 1. If the value is positive (negative), it indicates that both factors relate in the same direction (opposite directions). The higher the value without regard to the [positive or negative] signs, the stronger is the relationship.

**Example:** Spot FX case

At the end of December 2002, Bank A has a net FX position of long USD 20,000 and long JPY 100,000. The rates of exchange at the end of December 2002 are THB 35: JPY 100 and THB 38: USD 1. It is assumed that the bank has no position in the interest rate risk, prices of debt and equity instrument risks at all.

VaR for exchange rate risk of Bank A may be derived as follows:

Specifications (according to the estimating guidelines of the BIS) of the Holding Period = 1 day and Confidence Level = 99%.

Marked to market of each position are as follows:

- JPY 100,000 x THB 35/JPY 100 = THB 35,000
- USD 20,000 x THB 38/USD 1 = THB 760,000

Standard Deviation (SD) of the change of JPY value (SD_y) and USD value (SD_x) and correlation between JPY and USD compared to THB (r_{xy}) can be calculated with the aforementioned formula. Normally the standard deviation may be derived by using any calculator with financial functions or basis computer program such as Excel. The calculation therefore shall not be shown here. Additionally, it is assumed that SD_x = 0.01 and SD_y = 0.02, respectively.

Calculation of VaR of each portfolio using the following formulas:

\[
\text{VaR}_i = (\text{Value of portfolio}) \times (\text{S.D.}_i) \times (\text{Z-score})
\]

\[
\begin{align*}
\text{VaR (JPY)} &= 35,000 \times 0.02 \times 2.33 = \text{THB 1,631} \\
\text{VaR (USD)} &= 760,000 \times 0.01 \times 2.33 = \text{THB 17,708}
\end{align*}
\]

Provided the Z-score at Confidence Level of 99% which can be looked up in the one-tailed normal distribution table in any basic statistic text book is equal to 2.33.
The calculation of overall VaR of the entire portfolio takes into account the diversification benefits of the portfolio from the correlation \((r)\) between JPY and USD as following, assuming \(r\) value as derived above is equal to 0.4.

\[
\text{Total VaR} = \sqrt{\text{Var1}^2 + \text{Var2}^2 + (2 \times r \times \text{Var1} \times \text{Var2})}
\]

\[
= \sqrt{[1,631^2 + 17,708^2 + (2 \times 0.4 \times 1,631 \times 17,708)]} = \text{THB 18,421}
\]

Hence, the probability of Bank A having maximum loss per day not exceeding 18,241 Baht at least 248 days of 250 total business days (at the confidence level of 99%)

4. **Limitations of VaR Simulation**

Despite the VaR simulation modal is being used at several financial institutions for the calculation of market risk, it has the following limitations:

- It often makes calculation under the assumption that the holding period is the same in each of the product groups which they may not.
- The Variance - Covariance method does not address the non-normal distribution cases.
- If the financial institution does not assess real time risks, it shall not account for the intraday trading.
- VaR is normally used to express the risks of portfolio level or the overall level of the financial institution, however, risk management of the trader lever usually does not consider the risk of the transactions in VaR format.

E. **Technique of Monte Carlo Simulation**

Assessment of occurrences by random selection or Stochastic Element such as the change of interest rates under a large number circumstances including, for instance, finding value of the Portfolio or finding VaR as previously mentioned.

The various simulations mentioned in this manual with the exception of the Monte Carlo simulation model, assessing the values of the portfolio of the financial institution under
prescribed interest scenarios is an approach with limitations or the so-called “Deterministic Model”. Hence, if the interest rate fails to change according to the assumptions of the model, the risk of the financial institution actually incurred may be different from what the simulation model has projected.

Therefore, given the above limitations, the Monte Carlo Simulation is preferred since its technique can create countless interest rate scenarios randomly allowing probable distribution. The value of the portfolio of the financial institution is then assessed at various interest rates rendering parameters for the result to be more probable.

In addition, the Monte Carlo Simulation can handle the financial tools with risks from many variables. For example, FX swap of USD/THB with market value changes with the FX rate and interest rate of both countries. Since these exchange and interest rates are correlated, the adaptation of the Monte Carlo Simulation must take into account the correlation between Risk Factor via the Cholesky Decomposition to allow accurate result. The details for building a Monte Carlo Simulation with one risk factor is shown herewith.

1. Monte Carlo Simulation with One Variable Risk Factor

Creating a Monte Carlo Simulation is rather complex; it has 5 basic steps as follows:

(1) Create a Probability Distribution for interest rate to be generated randomly using present forward Yield Curve as the core in the calculation of Probability Distribution.

(2) Use the variables or other characteristics for the calculation to ensure that the average interest rate to be generated is consistent with the present interest rate structure and to ensure that the probability distribution of the interest corresponds with the market volatility. These characteristics are crucial in ensuring that the simulation does not provide an opportunity to Arbitrage.

(3) Calculate the cash flow consistent with the interest rate randomly generated. In other word, the financial institution shall specify the relationship between the interest rate and the cash flow in its portfolio. For example, the financial institution may create an equation for prepayment related to various interest rates. Upon adjusting the interest rate and the prepayment, such cash flow is called Option-adjusted.
(4) The option-adjusted cash flow for various interests shall be used to derive the present value by using risk-free interest rate such as yield of government bond. All results shall then be added together. The sum shall be divided by the number of all interest rate types and the result is the expected present value for the distribution. If the cash flow is adjusted correctly and the interest reflects market expectation accurately regarding the distribution of the expected interests in the future, this expected present value shall then express the base market price. If the assumptions of the simulation are correct, the cash flow is adjusted according to all risks, the market of the instruments under consideration is according to the theory, and then this base price shall be fairly close to the market price. If the net present value does not match the market price, a spread is generally added to the risk-free interest rate. Such is called Option Adjusted Spread.

(5) After deriving the base case scenario under Clause (4), adjust the present Forward Yield Curve with interest rates for various cases that the financial institution uses in the risk analysis. For example, if it assesses the risk in the case that interest rate increases 2% (200 basis points) equally along the return rate curve; the distribution of interest rates generated in Clause (1) shall move 200 basis points and the average shall increase by 200 basis points for every interval of the term. By conducting steps 2-4 repeatedly excepting when the market price indicates the possible price if interest rate changes in accordance with the assumption for such cases, the projected value derived shall then be included in the report.

2. Attributes and Limitations of the Monte Carlo Simulation

2.1 Attributes of the Monte Carlo Simulation

The Monte Carlo Simulation is an effective tool for risk analysis because it is able to adjust projected risk in accordance with Optionality and Convexity accurately and plainly. The stock market uses Monte Carlo technique in establishing prices of interest rate derivatives and housing mortgage derivatives by using the Option-Adjusted Spread analysis. Moreover, the financial institution is able to use Monte Carlo technique in creating an understanding and for assessing present market price including economic value in a risk occurrence. This technique is then a good tool for financial institutions for the assessment and management of interest rate risk.

2.2 Limitations of the Monte Carlo Simulation

The Monte Carlo Simulation has similar limitations as those of other interest rate risk assessment systems, which is the accuracy and effectiveness depend on the input and assumptions used for the deriving the results. The two important assumptions of the Monte Carlo
analysis are the steps in generating various types of interest rates and the relationships of the various interest rates with cash flow. Furthermore, creating the Monte Carlo Simulation is rather complex and requires a great deal of calculation. Therefore, the financial institution must have staff with expertise in theoretical statistics and finance in creating and adapting this simulation.

Simulation in general has errors for several reasons such as the user may specify incorrect assumptions regarding the deposit behaviour, change of interest rate spread, unsuitable selection of simulation with regard to the variables or a simulation may yield satisfactory result for one set of input may give unsatisfactory result upon changing of assumptions. Some users use a simulation wrongly while it may have been a good simulation. For example, inadequate number of interest scenarios may be generated for the want of speed, or when the designer prepares insufficient supporting documents can also to the probability that the simulation will have errors, etc.

F. Principal Transactions of Financial Institutions (Trading Book and Banking Book)

Generally the transactions of a financial institution may be categorized into two main types. These are transactions in the Trading Book and transactions in the Banking Book. The two types of transactions have different objectives and characteristics as follows:

Transactions in the Trading Book

These are transactions with the intention of generating short-term profits such as within one day, two days or three days. This type of transactions has the trading characteristic whereby the financial institution generates profits from the price changes e.g. the changes of exchange rates, the changes of securities prices, the changes of bond prices and the changes of commodity prices, etc. The products in the trading book are highly liquid i.e. able to be bought and sold rapidly in the market and the buying and selling prices are not significantly different. Hence, the products range from straightforward e.g. trading of foreign currencies, bonds, to complex ones e.g. various derivatives. Nevertheless, trading foreign currencies for customers is not deemed as transaction in the trading book since there is an underlying asset and the translation risk is likewise not included in the trading book.
Liquidity Risks are:

- Funding-liquidity risk arisen from the inability of the financial institution to find funding such that the cash inflow and outflow are mismatch.
- Market-liquidity risk arisen from the inability of the financial institution to quickly liquidate the loss position at a reasonable price.

Credit Risk is:

- Counterparty credit risk arisen from the inability of the counterparty to fulfil the stipulated conditions of the agreement resulting in losses to the financial institution.

Operational risk arises from the error in the operations, fraud or failure of various operating systems which causes damage to the financial institution including:

- Clearing/settlement risk arisen from the faulty delivery system or payment.
- Legal risk arisen from non-compliance with the laws or regulations of the government resulting losses in the trading book e.g. incomplete documents or counterparty is a bankrupt entity, etc.

Managing Market Risks in the Trading Book

Since the trading book has the objective of gaining profits in the short-term, the financial institution must recognize profit and loss from all positions in the trading book by marking to market or marking to model where there is no market price or price in accordance to the related accounting standard.

Financial institutions can measure the market risk from transaction in the trading book by using the valuated position to calculate the risk value. Such is the tool often used by financial institutions to assess and manage market risk i.e. Value at Risk (VaR). Upon knowing the size of risk, the financial institution is then able to manage the risk for the trading book portfolio. [It may be achieved] by reducing the amount of risk by hedging or controlling the amount of risk by stipulating various limits. In stipulating limits, it may do so by limiting the transaction volume by stipulating Position Limits such as Gross Position Limit, Net Position Limit, Currency Limit, Intra-day Limit and Overnight Limit. Alternatively, it may stipulate risk limits such as VaR Limit, PVO1.
Limit and Stop Loss Limit. It may stipulate such limits in various levels such as branch level, portfolio level, desk level or dealer level.

The tools used by financial institutions to measure the said risk may be applicable in the normal situation. However, as the market risk may severe affect financial institutions in a crisis, the financial institutions must then conduct stress test to determine possible damage under such circumstance. In the case that the contingent plan for the trading book fails due to the crisis of the market which makes situation control and implementation of the plan difficult to accomplish, the financial institutions may prevent the risk before the event of a crisis by establishing limits such as limiting positions or limiting loss by setting a trigger upon which the management must promptly take actions.

**Transactions in the Banking Book**

Transaction undertaken by the financial institution for the banking book means any position or financial instrument held by bank in the normal course of business, not for trading purpose, or financial instrument that the financial institution intended to hold until maturity. The transactions in the banking book, for example, are lending, deposits, bonds in the for-sale portfolio (without intending to make a profit) and bonds or equity instruments held until maturity, etc.

**Risks from Transactions in the Banking Book**

Risks developed from transactions in the banking book may not produce a negative effect immediately as it may occur in the trading portfolio. However, they may have long effects. Related risks are as follows:

*Market Risk* mainly comprises of interest rate risk since the interest rate change is the crucial factor to cause values of assets and liabilities in the banking book to change as time passes, in particular the medium term to long term transactions.

*Liquidity Risk* results from the inability of the financial institution to find funding such that the cash inflow and outflow are mismatch.

*Credit Risk* arises from the inability of the counterparty to fulfil the stipulated conditions of the agreement resulting in losses to the financial institution.
Operational risk develops from the error in the operations, fraud or failure of various operating systems which causes damage to the financial institution including:

- Legal risk arisen from non-compliance with the laws or regulations of the government or upon legal changes or changes of the regulations of the government which negatively affects the banking portfolio.

Managing Market Risks in the Banking Book

In transacting for the banking book, the financial institution shall recognize profit and loss on the accrual basis. It is able to measure the market risk of the transaction in banking book by using various tools or simulation models to assess and manage such risk. Most financial institutions use Gap Report, Duration Convexity, Earning Simulation Model, Economic Valuation Model (EVE Model). The financial institution can reduce risk by hedging such as using interest rate swap (IRS) to mitigate risk in lending, etc. or control the amount of risk by establishing various limits. Such maybe established in the form of limiting volume of transactions by setting the duration of the assets and liabilities such as setting the volume of lending with 5 year term or setting risk limits such as Gap Limit, Earning at Risk Limit, Duration Limit and Stop Loss Limit. The said limits are usually on the portfolio level.

The said tools used by the financial institution measure risks under the normal situation as mentioned earlier. The market risk can affect a financial institution severely in a crisis situation. It therefore must conduct stress test simulations to determine any extensive damage that may occur in the said situation and it should prepare a contingent plan to sustain any severe losses in the banking book to enable it to control the situation and implement its plan. Moreover, the financial institution may use additional preventive methods before the crisis such as establishing position limits or limiting loss by setting a trigger to activate management action upon reaching the set level.

Limitations of the Supervision of Trading Book and Banking Book

Currently the BOT has not established any regulation regarding separating trading book and banking book. The manual then emphasizes the market risk assessment on the whole book. Nevertheless when the BOT policy regarding determining capital funds to cushion market risk currently being developed, is enforced, the financial institution must prepare Trading Book Policy in which it shall clearly specify which transactions are to be in trading book and which to be in the banking book. In the said division, the auditor must determine if there is conformity in the
nature of the business of the financial institution or not and if the financial institution has complied with the policy on the grouping of the assets or not.

G. Back Testing

Back testing is an accuracy test of a risk simulation model by comparing daily VaR (projected maximum loss in 1 day at a specified confidence level) with the realized profit/loss from trading transactions. The number of days, which actual loss is incurred at a higher value than VaR which is projected by a simulation called exceptions, are counted and compared the proportion (in percentage) of exceptions whether it is higher or lower then the set confidence level. Such shall use previous data of the past 250 business days.

In conducting back testing, the VaR used for comparison shall be calculated from holding period of 1 day which differs from the BIS Framework that sets at 10 business days to reduce the effect of the actual position change during the holding period on the actual profit and loss, however, not reflected in the VaR since it is a projection calculated from a simulation of the position at the end of the business day.

Nonetheless, the daily profit/loss still has some limitations since the consolidated profit/loss incurred from intraday trading, fee income and other income not included in the VaR calculation. More complex methods rectify this drawback by attributing income by source such as fees, spreads between buying and selling prices, market movements and Intraday trading, etc. and comparing the VaR with the profit/loss incurred from such movement of market price only.

Therefore, the profit/loss for back testing should be derived from the valuation of the position at the end of the previous day using the market price of the day which is called hypothetical profit/loss. Then it shall be compared with the VaR.
Unofficial Translation prepared by The Foreign Banks' Association

This translation is for the convenience of those unfamiliar with the Thai language.

Please refer to the Thai text for the official version.

CREDIT RISK EXAMINATION MANUAL
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Part 1 Definition of Credit Risk

1.1 Definition of Credit Risk

Credit / default risk is a chance or probability that a counterparty cannot fulfil the agreed obligation, including a chance that the counterparty’s credit risk will be downgraded, which may affect earnings and capital fund of financial institutions (FIs). Credit risk is very important as it involves credit extension, which is a major transaction of financial institutions, both credits that are assets and contingent liabilities of the financial institutions. For example, lending, commercial or industrial credits, acceptance, aval or guarantee arisen from credit transactions where financial institutions may have to repay debts in the future. Including credit transactions and transactions where the counterparty has to deliver asset or debt repayment to the financial institutions (pre-settlement, settlement risk) such as investment related transactions, foreign exchange transactions. Together with commercial or industrial credits and a chance that the counterparty’s credit risk will be downgraded, which may incur losses from the lower marked to market value of a financial instrument and/or affect the amount of economic capital.

1.2 Sources of Credit Risk

There are 2 types of credit risk factors, namely external risk factors and internal risk factors.

1.2.1 External Risk Factors

Economic condition

Change in the macro-economic level, namely, global, regional, national, and regional economy such as change in national income, unemployment will impact credit risk through change in business cycle, exchange rate, interest rate, credit availability, and credit quality. In addition, change in the micro-economic level such as liquidity crunch or financial problem will impact borrowers’ ability to fulfil their obligation. Legal and regulatory change will cause
financial institutions to change how they oversee a transaction, as well as the quality and ability of
debt collections.

**Correlated risk factors**

Correlated risk factors are the impact that risk factors in one market have on another
market. The impact can be in 2 forms, direct and indirect correlation. Direct correlation is when
an impact on one industry directly affects another industry directly such as when loss in
construction industry affects construction materials industry. Indirect correlation is when an
impact on one industry affects another industry and spills over to another industry such as the
case of the seemingly unrelated industries such as oil and steel. In the past, a decline in global oil
price causes deterioration in credit quality of both oil and steel industries. A thorough analysis
revealed that the oil industry is indirectly related to the steel industry as oil companies purchase
steel through drilling rigs and pipe companies.

**Competition**

Competition pressure among financial institutions in terms of growth, profitability, and
the desire to be the market leader can cause financial institutions to lower their underwriting
standards or improperly price their loan products. Such will result in higher cost from increasing
non-performing loans. Competition comes from domestic financial institutions, foreign financial
institutions, branches of foreign financial institutions, specialized financial institutions, and
finance companies.

1.2.2 Internal Risk Factors

**Underwriting standards**

Underwriting standards is a process to determine what type of, to whom, for what
purpose and when credits should be granted. Proper credit approval process should comprise
proper guidelines on both the form and methodology in evaluating borrowers’ credit worthiness,
setting up of credit line and interest rate appropriate to borrowers’ risk and credits. Change in
underwriting standards should not occur too often. Deviation from the standards should be thoroughly analyzed and receives approval from the board of directors or delegated officers; the guideline of such deviation should be sufficient to ensure an effective credit approval process. Lenient credit underwriting can incur losses to financial institutions, especially when debt repayment cannot be demanded or collateral cannot be seized in time. Many of the problem loans arise from deficiency in underwriting standards and credit monitoring. Such problems can be reduced by prudent underwriting standards.

Credit concentrations

Credit concentrations can be a major cause of most credit problems as they can affect capital fund and assets of financial institutions. Concentrations can take several forms, including concentrations on each borrower or groups of borrowers or each economic sector such as real estate, construction, manufacturing, and agriculture. Concentrations arise through financial institutions’ desire to be a leader in a targeted market. Typically, financial institutions are cautious of credit concentrations, however, when faced with intensified competition, such caution may reduce.

Experience of staff

Credit officers that lack experience in the activities they are responsible for, be they credits, investment, management of problem assets or new products, can lead to poor lending practice, ineffective administration, and eventually, loss to financial institutions.

Management Information System (MIS)

Risk will increase if the management do not regularly receive accurate and timely reports on credits. The reports shall comprise important information related to underwriting process such as economic trends, change in the structure of industry, or market share, commodity prices, exchange rates, including past due credits, credit concentrations, and analysis of problem loans.
Inappropriate assessment of credit quality

This problem may result from competitive pressure and credit growth as they tend to put a time constraint on getting accurate data. Moreover, rapid growth and/or entry into new markets can tempt the management to lend without sufficient financial and economic analysis. To facilitate quicker decision making, the management may support credit decisions by using simple indicators of credit quality such as borrowers’ characteristics, current and expected value of collateral or support of a parent company or affiliated companies.

Introduction of new financial products or services without thorough risk assessment

Financial institutions that fail to thoroughly assess risk in introduction of new products and do not install risk management system prior to launch of new products represents another important problem. With rapid credit growth and/or heightened competition, financial institutions are pressured to introduce new products and services to the market without proper testing. Not in line with the principle of proper credit underwriting, such practice can lead several financial institutions to serious problems. Financial institutions that practice proper credit underwriting usually test new products and services before introducing to the general customers.

Subjective decision-making

Subjective decision-making by the management, especially when the credits appear to have the appropriate underwriting. However, subjective underwriting without proper consideration on supporting data can lead to credit risk. Credit approval over the limit or overriding the policy. In addition, the beneficiaries of these credits are usually related to senior management such as the companies owned by or affiliated with the management, friends or persons with unverified financial standing or celebrities. Maintenance of credit quality depends on prudent credit underwriting which should be in accordance with the policy. Credit overrides is highly unadvised.

Lending in excess of the real value of collateral
When credits are granted for purchasing or developing assets that are used as collateral, many financial institutions cannot assess the correlation between borrowers’ financial condition and income generating ability and price changes and liquidity of the market for the collateral. These types of credits such as commercial credits, hire purchase, factoring, and commercial real estate lending reveal high correlation between credit worthiness of borrows and the quality of asset placed as collateral. This is because the borrowers’ primary income, the principal source of repayment, is directly related to the quality of the associated asset. When the borrowers’ income stream deteriorates, due to economic problems, the value of the asset placed as collateral is likely to decline.

Negligence of business cycle

Credits granted without taking into account of business cycle can cause an overly optimistic credit analysis. For example, businesses such as retail business, commercial real estate, real estate investment, and consumer lending tend to have strong cyclical effects. Nevertheless, the effect of business cycle is less than the effect of product cycle, especially new, rapidly growing products such as business related to telecommunication.

Effective stress testing that incorporate the effect of business cycle and product cycle is one approach for credit decision process and should induce clearer understanding in credit risk.

Credit review

Independent and on-going credit review with accurate credit grading, appropriate amount and scope, and reporting to the management comprise good credit review since it allows financial institutions to monitor risk management and solve credit problems in an appropriate and timely manner. Such will prevent loss from failure of borrowers or counterparties to fulfil their obligations.

Excessive lending
Excessive lending imposes risk as well as lending without proper analysis. Lending in excess of borrowers' ability to repay will result in problem loans.

**Over-emphasis on income**

Too much emphasis on income from credits over the credit quality leads to the granting of credits with high risk. In the long run, such practice may result in problem credits and incur cost higher than the income initially received.

**Self-dealing**

Self-dealing can cause serious problems to financial institutions, resulting in failure of financial institutions. Such practices can be found in the form of excessive credits to insiders, overriding the specified credit policy, and use of authority to improperly obtain credits without proper credit analysis, making it difficult for credit officers to appropriately assess the credits. Sometimes, insiders may apply for credits in the name of unrelated parties in order to conceal the self-dealing transactions.

**Technical competence**

Technical incompetence is evident when the management cannot obtain and assess credit information in order to analyze the viability of credit products. Such management weakness can eventually lead to loan losses.

**Supervision**

Parts of problem credits arise when financial institutions’ boards or management cannot oversee various units to appropriately comply with the policy or when the supervision is ineffective due to lack of knowledge of borrowers' true condition.
Part 2 Credit Risk Management: Best Practices

2.1 Role of the Board of Directors and Senior Management

2.1.1 Developing Proper Credit Culture

Financial institutions’ credit culture accumulates from the value, belief, and behavior concerning credit practices. It reflects the standard and value of the board of directors and senior management. All financial institutions should have a credit culture that is evident and clearly understood throughout the organization.

The board of directors and senior management should establish a credit culture that can also oversee credit risk. This culture should be communicated to credit officers at all levels through the strategic plan and details supporting the credit policy should comprise the following elements:

1. Overview or objectives of credits of financial institutions
2. Strategic plan and budget, detailing various types of credit growth (e.g. by industry type or credit type) and expected growth
3. Credit policy which sets out guidelines on credit analysis and credit approval, including practical guidelines especially on acceptable financial condition, minimum cash flow, minimum value of collateral and pricing (interest rate)

Moreover, the board of directors and senior management should periodically assess whether staffs understand the financial institution’s credit culture and whether all staffs as well as the overall organization conform to the desired standard and value.

Such assessment can be carried out by comparing the real performance with the plan and budget, as well as staffs’ individual performance relative to the plan. Reports of exceptions to the policy and rules (exception report) should be reviewed. In addition, internal audit and credit review units should have some role in an independent review of these assessments.
Since credit culture has great influence on the credit process, including risk specification and approval, financial institutions' strategy must coordinate between credit risk and management objectives. The compensation system for credit officers should be associated with long-term credit quality objectives, rather than the extent of credit growth. In addition, compensation policy should be explicitly stated in order to maintain the credit quality standard.

2.1.2 Establishing an appropriate environment for credit risk management

The board of directors and senior management should periodically review, approve, and assess credit risk strategy and plan. The strategy should reflect financial institutions' risk tolerance and the level of profitability targeted at various different levels of risk. Moreover, the board of directors and senior management should be able to identify, measure, monitor and control risk, as well as arrange for management of risk for all products, especially new products.

In all areas of financial institutions' activities, the board and senior management have an important role in overseeing the credit approval process and credit risk management. Therefore, financial institutions should develop a credit risk strategy or operational plan to be a guideline for credit approval and revise the policy and procedure for different activities. The credit risk strategy and policy should be approved and periodically reviewed by the board of directors. The board must realize that the strategy and policy must cover activities with high credit risk exposure.

Strategy-target market

The strategic policy or business plan should mention target for different types of credits (e.g. commercial credits, consumer credits, and real estate), economic sector, geographical location, foreign currency from financial derivatives transactions, maturity date and expected profitability. Target markets and specific characteristics of credit portfolio (including acceptable level of diversification and concentration) must be identified and specified. Financial institutions should identify their primary customers and types of credit for these customers. In addition, the
policy should specify the undesired types of credits such as immoral activities, political activities\(^1\), or speculation\(^2\). The management should monitor the performance to be in line with the plan and appropriate risk management system should be in place, including policies, procedures, monitoring systems, and personnel to support the implementation of the plan.

**Strategy-risk profile**

Financial institutions can utilize risk profile for business with good credit quality, medium credit quality, large or small or retailed credits. Proportions for each business line should be clearly identified. Setting up of credit risk strategy will help determine the target on credit quality, profitability and growth. Financial institutions, small or large, must trade off between risk and return acceptable for each activity. Senior management and the board of director should specify the overall profitability target for credit operation. Larger and more sophisticated financial institutions usually want credits to correspondent with the minimum targeted profits relative to the capital (risk-adjusted return on capital). Smaller and less sophisticated financial institutions would want to set the interest rate and fees to be appropriate for each risk level of credits.

The board of directors should approve the strategy on level of risk and profitability. In addition, the board should periodically review the operating performance, revise the strategy based on the past performance relative to adequacy of capital against risk.

**Continuous review and revision**

The board of directors must regularly (at least annually) review the strategy or credit risk policy and credit approval criteria. In addition, the board must consider the organization structure of credit approval units as well as the independence of credit review function and the

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1 Including political activities such as campaign for election, for which, FIs must clearly specify in their credit policy.

2 If FIs have a policy to extend credits for speculation, there must be a clear guideline to consider the appropriateness and reasoning.
overall portfolio composition. Evidence on this process should be documented in the minutes of the board of directors meetings.

Furthermore, financial institutions must continuously re-assess and revise the strategy and business plan. The board and senior management should regularly assess the external factors so as to identify changes in the strategy of competitors and in customer demands. For example, when there is a change in competitor’s business strategy, as well as introduction of new products in the market, the management must review whether there is a need to change their operations and how. The management should be aware of changes in the market or competitive status, and rationally review the rate of growth, pricing and profit margins. This is because many financial institution crises around the world stemmed from undisciplined granting of credits. Many financial institutions granted credits to particular business sectors that are exhibiting rapid growth. With the desire to profit quickly, financial institutions lost sight of the overall picture and become lenient in their pricing and terms of credits. Thus, leniency in credit rules combined with the demand and supply of economic sectors results in overly lending in the targeted economic sectors.

Moreover, the management should review the impact of changes in both the current and future economic conditions. In general, financial institutions can easily make profits in an expanding market condition. The true measure of management ability is to know when to withdraw from a contracting market segment due to excessive competition and inadequate returns. For example, a “hot” market will experience rapid growth and shrinking profit margin. Skilled managers will be able recognized the increased risk and limit the overall credits, as well as tighten underwriting standard on new loan and request for renewal in order to compensate for the increased risk in the portfolio. Such issues should be discussed by credit departments and should be reported to senior management and the board for consideration.

2.1.3 Installing proper tools
Senior management is responsible for implementing the credit risk strategy approved by the board of directors and developing the policies and procedures to measure, monitor, and control credit risk. Such procedures and policies should be specified in all activities both individual credit and portfolio level. Approval authority and responsibility should be appropriately delegated and a periodic independent review of the credit approval units should be performed.

Written policies

An important principle safe and sound financial institution is an appropriate implementation of the policies to help identify, measure, monitor, and control credit risk, especially, the credit policy which is considered as the first line of defense against credit risk. The management must ensure that financial institutions comply with the credit policy and procedure so that credits are appropriately distributed in line with the targeted markets and the overall strategy. In this respect, the credit policy should specify the framework and practical guideline for credit granting activities, including such issues as targeted markets, portfolio composition, pricing, and limit structure. The policy should define portfolio composition and credit line or limit in terms of individuals, business group, industry, geographical areas, and type of products, as well as approval authority, and various exception reports. The policies should be clearly specified, consistent with prudent practices and related regulatory requirements, and adequate for complex activities.

Financial institutions must have a clear understanding of credit risks involved in complex activities such as credits to certain economic sectors, customer-written options, and credit derivatives as they required more detailed analysis than traditional credits. Although, complex credits require specific procedures and controls, the basic principle of credit risk management can still apply.
When financial institutions engage in granting credits internationally, risk associated with the situation of the home country of a counterparty increases. The management must acknowledge that foreign counterparty’s failure to fulfil the obligation may arise from economic factors of that country as country risk involves various factors such as economic, political, and social conditions of the country. Such conditions may have potential effects on availability of overseas credits and investment in that country as well. Thus, financial institutions that extend credit internationally must have an appropriate policy and procedure to identify, measure, monitor, and control country risk and transfer risk. Special team with expertise and understanding in credit risk and transfer risk should be directly responsible for international transactions as conducting such transactions requires good understanding of the global market and the potential effect form one country to other countries and regions.

To be effective in practice, the credit policies must be communicated throughout the organization and should be implemented through appropriate procedures. Moreover, the policies should be periodically reviewed to be in line with the changing internal and external environment. The policies should also be applied on a consolidated basis and at an individual basis, and should address appropriate diversification of credit at the portfolio level, taking into consideration operating performance of affiliated companies, as well as intra-transactions between affiliated companies or other units beyond the level specified in the policies that may incur losses.

In formulating credit policies for various business or industry, characteristics of each specific industry must be taken into account. Appendix 2 provide detailed characteristics of certain credits.

### 2.2 Risk Identification

Effective risk identification begins with individual credit assessment. Financial institutions should rate credit worthiness of each customer regularly. Some institutions may apply relative rating, for example, parent company’s rating may help revise its subsidiary’s rating. Some
rate by type of credits or transactions. Some apply both relative rating and rating by type of
credits or transactions. Risk rating should also be applied to off-balance sheet transactions. The
rating process should be conducted regularly so that the changes in credit quality will be
acknowledged in time. Such will help the management in revising the strategy as well as closely
monitor the non-performing loans within an appropriate time period. In addition to risk rating,
there should be a review and analysis of each segment and the overall portfolio to ensure the
regular risk rating. Trend analysis, change in risk level and weighted average risk level should be
incorporated with other information such as past due trend, credit growth, and the extent of policy
exception to help in the analysis of asset quality and credit risk. In addition, the management
should ensure that credit officer’s rating of debtors and credit reviews are in accord with the
specified risk factors and credit lines. The principle of effective risk management is identifying all
potential credit risks in the products and transactions through a thorough review of credit risk
attributes in the products and transactions.

New products that can incur risk should be given much attention in the new product
planning process. Close and careful monitoring should be carried out to ensure that the risks are
identified and appropriately managed. Adequate guidelines and control procedures should be
specified before the new products and transactions are proposed or introduced. Moreover, the
new products and transactions should be approved by the board of directors or other appropriate
committee.

In additional, senior management must delegate credit officers that involve in all new or
complex transactions with counterparties’ credit risk to be able to carry out their duty at their
highest standard and in line with the financial institutions’ policy and procedures.

2.3 Risk Measurement
Is a process that incorporates debtors’ quantitative factors and other related factors in the form of parameters to reflect the quantity of risk of an individual debtor and the overall portfolio.

Financial institutions should have an accurate and reliable system to measure credit risk of individual debtors in accord with the quality, repayment ability and type of credits or businesses, both on- and off-balance sheet credit transactions and treasury transactions. This is so that level of risk can be properly measured, monitored and controlled. To have effective risk measurement, financial institutions should proceed as follows:

1. Formulate a policy and strategy in risk measurement and the impact on financial institutions, comprising

   1.1 Method that financial institutions use to identify risk related to each debtor or counterparty. Such method should help financial institutions to analyze portfolio’s credit risk from the risk factors in order to be able monitor credit concentration;

   1.2 Appropriate frequency of credit risk analysis, including review of the analysis and the specified risk limit;

   1.3 Risk measuring technique suitable for the complexity and the level of risk of the transactions of financial institutions, using robust data. The technique should be regularly tested.

   1.4 Management information system that foster effective credit risk measurement of financial institutions, using the data prepared by the system supervised by the board of directors and associated management of the financial institutions.

2. Formulate risk measurement process

2.1 The management must understand the objective of a credit model, including the elements and techniques used to build the model.

2.2 Developing of the model should incorporate factors related to the transactions.

2.3 The model should be regularly and appropriately tested for accuracy.
2.4 In case that a financial institution purchase the model from other companies, the company selling the model should be respectable both the terms of risk measurement and provision of various supports. Financial institutions must understand the concepts and ideas behind the model, development procedures, and limitation of the model.

3. Assess the asset quality by financial institutions by incorporating the following

3.1 Rating guidelines that reflect debtors’ level of risk

3.2 Loan loss provisioning in order to have an accurate analysis on profitability and to be able to conduct a comparative analysis.

4. Clear customer segmentation and regular assessment of credit concentration. For example, compare the ratio of credits to group of large customers to total credits and periodically assess changes in that proportion, as well as closely monitor and supervise the relationship.

5. Assess the current level of loan loss provisioning against credit risk. That is, even when financial institutions have high level of risk, sufficient amount of provisioning can help cushion against the overall credit risk. Financial institutions should use appropriate ratios to test whether the level of loan loss provisioning is reasonable. Ratio analysis will reveal the trend of relationship between loan loss provision with various factors such as non-performing assets and normal loans, pass due loans, and stop accrued debts, credits and contingent liabilities, and write-off statistics.

2.4 Risk Monitoring

Is a process to identify the amount and level of debtors’ risk in a continuous and timely manner. Financial institutions should arrange to have monitoring of risk regularly as follows.

2.4.1 Proper credit administration and Monitoring

Credit administration is an important element in maintaining safety and soundness of financial institutions. Once a credit is approved, there must be a credit administration support
team to continuously monitor the risk of credits. At a minimum, financial institutions should ensure that the process includes

1. efficient and effective credit administration, including monitoring of documentation, contractual requirements, legal covenants and collateral;

2. accurate and timely input data for management information;

3. adequate procedures to control the “back office”;

4. section-wide controls as well as compliance with the policies, segregation of duties, checks and balances and reconciling accounts;

5. policies and procedures that are in line with the laws and regulations.

In order to have accurate monitoring and credit risk reporting, risk management unit must be segregated from the risk taking units so that activities of irregularity and non-compliance will be reported to the management and the board.

Policies and procedures should encourage behaviors expected by the organization. Credit policies of financial institutions should clearly specify the types of credit acceptable, the criteria under which the credits can be made, process and procedures to follow in requesting and approving the credits. In addition, the policies should clearly specify the types of behaviors unacceptable or prohibited by law. To ensure continuous compliance, financial institutions should establish a control self-assessment within the risk taking units in order to identify actions or behaviors not in accordance with the associated policies or laws.

**Monitoring of credit quality and adequacy of provisioning**

The procedures should address clear guidelines to identify and report the problem assets, as well as other reports to ensure that these problem assets will be regularly monitored with proper corrective action, classification, and or provisioning. These guidelines should not be based on past status alone.

Credit monitoring system should include
1. periodic assessment of borrowers’ or counterparties’ current financial conditions
2. cash flow analysis and assessment of repayment ability
3. compliance with the existing covenants
4. monitoring of use of credit lines to be in line with the requested credit plan
5. adequate collateral coverage relative to counterparties’ current condition
6. periodic identification and classification of problem credits, as well as provisioning

Specific staffs should be assigned to monitor credit quality to ensure that the relevant information is used in credit risk rating. Collateral and the guarantors’ status should be monitored on an on going basis so that financial institutions can properly manage their debtors and maintain adequate provisioning for credit losses in a timely manner.

2.4.2 Monitoring the structure and quality of credit

Financial institutions should establish a system to monitor the structure and quality of credit portfolios so as to monitor concentrations within the portfolios, which is a major cause of credit problems in financial institutions. Concentration risk can be in various forms:

1. a single counterparty
2. a group of connected counterparties
3. a particular industry or economic sector
4. a particular geographic area
5. an individual country or a group of countries whose economies are interrated
6. a type of credit facility
7. a type of security
8. credits with the same maturity

Not only does concentration risk arise from granting of credits, other types of financial institutions’ transactions that involves counterparties are also included. A high level of
concentration risk will expose financial institutions to changes that incur losses to the
concentrated credits.

Nevertheless, financial institutions cannot avoid or reduce concentration risk because
certain credits have special characteristics in terms of geographical location or lack of access to
economic changes that affect borrowers or counterparties. Including the case where financial
institutions want to capitalize their expertise by focusing on credits in a particular industry or
economic sector and where they view that the return can compensate the risk from concentration.
Therefore, financial institutions need to find a way to reduce or mitigate concentration such as
pricing for additional risks and increasing capital fund for the additional risks.

Management of risk and effects from credit concentration can be done by the following
methods.

2.4.2.1 Management of credit concentration

Financial institutions should specify the policy and system to monitor and manage
concentration of credits. Financial institutions should have proper records of information so as to
check and monitor concentration of credits. The complexity level of the reporting data depends
on the size and type of transactions of financial institutions. For example, large financial
institutions may develop an automated system that can separate credits by industry for a credit
portfolio (e.g. using the International Standard for Industrial Code-ISIC specified by the
government entity). If financial institutions want to extend credits to each particular industry or
transaction, the management should specify separating criteria that incorporate numerical
interrelationship between industries in various forms such as type of credits, industry,
geographical area, collateral, maturity, and default risk or risk of loss. One type of credits may
appear in more than one form, depending on different risk factors.

Financial institutions should set the maximum proportion of credits to be used internally
as risk limit. This limit depends on stability of counterparties’ financial conditions or ability to
convert their collateral to repay debts. Although there is yet the best practice on this issue, loss expected by financial institutions should be limited to the level of capital fund. Outstanding credits of debtors exceeding the specified limit must be closely monitored. Although the Bank of Thailand already stipulated the risk limits for each individual debtor or each connected group of debtors, financial institutions should set the in-house limits for individual debtors lower that the legal requirement in order to limit their risks.

Sometimes, once concentrations occur, it takes a long time before financial institutions can disperse the credits as business factors, inter-connection between economic, business, and geographic conditions make it difficult for financial institutions to reduce concentration within a short period of time. Nevertheless, financial institutions with credit concentration should have an appropriate system to control and mitigate credit concentration to be in accordance with the set plan.

2.4.2.2 Stress testing

Stress testing involves identifying potential loss that may incur for each debtor or counterparty and type of credits in the portfolio, the result of which is assessed with the existing capital adequacy and loss loan provisioning. This "what if" exercise (or scenario analysis) can reveal and help in the understanding of linkages between different types of risk in time of crisis, especially linkages between credit risk and market risk.

Stress testing should identify changes in economic factors that can have adverse effect on financial institutions' condition and assess financial institutions' ability to manage these changes. Financial institutions must consider the following 3 areas: 1) economic or industry downturn; 2) market risk factors and 3) liquidity conditions.

The analysis should be done on a consolidated basis with various scenarios such as higher than expected losses from economic downturn, both in the overall economy or in particular sectors, or a situation when combination of credit and market events cause serious liquidity
problems or losses. Stress testing analysis should include contingency plan and action plans for
management in each different scenario, including various techniques such as hedging against
outcome or reducing the size of exposure. Senior management should periodically review the
stress testing results and appropriate action should be taken if the results exceed the acceptable
levels. The result should be incorporated into the process of formulating and revising various
policies and limits.

2.4.2 Credit review system

The complexity and scope of credit review system will vary depending on the size of
financial institutions, type of operations, management practices. Nevertheless, credit review
system must be independent of lending units. Though small financial institutions are not expected
to separate their credit review units, it is essential that all financial institutions maintain effective
credit review systems.

Credit review guideline specified by the Bank of Thailand may differ from those of
financial institutions in certain areas (Detail is in Appendix 3: Credit Review Guideline for
Examiners).

2.4.3.1 Objectives of credit review system

A Credit review system should have the following objectives:

1. to ensure accuracy of risk rating system;
2. to promptly and accurately identify problem credits and ensure
   implementation of appropriate actions to minimize credit losses;
3. to project trends that affect debt collection ability and separate problem
   credits
4. to be a source of information on trends on repayment ability by geographical
   areas and economic sectors
5. to provide information for senior management and the board of directors to be used in specifying the objectives and frequency of the quality assessment of the overall credit portfolio

6. to provide information to be used in determining the adequacy of loan loss provisioning

7. to assess adherence to credit policies, management and rules, and monitor compliance with related laws and regulations

8. to examine completeness of credit documentation

9. to be a source of information for developing and revising credit policies and procedures

10. to help management in getting accurate information to be used for the purpose of financial and regulatory reporting

2.4.3.2 Credit review policy

The specified credit review policy must be in writing so that management can follow, and must be reviewed by the board of directors at least annually. The policy should generally address the following issues:

1. qualification of credit review officers

2. independence of credit review officers

3. frequency of review

4. scope of review

5. depth of review

6. corrective actions and follow-ups

7. work paper used in a review and reporting
1. **Qualification of credit review officers**

Officers in the credit review function should be qualified based on level of education, experiences, and training in credits. They should have knowledge in both sound practices on credits and specific practices of their financial institutions.

2. **Independence of credit review officers**

The management should specify that major credit such as all significant and risky credits be independently reviewed by officers that are not part of or not influenced by the anyone involved in the credit approval process.

Small financial institutions with small volume and simple transactions may have limitation in having an independent credit review unit. Nonetheless, such financial institutions should focus on accuracy of credit review and may hire external workers to regularly test the accuracy of transactions.

Large financial institutions should have an organization structure that fosters the quality of credit reviews by establishing a separate credit review unit. Usually, members of senior management that are independent of the credit management process or outside directors are directly responsible for this unit. Credit review results are reported directly to the board of directors that do not involve in credit or other committees (such as an audit committee, risk management committee or credit review committee).

3. **Frequency of review**

Individual officers must review their credits on a regular basis. Significant credits must be reviewed at least annually or more frequently when there are factors deteriorating the quality of credits. Such system of periodic reviews is very important in the process of provisioning for loan losses that corresponds to up-to-date quality of credits as well.
4. **Scope of review**

The review should cover all types of credits or the types of credit considered as significant, by covering large credits (20 million baht and more). Management may review small and normal credits that clearly reveal the risk characteristics of deterioration of credit in the near future as well as problem credits.

