

LCH SA

CPMI – IOSCO Self-Assessment 2018

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| Assessor | In 2018, LCH SA performed a self-assessment of its observance with the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMIs). |
| Objective of the assessment | LCH SA's self-assessment was undertaken in accordance with the PFMIs of April 2012 and to demonstrate compliance with them and related guidance. |
| Scope of the assessment | This self-assessment was made against all PFMIs which apply to CCPs and covers all the clearing services of LCH SA. |
| Methodology of the assessment | LCH SA followed the disclosure framework and applied the assessment methodology recommended by CPMI-IOSCO. |
| Source of information in the assessment | In making this assessment, LCH SA used a combination of public and non-public information, including LCH SA's policies, procedures and management information. This was also supplemented with discussions with LCH SA staff responsible for critical activities of the central counterparty. |
| Date of assessment | LCH SA's assessment was made using data available as of 31st May 2018 |

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1 Executive Summary

Banque Centrale de Compensation which conducts business under the name LCH SA (hereinafter “**LCH SA**”) has completed a self-assessment against the 24 Principles for Financial Market Infrastructures (PFMIs), as published by the Committee on Payment and Market Infrastructures (“**CPMI**”) and the International Organization of Securities Commissions (“**IOSCO**”)¹. The self-assessment was completed using the recommended assessment methodology published by CPMI and IOSCO².

¹ <http://www.bis.org/publ/cpss101a.pdf>

² <http://www.bis.org/publ/cpss106.pdf>

2 Overview of LCH SA

2.1 General description of LCH SA and the markets it serves

LCH SA is a France-registered central counterparty. In its role as a Central counterparty (“**CCP**”), LCH SA assumes counterparty risk between trading counterparties by becoming the legal counterparty to the trade and ensuring the financial performance of the trade. In clearing a trade, LCH SA becomes counterparty to, and responsible for, the corresponding trade obligations arising from the original bilaterally negotiated trade.

This principle is known as novation or registration. In its normal course of business, LCH SA does not hold positions for its own account, except to the extent that it invests cash margin received from clearing members in bonds and reverse repos.

LCH SA offers clearing services for exchange-traded futures and options on financial and commodity products, cash equities, Euro denominated bonds and repos and Credit Default Swaps through four lines of CCP services: EquityClear, CommodityClear, CDSClear and RepoClear.

LCH SA provides clearing services to the Euronext markets: Euronext Amsterdam NV, Euronext Brussels SA/NV, Euronext Lisbon, Euronext Paris. It also provides clearing services to Börse Berlin (Equiduct Trading), Bourse de Luxembourg, Bond Match and Galaxy Trading System.

Complete information on services provided by EquityClear and CommodityClear can be found at:

<https://www.lch.com/services/equityclear/equityclear-sa>

<https://www.lch.com/services/commodityclear/commodityclear-sa>

For products relating to fixed income activity (including sell and purchase transactions as well as French, Italian, Spanish, German and Belgium sovereign debts and repos), LCH SA provides government debt securities clearing services to: Euro MTS, ICAP Electronic Broking Ltd, MTS, ETCMS and Tullett Prebon Trading System. LCH SA also provides a triparty clearing service called €GCPlus, based on a European Central Bank (“**ECB**”) eligible Euroclear pool of collateral, Euroclear acting as triparty agent.

Complete information on services provided by RepoClear can be found at:

<https://www.lch.com/services/repoclear/repoclear-sa>

<https://www.lch.com/services/repoclear/eugcplus>

LCH SA provides clearing services for eligible CDS contracts including both European and US Indices and Single Names Index constituents, and clearing services for eligible European Index Swaptions. CDSClear offers its members and their clients clearing services on European and US Indices and Single Names Index constituents and European Index Swaptions, through MarkitSERV, Bloomberg and Tradeweb trade sources.

Complete information on services provided by CDSClear can be found at:

<https://www.lch.com/services/cdsclear>

2.2 Regulatory framework

LCH SA is regulated as a CCP by three National Competent Authorities: the Autorité de Contrôle Prudentiel et de Résolution (“**ACPR**”), the Banque de France (“**BDF**”) and the Autorité des Marchés Financiers (“**AMF**”).

LCH SA is authorized to offer clearing services in the European Union pursuant to the European Market Infrastructure Regulation (“**EMIR**”) which includes the supervision by a College of 18 European regulators and the ESMA.

As a clearing house and investment services provider, LCH SA is regulated by the AMF and therefore subject to the Règlement Général de l’AMF.

LCH SA is a credit institution as per the French Monetary and Financial Code and regulated by the ACPR. It is therefore subject to all the European and French banking legislations. It is indirectly regulated by the European Central Bank as a lesser important financial institution.

LCH SA is registered in the US as a Derivatives Clearing Organization (“**DCO**”) with the US Commodity Futures Trading Commission (“**CFTC**”) for its CDS business, and as Clearing Agency with the US Securities and Exchange Commission (“**SEC**”).

LCH SA is recognized as a foreign Central Counterparty by the Swiss Financial Market Supervisory Authority (“**FINMA**”).

As branches of a credit institution, the activities of LCH SA branches in Belgium and Netherlands are regulated respectively by the Belgium National Bank (BNB) & the Dutch National Bank (DNB).

3 Detailed assessment report

Principle 1: Legal basis

An FMI should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.

The LCH SA Rulebooks cover all material aspects of LCH SA's activities and aim to provide a clear and certain legal basis for its operations, as well as the rights and obligations of both LCH SA and its clearing members. The enforceability of the LCH SA Rulebooks, Instructions (or Procedures for CDS), Notices (together the "Clearing Rules"), and the Clearing Member Admission Agreement is protected by French legislation; and enforceability in other jurisdictions is underpinned by legal opinions from reputable external counsel based in those jurisdictions.

Key Consideration 1: The legal basis should provide a high degree of certainty for each material aspect of an FMI's activities in all relevant jurisdictions.

The material aspects, those which are fundamental to its safe operation as a CCP, of LCH SA's activities which require a high degree of legal certainty are:

- Settlement finality (see *Principle 8*)
- Default of clearing members (see *Principle 13*)
- Netting arrangements in the event of clearing member and client defaults and upon winding up of LCH SA
- Porting of client positions (see *Principle 14*) and
- Enforcement of collateral (see *Principle 5*)

A trade once accepted by LCH SA cannot be rejected. LCH SA can amend the terms for which it accepts trades for clearing but this would need to happen prior to registration.

A high degree of legal certainty on these activities is achieved through obtaining legal opinions as to the enforceability of the Clearing Rules in all relevant jurisdictions (see *Key Consideration 5* and *Principle 16*), performing due diligence, reviewing applicable legislation and procuring local legal advice.

The LCH SA Clearing Rules are governed by French law except for (i) the CDS Clearing Supplement and the Dispute Resolution Protocol, which are governed by UK laws, (ii) the Euroclear Pledge, which is governed by Belgian law and (iii) the FCM CDS Clearing Regulations, which are governed by New York law. Each prospective clearing member must enter into an Admission Agreement with LCH SA which requires the clearing member to comply with the terms of the relevant LCH SA Clearing Rules.

In order to ensure that the Clearing Rules are enforceable in all jurisdictions in which services are offered, LCH SA obtains a legal opinion for each new jurisdiction from a reputable external counsel based in that jurisdiction before any clearing member can be admitted.

In accordance with the Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems (the "Settlement Finality Directive"), LCH SA Clearing Rules' provisions set out the conditions under which the cleared transactions registered within the clearing system (in respect of exchange-traded transactions and OTC transactions) are irrevocable. These provisions are supported by the designation of LCH SA as a settlement system notified by the French Minister of Economy. Please see *Principle 8* for more details.

Key Consideration 2: An FMI should have rules, procedures, and contracts that are clear, understandable, and consistent with relevant laws and regulations.

LCH SA publishes the Clearing Rules on its website. Clearing members are consulted ahead of the implementation of any material rule change.

The LCH SA Clearing Rules contained therein cover all material aspects of LCH SA's activities, and aim to provide a clear and certain legal basis for its operations and the rights and obligations of each of its clearing members. In order to ensure that the Clearing Rules are enforceable in all jurisdictions in which services are offered, LCH SA obtains a legal opinion for each new jurisdiction from a reputable external counsel based in that jurisdiction before clearing members are admitted. The LCH SA Clearing Rules are consistent with applicable law. Should any inconsistencies with applicable law arise, such as on implementation of a new regulation, LCH SA will remedy this through changes to its Clearing Rules. LCH SA monitors the release of new regulations or changes to current regulations through in-house specialist functions and third party providers.

LCH SA requires that changes to its Clearing Rules be reviewed by its Rule Change Committee. Proposed changes to the CDS Clearing Rules are submitted to the CDS Clearing Members for review and comments and, only after such consultation period, submitted to the AMF, the SEC and the CFTC for approval, non-objection, or information. Proposed changes to the Clearing Rules other than the CDS Clearing Rules are submitted to the members for consultation and subsequently to the AMF for approval. They are also notified to other relevant regulators as necessary.

Key Consideration 3: An FMI should be able to articulate the legal basis for its activities to relevant authorities, participants, and, where relevant, participants' customers, in a clear and understandable way.

LCH SA's Articles of Association are available through the Paris Trade and Companies Registry. Key information related to the governance of LCH SA, including the composition and terms of reference of its Risk Committee, Audit Committee and Remuneration Committee are available on its website.

LCH SA publishes key information about its regulatory status on its website and in its annual report. The details of the relevant regulatory frameworks under which LCH SA operates, including statutory instruments and stated policies, are publicly available on the regulators' websites and Legifrance (<https://www.legifrance.gouv.fr>).

The LCH SA Clearing Rules cover all material aspects of LCH SA's activities, and aim to provide a clear and certain legal basis for its operations and the rights and obligations of each of its clearing members.

To ensure the basis for LCH SA's activities is known, LCH SA publishes the Clearing Rules on its [website](#). The Clearing Rules refer to supporting legislative instruments where appropriate. LCH SA consults with its clearing members ahead of the implementation of material rule changes.

Key Consideration 4: An FMI should have rules, procedures, and contracts that are enforceable in all relevant jurisdictions. There should be a high degree of certainty that actions taken by the FMI under such rules and procedures will not be voided, reversed, or subject to stays.

In order to ensure that the Clearing Rules are enforceable in all jurisdictions in which services are offered, LCH SA obtains, and provides upon demand, a legal opinion for each new jurisdiction from a reputable external counsel based in that jurisdiction before clearing members are admitted.

There are no circumstances under which LCH SA's actions under its rules, procedures or contracts could be voided, reversed, or subject to stays.

No court in any jurisdiction has ever held any of LCH SA's relevant activities or arrangements under its rules and procedures to be unenforceable.

Key Consideration 5: An FMI conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflict of laws across jurisdictions.

LCH SA checks the adequacy of its legal framework for cross-border clearing members by obtaining legal advice regarding the enforceability of the Clearing Rules, the jurisdiction of French courts over non-French domiciled clearing members, and the circumstances and extent to which a French collateral arrangement and Belgian law pledge will be enforceable under the laws of the jurisdiction. To date, LCH SA has obtained legal advice in relation to its Cash/Listed Derivatives/Fixed Income activities for France, England and Wales, Germany, Sweden, Switzerland, Belgium, Denmark, Finland, Ireland, Italy,

Luxembourg, Netherlands, Portugal, Spain and the State of New York (USA), and in relation to its CDS activities, for France, England and Wales, Germany, Sweden, Switzerland and North Carolina (USA). LCH SA has a Legal Opinion policy which requires legal opinions be refreshed every three years or earlier if material changes occur to either the foreign jurisdiction or the Clearing Rules that could impact the outcome of the opinion.

In many cases, conflicts of law between jurisdictions do not arise. For European Members, LCH SA is a designated system under the Settlement Finality Regulations. For clearing members from other jurisdictions any action against LCH SA would need to be brought in a French Court where LCH SA is designated under the Settlement Finality Regulations.

Publicly available resources

[Clearing Rules](#)

[Company Structure](#)

[Annual Report](#)

Principle 2: Governance

An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

LCH SA operates under robust governance arrangements which provide an explicit responsibility and accountability structure. The LCH SA Board and its Committees have representation of both executive and non-executive individuals who are appropriately skilled personnel. The Chairman and the Chairs of the Board Risk, Remuneration and Audit Committees are among the independent non-executive directors. The LCH SA website publicly discloses the governance arrangements, including the ownership and organisational structure, composition of the Board and Board Committees, as well as Board and Committee terms of reference.

Key Consideration 1: An FMI should have objectives that place a high priority on the safety and efficiency of the FMI and explicitly support financial stability and other relevant public interest considerations.

LCH SA is a subsidiary of LCH Group Holdings Limited (“**LCH Group**”) a private company limited by shares, incorporated in the United Kingdom and of Euronext N.V, a company incorporated in the Netherlands. LCH Group is 67.97 per cent owned by London Stock Exchange (C) Limited, a wholly-owned subsidiary of London Stock Exchange Group plc (“**LSEG**”), and 32.03 per cent owned by participants and exchanges.

The objectives of LCH SA are clearly identified and publicly available on the group’s website. LCH SA’s objectives are:

- To provide market leading risk management and clearing solutions.
- To manage our members’ and clients’ risk by providing effective and efficient clearing services.
- To promote a safe and stable financial market foremost in all that we do.

Furthermore, LCH SA is committed to safeguarding its members’ interests and supporting general market and financial stability through its operations, including with respect to international and jurisdictional regulations regarding procyclicality.

Through regular business and risk management reviews, LCH SA assesses its performance against its objectives at both LCH SA Board and executive level. The LCH SA Board has adopted a Risk Governance Framework, setting out the risks facing LCH SA, its tolerance for these risks, the personnel with responsibility for each risk and has defined reporting requirements for each.

By including as an objective the reduction of risks and the safeguarding of the financial infrastructure in the markets it serves, LCH SA explicitly places a high priority on safety and efficiency as well as supporting financial stability in its public mission.

Key Consideration 2: An FMI should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, relevant authorities, participants, and, at a more general level, the public.

LCH SA operates under robust governance arrangements which provide a clear organisational structure, and set out the composition, role and responsibilities of the LCH SA Board and the LCH SA Board Committees.

The governance arrangements include CEO Executive Delegation, the LCH Group Executive Committee Terms of Reference (“**TORs**”) and the Local Management Committee (LMC) TOR. These arrangements also set out the process for ensuring accountability to stakeholders.

LCH SA provides accountability to owners, participants and other relevant stakeholders by including user, clearing member and client representatives in governance forums. LCH SA's clearing services run Product Advisory Groups and Risk Working Groups where participants are able to comment on proposed changes to markets, products and services, and to risk policies, models and frameworks. In addition, Clearing Members and Clients of Clearing Members are represented on the LCH SA Board Risk Committee where all material proposals are reviewed and recommended to the Board for approval.

The governance arrangements of LCH SA are publicly available, including details of the LCH SA Board, the LCH SA Board committees' compositions and details of Executive delegation.

Key Consideration 3: The roles and responsibilities of an FMI's board of directors (or equivalent) should be clearly specified, and there should be documented procedures for its functioning, including procedures to identify, address, and manage member conflicts of interest. The board should review both its overall performance and the performance of its individual board members regularly.

