MAS' FRAMEWORK FOR IMPACT AND RISK ASSESSMENT OF FINANCIAL INSTITUTIONS

Impact Assessment

CRAFT Risk Assessment

Monetary Authority of Singapore

April 2007

(revised in September 2015)

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Contents ***Page***

MONETARY AUTHORITY OF SINGAPORE

APRIL 2007 (revised in September 2015)

1 Introduction

1.1 The Monetary Authority of Singapore (MAS) is the integrated supervisor of the financial services sector. The objectives of MAS' supervision, the functions we perform, and the principles that guide our approach are spelled out in "Objectives and Principles of Financial Supervision in Singapore", issued in April 2004.

1.2 This document gives more detailed information on one of MAS' key functions – the risk-based supervision of financial institutions. It covers how MAS' supervisory objectives and principles shape our supervisory framework, and the supervisory processes that underpin the framework including how MAS assesses the impact of financial institutions and the use of the **C**omprehensive **R**isk **A**ssessment **F**ramework and **T**echniques (CRAFT) to assess their risks. MAS' supervisory work to address themes that affect the industry as a whole and issues that cut across different financial service sectors is not, however, covered in this document.

1.3 The risk-based supervision of financial institutions is inter-related with the other oversight functions that MAS performs to achieve its supervisory objectives. These include authorising financial institutions to offer financial services, setting regulatory rules and standards, taking actions against institutions and individuals for regulatory breaches, and resolving non-viable institutions. MAS also undertakes surveillance of the financial system to identify emerging trends and potential vulnerabilities and risks in order to guide and support its supervisory activities. All these activities are integral to the achievement of MAS' supervisory objectives.

1.4 We seek through this document to provide greater clarity on the desired outcomes of MAS' supervision of financial institutions and to promote the industry's understanding of how MAS' supervisory activities help achieve these outcomes. The supervisory framework and the processes described herein apply to licensed banks and merchant banks, finance companies, insurance companies and brokers, capital market intermediaries, and financial advisers.

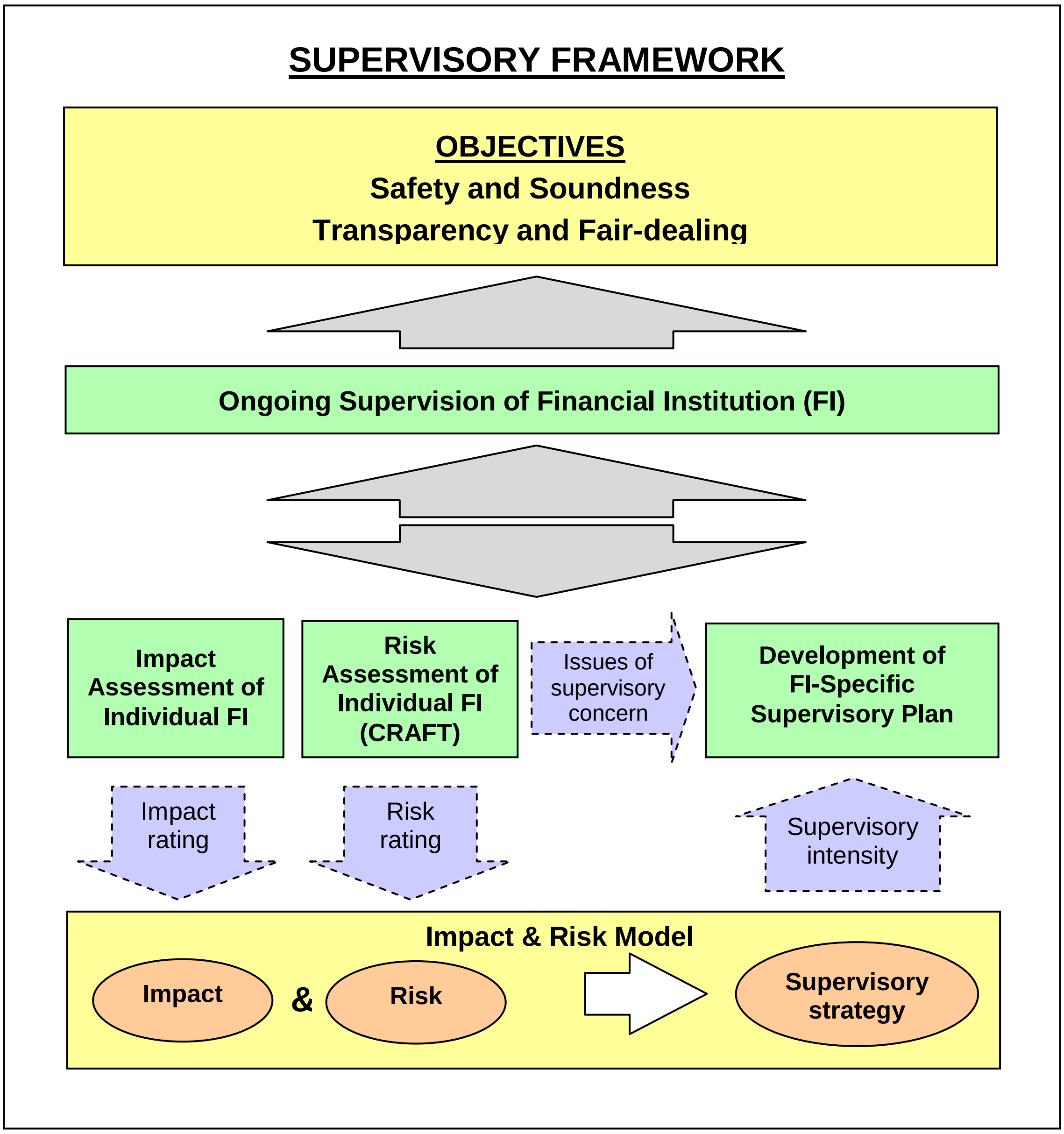
1.5 The document should be of particular interest to the key stakeholders that MAS works with, principally the boards and senior management of financial institutions. This is because:

- the supervisory assessment of an institution's impact and risk will determine MAS' supervisory strategy towards that institution and the supervisory activities in which MAS engages;
- MAS expects an institution's board and senior management, with whom the primary responsibility for risk oversight lies, to address any issues of supervisory concern that are identified in the course of our supervision; and
- how well institutions manage their risks will determine the intensity of MAS' supervisory attention and whether supervisory requirements need to be imposed.

1.6 This document goes on to describe the structure of the Supervisory Framework (paragraphs 2.1 to 2.13), the features of the Impact and Risk Model (paragraphs 3.1 to 3.12), the key components of the processes used in the Supervisory Framework (paragraphs 4.1 to 4.35), and how supervision is conducted in practice (paragraphs 4.36 to 4.45).