In addition, management may periodically review credits of persons related to the financial institutions (related loans), renewed large credits (20 million baht and more), and credits with repayment problems by specifying an appropriate proportion of the credits selected for review.

5. **Depth of review**

Credit review should analyze and assess major credit factors, including

1. overall credit quality and credit rating
2. completeness of credit and collateral documentation
3. accuracy of credit approval
4. adherence to covenants
5. compliance to the policies and procedures of financial institutions, and relevant laws and regulations.

6. **Corrective actions and follow-ups**

Credit review findings should be reviewed by credit officers, department managers, members of senior management responsible for underwriting credits. Progress in correcting deficiencies must be monitored in a timely manner (please find “thorough monitoring of compliance and credit policy exception report under the topic “Role of the board of directors, internal and external audits” in Operational Risk). Please see the Operational Risk Manual.
2.4.3.3 Identifying and tracking credit policy exceptions

Policy and underwriting exceptions can affect attainment of strategic objectives and desired levels of risk within the portfolio. Thus deviation from credit policy should be carefully documented and should justify an underwriting decision. Such information should be kept in a permanent credit file. In addition, there should be close tracking of such actions to help mitigate and assess risk from these actions.

An effective policy exception tracking system will facilitate better risk management by focusing more on the risks that the exceptions create in aggregate or individually than detecting whether there is exception or not. Actions should be taken to correct the exceptions. Although, high volumes of exceptions indicate increased risk, lack of exceptions may indicate that the policy is too broad. Therefore, in order to apply the result from the exception tracking system to revise the policy to be more effective, financial institutions should evaluate in 2 manners: revising the policy and re-specifying the weights of policy parameters, in stead of simple revision or relaxing the credit policy.

2.4.3.4 Identification and tracking of documentation exceptions

Credits documentation is the documents that show right of claim or legal enforcement, as well as analysis of borrowers’ financial position such as loan contract. Lost, impaired, and incomplete documents all are considered as documentation exceptions. Common credit documents include promissory notes, collateral agreements and collateral appraisal documents. These documents must be prepared, recorded, and filed. Financial statement must be analyzed in a timely manner. Outdated or missing documentation all affects the quality of credits. Therefore, there should be a control point for impaired or incomplete documents in order to be able to identify quality of borrowers for a timely action.

Financial institutions should control credit documentation by setting up a system to help identify incomplete documents or documentation exception to ensure that the documents remain
current and valid throughout the term of credits. Pre-underwriting reviews by credit officers and
the legal department and credit revision after credit approval by credit administration department
show the most deficiencies. Financial institutions should analyzed the type documents that
deviate from the policy so as to identify problems in the origination process, as well as identify
staffs, units, or geographic locations that need to strengthen their compliance with policies on
documentation.

2.4.4 Internal risk ratings

Is rating of credits by type of risks that determine risk characteristics. Such will help
financial institutions in more accurate determination of the overall qualitative characteristics of
credit portfolio, concentrations, problem credits, and adequacy of loan loss reserves. Financial
institutions with effective and sophisticated risk rating system can use the rating results to
determine capital allocation to absorb risk, risk-based pricing, profitability of various transactions,
and on-going monitoring of credit quality. The board of directors is responsible for oversight of
credit origination function so as to understand the cause of increasing levels and trends in problem
credits and proceed accordingly to prevent losses.

An internal risk rating system usually rates credits by type of risk, which can be in the
form of numbers or words such as "very good" "good" "fair" "satisfactory" and "poor". The level
of risk of the words (such as "fair") can also have additional number attached to better
differentiate the level of risk. In grading risk, financial institutions must decide whether to rate
the risk by type of borrower or counterparty (obligor rating) or by type of credits (facility rating)
or both. Generally rating by both types is preferred. In this respect, financial institutions should
structure the category of problem credits in accordance with the categories specified in the
Notification of the Bank of Thailand Re: Worthless or Irrecoverable Assets and Doubtful Assets
Which may be Worthless or Irrecoverable, namely, loss, doubtful loss, doubtful, substandard, and
special mention.
Internal risk rating is an important tool for monitoring and controlling credit risk. The system should include factors that truly reflect credit risk. These factors can be based on past status and qualitative factors such as industry sector profitability, operation trends, and compliance with covenants. Credits with higher risk level should be subject to additional oversight such as more frequent visits from credit officers and including the customers on a watch-list. Some financial institutions may transfer problem credits from the credit originating function to a special unit established for managing problem credits.

Internal risk rating should be used from the origination process. Afterwards, credit risk rating must be reviewed periodically and be assigned a new rating when credit conditions improve or deteriorate. Some financial institutions may have credit officers review the risk rating. However, as accuracy and creditability of credit risk rating is very important, responsibility for periodic review and confirming the credit level should be assigned to a review function independent from credit origination function.

Loan grading system is a tool to monitor quality of credit portfolio, the detail of which can be determined by each financial institution. For example, some financial institutions may categorize credit risk into 12 grades with risk grading of 1-3 internally categorized as "good".

Generally, risk rating of financial institutions is assigned to credit officers who have to identify problem credits as they can help identify credit risk more accurately and timely. Nevertheless, given the importance and subjective nature of credit risk rating, risk-rating review by credit officers should be subject to review. Such reviews may be performed through peer comparison, review by credit committees, or credit review experts. The review should be performed by individuals independent of credit origination function as these independent individuals will be more conservative in assessing credit quality. To be effective, credit review system should at least include the following:
1. A risk rating system that is in accordance with the framework of the Bank of Thailand

2. Identification of credits or credit pool that need special attention

3. A process to report credits that need special attention and corrective action proposed to senior management and the board of directors of financial institutions

4. Documentation revealing past loss experience for various elements of the credit portfolio.

2.4.5 Management of problem credits

Financial institutions may have different methods and organization for management of problem credits. Whether the responsibility will be assigned to the credit originating unit or a special unit depends on the size and type of credits. In general, a work-out unit should be independent from the originating unit. Organization should be in line with each institution's need and necessity. Credit policy should clearly specify how financial institutions will manage problem credits.

As management of problem credits is time-consuming and requires special expertise, many financial institutions specify in the policy to have credit officers transfer problem credits to a special unit. Such will ensure uniform treatment of problem credits. Credit officers may give an advice to a work-out unit only. As a special unit does not have to worry about relationship with debtors, its work can be done more effectively than having the old credit officers who already have some relationship with debtors.

2.5 Risk Controlling and Risk Mitigation

The objective of credit risk management is to maintain credit risk level of financial institutions, given various factors and variables, not to exceed an acceptable level specified by the board and senior management. A controlling process by setting a credit line and other procedures
will help assure financial institutions that credit risk level does not exceed the acceptable level and help management in monitoring compliance with the credit policy.

An appropriate system of credit line setting will ensure that management will be informed when the amount of credits extended exceeds the credit line and that management can monitor and control risk to be at an acceptable level. What financial institutions must have is proper management information system to alert management’s attention whenever the risk level approaches the specified ceiling. In addition to the information on credit lines that exceed the risk ceiling, the report should include the outstanding portfolio in the information system of financial institutions.

Audit process of credit risk management should be on a continuous and regular basis to ensure that credit transactions are in line with the credit policy and procedure, that the credits are approved within the guideline specified by the board of directors of financial institutions, and that the quality and value each credit transaction is accurate. Any change or adjustment should be reported to the management in charge in a timely manner. In addition, the audit should identify weakness of management, policy, procedure, and any exceptions.

Risk monitoring should take into account the following issues:

2.5.1 Setting the target and acceptable risk level

In managing credit risk, the board of directors and senior management should clearly specify and communicate the strategic targets and business plan. These targets should be used to determine the acceptable risk level. First, management should specify a guideline on diversification of credit portfolio so as to prevent concentration in certain sector. The proportion of credits for each acceptable level of credit risk should be identified. Credits to different industries as well as different credits facilities result in different risk. For example, credits to income-generating real estate may need smaller amount of down payment compared to credits for purchasing of vacant land to be developed since income from real estate is more certain than that
from vacant land. Therefore, financial institutions should set different policy for each different industry and type of facility.

In the process of setting the risk ceiling, it is necessary that the risk management process specify situations and a guideline for the board of directors of financial institutions and senior management to review the causes of increased credit risk level and take appropriate actions accordingly.

2.5.2 Management information system (MIS)

Effective risk management of credit portfolio must have good management information system. Senior management and board of directors should periodically assess adequacy of financial institutions’ MIS on credits such as monitoring of loan growth, business acquisition and change in level of risk.

The following types of information should be available and routinely reviewed by the management:

1. Performance of credits department relative to the strategic plan and budget;
2. Written explanation on material differences between actual operating performance and the strategic plan and budget;
3. Total credits and contingent liabilities;
4. Credits in excess of existing credit limits;
5. New credits and credit renewals, and restructured credits;
6. Detail of delinquent and/or non-accrual credits;
7. Credits being downgraded or requiring special attention;
8. Progress in resolving material problem credits;
9. Credits to the management, staffs, or parties related to financial institutions;
10. Credits not compliance with policies, laws, or regulations (e.g. newly approved credits and the aggregate relative to capital);
11. The overall credits transactions and analyses of credits by type, geographical area, and collateral.

2.5.3 Operating under a sound credit granting process

Financial institutions must have a process to analyze debtors’ ability to repay, especially some new debtors. In some cases, strict policies must be in place to avoid individuals that involve in fraudulent activities or crimes. Such can be achieved through a number of ways, for example, using reliable source of references, accessing credit bureaus, or becoming familiar with individuals responsible for managing a company and checking their references and financial conditions. Financial institutions should not grant credits simply because the borrower or counterparty is familiar to the financial institutions or is a reputable person. Each credit proposal should comprise careful analysis by a credit analyst with appropriate expertise commensurate with the size and complexity of the transaction. An effective credit assessment must specify minimum requirement for information for the analysis. Therefore, there should be a policy to specify type of information and documentation necessary for new credit approvals, credit renewals, and/or change in terms and conditions of previously approved credits. The assessment should be summarized in writing and consist, at the minimum, the following:

2.5.3.1 Purpose of credits and repayment plan

Granting of credits should specify borrowers’ purpose to obtain the funds such as for purchasing of assets, refinancing existing debts, real property development or commodity investment. The purpose of credits should not be too general or vague such as for “business” or “personal”. The purpose should be clear and provide enough information in identifying the source of repayment such as business income, sales of commodity or real asset rental income. In such a way, financial institutions can assess whether the borrowers’ plans are reasonable, and have potential to generate sufficient income for debt repayment.
2.5.3.2 **Integrity and reputation of borrowers or counterparties**

Is an assessment of characters and willingness of debtors in repaying their debts. Sources of information include borrowers’ credit history at the financial institutions, information from credit rating agencies or credit assessment companies. The best source of information in assessing borrowers’ willingness to repay is borrowers’ own repayment history with financial institutions. Therefore, borrowers who failed to repay in the past should not be considered for credit renewal, or if financial institutions have a policy to take the risk, more strict consideration should be undertaken.

2.5.3.3 **Borrowers or counterparties’ current risk profile and sensitivity to economic and market changes.**

Granting of credits should include the summary of borrowers’ business and the risk associated with that business, as well as the position of borrowers’ business relative to the industry. In addition, credit analysts should assess the overall industry in which the borrowers operate.

2.5.3.4 **Repayment history and repayment ability**

The analysis should at least include a summary of operating performance over the past 3 years or more, and focus on important trends in balance sheet composition (assets, liabilities) and operating performance in the financial statement and cash flow projection. Past operating performance of a business will help in a decision to expand or extend credits.

2.5.3.5 **Analysis of repayment ability under various scenarios**

Credit analysis should estimate expected cash flow and the ability to repay based on the assumption of the amount of debts received and contractual terms. Although the projection may not be reliable, such analysis is still necessary to ensure that the terms of repayment are in line with the funds. To review this type of projection, financial institutions must pay much attention to the overly optimistic projections of sales and profits, especially projection of increasing rental...
income, possession of assets, value of assets. Projections should be based on "market comparable" and supported by reasonable relationship between current prices and trends.

2.5.3.6 **Legal responsibility in assuming the liability of borrowers or counterparties**

A basic function of credit underwriting is to ensure that borrowers have the responsibility to the liability. In other words, financial institutions should obtain and check for completeness of the borrowers’ documents that support borrowers' legal existence, legal authority to assume the liability. Financial institutions should grant credits to borrowers only after all the documents are complete.

2.5.3.7 **Borrowers’ business expertise, position in the industry, and overall economic conditions**

Financial institutions should not grant credits to borrowers who do not have sufficient business expertise, which can be assessed from past track record. Credits to a business that does not have adequate ability to compete in that industry may incur high risk of default. In addition, as start-up business generally has little equity, unproven financial track record, and unpredictable profitability, the terms and conditions of such credits should be conservative.

2.5.3.8 **Terms and conditions of credits, including covenants or collateral to limit changes in the future risk profile of borrowers**

Credits granted in the international market must be in accordance with the international best practices by having “loan covenants” so as to prevent any increasing risk in the future. In other words, borrowers must agree to abide by all the payment obligations in the contract as well as conform to the operating guidelines. Covenants usually take the forms of maintenance of minimum financial ratio, minimum reporting requirement, loan loss provisioning, prohibition against certain actions without prior approval from financial institutions, and practicing of corporate governance. One of the acceptable financial covenants is continuing financial health of borrowers (or “MAC”, material adverse chance clause).
2.5.3.9 **Adequacy and enforceability of collateral or guarantee under various scenarios**

In granting of secured credits, especially in accordance with the international standard, financial institutions must ensure that their legal claim are fully enforceable. Moreover, management should be aware of how such enforcement is pursued. In evaluating management’s awareness of such legal issues, financial institutions should recognize that legal enforceability does not always occur in practice.

2.5.3.10 **Pricing considerations**

Granting credits involves accepting risks and compensated profits at the same time. Financial institutions should assess risk-return relationship of all types of credits as well as the overall profitability. Pricing of credits should include costs and compensate for the risks that may incur. In pricing or specifying required collateral or restrictive covenants, financial institutions must assess the risks against expected returns. In evaluating risks, financial institutions should specify adverse scenarios and assess their impact on borrowers or counterparties. A common problem of financial institutions is the inability to appropriately price credits and the overall relationship and thus they do not receive adequate compensation for the risks incurred.

2.5.4 **Loan loss provisioning**

Financial institutions must maintain adequate provisioning for “expected loss” from credits and contingent liabilities. Financial institutions should set and control the limit on expected loss relative to the acceptable returns and the capital maintained against loss from problem credits. Expected loss should incorporate all factors that affect collectibility of credits as at the evaluation date. The criteria to determine an adequate level should include loss statistics, trends of loan loss or existing level of classification. Management should also consider any factors that may cause expected losses to differ from statistical losses, for example,

1) change in credit policies and procedures as well as underwriting standards, collection, write-off, and recovery practices
2) change in local and regional economic and business conditions

3) change in credit growth in terms of both volume and type of credits

4) change in experience, expertise, and understanding of credit management due to change in management

5) change in volume and losses from past due, nonaccrual, restructured, or classified loans

6) change in quality of financial institutions' credit review system or the degree of board of directors' oversight

7) existing and change in the level of credit concentration

The board of directors and management of financial institutions are responsible for having financial institutions maintain sufficient loan loss provisioning. The assessment and loan loss provisioning should be carried out at least every quarter, with additional detail such as

1) credit review, monitoring system to identify asset quality problems in a timely manner

2) full write-off of loan or proportionate write-off whenever it is deemed uncollectible

3) a process to determine adequacy of reserve based on comprehensive, adequately documented, and consistently applied analysis.

Minimum provisioning

For purposes of filing a prudential report to the Bank of Thailand, an adequate loan loss provisioning should be no less than the sum of the following expected loan losses given the facts and circumstances as at the evaluation date (after deduction of loans classified as loss and write-off loans):

1) credits classified as substandard, doubtful, or doubtful loss, individually analyzed and estimated loan losses
2) credits that are not classified but estimated to incur losses in the upcoming 12 months

3) Loan losses expected from transfer risk on international credits

2.5.5 Other observations regarding risk controlling

2.5.5.1 Caution about collateral

Although financial institutions benefit from collateral and guarantee as they help mitigate losses on credits, credit granting should be based primarily on borrowers’ repayment ability. Collateral cannot substitute for assessment of borrowers’ or counterparties’ position, nor can it compensate for missing information. It should be realized that any enforcement action (e.g. collateral foreclosure and sale) typically incurs costs that will reduce income from credits or the enforcement action. In addition, financial institutions must aware that the value of collateral may deteriorate by the same factors that have led to the deteriorated credits. Financial institutions must have policies that cover acceptability of various types of collateral, procedures for collateral valuation, and a process to ensure that collateral is enforceable and realizable.

2.5.5.2 Appraisal

Appraisals are judgement of market value of real estate by independent appraisers. Three valuation approaches are the cost approach, sale prices comparison or market approach, and the income approach.

The cost approach: in this approach, the appraiser estimates the replacement cost of building and improvements, deducted by estimated depreciation, and added by the value of land. This approach is very useful in reviewing draws on construction credits. However, the property ages, both replacement cost and depreciation become more difficult to estimate. In general, this approach is not appropriate for troubled real estate since construction cost for new building will exceed the market value of existing property.
The sales comparison or market approach: this approach examines the price of similar properties recently sold in the vicinity. The estimated value of the property depends on the prices of comparable properties. Important characteristics are that the properties are similar in terms of location, financing terms, property condition and usage, and transaction costs.

The income approach: is an assessment of economic value of income-generating property in the future, including transfer value when sold, discounted back to present. If the market is perfectly competitive, the market value will equal this economic value. For unique properties or in depressed market, the value based on comparable sales approach may not be available or largely distorted. In such cases, the income approach is an appropriate method for valuing properties.

**Appraisal policy**

Financial institutions' board of directors is responsible for reviewing and adjusting policies and procedures for effective real estate appraisals by

1) establishing steps and procedures for an ongoing evaluation and monitoring of individuals who carry out appraisals. For example, comparing appraised value to the actual selling price of comparable properties to see whether the appraiser’s evaluation is appropriate;

2) arranging for independent appraisal or evaluation e.g. appraiser should not be connected to the property or any transaction to be evaluated;

3) establishing appraisal criteria;

4) providing for appraisal report to be in a timely manner to facilitate underwriting decision e.g. an appraisal should be received before the loan is disbursed;

5) establishing procedures to obtain up-to-date appraisal when property appears to have a problem;

6) establishing internal controls that promote compliance with the policy. In addition, financial institutions’ appraisal polices should establish procedure to select, price, and monitor the
performance of individual(s) who performs real estate appraisal. The procedures should ensure that

- financial institutions’ selection process is independent and unbiased
- individual appraisers have the required education, expertise, and competency
- individual appraisers are capable of rendering unbiased opinion on evaluation
- individual appraisers are independent and have no direct or indirect interest in the property or transaction to be evaluated. As an appraisal process is an integral part of credit risk management, it should be independent from credit underwriting process. An appraiser should be independent from staffs who perform underwriting and collection, and should have no financial interest with the property to be appraised.

2.5.5.3 Aggregate credit exposure to borrowers and industry

One important element in consideration of credit decision is current and projected line of credit of each borrower or counterparty. Particularly, credit analysis should identify total exposure of the counterparty. Setting of exposure is based on risk rating of borrower or counterparty; counterparty with better risk rating should typically have higher credit line. Credit line should be set by industry or economic sector, geographic areas, or type of products to ensure that credit transactions of financial institutions are adequately diversified. Results of stress testing should also be incorporated in the limit setting process. In this respect, stress testing should take into consideration economic cycles, interest rate and market movements, and liquidity conditions.
Part 3 Examination Guideline

3.1 Examination objective

1. To determine the level and direction of risk in credit portfolio, derivatives and off-balance sheet transactions, and overall credit risk;

2. To determine the quality of risk management and adequacy of loan loss provisioning of credit portfolio, derivatives related credit transactions and off-balance sheet transactions, and identify any deficiencies that need improvement;

3. To determine the adequacy of financial institutions’ board of directors and senior management oversight;

4. To determine the adequacy of policies, procedures, and management information system;

5. To evaluate compliance with laws, regulations, notifications, and policies and procedures in lending operations and treasury functions;

6. To order corrective actions when policies, procedures, or internal controls are deficient, when there is violation of various regulations, notifications of the Bank of Thailand, and laws.

3.2 Examination Scope

3.2.1 Assessing level of risk

A) Credit portfolio management

1) Policy

1. Evaluate whether the credit risk policy is adequate in controlling the quantity of risk as follow:

1.1 Credit underwriting process by considering

- approval authority

- credit committee structure
- credit analysis
- exception definition, exception authorization, and exception report

1.2 Underwriting process by considering
- underwriting standards
- credits structure
- repayment maturity
- collateral and appraisal document
- pricing
- financial information
- documentation filing standard and assessment of various external factors

1.3 Credit evaluation and monitoring by considering
- borrower or counterparty’s risk rating criteria
- accuracy of risk rating
- accountability and responsibility of risk rating
- risk analysis criteria
- collection and write-off responsibility, exception report, and reporting on guarantors’ position

1.4 Exposure limit and strategic goals are
- widely-acceptable credit practice (credit culture)
- credit distribution, desirable credit types, credit concentration, and exposure limit in each industry, and criteria on syndicate credits

1.5 Compliance with laws by considering
- insider transactions
- conflict of interest
- account recording
- legal lending limit and other regulations

2. Change in level of credit risk rating due to change in credit policy by considering

2.1 Credits granted and credits structure
2.2 Specification of type of customers desired by financial institutions
2.3 Specification of type of desirable type of collateral and proportion of collateral to credits
2.4 Risk limit criteria and potential impact if the risk limit is reached
2.5 Pricing criteria by assessing whether pricing policy of financial institution corresponds to risk-based pricing concept

3. Review of write-off policy by considering

3.1 Consistency with regulatory and accounting definitions
3.2 Consistency with policy, especially exception policy\(^3\)
3.3 Responsibility for loan write-off
3.4 Loan write-off in compliance with criteria and policy
3.5 Financial institutions’ senior management’s and board of directors’ review of write-off policy

4. Analyze composition of credit policy exception and determine its potential impact to level of risk

2) Underwriting process

1. Review current underwriting criteria, changes since previous examination, and the impact on risk level as follows:

\(^3\) If FIs do not have an internal tracking system, examiners may have to test for compliance with policy and assess the level of exceptions.
1.1 Borrowers' size standards, external risk rating, credit scoring, and credit history

1.2 Debt-service coverage ratios, cash flow calculation method, debt to income ratio

1.3 Borrowers' leverage standards, liquidity, and covenant requirement

1.4 Repayment maturity of borrowers

1.5 Collateral value to credits and collateral valuation

1.6 Financial institutions’ guarantor standard

1.7 Reporting to management

2. Analysis of financial institutions’ credit applications by considering

   - objective of credits
   - credit structure
   - repayment ability
   - credit goal and limit

3. Analyze the level, composition, and trend on underwriting exceptions and the impact on level of risk

3) Portfolio composition and strategic factors

1. Analyze the composition and changes in credit portfolio as well as off-balance sheet transactions since the previous examination by considering

   1.1 Growth or relative change of credits in each industry

   1.2 Change in the overall credit portfolio and in each industry, including

      1.2.1 risk level assessment of credits with high growth

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4 If FIs do not have an internal tracking system, examiners may have to test for compliance with policy and assess the level of exceptions.
1.2.2 change and trend of problem credits, i.e.

- non-performing credits
- low quality credits, classified credits, past-due credits, non-accrual credits
- loan write-off
- risk rating distribution

1.3 Consider the level and trend on credit concentration, including

1.3.1 credits by individual
1.3.2 credits by industry sector
1.3.3 credits by geographic area
1.3.4 credits by type of products

1.4 Level and trend on credit policy exceptions

1.5 Management expertise

1.6 Economic factors

2. Review undrawn commitments to determine the potential impact on risk from past-due credits

3. Analyze credit growth rate by type of products and the potential impact on credit risk

4. Analyze the management and review of credit portfolio by considering changes in risk quantification and the underlying cause of changes

5. Assess how implementation of strategic plan for credits will affect the level of credit risk by considering

5.1 growth target and goal on credit renewal and new credits
5.2 growth of industry sectors that financial institutions have not extend credits to
5.3 new products and business lines
5.4 emphasis on high risk products, customers, or industries
5.5 credit concentration
5.6 risk limit
5.7 expected loss estimation
6. Monitoring of actual performance against the target on credits and understanding of the risk implications
7. Impact from asset securitization and credits purchase/sale of financial institutions.

4) Asset quality and allowance for loan losses
1. Analyze quality of credit portfolio
1.1 Analyze the level and structure of credits classified in accordance with the notification of the Bank of Thailand and assets rated in accordance with financial institutions’ own guideline
1.2 Analyze ratios that indicate credit quality such as past due interests to credits, classified credits to total assets
1.3 Analyze change in credit classification that indicates change in asset quality
1.4 Determine the level of credits that may incur loss to financial institutions both now and in the future, e.g. credits to industry that is sensitive to changes in risk factors
1.5 Determine the level of restructured credits and the tendency that such credits will become non-performing credits
2. Determine the existing level of loan loss provisioning against present and projected classified credits
3. Determine the value and liquidity of collateral, including trend in value change due to future market demand and supply
5) Internal control

1. Review credit review report and related audit report to monitor adverse trend both in terms of risk quantification and control weakness
2. Analyze the trend on exception report and the potential risk from such exception
3. Assess compliance with laws, regulations, and rules on credit functions of financial institutions, as well as assessment of associated credit risk

6) External factors

1. Assess domestic and regional economic trends (microeconomic and macroeconomic factors) and the impact on risk level of credits
2. Assess the results of stress testing of credit portfolio or business types, and review the testing of changes in interest rates, collateral value, pricing declines due to competition/ or regulatory requirement
3. Assess financial institutions’ risk from any pending litigation, regulatory changes, notifications of the authorities, changes in accounting standards that will materially affect credit portfolio of financial institutions
4. Assess accuracy and reliability of the result of models used to measure and manage risk

B) Treasury function

Source of risk and risk measurement

1. Review credit risk measurement method used to calculate pre-settlement credit exposure and settlement credit exposure and determine it provides reasonable estimate of risk to

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5 If FIs do not have internal control and tracking systems, examiners may have to test for compliance with policy.
6 Please see more details in Appendix 1: Credit risk management of treasury function
ensure that credit exposure to counterparty of treasury function is aggregated with the overall
credit exposure in credit department

2. Assess counterparty credit line and ability to control the credit line

3. Determine the level of transactions management uses for settlement, close-out, or
multilateral netting arrangement

   3.1 determine whether operations of financial institutions can accommodate
netting in an accurate and appropriate manner

   3.2 determine whether counterparty payments are netted for the purpose of
computing periodic settlement, as well as reporting of credit risk related to treasury transactions

   3.3 determine whether the management has signed the agreements before netting
is performed, and assess a system to track unsigned agreements

   3.4 select a sample of counterparties where netting is performed to ensure that
contracts are signed for the transactions netted already

4. Determine adequacy and consistency on monitoring of credit risk rating of
counterparties that financial institutions transact with

5. Assess corrective actions in response to the adverse impact from counterparties’
credit downgrades on trading activities

Policies and procedures

1. Assess adequacy of credit risk management policy and control with respect to use of
derivatives in risk management

2. Specification and approval of exceptions, including the procedures and time line for
such approval is within the approver’s authority. Assess the level and nature of exceptions

3. Determine whether procedures are in place for appropriate actions when counterparty
limits are exceeded due to market movement
3.2.2 **Assessing quality of risk management**

A) **Credit portfolio management**

1) **Financial institutions’ board of directors and senior management oversight**

   1. Evaluate the board of directors’ responsibility for approving and periodically reviewing credit risk strategy and policies. The strategy should reflect risk level acceptable for financial institutions and level of profitability expected to achieve for each level of credit risk as follows:

      1.1 oversight role in overall credit risk management of financial institutions

      1.2 development of credit strategy or plan that establish credit underwriting method, necessary policies and procedures to be used in practice. Review of strategic plan for credit portfolio should have the following factors:

         1.2.1 share of credit portfolio in the balance sheet

         1.2.2 credit quality target

         1.2.3 portfolio diversification goals

         1.2.4 credit product mix

         1.2.5 growth target by type of product, customer, and industry

         1.2.6 specialized credits

         1.2.7 target markets and industries

         1.2.8 growth target and market share

         1.2.9 external factors

      1.3 Periodic review of operating performance and appropriate changes of strategy

      1.4 Appropriateness of board members, particularly, outside directors, to ensure that all acts primarily for the interest of financial institutions

      1.5 Remuneration policy for staffs of financial institutions should be in line with credit risk strategy (remuneration policy should not reward unacceptable behavior such as generating of
short-term profits that deviate from credit policy, exceeding of specified limit, or inducing of deficiencies in credit procedures). The policy should incorporate criteria on credit quality and procedures

2. Senior management’s evaluation of credit risk strategy implementation and development of policies and procedures to identify, measure, monitor and control credit risk. Such policies and procedures should address credit risk in all transactions of financial institutions both at individual and portfolio level by considering the following factors:

2.1 Policy and procedures are specified in writing and implemented

2.2 Consistency of credit planning process and strategic target and current situations

2.3 Consistency of credit underwriting process and strategic target

2.4 Appropriate and clear approval of credit review responsibility

2.5 Assessment of underwriting process by a unit independent from underwriting function

2.6 Policies and procedures on measuring, monitoring, and controlling credit risk are in writing

2.7 Strategic target and portfolio risk limit are clearly communicated to the board of directors of financial institutions and the board approves these targets

2.8 Planning is consistent with credit culture and credit policy is consistent with business plans and budgets

2) Risk measurement system

1. Policy and strategic plan to limit risk and the impact on financial institutions

1.1 Determine the methodologies used by financial institutions to identify risk of each borrower or counterparty. Financial institutions should be able to analyze credit risk at portfolio level in order to identify any factors that affect credit risk and concentration
1.2 Determine appropriateness of the frequency of credit risk analysis and review the analysis results against specified limit

1.3 Determine appropriateness of measurement techniques to the complexity of transactions, based on robust data and subject to periodic validation

1.4 Effectiveness of management information system to support credit risk measurement process

2. Credit risk measurement process used by credit department

2.1 Completeness and reliability of quantitative and qualitative credit data used in developing the model

2.2 Comprehensiveness of credit risk factors specified in the model

2.3 Management’s understanding of the model and its application in credit risk management

2.4 Frequency of model validation

2.5 Reliability of technical support by model vendor

3. Credit classification and assessment of credit quality of financial institutions by considering the following factors:

3.1 Whether the classification criteria reflect risk level of borrowers

3.2 Whether loan losses are recorded at the loan origination unit so as to have accurate analysis of profitability that induce risk-return analysis

4. Allowance for loan losses

4.1 Consistency of risk rating and loan loss provisioning

4.2 Appropriateness of loan loss estimation

4.3 Adequacy of current loan loss provisioning relative to the overall level and trend of credit risk
4.4 Effect on credit risk from current loan loss provisioning or significant changes in the level of loan loss provisioning

5. Credit concentration and portfolio segmentation

5.1 Criteria on identifying concentration of credit portfolio

5.2 Periodic monitoring of concentration of large borrowers by comparing the ratio of credits to the largest group of borrowers and total credits

3) Risk monitoring and reporting

1. Setting of policy and strategic plan on risk monitoring and reporting

1.1 Assess the policy review process in risk management when there are changes in operating procedures or changes in external environment to ensure flexibility of policy

1.2 Assess the review of credit exposures that approach the limit. Ensure that there is sufficient reporting to senior management as well as close supervision

1.3 Assess monitoring and reporting on limits to senior management and board of directors of financial institutions

1.4 Compare actual credits with specified risk level both in terms of level and quality. Verify the review and compare operating performance with the plan

2. Risk monitoring process

2.1 Evaluate the appropriateness of credit underwriting process. Credit approvals should at least incorporate the following information:

2.1.1 the purpose of credits and source of repayment

2.1.2 financial status and credit worthiness of borrower or counterparty

2.1.3 current risk profile of borrower or counterparty and its sensitivity to economic and market changes

2.1.4 borrower’s repayment history and current capacity to repay based on historical financial status and cash flow projections
2.1.5 proposed terms and conditions of the credits, including covenants to limit losses that may incur in the future from such borrowers

2.1.6 adequacy and enforceability of collateral or guarantee

2.1.7 credit structure

2.1.8 credit target and credit line

2.1.9 restructuring criteria and procedures

2.1.10 collateral valuation

2.2 Problem credits management

2.2.1 Ensure that there is a special unit to administer problem credits

2.2.2 Assess the criteria for problem credits management by the credit work-out unit

2.2.3 Determine whether risk rating of credit origination unit incorporates assets managed by the credit work-out unit

2.2.4 Determine whether losses are recorded with the credit underwriting unit in order to measure effectiveness of the underwriting unit on profitability, risk based pricing, and staffs' accountability

2.2.5 Assess criteria on transferring of credits to the credit work-out unit

2.2.6 Separation of credit work-out unit from underwriting unit

2.2.7 Use of credit work-out plan for problem credits and comparing operating performance and time used in each procedure

2.2.8 Determine whether return to motivate staffs in work-out unit is based on the level of restructured credits

2.2.9 Management information system to monitor performance

2.3 Loan collection

2.3.1 Ensure that there is a collection unit
2.3.2 Evaluate operation of collection unit by considering

1) collection rate

2) collection cost per amount of debts collected

3) collected debts by credit type

4) collection strategy

5) use of technology in debt collection

6) collection management information system that indicates
   
   6.1) reporting of collection rate

   6.2) level of restructured credits and operating progress

   6.3) write-off from restructuring

   6.4) quality of credits in collection process

7) report on collection

8) compliance with laws and regulations

2.3.3 Assess polices and accounting practices in reviewing, analyzing, and reporting re-aging past due credits

3 Assessment of credit portfolio structure

3.1 Management should pay close attention to credit concentration

3.1.1 appropriateness of credit concentration limit

3.1.2 policy exception, underwriting exception, and documentation filing exception of concentrated credits. Evaluate the adequacy of tracking of these exceptions

3.1.3 there are indicators for portfolio concentration with periodic monitoring

3.2 Appropriateness of monitoring system for assets acquired from debt repayment

4) Risk control and limits

1. Determine policy and strategic planning
1.1 Assess whether the policy is appropriate to changes in credit plan e.g. expansion of new business lines or introduction of new products

1.2 Assess whether the risk limits are clearly and reasonably established; whether the limit measurement method takes into account capital and earning at risk; and assess the impact on financial institutions if the actual risk exceeds the specified limits

1.3 Review the objective and process to establish risk limits acceptable by the management

2. Evaluate risk control process

2.1 Process for changing credit plan. Determine whether there are changes in the plan and analyze their impacts on the credit plan

2.2 Determine whether financial institutions use the underwriting guideline in setting limits and assess the consistency of the guideline to the credit policy and strategic plan

2.3 Ensure that all credit exposures (off-balance sheet transactions, contingent liabilities, etc) are captured in borrowers’ accounts

2.4 Ensure that reporting lines have open communication and limit the chances of conflicts of interest

3. Evaluate whether the policy on credit exposure limit by type of credits incorporate the following characteristics:

3.1 Risk rating relationship

3.2 Geography

3.3 Product type

3.4 Maturity

3.5 Collateral type

3.6 Industry

3.7 Legal or internal credit limit
B) Treasury function

1) Oversight of financial institutions' board of directors and senior management

1. Evaluate the scope and effectiveness of board of directors' and senior management’s oversight by reviewing

   1.1 Minutes of the board of directors meeting and other relevant committees such as Assets and Liabilities Committee (ALCO), audit committee, and new product committee

   1.2 Appropriate delegation of authority, credit limit, and rules to treasury management

   1.3 Whether the board of directors, ALCO, or other appropriate committees has established a risk control unit. If so, review the oversight responsibility and staffing of the risk control unit

2. Evaluate whether the board of directors of financial institutions and senior management use any tool to monitor risk, whether they obtain adequate information to understand the treasury transactions of financial institutions. Such information should include

   2.1 Clear strategy and policy on derivative transactions

   2.2 Understandable tools and information for on-going monitoring by management

   2.3 Internal and external audit reports

   2.4 Reports indicating adequacy of internal controls

   2.5 Reports indicating increase and decrease in value of derivative transactions, counterparties' concentration, and maturity dates

3. Evaluate the quality of key personnel and determine whether the management has expertise and capability in derivative management by reviewing

   3.1 Brief biography of managers responsible for derivative transactions

   3.2 Job descriptions of key positions
4. Evaluate whether there is a policy for key employees to take consecutive vacations to prevent concealment of information/ fraud from operation of a single employee for a long period of time.

5. Evaluate whether the board of financial institutions monitor and control the performance of management by reviewing:
   5.1 Consistency of operating performance and strategic and financial targets
   5.2 Internal audit reports, external audit reports, and the Bank of Thailand’s examination reports

6. Evaluate the quality of oversight by the board of directors of financial institutions and senior management by reviewing operation procedures and discussion with examiners responsible for derivatives examination.

7. Review compensation plan and incentive for derivatives staffs, e.g. traders, sale persons, risk control officers, operation officers

2) Risk measurement system

1. Evaluate the adequacy of credit risk measurement method used to calculate pre-settlement credit exposure by reviewing the model and discussion with management as follows:
   1.1 The measurement system can consistently produce a reasonable estimate of loan-equivalent exposure which includes mark-to-market value and an estimate of change in value over the remaining life of contract (add-on)
   1.2 The calculation of credit risk add-on must consider:
      1.2.1 information on market factors
      1.2.2 widely accepted guideline in assessing price risk except the case where add-on calculation uses remaining life of contract as a time horizon
      1.2.3 peak exposure
1.2.4 setting of stress scenario testing and calculation of forward credit risk add-

2. Review the credit risk measurement method used to calculate settlement exposure and assess whether such method provides a reliable result by considering

2.1 Settlement methods of various types of products, gross or net. Observe any exception to common practices

2.2 Whether financial institutions use standardized settlement methods

2.3 Whether receipts/disbursements are verified to reflect accurate net amount compared to the legally binding net amount.

3. Review whether credit risk measurement method has been validated prior to its use and is periodically verified for accuracy at least annually or whenever market condition changes by reviewing

3.1 whether the validation process covers all relevant systems including small application such as spread sheet

3.2 whether validation process is performed by an expert independent of the unit that develops and uses the model

3.3 whether validation process is documented

3.4 whether the management has monitored and corrected for any deficiency found in the validation results

4. Review whether financial institutions maintain reserves for counterparty exposure separate from allowance for loan losses and determine whether the method used to calculate the reserve is reliable

5. Review the appropriateness of risk measurement method to the complexity of products and transactions by reviewing
5.1 Whether financial institutions use close-out netting agreement. Make sure that the add-on is not netted against negative mark-to-market

5.2 If financial institutions use non-statistical method such as measuring a percentage of notional value, determine whether financial institutions use other risk controls such as specification of type of transactions for each counterparty, limiting on terms and conditions for each type of transaction, contracting on less volatile derivatives, or using conservative risk factors.

5.3 Whether the frequency of credit risk calculation is appropriate

5.4 Whether the model has been reviewed and accurately validated.

6. Evaluate the level and trend of counterparty and industry concentration as well as financial institutions’ exposure to external factors (countries, regions, industries, etc.) and internal factors (exposure, terms of credits, risk rating, etc). Discuss with the management on the strategy used in managing concentration risk and evaluate the rationale of such strategy

3) Risk monitoring and reporting

1. Review credit risk monitoring and reporting used by senior and line management with respect to operations of treasury function and evaluate whether such reporting is adequately comprehensive and easy to understand

2. Review coordination of credit risk management procedures and examination of credit portfolio management to assign risk rating, identify non-performing loans, and determine allowance allocation. Assess whether such procedures are reasonable

3. Evaluate the quality of credit risk administration and the credit quality of all counterparties

4. Review whether financial institutions identify and report past due counterparties, past due payments, watch-list, counterparties with a trend to deteriorate in quality. Discus with management on work-out strategy for these counterparties
5. Review whether financial institutions have appropriately communicated credit risk exposure to various levels of staffs in the organization, whether the reports are generated independently and provided to various levels of management and the board of directors. Determine from the list of reports that management should generate to report credit risk exposure. The frequency and formality of the reports depend on the level of treasury transactions and risk exposure.

4) **Risk control and limits**

1. Evaluate the adequacy of policies and procedures to ensure that the board of directors of financial institutions and senior management have established credit risk policies and procedures for treasury activities. The policies and procedures should incorporate:

   1.1 Establishment of guidelines for derivative transactions in terms of credit quality, concentration, and terms to maturity

   1.2 At least annual review of operating performance and risk rating of counterparties

   1.3 Approval and reporting of off-market trades as well as rate roll-overs

   1.4 Reserve allocation, loan loss provisioning to cover expected losses

   1.5 Periodic approval from the board of directors of financial institutions

2. Evaluate whether operation procedures and contracted requirements address:

   2.1 Counterparties’ ability to provide for collateral or margin requirements at contract inception and during the term of contract

   2.2 Acceptable type of collateral and margining

   2.3 Terms of collateral e.g. at inception, upon changes in level of risk, upon changes in level of exposure

   2.4 Collateral valuation methods e.g. sources of pricing, timing of revaluation

3. Review the adequacy of the scope and frequency of internal audit on treasury activities. The internal audit should at least accomplish the following:
3.1 Periodic review of overall operations of financial institutions

3.2 Periodic testing of compliance with the established policies and credit lines

3.3 Ensure that there is an independent validation of pricing, revaluation, and risk measurement method (including programs and relevant documents), especially for new products

3.4 Assess adequacy of data processing systems and software

3.5 Review unusual transactions such as off-market deals, unusual changes in transaction volume, and unauthorized after-hours trading

3.6 Review calculation of brokerage commissions and fees

3.7 Test the calculation of traders’ and sales representatives’ compensation

4. Evaluate the adequacy of the number and qualifications of audit staffs responsible for audit of treasury function by considering

   4.1 Product complexity

   4.2 Technical skills

   4.3 Systems skills

5. Evaluate the effectiveness of audit process and review any findings since the previous examination by considering

   5.1 Material deficiencies and examination findings

   5.2 Timely implementation of corrective actions

   5.3 Audit monitoring of various activities between full scope examinations

   5.4 Meaningful reports to the board of directors and senior management
Part 4 Appendices

Appendix 1: Credit Risk Management of Treasury Function

Credit risk arising from derivative activities should be addressed within the same framework used in credit risk assessment of traditional banking activities. Counterparty credit risk can be managed through measurement of exposures, ongoing monitoring, timely credit assessment and counterparty’s creditworthiness, and sound operating procedures. For example, netting arrangements, credit enhancements, and early termination agreements.

1. Credit risk

Credit risk in derivative products is in the forms of pre-settlement and settlement risk.

Pre-settlement risk is the risk that a counterparty defaults on a contract during the life of a contract. Pre-settlement exposure consists of 2 parts: 1) current exposure (risk from market value or replacement cost – cost from replacing that derivative transaction) and 2) add-on (risk of replacement cost during the rest of the contract life)

Settlement risk is risk arising when financial institutions deliver money or meet their obligations under a contract before the counterparty but the counterparty defaults due to breakdown of fund transfer operation or legal impediments, including bankruptcy and receivership.