The roles and responsibilities of the LCH SA Board are clearly specified through the company's Articles of Association and the LCH SA Board's Terms of Reference.

The LCH SA Board is responsible for the establishment of clear objectives and strategies, monitoring LCH SA's senior management, establishing appropriate remuneration policies, establishing and overseeing the risk management function, overseeing the compliance and internal control function, overseeing outsourcing arrangements and providing accountability to shareholders, employees, clearing members, clients and other stakeholders.

The LCH SA Board is comprised of 13 individuals: five independent non-executive directors (INEDs), one of whom is Chairman, five non-executive directors (of whom one is a LSEG director, one a representative of a venue, one a representative of a customer, two representatives of clearing members) and three executive directors.

The LCH SA Board has established an Audit Committee, Remuneration Committee and, as an advisory committee, a Risk Committee.

The composition of the LCH SA Board, Remuneration Committee, Audit Committee and Risk Committee are publicly available. The terms of reference for these committees are reviewed at least annually. Any changes arising from the annual review are reported to the relevant committee for recommendation to the Board which is then asked to approve the amendments.

The Remuneration Committee recommends, to the LCH SA Board, the broad remuneration policy and principles of LCH SA. Its responsibilities include:

- ensuring that the policy and principles are aligned with the company's risk tolerance and corporate strategy;
- reviewing that management and employees are provided with appropriate incentives to encourage focus on risk management as the core purpose of LCH SA; and
- reviewing that management and employees are, in a fair and responsible manner, rewarded for their individual contribution to the success of LCH SA.

The Remuneration Committee is comprised of four individuals: two INEDs, one of whom is the Chairman, a user representative and a LSEG director.

The Audit Committee represents the interests of the LCH SA Board in the sound financial management and internal control management of the company. Its responsibilities include:

- assisting the LCH SA Board in fulfilling its responsibilities to review audited financial statements;
- appointing external auditors;
- reviewing the internal audit function;
- reviewing regulatory compliance; and

- reviewing the operational risk framework and reviewing the internal control environment.

The Audit Committee is comprised of seven individuals: four INEDs, one of whom is the Chair, a user representative, a Euronext director and an LSEG director.

The Risk Committee advises the LCH SA Board on the company's risk appetite, tolerance and strategy. Its responsibilities include:

- reviewing risk policies periodically;
- reviewing membership criteria and reviewing decisions with regards to LCH SA membership;
- considering risk controls designed or adapted for new contracts, product types or services; and
- considering proposals to make significant amendments to margin methodologies.

In all cases, following their review the Risk Committee will make recommendations based on their findings to the LCH SA Board for approval. In the event the Board decides not to follow the recommendation of the Risk Committee, the CCP is required to notify the competent authority within five days.

The Risk Committee is comprised of six individuals: three INEDs, one of whom is the Chairman, two representatives of clearing members and one representative of clients of clearing members. The metric for determining which clearing member and clients are members of the Committee is based on factors including the asset classes cleared, volume cleared, the level of contribution to the relevant default funds and whether they have previously been a voting member of the Committee.

The Terms of Reference of the Board set out the obligations on LCH SA's Directors to disclose any potential conflicts of interest to other Directors, as well as the actions which may be taken to mitigate conflicts as they arise. The LCH SA Board of Directors performs an annual declaration of potential or actual conflicts of interest. At the beginning of each meeting of the LCH SA Board the agenda is reviewed by the Board Directors and actual or potential conflicts are considered for each agenda item. The tools available to the LCH SA Board to mitigate conflicts of interest include Directors recusing themselves from discussions. If there is any doubt whether a conflict exists, a determination will be made by the INEDs in conjunction with the Chief Compliance Officer, as to whether a conflict exists. The INEDs' decision is final.

As a measure of best practice, the LCH SA Board performs an annual review of its own performance and that of its Committees. The review includes consideration of the performance of LCH SA's Board members and the Chairman, and the LCH SA Board's behaviours and culture.

Key Consideration 4: The board should contain suitable members with the appropriate skills and incentives to fulfil its multiple roles. This typically requires the inclusion of non-executive board member(s).

The LCH SA Board is comprised of 13 individuals (see key consideration 3 above for further details). The LCH SA Board takes the advice of the LCH Group Nomination Committee before approving changes in its size, structure and members. The Committee's Terms of Reference state that the Committee will need to ensure that its recommended candidates are respected for their competence and are of good standing in their field of business.

An LCH SA INED must be independent in character and judgement, and have no relationships or circumstances (including any with LSEG or any of its subsidiary undertakings and/or with any significant user or venue shareholder) which are likely to affect, or could appear to affect, his or her judgement. The identities of the INEDs are disclosed on the LCH SA website.

The INEDs of the LCH SA Board receive a fee, which is fixed, and which is not linked to the business performance of LCH SA. Non-executive members of the LCH SA Board, other than the INEDs, do not receive a fee. The non-executive members of the LCH SA Board represent the users of the CCP and in many cases the shareholders of LCH Group.

It is a responsibility of the LCH SA Board, through its Terms of Reference, to perform adequate succession planning for the LCH SA Board, thereby ensuring the LCH SA Board continues to have appropriately skilled members.

Key Consideration 5: The roles and responsibilities of management should be clearly specified. An FMI's management should have the appropriate experience, a mix of skills, and the integrity necessary to discharge their responsibilities for the operation and risk management of the FMI.

LCH SA's senior management is responsible, in general, for ensuring consistency of LCH SA's activities with the LCH SA Board's objectives and strategy, establishing appropriate compliance and internal controls, subjecting internal controls to regular review and testing, ensuring sufficient resources are devoted to risk management and compliance, being actively involved in risk control processes and ensuring that risks posed to the CCP by its clearing and activities linked to clearing are duly addressed.

LCH SA's management team is made up of experienced professionals, taking responsibility for distinct areas of the operation, risk management and control of the CCP. In separating responsibilities, LCH SA has management in place with the necessary expertise for each area and maintains a mix of skills necessary for the operation and risk management of the CCP.

The roles and responsibilities of senior management are determined on the needs of LCH SA and set out in individual job descriptions. Once in role, LCH SA's senior management is subject to at least annual performance management reviews against their objectives and the core competencies identified as essential for all LCH SA employees. LCH SA is committed to ensuring that its reward practices promote sound and effective risk management and do not create incentives to relax risk standards. The annual performance review for members of the LCH Group Executive Committee also includes assessments by the Group Chief Risk Officer against their respective risk objectives and by Group Head of Internal Audit in respect of internal audit reports and closure of internal audit actions. Both assessments are presented to the Remuneration Committee.

LCH SA monitors the performance of its senior management through regular reviews: in the case of non-performance, processes are in place to identify, escalate, remediate and ultimately reprimand and remove management if necessary.

Key Consideration 6: The board should establish a clear, documented risk-management framework that includes the FMI's risk-tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision making in crises and emergencies. Governance arrangements should ensure that the risk-management and internal control functions have sufficient authority, independence, resources, and access to the board.

LCH SA's risk management is governed by the LCH Group Risk Governance Framework, adopted and reviewed annually by the LCH SA Board. This framework defines the universe of risks faced by LCH SA, the Board's tolerance for each risk, the standards which the Board expects LCH SA to meet in managing those risks, and, in addition, identifies the personnel with responsibility for each risk and sets reporting requirements. The Risk Governance Framework requires that a comprehensive risk policy framework is maintained which identifies how each risk is managed to those standards and within the Board's tolerance levels. The framework comprises a suite of risk policies, each of which is annually reviewed and approved by the LCH SA Risk Committee and LCH SA Board. The risk management function is responsible for putting the Risk Policy framework into practice and making reports to the Risk Committee.

The Chief Risk Officer reports directly to the Chief Executive Officer of LCH SA and makes independent reports to the LCH SA Risk Committee and LCH SA Board as necessary. The Chief Risk Officer is responsible for the management and control of risks within LCH SA pertaining to those risk types identified in the Risk Governance Framework. The Chief Risk Officer is supported by an effective team with the necessary authority, expertise, access and resource.

The Head of Internal Audit reports directly to the Chairman of the LCH SA Audit Committee. The Head of Internal Audit is responsible for providing objective and independent assurance to the Board of LCH SA on the effectiveness of risk management arrangements and activities across the company. The Head

of Internal Audit is supported by a team with the necessary access to material, independence from ongoing processes, authority and expertise.

The LCH SA Board ensures it has adequate governance surrounding the adoption and use of risk management models by setting policies and standards for the minimum level of review and governance steps which are required for margin models. The review steps culminate in evaluation by the LCH SA Risk Committee, which makes recommendations related to the models to the LCH SA Board.

New models and changes to existing margin models and related methodologies are reviewed through internal committees and external participant working groups as well as being subject to independent expert validation.

To manage a crisis or a default, LCH SA has established a Crisis Management Team (“CMT”) and a Default Crisis Management Team (“DCMT”), each working across all of the LCH SA services. Each of them works within regularly reviewed plans and procedures ensuring that the response to and management of a crisis or default is well co-ordinated and effective, minimising the impact on employees and members.

Key Consideration 7: The board should ensure that the FMI’s design, rules, overall strategy, and major decisions reflect appropriately the legitimate interests of its direct and indirect participants and other relevant stakeholders. Major decisions should be clearly disclosed to relevant stakeholders and, where there is a broad market impact, the public.

LCH SA discloses, on its website, detailed information on its operations and risk management, as well as information on the products it clears and associated fees. As and when these are amended the disclosures are updated and, where appropriate, circulars are distributed to members. Further to this, LCH SA routinely makes public announcements of changes in its Board Directors. LCH Group (the controlling shareholder of LCH SA) holds General Meetings for its shareholders.

The LCH SA Board includes in its membership representatives of clearing members, and venues, thereby allowing these groups of stakeholders to be part of decision making on the design of services, rules, overall strategy and major decisions. Further to this, the LCH SA Risk Committee also includes in its membership representatives of clearing members and clients, thereby allowing these groups of stakeholders to be part of recommendations made to the LCH SA Board on risk matters. The executive Directors of the LCH SA Board and Committee members provide feedback from market participants, based on their day to day interaction, as part of these forums.

LCH SA has in place a number of tools available to it to seek feedback from its user community, including formal consultations and clearing member and client advisory forums and working groups.

At a working level, LCH SA engages with its clearing members and clients of clearing members in a range of advisory and risk working groups to support product development, upcoming changes and major decisions.

LCH SA complies with the LCH Group Conflicts of Interest Policy which sets out the methods for identifying and managing potential and actual conflicts of interest, including those between LCH SA and its stakeholders. LCH SA requires all its employees to declare, annually, any potential or actual conflicts of interest. A register of conflicts is held and updated on annual cycle by the Compliance department. Where a potential conflict may arise, specific conflicts of interest management procedures are applied. Actions LCH SA may take include applying “need to know” information barriers and ultimately disclosing any conflict which it could not sufficiently avoid or mitigate.

Publicly available resources

[Structure and Governance](#)

[LCH SA Board Composition](#)

[LCH SA Committee Compositions](#)

Principle 3: Management of risks

An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks.

The LCH SA risk management framework reflects the LCH SA Board's risk appetite, and any amendments to this framework are subject to review and approval by the Board, to ascertain that such changes remain in alignment with the Board's risk tolerance. The risks identified within the framework and the risk management tools used to mitigate such risks are subject to ongoing and regular review, through a robust governance process. LCH SA maintains a recovery plan and a wind-down plan, which are reviewed annually by the Board.

Key Consideration 1: An FMI should have risk-management policies, procedures, and systems that enable it to identify, measure, monitor, and manage the range of risks that arise in or are borne by the FMI. Risk-management frameworks should be subject to periodic review.

LCH SA's overarching approach to risk management is administered according to the LCH SA Risk Governance Framework. This framework seeks to comprehensively identify the range of risks to which LCH SA is potentially exposed and to designate responsibility for these risks. Through the framework, the LCH SA Board defines tolerance levels for each category of risk and also sets guidelines for internal reporting to provide assurance that the framework is observed.

There are 22 risks defined within the Risk Governance Framework which is approved by the LCH SA Board:

- Latent market risk
- Sovereign risk (specific to clearing member positions)
- Wrong-way risk (specific to clearing member positions)
- Concentration risk (specific to clearing member positions)
- Counterparty credit risk
- Liquidity risk
- Procyclicality risk
- Settlement, payment and custody risk
- Foreign Exchange ("FX") risk
- Business risk
- Operational risk
- Legal risk
- Regulatory and compliance risk
- Pension risk
- Project risk
- Business continuity
- Model risk
- Information security and cyber risk
- Investment risk
- Default management risk
- Strategic risk
- Reputational risk

The framework is given effect by targeted and detailed LCH SA risk policies to cover:

- Financial resource adequacy
- Collateral risk
- Contract & market acceptability
- Counterparty credit risk
- Liquidity risk
- Settlement, payment and custody risk
- Investment risk
- Operational risk
- Model governance, validation & review
- Default management
- Procyclicality

These risk policies are managed by the LCH SA risk management function. Ownership of the risks and the control environment is defined in the policies, including the responsibility to maintain procedures in support of each relevant function.

The remaining risks, such as business continuity, legal risk, etc., are managed by dedicated business functions. The CRO is responsible for ensuring that an appropriate framework is in place to measure and monitor the status of each of the 22 risks against the Board's appetite, which is reported to the Board quarterly.

LCH SA operates systems which facilitate the accurate measurement and monitoring of risk exposures for all clearing services and associated functions, including margining, collateral and investment management, and credit risk management. These systems enable the aggregation of exposures across clearing services, counterparties and risk types.

The LCH SA Board ensures it has adequate governance surrounding the adoption and use of risk management models by setting policies and standards for the minimum level of review and governance steps that are required. The review steps culminate in evaluation by the LCH SA Risk Committee, which makes recommendations related to the models to the LCH SA Board.

New models and material changes to existing margin models and related methodologies are reviewed through internal committees as well as being subject to clearing member review and independent validation, in line with policies and standards.

The Risk Governance Framework specifies the LCH SA Board's standards and tolerance for each risk type; these underlie the principles and standards detailed in the risk policies. A set of performance indicators are used to monitor the effectiveness of the risk management framework. These indicators include back testing of initial margins, 'cover 2' stress testing of clearing member exposures against default fund sizes, aggregate exposure measures, counterparty credit scores, liquidity ratios, interest rate risk analysis and operational risk assessments.

System performance is constantly monitored; methodologies for the calculation of key risk parameters, including margin levels, stress testing, collateral haircuts and liquidity management are independently reviewed at least annually, with a strict governance process in place for managing changes. The LCH SA Board reviews compliance with the framework on at least an annual basis. The Risk policies supporting the framework and the framework itself are also subject to review on at least an annual basis taking into account changes in market and regulatory environments.

Key Consideration 2: An FMI should provide incentives to participants and, where relevant, their customers to manage and contain the risks they pose to the FMI.

Since initial margin and default fund requirements are proportional to risk, each clearing member has an incentive to manage and contain the risks it poses to LCH SA in order to reduce its financial obligations. LCH SA's application of additional margin, which increase initial margin requirements with credit, liquidity, concentration and sovereign risks that exceed base assumptions, provides an additional incentive.