2 Overview of the Supervisory Framework

2.1 The aim of MAS' risk-based supervision is to foster the safety and soundness of financial institutions and to promote transparency and fair-dealing by financial institutions in relation to their customers and counterparties. These two supervisory objectives contribute towards MAS' overarching objective of a stable financial system. We are concerned about any risks that prejudice the achievement of these objectives.



2.2 The ongoing supervision of a financial institution seeks, therefore, to identify and address potential risks that may affect the safety and soundness of the institution, or the transparency and fair-dealing of its market conduct practices. This means that MAS is concerned with institution behaviour that affects both its overall financial condition and its interaction with individual customers and counterparties.

2.3 In seeking to meet the two broad supervisory objectives mentioned in paragraph 2.1 above, MAS does not aim to prevent all failures. A 'zero failure' regime would place an excessive regulatory burden on financial institutions and could impair the efficiency of the financial system. Instead, we aim to reduce the risk and impact of failure of institutions or of inappropriate behaviour through increased supervision where it is both appropriate and likely to be effective.

2.4 This approach is articulated through the impact and risk model, which is at the heart of the framework. Within each financial services sector, we first evaluate and rate the impact and risk of an institution relative to other institutions. We use a risk assessment system, CRAFT, to evaluate the risk of an institution. We then combine the assessments of both impact and risk ratings and distinguish those institutions that may pose a higher threat to the achievement of our supervisory objectives. Finally, we determine the appropriate supervisory strategies and, in turn, the level of supervisory intensity required.

2.5 A supervisory plan designed to address issues of supervisory concern identified through the risk assessment of the institution is then prepared. The plan guides the supervisory activities undertaken during the ongoing supervision of the institution and takes into account the given level of supervisory intensity. It is updated at regular intervals with new information obtained from on-going supervisory activities.

2.6 The different components of the risk-based supervisory framework are not in practice discrete or rigid sequential steps, but operate in a dynamic and interrelated manner.

2.7 As well as being risk-focused, MAS' approach to supervision also relies on the board and senior management of each institution. The board and senior management play the central role in maintaining adequate risk oversight of the institution's business activities. They are responsible for implementing processes and controls to measure and manage the institution's risks, for ensuring its compliance with regulatory requirements, and for its dealing with customers and counterparties in a transparent and fair manner.

2.8 Within each financial institution, risk decisions need to be taken and overseen at appropriate levels by people with adequate and relevant expertise and incentives. An environment of sensitivity to risk and sound risk management is to be cultivated through the value system of the institution and in the way that people are recognised and remunerated. Of equal importance, an institution needs to embrace a culture of dealing fairly with customers and counterparties in the conduct of its business.

2.9 MAS seeks to reinforce the responsibilities of the board and senior management for the oversight and governance of the institution's activities and to support the efforts of the institution to improve its risk management and internal processes in order to protect the interests of its customers and counterparties, as well as its shareholders. As long as risks are adequately managed, we seek to minimise the need to interfere with institutions' business operations.

2.10 MAS performs its supervisory responsibilities by checking on the quality of corporate governance, internal controls and risk management of the institution and the institution's dealings with its customers and counterparties, with the aim of instilling a system of sound management practices commensurate with the institution's type, scale and complexity of business activities, and their related risks.

2.11 A risk-based framework entails MAS making informed choices about supervisory priorities, using the best and most pertinent information available. The framework must be continually refined to stay relevant and robust. It must be implemented well and in a consistent manner, and supported by supervisory staff with the requisite knowledge, experience and skills.

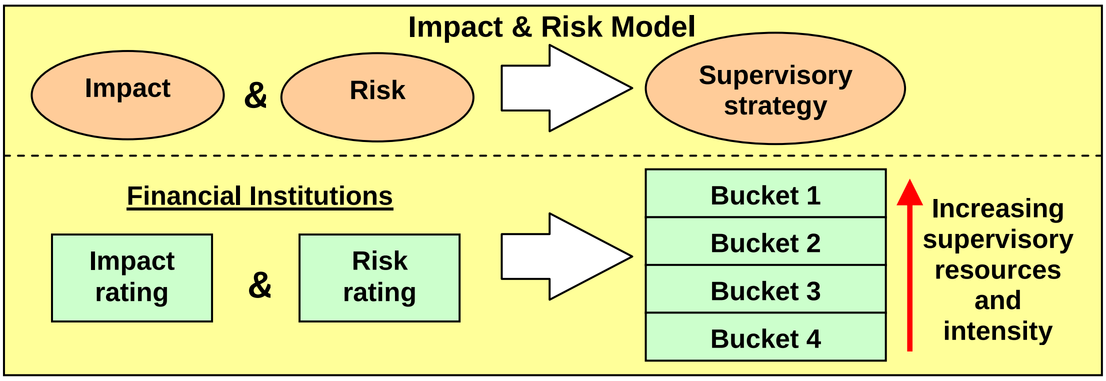
2.12 To maintain a high degree of confidence in the quality of its supervision, MAS puts considerable resources into training its supervisory and surveillance staff and in developing the breadth and depth of the expertise and experience of its risk and product specialists.

2.13 MAS has in place measures to assure that our supervisory activities are proportionate to the respective financial services sector's and institution's potential to affect the achievement of MAS' supervisory objectives and carried out in a consistent manner. They include:

- comprehensive operating procedures to guide supervisory staff in key supervisory processes;
- a system of challenge and review by experienced supervisors or panels of senior and specialist staff for key supervisory assessments of individual financial institutions;
- decision making on major regulatory or supervisory issues at senior management forums; and
- regular checks on the supervisory processes by MAS' internal audit function.

3 Impact & Risk Model

3.1 The financial institutions operating in Singapore form a large and diverse group. The supervisory framework uses a model to provide a systematic and consistent approach to help determine MAS' supervisory priorities, and to distinguish between individual institutions within each financial services sector - banking, insurance, and capital markets - so that the degree and nature of supervisory attention is varied and calibrated appropriately.



3.2 The model considers the impact of a financial institution within each financial services sector (i.e. relative systemic importance) and its risk (i.e. relative risk profile). These two critical inputs ensure that the intensity of MAS' supervision is proportionate to the institution's bearing on the achievement of MAS' supervisory objectives.

3.3 Using the model, the impact rating within the relevant financial services sector and the risk rating of each institution are combined to assign the institution to one of four categories of supervisory significance. For institutions of the same risk, those having higher impact would generally be in a higher bucket. Similarly, where institutions have the same impact, those of a higher risk would generally be in a higher bucket. We call these separate categories "supervisory buckets" numbered 1 to 4, where bucket 1 contains institutions that have the greatest potential to affect the achievement of MAS' supervisory objectives.