Senior management as well as traders, back office staffs, risk control officers and credit risk managers should understand the settlement process and be aware of key events that may give rise to counterparty’s default

2. Credit risk management

Each financial institution must have an effective method of measuring and controlling credit risk from derivative transactions. Examiners need to know whether the financial institution is in the position of a dealer or end user and whether the risk control systems are appropriate. A prudently controlled environment should have
1. Effective oversight by the board of directors and senior management

2. Establishment of polices and controlling procedures

3. Strong credit review, strict approval, and established limit process

4. Accurate and reliable risk measurement system

5. Effective and timely risk monitoring and risk reporting, including approval process for policy and procedure exception

6. Proper credit documentation standards

Credit risk should have an independent and strict control process. Policies and procedures should be established for credit activities. To prevent any mistakes and losses from operations and conflicts of interest, credit approval function should be independent from marketing function (trading/risk-taking) and staffed by qualified personnel. There should be segregation of duties for credit assessment, establishment of credit lines, monitoring and reporting, and approval of exception to policies and procedures. Such functions are typically performed by the credit department.

The credit department should review the creditworthiness, position, and credit quality of derivative counterparties, as well as assign credit risk rating for each counterparty as it should to customers of typical loan products. Continuous communication between management in charge of credit control and derivative trading will ensure that all parties are informed of changes in credit lines and credit quality or creditworthiness of counterparties. Non-performing contracts must be reported as are non-performing loans. The credit review unit should regularly review the quality of derivative counterparties and the integrity of credit risk rating.

To be consistent with safe and sound practice, financial institutions should not recommend transactions or products that are inappropriate for customers. And if financial institutions know that customers do not understand the risks of a derivative transaction or product, financial institutions must inform the customers and refrain from undertaking such transaction.
with the customers. If the customers insist to proceed, the management should document the
analysis of such transaction and disclose information concerning the transaction and associated
risks to the customers.

4. Credit risk measurement

   pre-settlement risk

   Financial institutions should have a system to measure pre-settlement risk, which
can be estimated by various methods

   There are various techniques from using the full notional amount of contract, or a
percentage of the notional amount. Nowadays, many financial institutions use a complicated
model that simulates scenarios to measure credit exposure over the life of derivative contract.
The method selected for measuring counterparty credit risk should be commensurate with the
volume and level of complexity of derivative transactions.

   Settlement risk

   can be measured from the cumulative amount of funds or assets to be delivered
irrevocably from the time of outgoing payment order until the time of incoming payment is
received and reconciled. The risk depends on characteristics and nature of payment system, as
well as internal reconciliation procedure of financial institutions. Financial institutions can reduce
this type of risk by negotiating with counterparties to reduce the time period that they cannot
revoke outgoing payment order.

5. Credit risk limit

   Counterparty credit risk limits should be approved before any execution of derivative
transactions. Financial institutions should establish counterparty’s credit line/ risk limit as in the
case of traditional credit lines. Documentation in the credit files should support the credit
purpose, repayment source, and collateral. Evaluation of counterparty’s credit line should be in
conjunction with other lines of credits, including commercial credits.
6. Credit risk mitigation mechanism

There are various tools that can reduce credit risk exposure, including netting arrangements, credit enhancement, and early termination agreements. Financial institutions can use these tools to reduce risk exposure and minimize transaction cost so as to manage credit lines more efficiently.

7. Management information system

In assessing and measuring credit risk of derivative transactions, management should consider the aggregate level of credit exposure of each counterparty to the financial institutions.

Management reports should be prepared on an aggregate basis. They should be accurate and correspond to the nature of transactions with the counterparties, with meaningful and timely contents. The reports should be prepared by a unit independent of derivative trading unit (typically trading room back office) and distributed to all level of managers related, which may differ depending on each institution’s organizational structure.
Appendix 2 : Nature of Certain Types of Credits

1. Commercial credits

Commercial credits generally means credits to business enterprises for commercial or industrial purposes. Commercial credits usually comprise one of the most important parts of total assets of most financial institutions. They can be secured or unsecured and for short-term or long-term maturity. Such credits include overdrafts, long term loans, and loans to small businesses.

Overdrafts are temporary working capital in excess of normal needs. They can be repaid by converting of working capital to cash and can be either secured or unsecured.

Long-term loans are granted for the purpose of acquiring capital assets such as plants and equipment. Long-term loans are usually exposed to higher risk than short-term loans due to the longer time period of the credits. Hence, long-term loans are usually secured and involve regular amortization. The loan contracts should also have written loan covenants such as operating restrictions (e.g. prior approval for major purchase or sale of assets) and minimum financial ratios (minimum working capital, maximum debt to equity ratio, and ratio of debt service coverage to company’s income) during the life of credits. Loan contracts should clearly specify that non-compliance with loan covenants is considered as an event of default.

In some circumstances, borrowers may use term loan for overdraft repayment. Such indicates borrowers’ problems in operation and may cause debt collection problems to financial institutions. However, the use of term loans should be amortized over specified time period and the collateral should have appropriate value throughout the lifetime of the loans.

Commercial credit policy of financial institutions should address the timely acquisition of credit information such as up-to-date collateral value, cash flow statements, and operating performance. In addition, the policy should specify the proportion of credit lines to the appraisal value of collateral and the approved credit lines, procedures to foreclosure of collateral, credit conditions, and write-offs.
1.1 Problems of overdrafts

Problems or warning signs associated with overdraft line is a part of assessment of borrowers’ credit risk, which can be divided into 2 parts, namely, before credit approval and during credit review (assumption that allocation/structure of credit lines to debtors are appropriate, with O/D as back-up facility).

1. Using of overdrafts to compensate for operating losses. Debt repayment or recovery will be problematic when a business uses advances from overdraft lines to fund operating losses, including funding of wages, operating expenses, other debt repayment, or any other cost not related to operations. Such action weakens the financial position of debtors and is usually an indication of deficient cash flows.

2. Using of overdrafts to invest in long-term assets. The use of overdrafts by a business to fund purchases of capital assets that normally use term loans may indicate credit or cash flow problems as it is a mis-match of the timeframe of use of fund and repayment.

3. Using of overdrafts to fund trade creditors indicate declining or inadequate cash flow. Unless corrective action is undertaken, borrowers may fully utilize the overdraft lines and still have problems paying trade creditors. On the other hand, borrowers’ business may incur problems as suppliers are unwilling to deliver goods, causing business closure and losses to financial institutions.

4. Using of overdrafts to invest in other businesses or projects indicates poor credit risk management. Approval of overdraft lines should be in accordance with the financial strength and funding need of a business enterprise. Division of funds to other enterprises will weaken the financial structure of the borrowing entity and reallocate the fund to place that financial institutions cannot collect.

5. Using of credit line for wrong purposes. Though approval of overdraft lines provides flexibility to borrowers in usage of the line (including for the purposes mentioned above), in
terms of controlling, financial institutions may not be able to control usage of credit lines to be in line with the stated purposes as borrowers may withdraw without notice. Nevertheless, financial institutions should have a system to monitor weakening financial positions of borrowers that may affect future repayment ability so as to take action to prevent potential losses in a timely manner.

1.2 Problems of term loans

Problems associated with term loans for commercial purpose

1. Cash flow from operations not sufficient for debt amortization is a fundamental problem that can be solved by adjustment of terms of repayment (to the level that debtors have adequate cash flow for monthly interest payments).

2. Smaller operating profits cause the business to sell more products to maintain the same profitability level. Unless the profitability level is maintained, borrowers will have higher risk of delinquency or default to financial institutions.

3. Higher sale volumes result in higher demand for working capitals, leaving less cash for debt amortization. This situation can occur from increased competition. The key to solve this problem is to carefully re-consider and re-evaluate the borrowers’ need of working capital. Financial institutions must be careful not to over-lend.

4. Sales are lower than expected. When facing this problem, borrowers will not be able to cut expenses, causing too much use of working capital and resulting in diminishing debt service ability.

5. Fixed assets financed by term loans become obsolete before debt repayment is complete, causing the ability to utilize the assets as well as the value of underlying collateral to deteriorate. Moreover, as the fixed assets must be replaced before the debt is fully repaid, financial burden of borrowers increases.

6. Excess cash from operation is used for increasing salaries or other unnecessary expenses, rather than repayment of debt, causing a tendency to default in the future.
7. Setting repayment of term loans to be higher than incoming cash flow will cause a business to have insufficient working capital for its operation or to allow for normal expansion and result in liquidity problem. This problem indicates the importance of debt management of borrowers based on incoming cash flow.

8. The overall financial condition of the business is deteriorating due to poor operating performance or abnormal events in the industry. Unless the borrowers can recover their competitive positions, financial institutions may have to strengthen the credit and/or reduce the credit exposures.

2. Credits secured by real estate

Credits secured by real estate are part of credit portfolios of most financial institutions, including credits for the purchase of real estate. However, real estate loans may also encompass credit extension for other purposes but with real estate as primary collateral.

The level of risk of credits secured by real estate depends primarily on the amount of credits and the collateral value, interest rate, and most importantly, the borrowers’ repayment ability. Financial institutions’ credit policy on credits secured by real estate must ensure that credits are granted with reasonable probability that borrowers will be able to meet the terms of repayment.

2.1 Credit policy for credits secured by real estate

Financial institutions credit policy should have a general outline of service area, distribution of targeted credits, nature of credits, debt servicing and debt collection, with the following details:

1. Identification of geographical areas in which financial institutions will consider granting of credits

2. Establishment of credit diversification policy and line of credits secured by real estate by type of credits and geographical area (e.g. credit line on higher-risk credits)
3. Identification of appropriate terms and conditions by type of credits secured by real estate

4. Establishment of credit origination and approval procedures, both generally and by size and type of credits

5. Establishment of credit underwriting standards, including loan to value ratio: LTV that are clear and measurable

6. Establishment of review and approval procedures for exception credits

7. Establishment of credit administration procedures, including documentation, disbursement, collateral inspection, collection, and credit review

8. Establishment of appraisal and revaluation procedure for real estate

9. Establishment of a monitoring and reporting systems for management to report to financial institutions’ board of directors

These management reports should incorporate monitoring of market demand and supply factors such as employment trends, economic indicators, current and projected unemployment, rate of construction and absorption, current and projected rental terms, rental rates, and sale prices, etc.

2.2 Underwriting standards of credits secured by real estate

Financial institutions’ credit policy should reflect the level of risk acceptable to their board of directors and establish clear and identifiable underwriting standards that enable credit officers of financial institutions to evaluate all relevant credit factors. These factors should cover

1. Borrowers’ capacity or income from the collateralized real estate to sufficiently service the debt

2. Market value of collateralized real estate

3. Borrower’ creditworthiness

4. Level of borrowers’ equity invested in the real estate
5. Other source of repayment

6. Any other additional collateral such as guarantees

2.3 Source of problems of credits secured by real estate

Credit assessment that relies on borrowers’ reputation and appraisal value of collateral rather than assessment of borrowers’ repayment ability is not prudent and does not comply with international best practices. Since when the business cycle turns down, these credits can potentially become loan losses and adversely affect financial institutions.

A large amount of financial institutions’ capital have been adversely affected from inappropriate approval of credits secured by real estate. For example, approval of credits during periods when real estate is in great demand, thus inflating the price structure than the normal level. At the same time, financial institutions overestimate borrowers’ demand for credits and repayment ability without proper consideration and any limitation on demand for credits secured by real estate.

2.4 Identifying problems of credits and real estate market

Real estate project or market may experience problems of declining appraisal value at the initial stage of a project, fluctuated economic development or competition, leading to problems of credits or real estate projects. Warning signs include

1. Discounts or concessions of prices that result in cash flow below the level originally projected or at the initial stage of the project

2. Change in concept or plan such as a condominium project changing to an apartment project

3. Delayed construction that results in cost overruns that may require additional credits

4. Slow lease contract or non-saleable and/or high volume of cancellations that result in protracted repayment or default

5. Lack of project feasibility study or analysis
6. Delay of periodic construction draws, resulting in increasing construction costs and expenses

7. Problem credits both in terms of past due loans and non-accrual interests

3. Real estate construction credits

Real estate construction credits are used for construction of a particular project within a specified period of time and should be controlled by restriction on predetermined fund disbursement.

Important note: In general, borrowers/developers of a construction project will not control fund disbursement from any sources related to the project.

To comply with international best practices, construction credits should be secured by a first lien and should have supporting documents such as purchase contracts signed by buyers.

Construction credits potentially have high risk. Majority of the risks arises from the necessity to complete projects within a specified cost and time period. These inherent risks can be limited by establishment of policy that specifies type and the level of financial institutions' involvement. Such policy should specify procedures to control fund disbursements and the difference between collateral value and credit outstanding, time of completion of the project and repayment periods.

Before entering into construction loan agreements, financial institutions should examine the history, expertise, and financial standing of counterparties. Credit files should include details on reputation, occupation, creditworthiness, and financial statements that indicate that developers, contractors, and subcontractors are capable of completing the project as assigned. The technique used to evaluate the construction project is important as in the case of credits secured by other types of real estate. Financial institutions should realize that the appraised value of collateral should not include funding cost and improvement expenses.
Finally, financial institutions and the property owners should jointly sign an agreement to identify obligations to be fulfilled during the entire course of construction. Loans should be disbursed based on construction progress. A progress payment plan should limit disbursement of funds to developers or borrowers to the amount of the construction progress, generally, in percentage of completed tasks.

3.1 Construction credit policy

Construction credit policy should include the following

1. Aggregate limit for construction credits

2. Concentration limit for construction credits by type of construction projects such as hotel, plants, and office building. In addition, financial institutions should limit the total credit exposures by the progress level of each project at all times.

3. Minimum required documents

4. Required collateral and the ratio of credit line to collateral

5. Minimum equity investment by borrowers for a project

6. Required ratio of loan to project value

7. Minimum acceptable quality of appraisal or evaluation

8. Acceptable standards for contract obligations, including concentration limit and minimum credit quality

9. Procedures for reviewing construction credit applications

10. Methods of loan disbursements

11. Procedures and guidelines to support periodic inspection of construction

3.2 Risk of construction credits

Risks of all types of construction credits are equivalent to the total value of the collateral when completed. Therefore, financial institutions must ensure that the funds are used properly to complete the construction or development of the property serving as collateral. When
default occurs, financial institutions should undertake financial restructuring so that the project construction progresses, depending of the type and size of the project being funded, since construction credits can be complex and highly risky. For this reason, financial institutions’ management must ensure that there exists a policy to monitor and control and a proper training program for credit officers before engaging in this type of credits.

3.3 Problems of construction credits

In addition to the factors listed under the section on credits secured by real estate, additional factors include:

1. Credits with no or minimal equity investment by borrowers

2. Credits for speculation in undeveloped property where repayment source is only the sale of property

3. Credits based on land value driven up by ownership turnover, but without any improvement or project to induce any supporting income

4. Additional credits to existing debt without any evidence to ensure full repayment

5. Credits to borrowers without any development plans or any current development plans

6. Loan renewals, extensions, and refinancing that do no have clear source of repayment fund nor reasonable repayment schedule.

4. Agricultural credits

Agricultural credits are used to fund production of crops and livestock, or to purchase or refinance capital assets such as farmland, machinery and equipment. Production of crops and livestock has 2 types of risk factors outside the control of borrowers, namely, commodity price and weather conditions

Financial institutions must realize weaknesses in operation and management of agricultural credits, by taking these external factors into account, as well as restructuring of debts.
or extending the terms of debt repayment when agricultural borrowers face financial problems due to adverse weather or commodity prices. Nevertheless, such issues will not cause much of a problem if the management oversees that credit approval complies with the guideline and proper risk control is in place.

4.1 Type of agricultural credits and maturity

1. Credits for operations is short term credits (one year or less) and uses as director cost to production of crops or livestock. Repayment source is sale of production at the end of production cycle. Terms of loans and repayments should coincide.

2. Credits for purchase of machinery or equipment are medium term credits for purchase of various equipment used in the production of crops and livestock, with production income as a source of debt repayment. Terms of loans and amortization should be appropriate to the life of the equipment.

3. Credits for purchase of farmland are long term credits for purchase of farmland as well as improvement of agricultural farmland, with production income as a source of debt repayment.

4. Credits for debt restructuring refer to credits for operation whose terms of repayment or maturity must be re-specified due to insufficient cash flow to meet debt repayment requirement. The need for debt restructuring can arise from poor weather, production quantity, and low commodity prices. The loans can be restructured to medium term or long term (5-10 years) depending on the type of collateral, borrowers’ repayment ability, borrowers’ financial standing and trend, or other factors. Nevertheless, financial institutions should write-off debtors expected not to be able to repay.

4.2 Underwriting standards

Many underwriting standards applicable to commercial credits can be applied to agricultural credits. As with any other types of credits, financial institutions must have sufficient
information to support credit decisions. Basic information includes balance sheets, income statements, cash flow projections, credit officers’ comments, and collateral inspections, reviews, and valuations. In general, financial information should be updated at least annually (credit officers should update the credit files as needed, as well other documents on important meetings or events). Credit information should be monitored and analyzed by management to ensure that proper and timely actions are taken to manage the credits.

Significant problems as mentioned above can be severe when financial institutions fail to estimate sufficient level of cash flow in underwriting process of agricultural credits. While collateral coverage is important, the primary source of repayment of medium and long term agricultural credits does not come from collateral but cash flow from normal operations. Assumptions in cash flow projections should be reasonable and consider not only current situations but also the historical performance.

Financial institutions should establish credit criteria for each case of secured or unsecured loans. However, agricultural credits are usually secured, with collateral in the form an all-inclusive lien on production, machinery and equipment, livestock, and farmland, etc.

4.3 Categorizing problems of agricultural credits

1. Credits for speculative purposes

2. Credits outside business scope of financial institutions

3. Credits for new or unproven types of operations or operations in which management has little or no experience

4. Unplanned credits

5. Problems or difficulties concerning collateral inspection

7 Most farmers are individuals and do not have business expertise. In this case, simple estimate of cash inflow and outflow through a production cycle will suffice, with an aim to verify that farm operation truly exists and loans are used as anticipated.
6. Worsen financial trends (especially increasing debt to equity or decreasing collateral to loan)

7. Inefficient administration (credit line extension without satisfactory operating performance)

8. Inability to meet debt repayment schedule

Moreover, financial institutions should monitor improper credit administration as follows:

1. Inappropriate credit structure such as
   1.1 inappropriate or untimely repayment schedule
   1.2 failure to identify restructured debts

2. Unwillingness to turn down borrowers with weaken financial standing, indicating
   2.1 over-lending (lending without consideration of quality or term effects on both borrows and financial institutions)
   2.2 failure to assess borrowers' management ability
   2.3 failure to analyze project cost of production
   2.4 failure to consider market trends

5. Credit card loans

   Financial institutions can get involved in credit card business in 2 ways, namely,
   (1) Agent banks, which receive credit card applications from customers and sales slips from merchants and forward these documents to licensee banks, and are accountable for the process of receiving and forwarding the documents.

   (2) Licensee banks, which undertake transactions of credit card loans and merchants’ accounts and may have their own centers for processing payments and sales slips, as well as undertake the roles of data processing and card issuing.
Financial institutions’ policy on reviewing credit and credit card loans should specify procedures for careful screening of applicants’ accounts, that is,

1) establishment of internal controls to prevent interception of cards before delivery or having merchants prevent customers’ fraudulent acts by using lost or stolen cards

2) periodic review of past-due accounts, cash-withdrawn accounts, and regularly used accounts

3) monitoring of past-due accounts

4) guidelines on account write-off

5) transfer of past-due accounts to a group that pays only interests

6) prevention of re-issuance of expired cards of customers with write-off balance or with unsatisfactory credit history with financial institutions

Since credit underwriting and management of credit card loans is highly competitive and technologically intensive, financial institutions must have sophisticated accounting system and customer rating system and must obtain specialized knowledge in administration and audit.

5.1 Business regarding credit card clearing of financial institutions

Financial institutions that act as a clearing institution will receive sales slips for clearing. These activities give thin margins but are of high transaction volume. Risk of financial institutions incurs when customers refuse to pay, while the clearing institution is obligated to honor customers’ legitimate request to reverse the transactions and the clearing institutions must seek reimbursement from the merchants. Problems arise when the merchants are unable or unwilling to reimburse the clearing institution. In such circumstances, the clearing institution will incur losses. Financial institutions should review whether such contingent liabilities exist.

The clearing institution must assess that the merchants with whom it contracts for clearing services have sound financial standing and operate with integrity, with complete and
clear acceptance standards, in order to avoid losses and ensure the safe and profitable operation.

Factors of concern are

1. the merchants should be carefully and strictly inspected in the same manner as evaluation of borrowers

2. the merchants should be closely monitored to ensure timely refusal of sales slips when the merchants face problems so as to minimize the loss

3. in case that the merchants request high volume of clearing, an account administration program should be arranged to review the merchants' financial statements and business activities, at least every accounting period

4. periodic reporting system of merchant accounts, both in terms of the amount and the number of transactions requested for clearing, should be established, as well as reviews of irregular transactions so that the clearing institution can promptly clears the problem with the merchants

5. compliance to the guidelines issued by credit card issuing network

In case that a clearing institution engages in the services of agents such as an independent sales organization: ISO, for which such organizations help the clearing institution in making credit card payments to the merchants. The clearing institution may incur great losses if permits ISOs to contract with discreditable merchants due to poor financial condition of the merchants or ISOs or both. In some cases, ISOs contract with some merchants on behalf of the clearing institution whereby some of the contracts are without approval from the clearing institution.

Financial institutions that undertake credit card business should develop their own procedures and internal controls to ensure sound standards in selecting the agents before getting involved with the ISOs. Since ISOs primarily seeks to contract with the merchants, the clearing institution should be carefully scrutinized. The clearing institution should adequately supervise
ISOs’ activities just as the institution should supervise any counterparties that provide the services on behalf of the institution. Therefore, the right to ratify or reject any merchant contract initiated by ISOs should be reserved.

6. Syndicated loans

Syndicated loan is a sharing of loans between two or more financial institutions. Normally, financial institution that leads the loan will prepare all the documentation as an agent, service the loan, and directly contact the borrowers for the benefits of all participants. When properly structured, syndicated loan helps to reduce financial institutions’ burden on lending in the amount exceeding the legal limit, diversify risk, and adjust for liquidity. Participating in syndicated loans of financial institutions can compensate for low local demand for loans or high volume or loans without servicing burdens. However, if not properly structured or documented, syndicated loan project can incur unlimited risk to both lead and participating institutions.

Participating financial institutions should perform credit analysis, just like the lead financial institution. To determine whether the syndicated loan meets the credit standards, participating institutions should obtain and review all relevant credit information and details on collateral value and status, loan agreements and syndicated loan agreement before signing the agreements. Absence of any documentation indicates that participating institutions do not use prudent judgement before making the decision. Such practice may cause a problem. Participating institutions should monitor the servicing and status of the syndicated loan throughout the life of the contract. To protect their own interests, participating institutions should ensure that the lead institution will provide complete and timely credit information on a continuous basis.

Formal credit policy of financial institutions should specify the procedures in participating in syndicated loan. Such procedures should be similar to direct loans. The policy should require that the analysis of credit quality under syndicated loans is complete, collateral
value and condition is inspected, and credit information is complete and maintained throughout the life of the syndicated loan.

Syndicated loans can clearly reveal problems when borrowers default, the lead financial institution has liquidity problem, or participating financial institutions cannot fulfil their commitment as planned. Such uncertainties should be specified in the written syndicated loan agreements, by clearly stating scope of duties and responsibilities of both the lead institution and participating institutions. The syndicated loan agreement should include the following:

1. Requirement that the lead financial institution must prepare timely credit information and notification of material changes in borrowers’ status.

2. Requirement that the lead financial institution must consult with participating institutions prior to any modification in syndicated loan agreement, guarantee, collateral, and any action on defaulted syndicated loan.

3. Detailed description of rights and resolution guidelines of both the lead and participating financial institutions when borrowers default.

4. Arbitration procedures to settle disputes when the lead and participating financial institutions cannot agree upon handling of defaulted loans.

5. Resolution procedures to settle any conflict between the lead and participating financial institutions in the event that more than one borrowers default.

6. Reservation of rights to terminate agreements between the lead and participating financial institutions in the event of illiquidity, contract cancellation, breach of obligations, or inappropriate actions by counterparties.

Some syndicated loan agreements may specify loan repayment on basis other than a proportion method, e.g. principal repayment may be paid first to the participating institutions while the remaining payment to the lead institution. In such cases, the syndicated loan agreement should specify that in the event of default, participating institutions will receive debt repayments.
in proportionate to the syndicated loan. Without such provision, financial institutions shall not apply the pro rata sharing of credits.
Appendix 3 : Credit Review Guideline for Examiners

1. Assessing the scope of review

To appropriately analyze any credits, examiners must obtain basic information on borrowers' financial standing, borrowing purpose, terms and conditions of repayments in the future. The analysis should not concentrate on past due status alone.

The necessity of obtaining the information to assess future position varies with the size of financial institution, type and complexity of transactions. Examiners should review the “pre-examination procedures” for additional guidance on specifying the scope of review, which depends on risk level. In additional, the scope of review should extend to credits to business sectors experiencing stress or rapid growth and/or having increasing level of past due credits relative to other sectors.

2. Review of individual credits

In appraising individual credits, examiners should carefully put a weight on the information obtained and make a decision on the credit quality. Each credit should be individually review by considering the risk involved, nature and level of collateral, financial capacity and responsibility in debt repayment, borrower’s contact record, and the feasibility and probability of repayment. The willingness and repayment ability of borrowers presents a major factor in measurement of risk. Borrowers must have sufficient profits or liquid assets to meet interest and principal payment within the reasonable and agreed time period. However, this does not mean that borrowers must be in a position to repay their debts at all times since it would means the purpose of extending the credit is no longer needed. Moreover, observation on deteriorating credits does not have to always wait until the credits are past due.

In reviewing individual credits, examiners should assess whether the problem credits result from inadequate credit polices and procedures, inappropriate or insufficient debt collection, or merely non-compliance to the specified credit criteria and policies. Sometimes problem credits
result from ineffective credit practices and/or inadequate supervision. Such problems may
deteriorate the quality of credits that are not corrected. Therefore, examiners must identify
problem borrowers and understand the cause of the problems. Weaknesses in credit policies and
procedures as well as corrective measures should be discusses in a meeting of financial
institutions’ management.

3. Factors to consider in reviewing individual credits

Examiners should assess and investigate preparation of documents as follows:

- Identification of borrower and borrowing purpose  Examiners should specify name, occupation or type of business of the borrower, cosigner, endorser, and guarantor. In case of commercial credits, it should be clear whether the borrower is a corporation, partnership, or sole proprietorship. Next, examiners should determine the true purpose of borrowing and source of repayment. A lack of, or too broad explanation on such issues should be commented. In addition, examiners must assess whether the repayment plan (terms and conditions of repayment) corresponds to the purpose of borrowing (e.g. borrowing for working capital should not be term loan) and must ensure that risk level or risk profile for the credit is within the specified credit line or limit and complies with the policy of financial institutions.

- Credit description should be concise as to type of credits, amount, approval date, and terms of repayment. Examiners should compare credit approval documents with outstanding ledger and accounting records. Any discrepancies should be commented and reported to the management.

- Collateral Description and valuation of collateral should indicate market price and condition of collateral. When the values are appraised, the source and reliability of the price should be evaluated.

- financial information Financial information from balance sheets and income statements should be reviewed. It is useful to review actual operating results relative to
borrowers’ business plan. The key is to assess whether borrowers’ cash flow is sufficient to service their debt. Declining trend in operating results or negative deviation between the business plan and actual performance is an initial sign of deteriorating credit quality. Borrowers’ characteristics, collateral value, and deteriorating status are next factors for consideration.

Note: Financial statements and especially cash flow statements are the key to evaluating credit quality. If financial institutions do not have the timely financial data, examiners should comment and consider a measure to correct the problem.

- review summary Review results should be summarized and documented. The documentation can take the form of report or individual working papers. Examiners’ summary of review should include

1. briefly summarize the borrowers’ characteristics, type of credits, and terms of repayment as well as source of repayment

2. summarize whether the credits comply with the policy, including the required documents

3. summarize positive and negative factors determined during the review. For example, comments on past operating results, what are the borrowers’ strength and weakness, whether the market position is improving or deteriorating, whether the management is strong or weak, and whether cash flow is sufficient to service debt

4. Risk rating and supporting reasoning

5. If there are comments to be made or problem credits to be monitored or problem loans to be restructured, such plans should be summarized so that progress in the plans can be monitored in during subsequent examinations

4. Credit documents that indicate weakness in credit

The following documents may help examiners in identifying potential problem credits during the review process:
- **debt instrument** Delinquency, debt payments not in accordance with the specified terms, irregular debt payments, or unusual or too frequent extension of terms of payment, credit renewal with little or no principal reduction, renewal with capitalized interests, and credits with high interest rate compared to market borrowing rate: borrowers facing these signs should be rated.

- **liability ledger** depends on borrowers’ type of liability, failure to amortize debt within appropriate time period (generally, amortization period depends on the period which collateral can be in use, typically not exceeding 30 years on an annual basis or seasons), and great increase in the amount of each borrower’s foreign liability compared to the previous examination

- **balance sheet and income statements** Inadequate or decreasing working capital, excessive volume or deteriorating trend in receivables, inappropriate level of inventory, receivables without recent aging, drastic increase in volume of account payables, increasing or more frequent renewal or extension of debt from operation, declining trend in sales and profits, rapidly increasing expenses, dividend payments inappropriate to operating performance, increasing level of debt to net worth, increase in operation net worth solely from revaluation of fixed assets: borrowers experiencing these signs should be rated as "special mention" or "substandard"

- **cash flow documentation** lack of cash flow statements or projections, cash flow projections that indicate inadequacy in principal and interest payments specified in a contract, as well as statements reflecting cash flow from sale of fixed assets or special items that are nonrecurring business situations or negative cash flow: borrowers experiencing these signs should be rated below "substandard" and in the case that asset quality is also deteriorating, the unsecured portion can be rated lower.

- **credit files and correspondence letters between borrowers and financial institutions** missing or incomplete collateral or loan documentation such as financial statements, collateral
agreements, guarantee contracts, appraisal documents, legal opinions, collateral insurance, credit applications, credit check documentation, correspondence letters between borrowers and financial institutions indicating that borrowers will not be able to meet the specified repayment: rating of borrowers will depend on the views of examiners or the circumstances.

- **collateral**: collateral that indicates speculative purpose of the loan or collateral with deteriorating market value (single-purpose real estate, or prohibited or restricted securities) which cannot be compensated or substituted by other reliable repayment sources and the collateral to receive afterwards extension of credits has unreliable value. Although such practices represent poor risk management, deciding whether or not to comment on this issue depends on past due status of borrowers.

**5. Indicators or signs of deteriorating credit quality**

The indicators listed below will help examiners in identifying problems or weaknesses in the review of borrowers’ financial information. While these transactions alone may not justify commenting on a loan, when considered in aggregate, they will help examiners to detect an imminent problem. The list is only a sample of red flags that prompt additional review. Examiners should also be able to identify issues that need further investigation after borrowers’ financial statements are roughly reviewed. Borrowers with these warning signs should be listed on “watch list”. The warning signs are

- longer collection period: this symptom indicates that borrowers intend to extend debt repayment and soften collection practices, which may lead to cash flow problems

- noticeable increasing level of inventory, both in terms of amount and percentage to total assets. Normally, increases in inventory will be supported by suppliers, and thus increasing the risk if turnover ratios are declining. Increases in inventory levels or lower turnover ratios may also result from reluctance to liquidate excessive or obsolete goods at a reduced price as most
businesses are willing to sacrifice liquidity to maintain profit margins. Such situations may eventually lead to cash flow problems.

- decreasing inventory turnover: indicate overbuying or imbalance purchasing policy. Many times, decreasing inventory turnover arises from a decline in sales. If the inventory value is undervalued, the actual inventory turnover will even be slower (longer) than the calculated results.

- existence of heavy liens on assets: holding of second and third lien on assets is a sign of greater-than-normal risk. Funding cost is usually high. Most borrowers are reluctant to use this source of funds unless other reasonably priced funding sources are available. Such businesses are typically over-leveraged and cannot withstand economic pressures from economic downturn for too long.

- concentration of non-current assets other than fixed assets: borrowing companies may use the funds to invest in affiliates or subsidiaries that lending financial institutions do have information on the businesses of those affiliates or subsidiaries. For this type of lending, financial institutions should have adequate information and credit analysis and structure it as direct lending. Lending to subsidiaries should have collateral other than a guarantee from parent company.

- high level of intangible assets in the balance sheet: such as goodwill or subscriber lists as the value of these assets is uncertain and may shrink much more quickly than tangible assets. However, some intangible assets such as patents or trademarks do have high value and should be incorporated in credit risk analysis.

- material increase in long-term debt that causes dependence on cash flow and longer-term operating performance to support repayment of long-term debt

- material difference between gross and net sales: such difference indicates the level of product returns and reserves. Lower product quality, customer dissatisfaction in borrowers’ products may affect borrowers’ profitability due to slower sales
- increasing percentage of cost: indicates businesses’ inability or unwillingness to pass higher costs to customers or inability to control cost.

- rising level of total assets compared to sales: when borrowers expand their businesses, there is a need for more current assets in the form of inventory, receivables, and fixed assets. Examiners should pay attention to the case when the asset growth of borrowers’ assets is higher than the sale growth since efficiency may decline.

6. Value of troubled real estate

A major indicator for troubled real estate is inadequate relation between total credits and the sale price and real estate and market demand. The potential sale price may not equal the appraised value. Current price or liquidating value in the market is more important than the appraised value since the real estate may have no market demand, causing the sale at a loss or very low price.

Examiners should comment on the appraised values that remain constant even during tightened economy since they indicate unrealistic conclusions. Incomplete or abandoned buildings are especially risky. Many times, physical deterioration during abandonment renders repair or increases completion costs to the extent that no operations can be done. To estimate the current price, current rental cash flow streams from the latest capitalization rate or discount rate must be assessed. In some cases, abandoned or partially completed building is worth only 10-25 percent of the original estimated value, depending on attractiveness of the location.

7. Assessing appropriateness and validity of appraised values of real estate

In assessing rationality of both facts and assumptions related to appraisals of real estate, especially troubled real estate, examiners should consider

- current and projected vacancy and absorption rate in relation to the rates used in real estate appraisals when fully utilized

- renewal trend and projected rents compared to the rates used in the appraisal
- amount and trends in past due rents
- feasibility study and market survey compared to current conditions
- effective rental rates or sale prices (including any concession, if any)
- net rental income compared to the projection
- discount rates and direct recapitalization rate compared to the current value

8. Evaluating the value of guarantee

When evaluating whether guarantee has value or not, examiners should consider or analyze the factors related to guarantee during the course of a review of borrowers as follows.

- ability level and willingness that the guarantor will fulfill the guarantee agreement
- whether the previous fulfillment of the guarantee was voluntary or was the result of legal actions by lenders

Examiners should set a scope of guarantee to borrowers who failed to fulfill the contracts in the past, unless there is clear evidence that the guarantors have intent and ability to honor the guarantee, e.g. willingness to pay a sum of money or place some assets as collateral in the guarantee. Otherwise, guarantee will be worthless if individuals or juristic persons cannot honor the guarantee commitment.

Nevertheless, guarantees are legitimate protection for financial institutions. The following circumstances may indicate that a guarantee is in full or partial value.

- guarantors have already fulfilled part of the obligations under the guarantee
- guarantors have material investments in the project such as have some equity or material cash investment
- guarantors have brought their other good projects for cross-collateralization or cross-borrowing
- the guarantee collateralized by marketable assets and under the control of the third party
Moreover, examiners should assess the ability to legally enforce the guarantee. Collection of funds under a guarantee should not be delayed or uncertain; such may lead to undue difficulties in legal enforcement in the future.

Even if financial institutions can legal enforce the guarantee, they may choose not to exercise their rights. Examiners should use own judgment on previous renewal of the credits which can indicated the successful and timely enforcement the guarantee and debt collection. Guarantees that financial institutions are reluctant to enforce are usually worthless.

9. Lost or missing documents

Deficiency in credit documentation should be brought to attention of management for remedial action otherwise it may lead to higher credit risk in the future. Excessive technical exceptions or restrictions also reflect the quality and ability of management, especially error or failure to obtain and review financial information. The situation where up to 25 percent of documentation to be reviewed are missing should be commented for ineffective credit administration practices.

10. Review of loan loss provisioning

Examiners are responsible for assessing credit quality, credit review system, adequacy of loan loss provisioning. Thus examiners should assess all significant factors that may affect debt collection ability.

In assessing the overall adequacy of loan loss provisioning, it is necessary to take into account the process, methodology, and underlying assumptions. The degree of loss estimates will depend on factors included in the consideration, in addition to the ability to assess the estimate each individual borrower. Therefore, the degree to which assessing of adequacy of loan loss provisioning is reliable depends on how these issues are addressed by the management.

- effective systems and controls to timely identify and monitor credit quality
- system of analysis that incorporates all important factors that affect debt collectibility
- Establishment of acceptable procedures in assessing adequacy of loan loss provisioning

Nonetheless, examiners should be aware that the Bank of Thailand’s guidelines on loan loss provision serve only as a minimum standard. Meeting the regulatory requirement does not insure that sufficient loan loss reserves for confidence in financial institution system. Thus it is very important that credit risk is accurately assessed and adequate reserves are maintained to absorb losses.
Appendix 4: Reports used for Credit Risk Monitoring

Financial institutions' board of director and senior management should periodically review and assess the performance of credit risk management. The frequency will depend on the type and complexity of the transactions. Nevertheless, the reports should cover the following issues:

1. Classification of assets

This report should provide summary information on asset quality (that is, special mention assets or classified assets according to the internal criteria such as substandard, doubtful, doubtful loss and loss, by type of assets) reserves from revaluation of assets and rate of illegal action over time. Such transactions should include assets at cost and deduction items, carried forward value of assets, and reserve from revaluation of the assets, appropriate market value and collateral valuation criteria. This report should have a note on the initial classification level by the authorities or external auditors. Financial institutions' own review system should have a data compilation unit independent from an underwriting unit to ensure that the objectives set are realized.

In addition, financial institutions' board of directors and senior management may expect to receive, in every accounting period, reports on granting of credits below standard and credits without adequate supporting information.

1.1 Warning signs

- rapid increase in classified assets both in terms of amount and number of accounts
- new credits from error in performing of duty or credits whose collateral is foreclosed
- increasing level of classified assets not in relation to the increasing level of loan loss provisioning
1.2 Rationale

Classification of assets is an essential tool in assessing asset quality and identifying asset quality problems that abruptly incur. The size and severity of classified assets is an indicator of the position of financial institutions and reflects financial institutions’ ability to comply to the credit policies and procedures that bring about financial institutions’ stability.

2. Loan loss provisioning

The reports should provide sufficient detail and supporting information on loan loss provisioning of financial institutions as are the case of normal reserves from revaluation that requires both quantitative and qualitative data. Moreover, it should provide quarterly information on losses and provisioning acceptable and compare the operating results with the policy targets.

2.1 Warning signs

- ratio indicating declining loan loss provisioning
- increasing trend in losses
- adverse changes in economic and business conditions

2.2 Rationale

When assessing accuracy of loan loss provisioning, financial institutions' board of directors and senior management should evaluate loss history as well as financial institutions' portfolio composition, asset classification level, standard and adequacy of collateral, current environment and economic trends. Insufficient loss provisioning will overstate the operating performance and requires more provisioning in the following accounting period, potentially reducing future incomes.

3. Foreclosed assets

The report should provide summary information on real estate and other assets received from foreclosure of debt. At the minimum, the report should have the following detail on major asset acquisition:
- acquisition date
- name and location of assets
- book value
- appropriate market value (including valuation date and method)
- level of internal classification
- income or loss from the assets (within the reporting period or accumulative amount)
- detailed operating results on usage of the assets compared with the management plan

3.1 Warning signs

- rapid increase in foreclosed assets
- disproportion of foreclosed assets by having the same source such as from the same credit officer, same branch, or same representative
- foreclosed assets from unclassified assets
- unclassified foreclosed assets
- foreclosed assets not marked to market or booked as credits on the acquisition date
- foreclosed assets held for too long
- foreclosed assets with sale price much lower than the book value

3.2 Rationale

Normally, foreclosed assets are from past due credits. Rapid increase in foreclosed assets is an indicator for deteriorating economic situations or inefficient credit underwriting standards or non-compliance to the set standards.

Holding of foreclosed assets for too long show that the value of assets is actually lower and not in accordance with the market value. Selling below the true value indicates incorrect valuation or poor sale management.
4. Pass due credits

The report should provide a summary of credits pass due from 30-59 days, 60-89 days, and more than 90 days, and a summary of all non-performance credits (NPL), by type of credits. The report on important non-performing credits should have the following information:

- borrowers’ identification code
- borrowers’ name
- lending amount
- classification level
- number of pass due months
- market value of collateral and valuation date
- process of collateral foreclosure for debt repayment
- management’s collection estimates
- payment received date
- summary of all credits more than 30 days pass due from last year
- summary of all credits whose repayments were extended during the past year

4.1 Warning signs

- increase in the level of pass due credits, especially credits pass due more than 60 days
- unexpected pass due credits (those that have never been classified)
- explainable extension of loans
- unfeasible collateral value appraised by management
- high level of new pass due credits in the past year

4.2 Rationale

Accuracy of information on pass due credits enables the board of directors and senior management of financial institutions to monitor the quality of asset, and ensure adequate provisioning against loan loss and high level of credit originating standards. Increasing level of
pass due credits and failure in debt collection are indicators of deteriorating credit quality or ineffective credit underwriting and management processes or non-compliance with the credit policy.

5. Restructured debt

The reports should provide outstanding debt restructured in the preceding quarter, including the total credit in the portfolio that has been restructured more than once, with the following details:

- Borrowers’ code/ ID number
- Credit outstanding
- Credit classification
- Name of borrowers
- Provision and write-off resulting from debt restructuring
- Previous terms and conditions such as interest rate, repayment schedule and collateral
- Repayment history
- Terms and conditions of debt restructuring
- Reasons supporting the management in deciding to restructure debt instead of foreclosure

5.1 Warning signs

- Debt workout, roll-over, and rescheduling, or debt restructuring or credit extension to repay interests or to avoid reporting such debt as pass due, without strengthening the financial position of financial institutions
- Extension of new credit to pass due debtors or related parties without requesting additional collateral
- Failure to classify restructured debtors with inherent risks higher than normal debtors
5.2 Rationale

Assessment based on aging does not reflect the effectiveness of debt restructuring. Debt restructuring by means of new credits to repay problem debt may give false impression of improved condition of financial institutions. Therefore, the assessment must take into account the appropriateness of debt restructuring guidelines and its implementation accordingly, as well as regular review to ensure its effectiveness. Additional credit extension may be considered as debt restructuring, but financial institutions’ board of directors and senior management should evaluate whether or not such restructuring is beneficial to financial institutions. If the restructuring merely aims at avoiding collateral foreclosure for debt repayment, risk exposure will increase instead.

6. Credit concentration

The report should provide details of credit concentration in various dimensions such as credit concentration by individual debtor, industry, geography, type of credit, and type of collateral, including property for speculative purpose not yet sold.