Policies and systems are designed to allow clearing members to manage and contain their risks by applying industry standard techniques where appropriate, which can be understood and replicated.

In the event that LCH SA's routine risk monitoring identifies instances in which a clearing member's portfolio sensitivity to price movements exceeds acceptable tolerances, LCH SA informs these clearing members and helps organise voluntary, mutually risk-reducing trades between clearing members.

Clearing members are provided with details of the margin and other default resource methodologies, in addition to a range of disclosures explaining LCH SA's risk management policies.

Key Consideration 3: An FMI should regularly review the material risks it bears from and poses to other entities (such as other FMIs, settlement banks, liquidity providers, and service providers) as a result of interdependencies and develop appropriate risk-management tools to address these risks.

Within LCH SA's recovery plan LCH SA performs a review of the criticality of its clearing services and ensures that appropriate recovery measures are in place to provide continuous provision of these clearing services despite a failure of other entities, for example:

- IT service providers
- FMI's like CSDs, and CCPs
- Settlement agents
- Etc.

The LCH SA Risk Governance Framework contemplates how risks posed by other entities should be covered through appropriate risk measures. In particular, LCH SA seeks to manage risks posed by payment and settlement intermediaries (see *Principle 9*), custodians (see *Principle 16*), essential service providers (see *Principle 17*), and other FMIs (see *Principle 20*).

By managing risks posed to its solvency and orderly operation, LCH SA limits the risks that it poses to other entities and financial markets.

LCH SA conducts its money settlements in Euro central bank money; for all other money settlements LCH SA only uses well rated institutions and only has limited exposure to these institutions.

LCH SA performs Delivery Versus Payment ("**DVP**") settlement through Central Securities Depositories ("**CSD**") and International Central Securities Depositories ("**ICSD**") safeguarding its own and clearing members' assets and minimises the risk on and delay in access to these assets.

In conclusion the risks for participants resulting from payment and settlement arrangements are minimised. See *Principle 9* for further detail.

Investments are made in instruments with minimal credit, market and liquidity risks. See *Principle 16* for further detail.

See *Principle 17* on how LCH SA manages the operational risks that its providers might pose to its operations, and how LCH SA identifies, monitors and mitigates the operational risks LCH SA may pose to other entities.

The response to *Principle 20* describes how risks related to LCH SA's links with other FMIs are identified, monitored and managed.

The risk management tools that are used to address the risks arising from the interdependencies with other entities, and the measures to review the effectiveness of such tools, are described in the responses to *Principles 9, 16, 17 and 20*.

Key Consideration 4: An FMI should identify scenarios that may potentially prevent it from being able to provide its critical operations and services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-down. An FMI should prepare appropriate plans for its recovery or orderly wind-down based on the results of that assessment. Where applicable, an FMI should also provide relevant authorities with the information needed for purposes of resolution planning.

In accordance with its status as a banking institution LCH SA maintain a recovery plan as per the Bank Recovery & Resolution Directive (BRRD).

The Plan sets out the steps that it will take in order to maintain the continuity of the services that it provides and the activities that it carries out that are specified in the event that such continuity is threatened.

The recovery plan contains the following elements:

- Recovery plan governance
- Review of critical services, operations and shared services
- FMI and SPC (Settlement, Payment, Custodian) risk
- Recovery Scenario analysis
- Definition of recovery plan triggers and measures
- Description of recovery tools
- Quantitative and qualitative analysis of recovery tools
- Strength and weakness analysis

Additionally, as required by EMIR, LCH SA maintains a Wind Down Plan which describes the scenarios and events that may trigger the Wind Down Plan alongside the expected activities to wind down the clearing activities of LCH SA.

LCH SA operates a robust Risk Governance Framework, which has the objective of defining risk appetite, designating responsibilities for the measuring, monitoring and managing of risks and also providing guidelines for assurance activities associated with the framework. Through the execution of this framework, LCH SA covers scenarios that may threaten its ability to continue to provide critical clearing services.

Scenarios have been categorised as follows:

- Member default losses resulting in uncovered credit losses or
- Potential and actual liquidity shortfalls
- Non Clearing member default losses or events that threaten LCH SA's solvency or ability to provide critical service to its clearing members (for example general business risks, custody and investment risks)

The Plans have been created with the objective of either continuity of critical services (Recovery Plan) or maintaining stability in financial markets by avoiding a disorderly failure of a CCP (Wind Down Plan). These objectives continue to be achieved by the comprehensive set of recovery tools available to LCH SA and the relevant wind down procedural steps and associated ring-fenced capital required to enable execution of the Wind Down Plan.

Reviews of both the Recovery and Wind Down Plans take place at least annually and where appropriate are aligned to existing annual market exercise regimes (e.g. annual fire drills) in order to simulate the implications of executing the Recovery and/or Wind Down Plans to ensure they remain relevant. Additionally, where the underlying business model of LCH SA is amended, the change framework in place ensures the implications of a change to the business model are considered with reference to the

Recovery and Wind Down Plans and any necessary updates are made. The LCH SA Board approves the Recovery and Wind Down Plans and is the final governance authority for updates to the plans.

Publicly available resources

[Risk Management Overview](#)

[Margin Methodologies](#)

Principle 4: Credit risk

An FMI should effectively measure, monitor, and manage its credit exposure to participants and those arising from its payment, clearing, and settlement processes. An FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that include, but not be limited to, the default of the two largest participants and their affiliates that would potentially cause the largest aggregate credit exposures to the CCP in extreme but plausible market conditions. All other CCPs should maintain, at a minimum, total financial resources sufficient to cover the default of the one participant and its affiliates that would potentially cause the largest aggregate credit exposures to the CCP in extreme but plausible market conditions.

The LCH SA risk management framework is designed to measure, monitor, mitigate and manage risks posed to LCH SA and its clearing members. LCH SA maintains financial resources sufficient to cover the default of the two member groups with the largest exposures under extreme but plausible conditions. LCH SA's overall risk management framework sets out internal policies, procedures and processes to identify and manage current and potential future credit exposures that arise as a result of LCH SA's business activities and operations. Policies require that variation margin is collected to manage current exposures; initial margin is collected to meet potential future exposures over conservative holding periods, at least a 99.7% level of confidence; and default fund resources are sized based on covering the defaults of two member groups in a range of theoretical and historical stress scenarios. LCH SA assesses margin coverage, and calls margin where necessary, multiple times each day.

Key Consideration 1: An FMI should establish a robust framework to manage its credit exposures to its participants and the credit risks arising from its payment, clearing, and settlement processes. Credit exposure may arise from current exposures, potential future exposures, or both.

LCH SA manages its credit exposures to clearing members through the maintenance of prefunded financial resources, the enforcement of participation criteria, and regular monitoring. In addition, the Clearing Rules allow LCH SA to call for additional funds from clearing members under certain conditions.

The prefunded financial resources include Initial Margin. As further explained under *Key Consideration 4* and in line with the LCH Group Financial Resource Adequacy Policy, the initial margin models for each clearing service is calibrated to the 99.7 percent confidence level. This ensures that enough margins are held to cover the potential loss from any member (including the clients of that member) to a 99.7% level under normal market conditions, should LCH SA need to close out that member's portfolio within the given holding period. This standard is monitored at least daily in each clearing service through a clean P/L backtest, and the results reported periodically to the LCH SA Board Risk Committee and the LCH SA Board.

Initial margin, as well as additional margin which are collected to cover member specific portfolio risk arising from both house and client activity (e.g. Concentration/Liquidity Risk; Wrong Way risk) are complemented by the default fund. This is a prefunded mutualised pool of resources available to cover any further potential losses to LCH SA in the event of a default during an extreme market stress. The default fund for each service is based on a Cover 2 standard, so that it must be enough to cover the potential losses from a close-out in an extreme event of the largest 2 clearing member portfolios and all clients of both these members. Stress test to assess the adequacy of the default fund size is run daily. In addition, LCH SA has a Reverse Stress Testing Framework to ascertain adequacy of financial resources held against member positions. The financial resources in question include all margin coverage, default funds and liquidity resources.

LCH SA calculates Internal Credit Scores (ICS) for each clearing member and other counterparties to which LCH SA has an exposure through an assessment of both quantitative and qualitative factors. These ratings influence LCH SA's risk management function's response to more specific risks identified by daily monitoring, as well as determining the frequency of future assessments of each clearing member. These internal credit ratings are also considered by internal risk governance.

LCH SA's risk management function is responsible for reviewing each clearing member's creditworthiness and financial condition. Clearing members' positions are monitored continuously, with particular focus on the size of each clearing member's cleared positions relative to its capital and to the total open interest in a particular contract.

Further, all new products are subject to the risk governance process in order to ensure that all new risks introduced by a new product or market (or maturity) are appropriately assessed as to their impact on the current risk management practices. Where additional risk measures are required, such as amendments to existing margin calculations, these are proposed along with a formal application to clear the new products through the risk governance process.

LCH SA's credit scoring framework is reviewed at least annually, as part of the regular policy review. This review will take into account changes to the business and market environment, market practices and new products; recommendations to change will be presented to the LCH SA Board Risk Committee and LCH SA Board for approval.

If LCH SA establishes a relationship with investment counterparties, these are subject to minimum internal rating and collateralisation of exposures with high quality collateral.

LCH SA also monitors the credit risk towards other counterparties through internal credit score. However financial exposure is very low as there is a preference to use central bank money and (I)CSDs.

Key Consideration 2: An FMI should identify sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk-management tools to control these risks.

LCH SA identifies sources of credit risk in its internal Risk Policy, listing the following within scope: clearing members interoperating CCPs, sovereigns, intermediaries and FMI's.

Credit risk from clearing members arises from their cleared positions for which LCH SA provides a guarantee towards other clearing members. A non-payment of monies due to LCH SA, e.g. settlement amounts, margins, default fund contributions and fees is a contractual event of default. A clearing member can also be declared in default in case of an insolvency (or similar procedure). Once a clearing member is placed into default, losses may be incurred during the liquidation/transfer of that member's positions, including those of any clients. Risks are mitigated through the provision of collateral for margins which is monitored and can be adjusted intra-day, default fund contributions which are monitored daily and adjusted monthly, and LCH SA's own capital.

If an interoperating CCP is placed into default, LCH SA will close the relevant link and perform cash settlement. Losses may be incurred from the cash settlement process of the inter CCP position or the liquidation of "in-flight" settlement. Risks are mitigated through the provision of collateral for margins by Interoperating CCP. Losses in excess of the Initial margin are covered through loss allocation to clearing member pro-rata the positive close out amounts. Margin to cover the risk on the interoperating CCP is paid once a day but an additional margin call is in place to cover intraday movements of initial margin. Please see *Principle 20* for more information on linked FMIs.

LCH SA has direct credit risk on sovereigns (including government agencies and supranational entities, where eligible) arises from investment in debt issued by or guaranteed by a sovereign. Credit deterioration (at extreme a default) of the sovereign may lead to the potential inability of LCH to realise the full investment amount including accrued interest. LCH SA strictly limits the investment of collateral to highly rated sovereign and any interest rate exposures are strictly limited to 10% of the CCP capital.

LCH SA has indirect credit risk on sovereign entities (including government agencies and supranational entities, where eligible) which arises from the acceptance of debt issued or guaranteed by a sovereign

entity deposited as collateral by clearing members to meet margin liabilities. Credit deterioration of the sovereign may lead to the potential inability of LCH SA to achieve sufficient value from the sale of sovereign debt which would be realised in case of a default of a clearing member.

Risks are mitigated through haircuts on securities and concentration limits on issuers and Wrong Way Risk monitoring.

Credit risk related to investment counterparties arises from the holding of secured investment (in accordance with EMIR and investment policy it is possible to perform unsecured investments but because of central bank access, LCH SA does not use this option for EUR. Risk related to investment outside EUR is negligible). In case of a default of an investment counterparty, LCH SA could have a loss if the liquidation losses are higher than the haircut applied. Risks are mitigated through credit criteria and strict collateral criteria.

LCH SA only holds securities in CSDs and ICSDs. These institutions hold the securities in the name of LCH SA and its members, and from time to time small cash amounts arising from settlement fails. Risks are mitigated through the legal segregation structure covering such assets and the monitoring of limits.

Exposures to all these entities are calculated at least daily.

LCH SA attributes internal credit ratings for each clearing member, investment counterparties, FMIs, etc. through an assessment of both quantitative and qualitative factors. These ratings influence LCH SA's risk management function's response to more specific risks identified by daily monitoring and determine the assessment cycle of each participant. LCH SA monitors all clearing members' compliance with LCH SA's net capital requirement on an on-going basis and clearing members are obliged to provide certain financial information for this purpose as set out in the LCH SA Clearing Rules. All clearing members are also obliged to immediately notify LCH SA in the case of a significant reduction in their shareholders' funds or net capital.

The following tools are used to limit credit risks arising from investment, payment, settlement and custody activities:

- Outright and concentration limits per counterparty and instrument type, scaled by ICS;
- Application of haircuts on securities received as collateral;
- Intraday and overnight limits for intermediaries;
- Use of Delivery Versus Payment (DVP) where possible;
- Use of Banque de France deposit facilities

Key consideration 3 is not applicable to CCPs.

Key Consideration 4: A CCP should cover its current and potential future exposures to each participant fully with a high degree of confidence using margin and other prefunded financial resources (see Principle 5 on collateral and Principle 6 on margin). In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposures for the CCP in extreme but plausible market conditions. All other CCPs should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliate that would potentially cause the largest aggregate credit exposure for the CCP in extreme but plausible market conditions. In all cases, a CCP should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount of total financial resources it maintains.

LCH SA uses variation margin, initial margin, a dedicated portion of its own resources and four mutualised, service specific default funds covering CDSClear, EquityClear/CommodityClear, RepoClear

and €GCPlus. For each default fund a dedicated waterfall to cover current and potential future exposures to its clearing members is in place.

Variation margin is called at least daily and on an intraday basis to cover market price movements on each clearing member's positions. Initial margin is called at least daily and on an intra-day basis and is calibrated at a 99.7 percent confidence level, assuming an appropriate holding period and using market prices from a sufficiently long lookback period. Further margins (add-ons) are called from members that have weak credit scores, those that have large or concentrated positions, or positions that are illiquid or exhibit correlation with the member itself; and in some circumstances where the clearing member has excessive exposures modelled under stress scenarios.

In order to cover potential future exposures from clearing members under extreme but plausible market conditions, clearing members contribute to the service specific default funds. LCH SA maintains additional financial resources sufficient to cover a wide range of potential stress scenarios that include, but are not limited to, the default of the two clearing members and their affiliates that would potentially cause the largest aggregate credit exposure for LCH SA in extreme but plausible market conditions (in line with both EMIR and this requirement under CPMI IOSCO for CCPs which are systemically important in multiple jurisdictions). The relevant default funds are sized to meet the largest two member stress losses above margins (including those of clients and affiliates), applying a set of scenarios of extreme but plausible market conditions. A buffer of 10% is added to the stress risk exposures to set the default fund.