3.4 In assigning the supervisory buckets, the impact rating is accorded more importance relative to the risk rating. So between a high-impact, low-risk institution and low-impact, high-risk institution, the model generally assigns the former to a higher supervisory bucket, given the likely greater overall consequences should things go wrong at the high-impact institution.

3.5 High-level supervisory strategies that influence the ongoing supervision of institutions have been developed for each supervisory bucket. These strategies consider the intensity of supervision and the share of MAS' supervisory resources that are to be allocated to each bucket, given the impact and risk of the institutions therein, and provide guidance on how these limited resources could be used most effectively.

Intensity of supervision

3.6 The intensity of supervision varies for different buckets of institutions. The variation is mainly in terms of the frequency of on-site inspections and the nature of the supervisory oversight of each financial institution.

3.7 All financial institutions are subject to standard, base-level monitoring. In addition to routine supervisory activities, such as the processing of regulatory applications, this includes monitoring key indicators and the development of the institution's business, reviewing regulatory returns, questionnaires and audit reports, as well as taking any necessary follow-up actions.

3.8 In general, the supervisory oversight of lower bucket institutions places greater reliance on off-site supervision and there will only be periodic visits and/or on-site inspections of the institution. We also leverage more on the work of the external auditors to complement our supervision of these institutions. As the buckets rise from 4 to 1, supervisory intensity increases with a corresponding increase in the resources allocated to supervise the institutions in the higher bucket.

3.9 The bucket 1 institutions are often complex and have business profiles that can change rapidly, particularly when their activities span a number of financial markets. In the event of distress, they pose potentially damaging consequences for systemic stability, market confidence and trust in the integrity of the financial system.

3.10 Reflecting the need to anticipate promptly as well as respond effectively to risks, our supervisory oversight of these institutions will entail frequent dialogue and interaction with the institutions in order to obtain a detailed understanding of their current and potential areas of risk. This will involve maintaining regular contact and the carrying out of on-site work to keep abreast of developments in an institution, including new business plans and strategy, and changes in operations, risk management systems and controls. These discussions could typically include members of the board of directors, senior management, business heads, compliance, internal auditors and risk managers of the institution as well as, in the case of overseas firms, its head office staff and home country regulators.

3.11 MAS may temporarily adjust the supervisory intensity of an institution in a particular bucket on a case-by-case basis, for example, when the institution experiences particularly heightened risk in its operation, until the circumstances prompting the heightened risk have improved or the resultant risks have been addressed.

3.12 For smaller financial institutions such as financial advisers, insurance brokers and captives that are deemed to be of lower impact and risk, MAS will adopt a less intensive approach. These institutions may not be risk-assessed individually or have an institution-specific supervisory plan. Instead, they are more likely to be subject to standard, base-level monitoring, where greater reliance is placed on off-site supervision, surveys and thematic reviews.

4 Key Processes in the Supervisory Framework

Impact assessment

4.1 The assessment of impact captures the relative importance of an institution within its own sector of the financial services industry. It involves evaluating the potential impact of the institution in the event of distress, such as doubts about solvency, prolonged business disruption, or major conduct of business problems.

4.2 MAS has developed criteria for assessing the potential impact of each financial institution on Singapore's overall financial system and the broader economy, as well as on Singapore's reputation. Each institution is assigned an impact rating on the basis of these criteria and the rating is reassessed periodically.

4.3 In rating the impact of an institution, MAS considers the financial services sector that the institution operates in as well as the nature and scale of the activities that are carried out. For example, the market share of retail deposits will be an important factor for assessing the impact of banks because a financially-distressed bank with a large retail depositor base could have grave direct consequences on confidence in the banking system and on the wider economy. Another example would be the role played by a bank in the payment system, given the potential impact for such bank to trigger payment system problems and gridlock if it fails to settle its payments.

4.4 The criteria we assess comprise a combination of qualitative factors and numerical measures that draw upon the data from regulatory reports filed by financial institutions. They cover aspects of the financial institution such as:

- relative size and importance in terms of share of activity in different markets;
- relative scale of retail reach in terms of number of customers and representatives, and of type of business; and
- criticality to the stable functioning of and confidence in the financial system.

Generally, the larger the institution's intermediary role in critical financial markets or in the economy or the greater its reach to retail customers, the higher would be its impact rating.

4.5 Specific to the banking sector, MAS has developed a framework for identifying and supervising domestic systemically important banks (D-SIBs) in Singapore. Please see Appendix 1 for more details on the impact assessment framework for banks.

Risk assessment – CRAFT

4.6 Risk assessment serves to identify and assess the risks that financial institutions pose to our supervisory objectives. The resultant risk rating serves, as described in paragraph 3.2, as an input to the impact and risk model used to assign institutions to one of four supervisory buckets. The risk assessment is also used as a basis for developing a supervisory plan to address the risks identified.

4.7 MAS uses a single risk assessment system - Comprehensive Risk Assessment Framework and Techniques (CRAFT) – to assess the risks of a financial institution irrespective of the financial services sector it is operating in. CRAFT uses the main business activities of the financial institution as basic units of risk assessment. Through this activity-based approach, CRAFT is sufficiently flexible to be applied in a consistent manner to all classes of financial institution supervised by MAS.

4.8 The activity-based approach further enables MAS to have a deeper understanding of the external and internal factors that may adversely affect the financial institution or its customers through the activities it conducts, and to better align our risk assessment process with how institutions organise and manage the risks of their activities. Such an approach is also in response, firstly, to the need for sharper focus in the risk and threat analysis associated with increasingly complex activities, products and delivery mechanisms where multiple risks are taken and/or bundled together and, secondly, to the advancement in activity-specific risk management and control practices.