6.1 Warning signs

- Credit increase as a result of lending to a particular borrower
- Significant increase in borrowers with high risk profile
- Violation of single-lending limit
- Increase in credit concentration in the following categories:
  1) Credits to a particular industry such as energy industry
  2) Credits to a particular region such as industrial towns
  3) Problem credits and credits based on single type of collateral

6.2 Rationale

With the benefit of diversification in terms of credit risk mitigation, the board of director and senior management should be mindful of the consequence of risk associated with credit concentration.
7. Reports on summary of new credits

The reports should provide summary of latest statistics of new credit granted by
financial institutions classified by type of credit, numbers of credit extension, and credit
outstanding, compared with the budget. Moreover, such reports should show summary of new
credits with risk profile greater than that of normal credit, for example, credit amount considered
high in comparison with the business transaction, and low quality credit for the purchase of real
estate. The board of directors should review new material credits in all reports.

7.1 Warning signs

- Acceleration of new credit extension without proper planning
- Long-term credit with exposure to interest risk
- Credits with high risk profile
- Origination of new credits significantly different from the business plan of financial
  institutions

7.2 Rationale

Quantity and good quality of new credits is an indicator of financial institutions’
performance. Among other factors, credit generally fluctuates in line with economic conditions.
It is imperative that the board of directors and senior management understand the causes of credit
fluctuation and abrupt fluctuation of credit within the portfolio.

8. Reports on internal credit review

The reports specify framework of guidelines on credit policy, and credit underwriting
standards and process approved by the board of directors that must be observed by the
management. In addition, the reports should consist of:

- Assessment of correctness of internal credit rating by financial institutions
- Basis for credit sampling, not restricted to new credits or large credit exposure, to ensure
  the fulfillment of sampling objective
• Independence of person or department responsible for report preparation from that responsible for underwriting credits
• Assessment of accuracy and internal control for credit extension, especially with respect to interest rate, adjustment of repayment installments and escrow account

8.1 Warning signs
• Non-compliance with credit policy and credit extension standards set by the board of directors
• Inconsistency between reports on internal credit review and that of external auditors or authority examiners
• Credits purchased by financial institutions below their required standards
• Frequency of consistent errors in credit extension of material level

8.2 Rationale
The credit review process that lacks independence is a warning sign of error in credit management and may lead to problem credits. Moreover, credit review process is a tool for assessment of adequacy of credit policy and credit originating process. Requirement for supporting documents for credit application and credit review process help identify potential problem credit and provide the board of directors and senior management with means of asset quality assessment. Such practice and careful credit extension should prevent legal litigation against financial institutions resulting from errors in credit extension.
Audit Manual for Liquidity Risk

This translation is for the convenience of those unfamiliar with the Thai language. Please refer to the Thai text for the official version.
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Section 1 Definition of Liquidity Risk

An objective of the liquidity risk assessment is to see whether a financial institution’s management has put an appropriate control system that can identify, measure, monitor and manage liquidity in place or not. The assessment of liquidity risk to be described in this manual is based on standards prescribed by the Basel Committee on Banking Supervision. As a result, assessor should be assured that a system implemented by a financial institution to identify, measure, monitor and control liquidity risk is appropriate and adequate for its scopes of business and degree of complexity. Large financial institutions with complicated services must have a complex risk management system which can measure all major risk levels while smaller counterparts with fewer services or uncomplicated transactions may be equipped with a risk and management and information system that is far less complicated and requires far fewer resources.

Unsound management and problems with the quality of assets are two fundamental problems which may founder the financial institutions. However, a lack of liquidity due to an inability to load off assets or seek enough cash to continue the operation may also cause financial institutions to stop businesses. Therefore, risk management is extremely important for them.

During the financial institution assessment, assessor should assess and be assured that the management has already provided enough liquidity to cope with various situations while the risk management system itself is proper enough to handle demands for funds in the future.

1.1 Definition of liquidity risk

Liquidity risk means risk resulted from a financial institution’s failure to pay its debts and obligations when due because of its inability to convert assets into cash, or its failure to procure enough fund, or, if it can, that the fund comes with an exceptionally high cost that may affect the institution’s incomes and capital fund now and in the future. An example is when a financial institution faces a bad asset problem and has bad reputation or is rumored with bad news, which may force huge deposit runs from this institution and cause creditors to suspend their credit facilities. This will prompt the financial institution to suffer from a liquidity crunch especially when demand for capital is far higher than the existing liquidity, it is therefore possible that the financial institution may go under.

In addition, liquidity risk may be a result of a financial institution’s inability to unwind or offset underlying risks from assets it currently holds, a situation which will force the financial institution to sell its assets at a loss as the assets are illiquid or the market is suffering a liquidity crunch. An example is when a financial institution signs a forward agreement to sell foreign currency to a customer and enters into a forward contract to buy the same amount of foreign currency for the purpose of hedging. If the customer cannot honor the agreement, the financial institution may have to unwind the forward purchase contract that it has entered for hedging purpose by selling such contract. In this situation, the financial institution may suffer from loss, which, if a lot, will affect the financial institution’s liquidity.

In addition, warning signals of a liquidity problem may include increasing costs of funds, demand for collaterals despite no such requirement in the past, a downgrade of the credit rating, a reduction of loan amount or a decline of long-term funding sources available to the company, suspension of support by related financial institutions and material change of the debt to equity ratio.
1.2 Sources of liquidity risk

1.2.1 External factors such as

**Competition:** Competition is an important external factor that affects liquidity. For example, deposits may be moved to competing financial institution offering higher interest rates or to another competitor offering lower bank fees or simply due to changing demographic trends; i.e. the public is more knowledgeable about financial products that offer better returns than bank’s deposit rates, including an issuance of government and state enterprise bonds and an establishment of various funds including non-bank financial products. In addition, economic conditions may also affect financial institution’s liquidity risk; for example, deposit or other sources of capital may decline or can’t be secured when local, regional or the world’s economy is in a recession.

**Market volatility:** Liquidity risk may result from market movements rendering negative effect to financial institutions. For example, as transactions of certain financial instruments or products in the secondary market are illiquid, financial institutions may suffer from loss if it has to sell the instruments within a short notice. In addition, the loss may negatively affect their reputation and back-up loans they usually get during emergency may now be suspended.

**Changes of the authorities’ rules and regulations:** Changes of the authorities’ rules and regulations such as changes of legislations and rules that induce more competition may affect liquidity risk. While customers will have more alternatives to manage their excess, financial institutions will struggle to lure new deposits and maintain the old ones. On the other hand, financial institutions are now having more choices to mobilize their funds from the capital market and even directly invest there, which may lead to investment risk as the entire liquidity can be in jeopardy if the management makes a wrong assessment.

1.2.2 Internal factors

**Business strategies/policies:** Strategies such as change of deposit rates or service fees or structure of assets, liabilities and transactions outside the balance sheet aimed to increase market shares may unintentionally change an institution’s financial structure. For example, deposits may flow in at an amount that far exceeds demand while the management of liquidity risk can become more complicated due to the maturity of transactions outside the balance sheet. On the contrary, existing customers may move on to competitor’s service due to the latter’s lower service fees as the operation cost of the financial institution in question is far higher than the market rate, or that it cannot calculate its cost or determine the pricing appropriately.

**Volatile funding:** Too much dependence on volatile funding such as overseas loans or borrowing from large creditors, which are interest sensitive, may result in liquidity risk. Funding from numerous small-time depositors are much more stable.

**Transactions outside balance sheet:** A number and a degree of complexity of transactions outside the balance sheet will affect liquidity risk; for example, obligations under Letter of Credit or guarantee, credit facilities already approved by financial institution but not yet withdrawn by customers or complicated derivatives transactions of which demand for liquidity is difficult to be estimated.

**Concentrated funding sources:** Poorly-distributed funding sources will likely increase liquidity risk. For example, funding sources from deposits or loans in a particular currency or with maturity in the same period, funding from the same source or the same market or funding mobilized from the same type of financial instrument.
Defected operating system: Poor management information system that each department sends to the Treasury Department for liquidity management, causes inaccuracy and delayed information. This may prompt a financial institution to face with liquidity crunch, a situation that can damage its reputation in the market.

1.3 Early warning indicators of liquidity risk

Financial institutions should monitor external and internal financial indicators that signal early warning of liquidity risk. These indicators help the management or the Board of Directors of a financial institution to monitor or analyze additional problems more quickly.

Samples of internal indicators are:

- Financial institution’s transaction or product tends to become negative or subject to a material increase of risk,
- Concentration of assets or liabilities;
- Asset quality is declining;
- Revenue is declining or estimated revenue is declining;
- Aggressive credit extension or increasing rate of approved loans; and
- Rapid credit expansion where funds come from large creditors or wholesale large volatile deposits.

External indicators however may come from financial analysts or other market participants. They may include:

- Market rumor that a particular financial institution is in trouble;
- Credit-rating agency downgrading financial institution’s rating;
- Falling share prices; and
- Deterioration in fund seeking, which leads financial institution to secure funds with higher costs, contractual parties demanding collateral and correspondent bank canceling or reducing amount of loans extended at a time the financial institution needs to repurchase its financial instruments in the market.

1.4 Factors to reduce liquidity risk

Strong financial status: The best device to reduce the liquidity risk is to have a sound and reliable financial position to reassure the market and to avoid massive deposit runs. However, past experiences have already proven that once the financial status of a financial institution is found to be declining severely, no matter how much liquidity it may have, this is unlikely to cope with deposit runs, loan termination or demand for immediate payment from other financial institutions.

Stable funding sources: Financial institutions with access to reliable funding sources are likely to expose to low liquidity risk than those having to depend on volatile sources of fund. However, Financial institutions depending on large or volatile funding sources should realize that their sources are unstable and prepare a contingency funding plan in case of emergency. Financial institutions can secure stable funding sources by opting for irrevocable
line of credit, which is far more stable than the advised line and, in case of tight market condition, is less likely to be suspended.

**Customer service**: Financial institutions depending on small-time depositors should focus on customer service to keep their customers at bay. If the quality of service is declining, executives may find that its deposit base is not as solid as he thinks it is since customers may shift their money to other financial institutions instead.

**Adequate planning of liquidity (risk management)**: Liquidity planning is extremely important whether the management has chosen stable funding sources or volatile ones, or whether it opts for a number of funding sources. Liquidity planning can be carried out in a number of ways and there is no single way that may universally apply to every situation or every financial institution. To say the least, if the financial structure of a financial institution is very volatile and risky, the risk management system should be increasingly complicated. If a financial institution experiences quite a stable and predictable fund flow, that financial institution is exposed to far lesser risk and therefore may not need a complicated risk management tool.

**Structure of the balance sheet**: Aside from managing risk out of the liability side of the balance sheet, we may reduce liquidity risk by simply maintaining the liquidity on the asset side of the balance sheet. Managing asset liquidity means managing/maintaining level of cash, loans and securities, structuring loans appropriately or selling credits to increase liquidity. However, the management must realize that selling the assets during crisis does not always result in an expected return.
Section 2 Guidelines for Risk Management

Aside from a solid organization structure, an effective risk management should consist of the following four processes; namely, (1) risk identification; (2) risk measurement; (3) risk monitoring and reporting and (4) risk controlling. Executives should be able to identify and assess a preliminary source of liquidity risk with accuracy and within an appropriate timeframe. To identify possible sources of risks, executives should understand the existing risks or those occurred in the past and potential risk from new businesses/transactions, laws and regulations. Executives should constantly monitor new sources of liquidity risk from a point of view of an individual transaction and an entire portfolio.

A financial institution’s risk assessment system should cover major sources of liquidity risk and places where liquidity can be used as well as the complexity and relationships between various risks. To select an appropriate risk measurement system that suits a particular financial institution, executives should understand the nature and structure of financial products and transactions. For financial institutions relying on large creditors, they should have a comprehensive risk measurement system to accommodate their transactions.

Executives should constantly test whether the risk management process remains appropriate. For example, they may periodically review an analysis report of capital inflows and outflows or other executive reports in similar manner to ensure that these reports truly measure and reflect significant items in and out of the balance sheet. The assessment and reporting system should be updated when there is change to the products or the risk of such financial institution.

Significant factors of an effective risk management process consist of management information system, risk limits, internal controls, management reports and contingency funding plan.

2.1 Risk identification

Risk management is a matter of estimating capital demand and securing capital to support such demand at the most appropriate cost. Financial institution can secure liquidity from both sides of the balance sheet; namely, assets and liabilities, as well as transactions out of the balance sheet. Executives who try to control liquidity from the asset side alone may neglect the liquidity from the liability side, which can probably have lower operating cost. On the other hand, the management of liquidity from the liability side alone or dependence on large source of fund mainly from the purchased fund (i.e. loans, wholesale large volatile deposits or interbank loans) may expose the financial institution to market conditions and other influential factors beyond its control. Executives capable to effectively manage the liquidity will have to consider several possible sources of liquidity when preparing a liquidity plan and when securing funds for actual use.

To achieve a good liquidity management, executives should understand the nature of capital owners, types of funds used, market restrictions or the authorities’ rules and regulations regarding fund mobilization. As a result, executives must learn about quantity, ratio, cost/pricing, cash flow and risk of assets, liabilities and transactions outside the balance sheet that the financial institution is having, other funding sources available to the financial institution, tendency that liquidity excess will be spent as well as additional risks from funding concentrations.
2.1.1 Sources of liquidity

Major sources of liquidity of financial institution include sales of liquid assets, increasing loans and/or short-term deposits, increasing irrevocable line of credit, reduction of illiquid assets in possession, increase of liabilities and capital increase.

2.1.2 Sources where liquidity may be used

Major sources where liquidity may be used include an expansion of assets or the purchase of liquid assets such as loans, securities investment, repayment of loans/deposits, increase of illiquid assets in possession and capital reduction.

2.1.3 Liquidity management based on the asset structure

Financial institutions may secure liquidity by managing the structure of their assets. For example, they may sell assets demanded by the market for additional money to respond to their loan expansion and for trading transactions. Liquid assets must be those easily and speedily converted into cash at an appropriate cost whenever financial institution needs additional liquidity. Liquid assets also refer to securities used as collateral or in an execution of a repurchase agreement. Although executives may expect some interest incomes from these liquid assets, their main objective is to be a liquid asset.

To what extent a financial institution has to maintain liquid assets depends very much on the stability of its capital structure and an opportunity to expand credit speedily. In general, if a financial institution gets an access to a stable funding source and can more or less estimate demands for credit, it may maintain liquidity at a very low level. The amount of liquidity however should increase in the following cases:

1. Increasing market competitions which allow customers to invest in other types of financial instruments;
2. Current liabilities tend to decline rapidly;
3. Most deposits belong to only a handful of customers;
4. Most deposits are volatile funds;
5. Most credits are bad;
6. Credit not yet withdrawn and the obligations are likely to be withdrawn in the near future;
7. Funds are concentrated in industries suffering from financial problem now and in the future;
8. Credit rating of a financial institution is low or declining, signaling that the financial institution may have trouble mobilizing fund in the capital market;
9. Financial institution cannot estimate its performance while operation result is volatile;
10. Financial institution experiences a liquidity gap – there is a much higher demand for capital in the near future than a large amount of funds it can lay hands to;
11. Financial status or operation result of affiliated companies adversely affects the financial institution’s liquidity; and

12. The integrity of an entire financial institution system is declining.

2.1.4 Liquidity management based on liabilities

It is normal for large financial institutions to seek funds from the money market. They usually find borrowing the most appropriate means to secure fund to respond to unexpected need or if given a short notice or if it has to cope with deposit runs because the cost is effective. Small financial institutions, which may not get access to the money market, may depend instead on liquidity from the liabilities which increase when deposits continue to be withdrawn. As a result, an ability to manage the funding sources as well as relevant costs and cash flow will be varied from one financial institution to another.

To manage liquidity from liabilities, financial institution may seek liabilities that match the cash flow it requires instead of spending time allocating amounts and types of assets it needs. In addition, by carefully determining the maturity period of its liabilities, financial institution may help reducing liquidity risk especially when it can extend their due periods even further. Besides, getting access to large customers means financial institution will be able to receive funds more quickly and for a far more amount than taking current or savings deposits.

Yet, capital management through liabilities is not without risk since changes in market condition will affect the amount and the cost of fund. For example, when managing the structure of the fund’s maturity, if interest rate goes up unexpectedly or rapidly, financial institution depending on short-term capital to fund long-term assets may see its incomes declining. On the contrary, if interest rate falls, financial institution using long-term fund to secure short-term asset will see its income drying up. As a result, to manage liquidity from the liability side, executives must formulate a strategic plan and follow the plan prudently than when managing liquidity from the asset side.

Although a financial institution may be able to attract more funds by offering higher interest rates, the institution should perhaps consider an option of selling its assets as well. This is because managing liquidity from both the asset and liability sides will drive the cost of maintaining the liquidity down. A significant difference between liquidity in large and small financial institutions is that larger financial institutions are able to determine the composition of their assets in a balance sheet far more easily that their small counterparts and can control the level and composition of liabilities far better when in need of capital. As a result, large financial institution will have far more alternatives to seek fund at a lower cost. In addition, an ability to seek funds from the money market quite easily means they can also reduce the amount of liquidity they must maintain during emergency.

To assess a financial institution which manages liquidity from the liability side of the balance sheet, one should take into consideration the institution’s ability to secure funds from the money market and the time span of loans borrowed to refinance the purchased fund due for payment. The difficulty to assess financial institution’s ability to secure funds lies at a question whether or not the cost of fund secured by the institution still yields a positive return since changing conditions in the money market may reduce the financial institution’s ability to secure funds at a reasonable rate. As a result, liquidity must also demonstrate the ability to seek funds in the money market whenever it wants and at a reasonable cost.

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1 Purchased fund includes loans, wholesale large volatile deposits or interbank loans.
Although by trying to attract more funds through cost competition means most financial institutions are able to respond to increasing demands for loans, volatile interest rates, misuse of fund or inappropriate or erratic liquidity management can, at one point, seriously affect financial institutions. As a result, financial institutions should realize that managing liabilities could lead to the following liquidity risks:

1. Financial institutions may not be able to always find a source of purchased funds every time they are looking for it. If the investor lacks confidence, it may affect the institution’s liquidity. Financial institutions that depend very much on purchased funds are likely to be exposed to high liquidity risk and are very sensitive to negative factors such as auditor’s negative view, operating loss or an economic downturn that negatively affects a financial institution and results in rapid deposit runs of the purchased funds. On the contrary, those depending on small-time deposit, which is a far more stable funding source, should be able to better negotiate the unpleasant situation.

2. Managing liquidity by focusing on liabilities may induce such a financial institution to hold fewer short-term assets or to relax its standard of liquidity management from the asset side. This may lead to a situation when financial institution can spend a lot of short-term liabilities to fund long-term assets, which, if the money market becomes tighter, its income will fall and it will suffer from liquidity crunch. Therefore, funds acquired from managing the liabilities should be invested in assets having a matching maturity structure or a similar rate of return. For example, if the liabilities are subject to fixed interest rates, they should be invested in assets yielding fixed interest rates and the same should apply to floating rates.

3. Due to interest rate competition in the money market, financial institutions may secure their funds with higher operation cost. This may induce them to reduce the quality/standard of loans and investment in securities in order to get higher returns to compensate their higher costs of fund. If a financial institution uses the purchased fund to accommodate assets already in the account, the purchased fund’s high cost may force its rates of return to become negative due to a failure to find a matching asset.

4. Financial institution will be able to best manage its debts when its funding sources are highly flexible and when executives are having expertise in managing these funding sources. Financial institutions having limited funding sources should avoid the use of purchased fund in the money market and instead depend on local funds. This is because when the money market becomes tight, financial institutions will be subject to credit rating, which will increase the costs of the purchased fund, except in only a few cases.

5. Funding through the lowest possible cost of fund alone without taking into consideration of the structure of the maturity period distribution will force financial institutions to confront with a volatile interest rate risk.

Strategically speaking, from the point of view of liquidity funding sources, there are two major types of liquidity: (1) large funding sources; namely, purchased money such as borrowing and/or wholesale large volatile deposits; and (2) retail funding sources. Financial institution’s strategy/policy should specify which strategy it will use or how much fund it will seek from each type. This is because different strategies have different impacts and a selected funding source will help determine a risk management tool. Besides, we should also consider securing foreign-currency funds as well.

Several factors help determine the selection of funding sources. For example, retail funds are likely to be more stable than large funds and therefore the risk management tends to be less complicated. However, smaller funds are likely to cost more than the larger
funds as financial institutions need more staff to handle retail deposit and withdrawal transactions, resulting in higher operating costs.

On the other hand, seeking large funding is less expensive than securing smaller funds since financial institutions are able to secure and manage a large amount of fund from a particular organization or an individual. Besides, the credit rating of a financial institution may cause interest rate paid to large depositors to be lower than that paid to retail depositors.

However, risk from this type of fund is more difficult to control. The case in point is that a depositor’s decision to renew his deposit depends very much on interest rate and credit rating only and that’s why we cannot expect a sense of loyalty from this funding source. To elaborate, depositor tends to shift his money if interest rate is not high enough to compensate an underlying risk and he will indicating their problems start withdrawing money as soon as financial institution shows any symptom. As a result, it is important for executives to closely monitor the liquidity risk more than the case of retail depositors and to maintain higher reserves for liquidity purpose than the case of retail depositors to accommodate the withdrawal of deposit if fund owner decides not to renew his money in the end.

(1) Retail deposits

In general, retail deposits are the foundation of the financial institution business and may be the result of the relationship between customers and marketing officers of relevant financial institutions. In the past, retail deposits were hardly sensitive to financial institution’s credit rating or interest rates since the authorities guaranteed all deposits and since customers had good relationship with the financial institutions. However, recent changes in the money market have affected retail depositor’s behavior. Now, they are more sensitive to interest rate and the financial institution’s credit rating.

The extent to which they will become sensitive to a financial institution’s credit rating or interest rate depends on customer’s financial knowledge, past experiences, financial institution’s location and other savings alternatives. An issue of concern whether a financial institution will survive or not as reported in medias and newspapers might affect depositors’ confidence regarding the safety of their money, which could then lead to massive deposit runs.

Rate of returns from various savings alternatives is another factor that affects amount of money a customer decides to deposit at a financial institution. For example, retail deposits of a financial institution may fall if depositors view that they will enjoy higher returns from other alternatives such as mutual fund. On the other hand, with stock market doldrums, a lot of cash may flow back into a financial institution system if investors feel that it is a safe place for their money when market becomes volatile.

However, to assess how sensitive retail deposits are to financial institution’s credit rating and interest rates is anything but easy. Owners of large funds sometimes use the so-called Demanded Deposit Account (DDAs) and Certificate of Deposit (CDs), which are products or tools for retail depositors. Under a crisis or changing economic conditions, smaller depositors will react differently from their larger counterparts. As a result, those managing liquidity must be able to differentiate large funding sources from smaller funding sources in various accounts and monitor the movements of the outstanding in these accounts and their trends.

If a financial institution chooses instead to depend on retail depositors, its strategy should take into consideration types of deposit accounts offered to customers and how the financial institution can constantly reach this group of customers. For example, retail
customers who tend to use a variety of products are likely to place a priority at the financial institution rather than at the interest rates. To secure and maintain deposits therefore involve a focus on service rather than expensive interest rates. As a result, financial institution may have to give enough guidance to relevant departments on how to launch a deposit product and how to market it as well as to prescribe a standard to control the quality of products it is offering. For example, a strategy plan should identify a target group, the target group’s demands in general and procedures to assess the target group from time to time.

(2) Large deposits

Various financial institutions depend on large customers to replace their loss of small-time depositors. Large customers refer to commercial businesses or large industries, other financial institutions, government agencies and wealthy customers. Therefore, these customers are quite sensitive to credit rating and interest rates, which add more liquidity risk to financial institutions. Those deciding to depend on this kind of funding sources must be very certain that they can get a regular access to the sources over the time.

In general, large investors or large fund owners must be reassured that financial institutions remain in good financial health so that they can renew their capital upon maturity. The strategy therefore should focus on how to manage these capital for maximum profits without affecting the security and stability of these financial institutions. Acquired capital should be used to make direct profit immediately; for example, to repay debts or invest in assets which can be converted into cash within an appropriate period of time by, among a few, extending credit to investment-graded companies or investing it in securities highly demanded by the market. The overall strategy should be to determine limits of long-term illiquid assets acquired through this type of funding sources.

(3) Funding concentrations

To select an appropriate funding source, executives must carefully consider the tendency of the funding concentration. Funding concentrations can happen if a single decision or a single factor leads to an abrupt withdrawal or a recall of massive capital. Funding concentrations depend on financial institutions and the structure of each financial institution’s balance sheet. Therefore, there is no standard amount of money or fund to determine whether or not the liabilities are concentrated. Funding concentrations are very sensitive to credit rating but the quality and reliability of collateral may help reduce a certain degree of that sensitivity.

When monitoring funding concentrations, executives should review reports about large depositors/creditors. The report should specify a total fund a financial institution plus its affiliates get from a single depositor/creditor or a single group. Financial institution should determine a limit or a ratio for monitoring or controlling purpose to avoid funding concentrations. When considering the funding concentration, financial institution should consider the concentration both in terms of the funding sources and their maturity.

2.1.5 Transactions outside the balance sheet

Transactions outside the balance sheet can be both funding sources and sources where liquidity is used, depending on types of transaction and levels of interest rate at the time. For example, financial institution may enter into an interest rate swap agreement by paying floating interest rate and receiving fixed rate. Upon maturity, if the fixed interest rate is higher than the floating rate, then the financial institution will benefit from the difference between the fixed and the floating rates. On the contrary, if the floating rate ends up higher than the fixed rate, the financial institution will have to pay the difference.
Examples of transactions outside the balance sheet where liquidity may be used include obligations resulting from an extension of various credits such as Letter of Credit with a fee to maintain the loan. Financial institution should be able to assess the amount it has to pay as a result of its obligations in different time spans or its obligation to guarantee the issuance of newly-issued shares so that it can find enough funds to accommodate the demand.

Those responsible for managing the liquidity should know and be able to assess an extent the transactions outside the balance sheet may affect cash flow and liquidity risk.

### 2.1.6 Managing liquidity in foreign currencies

Financial institutions having assets and liabilities in many foreign currencies are facing more complication when managing their liquidity due to two reasons: (1) local financial institutions are hardly recognized by creditors in foreign currency market. As a result, at a time of crisis especially when it involves a financial crisis in a country where the financial institution is situated, these creditors are not able to differentiate the rumor from the reality as well as local creditors in local currency do; (2) during a crisis, financial institution may not be able to convert enough liquidity in local currency and transactions in foreign currencies to accommodate the need for foreign-currency funds. These are important factors for financial institutions maintaining high foreign-currency position and/or position in illiquid currencies.

Factors affecting the management of foreign-currency liquidity depend on the nature of financial institution. For some, the use of deposits and short-term foreign-currency loans to fund local currency assets is a main reason that might cause the financial institution a trouble. For others, they may use local currency funds to secure foreign-currency assets. Financial institutions should analyze foreign-currency liquidity under different situations including during crisis. For example, a financial institution may find its foreign currency funding gap rising due to an abrupt change of exchange rates. In addition, foreign-currency assets may be depreciated especially when borrower fails to hedge against an exchange risk.

#### (1) Review of liquidity for foreign-currency loans and credits

Financial institutions must cautiously review various types of risk when extending foreign-currency loans. Executives must assess a possibility to access a foreign exchange market as well as a potential to exchange them into a currency the institution normally uses in its transaction under different circumstances when it may need to convert the fund from one currency to the other. In addition, financial institutions may have to consider possible exchange rates under different situations even in countries adopting fixed exchange rate. An easy but effective strategy in several cases is to possess assets and liabilities in foreign currencies in the relatively similar amount.

Financial institutions should analyze effects of various circumstances to their liquidity position on the basis of each currency. The analysis is extremely important especially in the case of illiquid currency. This is because at a time of crisis, even though the currency may be stable and liquid enough, it won’t always be easily exchanged to repay foreign debts. Financial institutions should therefore really consider which currencies they should put a limit on based on each currency and regularly review their rationale while making sure that this is in line with changing environment as well as the authorities’ rules and regulations.

Normally, financial institutions may experience less mismatch between their assets and liabilities in foreign currencies than the mismatch of assets and liabilities in local currencies. The mismatch should be considered in conjunction with the ability to secure
funds in a foreign exchange market and back-up reserves in foreign-currency denominations within the local money market.

(2) Use of foreign-currency funds to secure local-currency assets

During market crisis, devaluation will trigger deposit outflows if customers are concerned that the currency depreciation means financial institution’s liquidity will fall due to currency mismatch of financial institution or of customers themselves. In addition, by raising interest rate significantly high to protect customers’ money, financial institution may find itself struggling to manage the cash flow, which will damage the revival of local assets and affect the liquidity position of the entire financial sector. In addition, local funding costs will tend to rise due largely to higher interest rates.

If financial institution assumes instead that local currency deposit can be converted into foreign currency in order to repay foreign currency-denominated debts, it is necessary that the financial institution foresee a variety of scenarios by considering different possibilities that may occur in the foreign exchange market. The market may be difficult to access or it may lack liquidity and/or foreign exchange rate may tumble very quickly. In this regard, financial institution mobilizing credit lines in foreign-currency denominations or from large and retail depositors to fund its local-currency assets is likely to suffer damage from the movement of an exchange rate of local currency, which will further intensify the liquidity mismatch.

(3) Securing assets in foreign currencies

Financial institution extending loans to local customers in foreign currencies may be affected by various factors. When currency depreciates very quickly, local customers may not be able to repay foreign-currency debts, which will affect cash flow the financial institution expects to receive. As a result, the financial institution should consider an exchange risk that will affect customers individually and as a group as well as customer’s ability to generate foreign-currency incomes to repay the debt.

Financial institution may decide to maintain its liquidity in certain foreign currencies enough only to cope with the need for that currency, which will be considered a separated liquidity reserves from the local currency. In this regard, executives of a head office or of a regional/branch office must prescribe a strategy and a contingency funding plan as well as negotiation to secure a back-stop facility. Financial institutions must assess as well whether or not these reserves should still remain at a time of crisis.

2.2 Risk measurement

An effective risk measurement and monitoring measure is extremely important in the process of liquidity risk management. In principle, to assess a liquidity level, one has to evaluate cash flowing into and out of a financial institution and demands for funds to finance obligations outside the balance sheet. The idea is to identify a possibility of liquidity crunch in the future. Measuring liquidity risk can be done in a number of ways starting from an easy calculation of the current position without further adjustment to the use of a complicated tool or model to calculate it. Since every financial institution will be affected from economic and financial trouble, which, in principle, the central bank of a particular country, is responsible for this job. However, financial institutions should consider the central bank as a last resort and manage/maintain their foreign currency-denominated loans and facilities at an appropriate level.

A “back-stop” facility is foreign-currency loans lent by financial institutions. The objective of this loan facility is to ensure that financial institutions can still repay creditors if their customers are having financial trouble, which, in principle, the central bank of a particular country, is responsible for this job. However, financial institutions should consider the central bank as a last resort and manage/maintain their foreign currency-denominated loans and facilities at an appropriate level.
market changes, the monitoring of economic and market trends is therefore vital for its management of liquidity risk.

A liquidity risk measurement tool which remains very popular among financial institutions is an estimate of cash flow and liquidity position as well as an analysis of financial ratios. To choose which method or tool depends very much on the complexity of the structure and the management of assets, liabilities and transactions outside the balance sheet of a particular financial institution. Any financial institution having complicated transactions may opt for dynamic method, details of which are in the appendix attached hereto.

2.2.1 Estimating cash flow and liquidity position

To be able to assess demand for liquidity, executives must do a cash flow estimate, which, if they thoroughly understand their financial institution’s cash flow, will enable them to assess the level of liquidity appropriately and adequately. A contingency funding plan is an example of a cash flow estimate. Several financial institutions use the so-called behavioral cash flow report or the behavioral gap report to assess and analyze cash flow estimate, which is different from the repricing gap report used in measuring interest rate risk. The behavioral gap report will indicate various time bands when a financial institution may need money to fund its deposit withdrawal. A decline in other types of liabilities or an increase in a negative gap of liquidity means a shortfall of fund resulting from a mismatch between the acquired capital and capital being spent.

A number and intervals of bands used in the behavioral gap reports may be different. Most financial institutions will use only short band (daily) to assess potential risk in a period closed to present while gradually increasing the band in an extended period. For example, financial institution may estimate its cash flow on a daily basis for the first two weeks of its monthly estimate of the next 6-12 months, to be followed by a quarterly estimate.

When estimating cash flow, financial institution should assess customers’ likelihood to renew their due contracts instead of depending on maturity period of the contract alone. Cash flow of various products of a financial institution is uncertain due to influential factors of interest rates and customer behavior. In addition, cash flow may fluctuate on a seasonal basis and during business cycles. The case in point is financial institution locating in farming area may see a surge of credit during the production season and an increase of deposit during the harvesting season.

Executives should also consider an increase or decline in liquidity usually taking place during economic cycles although its forecast is far more complicated than the seasonal-based forecast. An economic cycle affects both demands for loans and amounts of deposit; demand for commercial loans will increase when business is doing well and level off when the economy is slowing down. Some financial institutions may even find it difficult to seek funds to accommodate robust demands for credits during the booming period, except if the financial institutions have already been backed up by large funding sources.

Financial institution should always have a funding source which is liquid enough to accommodate the volatility of its loans and deposits. It should also maintain a liquidity excess for safety purpose. In order to be reassured that an adequate amount of liquidity excess is being maintained, financial institution should estimate its demands for liquidity in different situations based on expected changes in economic, competition and business strategies.

Guidelines for a preparation of liquidity report based on the forms prescribed by the Bank of Thailand can be seen in a circular issued by the Monetary Policy Group Re: Liquidity Management of Financial Institutions and Relevant Report Forms
2.2.2 Use of liquidity ratio

A number of ratios can help assessing the level of liquidity as well as determining appropriate risk limits. However, if these ratios are not implemented regularly and their meanings are not interpreted in conjunction with other qualitative factors, financial institution may not be able to get a real picture of the liquidity trend. These factors therefore should be brought in and considered simultaneously with qualitative information regarding depositor’s borrowing ability and other behaviors such as increasing trend to withdraw deposit before maturity, reduction of credit limits, smaller transactions or shorter maturity period of secured funds. One financial institution having a strong capital fund may have a ratio of loan to deposit at a certain level and no liquidity problem at all while the other having the same ratio may suffer from the liquidity problem due to its dependence on short-term deposits which are highly sensitive to credit position concentrated mostly on daily funds.

To make any decision when managing assets and liabilities that depends on financial ratios, executives should first understand the composition and background of such ratios to see where the numbers come from and to look for other numbers which can be adjusted with fraction of these ratios as well as conclusion derived from the financial ratios.

Comparing the ratios between financial institutions or even between different periods of the same financial institution may lead to a misunderstanding since some financial institutions may calculate the ratio using different compositions because some factors might be adjusted to hide a declining trend.

2.2.3 “What if” scenarios

In general, financial institutions usually manage the liquidity under normal circumstance. However, they must also be ready to do so under irregular circumstances or during crisis. To assess whether or not a financial institution has enough liquidity depends on cash flow under relevant circumstances. Financial institution should consider both positive and negative liquidity changes in each situation, including internal factors within the organization and external factors. Internal factors may include negative rumor about the institution and unexpected demands for funds to accommodate huge amount of obligations, while external factors include non-performance of major contractual parties or a tight market condition.

2.3 Monitoring risk and reporting

A preliminary but crucial factor for executives to make a good capital management decision is to have a good information technology system in place. Reports consisting of significant fundamental information should be regularly made and reviewed. Forms and contents of the report may be different based on the characteristics and styles of a financial institution’s capital management. For example, those depending on retail deposits may not need to have too frequent follow-up while those depending on highly-concentrated funding sources or experiencing a material change of fund composition may need to analyze the situation and report it to the Board of Directors more often and on a regular basis. In other cases, financial institutions having exposure to high or medium risks which tend to increase must also report more frequently so that senior executives and the Board of Directors know the level of their existing risk even though it remains within a prescribed limit.

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3 Examples of the ratios can be found in the circular of the Monetary Policy Group Re: Liquidity Management Policy of Financial Institutions
2.3.1 Frequency of the monitoring

An appropriate timeframe for the monitoring of liquidity should be relatively short and include an intraday liquidity monitoring. This applies especially to the first day whenever a liquidity problem takes place since it is an extremely important period to maintain the stability of the liquidity position. Appropriate timeframe however depends on the nature of each financial institution’s business: those depending on short-term funds may have to monitor the movement very closely. As a matter of fact, in principle, these financial institutions should be able to calculate daily liquidity position during the period. For those who hardly depend on short-term funds, they may manage net demand for funds in a slightly extended period.

In addition, financial institution should also collect information and monitor the liquidity position in a longer term. Financial institution may end up finding a lot of funding gap in the long run and should try to manage or close that gap by adjusting the expiry date of relevant transactions. By collecting information in a more extended period, financial institution will have more opportunity to close the gap in advance long before it happens. Financial institution should be assured that demand for funds in the negative gap is within its means to secure from the market based on the amounts of loans it receives from the money market and its experiences in the past.

A good information system that will benefit the fund management should consist of the following:

1. Economic data relating to financial institution’s business, interest rate estimates and expected deviation from a plan or a budget;
2. Demand for liquidity and sources of funds to accommodate such demands, financial ratios and risk vis-à-vis prescribed policies or guidelines;
3. Returns of assets, costs of liabilities, net interest margin, changes from the previous month and budget (report should have enough details to analyze the cause of interest margin change);
4. Long-term trend of the interest margin;
5. Rate sensitivity position; and
6. Exemption from requirement to comply with any policy.

2.3.2 Types of reports

Financial institutions should prepare a report covering a wide range of situations. For example, in a base case, a maturity ladder report should indicate a renewal of assets and liabilities on a normal basis upon their maturity. In addition, financial institution may prepare a report assessing its liquidity at a time interest rate rises or falls to see; for example, how declining interest rate affects the asset’s average maturity. Financial institution should also assess an effect of loan prepayment in the maturity ladder report and consider whether or not the prepayment will affect its lack of liquidity in the long run; or if interest rate rises, whether any withdrawal before the term is due will affect its liquidity in the near future. This should also include other potential situations such as unexpected disbursement of money for obligations outside the balance sheet, withdrawal of large deposits and non-performance of major contractual parties. Finally, financial institution should prepare a maturity ladder report during the liquidity crisis as well.
The report’s complexity or details will depend on the complexity and transaction risk of a particular financial institution. For example, large financial institutions depending on major funding sources may need a daily report showing commercial transactions, size/volume of the executed transactions, average remaining period before each type of transaction is matured, renewal rate and estimates of cash flow. Smaller financial institutions with uncomplicated transactions may prepare only a net liquidity position report at a particular period, or a cash flow report, which takes into consideration a renewal or which monitors a liquidity ratio on a quarterly basis. Yet, every financial institution must prepare a report showing its funding sources to avoid fund concentrations. In addition, a summary of complicated or detailed matters should also be made for senior executives or the Board of Directors of the financial institution.

Other reports considered important for the management and understanding of financial institution’s liquidity risk include a report of asset quality and its trend, estimates of income, financial institution’s reputation in the market, change of the management, types and composition of balance sheet and new categories of funds (including sources, maturity and cost).

2.3.3 Review of assumptions

Since financial institution’s liquidity position in the future may be affected by various factors which cannot be accurately expected every time, as a result, it is necessary for the financial institution to review its assumption on a regular basis for a sound consideration, especially when market becomes volatile. However, financial institution should limit the number of its assumptions to those considered important only. To ensure that the estimate is sound enough, we will discuss liquidity assumption by dividing it into four categories of assets, liabilities, transactions outside the balance sheet and others.

(1) Assumption of assets

Assumption relating to financial institution’s assets includes market demands for such assets, the use of assets as collateral to increase cash inflow, assets for sale, renewed assets upon maturity and newly-acquired assets. When estimating a possible amount of asset, financial institution must know the following:

1. Ratio of renewed assets upon maturity;
2. Amount of credits expected to be approved; and
3. Obligation or limit expected to be withdrawn for which financial institution must set aside reserves.

When estimating demand for funds during a normal situation, some financial institutions will rely on what happened in the past with regard to renewal, withdrawal and new loan extension. However, others may use a statistic analysis by taking into consideration a seasonal factor and other factors that affect demands for loans such as consumer credit. There are some who estimate it based on their discretion, or those who assess large depositors individually and use past experiences to estimate the rest.

There are four levels of liquid assets demanded by the market as follows:

1. Assets with the highest level of liquidity such as cash and government bonds which financial institution may sell/repurchase or use as collateral in the market;
2. Securities in demand such as equities and interbank loans which can be sold. However, during crisis, they may not be liquid;
3. Assets with low liquidity such as loans that can be sold in the market. However, financial institution must fix a period when these assets will be sold. They may not be able to sell it when the time comes; and

4. Illiquid assets refer to assets the market does not want such as credit which can’t be sold, fixed assets, investment in affiliated companies and sub-standard assets (unless sold with a large discount).

Assets placed as a collateral with the third party must be deducted from each type of assets described above.

Each financial institution may categorize the same type of asset in different liquidity levels and different discount ratios since the management of these assets and liabilities is different. For example, one financial institution may categorize a credit as an asset with medium liquidity and a 20-per cent discount because it hardly sells the credit; the other may view the same type of credit as an asset that can change hands quickly based on its accounting value because the latter is engaging in a business of selling loans and therefore is having an extensive customer network.

In addition, financial institutions must consider how different situations will affect the liquidity of their assets. Certain types of liquid assets during a normal situation may suffer liquidity crunch during the crisis. Therefore, financial institutions may have to classify their assets in different categories or under different time spans depending on the circumstances.

Assessor must realize these differences and assess why financial institutions differentiates each asset in a different period and with a different discount ratio.

(2) Assumption of liabilities

To analyze liabilities as a funding source in the balance sheet, it is important that financial institution understands the characteristics of creditors and types of funds. When estimating cash flow from the liability side, financial institution must review liabilities under a normal business condition by considering the following:

1. Renewal levels of deposits and other liabilities;
2. The increasing rate of newly-opened deposit accounts; and
3. Estimated maturity of deposits with indefinite maturity period such as deposit on call and savings deposit.

When reviewing cash flow derived from liabilities during unusual circumstances (which includes a situation when a particular financial institution or the entire financial market is facing trouble), financial institution should look into the following four areas:

1. Which funding source will stay with the financial institution no matter what the situation is and can financial institution secure additional funds from this source?;
2. Which funding sources are expected to decline if the financial institution runs into a problem and to what extent will the reduction be? Will a change of deposit rate reduce amount of deposit?;
3. Which liabilities with a definite maturity or which liabilities with a non-definite maturity tend to decline immediately if financial institution starts to show a signal indicating a problem? Which liabilities can creditors demand for prepayment and which ones have a tendency to be recalled for certain if the financial institution has a problem?; and

4. When a problem occurs, does financial institution have back-up reserves? Can it actually withdraw the back-up reserves for use, or in which situation can it do so?

Liabilities in the first category are expected to stay with financial institution even in the worst case scenario. Some base deposits will still remain with the financial institution since retail depositors put faith on the safety of an entire system to avoid their loss or because there are underlying costs from switching financial institution especially in some services such as transaction cost. Switching financial institution in a short term may increase the cost.