The first step in the monthly sizing process for a given default fund is to calculate for each clearing member group the potential loss on their cleared portfolio under every stress scenario for each day in the lookback period; no netting of client and house portfolios, nor across client accounts, nor affiliated entities is permitted. Secondly, the potential losses for each account are reduced by the margin liability for that account on that day. Negative outcomes (i.e. where the modelled portfolio loss exceeds margins held) are summed per stress scenario for each clearing member group. Thirdly, for each day and for each scenario, the largest two negative net stress outcomes are aggregated; these figures represent the daily 'cover 2' requirement for each scenario. Finally, the default fund value is computed as the largest such 'cover 2' requirement multiplied by 1.1, to include a 10 percent buffer. This process is performed separately for each of the clearing service specific default funds. In order to prevent a situation where large net stress losses modelled for a single clearing member distorts a service's default fund, where the loss of either of the two clearing members driving the monthly re-sizing exceeds 45 percent of the default fund value, an amount up to the difference between the clearing member's net stress loss and 45 percent of the default fund value may be deducted from the default fund value if such member contributes an equal amount in monthly Default Fund Additional Margin (monthly DFAM).

The default funds' values may be subject to the application of a floor or cap, as prescribed in the LCH SA Clearing Rules.

LCH SA places a portion of its own resources, an amount equal to 25 percent of its minimum net capital held in accordance with Article 16 of EMIR and Commission Delegated Regulation (EU) No 152/2013 RTS, ahead of all non-defaulting members' contributions to the mutualised default funds. For CDSClear, this amount has been raised to 20 million Euro of own resources.

There are underlying procedures and model documentation for each of the services that outline the key principles adopted for the calculation of initial margin, variation margin and default funds to cover credit exposures to each clearing member. All such models are independently validated at least annually.

Variation Margin liabilities must be covered by clearing members in cash or collateral depending on the relevant service or product. Liabilities for Initial Margin Contingent Variation Margin and further margins may be met by clearing members either in cash, in a set of eligible currencies (EUR, USD and GBP), in securities issued or explicitly guaranteed by high quality sovereigns and Central Bank Guarantees (limited to guarantee issues by the Belgian and Dutch central banks).

Contributions to default funds are only acceptable in EUR cash and Central Bank Guarantees (limited to Belgian and Dutch members).

Margins are calculated separately for each proprietary account and for each client account. Default Fund contributions are calculated per clearing member.

Prompt access to these resources is ensured through the use of CSDs or (I)CSDs and the investment of cash received according to the internal policy, which sets minimum standards for the security, quality and liquidity of assets and instrument type.

As described above, LCH SA's Risk Appetite and policies establish that a confidence level of 99.7 percent must be used to cover LCH SA's close-out losses in the event of a member default in all but extreme market conditions. The sufficiency of these financial resources is evaluated on a daily basis via statistical tests results and backtesting coverage ratios. A reduction in coverage would initiate further investigation which may lead to a formal model review in accordance with LCH SA's model validation governance. Interim measures include amending configurable model parameters and/or calling additional margin from affected members until model remediation is complete. LCH SA's risk controls include a range of financial resources to cover its credit exposures. These consist of: margins provided by clearing members in respect of their outstanding positions; capital contributions from LCH SA; and segregated, mutualised default funds of prefunded contributions from clearing members. These resources would be used in the following order to cover loss due to a clearing member's default: the defaulted clearing member's margin and default fund contributions; LCH SA's capital contribution; and contributions from non-defaulting clearing members to the relevant default fund.

The LCH SA Clearing rules provide for the segregation of each of the Cash and Derivatives, €GCPlus, CDSClear and RepoClear Default Funds. The financial contributions of non-defaulting clearing members to each default fund cannot be utilised to meet losses arising from the default of clearing members in other services. This segregation also enables the continuation of LCH SA's other services should any single service close.

Stress losses on each clearing member's positions, including those of its clients and affiliates, are modelled each day against a set of extreme but plausible stress scenarios used to size the default fund and netted against margins held. Their largest net stress loss is limited to a maximum of 45 percent of the relevant default fund (the daily clearing limit); clearing members with weaker credit scores have lower limits. Any clearing member with a net stress loss above their limit is called additional margin to reduce their net stress exposure within limit, this is termed daily DFAM.

In addition to the daily stress testing of default fund adequacy, quarterly reverse stress testing is carried out to determine whether a combination of more than two members defaulting simultaneously under the same scenario would result in the default fund being exhausted. The results, together with any recommended actions, are reviewed by internal risk governance and are reported to the Risk Committee on a quarterly basis.

The rationale for the financial resource sizing is documented in both the LCH SA Board's Risk Appetite statement and the LCH SA Board approved suite of risk policies. Risk Appetite is expressed in the Risk Governance Framework which is issued by the LCH SA Board at least annually. It establishes the risk appetite and tolerance for each identified risk, and sets the high level standards it expects LCH SA to adopt in managing such risks.

LCH SA maintains policies covering each of the risk types and detailing how each risk is managed according to the LCH SA Board's expectations. These policies are subject, at least annually, to a thorough review by the internal risk governance and the Risk Committee and is approved by the LCH SA Board.

Key Consideration 5: A CCP should determine the amount and regularly test the sufficiency of its total financial resources available in the event of a default or multiple defaults in extreme but plausible market conditions through rigorous stress testing. A CCP should have clear procedures to report the results of its stress tests to appropriate decision makers at the CCP and to use these results to evaluate the adequacy of and adjust its total financial resources. Stress tests should

be performed daily using standard and predetermined parameters and assumptions. On at least a monthly basis, a CCP should perform a comprehensive and thorough analysis of stress testing scenarios, models, and underlying parameters and assumptions used to ensure they are appropriate for determining the CCP's required level of default protection in light of current and evolving market conditions. A CCP should perform this analysis of stress testing more frequently when the products cleared or markets served display high volatility, become less liquid, or when the size or concentration of positions held by a CCP's participants increases significantly. A full validation of a CCP's risk-management model should be performed at least annually.

LCH SA assesses the sufficiency of the default funds through daily stress testing. Sufficiency is assessed with reference to the sum of the two largest stress test losses under extreme but plausible scenarios, plus the stress test losses of the relevant members' affiliates and clients. This process involves the daily revaluation of each clearing member's portfolio using a set of historical and theoretical stress test scenarios incorporating price and volatility shifts to estimate a worst-case loss in excess of that clearing member's initial margin.

Stress test results are continually reviewed and monitored by the risk management function, with formal approval sought on changes to the framework as necessary from the LCH SA Board with recommendations made by the Risk Committee.

The LCH SA Chief Risk Officer is responsible for implementing and maintaining the framework, making recommendations as necessary to maintain a robust framework and reporting to, or seeking approval as necessary from, the LCH SA Board.

The stress testing framework is independently reviewed annually, with a full review of the coverage of the contracts cleared, of model assumptions and parameters. This process also involves a review of stress test scenarios to ensure their plausibility and accuracy. In addition, ad hoc reviews are carried out when it is deemed that a change in the market may have a material impact on any scenario's plausibility, or on the launch of a new product.

Reverse stress testing is carried out regularly. It examines whether plausible scenarios may exist which would produce more extreme results than those of the current suite of scenarios. The outcome, together with any recommended actions, are reported to the Risk Committee quarterly.

An internal policy sets out all the relevant steps relating to a new or changed model from initiation to independent validation, encompassing a regular model performance review and ensuring that any model changes are within the LCH SA Board's Risk Appetite. Independent validation is conducted by an LCH SA internal independent specialist team or by external specialist independent firms at least annually. The results of the reviews are analysed internally and shared with the Risk Committee and regulators, together with recommendations of the independent teams and actions taken.

Key Consideration 6: In conducting stress testing, a CCP should consider the effect of a wide range of relevant stress scenarios in terms of both defaulters' positions and possible price changes in liquidation periods. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.

LCH SA maintains a record of historical stress test scenarios covering financial crises and exceptional trading days in the last 30 years every time this is possible. These are a well-recognised set of past stresses in use today by most financial institutions. Any changes are subject to approval by the Executive Risk Committee and are reported to the LCH SA Risk Committee. Such changes will lead to the inclusion of scenarios covering new periods of increased market volatility which are added to the set of historical stress-test scenarios as soon as practicable.

In addition, LCH SA maintains and regularly reviews a suite of theoretical scenarios which entail either a remodelling of historically observed scenarios, with more extreme movements and/or de-correlation, or

hypothetical scenarios including for example a sovereign downgrade, price changes and yield curve shifts.

Together, the scenarios suite covers historical, antithetic, theoretical and de-correlation stresses. The stress scenario suite, together with the default fund sizing methodology, is independently validated at least annually.

Key Consideration 7: An FMI should establish explicit rules and procedures that address fully any credit losses it may face as a result of any individual or combined default among its participants with respect to any of their obligations to the FMI. These rules and procedures should address how potentially uncovered credit losses would be allocated, including the repayment of any funds an FMI may borrow from liquidity providers. These rules and procedures should also indicate the FMI's process to replenish any financial resources that the FMI may employ during stress events, so that the FMI may continue to operate in a safe and sound manner.

All clearing members of LCH SA are bound by the Clearing Rules. If a clearing member defaults, then the Clearing Rules establish a waterfall to allocate the losses arising from the default. They are allocated in the following order:

1. Defaulter's margins
2. Defaulter's contribution to all LCH SA Default Funds
3. At minimum, a pro rata allocation of LCH SA's capital calculated, in accordance with Article 35 of Commission Delegated Regulation (EU) No 153/2013 RTS supplementing EMIR
4. Non-defaulters' funded contributions to the relevant default fund that covers the service(s) in which the defaulter has caused losses
5. A Refill/Assessment of the defaulting clearing from each non-defaulter equal to the non-defaulter's funded contribution to the default fund(s) in which the defaulter has caused losses. For EquityClear/CommodityClear, €GCPlus and Repoclear, only one Refill may be called per default, and no more than three Refill contributions can be called in a six-month period. For CDSClear, LCH SA can only call one assessment independently of the number of defaults during the post-default period (25 business days after issuance of notice)
6. Service continuity is either a daily loss allocation to non-defaulters based on cumulative gains, or a daily allocation of losses pro rata the default fund contributions. Service continuity contributions are subject to a cap depending on the relevant service
7. Finally, if service continuity contributions are not sufficient, LCH SA may invite non-defaulting clearing members to make voluntary contributions for service continuity

If there are further losses, not covered by the previous phases of the waterfall, LCH SA will start the service closure phase where it will close out open contracts of the affected service and allocate any shortfall across those clearing members active on this segment. The process outlined above applies to both a single default and the default of multiple clearing members.

LCH SA has four default funds and waterfalls in place for its markets (EquityClear/CommodityClear, CDSClear, Repoclear and €GCPlus)

Following the completion of the default management process, the relevant default fund enters a 30 calendar day "cooling off period". During the cooling off period, each default fund may be refilled to the level of its floor. Except for CDS market where the assessment is strictly limited to one-time default fund contribution during the post default period of 25 business days.

If the default fund during this time is not sufficient to cover the relevant risks, Default Fund Additional Margin ("DFAM") is called to ensure that the waterfall is fully funded and meets the cover 2 standard. At the end of the cooling off period, the relevant default fund is subject to a full recalculation and it is funded up to its recalculated level.

At all times, each non-defaulting clearing member is appropriately margined and a non-defaulter's margin is not used for default management.

Where a clearing member's net stress losses exceed a percentage of the default fund value, it is required to post daily DFAM.

CC&G, with which LCH SA has an interoperable link does not contribute to the RepoClear fund. The surviving CCP will set a price for the Inter CCP position and will retrieve the margins it has provided to the defaulting CCP. The surviving CCP will then perform a cash settlement on positions and liquidate the in-flight settlements. If the collateral deposited by the defaulting CCP is not sufficient to run the cash settlements, the outstanding losses will be shared among members active on the Italian segment through a loss allocation based on the positive close-out values.

Any capital expended by LCH SA, as part of the default management process, would be replenished from its own resources, as described in the Recovery Plan.

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| <p>Publicly available resources</p> | <p>Clearing Rules</p> <p>Risk Management Overview</p> <p>Acceptable Collateral</p> <p>Public quantitative disclosure standards for central counterparties</p> |
|--|---|

Principle 5: Collateral

An FMI that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity, and market risks. An FMI should also set and enforce appropriately conservative haircuts and concentration limits.

Only financial instruments that are of high quality, highly liquid, and with low credit and market risk can be considered for LCH SA's eligible collateral list. LCH SA's risk policies take such criteria into consideration and set the standards for the acceptance of collateral. This policy framework, along with underlying procedures, incorporates development of appropriate haircuts, addresses the need for procyclical adjustments and application of concentration limits and monitoring, and provides for responsive and comprehensive operational systems and processes.

Key Consideration 1: An FMI should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity, and market risks.

Only high quality financial instruments with low credit and market risk and high liquidity can be accepted as collateral. It must be possible to establish mark-to-market value daily using an observed process from published sources. The issuer must meet a minimum ICS, and be approved through appropriate LCH SA governance processes. The Collateral Risk policy is reviewed annually and any revisions are subject to Board approval.

LCH SA operates and maintains a Collateral Management System ("CMS") through which requests by clearing members to deposit or release collateral are made. CMS prevents the submission or receipt of ineligible collateral into LCH SA.

LCH SA maintains a framework for the monitoring and identification of wrong-way and other concentration risks. The framework includes policies that require review and escalation when breaches of concentration limits occur, along with mitigation steps.

The details of eligible collateral including haircuts are published on the LCH SA website.

Key Consideration 2: An FMI should establish prudent valuation practices and develop haircuts that are regularly tested and take into account stressed market conditions.

LCH SA marks its collateral holdings to market daily, using observed market prices from published sources in accordance with internal LCH SA policy.

LCH SA is entitled to give any instrument or security lodged as collateral a zero value if it is found in any way to be unacceptable. LCH SA's internal policies define its collateral haircut framework: the framework includes quarterly monitoring and review of haircuts, and a stress testing regime that contains extreme but plausible scenarios. Collateral haircuts are made up of a base haircut as well as add-ons, and cover market risk, credit risk, wrong-way risk and FX risk in addition to concentration and liquidity risk. Haircuts must also comply with the internal policy on procyclicality.

Key Consideration 3: In order to reduce the need for procyclical adjustments, an FMI should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions, to the extent practicable and prudent.

During the review of haircuts, LCH SA may defer or phase changes to haircuts if deemed necessary, to avoid excessively procyclical effects. LCH SA internal policies require that a 10-year price history be used in haircut calibrations thereby reducing the need for procyclical adjustments. A test for procyclicality of margin collateral haircuts is performed, at least quarterly, as part of every margin collateral haircut review.

Key Consideration 4: An FMI should avoid concentrated holdings of certain assets where this would significantly impair the ability to liquidate such assets quickly without significant adverse price effects.

LCH SA monitors clearing member collateral holdings for concentration risk. Internal risk policy and the LCH SA Clearing Rules allow LCH SA to place concentration limits on particular asset types and to manage specific concentrations within collateral portfolios taking into consideration the ability to realise the value of a piece of collateral during normal and volatile market conditions. For securities collateral that is delivered by members, LCH SA specifies concentration limits on issuers in line with the internal risk policy.

Key Consideration 5: An FMI that accepts cross-border collateral should mitigate the risks associated with its use and ensure that the collateral can be used in timely manner.