COMPREHENSIVE RISK ASSESSMENT FRAMEWORK AND TECHNIQUES (CRAFT)

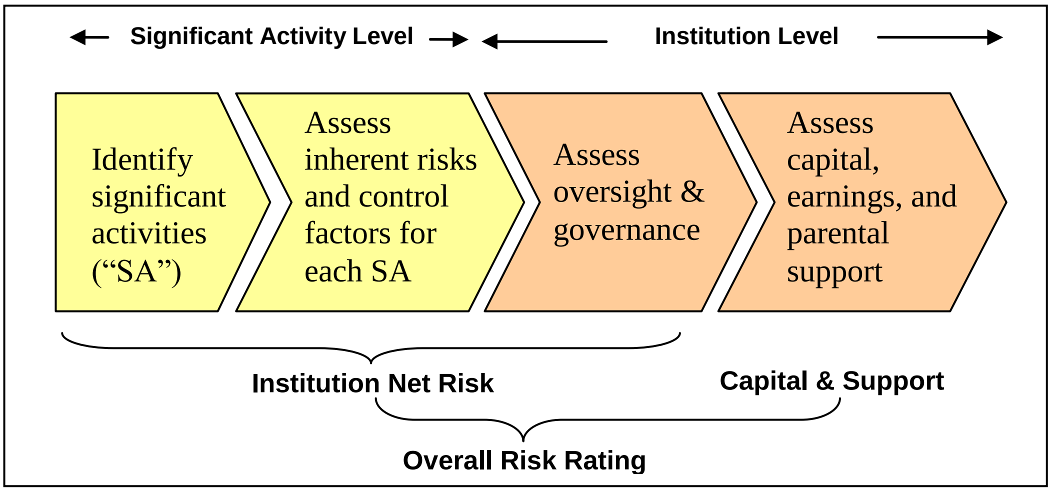
<table>
<tr><th colspan="4">Overall Risk Rating</th></tr>
<tr><th colspan="3">Institution Net Risk</th><th>Capital & Support</th></tr>
<tr><th>Inherent Risks</th><th>Control Factors</th><th>Oversight & Governance</th><td rowspan="2">• Capital
• Earnings
• Parental support</td></tr>
<tr><td>• Credit / asset
• Liquidity
• Market
• Operational
• Technology
• Insurance
• Market conduct
• Money laundering / Terrorism financing
• Legal, reputational and regulatory</td><td>• Risk management systems and control
• Operational management
• Internal audit
• Compliance</td><td>• Board of directors
• Senior management
• Head office / parent company</td></tr>
<tr><td colspan="2"><< Assessed at Significant Activity Level >></td><td colspan="2"><< Assessed at Institution Level >></td></tr>
</table>

4.9 The Overall Risk Rating of an institution is based on an assessment of inherent risks and control factors, of oversight and governance arrangements, and of financial strength factors, as described in greater detail below. This assessment also takes into account the policies, procedures and controls that institutions have in place to manage and mitigate money laundering and terrorism financing risks. A four-point rating scale is used to rate all components.

4.10 The Overall Risk Rating reflects MAS' assessment of the level of risks that may affect the safety and soundness of the institution, or the transparency and fair-dealing of its market conduct practices. Rated as High, Medium High, Medium Low, or Low, the rating is reassessed periodically.

4.11 MAS requires institutions to develop risk management practices that are commensurate with their business and risk profiles. Financial institutions engaging in more complex or riskier business activities must be able to demonstrate that their risk management capabilities match their risk appetite as well as the scale and complexity of their operations. Institutions are also expected to adopt business practices that deal fairly with their customers and counterparties and to put in place anti-money laundering and countering the financing of terrorism (AML/CFT) controls that are commensurate with their business activities and risk profile. MAS will take appropriate action against institutions that do not manage their risks to a commensurate standard or fail to comply with regulations. Such actions include, but are not limited to, issuance of warning and reprimand letters, restrictions on operations and business activities, imposition of financial penalties and revocation of licences.

4.12 The main elements of the CRAFT risk assessment process are illustrated in the chart below.



4.13 Explanations of the components of inherent risks and control factors, oversight and governance, and capital and support are shown in Appendix 2.

Identify significant activities

4.14 The risk assessment process starts by identifying the individual activities that are material to the institution, known as "significant activities". For example, an insurance company's significant activities may include motor insurance or the investment of insurance funds. They could include corporate lending or retail banking for a bank. For a securities broker, its significant activities are likely to be those of dealing in securities and the provision of custodial services. For locally incorporated financial groups, the identification of significant activities is done on a group basis, taking into account both their Singapore and overseas operations.

4.15 The significance of an activity is determined relative both to its importance in achieving the institution's business objectives or strategies, and to its influence on the operating and financial condition of the institution. Both qualitative and quantitative criteria are used.

4.16 Some examples of the criteria that may be considered include:

- Quantitative: financial measures (assets, revenue, premiums, capital, etc), risk measures such as risk or economic capital or risk-weighted assets or staff headcount (number of representatives, salespersons, etc).

- Qualitative: brand value, strategic importance, or criticality to ongoing operations.

Assess inherent risk and control factors

4.17 Within each significant activity, MAS assesses the key inherent risks before assessing the control factors that are put in place to manage and control these inherent risks.

4.18 We have identified nine categories of inherent risk that are generally applicable to financial institutions. They are:

- credit or asset risk;
- liquidity risk;
- market risk;
- operational risk;
- technology risk;
- insurance risk
- market conduct risk;
- money laundering/terrorism financing risk; and
- legal, reputational and regulatory risk

4.19 We first determine which of the above risk categories are applicable. The level of each applicable inherent risk is then assessed, based on the nature and characteristics of the activity.

4.20 The next step is to examine the ability of the institution to manage and control the inherent risks appropriately. Such capacity will include effective risk measurement, management and control processes, effective day-to-day management, and independent oversight of those processes. MAS assesses four control factors:

- risk management systems and controls;
- operational management;
- internal audit; and
- compliance

Assess oversight & governance

4.21 The role of oversight and governance rests with the board of directors and senior management of an institution. They are the custodians of good corporate governance and are responsible for ensuring that the institution's activities are conducted in a safe and sound manner, and in line with high standards of professionalism and sound business practice.

4.22 In the case of foreign institutions operating in Singapore, MAS assesses the effectiveness of the institution's board, senior management, head office, or parent company in providing stewardship, oversight and governance of the institution's operations in Singapore. The role of the head office or parent company in oversight and governance is assessed as it often has considerable influence over the business strategies as well as the conduct and risk management of activities in Singapore.

4.23 For locally-incorporated financial groups, MAS assesses the effectiveness of the institution's board and senior management in providing stewardship, oversight and governance of both their Singapore and overseas operations.

4.24 The assessments of oversight and governance, and of the risk profiles of significant activities will generate the institution's risk profile, or Institution Net Risk. The Institution Net Risk reflects the effectiveness of risk control factors and of oversight and governance in mitigating the inherent risks of the institution's activities.

Assess capital & support

4.25 Lastly, the institution's current capital and potential support are assessed. Capital and support constitute the financial resources available to the institution to absorb losses so as to ensure it remains solvent and able to meet its obligations to customers.

4.26 Capital and earnings are both sources of financial strength for an institution's safety and soundness. MAS assesses the adequacy and quality of the institution's capital and earnings in the context of its current risk profile and its planned business activities. The viability of foreign institutions operating in Singapore is also influenced by the ability (i.e. financial health) and willingness of their head office and parent company to support the Singapore operation. We reflect this element of dependence in the assessment of parental support, which also takes into account the effectiveness of supervision by the home country regulator.