Liabilities in the second category tend to stay with financial institution when problems remain minimal but will gradually flow out during the crisis. This includes base deposits excluded in the first category. Aside from the base deposits, some inter-bank funding may also remain with the financial institution.

The third category of liabilities consists of all remaining term deposits including part of indefinite liabilities such as large deposits. To foresee what will happen with this type of liabilities, one should exercise caution by assuming that financial institution must pay the liabilities at the earliest possible maturity, especially during the crisis, as these funds will flow to government bonds and other secured sources. In addition, there are other factors such as diversification of funding sources and financial institution’s ability to secure replacing funds. However, when the entire market is in trouble, some stable financial institutions may attract higher cash inflows from large depositors while others may see their deposits fall. Regardless of the circumstances, financial institutions must exercise caution when relying on this funding source because in certain situations, customers prefer to hold cash to themselves.

(3) Assumption of transactions outside the balance sheet

Financial institution should check the possibility of cash flow from transactions outside the balance sheet (aside from credit line already approved). Uncertainties from most instruments outside the balance sheet will make cash flow management even more complicated especially during the crisis. Obligations outside the balance sheet may reduce the liquidity immensely.

Unreliable liabilities of a financial institution include obligations under Letter of Credit and other financial guarantees show the possibility that the capital may flow out in no time due to reason not normally caused by the financial institution’s financial status. Financial institution may estimate a normal level of cash flow during a normal situation and then add an estimated amount, which may require during the crisis, on top of it. However, the crisis may result in a tremendous increase of payment under the Letter of Credit due to increasing defaults of payment and bankruptcy.

Other possible sources of cash outflow include swap contracts, OTC options, interest and forward exchange contracts and contracts with conditions to demand additional margin or to be terminated before maturity. Since the OTC derivatives and exchange rate-related products are principal to principal contracts, contractual parties are quite sensitive over financial initiation’s credit rating. Therefore, if financial institution sees
its rating being downgraded, their contractual parties may demand some cash in advance as a guarantee.

(4) Other assumptions

Not only financial institution’s demand for liquidity is a result of its business operation but it may also demand liquidity to support other operations; for example, when financial institution offers a clearing and settlement service with correspondent banks for commercial transactions, the amount financial institution is required to pay may be so huge that it affects the overall liquidity position. Therefore, financial institution should ask customers to estimate cash inflow and outflow so that it is able to plan a certain level of the overall liquidity even though there is still some uncertainty due to unexpected circumstances such as termination of contract by the other party or additional and unexpected transactions. In addition, this may be due to payer’s default of payment or delayed payment or the system’s defect or failure.

2.4 Risk control

An effective internal control system of liquidity risk includes a sound internal control environment, a process to identify and assess liquidity risk and an arrangement of controlling measures such as prescribing policy and operation procedures, having adequate information system and conducting regular reviews to ensure that performance is in line with the prescribed policies and procedures.

To come up with a good policy and operation procedures, it is important that we place a priority to an appropriate approval system, risk limits, reviewing process and other mechanisms designed to ensure that financial situation has indeed achieved its objective in liquidity risk management. Most of the processes in a good risk management such as assessing, monitoring and supervising are important factors for an effective internal control system. Financial institution should be reassured that every aspect of the internal control is effective, including those not directly related to the management of liquidity risk since; for example, ineffective control of customer’s accounts may lead to fraud, loss of financial institution’s reputation, deposit runs and a severe lack of liquidity.

In addition, an important component of the internal control system in relation to the management of liquidity risk is a regular assessment and review to ensure that relevant personnel have complied with prescribed policies and procedures and that such procedures can achieve the target. Review and assessment should be able to identify changes which may affect the effectiveness of the control. Financial institution must be reassured that the review and assessment is done by an agency independent from the one being assessed and that report is made to the Board of Directors through the Asset and Liabilities Management Committee (ALCO). As soon as internal control procedures have been improved, a mechanism should be put in place to ensure that newly-improved methods are being implemented.

Although each financial institution will have different processes to determine risk limits and different way of implementation, every financial institution should regularly review its practice to ensure that it complies with the prescribed policy and procedures on liquidity risk. As soon as the risk limits are exceeded, responsible executives must act according to the procedures stated in the approved policy. When reviewing the liquidity management, financial institution should identify a material change of the instruments in its possession, risk limits and an internal control procedure, which is changed or different from the last time.
The following shall be considered:

2.4.1 Roles of financial institution’s Board of Directors and senior executives

To manage liquidity effectively, a financial institution must have knowledgeable and caring Board of Directors, capable executives and appropriate personnel. The Board and senior executives must understand the nature and level of their financial institution’s liquidity risk and tools to manage such risk and be confident that fund-seeking strategies and practices are in line with acceptable levels of risk of such financial institution.

Since managing liquidity is crucial to the survival of a financial institution, the Board of Directors should therefore approve a strategy of liquidity risk management, important policy that controls or influences liquidity risk, including policies and processes to determine persons, approval authority and duties and responsibilities to manage the liquidity.

The Board of Directors of a financial institution should be confident that senior executives have already set up a clear guideline regarding an acceptable level of liquidity risk that matches financial situation’s liquidity strategy. In addition, policies and practices are put in place to effectively monitor and control liquidity risk.

In addition, the Board of Directors should monitor its financial institution’s operation results and background on liquidity risk and review them from time to time. Information must be enough and presented in time for the Board to understand and assess the liquidity of financial institution’s important portfolios as well as its overall liquidity. Besides, financial institution must be confident that the liquidity risk has been identified, measured, monitored and controlled.

Senior executives responsible for managing the liquidity risk on a daily and a long-term basis should develop a procedure and a practice that corresponds to the objectives, goals and levels of risk accepted by the Board. In addition, senior executives should be able to practice this as a standard of their operation, which is well understood by the employees, including complying with the power, duties and responsibilities prescribed by the Board of Directors. In addition, senior executives must monitor the implementation and improvement of the information management system or other operating systems to identify, measure, monitor and control liquidity risk of the financial institution and arrange an effective internal control system of the liquidity risk management.

2.4.2. The Asset/Liability Management Committee (ALCO)

In general, the Board of Directors of a financial institution will authorize power and responsibility to a higher executive body or the so-called Asset/Liability Management Committee to prescribe a policy and practices regarding liquidity risk management. The ALCO is responsible for making sure that a risk measurement system can identify and estimate financial institution’s liquidity risk and a reporting system can provide accurate information about the levels and sources of risks.

An effective ALCO will consist of members from various departments in a financial institution who relate to liquidity risk both as a risk-taking person and a risk-managing/controlling person. Members should include senior managers having decision-making power to execute liquidity-related transactions in a direction prescribed by the ALCO, and not becoming a hurdle to the overall operation. In addition, to assure that the ALCO is able to control liquidity risk incurred from new products and transactions in the future, members should contact risk management managers, planners and strategists of the financial institution on a regular basis.
In general, the ALCO will authorize power and responsibility for day-to-day operation to the Treasury Department. For smaller financial institutions with a few uncomplicated transactions, investment officer may be the person responsible for the task. However, before authorizing power, the ALCO should determine clear practices and restrictions in the treasury control operation. Normally, a treasurer will be responsible for managing or adjusting financial institution’s portfolios, which include securities portfolio, foreign currency portfolio, term deposits, large local deposits and transactions outside the balance sheet.

2.4.3 Management policy of assets and liabilities

A good asset and liability management policy should require coordination from related departments. The policy should clearly identify power, duties and responsibilities of those making liquidity-related decision. Senior executives should assess the liquidity position on a regular basis. In addition, the policy should include a guideline on how to maintain an appropriate level of liquidity. Examples of appropriate guidelines are as follows.

1. Guidelines to establish the ALCO, including qualifications of those becoming members of the Committee i.e. from which department and in what level⁴ they should come from, what should be their duties and responsibilities, frequency of the meeting, implementation of policy assigned by the Board of Directors and reporting of meeting results to the Board of Directors;

2. Determination of an operation goal i.e. minimum amount of net interest margin, net profit, rate of return of the shareholders’ equity, target of fee-based incomes, rate of return from credit extension and acceptable maximum cost of deposit. Therefore, to correspond with the goal and to support it, the policy should prescribe a guideline to manage the structure of the balance sheet for the operation to meet the target; for example, by prescribing a ratio of loan to deposit, level of cash and investment and components and structures of credit and deposit;

3. Guidelines to review and assess the deposit structure, which should include a review of amounts and trends of the overall and a particular type of deposit, structure of term deposit’s maturity, interest rates of each type of deposit, interest rates of the Treasury Department, sources and amounts of large deposits and total deposits from large depositors, foreign currency-denominated deposits, deposits from other sources than normal operation and other necessary information. Financial institution should also be able to monitor the overall costs of funding;

4. Determination of factors to control the use of borrowed funds, which include volatile short-term liabilities. In particular, the guideline should prescribe types of funds which can be used, condition of timing as when the fund will be used and maximum amount of fund a financial institution can use. Financial institution should also set up a limit for contractual parties and countries to distribute risks;

5. Determination of a method to price loans, which consists of cost of fund, administrative and operation expenses and anticipated profit. In addition, loan-granting fee, fee rates and conditions for fee exemption should also be determined. A guideline to choose fixed or floating interest rates should be stated as well;

⁴ Members of the ALCO should come from every main department including operation. They should at least consist of senior officers from the Credit Department, Deposit Department, Treasury Department and major supporting departments including strategic planning, IT, marketing and risk management.
6. To correspond with its investment policy, financial institution should identify appropriate types of securities for investment purpose, size of portfolio, proportion of investment in each type of securities and maturity distribution;

7. To correspond with its lending policy, financial institution should specify types of credits it wishes to extend, proportion of each type of loans, amount of loans compared to deposits, loans about to reach maturity and amounts of obligations resulted from the granting of credit; and

8. The policy must also identify other possible sources of funds as well as amounts and levels of loans expected to receive. Financial institution must be certain that the amount is indeed available for disbursement.

2.4.4 Management structure

To decide which structure to choose when managing the liquidity, financial institution’s executives will make such a decision based on sizes, scopes and complexity of its transactions where it may opt for consolidated or decentralized style. Each business unit will be empowered to manage liquidity on its own but this must be within the limits determined by senior executives. In addition, it may use a combination of the consolidated and decentralized methods. Regardless of the means, the management structure should be as flexible as needed, and one should be assured that the liquidity strategy already approved by the Board of Directors has been effectively implemented.

Although managing liquidity on a consolidated basis will be beneficial and effective in an overall picture, this does not undermine duties and responsibility of executives at a branch/subsidiary level to maintain an organization’s security and stability and to keep its capital fund at a required level. To make sure that the management and planning of liquidity meets legal requirements regarding fund mobilization, executives should analyze the liquidity of each branch and each affiliated company. Effective liquidity analysis requires an understanding of each branch or affiliated company’s fund position, which can be a source of fund or a place where financial institution’s liquidity is absorbed. In addition, an affiliated company is in trouble, depositors may lose confidence and this may lead to abrupt deposit runs. To analyze the liquidity, one must consider relevant cash flows including cash inflows or outflows outside the financial institution.

If financial institution chooses to decentralize the management of its liquidity, assessor should consider whether the liquidity risk of a branch or an affiliated company in the past affects an overall risk of the financial institution by either increasing or decreasing it or not.

However, for a branch or an affiliated company of a Thai financial institution located overseas or a branch of a foreign financial institution in Thailand or a Thai financial institution whose majority shares are held by foreign company/foreign financial institution, change of legislations, conditions or international agreements may affect the risk of such organization or branch, which may be considered on a special basis. These organizations or branches should be able to manage their liquidity risk without having to depend on their overseas headquarters.

Aside from the liquidity management structure, financial institutions should have processes and procedures to manage the liquidity so as to comply with their liquidity strategies and policy effectively. Financial institutions should authorize the responsibility to formulate a policy and review liquidity-related decisions to executives of the highest level. However, the responsibility to manage the overall liquidity of a financial institution should be assigned to a particular person such as the ALCO, which consists of senior executives and
treasurers. In addition, there should be an arrangement for appropriate check and balance system. For example, financial institution should consider establishing a risk-managing unit, which is truly independent from a risk-taking unit, to ensure that it has duly complied with the prescribed policies, processes and risk limits.

2.4.5 Information system

Another important factor for the management of liquidity is the information system, which provides accurate information of financial institution’s liquidity to its Board of Directors, senior executive and relevant officers in a timely fashion. Effective information system leads to appropriate decision-making. It should however be flexible enough to accommodate any emergency that may happen.

The information system for liquidity management should be able to calculate the liquidity position of every major foreign currency in which the financial institution transacts, both on a currency-by-currency basis and on a consolidated basis when every currency is combined. Every financial institution should be able to calculate its daily liquidity position in a short span such as during the next five days while figuring its liquidity position in an extended period so that it can effectively manage and monitor the net capital demand.

Financial institution should rely on the information system to ensure that its practices are in line with its policy, processes and risk limits. Risk should be reported quickly and in due time. In addition, the current liquidity position should be compared with risk limits that have been prescribed. The information system should be able to help executives assess an overall trend of their liquidity position. Clear assumptions should be made so that executives are able to assess the accuracy and consistency of the main assumptions being used while understanding the nature of various situations.

2.4.6 Determining risk limits

Financial institution’s Board of Directors and senior executives should set risk limits on the basis of the nature of liquidity risk and acceptable amount of such risk. They should review and improve the limits from time to time whenever circumstances or level of risk begin to change. When determining risk limits, executives should consider financial institution’s strategies and nature of transactions, past operation results, levels of incomes and back-up fund reserved to accommodate damage that may incur and levels of risk accepted by the Board of Directors.

The complexity of the balance sheet structure is a factor to determine whether it is necessary to set up risk limits and what types of risk limits a financial institution should come up with on a daily basis and in a long run. While financial institution enjoying stable operation results and solid funding sources may not be required to set much of the risk limits, those depending on huge funds sensitive to the financial institution’s credit rating must ensure that an implementation of risk limits strictly complies with the stipulated policy or guidelines. However, risk limits do not prevent a financial institution from having to confront with the liquidity crisis. On the contrary, exemptions from the risk limits can be an early warning indicator of an unacceptably high liquidity risk level or an inadequate liquidity risk management.

There are two major methods to determine the risk limits as follows:

1. **Dynamic risk limits**: this is to determine a maximum level of aggregate cash flow mismatch at a particular period of time; for example, a ratio of cumulative net funding requirement to the total liabilities for the following day, the next five days or next month. Calculation of a cash flow mismatch or a net liquidity position should take into
consideration market demands for liquid assets based on the principle of precaution as well as discount rates\(^5\) to cope with pricing volatility and price reduction if forced to sell. In addition, one should also take into consideration cash flow resulting from withdrawal of money under the obligation.

2. **Static risk limits**: this is to determine a minimum level of liquid asset to short-term liabilities ratio. Discount should also be applied to reflect the pricing volatility. Assets included in this limit should be rather liquid such as assets demanded by the market.

The following examples are factors and minimum risk limits that should be prescribed in the liquidity policy or the asset and liability management policy:

1. Loan to deposit ratio; for example, loans should not exceed 70 per cent of the total deposits excluding borrowing and large liabilities;

2. Levels of illiquid assets compared to total liabilities: liquid assets refer to cash, nostro account and short-term liquid asset;

3. Limits for liquidity gap or limits relating to a relationship between expected demands for funds and existing funding sources to accommodate such demands\(^6\). In addition, preliminary sources of funds for capital demands should also be specified;

4. Guidelines for risk diversification, including:

   4.1 Prescribing flexible limits for certain liability ratio such as a ratio of large Certificate of Deposits (CDs) or other volatile deposits to the total deposits.

   4.2 Limits for individual customer or a particular market segment, which is a source of fund to avoid funding concentrations.

5. Flexible limits for minimum and maximum average maturity period of each type of liabilities; for example, average maturity period of negotiable Certificate of Deposit should not be lower than a certain number of months;

6. Maximum level of low and/or short-term volatile deposits compared to the total liabilities; and

7. Minimum liquidity for reserves purpose to accommodate business operation, which should be updated in the long run as necessary.

\(^5\) In another word, this refers to the cash we expect to generate from a sale of an asset sale that is expected to decline from its existing value if that asset becomes illiquid or if it experiences pricing volatility. For example, cash and short-term government bonds are expected to fetch an amount of cash equivalent or very closed to their par value. Yet, financial institutions may set the value of cash they expect to receive from short-term government bonds at 70 per cent of the instrument’s value due to volatility in price. In addition, other companies’ shares may fetch very low net cash especially when sold during emergency since it may get as little as 50 per cent of the book value.

\(^6\) For example, financial institution should assess and monitor the level of expected demands for capital by comparing it with the existing sources of available capital during different time spans such as call in 1 day, 3 days, 7 days, 15 days, and others. In addition, financial institution must be certain that the level of capital fund will not be lower than the level of fund required in each span. For a short-term span, financial institution should have no less than 100 per cent of the capital it requires to use.
2.4.7 Managing market access

An important component of the liquidity management is an assessment of funding sources especially the money market and an understanding of funding alternatives. That is, financial institutions must learn how much money it will receive from the market in normal situations and during crisis.

Senior executives must ensure that they have competent personnel to manage the mobilization of funds from different funding sources by creating good relationships with contractual parties such as correspondent banks, large corporate and contractual parties in a clearing and settlement system. Creating a closed relationship with major fund owners is similar to building a protective wall against liquidity headache, which is considered part of the liquidity management. In addition, frequency of contacts and the use of funding sources also signify how healthy the relationship with the funding sources is.

2.4.8 Contingency funding plans

As part of the liquidity management process, every financial institution should prepare and maintain a contingency funding plan. An ability of a financial institution to seek temporary and long-term funds for all or part of its transactions in a timely fashion and with a reasonable cost of fund depends on an adequacy of its contingency funding plan. An effective contingency funding plan should at least be able to answer the following questions: (1) what is the executives’ plan when facing a crisis? and; (2) what method will the executives use to get access to the funds at a time of emergency? Senior executives/the ALCO should update and review the contingency funding plan at least once a year to assure its effectiveness and that it reflects operation changes of the financial institution.

The contingency funding plan is an estimate of cash flow and a plan to secure funding by forecasting demands for capital and identifying sources of available funds in the market in different situations, including a time when assets may grow rapidly and liabilities may be recalled abruptly. The contingency funding plan should show a structural change of a balance sheet, which may result from liquidity crunch or loans. The contingency funding plan may also help controlling the liquidity risk on a daily basis by showing that financial institution manages to secure enough funds to answer to capital demands despite its financial problem.

Executives should review the capital position if the contingency funding plan shows that more funds are needed than financial institution’s ability to generate it in the near future. To reduce the funding risk and liquidity, most financial institutions will (1) replace liabilities sensitive to their credit rating with stable funding sources such as long-term loans or retail deposits; or (2) reduce amount of assets funded by capital during that maturity period, such as loans. The contingency funding plan will reassure that financial institution or companies within the same group can manage their liquidity both in a normal situation and during volatile time prudently and effectively.

-Contingency funding plan for liquidity management during normal situation: a contingency funding plan proves useful to the management of daily liquidity because results of the liquidity analysis in different situations can be applied to the management of the daily liquidity. This is to assure that financial institution is ready to handle unexpected problems as it has already set aside an appropriate amount of liquid assets, assessed and estimated demands for funds in various circumstances and arranged to access the funding sources.

-Contingency funding plans to manage liquidity during crisis: liquidity crisis can happen without much warning. In addition, there is little time left to plan after the crisis happens. Executives must make decision very quickly using actual and existing information.
Therefore, executives should plan thoroughly on how to handle future crisis as a preparation before the actual crisis occurs. Gaining or losing senior executives’ reputation, which is a key to maintaining public confidence, and accessing funding sources will therefore depend on executives’ ability to handle these situations. The contingency funding plan can be a means to reassure both executives and staff that they are ready to handle or respond to the situation.

Financial institution’s liquidity is quite sensitive to negative credit rating (credibility), capital funds or reputation. In addition, worsening financial status (reflecting in various items such as quality indicators of assets, liabilities or capital), management conditions or other relevant factors may negatively affect an access to capital. Financial institution’s liquidity may be adversely affected by concerns over its credibility or reputation, especially when its credit-rating is lowered to non-investment grade.

The complexity of a contingency funding plan will vary according to the complexity of risk status, transactions, products and organizational structure of a financial institution. The contingency funding plan should start by estimating demands for funds and liquidity, where cash flows of all important items in and outside the balance sheet and relevant impacts should be analyzed.

- Matching funding sources and possible sources in which funds can be used; and
- Determining indicators which can warn executives in advance of possible risks and crisis.

To assess financial institution’s demands for capital funds and its strategy under changing market environment, the contingency funding plan should include estimates of the fund position when there is a temporary or long-term change to the liquidity and the liquidity after liabilities caused by sensitivity to financial institution’s credit risk decline. Possible liquidity scenarios should include the following:

- **Temporary lack of liquidity:** This is a demand for short-term fund as the problem can be resolved by itself since the situations such as a breakdown of major operation and payment system can be resumed within a short time.

- **Long-term lack of liquidity:** This scenario is due to prevailing market pressure. It may include change of credit rating which large creditors pay attention to, tight money market and other scenario analysis depending on executive’s opinions and nature of that financial institution.

The contingency funding plan should include funding sources, estimated volumes or amounts of money and rankings of all funding sources, which should cover the following:

1. Reduced amounts of assets;
2. Debt restructuring or increase of liabilities;
3. Funding sources outside balance sheet such as unused credit facilities. A contingency funding plan should be in store if these reserves can’t be accessed; and
4. Other alternatives to control the structural change of balance sheet such as conditions for the structural change of assets and liabilities in each scenario.

The contingency funding plan should also look into a strategy to use assets to handle the liquidity crisis. For example:
1. Should excessive liquid assets be sold?

2. In which cases securities held upon the maturity can be sold?

3. Should liquid assets be sold in the repurchase market?; and

4. When will be the best time to sell long-term assets, fixed assets or certain kinds of business?

The contingency funding plan should also correspond to the funding strategy from the liability side. This may include:

1. Coordination with lead bank;

2. Prescribing an interest rate policy when seeking funds. This may be done by determining a maximum premium it is willing to pay or by prohibiting additional payment of premium to avoid additional risk;

3. Identifying funding sources recommended for further contact or for avoidance;

4. Determining strategies to access new funding sources not relating to the original ones by identifying who to contact, what information and details to prepare and who to provide additional details later. In addition, interaction should be in the same manner;

5. Determining a policy and practice for small depositors who withdraw their money prior to maturity, which should match disclosed information about small depositor accounts. The policy should be implemented across-the-board to avoid discrimination and include cases where large customers may need to get paid before maturity. However, during crisis, no pre-payment will be allowed; and

6. Estimating liquidity expected to receive from the authorities, which should include information such as timing (how long the assistance will last), help period and sources of fund for repayment.

The contingency funding plan should also stipulate the following policy and procedures in order to manage liquidity during the crisis.

1. Responsibilities of senior executives during crisis;

2. Name, address and telephone numbers of the crisis team;

3. Address or workplace of the crisis team;

4. Coordinator with the third party such as regulatory organizations, investors, analysts, third-party auditors, press members, large customers and others to prevent the spread of rumor, which is a cause of rapid capital outflow;

5. Internal communications between the management, the ALCO, portfolio managers, marketing officers, corporate staff and others; and

6. Submission of relevant reports to the ALCO at an appropriate time so directors can learn and understand the intensity of the situation and manage to seek a right solution at a right time.
However, financial institution must also review as many scenarios as possible that match its transactions. For example, financial institution having a huge exposure of foreign exchange position may also need to set up an appropriate policy and guideline that matches their demands for foreign currencies in the contingency funding plan.

In addition, a separate contingency funding plan should be made for parent company and affiliated companies in major currencies. Overseas units or branches may need a separate contingency funding plan since there may be some regulations or restrictions of international laws as described in the consolidated liquidity management. Besides, since liquidity is very crucial, executives should summarize the position of their liquidity risk position and submit the contingency funding plan to the Board of Directors on a regular basis. In certain situations, the Board of Directors of a financial institution may need to get involved in the development and implementation of the contingency funding plan. Therefore, financial institution’s Board of Directors must have a thorough understanding and knowledge about the matter.
Section 3 Guidelines for Risk Assessment

3.1 Objectives of the assessment

1. To assess financial institution’s liquidity risk level by considering its policy and strategies, structure of its assets and liabilities and items outside the balance sheet, capital management structure and cash-flow excess or shortfall;

2. To assess the management system of liquidity risk and an internal control system to see if it is appropriate and enough to manage and control liquidity risk properly within a framework of such financial institution and the authorities;

3. To ensure that executives have secured enough funding sources for liquidity under different circumstances to meet future demands; to formulate a contingency funding plan; and

4. To ensure that financial institution has complied with the internal liquidity policy, restrictions and practices.

3.2 Scopes of the assessment

3.2.1 Assessment of risk levels

1. Does existing information signal increasing risk? In particular, does a report show the following?

   1.1 Tight money market and tight capital market;

   1.2 Market crisis;

   1.3 Impacts from other financial institutions’ lack of liquidity;

   1.4 Downgrading of contractual party’s credit rating; and

   1.5 Market expectation is changing in terms of product nature; for example, there is an increasing shift to long-term deposits or conditional deposits, or long-term loans are increasingly offered with fixed interest rate, or there are more varieties of conditional loans to choose from.

2. Review a strategic plan and budgeting as well as a plan to change the balance sheet’s structure. In particular, a business expansion plan must match a fund-securing plan as follows:

   2.1 Is financial institution’s expansion plan properly supported by an equally appropriate funding plan?

   2.2 Does an increase or a decline in a number of subsidiaries/affiliated companies require additional funds?

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7 If there is a plan to expand assets by more than 25 per cent a year, analysis should be made with extreme caution, especially with regard to an assessment of funding sources, estimated costs of funds and rationale of assumption used in the estimate. However, although the asset expansion plan will be lower than 25 per cent a year, this is still higher than the expansion rate in the past with a material implication, that’s why closed monitoring is still required. In addition, assessor must check whether the standard by which loans are granted is getting lower or not if the asset expansion plan emphasizes at expanding the loan portfolio.
2.3 Is funding distribution appropriate enough – meaning that they are not too concentrated in a single source?
2.4 If financial institution is to secure a large increase in the amount of fund, will the cost of fund and estimated pricing increase accordingly?
2.5 Does financial institution’s operation match its budget?; and
2.6 If not, look for causes that lead to that difference and executives’ reactions towards the difference and review funding concentrations.

3. Review a report that a financial institution uses when managing risk; assess the amount of liquidity difference in different time spans based on each main currency.

3.1 If the difference is positive, consider whether such difference is enough and proper for the business;
3.2 If the difference is negative, consider whether the negative shortfall will materially expose the financial institution in question to risk; see if executives have done anything to reduce risk such as preparing to load off assets and/or securing funding sources; and
3.3 Assess a tendency of the liquidity difference; review the pattern of difference; for example, if the difference is negative, determine if it may have been a result of seasonal deposit flows.

4. Review the cash flow structure of a loan portfolio.

4.1 Review concentrations of single-pay loans and loans of which maturity periods are extended;
4.2 Consider whether or not non-performing loans (NPLs) extended so far will affect financial institution’s cash flows; and
4.3 Consider whether or not debt-restructuring loans with new conditions will affect cash flow.

5. Review strategic plan and/or credit policy; consider whether or not there is any plan to rapidly expand credits or to focus on loans with longer maturity period.

5.1 Review a rapid expansion of some or all types of loans combined (having an expansion rate of more than 25 per cent a year);
5.2 Assess the characteristics of each type of credit experiencing a rapid rate of expansion and possible effects to the liquidity; and
5.3 Assess whether or not the credit expansion has already taken into consideration a maturity period of acquired fund has appropriately matched the loan’s maturity period.

6. Review whether or not foreign currency-denominated loans are relatively high compared to the capital fund and whether the maturity structure is long- or short-term.

6.1 See if the maturity structure between foreign currency-denominated credits and loans remains in balance; and
6.2 If not, will it materially affect the liquidity?

7. Review the amounts and types of funds in currencies other than the currency of the acquired fund to see their impact to liquidity.
8. Review the amounts of obligations resulted from credit extension; consider amounts of loan expected to be withdrawn and amounts of funds expected to be set aside for such withdrawal.

9. Review the strategic plan and the treasury policy to see if there is a potential for transactions to increase; for example, more securities with longer maturity and/or lower quality are held; derivatives or trading transactions are increasing or initiated.

10. Will newly-launched products or transactions such as new credit or deposit product or a trading transaction increase the liquidity risk?

11. Review the nature of new products and transactions; assess whether such products or transactions will increase the liquidity risk. Review whether or not the cash flow is long term, unstable or difficult to monitor and control in terms of liquidity risk.

12. Review the credit rating of derivative counterparties; assess in case the parties breach any contract, will that materially affect financial institution’s liquidity position?

13. Review the amounts and composition of the current investment portfolio to see if financial institution has held a lot of long-term and/or low-quality securities or has invested in complicated products with unpredictable cash flow.

14. Assess the scopes and amounts of transactions of the trading function.

   14.1 Assess an open position to see if it is appropriate compared to the liquidity level and underlying capital funds; and

   14.2 Assess the liquidity of financial instruments a financial institution is possessing for trading purpose. In case the instruments are illiquid, timing and pricing will be highly uncertain if the financial institution wishes to close its risk position.

15. Assess the amounts of transaction outside the balance sheet which may affect financial institution’s liquidity.

16. Review fee-based transactions such as brokerage service and payment service in order to see whether there is any transaction that may cause a material settlement risk, which will affect the financial institution’s liquidity.

17. Review business strategic plan and liquidity policy regarding deposit to see if there is an increasing tendency that financial institution will depend more on short-term funds, very few large funding sources or foreign currencies.

18. Assess the composition and structure of deposit; consider fund concentrations or dependence on a single source of deposit, a single type of deposit product or a deposit with the same maturity period concentrated in a particular point of time; review both the current position and future trends.

19. Review deposit interest rates offered to both large and small depositors and compare them with market rates; review whether financial institution must offer higher interest rates than the market rates in order to maintain its deposit base.
20. Assess financial institution’s market reputation by reviewing its report/credit ratings of, for example, unsecured debt rating, taking into consideration the following:

20.1 Will financial institution’s acquired credit rating help it issue additional debt instruments?;

20.2 Will financial institution’s credit rating help it secure more funds in both the capital and money markets?; and

20.3 Does its financial status remain at a satisfactory level?

21. Assess the maintenance of liquid assets to deposits and loans during the past three months.

22. If possible, assess a financial status of parent company/headquarters (in case of foreign bank branch) which may affect financial institution’s liquidity both in terms of assistance it will get from the head office or chances the head office may cause a liquidity problem.

3.2.2 Assessment of risk management

(1) Roles of the Board of Directors and senior executives

1. Assess the quantity, quality and frequency of monitoring effort of senior executives and the Board of Directors to see if this is appropriate with the nature and complexity of financial institution’s fund-seeking practices.

1.1 Does the Board of Directors have a role in managing liquidity risk, agenda and minutes of the meeting? Do supporting documents show the Board of Director’s monitoring efforts of the liquidity risk?;

1.2 Is the amount of information, its quality and its reporting frequency to the Board of Directors enough for the Board to assess, make decisions and supervise what is going on?;

1.3 Does the Board of Directors formulate enough liquidity risk guidelines? Does the Board of Directors review and approve a new policy from time to time to meet changing environment?; and

1.4 Does the Board of Directors set up a system to ensure that the operation is carried out under the prescribed risk limit or restrictions?

2. Assess the process of liquidity planning and see if it essentially covers everything including duties and responsibilities and major business lines.

2.1 Hold a joint meeting with financial institution’s executives to ensure that the following have been carefully considered during the process of liquidity planning:

2.1.1 appropriate budget throughout the period of the plan especially estimates of funding sources and where money will be used;

2.1.2 Estimates of business expansion and funding sources to support the expansion;
2.1.3 Estimated change of the ratio of assets or liabilities;

2.1.4 See if the estimate is reasonable; assess financial institution’s ability to create/expand assets and secure amounts and types of required funds for such assets; and

2.1.5 Financial institution’s sensitivity to interest rates.

2.2 Assess whether or not the process of liquidity planning has already taken into consideration transactions and demands for funds of subsidiary companies including the financial institution’s guarantees of its subsidiary’s liabilities or borrowing.

2.3 Assess whether or not the liquidity plan has already taken into consideration transactions outside the balance sheet including derivatives transactions and clearing and settlement activities.

3. Review the structure of treasury function such as its personnel, branch and/or operation and person responsible for the management of liquidity to see if there is any indication of increasing risk. The following will be reviewed:

3.1 Material change in the structure of the risk management duties and responsibilities;

3.2 Increase or replacement of senior staff responsible for liquidity management;

3.3 Reduction or increase of supporting staff for liquidity management; and

3.4 Whether or not a risk management unit has been separated from a risk-taking unit.

4. Identify person responsible for the liquidity management; review the process of remuneration payment and assess to ensure that payment is made on an ability to generate incomes and the quality of risk management.

4.1 Review if duties and responsibilities for organization-wide liquidity are clearly stipulated;

4.2 Review whether persons responsible for organization-wide liquidity directly report to or are part of senior executives and that they are properly authorized; and

4.3 Review job description and remunerations of each person to ensure that remuneration-based incentives are subject to the maintenance of enough liquidity and an overall ability to generate profits.

5. Assess qualifications of senior officers whose duties are to manage the liquidity to see if they have necessary qualifications to manage financial institution’s liquidity.
5.1 Does each staff have an experience to manage the liquidity in financial institutions of the same size and with the same business structure?;

5.2 Does each staff have relevant and enough education qualifications for the job?; and

5.3 is salary scale in line with responsibilities? (Sometimes, low salary paid to executives affects their managerial capability and efficiency.)

6. Can executives identify and understand financial institution’s main sources of liquidity risk?

6.1 After assessing the structure and products of a financial institution, ask its executives again if each person assigned to manage the liquidity truly understands the product’s nature and its underlying risk; and

6.2 Consider whether or not there is a procedure to identify and indicate a cause of liquidity risk such as researches and reports, regular meetings to discuss the matter, a committee set up to review the new product and etc.

7. Assess if senior officers have received enough training regarding the existing products and products about to be launched including risk management tools.

7.1 Review whether training has been regularly held or not; and

7.2 Review the contents of the courses held in the past and assess training efficiency by reading training documents to see if reader can understand the products and/or risk management tools.

8. Assess whether or not senior executives have appropriate control mechanisms to identify and prevent an over-limit event.

9. If the over-limit event is reported, is the problem resolved immediately?

9.1 Review if all relevant committees including the Board of Directors are regularly reported of the over-limit incidents;

9.2 Review if senior executives are regularly reported of a remedy plan where procedures and periods to resolve the situation are clearly stated; and

9.3 Review whether or not the Board of Directors has monitored executives’ progress to implement the plan.8

10. Whether or not financial institution has implemented the ALCO’s role. If yes, is the implementation proven efficient and does it cover all major issues?

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8 The easiest solution to the over-limit problem is to prevent it from happening. However, if it did happen, it must be remedied in a short time or it may take a while depending on the situation.
10.1 Executives have already determined targets to cover the following important matters:

10.1.1 Target in terms of structure and ratio of required assets and liabilities;
10.1.2 Structure of loan portfolio;
10.1.3 Structure of capital;
10.1.4 Loan and deposit pricing guidelines including fee-based incomes; and
10.1.5 Method to measure a minimum amount of net interest incomes and net incomes.

10.2 Whether or not the Board of Directors of ALCO has considered and reduced the position of liquidity risk vis-à-vis other risks such as strategic, credit and market risks.

10.3 Whether or not the Board of Directors of ALCO monitors the practices to see if they comply with the target and risk limits.

10.4 Whether or not the Board of Directors of ALCO consists of personnel from main functions such as executives, finance department, planning department, credit department, deposit and funding department and treasury department.9

(2) Risk measurement systems

1. Review the system of liquidity risk management of a financial institution to see if this is appropriate with the nature and complexity of the financial institution’s fund-securing activity.

1.1 If the transaction is complicated or if an aggressive liquidity strategy is being used, financial institution must also prepare a scenario analysis;

1.2 Whether or not senior executives and the Board of Directors regularly assess the liquidity risk management system to see if it remains sound; and

1.3 Review the latest assessment of the risk assessment system and see if senior executives and the Board of Directors have already considered the system is appropriately sound.

2. Review the risk measurement system to see if it covers main sources of liquidity risk by considering the following:

9 The ALCO’s objective is to determine and maintain a financial structure that can achieve the goal at the highest satisfaction level. The bottom line is to achieve the best performance under different risk profiles. Therefore, all major business lines must have its members sitting in the ALCO.
2.1 Whether or not the system has reviewed all major business lines and important products resulting from credit facilities, treasury and deposit/loans;

2.2 The process of liquidity management has taken into consideration transactions and capital demands of subsidiary companies; and

2.3 Liquidity planning has already taken into account transactions outside the balance sheet resulted from credit extension, derivatives transactions and settlement transactions.

3. Review whether the risk-measuring unit is independent from the risk-taking unit.

3.1 Is a division of labor clear enough?; and

3.2 Whether or not the risk management report is done by officers or departments not relating to the liquidity management.

4. Regularly review to see if the risk measurement system remains accurate.

4.1 Have an independent unit, which should be an internal auditor, address the system’s accuracy regularly;

4.2 Review the latest accuracy test that there is no material defect; and

4.3 If there is no official procedure to test the system’s accuracy, review how financial institution can be reassured that the report accurately covers everything considered important.

(3) Risk monitoring and reporting

This involves an assessment and a review of various reports such as report presented to the ALCO, minutes of the ALCO meeting, the ALCO packages and all reports presented to senior executives with regard to the management of liquidity risk.

1. Assess frequency and details of the supervision effort; report to the ALCO that it matches financial institution’s liquidity risk.\(^\text{10}\)

2. Assess frequency and details of the control effort; report to senior executives that it matches financial institution’s liquidity risk.

2.1 Whether or not report’s frequency is enough to accommodate changes of the trading position and intraday settlement transactions (in case of only a few transactions, report can be less frequent.);

\(^\text{10}\) A risk monitoring report should be in a form of a summary, which clearly presents the issues that require further monitoring effort; for example, current liquidity status, liquidity positions under various time spans and current risk limits. Financial institution’s board of directors should have a thorough understanding of its financial institution’s current liquidity as presented in the report as well as trends in various time spans.
2.2 Whether or not financial institution has assigned executives to monitor these reports;

2.3 Whether or not executives have been authorized to make any order or to change transaction such as delaying securities purchase for investment purpose, borrowing within an approved credit amount for business to continue its operation; and

2.4 In case of an emergency or crisis, whether or not executives can get access to the Board of Directors and/or senior management.\textsuperscript{11}

3. Clearly report the monitoring result regarding compliance within risk limits.

4. The monitoring and reporting function must be independent from the risk-taking function.

4.1 A duty to prepare and submit a liquidity monitoring report must be clearly separated from the risk management unit; and

4.2 A unit clearly separated from the risk management unit is the one who prices securities and derivatives.

5. Review the risk monitoring report to see if the auditing has been regularly conducted.

5.1 The auditing has been regularly conducted by an independent unit, which should be an internal auditor;

5.2 Review the latest auditing to ensure that there is no material defect; and

5.3 If there is no official auditing procedure, consider how financial institution can be assured that the report accurately covers everything deemed important and accurate.

(4) \textbf{Risk controls and limits}

1. Review the liquidity management policy by observing changes from the previous assessment.

1.1 Is the policy appropriate for current transactions and risks?;

1.2 Have changes increased financial institution’s risk exposure especially management change to respond to proactive operation?; and

1.3 Has the policy been complied?

\textsuperscript{11} Financial institutions depending on short-term volatile funds should monitor their capital position more often than when they depend on small-time deposits. Normally, the reporting frequency should be no less than once a month.
Note: Assessor should pay attention to financial institution having an aggressive operation style but without an appropriate internal control policy or system to accommodate such operation.

2. Assess financial institution’s liquidity and funding policy to see that enough guidelines are appropriately prescribed for the nature and complexity of financial institutions’ funding.

2.1 Whether or not the policy has clearly determined the structure of capital it requires.

2.2 Whether or not the policy has determined guidelines and limits in every transaction, which may affect liquidity risk including credit risk, borrowing risk and treasury risk.

2.3 Review financial institution’s transactions whether there is any policy about emergency liquidity scenario.

2.3.1 Whether or not the policy has written about a build-up to liquidity crisis including other emergency scenarios; and

2.3.2 Whether or not the policy has stipulated senior executives’ duties and responsibilities regarding how to solve liquidity problems in various situations.

3. Whether or not the policy has set limits of deposit structure, funding concentrations and net funding gap.

4. Whether or not other risk limits such as an overall limit of the capital structure are appropriate.

4.1 Whether or not the liquidity policy also includes limits of short-term volatile debt amount currently in use or limits of short-term debts to be implemented in the future;

4.2 Whether or not the policy has set ranges in which maturity mismatch between volatile debts and assets acquired from spending these liabilities is allowed;

4.3 Whether or not the policy has set limits of foreign currency-denominated assets and liabilities; and whether or not it has determined funding gap limits of assets and liabilities in foreign currencies; and

4.4 Whether or not the policy has stipulated the monitoring and solutions for out-of-guidance situations.

4.4.1 Review whether the policy requires executives to inform financial institution’s Board of Directors of out-of-guidance situations;

4.4.2 Review that the Board of Directors has monitored the latest development of solutions for these out-of-guidance situations; and
4.4.3 Assure that out-of-guidance situations taking place in the past or at present are resolved without delay.

5. Whether or not financial institutions have arranged enough back-up funding and/or contingency funding plans to meet demands for short-term funds in case of emergency both in normal situation and during crisis.

5.1 Whether or not these back-up funding sources are enough for financial institution’s transactions. For example, sales of asset should not be the first alternative to compensate capital demands for the trading operation; and

5.2 Whether or not there is a periodical test of an existence of the back-up loans.

6. Whether or not a financial institution has arranged a contingency funding plan that mentions about liquidity demands during emergency and/or during a volatile or tight money market condition and whether or not the assumptions used in such a plan are reasonably sound.
Section 4 Appendices

Appendix 1 Assessment of Liquidity Risk Management Models

Guidelines of the assessment

1. Is the tool appropriate with the funding complexity?

2. The tool must be able to measure every funding source and place where money is spent with an appropriate level of stress testing.

3. Review major assumptions applied to the model.

   3.1 Have senior executives and the Board of Directors already reviewed and approved the assumptions?

   3.2 Are these assumptions reasonable?

4. Ask executives and/or directors of a financial institution especially those relating to the ALCO Committee about the working process of these tools to ensure that executives understand the fundamentals, the assumptions and the restrictions of the tool.

5. Ask officials responsible for the operation and maintenance of the tools to ensure that they are qualified for the job and that they can accurately interpret results from these tools.

6. Review whether financial institutions has periodically conducted the accuracy test of the tools.

   6.1 Test the reliability and soundness of inputs and assumptions;

   6.2 Test mathematical accuracy (calculation) of inputs and result; and

   6.3 Conduct a back testing to test if forecast is reliable.

7. Review results.

   7.1 Whether or not results reported to senior executives and the Board of Directors are accurate and easy to understand; and

   7.2 Whether or not the acquired results are updated and can support the decision-making process.

8. Review the reliability of model’s sales representative to see if there is any risk from after-sale service and/or status that may prevent financial institution from using the model.