Where a clearing member delivers securities, including cross-border delivery, the securities are held in accounts in the name of LCH SA at the relevant (I)CSD, in transfer of ownership (pledge solution is in place only for CDS). LCH SA takes legal opinions in relation to the jurisdictions in which collateral assets, and their issuers, are located, and on the enforceability of its Clearing Rules on a 2-3-year cycle, unless there is a change that requires additional legal advice in the intervening period.

LCH SA holds non-cash collateral in accounts in its name at CSDs to enable it to access such collateral in a timely manner.

LCH SA only applies securities to clearing members' collateral accounts when the (I)CSD has confirmed settlement has occurred. LCH SA performs due diligence of its (I)CSDs and custodians to ensure ongoing compliance with its settlement finality rules and segregation requirements.

Key Consideration 6: An FMI should use a collateral management system that is well-designed and operationally flexible.

CMS provides clearing members with a real-time view of collateral balances on relevant accounts at LCH SA, and provides functionality that allows clearing members to instruct movements of collateral to or from LCH SA and between a clearing member's accounts, and in line with LCH SA's cut-off times and thresholds. CMS also provides information to clearing members on its securities valuations, including haircuts, FX and price data; liability data, i.e. initial margin obligations for each clearing member account; and excess collateral valuation.

CMS instructions on lodge and release of cash and non-cash collateral are managed, after control on concentration and eligibility, in the LCH SA Treasury Banking System ("**CATS**"). CATS instructs the movements of cash to and from clearing member nostro accounts at designated banks and of securities settled from dedicated accounts at (I)CSDs level.

CATS also records the changes on collateral, carrying out the required checks on account balances and ensures the correct monitoring of information and production of regular reports. CMS, CATS and associated systems are subject to a review process to ensure that they are adapted to new monitoring and management functions, e.g. the addition of new (I)CSDs or new collateral products.

LCH SA Collateral Operations team manages CMS from 7 am to 18am (French Time).

Publicly available resources

[Acceptable Collateral](#)

[Collateral Management System](#)

[Collateral Service Description](#)

[Clearing Rules](#)

[Public quantitative disclosure standards for central counterparties](#)

Principle 6: Margin

A CCP should cover its credit exposures to its participants for all products through an effective margin system that is risk-based and regularly reviewed.

The LCH SA risk management framework incorporates policies which set out risk-based standards for margin models, as well as procedures and processes to calculate a clearing member's risk position and initiate margin calls. The framework requires monitoring of clearing member positions, in addition to mark-to-market calculations and the collection of margin intraday if necessary. Margin levels are backtested daily, to assess whether the models are performing at the desired level of confidence (99.7%).

Key Consideration 1: A CCP should have a margin system that establishes margin levels commensurate with the risks and particular attributes of each product, portfolio, and market it serves.

LCH SA's general framework of margining consists in the calculation and collection of intraday and end-of-day initial margin and variation margin. Initial and variation margins are collected from LCH SA's clearing members to cover the risk that members are unable to fulfil their obligations as set out in the LCH SA Clearing Rules and Clearing Member Agreement.

Initial margin performance is assessed on a daily basis through member portfolio backtesting. All of LCH SA's margin models have to pass both the regulatory defined minimum backtesting threshold and the thresholds established by LCH SA's Risk policies and procedures.

Credit exposures arise from latent market risk. Adverse changes in the value of the contracts and products can be attributed to a wide range of risk factors such as interest rates, FX rates, equity prices, commodity prices, credit spreads and implied volatility. Further credit exposures can arise from the cost of securing liquidation for concentrated positions and/or illiquid contracts.

LCH SA's margin models are specifically designed to capture the key risk factors that affect the value of the contracts. The changes in the values of each risk factor and combinations of risk factors are assessed over a wide range of possible outcomes. The initial margin reflects the worst of these outcomes given a pre-defined confidence interval and holding period.

In instances where it is not possible to model all the risk factors that contribute to the potential adverse change in the value of a contract or product, an additional margin will be applied to mitigate this risk. For example, LCH SA has the ability to apply liquidity and concentration risk margin for large positions.

LCH SA has processes in place to calculate and make regular margin calls. By having regular intraday margin calls, the period for which there is an uncovered exposure is minimised and therefore the risk of a clearing member payment failure leading to a large margin shortfall is mitigated.

Clearing member payment failure is, *prima facie*, an event of default. This is likely to trigger LCH SA's default management process which entails a wide range of measures that not only prevent the risk from increasing but reduce and eliminate all open positions. The default management process is regularly rehearsed through default fire drills.

LCH SA has fully documented the margin methodology for all of its clearing services. In addition, as required by LCH SA's risk policies, all margin models are annually reviewed by independent model validation specialists, as well as following either material changes or the introduction of a new model.

The results of the respective independent margin model validation, including any actions that LCH SA may undertake, are subject to a review by LCH SA's internal risk governance, including an annual review by the LCH SA Board.

LCH SA discloses key components of the respective margin model on its public website. In addition, further information is made available to clearing members and is routinely discussed at LCH SA's Risk Committee or in Product Advisory or Risk Working Groups, which have clearing member participation.

Key Consideration 2; A CCP should have reliable source of timely price data for its margin system. A CCP should also have procedures and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.

LCH SA uses prices from public venues or exchanges, should price discovery occur at such venues, for all its clearing services. For clearing services where price discovery is based on reliance on broker-dealer quotes in OTC markets, such quotes are required. The broker-dealer prices can be obtained directly and via published composite or multi-contributor sources.

The same sources are used to build price history data that comprise the market input for the margin models.

LCH SA has policies and procedures that require prices to be available both intraday and at end of day and set out criteria for the quality and reliability of price sources used. There are price validation controls in place to identify when prices have become stale, changed value excessively or the provider ceases to publish price information.

Where a price is not readily available or reliable, LCH SA will utilise an alternative price source. In the event all sources become unreliable, and as set out in LCH SA's Clearing Rules, the last known price will be used as the input into the margin requirement until a suitable replacement is found. If no suitable replacement exists, the contract may not be eligible for clearing and can be suspended.

LCH SA's policies define the approach to ensuring the presence and coverage of price sources. If reliable price sources are not readily available this may constitute a barrier to enabling clearing for the respective product. If reliable prices are available but no historical data is, for example in the case of a new issue that has not traded before, a proxy price will be used to generate the risk factor estimate required for the margin model. . The LCH Group Risk Contract and Market Acceptability Policy describes the principles and factors to be considered prior to the acceptance of any new contract or market. For new cleared Contracts which are already traded, historical price moves and volatility should be assessed to ensure the product can be adequately valued, margined and subjected to stress testing. Where a new contract is added to group of similar contracts that fall into an existing margin class the historical price assessment will be that of the existing margin class. Where this is not the case, new margin calculations may be introduced to manage this risk, or margin may be set in line with a similar highly correlated product. It must be demonstrated that any new margining methodology provides coverage in line with that expected of existing cleared markets.

The choice of a proxy is determined by a number of considerations such as economic equivalence, correlation and volatility. If the best choice of proxy is still weak, the initial margin coverage can be increased by allocating the contract to a more conservative margin group or more conservative liquidity banding.

Finally, all margin models are subject to independent review at least annually. The review scope includes an evaluation of pricing models, market data and potentially the use of proxies. The findings of the review are subject to LCH SA's risk governance review.

Key Consideration 3: A CCP should adopt initial margin models and parameters that are risk-based and generate margin requirements sufficient to cover its potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default. Initial margin should meet an established single-tailed confidence level of at least 99 percent with respect of the estimated distribution of future exposure. For a CCP that calculates margin at the portfolio level, this requirement applies to each portfolio's distribution of future exposure. For a CCP that calculates margin at more-granular levels, such as at the subportfolio level or by product, the requirement must be met for the corresponding distributions of future exposure. The model should (a) use a conservative estimate of the time horizons for the effective hedging or close out of the particular types of products cleared by the CCP (including in stressed market conditions), (b) have an appropriate method for measuring credit exposures that accounts for relevant product risk factors and portfolio effects across

products, and (c) to the extent practicable and prudent, limit the need for destabilising, procyclical changes.

LCH SA's initial margin model consists of both analytical (Value at Risk ("VaR")-like) models and empirical (SPAN-like) models. The confidence interval and minimum level of coverage is determined by the LCH SA Board Risk Appetite and is set at 99.7 percent for all initial margin models.

(A) Analytical models

The key assumptions under the analytical models include a combination of the following:

- Return assumptions
- Holding period assumptions
- The empirical distribution of historical returns of each individual risk factor reflects a reasonable and likely distribution of potential outcomes over the holding period
- Scaling of returns improves predictive power of the history
- The choice of Exponentially Weighted Moving Average ("EWMA") decay factor represents the most appropriate speed of adjustment to changes in market volatility
- There is equal probability of scenario occurrence; and
- The defaulter's portfolio is held constant over the chosen holding period

Analytical models are listed as follows:

| Market | Margin method used | Look-back period | Holding period |
|----------|---|-----------------------------------|--------------------------------------|
| CDSClear | Historical simulation with volatility scaling | Fixed start date of November 2007 | 5 days (7 days for client positions) |

LCH SA additionally applies margin requirements to clearing member in order to cover further credit, liquidity, concentration and sovereign risks that exceed the assumptions of the base calculation.

Procyclical margining changes are mitigated through features such as averaging the largest losses, the application of counter-cyclical buffer and the use of long-term margin floor. For example, the risk of overly procyclical margining in the CDSClear model is mitigated through features such as the averaging of the largest simulated losses; the use of a relatively long look-back period; the use of exponentially weighted moving average volatility scaling; and the use of a percentile long-term quartile margin floor.

(B) Empirical models

The key assumptions under the empirical (SPAN-like) models are:

- Return assumptions
- Holding period assumptions
- Historical correlations continue to hold true under normal market conditions
- Offsets are applied only to offsetting positions, and positions in the same direction are assumed to have unit correlation; and
- The defaulter's portfolio is held constant over the chosen holding period

LCH has a margin model standard whereby initial margins should not jump significantly (by more than 25%) over the holding period during a replay of history model test. The natural length of time to consider in assessing this standard is a 10 year market history, as this is then compatible with the EMIR standard on procyclicality. Implicitly, this formally recognises that a 10 year period is enough to capture the full economic cycle. The 25% jump over the holding period is suggested by the ESRB standard of 25% for a procyclical buffer.

Procyclical margining changes in other models with a lookback period of less than 10 years are mitigated through features such as the application of a counter-cyclicality buffer, the use of long-term margin floor and/or the inclusion of stressed returns.

Empirical models are listed as follows:

| Market | Margin method used | Look-back period | Holding period |
|----------------------------|--|------------------|----------------|
| EquityClear/CommodityClear | SPAN derivatives for Options and Futures | 10 years | 2 days |
| EquityClear | SPAN cash | 1 year | 3 days |
| RepoClear | SPAN like | 10 years | 3 days |

The main margin rate for EquityClear/CommodityClear is the scanning range, which is the highest of three standard deviations of historic volatility based on the higher of one-day or two-day relative price movements in the lookback period.

For RepoClear and €GCPlus, margin parameters are defined considering the maximum of the 99.7% percentile of the 1 day, 2 days holding period days historical P&L over the last 10 years.

(C) For all models:

Margin rates may be adjusted to account for contracts which are affected by external events in the period under review, such as political, seasonal, and economic. All material adjustments to margin rates must be approved by the Executive Risk Committee and will be notified to the Board Risk Committee.

Key model parameters are determined by calibration to backtesting performance, margin stability, reactivity and decay metrics, liquidity thresholds, historical volatility and benchmarking.

The following factors are considered when determining the appropriate close-out period:

- Duration to formally execute the default notice, inform stakeholders, remove market access and initiate the Default Management Group
- Duration to agree exit strategy, hedge trades and auction portfolios
- Duration to execute the exit strategy in a normal market or stressed market; and
- Duration to initiate and complete the client porting process

At least 10 years of data are obtained for the historical sampling period. This ensures at least one economic cycle is captured. Where 10 years of data are not available or are unreliable or create excessive data overhead, a shorter sample is used, either five years or one year. The shorter samples are subject to a 25% buffer which limits how far margins can be reduced and limits procyclicality.

The additional margins such as concentration and liquidity margin are threshold based. The thresholds are calibrated using market data such as observed volumes and open interest on public exchanges or using survey derived data from participants in OTC markets. Thresholds derived from surveys are benchmarked to internal cleared trading data and subjected to regular review by the respective Default Management Groups (“DMG”).

Two types of wrong-way risk have been identified. Firstly, specific wrong-way risk arises where a member has exposure in collateral provided in the form of its own securities or affiliates' securities. This type of wrong way or self-referencing risk is not permitted, i.e. members cannot post collateral in their own name, in the case where it does arise in the clearing exposures such as a member trading in its own name then the margin requirement is a flat 100% of the specific wrong way exposure. Secondly, general wrong-way risk arises when a member's portfolio is highly correlated to the country of domicile or the member's creditworthiness, or that the assets and liabilities in the member's portfolio are highly correlated.

The consequence is that in certain scenarios, the member's exposure can be magnified due to these linked risks. Where wrong-way risk arises, additional margin is called to mitigate the adverse correlation.

LCH SA's Default Management Process does not seek to maintain open positions in a default beyond the holding period. Therefore, adverse price affects are assumed when closing out large or illiquid positions. All fire drill exercises have resulted in significant excess of margin. LCH SA is therefore comfortable that even a significant risk position could be closed out within margin levels inside the assumed close out period.

Key Consideration 4; A CCP should mark participant positions to market and collect variation margin at least daily to limit the build-up of current exposures. A CCP should have the authority and operational capacity to make intraday margin calls and payments, both scheduled and unscheduled, to participants.

LCH SA marks to market clearing members throughout several mechanisms depending on the underlying assets. For CDS or listed futures, pass through variation margins are considered. For Repos, cash equities and options, collateralized mark to market, like contingent variation margins are calculated and included into the Initial Margin amount.

LCH SA has the authority and operational capability to make intraday margin calls for each clearing service. All intra-day margin monitoring account for adverse changes in both variation margin and initial margin. Margin calculations are based on intraday positions and valuations.

Key Consideration 5: In calculating margin requirements, a CCP may allow offsets or reductions in required margin across products that it clears or between products that it and another CCP clear, if the risk of one product is significantly and reliably correlated with the risk of the other product. Where two or more CCPs are authorised to offer cross-margining, they must have appropriate safeguards and harmonised overall risk-management systems.

LCH SA does not permit offsets between itself and other CCPs or between the default funds within LCH. The purpose of this restriction is to avoid any potential contagion risk between different default funds or CCPs. LCH SA does permit offsets within certain classes of products within a common default fund.

In order to permit offsets or reductions in required margins, LCH SA must be satisfied that the following conditions are met:

- The price risk of one financial instrument or a set of financial instruments subject to an explicit discrete offset is significantly and reliably correlated, or based on equivalent statistical parameter(s) of dependence, with the price risk of other financial instruments. When the financial instruments are subject to implicit combined offsets the price risk is sufficiently reliable to the extent that it does not create statistically significant model error.
- The economic offset cannot be based purely on a (potentially spurious) mathematical correlation, but the rationale must be supported on risk and economic grounds such as commonality of underlying risk drivers for the products in question, or the existence of a traded product linking the products for which the offset is sought.
- The economic offset must be demonstrably resilient during stressed market conditions and must be subject to a stress test regime.