4.27 We derive the Overall Risk Rating of the institution from the assessments of the institution's risk profile and of capital and support. This overall assessment is essentially based on judgment. A positive assessment of capital and potential support, when viewed in relation to the unique circumstances of each institution, may mitigate Institution Net Risk. However, capital and support, no matter how substantial, can never be considered substitutes for appropriate risk oversight of the institutions' activities.

Development of a supervisory plan

4.28 The supervisory plan sets out systematically the particular areas of supervisory coverage, selects the range of supervisory tools, establishes any remedial action required and determines the desired timeframe for taking corrective actions to address any issue of supervisory concern.

Areas of coverage

4.29 The plan is closely related to the impact and risk assessment of the institution. It identifies and scopes the areas for supervisory attention and details the work planned on the significant activities, risk management processes and governance issues that have been identified as areas of supervisory concern in the risk assessment. Areas assessed to be higher-risk will receive more frequent and closer attention than lower-risk ones.

Supervisory tools

4.30 MAS has available a broad range of supervisory tools. These tools can be broadly categorised into diagnostic (used to identify and monitor risks) and remedial (used to mitigate risks and remedy shortcomings). We judge which tools are most appropriate to achieve desired supervisory outcomes effectively and efficiently. We will leverage, to the extent feasible, on the work of the institution's own functions such as internal audit, compliance or risk management, as well as of other stakeholders such as industry associations, the external auditors, the head office or parent company, and home country or other overseas regulators. MAS also works closely with other Government agencies such as the Commercial Affairs Department.

4.31 Diagnostic tools seek to identify problems at institutions at an early stage. This allows MAS to engage the institution before these problems become a serious threat to our supervisory objectives. To learn more about the institution's businesses and risk management practices, MAS may need to ask institutions for more information if there are information gaps or where there has been substantial change in the activities of the institution or its customer profile.

4.32 Remedial tools will in many cases require the institution to take action and work with MAS to achieve a specific outcome. For instance, in our inspection MAS may come across certain weak controls and governance practices. We will then require the institution to remedy the shortcomings and subsequently to provide us with progress reports on the remedial actions taken.

4.33 MAS also organises and participates in supervisory colleges to have a better understanding of risk management and controls of the group to which the institution belongs. Through such supervisory forums, MAS exchanges views with other financial supervisors involved in supervising entities within the group which the institution belongs to.

Timely corrective actions

4.34 The supervisory plan is outcome-oriented. For instance, diagnostic work will seek to confirm whether or not a particular risk or concern has substance and is material. Remedial work will set clear plans to mitigate risks or remedy shortcomings and enhance the risk and compliance culture. The plan to address an issue or supervisory concern will include the timeline for achieving the desired outcome. In the example mentioned in paragraph 4.32 above, the intended outcome is that the institution assures itself that its internal control and governance processes are rendered effective within the timescale agreed.

4.35 MAS monitors the progress of planned supervisory activities and corrective actions to address supervisory issues, and reviews the effectiveness of supervisory tools used against the expected outcomes.

Supervision in practice

4.36 The risk-based supervisory framework and each of the interrelated supervisory processes described earlier respond in a dynamic manner to keep pace with the changes taking place within institutions and the environment in which they operate.

4.37 For example, an institution may make an acquisition, embark on a new line of business, enter new markets or target new groups of clients, or introduce new technologies and delivery channels that may change its risk profile, including its money laundering and terrorism financing risks. To determine how this affects MAS' supervision, we may gather more information and meet with the institution to further understand the changes and their potential effect on its operations and risk profile. These are then factored into MAS' assessments of the institution's impact and risk and may result in an overall change in the intensity of supervisory activities.

4.38 The supervisory plan may then identify new areas for closer supervisory attention, whether through off-site or on-site work. As the work is undertaken, initial concerns in relation to the acquisition or new business will be clarified. New weaknesses may be identified, some of which may lead to further supervisory activity and revision of the supervisory plan. At the same time, the institution may need to take action to address issues of supervisory concern that have been confirmed.

4.39 Thus, the supervisory plan is revised as needed to reflect feedback from the diagnostic and remedial tools or to react to market developments or to other specific events that may alter the risk profile of the institution. Financial institutions should facilitate this process by keeping MAS informed of any significant developments affecting the institution. At a minimum, MAS will update the supervisory plan in connection with each periodic review of the risk assessment of the institution.

4.40 There may, however, be instances where identified risks escalate. Where the institution's problems are less serious, and if the institution's management is assessed to be willing and able to take prompt and effective action to deal with the problems, remedial tools may include moral suasion through oral advice, written recommendations, or supervisory warnings.

4.41 However, where the risks of the institution escalate into serious problems, for instance, when there is a serious breach of rules and regulations, or where MAS believes the institution will not take appropriate remedial action on its own, MAS will not hesitate to take stronger action. This can include formally requiring institutions to appoint independent professional parties to conduct reviews of the institution's internal controls or valuation of assets and liabilities, issuing directives with the force of law which require the institution to scale back activities that give rise to excessive risk or to increase financial resources in order to support its operations, or taking enforcement action for regulatory breaches and publishing regulatory actions taken in relation to market conduct issues.

4.42 In resolving the problems faced by the institution, there may be circumstances where the head office or parent company needs to be engaged or where the remedial action needs to be taken in cooperation with home country or other overseas regulators.

4.43 In this ongoing process of supervision, MAS seeks to allocate its limited supervisory resources to best achieve our supervisory objectives. It is in the interest of all parties for MAS, financial institutions and stakeholders to work closely together.

4.44 MAS will co-ordinate with the institution if onsite work is to be carried out to gather information about the institution's operations, to follow up on issues identified from previous work, or to undertake qualitative assessment of internal controls and/or risk management processes. Under ordinary circumstances MAS will notify institutions of planned visits or inspections so as to minimise disruption to the institution arising from our onsite work, although unannounced visits or inspections will sometimes be necessary. At the same time, institutions are expected to extend their full co-operation to our supervisory activities.

4.45 We encourage financial institutions to seek clarification when they are unclear about the supervisory activities that MAS is undertaking with respect to their institution or about the actions expected of them.

Appendix 1

Framework for Identifying and Supervising Domestic Systemically Important Banks

1 Overview

1.1 MAS' framework to identify and supervise D-SIBs assesses a bank's systemic importance to Singapore's financial system and broader domestic economy (the D-SIB framework). To address the negative externalities posed by such banks, appropriate policy and supervisory measures will be applied on them. The D-SIB framework is aligned with the principles set out by the Basel Committee on Banking Supervision (BCBS) for determining banks that are of domestic systemic importance.