9. Executives have designed an official procedure to review and approve any material change resulted from the model such as changes of assumptions used in the calculation, database and patterns of results (form of report).

10. Financial institutions have arranged and kept documents relating to the change or modification every time following the change approval whether it is about where
the change takes place, reasons to change and revision and approval made by executives.
Appendix 2  Treasury/Investment

Section 1 - Objectives of the assessment

1. To examine that there are enough policy, procedure and practice with regard to the treasury and investment;
2. To ensure that financial institution complies with the laws, rules and regulations of the authorities and its internal practices;
3. To review the overall quality of the investment portfolio and the overall effects to the organization; and
4. To change if any policy, procedure and practice or the internal control system is found defected or inadequate; or if illegal actions or breach of rules and regulations of the authorities are found.

Section 2 - Main procedures

1. Review the risk management system (based on scopes of assessment stated in the pre-exam procedures).
   1.1 Review whether the system remains efficient and sound; and
   1.2 Examine that transactions are accurate in order to assess an efficiency or the risk amount of the system.
2. Discuss with executives of financial institution from time to time during the assessment in order to:
   2.1 understand financial institution’s business strategies and procedures of risk management; and
   2.2 reach a conclusion during the assessment and get the final conclusion from the assessment.
3. Make sure that executives agree to make changes (if necessary).

Section 3 - Guideline of the assessment

Roles of the Board of Directors and senior executives

1. Assess the amount and quality of the monitoring process of the Board of Directors and senior executives by considering whether the intensity, quality and frequency of the monitoring is appropriate with the investment’s nature and complexity.
   1.1 Whether or not the Board of Directors is enthusiastic to manage its investment portfolio;
   1.2 Whether or not information submitted to the Board of Directors is appropriate in terms of quantity, quality and frequency or whether it helps the management task;
1.3 Whether or not the Board of Directors has formulated enough policy and whether the policy is periodically reviewed and re-approved from time to time; and

1.4 Whether or not the Board of Directors have reviewed and approved the investment on every occasion.

2. Identify those responsible for the treasury and investment portfolio; examine rate of remunerations and performance to ensure that the remunerations and the promotion depends on incomes received and quality of risk management (not depending on revenues alone).

3. Assess the experience in performances of senior officers whose duty is to manage money and investment portfolio to see if they are fully qualified.

4. Financial institution has adequately trained senior officers regarding existing and new products and liquidity risk management tools.

5. Assess the number of current and future staff to see if it can adequately accommodate demands for treasury and investment portfolio.

6. Senior executives have already established an appropriate control system to identify and prevent over-limit situations.

7. As soon as the over-limit incident is identified, whether or not the monitoring and solution efforts are made in a timely fashion.

Risk assessment system

1. Analysis has been conducted before investing or buying securities (equity).

2. Check that there are enough documents about investment or securities financial institutions have held or invested to identify and assess the quality of such investment or securities.

3. Check that documents governing the sales and purchase of securities or investment have been kept.

4. Check that financial institution has conducted a sensitivity analysis of securities for investment or other securities before buying them. The idea is to analyze changes that may affect cash flow and market value due to interest rate change in the market.

5. Check that all investments or securities do have an underlying risk management system.

6. See that the risk management unit is independent (clearly separated) from the risk-taking function.

6.1 There is a division of labor between those executing transactions, recorders of the transactions, those reconciling transactions and payment staff; and

6.2 Compliance tracking, reporting and pricing functions are clearly separated from the risk-taking function.
Risk monitoring and reporting

1. Check that the frequency and the risk monitoring and reporting process match the structure and the complexity of an investment portfolio.

2. Check that the monitoring report has clearly indicated that a monitoring activity is going on to ensure that compliance is within risk limit.

3. Ensure that risk monitoring and reporting officers are truly independent from the risk-taking function.

4. Examine that a risk monitoring report has been periodically evaluated for its accuracy.

Risk control and risk restriction

1. Assess financial institution’s investment policy to see if enough guidelines have been made to accompany the nature and complexity of the existing investment; see if the following have been determined:

   1.1 Guidelines about revenues and liquidity;

   1.2 Transactions or products allowed to transact;

   1.3 Restrictions about quality, maturity period, distribution of portfolio and marketability of securities for investment at the lowest acceptable level;

   1.4 Authorization for securities purchase and sale;

   1.5 Name of dealers allowed to do the business;

   1.6 Approval for items not corresponding to normal policy, rules and regulations; and

   1.7 Practices regarding bookkeeping, procedures and period for re-evaluation.

2. Whether or not financial institution has any agreement to repurchase or resell the securities. If yes, whether or not this has been prescribed in the policy and whether or not the policy has also prescribed details of the following:

   2.1 Assessment of quality and credit rating of contractual parties;

   2.2 Exposure limit of each contractual party;

   2.3 Types of acceptable guarantees (government bond, private sector securities and etc.);

   2.4 Breach of contract or any situations requiring the guarantee sale;

   2.5 Ownership;

   2.6 Rights to replace guarantee; for example, guarantee holder may change and return a different guarantee from the original one;

   2.7 Authorization of power to execute a transaction (entering into a contract); and
2.8 Control and supervision of collateral.

3. If financial institution conducts futures transactions and transactions regarding sales, purchase and exchange of put and call options, forward placement or standby contract, the following shall be considered:

3.1 The policy has adequately stated details about the matter, whether it is a strategy about the transaction or its relationship with other transactions of the financial institution;

3.2 Data kept in the system has enough details for reviewing purpose to see if operating officials have indeed complied with the objectives;

3.3 The Board of Directors or authorized representative has determined limits of the contract position and the position is reviewed at least once a month to ensure that it corresponds to the stipulated limits;

3.4 The gross and net positions are within the prescribed position and limits and the transaction is carried out by authorized representative;

3.5 Financial institution keeps or arranges a registration control system which consists of the following details to the least:
   
   3.5.1 Types and amount of each contract;
   3.5.2 Maturity date of each contract;
   3.5.3 Current market price and cost of each contract; and
   3.5.4 Outstanding in margin account.

3.6 Values of every futures, forward, standby contract and options transaction is adjusted according to the market rate or at a price that is lower than its cost or the market price;

3.7 Securities acquired upon maturity or when exercising rights have their values recorded at a price lower than the cost or the market price;

3.8 Fee-based incomes from standby contracts have been appropriately stipulated;

3.9 Financial report also elaborating details of futures, forwards, options and other standby contracts such as Standby L/C;

3.10 A system to monitor credit risk in forward and standby contracts has also been installed; and

3.11 The process of internal control, report and assessment is enough to ensure compliance according to the prescribed policy.

4. Status of dealers financial institution transacts with is periodically analyzed and assessed. The analysis covers:

4.1 Financial status; and

4.2 Reputation or image.

5. Whether or not the clearing and settlement procedures correspond to the market’s standard or the principle of the internal control best practice.
6. Whether or not the practice corresponds to a guidelines or limits prescribed earlier.

7. Whether or not an investment portfolio is appropriately distributed.

8. Whether or not financial institution have taken into consideration and pay attention to a large amount of loss resulted from unexpected sales of investment securities.
Appendix 3 Guidelines for Dynamic Liquidity Risk Assessment

Cash inflow of a financial institution comes from several sources such as matured assets, sales of assets not yet matured in the market, access to deposit or liability sources, amount of loans available for use and securitization of international financial institutions. These cash inflows however must match the cash outflow such as liabilities due for payment and uncertain liabilities due to certain obligations especially loans subject to withdrawal or cash outflow resulted from unexpected events.

A maturity ladder is a useful tool to compare cash inflow and outflow on a daily basis and in various time spans. An analysis of net capital demand can be done by building a maturity ladder and calculating the outstanding or accumulated net excess or shortfall at a particular period. Financial institution’s net capital demand will be based on future cash flow analysis, which will depend on assumptions of future assets, liabilities and transactions outside the balance sheet, business strategy or policy in the future such as plan/policy to expand credit or investment. Then, accumulated excess liquidity or the net shortfall will be calculated during each period of the liquidity risk assessment.

When calculating financial institution’s risk position, executives should monitor and assess the liquidity gap of a position on a spot basis and on an aggregate basis. This will enable financial institution to identify mismatching cash inflow and outflow and therefore find solutions for it such as seeking back-up fund or restructuring assets and/or liabilities. However, it is possible that a temporary lack of liquidity, say, 30-40 days\textsuperscript{12}, may be compensated by the liquidity excess from the previous period. The liquidity report should be able to clearly report these circumstances. If the report fails to cover it properly, the excess may be spent and no longer exists when there is a need for such liquidity.

When making a maturity ladder, financial institution should allocate cash inflow or outflow from the start, which normally is the following day (financial institution must clearly understand about a process and timeframe of the clearing and settlement so that it can allocate appropriate cash flow in a particular period). It depends on the management’s decision to determine each maturity period. However, like the interest rate risk gap report, bands should be shortened and become more frequent for periods closer to the present, and lengthen for periods further away from now, such as spot or call for 1 day, 2-5 days and 10-20 days. This is due to uncertainty in long-term situations where the longer gap band will be there to help estimating a shortfall of capital to manage the liquidity shortage problem in advance.

The first step when doing a maturity ladder (table of the maturity period of financial instruments) is to rank the order of cash inflow and outflow. Cash inflow can be ranked on the basis of asset’s maturity date or expected date when loans will be withdrawn on the conservative basis. It should include cash flow from interest incomes and other important factors. For example, assets demanded by the market may be placed at the shortest span of the maturity ladder when the asset can be sold and converted into cash. Cash outflow meanwhile may be ranked according to the liability’s due date for payment or the shortest period creditor is entitled to demand financial institution to pre-pay the liabilities or the shortest period financial institution may be demanded to pay uncertain types of liabilities such as amount subject to payment under the obligations. However, financial institutions and regulators

\textsuperscript{12} In this situation, financial institution should be reassured that back-up reserves are there and ready to support capital demands if cash inflow is less than expected or if there is no cash flowing in as expected.
should consider whether or not to offer discounts to these assets in order to reflect market risk or a possibility that a sudden sale of the asset may not result in as high a return as expected.\(^{13}\)

In addition, we may make certain assumptions, based on past experiences such as differences between cash inflow and cash outflow in each period and amount of capital excess or shortfall, which will be a starting point to assess a financial institution’s excess or shortfall of the liquidity in the future during different periods of time.

To ensure that the analysis is complete and comprehensive, financial institution may need to estimate cash flow time spans of each type of assets and liabilities by assessing the probability of cash flow situation in various circumstances. Decision with regard to time spans and amount of cash flow is a major factor leading to the preparation of a maturity ladder in each circumstance. For example, to consider funding sources, financial institution may need to review the behavior relating to each type of liabilities such as (1) single payment of the total amount when due; (2) gradual payment within a few weeks; or (3) renewal when due or available when needed. Financial institution’s experience regarding the previous forms of cash flow in the past and its understanding about the market’s characteristics can be used as a guideline for financial institutions to make a decision. Yet, judgment always remains very crucial especially when the situation is getting complicated. As a result, to reduce liquidity risk, financial institution must exercise the rule of precaution by prolonging the incoming cash flow while speeding up the out-flowing cash.

Subsequently, time spans of cash inflow and cash outflow in a maturity ladder may be different depending on circumstances. Assumptions too may be different. For example, based on past experiences, financial institution may wrongly believe that its ability to control the level and time span of future cash flow generated from a sale of an asset demanded by the market at the time of a bank-specific crisis will be just a little lower than during a normal situation. However, such an ability may be greatly suffered by the market crisis in general since there will be far fewer financial institutions willing to or being able to spend cash buying liquid assets. On the contrary, reputable financial institutions in the market may benefit from a shift of deposit since depositors may want to find the safest nest to park their money. Therefore, when assessing the liquidity, financial institution should also take into consideration past experiences of its own and of other financial institutions during the crisis.

More details can be found in the Bank of Thailand’s forms stated in the circular letter regarding its policy Re: Liquidity Management of Financial Institutions and Relevant Report Forms.

\(^{13}\) One way to prepare a maturity ladder is to estimate cash flowing in and flowing out based on contract’s maturity period. However, most financial institutions will build a maturity ladder based on the most reliable maturity date or on the first day the asset can be effectively sold when assessing liquidity during unusual period. For example, five-year government bonds with very high liquidity may be categorized into a 1-3 day band since they can be easily sold during this short period. However, due to price and interest movements, financial institutions may not be able to sell them at a full value price or at the current market value. As a result, when building a maturity ladder based the shortest time span that the asset is expected to be sold, one should lower the bond’s value to only 80 per cent of its book value or the current market price. Investment in illiquid equity or equity not actively traded in the market should also be evaluated in a similar manner but perhaps with an even higher discount rate, say, 50 per cent, to reflect more access restrictions to the market. Sales of loans and facilities should also be calculated with a discount rate that more or less reflects a difficulty to load them off whenever wished.
Unofficial Translation prepared by The Foreign Banks' Association
This translation is for the convenience of those unfamiliar with the
Thai language.
Please refer to the Thai text for the official version.

Operational Risk Audit Manual
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Part 1  Definition of Operational Risk

1.1 Defining Operational Risk

In outlining the assessment of operational risk for financial institutions, this Operational Risk Evaluation Handbook refers to the definition of “operational risk” from the Basel Committee on Banking Supervision, which is defined as the following:

“Operational risk” is the risk of damage resulting from the lack of skillful management or good governance within an organization and the inadequacy of proper control, which might involve internal operations, personnel, the system, or external occurrences that in turn affect the income and capital funds of financial institutions.

This definition however, does not include strategic risks, credit risks, market risks, and liquidity risks. Deficiencies or failure resulting from the 4 key aforementioned factors may also cause operational risk. Examples of these deficiencies include fraud, the lack of or incorrect information in making decisions, interruption or breakdown in the computer system, terrorism, natural disasters, etc. These shortcomings may cause damage to daily operations and capital of financial institutions.

1.2 Types of Operational Risks

Operational risks can be categorized into the following:

1.2.1 Risk from Fraudulence

1.2.1.1 Risk from Internal Fraud is risk resulting from the dishonesty of personnel within the organization for the purpose of gaining benefits from the organization for oneself, such as forgery of checks and documents, embezzlement, bribery, etc.

1.2.1.2 Risk from External Fraud is risk resulting from the dishonesty of individuals outside the organization that directly causes damage to the financial institution, such as forgery of checks and financial documents, fraudulence, etc.

1.2.2 Risk from Employment and Hazardous Working Conditions is risk resulting from inappropriate hiring of employees, unjust compensation, or mistreating employees, producing consequences such as litigation, resignation, or demonstrations. Moreover, it
includes risk stemming from the enforcement of safety regulations and the inability to control the environment in working conditions, causing detrimental effects to employees’ health such as diseases, or accidents while working.

1.2.3 **Risk from Property Damage** is the risk of property damage in financial institutions resulting from various accidents such as conflagration, natural disasters, destruction of property, riots, political uprising, terrorism, etc.

1.2.4 **Risk from Interruptions and Breakdowns in the Operational System and Computer System** is risk resulting from anomalies in the system or failure of the system in various aspects such as inconsistency, disparity arising from combining operations, defects in the computer system and network system, and the usage of outdated and substandard technological tools.

1.2.5 **Risk from Operational Processes** is risk resulting from errors in methodology, in the operational process itself, or from employees within the financial institution and employees outside the institution. Such as submitting inaccurate information, evaluating incorrect warranty values, failure to follow contract rules, recruiting employees based on other institution’s employment contract, lack of knowledge and comprehension of employees in operations and usage of the computer system, inappropriate improvements in operations, and drawing incomprehensive contracts and legal documents that produce loopholes, etc.

1.2.6 **Risk from Customers, Products, and Business Practices** is risk resulting from the method of business practice, the product introduction, and the accessing of customer’s information that is inappropriate or noncompliant with the prescribed laws, regulations or rules, such as unlawful transaction, unapproved dealings, money laundering activities, and the usage of confidential customer’s information by financial institution for its benefit, etc.
Part 2 Guidelines to Operational Risk Management

The definition of operational risk includes loss incidents that may occur as a result of operational errors made from the business unit within financial institutions, which may occur in the operations of every level of management. Furthermore, a business unit faced with operational risk may affect and cause chained damage to other business units. For instance, in the event of an electrical failure in the computer system causing a breakdown in the computer network of the financial institution will likely have an effect on operational systems that are closely involved such as the branch administration, credit system, payment system, deposit system, etc.

Moreover, operational risk from one business unit may cause operational risk or risk in other aspects to another business unit. For instance, ineffectiveness within the trading limits control system of the trading room causes excessive investment in a currency without proper risk control. Therefore, if there is an unfavorable change in the exchange rate, it may cause a loss in the investment. In this case, it can be concluded that the effect from operational risk causes market risk. Hence, it is essential for the financial institution to have an effective operational risk management system that is also compatible with the business environment, in order to assure that it is capable of managing operational risk without any adverse effect on the stakeholders. To have an effective operational risk management system, financial institutions should consider 3 key components as follows:

2.1 Establishing strategy in managing operational risk
2.2 Establishing an organization to ensure the management of operational risk
2.3 Installing the operational risk management system
2.1 Establishing Strategy for Operational Risk Management

2.1.1 Establishing Policies and Overview in Operational Risk Management

The board of directors of the financial institution or a designated committee and senior management should collectively establish policies, scopes, and strategies in managing its operational risk, in order to manage operational risk in a clearly defined direction such that the management next in rank is able to comprehend and use the strategy as a guideline in managing operational risk within their business units effectively as well as producing consistency within the whole organization. Additionally, they must jointly review these polices, scopes, and strategies on a regular basis. The review should including the following issues:

2.1.1.1 Establishing Comprehensible and Standard Definition of Operational Risks and Types of Operational Risks

In order for managers and employees at all levels to have the same understanding of the principles and guidelines in managing operational risk, the extent covered by the definition and types of operational risk that the financial institution establishes will depend on the scopes of operations, characteristics, and the business environment of the particular financial institution. However, it must include the key risks that may occur and affect the operations of financial institutions such as:

- Risk from both internal and external fraudulence
- Risk from employment and hazardous working conditions
- Risk from property damage
- Risk from interruptions and breakdowns in the operational system and computer system
- Risk from operational processes
- Risk from customers, products, and business practices

Furthermore, establishing clear, comprehensive, and standardized definitions and types of operational risks will help produce a general overview in managing operational risk, enable managers to understand and use the available information to make decisions regarding policies, improve the control system to minimize risk, enhance the effectiveness in
operations, and help organizing internal information for monitoring the overall situation of risk in financial institutions.

2.1.1.2 Establishing Policies and Scopes of Operational Risk Management in Financial Institution

The board of directors of the financial institution or a designated committee and senior management should collectively establish policies, scopes, and guidelines in managing operational risk that includes determining the risk appetite/tolerance of the institution and using it as a benchmark to determine capital charges for operational risk by referring to the regulation on maintenance of capital funds established by the Bank of Thailand, risk identification, risk assessment, risk monitoring and reporting, risk control and mitigation, which will be explained in detail in Section 2.3 Setting up the operational risk management system. In addition, the board of directors of the financial institution or a designated committee and senior management should collaborate in reevaluating the appropriateness of the policies, scopes, and guidelines in managing operational risk periodically, at least once a year or every time there is a change in the elements of risk that might have significant effects on the operations of financial institutions. For instance, the introduction of new products, a change in the operational system of financial institutions, a change in the official rules and regulations, a change in the economy or the business environment, etc.

2.1.1.3 Planning a Strategy for Operational Risk Management

When the board of directors of the financial institution or a designated committee and senior management has established policies in managing operational risk, managers and working units involved in managing operational risk should regularly collaborate in determining and reviewing the strategy, in order to use it as an action plan in improving the operational system that is closely tied to managing operational risk at the organizational and various business unit levels. The strategy established by the financial institution should include the details of objectives, scopes, individuals responsible in the operations, budget, resources needed, and the time required for the plan. The financial
institution should also closely monitor the process of implementation of the established strategy.

2.1.2 Building Corporate Culture and Communication

The board of directors of the financial institution and senior management should lead in building corporate culture by communicating the principles of management and building an operational risk management system to all involved employees, regardless of level. This will help to develop consciousness, knowledge and understanding, and build an awareness of responsibility that management and operational risk management is not merely the responsibility of the operational risk management unit or of any individual but is the responsibility of everyone in the organization.

2.2 Establishing an Organization to Support Operational Risk Management

2.2.1 Determining Organizational Structure

The board of directors of the financial institution or a designated committee and senior management should collectively determine an appropriate organizational structure in order to lend support to the management of operational risk. A working unit should be established to be responsible for promoting risk management function and control function, both in policy and operations levels. The working unit may be established in the form of a committee, subcommittee, or business unit.

Nevertheless, setting up an appropriate organizational structure has no fixed format for each financial institution. However, most important is that the committee, subcommittee, or business unit that is responsible for managing operational risk and setting up the control system must be clearly separated from the internal monitoring unit. Each financial institution must consider its own factors in managing operational risk to establish an appropriate structure in the organization, such as the risk tolerance of the organization, size of the organization, the principles in managing operational risk, the limit in manager and employee’s ability to manage risk, and the effectiveness in collaboration between directly involved working units and management from the board of directors of the financial
institution, the audit committee, the operational risk management committee, senior management, internal audit unit, external auditor, and the supervising authority.

In establishing an internationally accepted organization, financial institutions must consider independence, balance of authority between management and executives or the operational risk management unit, redundancy in operations, and negligence of work. Guidelines in setting up organizational structure can be combined into 2 types of organizations, which are:

2.2.1.1 Top-down Approach and Bottom-up Approach of Risk Management

Combining the principles of the top-down approach and the bottom-up approach in defining organizational structure will produce a variety of perspectives in managing operational risk, both in policy and operations level. The board of directors of the financial institution or a designated committee and senior management shall establish the policies and strategy in managing operational risk, in order for the next level of management to use these guidelines to draw a plan in operations that lends support to the management of operational risk at the business unit level and narrowed down to the operational level. At the same time, management and employees at the operational level are the leaders in carrying out the operational plan, reporting information, and providing an evaluation on managing operational risk to senior management, in order for them to continue making decisions and draw policies on managing operational risk at the organizational level. Therefore, the financial institution should consider fostering strong communications between management at all levels to increase efficiency by establishing a reporting system and risk monitoring system that is appropriate with the current operational risk management system.

2.2.1.2 Centralized Approach and Decentralized Approach of Risk Management

The financial institution’s consideration of the centralized approach or decentralized approach or the blend of both approaches together must take into account the coordination ability among the business units with the same level of management as well as the management independence of each business unit, the personnel’s ability in managing the risk of each business unit, and the ability levels of the financial institutions in accepting the
risk. By general principle, these are the broad trends in considering the selection of the organizational approach that can be concluded as follows:

<table>
<thead>
<tr>
<th>Factors for consideration</th>
<th>Management Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Centralized</td>
</tr>
<tr>
<td>Organization’s risk tolerance</td>
<td>Low</td>
</tr>
<tr>
<td>Each business unit’s risk tolerance</td>
<td>Equal</td>
</tr>
<tr>
<td>Business unit’s operation independence</td>
<td>Low</td>
</tr>
<tr>
<td>Personnel’s ability in managing the risk in the business units</td>
<td>Unskilled</td>
</tr>
<tr>
<td>Effectiveness on the coordination among the business units</td>
<td>Low</td>
</tr>
</tbody>
</table>

Nevertheless, the financial institution may consider the appropriateness of the organizational management approach by using the risk management policy characteristics as the organizational approach factors, i.e., the use of the centralized approach risk management specifically with the enterprise-wide risk policy to produce the equal standard in each business unit such as the personnel risk policy, security risk policy and so on. For the risk management policy with the specific characters for each business unit such as establishing investment ceiling and cash control may have to be emphasized on the decentralized approach management. That is to say, the business unit is required to manage its risk as deemed appropriate. In such case, the central risk management unit shall act to supervise and give advices to the business units on establishing policies only.

2.2.2 Roles, Duties, Responsibilities and Qualifications of Personnel and Units Related to Operational Risk Management

Board of Directors and Senior Management

General Roles

The board of directors of the financial institution and the senior management as the leaders have the significant roles in leading their organizations to the success with the visions and duties in setting the strategy and policy, as well as approving the suitable
organizational structure to increase the competition capability which shall mean the organization's growth and prosperity and to increase the value in the long run for the shareholders. In addition, the board should set the supervising directions and practice guidelines for the assigned committee and senior management including the responsibility in providing and assuring the sufficient control system and yet having the roles and duties in monitoring the business operations of the financial institutes to be within the frame of laws, regulations, rules and good governance of the organization.

General Qualifications

The financial institution's board of directors and management should have the qualifications and compositions as required by the financial institution and in accordance with the related laws or provisions of the supervising authorities such as the Office of the Securities and Exchange Commission of Thailand, the Stock Exchange of Thailand, the Bank of Thailand, etc., in order to comply with the good supervisory regulations or to promote good governance within the organization.1

2.2.2.1 Board of Directors of the Financial Institution

Apart from the general roles, the qualified board of directors of the financial institution must have their own working objectives, knowledge, abilities and understandings in the business operation and relevant risks of a financial institution to ensure that various problems are suitably resolved and to enhance effectiveness of the internal control system.

In addition, the qualifications of the Financial Institution Committee must be in conformity with the general qualifications as mentioned above, including the requirements provided by the financial institutes.

2.2.2.2 Audit Committee

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1 The Bank of Thailand had a circular letter No.: ThorPorTor. SorNorSor. (31)Wor.2770/2545 dated December 3, 2002, Re: Structure of Good Governance Promotion Committee of Commercial Banks, see at www.bot.or.th
The audit committee is responsible for the monitoring of the administration of the management and report to the board of directors of the financial institution by reviewing internal audit report. Its foremost roles and duties are:

1. To review the scope of the operation and the conclusion of the audit, including the review and assessment of the adequacy of the internal audit and the resolution of discovered errors.

2. To review, in conjunction with the management and external auditors, the law compliance such as the Commercial Bank Act, the Finance and Securities Business Act, the law on securities and stock exchange, the regulations of the stock exchange as well as other laws related to the financial institutions’ business and internal regulations.

3. To report and advise guidelines for resolving problems to the board of directors and senior management to be completed within the period of time as deemed appropriate by the audit committee. For example, activities undertaken without taking into account of the benefits of the financial institution as the principle consideration, fraudulence or unusual things or significant errors within the internal audit system, violation of laws, regulations and various related requirements.

However, the roles and qualifications of the audit committee must be in line with the general roles and qualifications as mentioned above, including the financial institution’s requirements.

2.2.2.3 Operational Risk Management Committee

Roles, Duties and Responsibilities

1. To set up framework for policy, strategy and practical guidelines with respect to the risk to be consistent with the financial institution’s strategy in order to present them for consideration of the board of directors regarding overall operational risk management which must cover other important risks such as strategic risk, credit risk, market risk, liquidity risk and operational risk, etc.

2. To set up strategies in line with risk management policy, capable of identifying, measuring, monitoring, reporting and controlling the risk of the financial institutions to be within a suitable level.
3. To review the adequacy of the operational risk management policy and system, including the efficacy of the operational system and the compliance with the established policy by approving the risk level establishment, risk monitoring process and to set up suitable measures for prevention, rectification and control of risks; to supervise the compliance with the approved risk management policy; to approve the preparation of business continuity plan.

4. To report to the audit committee regularly of actions required to improve and amend in order to comply with the established policies and strategies, including performing other duties as assigned by the audit committee.

5. To ensure that there are adequate resources for managing operational risk, e.g. personnel of both risk management unit itself and units responsible for risk control, improvement of the work process in support of the risk management, etc.

In addition, the roles and qualifications of the operational risk management must be consistent with the general roles and qualifications as mentioned above, including the financial institution requirements.

2.2.2.4 Operational Risk Management Unit

Roles, Duties and Responsibilities

1. To participate in establishing framework and guidelines of the operational risk management, risk assessment, to prepare risk indices and to make recommendation on risk control and mitigation.

2. To participate in or give advice for organizing the operational risk management system for different business units according to the framework and guidelines of the operation risk management as stipulated.

3. To communicate risk management policy with various business units.

4. To publicize the knowledge on the operational risk to create awareness and understanding to all levels of employees within the financial institutions.

5. To undertake risk management and control, sound warning signal when there is a propensity that the risk will increase as well as to monitor and assess the risk management.
6. To coordinate, act as consultant or participate in preparing, testing and reviewing of the business continuity plan for every business unit and to report various risks to the risk management committee and relevant management.

7. To study, follow up, develop risk knowledge and to analyze and develop new techniques of risk management.

2.2.2.5 Internal Audit Unit

General Roles

Internal control systems and internal audit are essential to the good business supervisory process. The internal auditor has a vital role in assessing the effectiveness and raises the standard of the financial institutions’ control system which is very important in creating stability in the financial system on a whole. Hence, the suitability of the financial institutions’ internal audit structure is crucial. The financial institution should establish the internal auditing unit to fit with the size, characteristics and scope of the financial institution’s transactions to perform verification and test on the control system and the risk management system.

The internal auditor must have the knowledge and ability necessary for the performances as well as having analysis, decision making and communication skills. The auditor should at the minimum have the following qualifications:

- Auditing skill
- Knowledge on business, organization and techniques sufficient enough for the assigned responsibilities such as specific knowledge on the related business, for instances, fund trading, IT and assets and liabilities management.
- Communication skills, both written and presentation, in particular for recommendations on the solutions to detected problems.
- Understanding of the standards and principles of the accounting and auditing (Except in the case of the specific field auditors). The financial institution should have consistent assessment system of knowledge and
abilities on various fields of the auditors in order to further develop auditors’ knowledge and ability.

**Duties and Responsibilities**

- To establish objectives, verification and assessment of transactions in various areas according to the audit plan in order to create a good and adequate control and management information system for the financial institution’s management.

- To participate in improving the efficiency of the financial institutions’ risk management process as well as ensuring that there is risk management in different areas according to the established guidelines to prevent and mitigate any potential risk.

- To ensure that the financial reports and reports related to various regulations are correct and timely.

It can be seen that the internal audit’s function is the important part to ensure the financial institutions’ management that the various transactions which occur are complete and correct veracity as approved in accordance with the stipulated authorization. It ensures that there are reliable reports on the financials and control, in addition to monitoring and problem solving where there is a breach of relevant laws, regulations and rules, determining whether there is compliance with the policy and how good is the system for protecting assets. To achieve the goal and accomplish the objectives of such working units, the audit operation (manual) guideline has to be applied, including the establishment of audit scopes, audit programs, assessment criteria, audit reports, follow ups and conclusions to be presented to the audit committee as well as guidelines for solving uncovered problems. The most essential thing of the operation of the internal audit is work independence.

2.2.2.6 External Auditor

**Roles, duties and responsibilities**

The external auditor, independent auditor or certified public accountant refers to the person who is appointed by the resolution of the majority of the shareholders’ meeting
to perform an audit of the financial institution in addition to receiving approval of the Bank of Thailand.

An audit by an external auditor, normally, must be made by a qualified auditor and accomplished in accordance with the law and auditing standards provided by the supervisory institutions. However, the financial institution should place importance on these issues, that the auditor:

1. Has independence and is aware of the financial institutions’ objectives.
2. Assess the internal audit system of the financial institution to be used in audit planning and for assessment of risks from the control system.
3. Has different methods that are able to assess financial reports adequately and are suitable with the business conditions and the working environment.
4. Provide important information that is useful to shareholders, board of directors and management of the financial institution.

2.3 Operational Risk Management System

The operational risk management system of the financial institution should be consistent with the policy and the organizational configuration established by the financial institution in order to conduct appropriate operational risk management with maximum effectiveness. The financial institution should consider instituting a risk management system according with the international standards, covering operations in all levels of the financial institutions’ business units. The procedures for risk management should have the following processes:

2.3.1 Risk identification
2.3.2 Risk assessment
2.3.3 Risk monitoring and reporting
2.3.4 Risk control

2.3.1 Risk Identification

The financial institution should identify and review the existing operational risks. The identification of risks with respect to the financial institutions’ operations should be made regularly or at least once a year or every time a risk factor is changed such that it
affects the operations, for instance, introduction of a new product, issuance of a regulation by the authority, operational restructuring, etc. The financial institutions’ risk identification should be made in all management levels from the operational level to the management level and also to cover all business units within the financial institutions. Such risk identification must be under the criteria and standard according to the board of directors of the financial institution or the authorized committee and the assigned senior management. The specifics used by the financial institution to primarily identify the risk are as follows:

2.3.1.1 **Loss Incidents Information** is the information collected and established by the financial institution from its loss or damage occurred in the past. It would help the financial institution to comprehend the power and probability of the occurrence of the operational risk of the various business units and enable the financial institution to identify or estimate the risk that may occur in the future if the surrounding factors do not changed significantly.

2.3.1.2 **Risk Indicators** for which the details shall be mentioned in Section 2.3.3 on the risk monitoring and reporting, would help the financial institution to see the risk level existed during an interval by utilizing indications of various risk factors stipulated by the financial institution.

2.3.1.3 **Work Process Mapping or Operational Procedures** would help the financial institution to learn about the surrounding risk factors and elements relating to the operations for each working process of each business unit that may be the factor which activate risk in different forms. Within the working process mapping, the control system, risk factors, documents, work system, computer system and responsible persons relating to these processes should be clearly assigned.

2.3.2 **Risk Assessment**

The financial institution should establish or review the approaches and methods in assessing operational risks that are suitable to the business operation to enable all levels of management of each business unit to appropriately assess the operational risk that
may occur as the result of the operation of the business unit under his/her responsibility. By general standard, the financial institution should assess the level of operational risk by referencing the internal standard risk rating stipulated by each financial institution. This may be provided in the form of numeral level, color symbol or high or low level descriptions. However, the difference span should be clearly and concretely determined in the form of the risk matrix resulted by the calculation comparison between the likelihood that the risk would occur and the severity level of the impact that instigated from such risk. A sample is shown in this table:

<table>
<thead>
<tr>
<th>Probability of Occurrence</th>
<th>Level of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Medium</td>
<td>Relatively Low</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

In addition, the financial institution may set up the formats and conditions for the operational risk assessment in a suitable approach other than what has been mentioned above by using the specific calculation method according to the mathematical principle and other statistical correlation values or using the computer package program or computer program developed by the financial institution. Each said approach and calculation method must be in consistence with the nature, scope of business operation and risk tolerance of the financial institution as well as reality as an important principle. The identification procedures and the risk assessment as mentioned in Sections 2.3.1-2.3.2 of the financial institution, must consider the internal and external risk factors such as the business structure, personnel quality, employees circulation rates, the new product debut, competition situation, technological progress, etc. The risk identification and assessment can be done by operational employees in that working unit, relying on the control self-assessment or the financial institution may require the central risk management unit or an external party to perform the assessment, depending on the policy of each financial institution.
2.3.3 **Risk Monitoring and Reporting**

2.3.3.1 **Risk Monitoring**

The financial institution should have a system to monitor risks, reporting risk factors as well as risk profile in an aggregate picture for the financial institute’s senior management continuously and consistently. A suitable monitoring frequency of the risk situation depends on the methods and the risk factors selected by the financial institution. If the risk factors change rapidly and constantly, the financial institution should set the more frequent monitoring such as daily and weekly monitoring. However, if the risk factors change slightly and somewhat slowly, the financial institution may monitor once a quarter, twice a year or once a year, enabling the management of the financial institution to monitor the existing risk situation in each interval and enabling appropriate planning for operational risk management. Additionally risk monitoring is also an alternate tool for assisting the management of the financial institution for the assessment of capability of the control system of how efficient it is. If the control system is sufficiently effective, the risk situation of the financial institution should decreases accordingly. In general, the information used by the financial institution in monitoring the risk consists of:

2.3.3.1.1 **Risk indicator** is a tool functioned as the advance warning to inform the management of the financial institute of the severity of the risk factors at any time period in numerical or any other symbols such as color levels, severity scale, etc., depending on the methods selected to use by the financial institution. A good risk indicator not only reflects the risk occurred in the past (lagging indicator), it should be able to indicate or give forecast to enable the management of the financial institution to estimate risk that may occur in the future (forward looking indicator) from the level of severity of the risk factors that will help the financial institution to be able to adjust and to protect itself from the risks before such risks occur and cause damage to the financial institution. The examples of the operational risk indicators are as follows:
### Business Line | Ancillary Type of Risks | Risk indicators
--- | --- | ---
Corporate Finance |  | Setting suitable risk indicators for the financial institution depends on the internal management policy of each financial institution.
Trading and Sales |  | 
Commercial Banking |  | 
Retail Banking |  | 
Payment and Settlements |  | 
Agency Services |  | 
Assets Management |  | 
Retail Brokerage |  | 

2.3.3.1.2 **Loss incident data** is the information of detailing loss occurred in the past. An effective data collection of loss incidents will enable the financial institution to analyze and monitor risks more effectively. Collection of loss incident data should contain primary details of the following key issues:

- Types of the loss incidents.
- Causes, effects and loss value.
- Level of risk, considering from probability of risk occurrence and the severity level.
- Responsible business unit.
- Risk control and mitigation guidelines.

Furthermore, the financial institution should clearly define the roles, duties and responsibilities in monitoring the risks. [It should specify] which units or business units have the duties to monitor the risk which shall include the policy setting and the information technological system development or concurrently provide report forms used in monitoring the risk.

2.3.3.2 **Risk Reporting**

The financial institution, by its board of directors or authorized committee and senior management must arrange to be reported on the operational risk management in a clear and consistent manner to ensure that the relevant business units
receive the information related to operational risk management correctly and well-timed as well as enable the committee and the senior management to keep abreast with the result of the operation and any arisen problems in order to use it to supplement the setting of appropriate and effective policy, risk management and control system. Such is accomplished by presenting and recapitulating the loss incidents or problems occurred as the result of the operation, detected observations as well as solution guidelines to prevent, control and mitigate operational risks. The nature, type and channel of report depend on the situations, incidents and severity of effects occurred. The primary reports related to operational risks to be prepared by the financial institution are as follows:

1. **Report to the Board of Directors**

   When the risk management committee issues any policy or regulation to prevent and mitigate possible risks, it should regularly report the related information to the board of directors of the financial institution. In case where such risk causes damage to the financial institution or affect the operation, it must be reported to the board of directors promptly in order for the board to use such information in the decision making to suitably and timely remedy the problem.

2. **Report to the Audit Committee**

   The internal auditing unit must report a summary of internal audit result in each period. Such shall include reports related to the external auditor such as report of the certified public accountant on financial statements for each period, report of the interim audit or special audit report and report of the risk audit and the internal control system, etc. These shall be submitted to the audit committee periodically and consistently to ensure that the control systems of the financial institution established by the business unit are able operate effectively and are suitable to its nature and scope of business.

3. **Report to the Risk Management Committee**

   The Risk Management Committee has a direct role in setting the policy and overall risk management guidelines of the financial institution. Hence, the Risk Management Committee must hold regular meetings as appropriate to set up or review the policies and give recommendations as a guideline in establishing sufficient and effective control system, including the preparation of the related reports such as the report of errors, the losses occurred in each business unit and the report of the non-compliance with law,
regulations and rules, etc. in order to further report to the board of directors or Audit committee as appropriate. In addition, the risk information reporting process which is useful for the policy decision making must be consistently established and presented to the Risk Management Committee from the risk management unit or other business units. In the report presented to the Risk Management Committee, the internal auditing units may be required to observe and render independent opinions on the improvement of the system and setting of the regulations to prevent and mitigate possible risks.

(4) Report to the Management of the Financial Institution

Upon the occurrence of a risk incident in the operation, the business unit must report to the financial institution’s management the damage and the solution in concurrence with the report submitted to the risk management unit for the management to be aware of the problem, to advise a timely solution and to limit or mitigate the effects that may happen to the financial institution’s operation.

(5) Report to the Operational Risk Management Unit

The financial institute’s business unit must collect the information on risk assessment, loss incidents, risk indicators and risks arisen from the operation. It must report [such information] to the operational risk management unit regularly as required by the operational risk management unit enabling it to analyze the collected information in an aggregate picture and recommend to the risk management committee on risk prevention, control and mitigation. Such information reporting may be developed through the real time or periodical information technological system as appropriate.

2.3.3.3 Information Technological System for the Operational Risk Management

The information technological system is an important component in helping to manage, monitor, control and mitigate operational risks to be performed more effectively. The information technological system selected by the financial institution may be developed internally or by a third party. The principle issues to be considered in the setting up of the information technological system in support of the operational risk management system are as follows:
(1) The information technological system should help the financial institution to store complete and appropriate information relating to and necessary for the operational risk management. For instance, past risk incident data, risk indicator information, the information behind the calculation of loss probability and loss data, etc.

(2) The information technological system should be able to respond to and assist the management of the financial institution on various levels in the monitoring, assessment, control and mitigation of risks as well as in policy decision making on matters related to the operational risk management.

(3) The information technological system should be able to support the amount of fund calculation or to support the need used for managing the operational risk according to the regulations and criteria of the administration and to benefit the development or taking the information for use in the construction of the operational risk model.

(4) The information technological system established by the financial institution must have the up-to-date information and be in consistence with the system and risk reporting format established, possessing a suitable accessibility.

However, in developing the information technological system for the operational risk management the financial institution should consider of the suitability of the system development and the information application requirement.

### 2.3.4 Risk Control

After the financial institution completes the risk assessment, it should rank the risk in accordance with its importance in order to establish the risk control system for each type of the business units. The control system shall have the main objective in limiting the risk within the tolerance level of its business unit. A good control system must be easy to apply, incur reasonable cost and upon actually being applied it must not cause any negative effect on the work process and work quality. Such control system must be able to significantly reduce risks. The principle consideration in determining the strategy for the control system establishment is to consider risk assessment results by analyzing the probability of risk occurrence and the severity of possible damage. In other words, if any possible risk occurrence is of high frequency but low severity, the financial institution may consider using a control measure that will reduce the probability of occurrence of the risk
such as increasing the check and balance process, preparing of an operation manual, etc. The control of risks with low frequency but high severity is possible with measures that mitigate or limit possible effects, e.g. establishing transaction ceilings, taking insurance and using risk distributing tools.

For the establishment of the risk control system with the high frequency and high severity, the financial institution should avoid or cease such operations or consider outsourcing in order to reduce or remove such risk from its operations. In considering the risk control system establishment the financial institution should consider the following issues:

2.3.4.1 Control Structure

The financial institution should instill consciousness for the construction of the control system in the corporate culture such that all concerned persons on every level are aware that the control activities are the duty of everyone in the financial institution and not only a duty of any specific business unit. However, the board of directors or the authorized committee and the senior management must be responsible for and act as the communication leader in advising on guidelines and emphasizing on the importance of control. They are to set an example for the employees of the financial institution which includes the management ethics in order to create a good operation and control system in accordance with the principle of the good business supervision within the organization. In addition, the financial institution must have a monitoring system to ensure that the business units have reasonably applied the control principle on their operations and have an official assessment system of the effectiveness, adequacy and suitability of the control system of both within the financial institution and of external parties or organizations. Moreover, the report of the results must be made regularly to the management of all levels.

2.3.4.2 Control Activity

The control activity is considered as the important element that should be present in the business operation and the daily performances of all levels of employees in the financial institution. The effective control system must be accompanied by an adequate control activity under a suitable control structure in each level of the business unit
management in order to prevent any operation to be performed in contrary to good governance.