- Where multiple instruments are involved, the margin reduction can be no more than 80% of the sum of the margins for each instrument calculated on an individual basis.
- Financial instruments margined jointly with offsets must be default managed jointly.

Offsets parameters for Fixed Income are implemented directly by spread margins or inter-commodity spread credits between two contracts or indirectly by portfolio margin methods. The maximum offset is capped at 80 per cent.

The robustness of LCH SA's portfolio margin methodologies is measured daily through margin erosion and backtesting analysis. Model performance is assessed at member portfolio level, risk factor level and stylised portfolio level. The stylised (hypothetical) portfolios check margin performance for positions that contain a high degree of price dependency such as stylised calendar spreads and relative value positions. Regular sensitivity testing evaluates changes in recent correlations.

Key Consideration 6: A CCP should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting – and at least monthly, and more-frequent where appropriate, sensitivity analysis. A CCP should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. In conducting sensitivity analysis of the model's coverage, a CCP should take into account a wide range of parameters and assumptions that reflect possible market conditions, including the most-volatile periods that have been experienced by the markets it serves and extreme changes in the correlations between prices.

Initial margin coverage is backtested on a daily basis by comparing the portfolio initial margin with ex post clean profit and loss. The backtest results are reviewed daily by the LCH SA risk management function with monthly summaries shared at each LCH SA Risk Committee. If backtesting suggests the margin coverage target cannot be met, LCH SA will conduct further investigation into the performance of the margin model. Additional analysis is performed on a monthly basis to investigate underlying causes of margin coverage breaches and identify any model weaknesses with respect to specific products, risk factors and market conditions.

LCH SA performs a number of different sensitivity tests depending on the model type. The tests for the analytical models examine sensitivities to certain portfolio types, volatility scaling assumptions, risk factor return assumptions, risk factor level dependence, EWMA decay factor sensitivity and correlation changes. The tests for the empirical models examine sensitivities to certain portfolio types, scanning ranges and the sensitivities to changes in contract offsets.

Tests are performed monthly with quarterly reports made to the risk management function.

Potential shortcomings may arise for a number of different reasons such as that the model does not capture all the risk factors, the model is overly procyclical, the model does not respond to new volatility and correlation, the model exhibits excessive ghosting effects, model backtesting breaches are excessive or clustered, or market conditions breach the model assumptions.

LCH SA will call additional margin for portfolios exhibiting excessive margin erosion until the model is updated and performance issues are addressed.

Backtesting results by service are disclosed on the [LCH SA website](#).

The results of the sensitivity tests are for internal purposes only and are not disclosed to members or clients.

Key Consideration 7: A CCP should regularly review and validate its margin system.

LCH SA's margin models are validated on an annual basis considering data over the past year. The independent review of margin models considers all available backtesting and stress testing results. In addition, it tests the performance of the models across various levels of confidence, and tests and

calibrates the underlying parameters of models. In addition, LCH SA's risk policies and outcomes are reviewed on a regular basis by the LCH SA Risk Committee.

The model review evaluates the validity of the margin model in theory and its performance in practice, and also appraises its parameters and assumptions. The review considers any changes in market practice and recent market conditions.

Material changes to margin methodology are subject to LCH SA's internal risk governance process, which includes both internal review and independent validation of the model, and must receive approval from both the Executive Risk Committee and the LCH SA Board.

The model validation report and recommendations, for each LCH SA clearing service, are notified to internal risk governance, the Internal Audit department and to relevant Regulators.

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|--|--|
| <p>Publicly available resources</p> | <p>Margin Methodologies</p> <p>Risk Management Overview</p> <p>Clearing Rules</p> <p>Public quantitative disclosure standards for central counterparties</p> |
|--|--|

Principle 7: Liquidity risk

An FMI should effectively measure, monitor, and manage its liquidity risk. An FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions.

LCH SA has robust arrangements for the management of liquidity risk during business-as-usual and in default situations. An operational liquidity target is set and closely monitored by LCH SA and stress testing is performed using conservative assumptions, including the default of the two member groups that would generate the largest liquidity need, to determine the adequacy of its liquid resources.

Key Consideration 1: An FMI should have a robust framework to manage its liquidity risks from its participants, settlement banks, nostro agents, custodian banks, liquidity providers, and other entities.

LCH SA's framework for the management of liquidity risk is set out in an internal policy which is validated by the LCH SA Risk Committee and approved by the LCH SA Board. It sets out the parameters within which liquidity risks must be managed, including sources of liquidity and liquidity needs, the nature and frequency of liquidity assessments, limits and stress testing.

The framework is further detailed in a series of underlying detailed procedures, namely:

- A Liquidity Plan which is also approved by the LCH SA Board, and sets out the principles and procedures for liquidity management: this includes details of liquidity tools available to LCH SA and the assumed availability of each tool in both normal and stressed market conditions
- A Liquidity Testing Procedure
- A Liquidity Stress Testing Procedure

LCH SA's liquidity policy considers two key sources of liquidity needs, as well as other potential outflows that might further deplete liquidity resources. The two main sources of liquidity needs are:

- (i) outflows that arise in the normal course of operations (i.e. not due to member default), such as repayment of excess cash upon clearing member request, overall reduction in initial margin resulting from clearing members' reduction or close-out of positions, clearing member request to substitute non-cash collateral for cash collateral or to facilitate settlement (including for settlement fails); and
- (ii) the potential liquidity need in the event of clearing member default(s), thereby requiring LCH SA to
 - (a) fulfil the settlement obligations of the defaulting clearing member(s) and,
 - (b) pay variation margin to non-defaulting clearing members on the positions held by the defaulting clearing member(s). There may also be hedging costs and potential losses due to the liquidation of the defaulting clearing member(s) cleared positions and/or collateral lodged with respect to those cleared positions.

The liquidity policy also considers other potential liquidity needs such as those generated by payment delays or disruptions, as well as the failure of an investment counterparty to return cash at the maturity of an investment. Note that in the absence of a clearing member default, cash flows arising from the clearing activity itself are matched across LCH SA's books.

The size of LCH SA's liquidity requirement is an aggregate of the sources of liquidity needs which are assessed daily. Liquidity risk is managed on a centralised basis taking into consideration the aggregate liquidity needs across all services. In its quarterly CPMI/IOSCO quantitative disclosure, LCH SA publishes

the size and composition of its qualifying liquid resources, and the estimated and actual largest same-day, and where relevant intraday and multiday payment obligation in total.

LCH SA's liquidity risk management framework recognises the multiple roles clearing members or their affiliates may also play as custodians, settlement banks or investment counterparties, and so such exposures are assessed and monitored daily (including intraday) against defined limits in accordance with the Liquidity Risk Policy.

Key Consideration 2: An FMI should have effective operational and analytical tools to identify, measure, and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.

LCH SA's systems contain records and settlement status of all margin, settlement, funding and investment flows.

The Treasury and Operations department tracks liquidity usage of the Banque de France intraday liquidity line (3G line) and the cash injected in the settlement platforms on a near real-time basis.

An escalation process is in place within LCH SA to alert senior management to unusual movements.

Key Consideration 3 is not applicable to CCPs.

Key Consideration 4: A CCP should maintain sufficient liquid resources in all relevant currencies to settle securities-related payments, make required variation margin payments, and meet other payment obligations on time with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate payment obligation to the CCP in extreme but plausible market conditions. In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemically important in multiple jurisdictions should consider maintaining additional liquidity resources sufficient to cover a wider range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would generate the largest aggregate payment obligation to the CCP in extreme but plausible market conditions.

Liquidity needs in all relevant currencies are monitored daily, as part of LCH SA's liquidity risk management framework.

The results of liquidity stress testing are reported to senior management within LCH SA's risk and Collateral and Liquidity Management ("CaLM") functions on a daily basis.

LCH SA's liquidity risk management framework is designed to ensure sufficient liquid resources are maintained in order to meet its payment obligations on time. LCH SA's monitoring always considers the liquidity need that could be generated in the event of default of the two largest clearing member groups (including affiliates and investment exposures), in extreme but plausible market conditions.

LCH SA carries out daily liquidity stress tests based on both business as usual and stressed market conditions. LCH SA models its liquidity out to 5 days to ensure sufficient liquidity to cover ongoing operations. LCH SA estimates the size of the liquidity requirement in EUR.

In addition to the Cover 2 liquidity stress tests, LCH SA also performs several additional extreme but plausible stress-test scenarios, which target events that are considered to have a probability of up to once in 30 years, such as the impact of a regional economic crisis, large margin outflows and the default of multiple clearing participants. The results of these additional stress tests are used for management information.

Currently LCH SA uses initial margin (IM) to model future variation margin (VM) flows as part of its liquidity risk management framework, but will shortly amend this component by adopting the extreme-but plausible standard and use Stress Test Losses to model future VM flows, subject to final regulatory approval. Specifically, to ensure consistency when modelling future variation margin payments, LCH SA will utilise the stress test suites run within each clearing service to measure credit/market risk. Stress test losses are calculated by clearing service using the full range of stress scenarios available, which include historical,

theoretical and antithetical stresses. The stress test losses of each clearing member group will be aggregated across clearing services to ensure each component of the variation margin payment is modelled under extreme but plausible market conditions.

LCH SA is licensed in multiple jurisdictions to clear several asset classes, consequently the complexity of LCH SA's activities is limited to these parameters, rather than the acceptance for clearing of financial instruments that are characterised as complex. LCH SA adopts the most rigorous of the applicable regulatory regimes as a minimum when setting the standards for its liquidity risk management framework.

Key Consideration 5: For the purpose of meeting its minimum liquid resource requirement, an FMI's qualifying liquid resources in each currency include cash at the central bank of issue and at creditworthy commercial banks, committed lines of credit, committed foreign exchange swaps, and committed repos, as well as highly marketable collateral held in custody and investments that are readily available and convertible into cash with prearranged and highly reliable funding arrangements, even in extreme but plausible market conditions. If an FMI has access to routine credit at the central bank of issue, the FMI may count such access as part of the minimum requirement to the extent it has collateral that is eligible for pledging to (or for conducting other appropriate forms of transactions with) the relevant central bank. All such resources should be available when needed.

LCH SA's primary liquid resources consist of cash and highly marketable securities (including those provided by defaulted and non-defaulted members as collateral and received as settlement of the defaulter's cleared positions) which are eligible to be deposited at the Banque De France in order to get same day cash without pre-notification or approval. The non-defaulted members non cash collateral is transferred in full title and can therefore be used immediately to generate liquidity.

The LCH SA quarterly CPMI/IOSCO quantitative disclosure contains data related to the size and composition of its qualifying liquid resources.

LCH SA's liquid resources are managed in compliance with its internal investment and liquidity policies to ensure capital preservation and availability of liquidity to meet stressed liquidity requirements. LCH SA has processes that can be invoked in stressed environments to raise liquidity. These processes make assumptions around some activities which are not utilised in a business as usual environment, and hence care has to be taken to ensure that these assumptions are realistic. To ensure that this is the case, LCH SA undertakes an exercise of 'War Games' to test the assumptions. These activities test market/counterparty appetite for securities that LCH SA does not actively invest in or sizes/concentrations of exposures that are outside the day to day activity.

LCH SA also has arrangements in the form of completed GMRA agreements with a number of high quality counterparties, including counterparties with particular expertise and capacity in specific collateral markets. LCH SA engages in reverse repurchase transactions for investment purposes, and has a regular programme of test repurchase transactions, which are reported through the risk governance process. LCH SA also has a limited funding arrangements with one major ICSD.

LCH SA's liquidity policy requires that a minimum buffer be maintained above the stress tested liquidity resource requirement on a cover two basis and remedial action be taken if the buffer is eroded.

Key Consideration 6: An FMI may supplement its qualifying liquid resources with other forms of liquid resources. If the FMI does so, then these liquid resources should be in the form of assets that are likely to be saleable or acceptable as collateral for lines of credit, swaps, or repos on an ad hoc basis following a default, even if this cannot be reliably prearranged or guaranteed in extreme market conditions. Even if an FMI does not have access to routine central bank credit, it should still take account of what collateral is typically accepted by the relevant central bank, as such assets may be more likely to be liquid in stressed circumstances. An FMI should not assume the availability of emergency central bank credit as a part of its liquidity plan.

LCH SA does not count non-qualifying liquid resources as being available to meet liquidity outflows in its liquidity stress testing. A large part of the Collateral accepted by LCH SA as collateral for investments or

as non-cash collateral for margin (which can only be used in the event of the default of the member who provided the collateral) is denominated in Euro and therefore acceptable as collateral at the Banque De France.

LCH SA does not rely on supplemental liquid resources, or any assumption of the provision of central bank credit, in meeting its stressed liquidity needs.

Key Consideration 7: An FMI should obtain a high degree of confidence, through rigorous due diligence, that each provider of its minimum required qualifying liquid resources, whether a participant of the FMI or an external party, has sufficient information to understand and to manage its associated liquidity risks, and that it has the capacity to perform as required under its commitment. Where relevant to assessing a liquidity provider's performance reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue may be taken into account. An FMI should regularly test its procedures for accessing its liquid resources at a liquidity provider.

LCH SA relies mainly on the cash and the liquidity line provided by the Banque de France to meet its minimum required qualifying liquidity resources. The highly marketable securities received as collateral or purchased through investments can be readily convertible into cash through the intraday liquidity line granted by the Banque de France.

LCH SA carries out appropriate ongoing due diligence on counterparties as required by its Counterparty Credit Risk and the Settlement, Payment and Custodian Policies.

LCH SA maintains a Liquidity Plan that describes the tools that would be used to fund liquidity to meet operational or default liquidity needs. The plan considers possible constraints on access to each source of liquidity, including whether they would be available during periods of market stress or during a "liquidity event" (defined as a situation where there is an actual or perceived risk of any cash shortfall). The choice and prioritization of options to generate liquidity will depend on timing and duration of liquidity requirements and market conditions. For short term liquidity requirements funding is likely to focus on ECB liquidity, repo and other borrowing mechanisms. For longer term or structural changes to the liquidity profile the recourse is likely to be the assets sale. In terms of Euro management, LCH SA has access to the ECB liquidity through the open market operations and standing facilities. Some of the options LCH SA would use to address a liquidity shortfall are applied on an ongoing basis as part of LCH SA's standard investment and liquidity management activities e.g. usage of 3G credit line, sales of securities and maturing investments. To ensure that it could access liquidity through using the tools that are not used on a day-to-day basis (e.g. repo, borrowing, FX lines), LCH SA conducts regular 'War games'. As part of these tests, LCH SA also simulates the liquidation of a defaulting clearing member's collateral.

Key Consideration 8: An FMI with access to central bank accounts, payment services, or securities services should use these services, where practical, to enhance its management of liquidity risk.

LCH SA's internal risk policy sets a preference for the use of central bank services where available. The liquidity requirements are mainly in Euro therefore LCH SA uses its Central Bank access to raise Euro liquidity.