1.2 This appendix sets out the scope of D-SIB assessment (section 2), the assessment methodology (section 3), and policy measures that would apply to D-SIBs (section 4).

2 Scope of assessment

2.1 MAS will assess all banks licensed in Singapore for their systemic importance. This includes all locally-incorporated banks (including subsidiaries of foreign banks) and foreign bank branches in Singapore.

2.2 We will assess locally-incorporated banks inclusive of their operations outside of Singapore. For foreign banking groups we will take into account the activities of related banking entities in Singapore. This is in view of the contagion risk within the banking group. The designation of a D-SIB will hence be on a country-level basis, such that in the case of foreign banks, it includes all related banking entities in Singapore that are within the scope of assessment.

2.3 Banks designated as D-SIBs in Singapore can be broadly classified, according to their operating model and structure, into the following three types[1]:

(a) **locally-incorporated bank groups:** Banks headquartered in Singapore;

(b) **foreign bank groups:** Locally-incorporated foreign bank subsidiaries and sister branches, if any. This would also include foreign bank branches with significant retail presence pending local incorporation of their retail operations; and

(c) **foreign bank branches:** Foreign banks that operate only as branches in Singapore.

MAS will apply appropriate policy measures to the relevant entities on a targeted basis.

3 Assessment methodology

<u>Indicator-based approach</u>

3.1 MAS' D-SIB framework adopts an indicator-based approach based on four factors (size, interconnectedness, substitutability and complexity) to assess banks' systemic importance.

Size

3.2 Size is a key measure of systemic importance. The larger a bank and its share of domestic activity, the higher the likelihood that its failure or distress will negatively affect the domestic economy and financial markets. MAS will assess *Size* based on the following indicators:

- Share of total assets;
- Share of total non-bank deposits;
- Share of resident non-bank deposits; and
- Number of depositors with accounts less than or equal to S$250,000.

The latter two indicators allow MAS to identify banks with a significant retail presence which would be required to locally incorporate its retail operations.

[1] In this appendix, "banks" would refer to banks or their banking groups in Singapore.

Interconnectedness

3.3 FIs operate in a network of contractual obligations wherein financial distress at one institution can generate spillover effects and raise the likelihood of distress at other institutions. The systemic impact of a bank's failure is therefore likely to be positively correlated to its interconnectedness to other financial institutions. Unlike the other factors of systemic importance, the measurement of interconnectedness should not be confined to a single jurisdiction's financial system. For example, a parent bank headquartered overseas could have spillover effects on its branch in Singapore, which could lead to distress on other banks in Singapore to which the branch has linkages with. MAS will assess *Interconnectedness* based on the following indicators:

- Network analysis of the interbank system – assesses domestic interbank linkages based on amounts due to and amounts due from banks in Singapore, using the following centrality measures;
    - Closeness Centrality – identifies banks that have short contagion distances with other banks in the interbank system, measured by the number of direct and indirect linkages, with other banks. Banks that have shorter contagion distance will have a higher closeness;
    - Between-ness Centrality – identifies banks that have high probabilities of lying on contagion paths, or possible routes that could carry the shock of a bank failure to the rest of the system. Banks that are intermediaries for many other banks will have a higher between-ness;
    - Rank Centrality – identifies banks that are well-connected to other highly connected banks, taking into account the bank's size of borrowing or lending. Banks that are either a counterparty of a few banks that are highly connected, or a counterparty to many banks that are less connected will have a higher rank;
- Share of amounts due to and amounts due from banks in and outside of Singapore – assesses and identifies large interbank players; and
- Share of total derivatives receivables and payables – assesses and identifies large players in the derivatives market.

Substitutability

3.4 The larger the role a bank plays as a market participant and/ or service provider, the greater the potential for widespread disruption if the bank were unable to carry out its services. Finding a substitute bank that can provide the same service in a timely manner will also be more difficult and potentially more costly. MAS will assess *Substitutability* based on the following indicators, as they reflect functions and activities that are essential to the effective functioning of Singapore's financial system and broader domestic economy:

- Share of MEPS+ payments; and
- Share of assets under custody.

Complexity

3.5 A bank's business, structural and operational complexity could amplify its systemic importance. More time and resources would be required to resolve a more complex bank under distress, potentially causing larger spillover effects. MAS will hence assess *Complexity* based on factors which affect a bank's resolvability. MAS will also assess a bank's share of gross bilaterally-cleared over-the-counter ("OTC") derivatives outstanding, as a bank's ease of resolvability decreases the larger its derivatives outstanding which is not cleared through a central counterparty.

Factors	Indicators
Size	• Share of total assets • Share of total non-bank deposits • Share of resident non-bank deposits • Number of depositors with accounts less than or equal to S$250,000
Interconnectedness	• Network analysis of the interbank system (study of domestic interbank linkages based on amounts due to/from banks in Singapore) • Share of amounts due to/ from banks in and outside of Singapore • Share of total derivatives receivables/ payables
Substitutability	• Share of MEPS+ payments • Share of assets under custody
Complexity	• Share of gross bilaterally-cleared OTC derivatives outstanding • Qualitative assessment of factors affecting resolvability

Two-stage assessment process

3.6 MAS adopts a two-stage assessment process for the assessment of banks' systemic importance:

(a) **Stage One: Preliminary Selection –** MAS will select banks that cross the threshold of any impact indicator in the *Size, Interconnectedness and Substitutability* categories. This approach recognises that the failure of a bank which ranks highly in any of these categories could have a significant impact on the domestic financial system and economy. MAS will rank the banks using each of the indicators, with a view to enabling MAS to identify clusters of banks with similar relative systemic importance, and apply a calibrated cut-off threshold. MAS will select banks that cross the cut-off for further deliberation in the second stage. As complexity itself is not a sufficient guarantee of systemic importance (i.e. a complex bank is unlikely to be systemically important unless it is also large, highly connected or a provider of services that are hard to substitute), MAS will only select a bank which is high in *Complexity* if it is near the threshold of an indicator in any of the other three categories.

(b) **Stage Two: Detailed Consideration –** MAS will subject banks selected in the first stage to a second stage review. Detailed consideration under the second stage is necessary to mitigate the limitations associated with an otherwise mechanistic indicator-based approach. MAS will also exercise supervisory judgment along with the consideration of other supplementary indicators such as size of overseas operations (in the case of locally-incorporated banks), share of credit facilities granted to non-bank financial institutions or a particular non-financial institution sector, share of interbank GIRO, and the provision of time-critical services. MAS will make an overall assessment, taking into account all four factors of systemic importance. The results of the overall assessment will be approved by senior management of MAS.