Examples of inappropriate management are as follows:

1. encouragement of the operation to achieve the goal in the short period of time without considering of important factors such as compliance with the stipulated regulations, mitigation of operational risks and the financial situation in the long run of the financial institution, etc.

2. Awarding rewards or incentives tied with only performances exceeding standard without observing principle of good governance.

3. Operating without duty segregation, transparency or proper control system, including the improper use of resources or false reporting of operating results.

4. Improper reprimands upon violation of the regulations of the financial institution.

5. Transacting business to seek benefits for acquaintances by directly and indirectly usage of insider’s information.

Thus, to effect a good control system and to ensure of transparent and fair operation with proper ethics of its institution and its management including the consideration of the control system establishment for prevention and mitigation of possible operational risk, the financial institution through the board of directors or authorized committee and senior management should establish policies and operational guidelines related to the development of the business units’ control system by referencing to good control principles which include:

5.1 Participation of its management.

5.2 Operational Control in each business unit.

5.3 Operational control in compliance with regulations.

5.4 Defining policies in accordance with anti-money laundering measures.

5.5 Approval and approval authority.

5.6 Verification and reconciliation.

5.7 Duty segregation.

5.8 Reliability and security maintenance of the information technological system.
Management Participation

The management of the financial institution should take part in the preparation, review and assessment of the operational process control system of the business units of all levels, including regular participation in the deliberations of reports related to control or reports of the risk status of the business units under his/her own responsibilities, e.g. report of operational status, report of risk indicator indices, report of loss incidents, report of internal auditing, etc. It is enable them to monitor the changes and for the use in making policy decisions in order to timely respond to the changes of risk factors and to encourage the management at different levels to be able to assess the suitability of the control system for the improvement and development of the working efficiency and to mitigate risks to be within tolerance levels of the financial institution.

Operational Control for Each Business Unit

The control system adopted by the financial institution to control the operation of each business unit may be similar or different depending on the nature of the operation and the risk level of that business unit. For example, setting a control system for the working process relating to cash, the financial institution should stress fraud prevention and cash security by arranging a check and balance system, ceiling and comprehensive reconciliation, etc. For an analytical unit, the financial institution should emphasize the accuracy of information, the effectiveness of the information storage and processing, maintenance of customer’s confidentiality and the data analysis quality, etc. Establishing a control system of each business unit should be performed by the directly concerned persons with expertise on such working process. Auditing and reviewing by independent persons or working units such as internal auditing unit, risk management unit, control unit and external auditor of the financial institution should be regularly conducted.

Operational Control in Compliance with Regulations

The financial institution should have an audit system to ensure that the business units operate within the scope of regulations and rules of the financial institutions, government agencies or related organizations as stipulated in order to avoid any transaction that may have created risks or losses both financial and reputation losses. In addition, if any non-compliance or the negligence of performance according to the rules and regulations is detected, there
should be official reporting and monitoring system to keep the management informed and enable it to follow up or remedy to prevent aggregate losses to the operation of the financial institution.

**Defining Policy in Compliance with the Anti-Money Laundering Measures**

The financial institution should establish policies, rules and regulations with respect to the transactions it offers to its customers in order to prevent money laundering, in addition to installing a practice and control in accordance with notification, regulations and guidelines by the Anti-Money Laundering Office and the Bank of Thailand such as the Anti-Money Laundering Act B.E. 2542 and the notification of the Bank of Thailand on requiring the commercial banks to undertake regarding money deposit, dated December 24, 2001.

**Approval and Approval Authority**

The financial institution should clearly define the scope of authority and responsibility of any person or position, including setting approval authority ceiling in order to provide a good and suitable screening system in consistence with the sizes of the transactions and the scope of authority and responsibility of the management in each level of authority.

**Verification**

Verification of transactions of the financial institution is an audit tool to ensure that the employees’ performances or the working systems are able to work efficiently, particularly for the operation in connection with tangible properties, the processing work requiring high accuracy such as accounting systems as well as applying simulation models for analysis and planning of business operation. The financial institution should have an audit system to regularly confirm the accuracy in order to promptly commence a remedy in case of fraud and error in the operation or data processing. In general, the verification or the audit of any reconciliation should be performed by an independent person or working unit who does not directly performed the audit or is not directly responsible for the audit of such area.

**Duty Segregation**

A good control system must have suitable and non-complicated duty segregation and description of responsibilities assigned to any person by establishing an organizational structure and delegation of authority with no loophole in the internal control and any...
performance must be made principally for the best interest of the financial institution. In determining duty segregation, the financial institution should consider audit issues and the balance of power to establish the scope of duty and to mitigate risk from the modification, alteration or illegal or dishonest concealment of the operational information. For example, any personnel or positions should not be given the power to approve payment, verification of the transaction and reconciliation in connection with such payment at the same time or having authority to approve business transactions in the banking book and trading book at the same time as it would give an opportunity for the loss items to be hidden as the result of the investment by transferring the items between both accounts.

Credibility and Security Measures of the Information Technological System

The financial institution should have risk control measures related to the management of information technological system with respect to credibility, accuracy of the information and data processing on the information security in term of information usage without permission, fraud and changes of information for personal interest. In addition, the financial institution must bear in mind management efficiency of the information storage and system as well as mitigation of risks as the result of any interruption of the computer system and its network system. The minimum control system that should primarily be considered by the financial institution is as follows:

1. The financial institution should have a data back-up system available in both near by and remote sites where they are located at the reasonable distance from the main system to prevent any possible damage in case the main system ceases functioning or the site is damaged as the result of disasters. The back-up system may be either a hot or cold site depending mainly on the nature of the information storage and the policy of the financial institution.

2. The financial institution should prepare detailed and precise operating procedures of the back-up system, information retrieval or of information technological systems. It should also prepare a business continuity plan to maintain the crucial operations. (Details are shown in the heading No. 2.3.4.3 on the business continuity plan).

3. The financial institution should study or develop software regarded various work systems. Each work system should be linked to each other to enable them to be operated efficiently together.
4. The financial institution must clearly establish methods, procedures for the inspection and maintenance as well as develop hardware capability.

5. The financial institution should have suitable measures to safeguard information such as stipulating right to access, distribute, modify and delete information, etc.

6. In the event that the financial institution develops its own information technological system, the following procedures should be taken into the consideration.

   6.1 Retaining a system administrator with knowledge and capability to manage information technological system, program and develop computer software, direct information system and administer information structure as well as being familiar with operational risk management in order to act as supervisor and to manage the system such that it could operate efficiently and properly suitable to the operation of the financial institution.

   6.2 The developed information technological system must be able to be installed on various operating systems of the server of the financial institution and should be able to support the technological changing and the operational system further developed by the financial institution in the future. The financial institution should be able to develop and organize an information technology system in consistency with or in response to the changes of the business of the financial institution.

   6.3 The financial institution should establish plans for management of information and information technological system in accordance with the information technological system management standard in general such as preparing back up data base, information retrieval system, storage security system and information application, etc.

7. In case the financial institution does not develop its own information technological system but adopts a system developed by an outside service provider, the financial institution should be considered the suitability of the service by means of the followings:
7.1 The financial institution is still responsible for providing continuous services to its customers and still needs to maintain service dependability in the same way as it would have as if it conducts its own information technology operation.

7.2 Outsourcing information technology service may create different risks to the financial institution from its normal operations such as operational risk may increase as a result of the operation of the service provider, specifically on safeguarding customers’ confidential information. Two major issues should be considered as follows:

(1) The financial institution should consider the effect to its capability in development and offering of new services in the future. The building of capabilities on these areas partly depends on the financial institution’s understanding of information technology.

(2) In outsourcing to service providers abroad, the financial institution must give importance on legal risk and operational risk arisen from the differences of laws and regulations in each country with respect to cross border transactions. Hence, the financial institution should put great emphasis on the consideration of service provider selection.

7.3 The major processes of outsourcing information technology service to other service providers that the financial institution must undertake are defining of policy regarding outsourcing of information technology service to other service providers, risk management, service provider selection, contract preparation and monitoring, assessment and audit of the services.

2.3.4.3 Business Continuity Plan

The financial institution should prepare a business continuity plan of the operational process or major work systems as safeguard against various risks and to limit or mitigate possible effects on interested parties as the result of the business disruption caused by different types of incidents such as interruption of computer network system,
communication system or business infrastructure, terrorism and other disasters. Primary principles for the preparation of a business continuity plan are as follows:

1. The board of directors of the financial institution or the authorized committee and senior management must participate in the preparation of its business continuity plan.

2. The financial institution should set hypothetical situations in severe condition and in various loss patterns as well as the worst possible case scenario as one of the assumptions in the preparation of the plan including preparing an assessment of various possible constraints upon occurrence of loss incidents.

3. The business continuity plan should stipulate detailed working processes practicable, including assigning responsible persons and clearly defining the scope of commanding authority on different levels. The minimum details should include the following issues.

3.1 An emergency plan that is an operational plan describing methods to support, control and remedy various emergency incidents such as fire, earthquake or accidents, etc. It should include details of loss mitigation measures on personnel, properties and suitable business operation. It should contain employee evacuation plan and removal plan for important assets as well as the setting up of administrative center to deal with the emergencies.

3.2 A back-up plan that is an operational plan with detailed methods in selecting options of work system and procedures in order to continue the business by providing operating facilities or back-up facilities and necessary back-up systems. There should be a plan to efficiently utilize various resources as well as communication plan and public relations plan for contacting with other concerned persons or working units.

3.3 A business recovery plan that is an operational plan describing procedures to recover damaged conditions to return to normal business operation.
4. The financial institution should stipulate appropriate and regular testing of the emergency plan by simulating real life situations and upon completion of the testing, the test results should be assessed by an independent party or working unit as appropriate in order to employ the assessment result and observations to improve the efficiency of the emergency plan.

5. The financial institution should set clear procedures and assign responsible persons for the review and improvement of the emergency plan. Additionally the emergency plan should be modified to keep current every time there is a change in the working procedures, operation site, work system or commanding structure to keep the plan up-to-date and practical at all time.

6. The financial institution should provide trainings and seminars to promote understanding of the roles, duties and responsibilities of its employees and persons relevant to the business continuity plan.

For detailed guidelines for the preparation of a business continuity plan, the financial institution can refer to the notification of the Bank of Thailand regarding emergency plan preparation.
Part 3 Audit Guidelines

3.1 Audit Objectives

1. To appraise whether the financial institution’s board of directors and management recognize major risks and [factors] related to operational risk within the organization and if a policy with respect to this matter is clearly established, in addition to taking leading role on instilling corporate culture related to risk management.

2. To assess the overall qualifications of the board of directors and senior management on whether they possess suitable qualifications as stipulated.

3. To assess whether the management develops and endorse the strategic plan, policy, operational risk management and that supervision is properly conducted.

4. To learn of the business unit related to risk and to assess the level and quality of the operational risk management. The strategic plan, organizational structure, design of the operational system, reporting system of the financial institution as well as exceptional reporting, systems in managing, monitoring and controlling possible operational risks including the system for archiving of operational information.

5. To assess the effectiveness and appropriateness of the control structure of the work system and the present information technological system whether they are able to sustain business and support the complexity of the transactions as well as the future plan.

6. To assess whether the financial institution possess a working unit responsible for instituting rules, regulations, criteria in operation, supervision, monitor and educate and increase awareness of the employees on the operational risks and compliance with the prescribed rules and regulations. It includes the availability of independent working unit to monitor and inspect the performance of each business unit and to assess the ability of the management to recognize and resolve problems in timely manners.

7. To assess whether there is an assignment of a working unit responsible for the improvement, modification of the system or operational regulations including monitoring of compliance with the laws, regulations rules or requirements of the supervisory authorities such as the Office of the Securities and Exchange Commission of Thailand, the Stock Exchange of Thailand and Bank of Thailand, etc.
8. To assess deficiencies of the control structure and to evaluate the guidelines to remedy the deficiencies in the financial institution.

9. To assess the independence and efficiency of the performances in each business unit, the operational risk supervising working unit and the internal audit as well as the ability in controlling and mitigating risks with consideration to the appropriateness and adequacy of the financial institution’s transactions.

10. To assess whether the audit results of the internal audit department are reported directly to the board and/or the management and whether there is a follow up to the resolving of the problems arisen from error, negligence or if there is any damage arisen from the operation.

11. To assess whether the financial institution has a policy and a business continuity plan in the event of uncontrollable incidents such as fire, natural disaster, sabotage, political unrest, etc. Such plans shall have the details showing the procedures for solving problem upon irregular incidence which affect the financial institution’s operation.

3.2 Audit Scope

3.2.1 Risk Level Assessment

3.2.1.1 Strategic factors

- To verify the suitability of the organizational structure, the duty segregation, job positions, work systems and work procedures as well as to assess the effects on the financial institution arisen from the affiliated companies’ business operation and the outsourcing companies or any of the duties that is not included in the organization chart by considering of possible risks arisen from segregating the functions to the outside of the organization.

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2 The Bank of Thailand issued a circular No: ThorPorTor. SorNorSor. (31)Wor.2770/2545 dated December 3, 2002, Re: Structure of Good Governance Promotion Committee of Commercial Banks, available at www.bot.or.th
- To verify the suitableness of the working units responsible for operational risk management as well as duty segregation, work systems and work procedures.

- To verify the communications or the risk reporting of each working unit by considering of communication effectiveness.

- The verification of the organizational structure shall include the verification of personnel and business aspects. What type of proceedings has changed which may produce risks to the financial institution, for instance,
  
  (1) The major changes in the structure such as the establishment of a work unit to produce new products.
  
  (2) The change in the operational process in response to new requirements.
  
  (3) The increase, decrease or change of senior employees or important positions.
  
  (4) The resignation of employees from important positions.
  
  (5) The increase or decrease of number of branches and/or new products.
  
  (6) The increase or decrease of products or services on assets or liabilities on the balance sheet.

- In case of employee resignation that may create operational risk such as the financial institution regularly changes employees and may cause them to be unfamiliar with the policy, regulations or may cause error control. Hence, the auditors assess the following issues.
  
  (1) The effects on the entire organization or only on certain type of products in case of large number of new employees for important positions or mass resignation of employees.
  
  (2) Has the financial institution expanded or reduced work procedures since previous audit. The desired effects of such changes should be considered.
- To verify various regulations employed within the organization to ensure that the senior management fully understands the scope of authority and duty. [The auditors must ensure] that the non-compliant action of the policy and normal regulations is approved by the superior authority.

- The verification of regulations shall include the verification of procedures for dealing with customers, problem solving and the disclosure of the information adequately and appropriately.

3.2.1.2 Transaction and Product Factors

- To verify new product and service development system of the financial institution (New Product Approval Process) to consider if the financial institution possesses any control system for product development by taking into account operational risks and possible effects to the financial institution of all major factors such as marketing risks, account recording, work process, etc.

- To assess trends, system and work process of conduct transactions of the financial institution to determine which type of products creates more operational risks, particularly in complex transactions and products that there are various hidden risks, such as:
  
  (1) Derivatives.
  (2) Trading.
  (3) High-volume transactions or products.
  (4) Large lending such as construction business and various developing projects.

In addition, the transactions or products with limited operational system must be considered since new technological system is not employed or having inadequate or inappropriate control system.

- To verify financial reports and organizational structure reports in order to identify products related to the operational risk by considering:
(1) The initiation of the new product application is complicated.
(2) The new technology has been introduced.
(3) The transaction with foreign countries has been expanded.
(4) Any product output has caused the large amount of profit for the financial institution.
(5) The financial institution growth is for the entire organization or only the limited growth of some business lines.

- To verify the extent of loss and degree of severity arisen from noncompliant action with the regulations governing financial institutions such as the fraud, operational error, etc. The auditor should determine the frequency, volume and inclination as well as cause of the said error.

- To verify whether the financial institution has any shortcoming as a result of inadequate or inappropriate control system.

3.2.1.3 Information Technological (IT) System and Reporting Factors

- If the financial institution changes its information system, a consideration need to be made on how suitable is the information control system or is there a validation system to ensure accuracy and completeness of the information is used. Hence, the auditor should verify the following issues at the minimum.

(1) If the financial institution has undergone changes, has the IT reporting format, content or presentation channel changed from the previous audit?

(2) Has the financial institution undergone any changes or improvement of its IT system (including the system newly implemented to support new transactions or products)?

- To verify the accuracy and reliability of financial and accounting information system including disclosure of the related information.
- Verification of the error of the reporting system, non-compliant with regulations items, monitoring and improvement, considering the adequacy of the reported information and reporting independence.

3.2.1.4 Factors on Legal Compliance
- To assess the volume, amount of money, frequency and significance of any noncompliant action with law or official policy or disputed item pending on legal action as well as item arisen from the customer’s complaint.
- To assess the frequency and nature of the error in the preparation of reports submitted to the authority.

3.2.2 Assessment of Risk Management

The assessment shall evaluate the risk management direction of the formation of policy, operation process and monitoring, prevention and resolution of possible problems by take the following issues into consideration.

3.2.2.1 Policy and Strategy on Operational Risk Management
- Verification of the guidelines, policy making process and operational risk management strategy to ensure that such policy and strategy has been established and approved by the board of directors of the financial institution /risk management committee, including consideration of roles and participation of the related departments and executives.
- Verification on whether the established policy and the operational risk management strategy are clear, easy to understand and are able to be applied as the risk management guidelines in the business unit level. However, the set policy must cover the identification, assessment, monitoring and reporting and the operational risk
control as well as the establishment of the financial institution’s risk
tolerance related to operational risk.

- Verification on whether the policy and strategic plan have been
  consistently monitored and reviewed by the committee, managenent
  and working group which could be examined from the minutes of the
  meetings of the financial institute’s board of directors and the
  working group or the agenda of the minutes and other relevant
documents.

- Verification on whether the policy and strategic plan and
  operational risk management guidelines approved by the financial
  institution’s board of directors have been communicated to all levels
  of concerned employee.

- In case the financial institution has a model or plans to use a model
to measure the operational risk, information archiving process; the
  data collection for validation and various simulation models for
  stress testing have been approved by the committee or responsible
  working units and by the financial institution’s board of directors.

3.2.2.2 Organizational Structure and Management

- To verify whether the financial institution has established an
  appropriate organizational structure and operational management
  structure of each business unit with the reconciliation and balance of
  power between each other.

- To verify whether the financial institution has clearly defined the
  working units, responsible committee in each business line,
  management and personnel responsible for the operational risk
  management support. However, such working units must be
  independently from the working unit that may have caused the risk.
In addition, there must be a complete and consistent timely
reporting system for the financial institution’s board of directors.
- To verify whether or not all departments and business units have set clear and complete scope of works and duties with the suitable check and balance of power in the work group in area requiring high accuracy and without duplication.

- To verify whether the organizational structure chart and personnel chart have been reviewed regularly by the committee and senior management to ensure that the business transactions have been clearly defined on both authority and line of report.

- To verify the structure of the audit committee to ensure that it comes from independent directors or other persons who are not on the board of directors of the financial institution and shall have the following qualifications:
  1. Non-affiliated.
  2. Not a debtor of such financial institution.
  3. Being knowledgeable, capable and experienced appropriate to the position.

3.2.2.3 Operation Process

- To verify on whether or not the board of directors or the management of the financial institution arranges a monitoring system to follow up correct the error in the operation process, the action incompliant with the policies and the control system established. To consider the operational manual in each work line whether it is documented or not. Alternatively, are there criteria or guidelines for the suitable practice keeping in mind the case where the employees have to be replaced or their performing duties have to be switched? In addition, errors in each department arisen from operations or from [lack of] knowledge and understandings of the employees must be verified.

- To verify the set risk tolerance, limits in monetary terms and the suitable control system.
- To assess the efficiency of the senior management by considering the effectiveness arisen suitable performance.
- To assess whether the employment and training plans are efficient and adequate.

3.2.2.4 Establishing an Operational Risk Management System

(1) Risk Identification

In order to assess and control risks the board of directors and senior management of the financial institution must undertake to identify operational risks in relation with the financial institution’s operation on a regular basis. The following issues are to be considered.

- To consider whether or not the factors used in identifying the risks are appropriate. The risk identification factors consist of the changing in the organizational structure and management, personnel, operational system, control system, economical conditions or major information reporting system.
- To consider if types of risks have been clearly identified and suitable for the types, sizes and objectives of business.
- To verify the minutes of the meetings of the financial institution’s board of directors and other relevant working groups and to interview the management to ensure that the risk management system and the operational system have been reviewed periodically to be consistent with the organization’s internal and external factors.

The following proceedings must be performed by the board of directors.

(1) To periodically review the financial institution’s risk tolerance to ensure prudence and effectiveness.
(2) To assess the success of the monitoring and control.

(2) Risk Assessment
- To verify the present status of the financial institution’s business unit to ensure that the board or other authorized committees and senior management participate in periodically assessment of the risks of products and services (The management interview method and reports and information systems available in the financial institution may be used).

- To verify whether or not the board or other authorized committees and senior management participate in establishing guidelines and methods of the risk assessment and the measurement of the operational risks and such assessment method is in consistence with the nature, scope of business operation and risk tolerance accepted by the financial institution.

- To verify products or services introduced after previous audit by:
  
  (1) Reviewing the policy of the financial institution on whether or not the operation new products and services are clearly specified.

  (2) Verifying that the procedures, authority in taking care of the new products and operation methods have been clearly specified.

  (3) Reviewing the documents to ensure that the board or authorized committees and senior management perform the assessment of the product risks and plan to manage such risks appropriately before the introduction. However, the board and senior management must approve or agree to such risk assessment as the case may be.

  (4) To verify whether the existing products and services are reviewed by the senior management.

  (5) To verify whether the review procedure is encouraged by other sections such as information technology, accounting and audit.

   (3) Risk Monitoring and Reporting
- To assess the effectiveness of the risk monitoring tool used by the financial institution and to verify the risk monitoring report submitted to the board and senior management on how the monitoring and remedy are made.

- To enquire with the auditors on other aspects such as credit, strategy, liquidity or marketing and to verify the risks control report whether or not the operation errors are reported and are they beyond the stipulated scope; whether or not non-compliant with policy and practical regulations items are reported to the board and senior management of the financial institution.

- To verify the minutes of the audit committee meeting to ensure that the audit committee has clear plans and working procedures for identifying the internal auditing flaws including making recommendation on the timely solution plan. However, the following issues should be considered:
  
  (1) Whether the policy is adequately stipulated.
  (2) Whether or not the audit committee implements the solution plan within the prescribed schedule.
  (3) Whether or not the solution plan is reasonable.
  (4) Whether or not delayed projects are periodically reported to the financial institution’s board of directors.
  (5) Whether or not the number of delayed solution plans is high.
  (6) The importance the management gives to the delayed solution plan.

- To verify and assess the monitoring plan to ensure that risk management is implemented to supervise the business units with risks.

- To verify the current status of the audit unit and the operational risk management unit, including previous year plans to be aware of:
(1) The audit covers all business units with risks without exception.

(2) Whether or not the operation is achieved according to the objectives.

(4) Risk Control

(4.1) Control System

The mitigation of operational risks needs a strong control which depends on the delegation of authority and suitable operation procedures. However, in order for the management to achieve success, it must make certain that the employees acknowledge the benefit of such control. Hence, the control assessment shall consider the structural layout, the delegation of authority, operation, controlling and commanding, document channels and approval authority by:

- Verifying the operational structure and tasks to ensure that the job segregation is appropriately made in each business unit by the financial institution e.g. the management of deposit department, investment department and credit department, etc.

- To verify the personnel policy:

  (1) Whether there is control system or tool to prevent any loophole in the internal control to encourage performances with the benefit of the financial institution as the main consideration and whether the violator is punished.

  (2) Whether the financial institution’s board of directors possesses a code of conducts which emphasizes the significance of corporate good governance.

  (3) Whether or not various rules and regulations are adequate, precise and comprehensible.

- To verify the administration of salary management, remuneration management and promotion such that they are not depended on the profit of the business, in particular, on the increased profit of the items incurred from transactions not within the normal business, for
instance, profit obtained from the sale of the real estate, etc. The information on this matter can be obtained from the followings:

(1) The stipulated objectives of the organization.
(2) Profit target.
(3) Compliance with regulations and stipulated risk ceiling.
(4) Code of conducts in performing duties.
(5) Increasing efficiency to the performance.
(6) Stipulation of remuneration and rewards.

- To verify the training plan, to obtain information related to training, to ensure of that periodical trainings are arranged, particularly for the new employees and also in the case of the system change or methodological change. In addition, special training on rules and regulations and methodology of the risk control should be organized.

- To verify whether or not the rules and regulations as well as to validate that the methodology are up-to-date and the communication system is able to reach every employee in addition to substantiating its efficiency.

- To verify the business continuity plan to sustain against incidents that may occur unexpectedly. To ensure that the financial institution has sufficient plans to deal with such incidents and able to offer basic services to its customers. In addition, the verification should be regularly made on the review and exercise of the business continuing plan to ensure that such plan is able to handle the actual incidents.

(4.2) **Control Methods**

**Controlled by senior management**

In the event that the board of directors of the financial institution and senior management are unable to monitor the performances according to the objectives and unable to control the organizational risk which instigating increasing operational risk, the audit on the following areas shall be considered.
- Verification of examples of reports submitted by the senior management to the board of directors of the financial institution and senior management. The information obtained from the reports shall use to compare with the organization’s objectives and to consider the control of the organizational risks keeping in mind present risks and risks that may occur in the future.

- Verification whether the senior management conducts audits to ensure that the operations are in consistence with the financial institution’s objectives.

- Verification of examples of the financial institution’s major business reports, taking into account the control that the financial institution prescribed by presenting the information in the reports.

Operational Control

The acknowledgement process, methods and operational control in each section shall be considered on whether and how adequate and appropriate the rules, regulations, procedures as well as operational handbook used in the operation are available. The information verification shall be made from the performance reports or report of errors and to monitor the remedy that encourages better control by:

- Interviewing the unit heads to check on what information indicates the operational control and the problem correction, including examining the frequency and promptness of the reports.

- Verifying the adequacy of the reports which denote transactions that are over one’s authority.

Control of Tangible Properties

Control of tangible properties is very important and necessary for the financial institution. The operational risk shall increase if an effective property control system is lacking such that it may cause damage and negative effect on the business reputation. Such includes reporting errors of the financial information. The properties under the control consist of those used in the business operation and those obtained from the transactions such as cash, transfer, deposit and withdrawal, investment and trading or speculation, etc.
- To verify the operational policy from the unit selected to examine whether or not the proper supervision has been arranged by the senior management, for examples, the property maintenance and periodical audit of property list or at least the audit should be made in relation to:

(1) Cash at the counter and safe deposit system.
(2) Various collaterals.
(3) Fund trading room
(4) Recording of transactions via electronic machines.
(5) Accounting documents, important documents and valuable printed matters.
(6) Hardware and Software processing.
(7) Long distance communication.
(8) Fixed assets with high values

- To verify the operational policy to ensure that the job segregation within the organization is properly arranged by the senior management without permitting only one individual to perform the following transactions.

(1) Approving and withdrawing payment.
(2) Executing a transaction from the beginning to the end, including the verification.
(3) Taking care of customers and recording the transactions.
(4) Recording transactions in both the trading book and banking book of the financial institution.
(5) Trading funds and to have duties in the middle office and back office.

- To verify if there are rules and regulations with respect to the prevention of duty performance without primarily considering of the interest of the financial institution or any action that would creates loopholes within the internal control.
- To discuss the preliminary results of the audit with other auditors to ensure that none of the items has significance on the operational risk that has not yet monitored or verified.

Compliance with Rules, Regulations, Operating Procedures and Risk Control

To assess compliance with the existing rules, regulations, risk control and the presence of many incidents of non-compliance with the policy and procedural regulations indicates a weak internal control structure and creates more operating risks. Therefore, following issues should be considered.

- To consult about the preliminary results of the audit with the auditor within the team.

  (1) To verify whether or not there are operational rules and regulations and the risk control.

  (2) To verify if the customary practice in the financial institution is in violation of any law, rule or regulation pertaining to the organization and against the same of the financial institution itself, for examples, the practice on the money deposit, granting credit and making investment, etc.

  (3) To verify any item is not in compliance with the policy and normal procedural regulations and if such items are reasonable to receive the approval from the authorized person.

  (4) To verify whether or not the audit covers all doubtful items and if there is any question.

- To consult about the preliminary discovery with the other auditors in the team to find any point which the monitoring has not yet been made.

- To verify the level of risk at the point where the fund and income are affected.
Approval Authority

In controlling the risk, acting in compliance with rules and regulations or within the assigned authority is very important. Thus, the following issues should be considered.

- Is there any operation not yet officially been supervised by rules and regulations?
- Are the employees of the financial institution aware of the various approval authorities?
- Is there any item not yet in compliance with the policy and normal regulations and does it have reasonable ground?
- The suitability of the approval authority.

Verification of Accuracy

Verification of accuracy must be conducted independently. Confirmation on the verification and reconciliation should be made periodically to ensure that the financial reports are correct. Insufficient verification may create operational risks. Hence, the following issues should be considered.

- What stages of the financial institution operation that the confirmation and reconciliation systems are employed as tools for internal control. The verification of the working procedures is required to ensure that:
  
  (1) There are reconciliation and verification of items in the financial statement periodically.
  
  (2) The consistency of the reconciliation and verification should be in conformity with the sizes and volume of the items and their significance.
  
  (3) The person who performs reconciliation and verification must be separated from the person who undertakes the transaction.
  
  (4) The management must examine the accuracy of the reconciliation and verification every time.
(5) The inaccurate or incorrect items must be brought up and corrected.
- To verify the various items with no movement and to duly adjust or amortize the account.

Information Technological and Reporting Systems
- Where there are changes in the information system or in the event of insufficient control system or no audit to ensure accuracy before the information is employed, such could create flawed report. Hence,
  (1) The verification should be made on whether or not the financial institution has changed its reporting format, information technology, contents or presentation channel since the previous audit and whether or not such changes of formats affects the operational risk and how.
  (2) The verification should be made on whether or not the financial institution has changed or improved the information technology and whether or not the changed information has any effect against the operational risk and how.
- The board of directors and senior management of the financial institution must obtain reliable information for management and control of risks since incorrect information may be caused by operational risks (operational error, fraudulence or system error) or is the cause of other consequential risks such as strategic risk, credential risk, marketing risk and liquidity, etc.
  (1) To review what have been initially detected, to enquire with the auditors of other areas in the audit team and to determine if the reports submitted to the board of directors or senior management of the financial institute are adequate and such reports must indicate:
    - Progress of the operation according to the financial institution’s strategic plan.
- Result of the operation comparing to the plan or budget.
- Items not to be in compliance with the policy and normal regulations that are approved.
- Items not to be in compliance with the policy and normal regulations that are not approved.
- Result of the operation measured from the risk tolerance level.

(2) To verify on whether or not the risk management committee submits the correct and accurate information consistently and in timely manner to the financial institution’s board of directors.

(3) To verify the regulations and practical guidelines of employees, to interview the management and to clearly examine on whether or not all employees are informed of the regulations and methodology prescribed by the management.

- To verify channels of submission to create an understanding for the concerned persons.
- To verify to ensure that the management and employees are informed of the changed regulations.
- To verify that the financial institution provides trainings to the employees periodically, particularly in the event of establishing new system, new regulations for the operation or introduction of the new products.

(4) To verify the internal monitoring plan and the audit plan of the external auditor to ensure that the board of directors and the senior management of the financial institution arrange the installation an accurate and reliable information technology system.
- To verify that the internal auditing plan and the audit plan by the external auditor are audited fully and accurately under the responsible party.
- In case the audit does not cover all points, it must be observed if the management employs other methods to audit the accuracy, for examples, the audit made by the employees of the financial institution or the employment of the external company to act as the additional auditor from time to time in addition to the external auditor.

(5) To assess the information safety measures by auditing to ensure that the board of directors and senior management of the financial institution have reasonably supervise these matters.

- To assess the reporting procedures and minutes of audit committee’s meetings to ensure that:

(1) The audit committee consists of the committee members from the outside and is independent from the senior management.

(2) The internal auditing unit makes direct report to the audit committee on the planning, budgeting and fixing the salary and the audit committee shall be responsible for the approval annual plans and budget of the audit unit and to assess the performances of the management of the internal auditing unit.

(3) The audit reports are submitted directly to the audit committee.

(4) The management supervises and corrects the errors in the audit. Such errors must be reported to the audit committee.

- To verify the audit reports if there is adequate information by considering in the following issues.
(1) Subjects to be audited.
(2) Scope of work or scope of audit.
(3) Levels of severity and various errors.
(4) Various recommendations.
(5) Management response.
(6) Followed up remedy of errors and problems found in the previous audit.
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Foreword

Risk ratings must be carried out before and after the examination. The purpose of risk rating prior to the examination is to specify risk areas based on existing data, and correspondingly allocate the appropriate time and resources for the examination. Risk ratings following the examination outline the financial institution's risks which will be indicative of the level of importance supervisors must give to monitoring and implementing risk control measures.

Risk examinations shall focus on five main types of risks: strategic risk, credit risk, market risk, liquidity risk, and operational risk and include other types of risk where significant. The examination shall evaluate each type of risk and risk management of each risk type including ranking them by their impacts on income and capital funds, evaluate aggregate risk trends and provide an aggregate risk rating for each type of risks based on the table below.

### Aggregate Risk Ratings

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Following, a composite rating shall be carried out based on considerations of the risk ratings above in conjunction with the institution's ability to generate income, and the adequacy of the capital funds taking account of the effects of the risks.
Observations in carrying out risk ratings.

1. The risk factors outlined in this Handbook are guidelines stating the minimum considerations for risk ratings, and additional factors affecting the level and quality of risk management must also be considered. For each risk factor, it is not possible to set out fixed values to judge if risks should be considered high, medium, or low; the weight of each risk factor depends on the sensitivity of the capital fund and the institution's income generating capabilities to the risk. A risk factor that is significant to one financial institution may not affect another institution; similarly, in the same institution, a risk factor may be significant in one period and have no relevance in another period. It is therefore not possible to provide fixed parameter values and weights to estimate risks from different risk factors.

2. The risk ratings guidelines in the Handbook outline each risk factor and the risk ratings based on each risk factor individually. In practice, however, all risk factors must be considered together and the effects of all risk factors must evaluated simulataneously in aggregate before risk ratings are carried out. For any one type of risk, risk factors which appear to result in low risks when considered individually may have medium risks when considered as a group if the aggregate effect of the group of factors have a medium effect on income and on the capital fund.

3. Risk trends shall be evaluated over a forward-looking 12-month horizon, however, if there are risk factors or events which are likely to effect the financial institution over a longer horizon, these factors and events must also be taken into account. Risk trends shall affect the state authority's supervision strategies which may include widening the scope of the examination.

4. Evaluations of risk levels and the quality of risk management must be carried out separately and independently. Therefore, the quality of risk management no matter how good or bad, should not be considered in risk rating evaluations. An exception may be the risk rating of strategic risks for which it may not be possible to clearly separate risk factors from the quality of risk management due to the inter-relationships between the two which make it difficult to accurate measure the level of strategic risks. Notably, neither capital funds nor the strength of the institution's financial position can solve inadequacies nor reduce deficiencies in an institution's risk management system.
5. The examiner should not automatically conclude that high risk levels are bad, nor that low risk levels are good. Risks level merely reflect the risks resulting from business operations. Where risk levels are appropriate depend on the institution's risk management system's ability to measure, monitor, and control the risks.

6. Increasing or decreasing forward-looking trends in aggregate risks over a 12-month horizon does not necessarily mean that aggregate risk ratings will increase or decrease following the level implied over the next 12 months. For example, given a high aggregate risk rating, a decreasing risk trend does not mean the institution's risks will fall enough to merit a medium-high or medium risk rating. For all types of risk, a high aggregate risk level still has the potential of higher risk trends; and low aggregate risk levels can still follow decreasing risk trends. The risk ratings are based on threshold levels at which risks are deemed high or low, and upon passing the threshold risks may continue higher or lower.

7. Assets to be sold shall be considered as when evaluating market risk as the item is subject to risks resulting from changes in price. As such, price risks cover the bid-ask spread in the investment amount, and as the prices of assets to be sold have generally fallen quite low, it may be estimated that financial institutions are unlikely to require significant additional reserve provisions in this area, therefore risk ratings are not necessary here. However, observations regarding the management of said assets, if any, should be included in the evaluation of market risk section of the examination report.

Evaluations for the composite risk rating must include assessment of the capital adequacy fund, income generating capabilities, and the aggregate assessment of each type of risk. In cases where capital funds are stable and have a good income generating capabilities but have unsatisfactory aggregate risk ratings, composite ratings considerations shall focus first on the risk assessments. However, in cases where aggregate risk ratings are satisfactory but capital adequacy funds and income generating abilities are not satisfactory, composite ratings considerations shall focus on the capital adequacy funds and said income generating abilities.

Considerations of effects of the five types of risks and their aggregate risk assessments and the weights given to each type of risk must take account of the
sensitivities of the capital adequacy fund and its income generating capabilities to each type of risk. The sensitivities to risks and the weights which should be given to each type of risk will differ across different financial institutions, and within one financial institution risk sensitivities will vary between different time periods, and the examiner must estimate the effects that risks will have on the capital adequacy funds.

Risk Examination Division
Risk Management and Information System Examination Department
Supervision Group
December 2003
Strategic Risk Ratings

Risk Levels

Low

Changes in the organisation structure and key personnel following the previous examination having little effect on the organisation.

The financial institution has set out strategic plans to support effective risk management. The assumptions and various factors applied to strategic planning are reasonable and the plan well reflects strengths, weaknesses, opportunities, obstacles, and the market position of the financial institution.

Strategic plans inspire confidence, and have sufficient future support in terms of funding, human resources, operational systems, and management. Risk management systems are in place, and strategic plans have efficient operational procedures, clear strategic targets consistent with the direction of business enterprises and the changing environment. There is comprehensive communication of strategic targets and of the organisational culture which are consistently followed and met.

Strategy decisions or changes in external factors have little effect on the financial institution.

Medium

Changes in the organisation structure and key personnel following the previous examination having some but not significant effects on the organisation.

The financial institution has set out strategic plans to support adequate risk management. The assumptions and various factors applied to strategic planning are reasonable and the plan adequately reflects strengths, weaknesses, opportunities, obstacles, and the market position of the financial institution.
Strategic plans have sufficient future support in terms of funding, human resources, operational systems, and management. Risk management systems implementation procedures are consistent with strategies. Strategic targets may be aggressive but are consistent with the direction of business enterprises and the changing environment. Communications of strategic targets and of the organisational culture are carried out and are effectively adopted and followed throughout the organisation.

Effects of strategy decisions or changes in external factors are not significant to the financial institution.

High

Changes in the organisation structure and key personnel following the previous examination having significant effects on the organisation.

Strategic plans do not support effective risk management. The assumptions and various factors applied to strategic planning are unreasonable and the plan does not adequately reflect the strengths, weaknesses, opportunities, obstacles, and the market position of the financial institution.

Capital funds, human resources, operational systems, management, risk management systems, and implementation procedures do not adequately support operational implementation of strategies due to over-expansion or over-extension of business enterprises. Continued over-expansion will affect income and capital adequacy funds. Strategies may be inconsistent with the direction of business enterprises or may be inappropriate to the changing environment. There is inadequate or unclear communications of strategic targets and of the organisational culture, inadequate adoption and compliance or ineffective implementation of strategies.

Strategy decisions or changes in external factors may have great detrimental effects on the financial institution.

Risk Management

Good
Business management follows the principles of good governance achieving efficiency and transparency regarding the disclosure of information. Clear policies and operational procedures are set out for work carried out for and by organisational personnel (insiders) to protect against operational problems concerning conflicts of interest where personnel may carry out tasks for personal gain instead of the good of the organisation.

Strategic decisions may be changed with little expense and no obstacles. Contingency plans are in place in cases of crisis covering key areas, plans have been communicated to personnel throughout the organisation, and are regularly tested.

The financial institution has official policies for training and reserve managerial capacity building to ensure management continuity. Information systems effectively support strategy implementation, the management are highly skilled in the development of strategy direction, in increasing efficiency in strategy implementation and business operations to successfully meet set targets.

The financial institution's board of directors is fully qualified, has diversified experience, regularly attend board meetings and each is without any influence over the other members. There is a committee responsible for the supervision of all risks.

Adequate

Business management follows the principles of good governance with transparency regarding the disclosure of information. Adequate policies and operational procedures are set out for work carried out for and by organisational personnel (insiders) to protect against operational problems concerning conflicts of interest where personnel may carry out tasks for personal gain instead of the good of the organisation.

Strategic decisions may be changed with no obstacles and no significant expenses. Contingency plans are in place in cases of crisis adequately covering key areas, contingency plans are regularly tested and communicated to personnel throughout the organisation.

The financial institution has adequate official policies for training and reserve managerial capacity building to ensure management continuity. Information systems adequately support strategy implementation, the management show capabilities in
implementation and carrying out business operations to meet set targets and objectives, and have good decision-making and managerial skills.

The financial institution’s board of directors are qualified, have diversified experience, there may be some inattendance of meetings but with no significant consequences, and no board member has controlling authority over other members. The scope of the board of directors’ responsibilities cover the key risk areas.

Weak

Business management does not follow principles of good governance, and there is no transparency regarding the disclosure of information. Inadequate policies and operational procedures regarding work carried out for and by organisational personnel (insiders) to protect against operational problems concerning conflicts of interest where personnel may carry out tasks for personal gain instead of the good of the organisation.

Changes in strategic decisions will result in obstacles and significant expenses. Contingency plans in case of crisis are inadequate, and are not regularly tested and nor communicated to personnel in the organisation.

The financial institution has inadequate official policies for reserve managerial capacity building, or is inefficient and has inadequate training programmes to ensure management continuity. Information systems do not adequately support strategy implementation, the management do not have the capability to implement and carry out business operations to meet set targets and objectives, and are unsuccessful in decision-making and the management of the business.

The financial institution’s board of directors are not adequately qualified, do not have diversified experience, lack attendance of meetings, a board member has controlling authority over other members, and the scope of the board of directors’ responsibilities do not cover key risk areas.
Credit Risk Ratings

Risk Levels

Low

Current and forward-looking risk exposures which have the potential to cause loss of income or loss to the capital adequacy fund are low. The credit structure and size of loans are conservative. The risks arising from items which do not comply with loan extension standards and from unauthorised loan extensions are low. Loans portfolios and capital investments have good risk diversification in terms of both rankings of investability and behaviors of debtors regarding reliance on borrowings. Overall, counterparties and issuers of debt instruments with whom the financial institution has carried out investments have good credit ratings. Debtors carry out businesses in markets and industries which are stable. The financial institution has low concentration risks. Loan portfolios and capital investments have low sensitivity to changes regarding economic conditions, industry, competition, government policies, and technological changes.

Risk of losses due to subsidiaries and related businesses are low, and the returns received compensate for existing risks. The size of expansion of the loan portfolio and capital investments are at levels which do not cause concern. The ratio of problem loans to the capital adequacy fund is low, and are solvable under normal operating conditions. The amount of nonperforming loans is low is likely to decrease. The financial institution in strict in carrying out asset classification and making reserve provisions.

Collateral assets have high liquidity, and have market values which are not sensitive to changes in market conditions. Losses incurred do not have significant effects on current reserves, and any additional reserve provisions are small in terms of their proportion to income.