Key Consideration 9: An FMI should determine the amount and regularly test the sufficiency of its liquid resources through rigorous stress testing. An FMI should have clear procedures to report the results of its stress tests to appropriate decision makers at the FMI and to use these results to evaluate the adequacy of and adjust its liquidity risk-management framework. In conducting stress testing, an FMI should consider a wide range of relevant scenarios. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. Scenarios should also take into account the design and operation of the FMI, include all entities that might pose material liquidity risks to the FMI (such as settlement banks, nostro agents, custodian banks, liquidity providers,

and linked FMIs), and where appropriate, cover a multiday period. In all cases, an FMI should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount and form of total liquid resources it maintains.

LCH SA carries out daily stress testing which compares stress needs for liquidity against the stressed resources available.

Daily reports of the results of such testing are circulated to senior risk management including the Chief Risk Officer.

The stress tests take a conservative set of assumptions about potential outflows and the ability of LCH SA to liquidate assets, and assume the default of the two largest members, along with their affiliates and clients, that have the largest liquidity requirements. In addition to the Cover 2 liquidity stress tests, LCH SA also performs several additional extreme but plausible stress-test scenarios, which target events that are considered to have a probability of up to once in 30 years, such as the impact of a regional economic crisis, large margin outflows and the default of multiple clearing participants. The results of these additional stress tests are used for management information.

The liquidity stress tests take into account liquidity risks arising from the different relationships LCH SA has with the entities, or members of the same group, and assume that they may simultaneously default in their capacities as clearing member, as investment counterparty. LCH SA's stress testing seeks to ensure that it is able to settle its payment obligations on time under this circumstance. As part of the quarterly liquidity reverse stress testing scenario suite, both the availability of the liquid assets and the size of the liquid liabilities are stressed in different ways to determine whether it would be plausible to be left with a liquidity deficit (i.e. the Liquidity Coverage Ratio would be under 100%).

The liquidity risk management framework is subject to an annual independent validation, and where changes are identified these must be approved by Executive Risk Committee and notified to Risk Committee. The Liquidity Risk Policy which sets the liquidity risk standards, and the Liquidity Plan which describes the liquidity tools available to LCH SA are also subject to annual review by Risk Committee, which in turn makes recommendation to the LCH SA Board for approval.

Key Consideration 10: An FMI should establish explicit rules and procedures that enable the FMI to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations on time following any individual or combined default among its participants. These rules and procedures should address unforeseen and potentially uncovered liquidity shortfalls and should aim to avoid unwinding, revoking, or delaying the same-day settlement of payment obligations. These rules and procedures should also indicate the FMI's process to replenish any liquidity resources it may employ during a stress event, so that it can continue to operate in a safe and sound manner.

LCH SA maintains arrangements for ensuring settlement finality as described in the assessment of compliance with Principle 8. These arrangements along with its liquidity risk framework (see above - Key Consideration 1) provide the structure for ensuring LCH SA is able to settle payment obligations on time even in the event of participant(s) default. The Settlement Finality Regulations within the LCH SA Clearing Rules provisions describe the irrevocability of a Transfer Order and prohibit revocation of a Transfer Order.

The key tests used to determine the liquidity requirement in the event of a member default are the intraday liquidity stress tests and 5-day liquidity stress tests, which forecast liquidity requirements that arise over the next 5 business days under stressed market conditions and assuming the default of the two member groups with the largest liquidity requirements. To ensure it maintains sufficient liquid resources, under the Liquidity Risk Policy requires LCH SA maintain a minimum liquidity buffer above its total liquidity requirement. This ensures that the CCP has sufficient liquidity to meet intraday and daily liquidity needs following the default of the two clearing members (with their affiliates and clients) with the largest liquidity requirements. The actions that LCH SA would take to address uncovered liquidity shortfall or replenish its liquidity resources are described in the Liquidity Plan and Recovery Plan. The Liquidity Plan covers the tools that could be used to fund operational and default liquidity needs. LCH SA typically holds a substantial buffer of liquid resources in excess of its liquidity coverage ratio ("**LCR**") required to meet the projected

operational and default liquidity requirement. The Liquidity Plan and the Recovery Plan consider possible constraints on access to each source of liquidity, including whether they would be available during periods of market stress or during a “liquidity event” (defined as a situation where is an actual or perceived risk of any cash shortfall).

Publicly available resources

[Clearing Rules](#)

[Public quantitative disclosure standards for central counterparties](#)

Principle 8: Settlement Finality

An FMI should provide clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, an FMI should provide final settlement intraday or in real time.

LCH SA's arrangements for ensuring settlement finality are founded on the designation of LCH SA as a settlement system notified by the French Minister of Economy to the European Commission; LCH SA Clearing Rules' provisions; and the commissioning of legal opinions in support of the applicable provisions within its Clearing Rules.

Key Consideration 1: An FMI's rules and procedures should clearly define the point at which settlement is final.

As a settlement system, and in accordance with the provisions of the Settlement Finality Directive (as adapted into French law), LCH SA's Clearing Rules define the moment when the **cleared transactions** are **irrevocable** within its system, i.e. when they are registered in the clearing system.

The moment when **the settlement** of these cleared transactions is **final** is defined in the rules of the relevant settlement systems.

LCH SA has established technical links with several CSDs/settlement systems for the purpose of the settlement of cleared transactions on the EquityClear, CommodityClear and RepoClear clearing segments. The list of the relevant CSDs/settlement systems is available in LCH SA's Clearing Rules available on its website.

The rules of these settlement systems are available on their respective websites.

Key Consideration 2: An FMI should complete final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk. An LVPS or SSS should consider adopting RTGS or multiple-batch processing during the settlement day.

Please refer to our answer above, i.e. "as a settlement system, and in accordance with the provisions of the Settlement Finality Directive (as adapted into French law), LCH SA' Clearing Rules define the moment when the **cleared transactions** are **irrevocable** within its system, i.e. when they are registered in the clearing system.

With regards to the moment when **the settlement** of these cleared transactions is **final**, it is defined in the rules of the relevant settlement systems, available on their website."

Key Consideration 3: An FMI should clearly define the point after which unsettled payments, transfer instructions, or other obligations may not be revoked by a participant.

The Settlement Finality Directive aims to reduce the risks associated with participation in EU payment and securities settlement systems by minimising the disruption that may be caused by insolvency proceedings brought against a participant in such a system. LCH SA's Clearing Rules specify that the **cleared transactions** are deemed to be irrevocable when they are registered in its clearing system.

The time when **settlement instructions**, sent by LCH SA in the name of its clearing members to the relevant Securities Settlement System, become irrevocable, is defined in the Securities Settlement System's rules.

Publicly available resources

[Clearing Rules](#)

Principle 9: Money Settlements

An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money.

LCH SA uses central bank money for settlement purposes where available and practicable. Where commercial banks are utilised, LCH SA has contractual arrangements in place through legal agreements and its Clearing Rules provisions, to minimise incurring credit risk. Supporting operational procedures and processes are also designed to mitigate credit and liquidity risk.

Key Consideration 1: An FMI should conduct its money settlements in central bank money, where practicable and available, to avoid credit and liquidity risks.

Thanks to its banking licence and its full access to ECB liquidity facilities, LCH SA offers central bank money settlement as a Direct Connect Party (DCP) to Target2 Securities (“T2S”) for euro denominated products representing over 99% of the business cleared by LCH SA. Remaining non euro settlement activity is settled in ICSD in commercial bank money.

Key Consideration 2: If central bank money is not used, an FMI should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.

LCH SA has a very limited non euro denominated products clearing activity settling in Euroclear Bank. Euroclear Bank is closely monitored in application of the LCH Group Counterparty Credit Risk Policy.

Key Consideration 3: If an FMI settles in commercial bank money, it should monitor, manage, and limit its credit and liquidity risks arising from the commercial settlement banks. In particular, an FMI should establish and monitor adherence to strict criteria for its settlement banks that take account of, among other things, their regulation and supervision, creditworthiness, capitalisation, access to liquidity, and operational reliability. An FMI should also monitor and manage the concentration of credit and liquidity exposures to its commercial settlement banks.

LCH SA may undertake regular due diligence of ICSDs and a quarterly meeting between LCH SA and the ICSDs is organised in order to formally review the service.

Key Consideration 4: If an FMI conducts money settlements on its own books, it should minimise and strictly control its credit and liquidity risks.

LCH SA is settling 100% of its clearing activities within accounts opened under its own name. LCH SA does not outsource settlement functions to any third party. LCH SA does not conduct money settlements on its own books.

Key Consideration 5: An FMI’s legal agreements with any settlement banks should state clearly when transfers on the books of individual settlement banks are expected to occur, that transfers are to be final when effected, and that funds received should be transferable as soon as possible, at a minimum by the end of the day and ideally intraday, in order to enable the FMI and its participants to manage credit and liquidity risks.

This consideration is not applicable to LCH SA

Publicly available resources

[Clearing Rules](#)

Principle 10: Physical deliveries

An FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor and manage the risks associated with such physical deliveries.

LCH SA Clearing rules govern and set out the overall obligations and responsibilities of all market participants clearing physically delivered instruments (bonds and equities) through LCH SA. LCH SA does not offer to store physically delivered instruments or commodities. LCH SA manages the delivery cycle for all physically delivered instruments and commodities in accordance with its publicly available Clearing Rules.

Key Consideration 1: An FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.

LCH SA supports physical delivery for the EquityClear, CommodityClear and RepoClear clearing services.

The overall obligations and responsibilities that govern physical delivery are publicly defined in the respective Exchange and LCH SA Clearing Rules. In the case of LCH SA, these are set out in its Clearing Rules and include both the rights and obligations for all market participants as well as how the physical delivery process is being administered. LCH SA does not offer to store physically delivered instruments nor commodities.

LCH SA sends settlement instructions to (I)CSDs and T2S for transactions between LCH SA and its clearing members. These are settled under the rules and procedures of the (I)CSD. LCH SA supports its clearing members by ensuring that they have a strong understanding of their obligations and the procedures for physical delivery and that they are adequately supported throughout the delivery process.

The membership requirements for new clearing members set out the technical and operational obligations, including for physical delivery that they must meet as part of their membership of LCH SA and the relevant clearing service. Finally, LCH SA provides training to new clearing members on the physical delivery process, LCH SA's systems and their obligations.

Existing clearing members, as part of the annual member survey, are asked to provide information on their ongoing technical and operational capacity, including for physical delivery. In addition, LCH SA provides a rolling schedule of training courses to all clearing members, which includes physical delivery, enabling them to train their staff. Any clearing member can request additional training at any time. LCH SA further supports its clearing members by making the clearing member test environment available such that they can test their procedures, processes and reconciliations and become familiarised with the systems.

Finally, LCH SA is available to assist clearing members with any practical, operational or procedural questions associated with the delivery process.

Key Consideration 2: An FMI should identify, monitor, and manage the risks and costs associated with the storage and delivery of physical instruments or commodities.

LCH SA does not offer to store physically delivered instruments or commodities. LCH SA manages the delivery cycle for all physically delivered instruments in accordance with its publicly available Clearing Rules. As part of this management cycle, the risk and costs are primarily associated with the position management process and ensuring that a delivery is made in accordance with the contract specifications.

For those physical instruments that settle in an (I)CSD or via T2S, it is the (I)CSD that is responsible for administering the delivery process as well as the application of any associated fees to the (I)CSD participant.

LCH SA has procedures that are designed to actively position manage trades through to delivery.

LCH SA provides automated position reporting to its clearing members to enable them to accurately monitor their obligations, to allow them to ensure they have the necessary inventory to fulfil their obligations.

LCH SA operates an active fails management process, which will ultimately see failed deliveries being added to the following day's delivery obligations for the respective member. LCH SA employs a fails fee regime in accordance with Article 15 of the Short Selling Regulation (Regulation (EU) 236/2012) for cash equities. In addition, and in accordance with the LCH SA Clearing Rules, LCH SA also employs a fails fee covering fixed income. In order to maintain efficient and effective delivery processes, LCH SA regularly reviews delivery amounts against the obligations of its clearing members to ensure that any risks are identified immediately in order to maintain a robust position management process.

Finally, LCH SA ensures its ongoing compliance with international sanctions, including with respect to the potential impacts on the delivery processes. In order to ensure that LCH SA's clearing members have the necessary systems and resources available to them, LCH SA sets transparent membership criteria requiring technology, operations and resources be in place prior to the member joining LCH SA and throughout their membership. In addition, LCH SA requires its clearing members to complete Static Data forms accurately and on a timely basis to ensure their delivery preferences are met.

Publicly available resources

[Clearing Rules](#)

Principle 11 (Central securities depositories) is not applicable to CCPs.

Principle 12 (Exchange-of-value settlement systems) is not applicable to LCH SA.

LCH SA does not operate an exchange-of-value settlement system and therefore does not need to complete a self-assessment for **Principle 12** (Exchange-of-value settlement systems).

Principle 13: Participant-default rules and procedures

An FMI should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the FMI can take timely action to contain losses and liquidity pressures and continue to meet its obligations.

The LCH SA Clearing Rules contain default rule provisions that set out LCH SA's rights and obligations in the event of a clearing member default. It also contains provisions in relation to the management of the defaulter's positions and the allocation of losses.

Key Consideration 1: An FMI should have default rules and procedures that enable the FMI to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default.

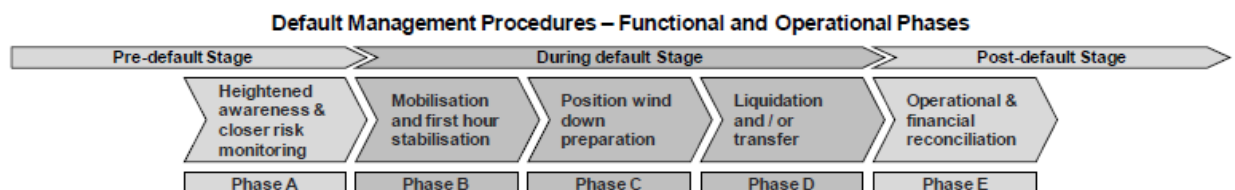
LCH SA's Default Rules, contained in its Clearing Rules, set out that it is entitled to place a clearing member in default if it appears to LCH SA that the clearing member is unable, or is likely to become unable, to meet its obligations in respect of one or more contracts. The Clearing Rules set out a non-exhaustive list of events which may show that a clearing member is or is likely to become unable to meet its obligations and may be declared in default. If a clearing member becomes subject to any insolvency event, it will also be declared in default.

The Clearing Rules set out the steps that LCH SA may take with respect to a defaulter, including entering into contracts to hedge market risk, selling any security, porting client accounts of that clearing member to another clearing member, liquidating the defaulter's proprietary portfolio and/or any client accounts of that clearing member which could not be ported to another clearing member) and generally taking such action as LCH SA may deem necessary for its protection. The sequence of actions will be determined by a number of factors, including size and characteristics of the defaulted member's portfolio and the market environment.

All LCH SA clearing services have a Default Management Process ("DMP") and a specific default management instruction/procedure, which is part of the overall Clearing Rules.

All significant decisions will be taken by the LCH SA CEO supported by the DCMT (Default Crisis Management Team).

The functional and operational phases of default management can be shown as follows:



On calling a default, the LCH SA CEO will convene the DCMT which will be responsible for the overall management of the default.