3.7 In the case where a bank is assessed to have a significant retail presence, such a bank will be designated as a D-SIB, and will be required to locally incorporate its retail operations. MAS regards a bank as having a significant retail presence if it satisfies the following two criteria:

(a) share of resident non-bank deposits of $\geq 3\%$; **and**

(b) number of depositors with accounts less than or equal to S$250,000 $\geq$ 150,000.

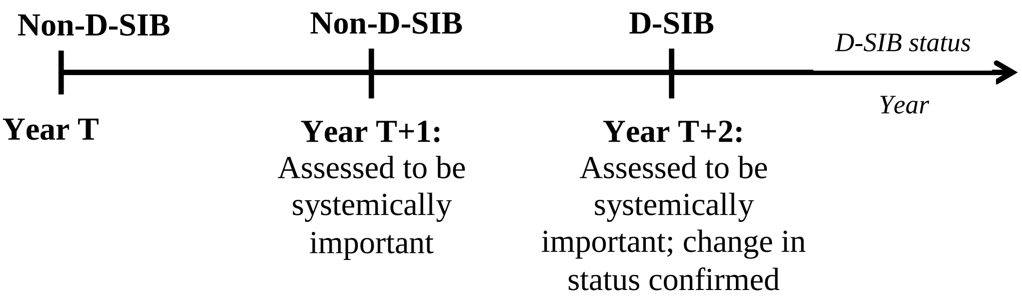
Review of the D-SIB framework

3.8 MAS will review the D-SIB framework, including the methodology and indicators, every three years to ensure that the framework remains relevant by taking into account developments in the banking sector and assessment methodologies. MAS will announce the outcome of the review upon its completion where there are changes to the framework. A fixed review period will provide clarity and certainty on the frequency of reviews and provide assurance that the framework is kept up-to-date. A three-year period will ensure ongoing suitability and effectiveness of the framework, and yet provide MAS with sufficient time to monitor that any changes are relevant.

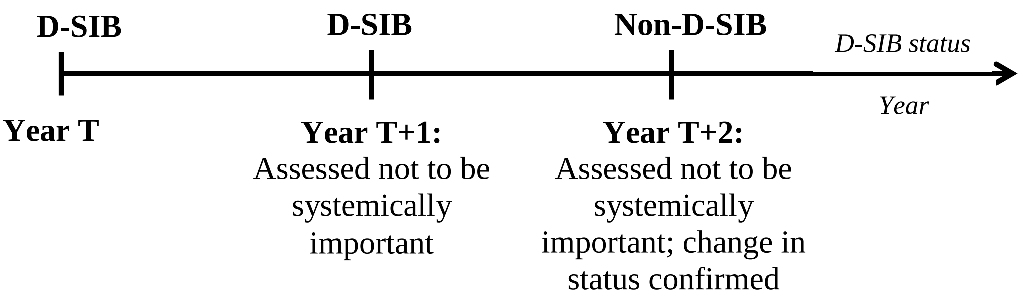
Periodic review of D-SIBs

3.9 MAS will assess banks' systemic importance on an annual basis. This takes into account changes in their systemic importance as a result of changes in their risk profiles or business models over time. Two years of data will be taken into account before confirming subsequent changes in a bank's D-SIB status. For example, a non-D-SIB in year T that is assessed to be systemically important based on the two-stage assessment process in Year T+1 will not be designated as a D-SIB immediately in year T+1. If the bank continues to be assessed as systemically important in Year T+2, it will be designated as a D-SIB in Year T+2 (see timeline below). Conversely, if a D-SIB in Year T reduces its systemic importance such that it is no longer assessed as systemically important in Year T+1, its D-SIB status will remain unchanged until the change in systemic importance is confirmed in Year T+2. This will provide greater certainty of a bank's status before applying or dis-applying the appropriate D-SIB policy and supervisory measures.

Change from a non-D-SIB to a D-SIB:



Change from a D-SIB to a non-D-SIB:



3.10 MAS recognises that that there may be instances where a change in systemic importance is likely to be permanent (e.g. inorganic growth or restructuring of operations). In such instances, MAS will exercise discretion to adjust the bank's D-SIB status and its policy measures during the observation period as described in paragraph 3.9 above.

Results of assessment

3.11 MAS will publish any revisions to the list of D-SIBs following each annual assessment.

4 Policy Measures

4.1 Each type of D-SIB will be subject to appropriate policy measures as follows –

	MAS' D-SIB Policy Measures
Locally-incorporated bank group	• Higher loss absorbency • Enhanced disclosure • Recovery and resolution planning • Effective risk data aggregation and risk reporting • Liquidity coverage ratio (LCR)
Foreign bank group, comprising a locally-incorporated bank and a sister branch, if any	Locally-incorporated foreign bank • See policy measures for a locally-incorporated bank group above Branch • Recovery and resolution planning • Effective risk data aggregation and risk reporting • LCR
Foreign bank branch	• Local incorporation requirement of the retail operations for foreign bank branches that have a significant retail presence in Singapore • See policy measures for a branch above

Higher loss absorbency (HLA)

4.2 The application of HLA to D-SIBs aims to reduce the probability of their failure by increasing their going-concern loss-absorbency. MAS announced in June 2011 that we will require locally-incorporated banks to maintain minimum capital requirements that are 2% point higher than those imposed by the BCBS, on the basis of each bank's systemic importance and substantial retail presence.[2] The 2% point higher minimum capital requirements in the form of Common Equity Tier 1

[2] http://www.mas.gov.sg/News-and-Publications/Media-Releases/2011/MAS-Strengthens-Capital-Requirements-for-Singapore-incorporated-Banks.aspx

capital thus forms the HLA for locally-incorporated banks designated as D-SIBs.

4.3 For locally-incorporated banks which are non-D-SIBs that become D-SIBs, MAS will provide a one-year transition period for such newly-designated D-SIBs to comply with the HLA requirement. Otherwise, such banks are subject to minimum capital requirements in line with those imposed by the BCBS.

4.4 Where a locally-incorporated bank group headquartered in Singapore has been identified as a D-SIB as well as a global systemically important bank (G-SIB), the higher of either the D-SIB or G-SIB HLA requirements will apply. Where the D-SIB is held under a Financial Holding Company (FHC) that is designated for MAS' regulation, and the FHC group is a predominantly banking group, the capital adequacy and HLA requirements will apply at the FHC group level.

Enhanced disclosure

4.5 Timely disclosure of information relating to the financial conditions and risk profiles of locally-incorporated D-SIBs enhances market discipline and allows for early intervention by both MAS and the market. MAS will require locally-incorporated D-SIBs to make available information relevant for enhancing market discipline on a timely basis under Pillar 3 of the risk-based capital adequacy framework.[3]

Recovery and resolution planning

4.6 To make feasible the resolution of D-SIBs without severe systemic disruption, D-SIBs will be subject to recovery and resolution planning requirements. Recovery and resolution planning ensures the continuity of functions that are critical to the economy, and allow a distressed D-SIB to be restructured or to exit from the market in an orderly manner.