Medium

The risk exposures which have the potential to incur loss of income or loss to the capital adequacy fund are not at significant levels. The credit structure and size of loans are acceptable. There may be a significant number of items which do not comply
with loan extension standards and from unauthorised loan extensions, however, these do not instigate complex risks. Some portions of capital investments may be ranked as non-investible and some debtors' operations are too dependent the on the loans but debtors carry out business in markets or industries with low volatility. Some counterparties and issuers of debt instruments with whom the financial institution has carried out investments may have low credit ratings, but overall, counterparties and issues have average credit ratings. The financial institution's concentration risks from loans are not at significant levels. Loan portfolios and capital investments may be affected by changes regarding economic conditions, industry, competition, government policies, and technological changes.

There are risks of loss due to subsidiaries and related businesses but risks are not at significant levels, and the returns received compensate for existing risks.

There may be unusual expansions of the loan portfolio in certain products or region/industry with supporting work plans which are consistent and reasonable. The amount of problem loans are limited compared to the capital adequacy fund, and are solvable over a reasonable length of time. The amount of nonperforming loans is within average industry limits is likely to decrease. Asset classifications and reserve provisioning are in compliance with the regulations of the Bank of Thailand.

Collateral assets have average liquidity, with market values which change following market conditions. Losses incurred no have effects on reserves, or have effects which are not significant compared to their proportion to income.

High

The risk exposures which have the potential to cause loss of income or loss to the capital adequacy fund are significant. There is aggressive credit extension, and a large number of items which do not comply with loan extension standards. A major portion of capital investments are ranked as non-investible or are debtors which are too dependent on loans to carry out operations or are debtors whose business are in highly volatile markets or industries. Counterparties and issuers of debt instruments, on the average, fail to receive reliable ratings. The financial institution's loans have significant concentration risks. Loan portfolios and capital investments are significantly affected by changes.
regarding economic conditions, industry, competition, government policies, and technological changes.

There are significant risks of loss due to subsidiaries and related businesses, and returns may not compensate for existing risks.

There are aggressive growth of the loan portfolio in certain products or region/industry. The financial institution has a large amount of problem loans compared to the capital adequacy fund which may require protracted remedial period, or the institution has a large amount of nonperforming loans. Asset classifications and reserve provisioning are not in compliance with the regulations of the Bank of Thailand.

Collateral assets have little liquidity, with market values which are highly volatile to market conditions. Losses incurred may significantly reduce reserves, and the financial institution will need to make significant additional reserve provisioning compared to the size of their income.

**Risk Management**

**Good**

The financial institution has loan policies which clearly set out acceptable risk limits and the responsibilities of related parties. Loan policies and strategies have been reviewed and approved by the institution’s board of directors, and communicated to all related parties. There is a balance between loan market expansion and credit analyses.

The loan approval process is easy to understand and strictly adhered to. Credit analyses are detailed and carried out with careful consideration, and monitoring of loan quality/status is timely. Risk measurement and risk control systems are comprehensive and are able to support management decision-making regarding changes in loan quality and market conditions. Methodologies for risk measurement and risk limits setting are reasonable and carried out by parties independent of the risk generating divisions. Risk systems and methodologies are appropriate for the complexity and size of the organisation.
Credit risk measurement and risk management tools are able to provide useful information for timely decision-making. These tools have been evaluated by independent parties, are continuously developed and up-to-date. Credit risk database systems provide sufficient and current information, are linked to risk management systems, and are accurate, complete, timely, reliable, and clearly assist in analyses and evaluations of operations following policies and regulations. Reports of items in non-compliance with operational guidelines are automatically reviewed as they occur. Rankings of debtors' credit quality are accurate and reported in a timely manner.

Loan department operations are efficient, manager set out and manage risks including risks relating to the structure and concentration of loans. Provisioning methods are appropriate and sufficient. Operations strictly comply with collateral policies.

Personnel have technical and managerial expertise. The turnover or leaving rate of key personnel is low. The committee in charge of the evaluation and approval of loans have appropriate qualifications and carry out their responsibilities for the benefit of the financial institution as a whole. Internal control systems are effective. Loan reviews and internal audits are competent and independent.

Adequate

The financial institution has loan policies which set out acceptable risk limits and the responsibilities of related parties. Loan policies and strategies have been approved by the institution's board of directors, and communicated to all relevant parties. There is a balance between loan market expansion and credit analyses.

The loan approval process is easy to understand with sufficient credit analyses and monitoring of loan quality/status. Risk measurement and risk control systems provide information which management is able to use in decision-making regarding changes in loan quality and market conditions. Methodologies for risk measurement and risk limits setting are reasonable and carried out by parties independent of the risk generating divisions. Risk systems and methodologies are appropriate for the complexity and size of the organisation with only slight deficiencies.
Credit risk measurement and risk management tools are able to provide adequate information. Said tools have been evaluated by independent parties, are continuously developed and up-to-date. Credit risk database systems are efficient, and may be used in analyses and evaluations of operations following policies and regulations. Reports of items in non-compliance with operational guidelines are reviewed from time to time. Rankings of debtors' credit quality are accurate and reported in a timely manner.

Loan department operations are acceptable, managers set out and manage risks including risks relating to the loan structure, loan concentration, and adequate provisioning for losses from loan portfolios. Collateral policies are clearly set out and appropriate.

Personnel have the required technical and managerial skills. The turnover or leaving rate of key personnel is at average levels and controllable. The committee in charge of the evaluation and approval of loans have appropriate qualifications though members may not always carry out their responsibilities for the benefit of the financial institution as a whole. Internal control systems are effective. Loan reviews and internal audits are competent and independent.

Weak

The financial institution has loan policies which do not clearly set out acceptable risk limits or responsibilities of related parties. Loan policies and strategies have not been communicated to all related parties. Aggressive loan market expansions outweigh prudent credit analyses. Loan approval processes are not clearly set out.

Credit analyses and monitoring of loan quality/status is insufficient considering existing risk levels. Risk measurement and risk control systems provide insufficient information to support management decision-making regarding changes in loan quality and market conditions. Methodologies for risk measurement and risk limits setting are not cogent or are carried out by parties not independent of the risk generating divisions. Risk systems and methodologies are insufficient or are inadequate for the complexity and size of the organisation.
Credit risk measurement and risk management tools are unable to provide useful information. Said tools have not been evaluated by independent parties, are not continuously developed to be up-to-date. Credit risk database systems are flawed and are unable to provide information for analyses and evaluations of compliance with legal stipulations. There is no reporting of items in non-compliance with legal stipulations. Rankings of debtors' credit quality do not accurately reflect the quality of debtors.

Loan department operations are not efficient, managers are unable to set out and monitor risks, and not enough attention is given to the diversification of risks. Provisioning methods are insufficient for loan portfolio losses. The financial institution lacks clear and appropriate collateral policies.

Personnel lack technical and managerial expertise. The attrition rate of key personnel is high. The committee in charge of the evaluation and approval of loans lack the appropriate qualifications and carry out their responsibilities for personal benefit rather than for the benefit of the financial institution as a whole. Internal control systems are ineffective. Loan reviews and internal audits are inefficient and lack independence.
Market Risk Ratings

Risk Levels

Low

Interest rate risk exposures, and market (price) risks from unhedged or illiquid positions are low. Most of the assets which are sensitive to changes in interest rates are short-term assets and/ or have floating interest rates. The financial management departments have low transaction levels. Currencies risks are not significant to the capital adequacy fund. Hedging transactions are well-able to remove risks. Transactions undertaken on behalf of clients usually concern speculation or trading of financial instruments which are liquid and easy to manage, and risk monitoring and controls are able to manage the level of transactions. There are no significant mismatches in long-term risk exposures, the institution is able to forecast cashflows and hedge against almost all its risks. Mismatches in currency positions are short-term and the majority of these have been hedged.

Current and future levels of income and capital adequacy fund are not sensitive to changes in interest rates or to exercising options instruments. Exposures to price risks are limited and therefore the potential loss to income and to the capital fund are not significant. Changes in interest rates, exchange rates, and price of equity instruments have only a small effect on the financial institution's credit facilitation business, income and capital adequacy funds. The risk exposures of subsidiaries and related companies have only small effects on the financial institution's market risks.

Medium

Interest rate risk exposures are at manageable levels. Price risks are at medium levels. Assets which are sensitive to changes in interest rates include both fixed and floating rate assets, and are at manageable levels. The financial management departments have medium transaction levels. Currencies risks exist but do not adversely affect the capital adequacy fund. Hedging transactions are able to remove some risks. The financial institution is able to carry out hedge transactions at reasonable cost.
Mismatches in long-term risk exposures are manageable, while mismatches in cashflows are at medium levels and forecastable. There are long-term mismatches in currency positions, however, these have been effectively hedged at reasonable cost.

Income and the capital adequacy fund are somewhat sensitive to changes in interest rates or to the exercise of options instruments but the effects are not significant. Exposures to price risks are at medium levels, therefore significant potential loss to income and to the capital fund is limited. Changes in interest rates, exchange rates, and price of equity instruments do not have significant adverse effects on the financial institution's income and capital adequacy fund. The risk exposures of subsidiaries and related companies do not have significant effects on the financial institution's market risks.

**High**

Interest rate risk exposures and price risks are significant. Assets which are sensitive to changes in interest rates comprise mainly of long-term assets with fixed interest rates. The financial management departments have high transaction levels, involving volatile assets. Currencies risks have significant effects on the capital adequacy fund. Hedge transactions are unable to remove risks. Transactions to offset or hedge risk exposures are difficult and costly due to the size, maturity, complexity, or illiquidity of the market or the product/ instrument. Mismatches in long-term risk exposures are significant, and mismatches in cashflows are unhedged. There are long-term mismatches in currency positions with high hedging costs; said currency exposures are unhedged where some exposures are to illiquid currencies.

Income and the capital adequacy fund are highly volatile to changes in interest rates or to the exercise of options instruments resulting in significant losses to income and the capital fund. Changes in interest rates, exchange rates, and price of equity instruments significantly affect the financial institution's credit facilitation business, the institution's income, and its capital adequacy fund. The risk exposures of subsidiaries and related companies significantly affect the financial institution's market risks.
Risk Management

Good

The management understand all types of market risk which affect the short-term income and the long-term market value of the business. There are sufficient and timely risk monitoring, measurement and controls able to quickly respond to market changes. Related personnel have a good knowledge and understanding of market risks.

Risk management systems and processes are effective and aggressive in measuring risks and cover both on- and off-balance sheet transactions. Risk measurement tools and methodologies are appropriate to the size and complexity of the financial institution. Risk models are reliable and tested. Supporting documentation is up-to-date and provide meaningful and timely information. The assumptions used are appropriate and regularly reviewed. Product business strategies are set out and the services provided are consistent with the competitive environment in the market with only small deficiencies or errors. Research analyses and documentation are prepared regarding the risks of each new product prior to providing a service. There is appropriate interest risk management, and good liquidity management and marketing of the product.

The information provided to various levels of management within the organisation is able to provide comprehensible results from evaluations of policy risks, strategic risks, and compliance with risk limits including any exceptions (if any). The data is accurate, complete, reliable, and timely. There are regular reviews of reports of items in non-compliance with normal policy and operational procedures. Set risk limit structures clearly illustrate acceptable levels of risk under both normal and crisis conditions, and are communicated to all related parties. The objectives in hedging risks are reasonable and are also communicated to all related parties.

Parties responsible for the measurement, monitoring, and control of risks under set risk limits have the knowledge, skills and training, and are independent of risk generating divisions and of parties authorised to carry out decisions to undertake risks.
Adequate

The management understand the key aspects of market risks which affect the short-term income and the long-term market value of the business. There are appropriate and timely risk monitoring, measurement and controls able to respond to market changes. Related personnel have knowledge and understanding of market risks.

Risk management systems and processes are adequate and cover key risks. Risk measurement tools and methodologies are adequate, and despite small deficiencies or weak points, are appropriate to the size and complexity of transactions both on- and off-balance sheet. Risk models are reliable and tested. The accuracy of risk exposures are reviewed by independent parties. The management consider the risks of each new product before marketing it.

The information provided to various levels of management within the organisation is able to provide results from evaluations of policy risks, strategic risks, and compliance with risk limits including any exceptions. There is preparation of credit and market data for management from time to time on an ad-hoc basis. There are reviews of reports of items in non-compliance with normal policy and operational procedures, though these may not be timely. Set risk limit structures clearly illustrate acceptable levels of risk under both normal and crisis conditions, and are communicated to all related parties. The objectives in hedging risks are reasonable and are also communicated to all related parties.

Parties responsible for the measurement, monitoring, and control of risks under set risk limits have the appropriate qualifications, and are independent of risk generating divisions and of parties authorised to carry out decisions to undertake risks.

Weak

The management do not understand key aspects of market risks which affect the short-term income and the long-term market value of the business. Risk monitoring, measurement and controls are inadequate, and the institution is unable to respond to
market changes in a timely manner. Some management executives lack knowledge and understanding of key aspects of market risks.

Risk measurement tools and methodologies are inadequate and inappropriate to the size and complexity of the financial institution's business operations and both on- and off-balance sheet transactions. Calculations of market values of risk exposures are carried out too infrequently and do not cover all key products. There is insufficient evaluation of the risks of new products prior to their release in the market.

The information prepared for various levels of management within the organisation is unable to provide accurate results of evaluations of policy risks, strategic risks, and compliance with risk limits including any exceptions. Further the information may not cover consolidated risks of all risk exposures. Credit and market data prepared for management is unreliable. There are no reports of items in non-compliance with normal policy and operational procedures. Risk limit structures are unclear and unreasonable, and are not communicated to all related parties. Further, risk limit structures do not reflect the risks which affect income and capital adequacy funds under both normal and crisis conditions. The objectives in hedging risks are unclear, unjustified and are not effectively communicated to all related parties.

Parties responsible for the measurement, monitoring, and control of risks under set risk limits do not have appropriate qualifications, and are not independent of risk generating divisions or of parties authorised to carry out decisions to undertake risks.
**Liquidity Risk Ratings**

**Risk Levels**

**Low**

The financial institution has sufficient liquidity to support future cash outflows with no difficulty.

The financial institution has no difficulty in obtaining capital funds even during adverse market changes. The effects of liquidity risks on income and the capital adequacy fund are small. Losses from subsidiaries and related businesses have a small effect on the organisation.

Income is stable with continuous growth. Loans are of good quality and generate consistent cashflows. Sources of deposits and borrowings are not concentrated, with many stable main deposit funds. Cash inflows balance cash outflows in every period, with cash inflows exceeding outflows. Deposits are stable and there is market acceptance of the organisation's reputation which helps give the institution an advantage regarding the cost of funds when raising funds from the market allowing the institution to easily raise funds from both financial and capital markets under both normal and crisis conditions.

The management is able to choose the sources of funds and raise funds in accordance to their needs with no effects on the organisation's main business operations.

**Medium**

The financial institution has sufficient liquidity to support future cash outflows with little difficulty.

The financial institution has few difficulties in obtaining capital funds even during adverse market changes. The effects of liquidity risks on income and the capital adequacy fund are manageable. Losses from subsidiaries and related businesses do not have significant effects on the organisation.
Income may not be stable nor have continuous growth, but the institution is able to manage its income. Loans are of adequate quality and generate satisfactory cashflows. Sources of deposits and borrowings have appropriate diversification or only small concentrations. The volatility of funding sources are at medium levels. Cash outflows exceed cash outflows in some periods. Some funding sources may have the same objectives as the financial institution in making investments, or funding sources may be affected by economic conditions in a similar manner to the financial institution. The financial institution can easily raise funds only from financial capital markets.

Sources of funds are sufficient. On- and off-balance sheet transactions and cashflows are balanced resulting in stable levels of liquidity, and initial costs are reasonable with no effects on the organisation's main businesses.

**High**

The financial institution has insufficient liquidity to support future cash outflows.

The financial institution's status does not facilitate the raising of capital funds during adverse market conditions. Losses from subsidiaries and related businesses significantly affect the organisation.

Income and/ or growth is volatile. There are problems regarding the quality of loans quality generating low levels of cashflows. Sources of deposits and borrowings have significant levels of concentration, and funding sources may be considerably volatile. Cash outflows exceed cash outflows. Some funding sources may have the same objectives as the financial institution in making investments, or funding sources may be affected by economic conditions in a similar manner to the financial institution. The financial institution does not have market acceptance, which may limit the raising of capital funds from financial and capital markets. Short-term liquidity needs may increase while medium-term and long-term liquidity fall.

The financial institution’s source of funds and financial structure may be obstacles in maintaining liquidity under reasonable costs. Income and capital adequacy
funds may decrease due to higher funding costs, assets may increase without forward planning, or the quality of assets may depreciate significantly. The institution may have to implement contingency plans to increase liquidity, which may involve the sale or suspension of some of the institution's main businesses.

**Risk Management**

**Good**

The financial institution has comprehensively set out all the key liquidity risks in its risk management policies, also covering the forecasting and responses to market changes in a timely manner. The management have set out clear and appropriate policies and operational guidelines regarding the acceptance and management of risks. Internal control systems are effective, include the forecasting and responses to market changes in a timely manner, and liquidity planning is carried out as part of strategic planning, financial statement preparation, and financial management.

The tools and methodologies for measuring liquidity risks are appropriate to the size and complexity of the organisation, and are able report all significant capital inflows and outflows. Liquidity models and methodologies are reviewed, tested, documented, and developed and up-dated by independent parties. Said models and methodologies help provide useful and timely information to management for use in decision-making, based on reasonable assumptions which have been evaluated and approved. The management is attentive regarding the efficient management of the balance sheet, cashflows, and cost of funds. Further, shareholders are supportive regarding the evaluation and selection of funding sources.

Information used by management is timely, complete, and reliable; and may be used to clearly evaluate policy and strategic risks, and transactions in non-compliance with policies and normal operational guidelines. Set limits regarding loan structure, deposits, concentration of funds, and net capital flows help to clearly illustrate the risks to income and capital funds both in normal and crisis conditions. Further, said limits are communicated to all related parties.
Contingency plans regarding the raising of capital funds are comprehensive and are linked to risks management systems to enable the financial institution to respond to changes during crisis periods in an efficient and timely manner. Personnel who are responsible for the monitoring and control of liquidity levels have appropriate qualifications and sufficient training, and are independent of the risk generating divisions.

**Adequate**

The financial institution has adequately set out the key liquidity risks and policies to manage liquidity, and sufficient internal control to respond to market changes. The management has carried out sufficient planning regarding liquidity risk management, implementation, and internal controls. Liquidity planning is carried out as part of strategic planning, financial statement preparation, and financial management.

The tools and methodologies for measuring liquidity risks are appropriate to the size and complexity of the organisation, and are able to report sources of significant capital inflows and outflows though tools and methodologies may have minor deficiencies. Liquidity models and methodologies are tested and reviewed. There is documentation and development of models and methodologies to be up-to-date. Liquidity models and methodologies help provide useful and timely information to management for use in decision-making. The management is attentive regarding the efficient management of the balance sheet, cashflows, and cost of funds. There are deficiencies regarding cashflow management, however, and shareholders show no interest in capital support issues.

Information used by management is timely, complete, and reliable; and may be used to help evaluate policy and strategic risks, and transactions in non-compliance with policies and normal operational guidelines. There are clear and reasonable limits regarding loan structure, deposits, concentration of funds, and net capital flows which are communicated to related parties throughout the institution. Further, said limits have been adequately applied to control risks which may affect income and capital funds under both normal and crisis conditions.

Contingency plans regarding the raising of capital funds support liquidity risk management, and may be implemented under crisis conditions. Personnel who are
responsible for the monitoring and control of liquidity levels have appropriate qualifications, and are independent of the risk generating divisions.

**Weak**

The financial institution has not adequately set out the key liquidity risks and liquidity management guidelines to respond to market changes. Liquidity management policies, operational guidelines, and internal controls are insufficient. Liquidity planning is not adequately integrated into strategic planning, financial statement preparation, and financial management.

The tools and methodologies for measuring liquidity risks are inadequate and inappropriate to the size and complexity of the organisation, and are unable to report significant capital inflows and outflows. The institution has no liquidity models, or liquidity models and methodologies are not tested and reviewed. There is no documentation and development of models and methodologies to be up-to-date by independent parties, and liquidity models and methodologies are unable to provide useful information for management decision-making. The management give insufficient attention to cashflow statements, or there is no cashflow management at all. Shareholders are leary of providing capital support, management has not realistically evaluated the institution's ability to raise capital from capital markets, or management has given insufficient attention to the diversification of risks or have given only little consideration to the existing large funding sources and related risks.

Information used by management may contain errors. Limits regarding loan structure, deposits, concentration of funds, and net capital flows are unclear and unreasonable, and have not been effectively communicated to related parties. Further, said limits do not reflect an understanding of the effects of liquidity risks on income and capital funds.

There are deficiencies in contingency plans to raise capital funds resulting in management inability to resolve liquidity problems under crisis conditions. Personnel who are responsible for the monitoring and control of liquidity levels do not have appropriate qualifications, and are not independent of the risk generating divisions.
Operational Risk Ratings

Risk Levels

Low

Changes in personnel, products, or major businesses have only small effects on the financial institution. The organisational structure and hierarchy is clear, compact, and encompasses major businesses and/or subsidiary businesses. Managerial authority is not limited to senior executives, nor is managerial authority unlimited. There is little non-compliance with decision-making authority nor set guidelines. Internal controls cover all major businesses with regular examinations by the middle office or by internal examiners. The management fully endorses monitoring of compliance with observation results from said examinations.

The financial institution has good contingency plans to support business operations under crisis conditions including backup plans, emergency plans, and recovery plans. Changes in external auditors do not have adverse effects on the organisation.

The amount and complexity of new and existing products and services may result in a low level of risk due to possible fraud, errors, suspension of operations, internal control failure, or deficiencies in system development.

The amount of aggregate transactions, the complexity of operational processes and system development have a small effect on the ability to generate income, capital adequacy funds, and the institution's reputation. The initiation of new strategic plans, the introduction of new technologies, or overseas operational expansions result in small operational risks and do not affect the financial institution's reputation. Information systems have been partially replaced, or upgraded, or small repairs have been carried out. No business under the financial institution has shown profits or growth which are higher than the norm.

The amount of wrongdoing, legal prosecution, client-issued claims, and losses are small and have no effect on the financial institution's reputation, value, ability to generate income, capital adequacy funds, nor on the institution's business opportunities.
No significant errors were found regarding business operations carried out between departments, business lines, and subsidiary businesses to indicate problems regarding the financial institution's operational systems. The features and scope regarding the implementation of transactions is able to limit risks from disregarding or breaking rules or regulations. The likelihood of loss due to changes in the market or public perception is low as the market and the public have a good opinion of the financial institution.

Employee turnover or leaving rate is low, there is no appointment of new employees to key positions, and increases or decreases in staff are small in the period following the previous examination.

Medium

The effects of changes in personnel, products, or major businesses do not materially affect the financial institution. The organisational structure and hierarchy is unclear and does not encompass some secondary businesses and/or subsidiary businesses which are not main business operations. Some management executives have high levels or unlimited authority, however not in such a way as to cause problems to the financial institution. There is non-compliance with decision-making authority or set guidelines, but with no significant effects. Internal controls sufficiently cover major businesses and regular examinations are carried out by the middle office or by internal examiners. The management endorses compliance with observation results from said examinations.

The financial institution has contingency plans to support business operations under crisis conditions including backup plans, emergency plans, and recovery plans for main businesses which are sufficient to resolve potential operational problems. Changes in external auditors do not have adverse effects on the organisation.

The amount and complexity of new and existing products and services may increase risks from possible fraud, errors, suspension of operations, internal control failure, or deficiencies in system development.

The amount of aggregate transactions, the complexity of operational processes and system development have impacts on risks, reputation, income and capital
Ratings Handbook

There are risks from setting and implementing new strategic plans, however risks are at manageable levels. The initiation of new technologies, or overseas operational expansions do not result in overly high operational risks. Information systems have been partially replaced, upgraded, or repaired. The financial institution has businesses which have shown very high profits or fast growth, but are not cause for concern.

The amount of wrongdoing, legal prosecution, client-issued claims, and losses are not at significant levels and do not have impacts on the financial institution's reputation, income, capital adequacy funds, or business opportunities. The financial institution does not have a past history of serious filings for prosecution or legal action. There are some errors regarding business operations carried out between departments, business lines, and subsidiary businesses which may cause problems to the financial institution's operational systems. However, said errors were discovered in time. The features and scope regarding the implementation of transactions may result in risks from disregarding or breaking rules or regulations. The likelihood of loss due to changes in market or public perception is not at significant levels, as may be evaluated from the level of prosecution cases, losses, claims, and client perception.

Employee turnover or leaving rate is at medium levels, there are appointments of new employees to a few key positions, and there are not significant increases or decreases in staff since the previous examination.

High

Changes in personnel, products, or major businesses have material effects on the financial institution. The organisational structure and heirarchy is unclear and does not encompass main business lines and/or subsidiary businesses. Many management executives have high levels of personal authority or unlimited authority. There is non-compliance with decision-making authority or set guidelines. Internal controls are insufficient and lack regular examination by the middle office or internal examiners. The management gives no support regarding compliance with observation results from examinations.

Risk Management and Information System Examination Department
Supervision Group, Bank of Thailand

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The financial institution has contingency plans to support business operations under crisis conditions including backup plans, emergency plans, and recovery plans but these are insufficient and do not cover major departments within the organisation. Changes in external auditors have adverse effects on the organisation.

The amount and complexity of new and existing products and services may may increase risks from errors or deficiencies. Operational processes are not systematic, inefficiencies in system development, the amount of aggregate transactions, the complexity of operations, and system development have impacts on reputation, income and the capital adequacy fund. The initiation of new technologies, or overseas operational expansions have sizeable impacts on operational risks. There are significant changes to Information systems. The financial institution has businesses which have shown excessively high profits or growth levels.

The amount of wrongdoing, legal prosecution, client-issued claims, and losses are high and have material significance having impacts on the financial institution’s reputation, income, capital adequacy funds, or business opportunities. The financial institution has a past history of client claims and serious filings for prosecution. There are significant deficiencies in business operations carried out between departments, business lines, and subsidiary businesses causing problems to the financial institution's operational systems. The features and scope regarding the implementation of transactions may significantly increase risks from the disregard or breaking of rules and regulations. The likelihood of loss due to changes in market or public perception is high, due to prosecution cases, losses, and claims.

Employee turnover or leaving rate is at high levels, there are appointments of new employees to many key positions, and there are large increases or decreases in staff since the previous examination.

**Risk Management**

**Good**

The financial institution has set out risk management policies and acceptable risk levels which have been approved by the financial institution's board of directors.
Policies and operational procedures for major new products and services have been considered and approved by the institution's board prior to their release, where said policies support the achievement of strategic targets and are regularly reviewed and evaluated. Communications throughout the organisation are efficient. There is delegation of authority to approve items/transactions which are not compliant with normal policies and operational procedures.

The financial institution's board of directors have given the responsibilities of risk management to working group independent from divisions whose operations are risk-generating. Audit committees are independent. The management forecasts potential risks and is able to, efficiently and in a timely manner, manage risks arisen from changes in the operational procedures, development of operational systems, or by bringing in new technologies, changes in the market or from government regulations which may impact the financial institution's reputation.

There are efficient amendments to deficiencies regarding policies, operational processes, personnel, and internal controls. Regular risk evaluations are carried out for all products and services, including transaction risks, risks of non-compliance with rules and regulations, and reputation risks. The management endorses operational procedures which are consistent with the organisational culture, and supports the operations of all its departments until success is achieved.

The financial institution is able to carry out its operations and control the risks from its products and services within acceptable levels, following the organisation's operational rules and following the rules and regulations of the supervisory authorities. It is able to carry out the monitoring, controlling and auditing extensively. The institution has handbooks for all business operations and carries out independent examinations of all its operations. The institution takes care to prevent conflicts of interest, and allocates resources to enable timely operations. The institution tests the accuracy and reconciliation of data and various reports. There is monitoring and reporting of transactions/items not in compliance with normal policies and operational guidelines to management at appropriate times.

Internal examinations encompass all key risk operations. Database and information systems are efficient. Reports to management may have minor deficiencies
but provide sufficient information that is accurate and timely for management decision-making.

Senior management and executive management of main departments have the knowledge and management expertise. There are appropriate hiring or employment processes, and staff training to improve the aptitude of personnel. Assessments of performance and renumeration are appropriate and are not dependent on the ability to generate short-term profits, or profits from trading without taking account of the quality of management and risk controls. Personnel receive sufficient training, have managerial expertise, and possess an understanding and knowledge of operations to achieve success following given strategies and within acceptable risk levels.

Adequate

The financial institution has set out adequate risk management policies and acceptable risk levels which have been approved by the financial institution's board of directors. Policies and operational procedures for major new products and services have been considered and approved by the institution's board prior to their release. The policies may deviate from set strategies, but policies are adequately reviewed and evaluated by the board of directors. Communications within the organisation are good. The approval of items/transactions which are not compliant with normal policies and operational procedures is carried out by authorised personnel at senior levels.

The financial institution's board of directors have given the responsibilities of risk management to working group independent from divisions whose operations are risk-generating. Examination committees are independent. There is responsiveness to risks associated with changes in operational procedures, development of operational systems, the introduction of new technologies, and changes in the market or government regulations which may impact the financial institution's reputation.

There are amendments to deficiencies regarding policies, operational processes, personnel, and internal controls. There is sufficient evaluation of risks for all products and services, and risks of non-compliance with rules and regulations.
The management provides for tools to control and lower risks from new products and services in a satisfactory manner, and monitors operational procedures to ensure they are consistent with the strategies, policies, acceptable risk levels, and the regulations of the Bank of Thailand.

There are systems to comprehensively and independently monitor, control, and examine operational procedures. There are sufficient handbooks which are regularly reviewed. The management is able to carry out monitoring to prevent conflicts of interest, and allocates resources to enable timely operations. Support is provided for divisions carrying internal control functions.

There are examination processes to adequately test accuracy and reconciliation of data, and report transactions/items not in compliance with normal policies and operational guidelines to management at appropriate times. Internal examinations are carried out for some divisions. Database and information systems are satisfactory, though they may not be as efficient as they should. Management reports used for decision-making are provided from time to time according to management needs, but are not provided on a regular basis.

Senior management and executive management of main departments have sufficient knowledge and management skills. There are appropriate hiring or employment processes, and adequate staff training. Assessments of performance and renumeration are based on quality management and risk control abilities. Personnel possess management skills, receive sufficient training, and have an understanding and knowledge of operations to achieve success.

**Weak**

The financial institution has not set out sufficient risk management policies and acceptable risk levels, and said policies and risks have not been approved by the institution's board of directors. Policies and operational procedures for major new products and services have not been sufficiently reviewed nor approved by the board of directors prior to their release. Policies do not support the financial institution's strategies, and policies are not adequately reviewed and evaluated by the board of directors.
Communications within the organisation are not efficient enough. There is often non-compliance with policies and operational procedures.

The risk management committee's operations are not carried out efficiently nor independently of risk-generating divisions. Examination committees are not independent. The management do not forecast potential risks, and is unable to respond to risks associated with changes in operational procedures, development of operational systems, the introduction of new technologies, and changes in the market or government regulations which may impact the financial institution's reputation.

Deficiencies regarding policies, operational processes, personnel, and internal controls are not amended. There is insufficient evaluation of risks for all products and services. There are transactions risks, risks of non-compliance with rules and regulations, and reputational risks, and weaknesses in key operations.

There is insufficient planning for new products and services. There is insufficient monitoring of operational procedures to ensure achievement of strategic targets under acceptable risk limits, and with compliance with the policies and regulations of the Bank of Thailand.

Monitoring, internal control, and examination systems are inadequate, do not cover all key departments, and are not independent. Operational handbooks are not complete and lack regular reviews. There are weaknesses in management, conflicts of interest, and clear non-compliance with rules and regulations. Management is unable to appropriately allocate resources, there is a lack of support for divisions carrying internal control functions.

Examination processes to verify the accuracy of data and carry out account reconciliation are inadequate. There is insufficient reporting of transactions/ items not in compliance with policies and operational guidelines to management. Internal examinations are not carried out for all divisions with key risks. Management systems have weaknesses and management reports are inadequate for use in decision-making.

Senior management and executive management lack sufficient knowledge and management skills. Hiring or employment processes and staff training to improve personnel aptitude are inefficient. Assessment procedures for performance and
renumeration are inappropriate. Personnel lack knowledge and management skills, lack sufficient training, and lack an understanding and knowledge of operations to achieve set strategies under acceptable risk levels.
**Assessment of Capital Adequacy Fund Positions**  
and Income Generating Abilities

The capital adequacy fund and income generating abilities should be assessed simultaneously with the evaluation of the five risk types in order to determine the aggregate risk ratings. As such, ratings are not carried out for capital adequacy funds nor income generating abilities as aggregate risk ratings already take the effects of risks on capital adequacy fund and income generating abilities in account.

**Factors Used to Assess Capital Adequacy Funds**

1. The level and quality of capital adequacy funds are evaluated based on-:
   - The strength of the capital fund, based on capital fund levels after taking account of risk impacts;
   - The quality of capital funds, by evaluating the structure of Tier 1 and Tier 2 capital, and the ratio of Tier 1 and Tier 2 capital to risky assets.

2. The management's ability to anticipate capital needs and set out business plans for growth taking account of past growth, based on consideration of the following.
   - The feasibility of financial and business forecasts over a 3-5 year horizon, by evaluating the likelihood of forecasts, feasibility of assumptions, and consistency with expected or forecasted economic conditions.
   - Plans for growth have incorporated estimates of additional capital funds required as well as recapitalisation plans. For example, the amount of additional Tier 1 and Tier 2 capital that would be needed to resolve problems regarding the ratio of capital funds to risky assets over any time period in case of credit expansion.

3. Components of balance sheet items, market risks, loan concentration risks, trends in loan quality, and other risks including risks from transactions outside normal business operations and risks from off-balance sheet items.

4. The following should be taken into account when entering into the capital market or when considering capital sources, including backing from shareholders.
• The readiness of shareholders to provide backing and recapitalisation if necessary;
• The ability to find new associates for recapitalisation;
• The financial institution's reputation and market acceptance in case the institution needs to increase Tier 2 capital by issuing long term debentures.

5. Feasibility of profit levels and profit quality with respect to dividend payments, by considering if they are appropriate and consistent with levels of capital adequacy funds maintained by the institution, and reflecting the continuity and stability of future growth in profits and capital adequacy funds.

Factors Used to Assess Income Generating Abilities

1. Profit levels, trends, and stability based on the following considerations.
   • The level of profits which would be high enough to strengthen capital funds and support business operations and risks relative to asset quality and asset growth. Other factors which may impact the quality, quantity, and trends in profits.
   • The stability of profits, by assessing the volatility of profits from analysing differentials between interest rates received from performing assets and interest rate costs of capital; and interest rate differentials when non-performing assets are taken into account. Further, impacts from changes in economic condition, foreign exchange rates, interest rates, and industrial condition must also be analysed.
   • Trends regarding business expansion and contraction of debtors in the institution's loan portfolio which would affect the financial institution's profit levels and profit trends

2. The quality and source of profits, based on evaluating the proportion of profits received from normal operations of the financial institution's main businesses such as from net interest income and fees, excluding irregular or unusual income items such as profits from the sale of property.
3. The level of expenses associated with operations, by assessing the propriety of expenses, for example, staff-related expenses and management salaries, which should not be excessively high relative to net income.

4. The consistency between the budget and business plans and set targets for income and business expansion. Budget allocations should be appropriate and sufficient to enable achievement of income targets.

5. Current provisions for loan loss and impairments are able to support risks without making additional provisions.

6. Risks from changes in interest rates, foreign exchange rates, and asset prices, which may lower interest differentials between interest rates paid and interest rates received, or which may cause marked-to-market losses.

7. The adequacy of profits to absorb losses which may arise from operational risks.
Composite Ratings

Composite ratings are an overall evaluation of a financial institution, based on assessments of the institution's positions and performance after taking account of the effects of risks. The weight attributed to each type of risk is based on the impact of each risk type on income and capital funds. There are a total of five composite ratings: level 1 for good, level 2 for above average, level 3 for average, level 4 for below average, and level 5 for weak.

Level 1

After accounting for risks, the financial institution's positions, performance, and capital funds are at very stable levels and are able to absorb the institution's existing risks.

The financial institution's operations are in compliance with all measures to promote stability and safety. The institution's operations are consistent with the institution's as well as the government's policies and operating procedures. Operations are lawful and in compliance with government regulations, internal policies and processes, whereby unusual items outside of normal operating procedures are few and not significant.

The board of directors and the management have the knowledge, the understanding, and the ability to adjust to different business conditions, and are able to respond to changes in external factors. The management and directors are conscientious regarding their role and responsibilities as well as to risk management. Said management and directors have set out appropriate policies and limits, reviewed the approval of policies and rules, and accurately and efficiently monitor and control the institution's positions. The institution has appropriate monitoring and reporting processes, and database systems support for the management. Database systems are able to provide the necessary information and analyses for decision-making in response to various changes in an appropriate and timely manner.

The management is able to specify and efficiently control all major risks arising from the organisation's business activities including the launch of new products and...
changes in market conditions. Risk management procedures including risk specification, risk control, and risk monitoring, are efficient and appropriate to the size, complexity, and risks of the organisation.

Internal controls and examinations are appropriate and satisfactory given the organisation's size and transactions.

There are no important issues which require the attention of authorities.

**Level 2**

After accounting for risks, the financial institution's positions, performance, and capital funds are at stable levels and are able to absorb the institution's existing risks.

The financial institution's operations are in compliance with all measures to promote stability and safety. The institution's operations are consistent with the institution's as well as the government's policies and operating procedures. Operations are lawful and in compliance with government regulations, internal policies and processes, whereby unusual items outside of normal operating procedures are few and not significant.

The board of directors and the management have the knowledge, the understanding, and the ability to adjust to different business conditions, and are able to respond to impacts from changes in external factors. The management and directors are conscientious regarding their role and responsibilities as well as to risk management. Said management and directors have set out appropriate policies and limits, reviewed the approval of policies and rules, and accurately and efficiently monitor and control the institution's positions. The institution's database and reporting systems are satisfactory and are efficient in promoting stability and safety of the organisation. There may be a few deficiencies regarding all the above but they are not significant, and the board of directors and management are willing and able to resolve these.

The management is able to specify and efficiently control all major risks arising from the organisation's business activities including the launch of new products and changes in market conditions. Risk management procedures including risk specification, risk control, and risk monitoring, are effective though there may be some insignificant
deficiencies which are acknowledged by the management. Risk management is satisfactory considering the size, complexity, and risks of the organisation.

There may be some weaknesses and deficiencies regarding internal controls and examinations, however these are not significant and can be resolved under the process of normal business operations.

The are no important issues which require special attention from authorities.

**Level 3**

After accounting for risks, the financial institution's positions, performance, and capital funds may not be sufficient to absorb the existing risks, though the percentage of capital adequacy funds as defined by law are not below minimum regulatory limits.

The financial institution may have carried out certain operations in non-compliance with the law and with government regulations with significant effects.

The board of directors and the management may not have carried out continuous and regular monitoring and control of business operations and risks, resulting in inability to resolve deficiencies in a timely and appropriate manner. Management and directors have little ability to adjust to changes in business conditions, and are prone to impacts from changes in external factors. The institution's database and reporting systems have significant deficiencies and if these are not fixed in a timely manner, they may cause wrongful decision-making which will have impacts on the position and stability of the organisation.

The management is able to specify and control the majority of the key risks arising from the organisation's business activities including the launch of new products and changes in market conditions. Risk management procedures including risk specification, risk control, and risk monitoring, are not yet satisfactory or have some significant deficiencies which must be fixed. Given the size, complexity, and risks of the organisation, if existing deficiencies are fixed in a timely manner, risk management levels will be acceptable.
There are many deficiencies regarding internal controls; there may be non-compliance with policies, processes, or stipulations; or there are items which continually do not comply with normal operating procedures which may impact the stability and safety of the organisation if these items do not receive attention and are not resolved by management.

Authorities may need to be given continued special attention, which may include the issue of both official* and unofficial instructions**.

**Level 4**

After accounting for risks, the financial institution's positions, performance, and capital fund levels are low and are not able absorb the financial institution's existing risks. Assistance is required in terms of financial aid or other types of assistance from internal or external sources.

The financial institution has carried out operations in non-compliance with the law and with government regulations with significant repercussions.

The board of directors and the management lack the ability to set the framework and sufficiently control and monitor business operations and risks, or directors and management have not carried out continuous and regular monitoring and control of business operations and risks. The institution's database and reporting systems have significant deficiencies causing unsatisfactory or untimely recognition and resolution of problems and deficiencies, resulting in the inability to respond to business changes with severe impacts the financial institution's performance.

The management does not acknowledge or is unable to sufficiently specify and control several of the financial institution's key risks. Overall risk management systems are unsatisfactory or unacceptable for the size, complexity, and risks of the organisation, and there are deficiencies in risk management procedures which require urgent resolution.

* Official instruction which is enforceable by law, such as instructing the financial institution to carry out or refrain from carrying out certain activities as set out by law, the imposition of fines, the dismissal of management, taking control of the business, temporary suspension, and the revocation of permits.

** Unofficial instructions such as requests for cooperation, instigating agreements with the financial institution's board of directors, instigating a memorandum of understanding (MOU).
Internal controls and examinations have many deficiencies and are not consistent with the institution's policies, processes or stipulations, requiring serious amendments as they may cause financial information and reports to be unreliable, and may have severe impacts on the organisation's stability and security if not appropriately resolved.

Authorities must pay close attention and monitor the institution, where authorities may issue official instructions* to help resolve the problems, or authorities may need to provide financial aid. The institution may be able to continue business operations of various problems and weaknesses are not satisfactorily resolved.

**Level 5**

After accounting for risks, the financial institution's positions, performance, and capital fund levels are low and are not able absorb the financial institution's existing risks. There is a high likelihood the institution must close business operations. Urgent externa; assistance is required in terms of financial aid or other types of assistance for the organisation's survival as the size and severity of problems are beyond the capabilities of the management to control or resolve.

The financial institution has carried out operations in non-compliance with the law and with government regulations with significant repercussions.

The board of directors and the management lack the ability to set the framework and sufficiently control and monitor business operations and risks, or directors and management have not carried out continuous and regular monitoring and control of business operations and risks. The institution's database and reporting systems have severe deficiencies causing unsatisfactory or untimely recognition and resolution of problems and deficiencies, resulting in the inability to respond to business changes with severe impacts the financial institution's performance.

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* Official instruction which is enforceable by law, such as instructing the financial institution to carry out or refrain from carrying out certain activities as set out by law, the imposition of fines, the dismissal of management, taking control of the business, temporary suspension, and the revocation of permits.
The management does not acknowledge or is unable to sufficiently specify and control many of the financial institution's key risks. Risk management procedures are inefficient and inappropriate for the size, complexity, and risks of the organisation. Risks management systems are hopelessly flawed.

Internal controls and examinations have severe deficiencies with impacts on the survival of the organisation. Accounting records and reports are unreliable, and severe losses are likely if problems are not immediately fixed.

Authorities must give close, immediate and continual attention and monitoring over the institution. There is a high likelihood the institution will be unable to continue business operations.