4.7 MAS recognises that the development and maintenance of robust and credible recovery and resolution plans involves coordination between home and host authorities. For a D-SIB which is part of a foreign bank group, the development of such a plan should be done in consultation with the parent bank or head office, and could include aspects of the group recovery plan, as long as it covers and addresses the recovery of the Singapore operations. MAS will also engage foreign authorities closely in the preparation of resolution plans for D-SIBs.

[3] MAS Notice 637 on Risk-based Capital Adequacy Requirements for Banks Incorporated in Singapore

Effective risk data aggregation and risk reporting

4.8 MAS expects all D-SIBs to have in place strong risk data aggregation capabilities and robust internal risk reporting practices. Besides enhancing the decision-making process, improving D-SIBs' ability to aggregate risk data will improve their resolvability. MAS expects all D-SIBs to work towards complying with the BCBS' *Principles for effective risk data aggregation and risk reporting* within three years of their designation as D-SIBs.

Liquidity coverage ratio

4.9 MAS will require locally-incorporated D-SIB bank groups headquartered in Singapore to meet a SGD LCR requirement of 100% with effect from 1 January 2015. In addition, such banks are required to meet an all-currency LCR requirement of 60% with effect from 1 January 2015. This will be increased by 10% points each year to 100% by 1 January 2019.

4.10 MAS will also require D-SIB foreign bank groups and branches to meet a SGD LCR requirement of 100% with effect from 1 January 2016. Such banks designated as of 1 January 2016 are also required to meet an all-currency LCR requirement of 50% with effect from 1 January 2016.

Local incorporation

4.11 To enhance retail depositor protection, MAS will require any Full bank deemed to be a D-SIB by virtue of its significant retail presence in Singapore to locally incorporate its retail operations. For the avoidance of doubt, the local incorporation requirement is a prudential measure and does not entail additional branching privileges. Where appropriate, MAS will provide such D-SIBs with an adequate transition period to comply with this requirement.

Appendix 2

Components of inherent risks and control factors, oversight and governance, and capital and support

INHERENT RISKS	
Credit or Asset Risk	The risk of loss arising from the failure of an obligor (e.g. borrower, counterparty, reinsurer, etc.) to perform according to the terms and conditions of his contract/agreement with the institution, as well as a loss in value of the institution's assets due to deterioration in credit quality of the obligor.
Liquidity Risk	The risk that an institution will be unable to meet expected and unexpected current and future cash flow needs hence affecting its daily operations or financial condition. It arises from the mismatch of maturities of cash inflows and outflows.
Market Risk	The adverse effect on asset value due to adverse movements in the level and volatility of the market rates or prices (e.g. interest rates, exchange rates, equity prices, commodity prices, credit spreads, etc.) of the underlying asset.
Operational Risk	The risk of loss arising from complex operations, inadequate internal controls, processes and information systems, organisational changes, fraud or human errors, or unforeseen catastrophes (including terrorist attacks and natural disasters).
Technology Risk	Any potential adverse outcome, damage, loss, violation, failure or disruption arising from the use of or reliance on computer hardware, software, devices, systems, applications and networks. This risk is usually related to system flaws, processing errors, software defects, operating mistakes, hardware breakdowns, system failures, capacity inadequacies, network vulnerabilities, control weaknesses, security shortcomings, malicious attacks, hacking incidents, fraudulent actions or inadequate recovery capabilities.
Insurance Risk	The risk of loss resulting from inadequate pricing, making wrong judgments in the selection, approval and retention of risks to be insured or under-estimation of insurance policy liabilities.
Market Conduct Risk	The risk of loss or harm to consumers and counterparties arising from undesirable market conduct practices by an institution and/or its representatives, and/or their inability or unwillingness to comply with the requisite market and business conduct requirements.
Money Laundering/ Terrorism	The risk of an institution being used to transfer or hold funds that are related to illicit activities such as terrorism, drug dealing, and other serious offences.

INHERENT RISKS	
Financing Risk	
Legal, Reputational and Regulatory Risk	The risk of loss arising from unenforceable contracts and adverse judgments, negative publicity regarding an institution’s business practices, or its inability or unwillingness to comply with laws, rules and regulations.

CONTROL FACTORS	
Risk Management Systems and Controls	The effectiveness of risk management systems and internal controls in managing the risks inherent in the institution’s activities.
Operational Management	The effectiveness of line management (local and/or cross-border), department heads, etc, in the planning, directing and controlling of the day-to-day operations of an institution’s business activities and in ensuring that policies, processes, control systems, staff levels and experience are in place, and are sufficient to effectively assess, manage and mitigate risks inherent in the institution’s activities.
Internal Audit	The effectiveness of the internal audit function in providing independent assurance of the effectiveness of, and adherence to, the institution’s risk management, control, and governance processes.
Compliance	The effectiveness of the compliance function in providing independent oversight of the management of the institution’s compliance with all laws, regulations, codes of conduct, and standards of good practice relevant to the activities of the institution in the jurisdictions in which it operates.

OVERSIGHT AND GOVERNANCE	
Oversight and Governance	The effectiveness of an institution’s board, senior management, and head office in providing strategic direction and oversight of an institution’s operations. The assessment of Oversight and Governance takes into account an institution’s corporate governance structure and practices, and the ability of the board and management to ensure that activities are conducted in a safe and sound manner and that the institution’s dealings with customers are transparent and fair in line with high standards of professionalism and sound business practice.

CAPITAL AND SUPPORT	
Capital	Capital is a source of financial strength to cushion an institution against unexpected losses. The assessment of Capital takes into account an institution's track record in capital management, capital management process and whether its capital level and quality provide an adequate buffer against unexpected losses arising from its existing and planned risk exposures, and against future market distress.
Earnings	Earnings absorb normal and expected losses from ongoing operations and represent an internal source of incremental capital to support growth or to replenish reserves in the event of unexpected losses. The assessment of Earnings takes into account the sustainability and quality of an institution's earnings, as well as whether earnings are sufficient to support the operations and meet the capital and provision needs. The impact on earnings of changes in the operating environment and in the strategic plans of the institution is taken into account in the assessment.
Parental Support	The viability of foreign institutions operating in Singapore is also influenced by the financial health of their head offices or parent companies. This element of dependence is reflected in Parental Support. The assessment of Parental Support takes into account the ability and willingness of the head office, parent, or shareholders to provide financial support to the Singapore entity, as well as the effectiveness of supervision of the home country regulator.