The DCMT will instruct the head of each impacted clearing service to convene a Default Management Group (DMG), which comprises LCH SA staff and, for some services, clearing members. Where representatives of clearing members are seconded to a DMG of LCH SA for the purpose of default management, they act on behalf of LCH SA and appropriate confidentiality arrangements are in place.

DMGs will request approval for all significant decisions to the DCMT. The Default Rules set out how LCH SA shall meet any losses arising from a default, including the use of collateral provided by the defaulter, LCH SA's own funds and the default fund(s) and the remainder of the waterfall.

The non-defaulting members are incentivised to participate in the DMP and in auctions to safeguard their own default fund contributions and to ensure the continued operation of the markets.

The Clearing Rules also set out the order in which LCH SA shall reduce or bear its losses. In the first instance, losses are met by applying any collateral provided by the defaulter and then by recourse to the defaulter's contribution to the default fund(s). If those are exhausted, then further losses are met by payment from LCH SA's own funds (also referred to as skin in the game). Thereafter losses are met by the non-defaulting clearing member's contribution to the default fund(s) in respect of the relevant default fund.

Subsequently LCH SA will request a refill/assessment of the default fund contribution of non-defaulting clearing member. For €GCPlus, RepoClear and EquityClear / CommodityClear, a Refill is performed if 25 percent of the relevant default fund is used up in managing the default, LCH SA then has the right to call additional funds from non-defaulting service clearing members. For CDSClear, the default fund assessment can be performed as soon as the loss exceeds the resources of the defaulter and the CCP's skin in the game.

The value of Refill/Assessment contributions that LCH SA may call from each relevant default fund is capped at an amount equal to that clearing member's funded contribution to the relevant default fund at the time of the default.

Should all Refill/Assessment contributions available to LCH SA be exhausted, a service continuity (loss distribution phase) phase will be triggered. The tool will charge each non-defaulting member on a daily basis a Loss Distribution Charge if there are any uncovered credit losses.

For RepoClear, EquityClear and CommodityClear this is calculated as the product of the LCH SA uncovered Loss and the proportion of which that Member's Contribution bears to the aggregate of the Contributions of all Non-Defaulting Clearing Members.

For CDSClear, VM haircutting applies by reducing the cumulative net gains due to non-defaulting members during the loss distribution period by the Distribution Haircut fraction ($\text{LCH SA Uncovered Loss} / \text{Total Cash Gains}$) in order to allocate uncovered credit losses incurred from the member default. The limit of the loss distribution charges to be called by the CCP is equal to original Default fund contribution for RepoClear, EquityClear and CommodityClear. For CDSClear, the loss distribution charges are based upon a VM haircut process and the limit is the higher of 100 million Euro and the Default contribution.

The voluntary service continuity phase could be triggered when the losses accumulated from the default cannot be covered by neither the default fund, the assessment nor the service continuity phases. Upon this trigger, all non-defaulting members will be informed that all relevant resources have been eroded and will be requested, on a voluntary basis, to provide additional resources in order to avoid a Service Closure phase.

If all resources from service continuity are eroded and the additional resources from a voluntary service continuity are not sufficient to cover the relevant loss, LCH SA will start the Service Closure phase. Within this phase, LCH SA will cease clearing activities and perform cash settlement. LCH SA will perform a final allocation of losses to its clearing members, either pro-rata the relevant default fund (all markets except CDS) or based upon gains haircutting (CDSClear).

On successful completion of the default management process, a cooling-off period or post default period is triggered. The default fund will remain unchanged during this period.

However, for RepoClear, EquityClear and CommodityClear, if the default funds have fallen below the floor level, clearing members must restore them to their respective floor levels, with the complete replenishment taking place at the end of the cooling off period. If another default occurs within the 30-day cooling off period, the DMP will be implemented again and the replenishment will be cancelled. Accordingly, service clearing members would be obliged to pay further unfunded contributions called on the new default and participate in the loss distribution process, if applicable.

Such further unfunded contributions are again capped at an amount equal to each clearing member's funded contribution to the relevant default fund at the time of the (second) default. Unfunded contributions may not be called by LCH SA in regard to more than three defaults in any six-month period.

LCH SA will continue to stress test the service default funds as usual throughout the DMP and during the post default or cooling-off period. If any service clearing member's stress-test losses above margin exceed 45 percent of the remaining default fund, LCH SA will call for additional margin from those clearing members to cover the excess uncovered stress-test losses above that threshold. Clearing members with weaker credit scores are subject to lower thresholds.

For CDSClear LCH SA can only use one assessment of the default fund throughout the post default period. If the default fund is below the required size, LCH SA will request additional margin so that overall coverage remains at the adequate level.

Key Consideration 2: An FMI should be well prepared to implement its default rules and procedures, including any appropriate discretionary procedures provided for in its rules.

There are a number of levels of documentation and procedures that support the DMP. These detail the standards which must be met in dealing with the default of a clearing member, and provide guidance for each service on how to define and implement the default management process. In addition, the guidance describes the high level strategy, principles, standards, ownership and governance at the CCP and service level. Also included are details of the step-by-step processes and procedures at the service level for managing a default.

The Default Management Procedures, which are specific to each clearing service, detail the processes and procedures at the service level for managing a default, including arrangements for actions such as risk neutralisation, liquidation, client porting, auction organisation and execution, and loss allocation as appropriate. These procedures meet the standards laid out in the Default Management Policy and follow the principles outlined in the Default Management Guidelines. Throughout these documents, roles and responsibilities are clearly detailed. All areas are resourced to ensure that business as usual activity can be managed alongside a default event.

In the event of a potential or actual default, the DCMT will be convened. The key responsibility of this team is to ensure that all key aspects of the default management procedures are followed, including communication plans, the calling of the DMGs and monitoring the DMGs' progress. Each department responsible for communicating to the various stakeholders is represented in the teams and has procedures to support the process.

The documentation supporting the DMP is updated and reviewed on an annual basis (or more frequently if required).

The default management procedures for each service are also reviewed at least annually. LCH SA's preparations for implementation of the DMP are enhanced by regular fire drills as described further under Key Consideration 4.

The Default Notice which LCH SA will issue to a defaulting clearing member is publicly disclosed on the LCH SA website.

Key Consideration 3: An FMI should publicly disclose key aspects of its default rules and procedures.

A section detailing the definition of default and relevant measures are contained in its Clearing Rules and in addition specific DMP instructions have been issued which are part of the CCP rules, which both are publicly available on LCH SA's website. The Clearing Rules set out the circumstances in which a clearing member may be declared to be in default, the actions that LCH SA may take with respect to that default and the waterfall. The instruction contains more detailed rules relating to the DMP, including the constitution of the relevant DMGs and the execution of auction processes.

Key Consideration 4: An FMI should involve its participants and other stakeholders in the testing and review of the FMI's default procedures, including any close-out procedures. Such testing and

review should be conducted at least annually or following material changes to the rules and procedures to ensure that they are practical and effective.

All LCH SA clearing services involve external participants (such as clearing members, execution brokers etc.), as required, in their default management fire drills. For some services (notably those serving the OTC markets), the DMGs have representatives from clearing member firms and they are consulted on changes to the default management procedures.

A Group-wide (i.e. involving all CCPs and clearing services within the LCH Group) default management fire drill takes place at least annually and more frequently if there are substantive changes to process which means that further testing is required. In addition, service-specific tests are held as and when required, for example if there are changes to rules and procedures within that service or if a significant new product is added. Such tests may include external participants who would be involved in the DMP. Each external participant rehearses its role in an actual default event. For example, a broker will be given orders to simulate hedging or liquidation of positions, and clearing members will participate in the DMG to review a synthetic portfolio, recommend hedging and liquidation strategies and submit bids in a dummy auction.

LCH SA also holds a CCP wide fire drill, where the process is tested internally (without participation of external parties) and several recommendations for improvements are tested. Therefore, at least two fire drills are performed per year.

Following a fire drill test, a report is produced that evaluates the exercise and identifies areas for improvement and change. The reports are shared with the Audit Committee and regulators following internal review. Each fire drill has specific objectives to ensure that all aspects of default management are covered by the range of different tests performed. Some tests include external clearing members; others seek to test internal routines or close-out assumptions and procedures.

The Group-wide fire drills generally cover the scenario of a clearing member defaulting across all CCPs and services simultaneously. Scenarios may be introduced where the defaulting entity also acts as a counterparty of a different type (for example payment agent or investment counterparty).

Fire drills may be coordinated with other major CCPs in order to test the ability of clearing members to provide staff to more than one CCP DMG at the same time, which more realistically simulates the default of an institution which has exposures at multiple clearing houses.

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| <p>Publicly available resources</p> | <p>Clearing Rules</p> <p>Risk Management Overview</p> <p>Public quantitative disclosure standards for central counterparties</p> |
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Principle 14: Segregation and portability

A CCP should have rules and procedures that enable the segregation and portability of positions of a participant's customers and the collateral provided to the CCP with respect to those positions.

LCH SA offers two models of client segregation arrangements, to meet the regulatory requirements of each jurisdiction in which it is authorised, and maintains its books and records, and segregated accounts where relevant, in accordance with those requirements. Individually segregated client accounts are available as well as omnibus segregated client accounts. LCH SA provides, in addition, for services where it is regulated by the CFTC, client segregation arrangements in order to satisfy US requirements. LCH SA's Clearing rules set out the rules of segregation and portability for each model.

Key Consideration 1: A CCP should, at a minimum, have segregation and portability arrangements that effectively protect a participant's customers' positions and related collateral from the default or insolvency of that participant. If the CCP additionally offers protection of such customer positions and collateral against the concurrent default of the participant and a fellow customer, the CCP should take steps to ensure that such protection is effective.

LCH SA offers segregation arrangements to meet the regulatory requirements of each jurisdiction in which it is authorised. LCH SA is required to segregate clearing member client positions and collateral (including affiliates' positions and collateral) from clearing member proprietary business in all markets, including cash markets.

Individual segregation means that LCH SA records positions, margin requirements and collateral delivered by a clearing member for a specific client against an account that is exclusive to that client, and which is not exposed to losses on any other client or member accounts.

LCH SA also offers various models of omnibus client segregation, in which clients' positions, margin requirements and collateral are pooled, to different extents, although they are never commingled in LCH SA's books with positions and collateral of the clearing members' proprietary accounts.

Within the European Union, national implementations of the Settlement Finality Directive (SFD) protect certain actions pursuant to the default rules of LCH SA as it has been designated under the SFD. A more detailed description of the legal aspects of LCH SA's activity can be found at the discussion on Principle 1 (*Legal basis*).

LCH SA obtains a legal opinion from a reputable legal firm located in the jurisdiction in which each clearing member is incorporated before accepting a clearing member from that jurisdiction. This legal opinion seeks to establish, with a high degree of confidence, that there is domestic legislation in place that protects and supports provisions within LCH SA Clearing rules with respect to porting of client positions and collateral from challenge under domestic insolvency law. Where it is unclear, or such legislation is not in place, LCH SA requires that the clearing member execute a security deed, provided it has established via the legal opinion that the security deed is effective and enforceable in the jurisdiction of the clearing member.

Key Consideration 2: A CCP should employ an account structure that enables it readily to identify positions of a participant's customers and to segregate related collateral. A CCP should maintain customer positions and collateral in individual customer accounts or in omnibus customer accounts.

As described above, LCH SA segregates clients' positions and collateral in its own books and records, and offers both individual and omnibus levels of segregation.

Collateral supporting clients' positions covers initial and contingent margin, including margin add-ons (for credit risk, concentrated positions and other risks), as well as any excess collateral that clearing members may choose to post to the CCP for their client accounts.

LCH SA relies on clearing members providing correct information about new transactions, positions and collateral relating to each client at the time that the member submits the transaction for registration or lodges

the collateral. LCH SA maintains a separate record of the actual collateral provided in respect of each client individually segregated account; whereas in omnibus accounts LCH SA allocates collateral to each customer on a value basis. Collateral in respect of omnibus client accounts can be called on a net or gross basis depending on the account type.

In an individually segregated account, a client's collateral is fully protected from fellow client risk. In other types of accounts there are varying degrees of protection from fellow client risk. The omnibus structure will generally provide for a mutualisation of losses and a pooling of risk between the clients in the relevant account.

Key Consideration 3: A CCP should structure its portability arrangements in a way that makes it highly likely that the positions and collateral of a defaulting participant's customers will be transferred to one or more other participants.

LCH SA offers all known clients of a defaulting clearing member the opportunity to port to a new clearing member. The chances of porting being successful depend on the segregation model selected by the client and the extent to which the client has pre-arranged a back-up clearing member, or can arrange one quickly after the default. Except in conditions of severe margin erosion on the client account, LCH SA allows a minimum of 24 hours after a default for the defaulting clearing member's clients to identify and authorise a replacement clearing member.

The LCH SA Clearing rules contain provisions in their Default Rules with respect to obtaining consent from clearing members to which positions and collateral are to be ported, where an individual segregated account clearing client or an individual omnibus gross segregated clearing client has appointed a back-up clearing member. The Clearing Rules also set out that in the event of a default LCH SA will publish the deadline by which written consent must be received from a client in order for LCH SA to seek to port.

Once the porting is effected, the new clearing member will be called for any shortfall in margin cover (for example, in relation to positions that lost money between the default and the port).

Key Consideration 4: A CCP should disclose its rules, policies, and procedures relating to the segregation and portability of a participant's customers' positions and related collateral. In particular, the CCP should disclose whether customer collateral is protected on an individual or omnibus basis. In addition, a CCP should disclose any constraints, such as legal or operational constraints, that may impair its ability to segregate or port a participant's customers' positions and related collateral.

LCH SA makes public disclosures in accordance with Article 39(7) of EMIR, including the basis on which collateral is protected in the different segregation models, for both its general and FCM models and more generally, on the segregation and portability arrangements it offers.

In addition to the LCH SA Rules detailing the liquidation and transfer process in case of an event of default of a clearing member (please refer to Key Consideration 1), LCH SA also transparently displays the operating process within each business line service description (Please refer to Principe 23 / Key Consideration 3).

Costs for different types of accounts are disclosed on the LCH SA website.

Publicly available resources

[Clearing rules](#)

[Collateral Management](#)

[LCH SA Account Structures under EMIR](#)

[Public quantitative disclosure standards for central counterparties](#)

[LCH SA Customer Protection](#)

Principle 15: General business risk

An FMI should identify, monitor, and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.

General business risk is one of the risks considered within the risk management framework. To assess this risk consideration is given to key drivers, both with and without financial impact-reducing mitigants. These drivers are monitored quarterly and subject to the governance process. Accordingly, LCH SA holds liquid net assets funded by equity and has developed both a Recovery Plan and a Wind-down Plan which are approved by the LCH SA Board and subject to review at least annually or following material changes.

Key Consideration 1: An FMI should have robust management and control systems to identify, monitor, and manage general business risks, including losses from poor execution of business strategy, negative cash flows, or unexpected and excessively large operating expenses.

LCH SA identifies its business risks by considering the general business conditions, which are likely to impair its financial position as a consequence of a decline in its revenues or an increase in its expenses resulting in a loss that must be charged against its capital. Examples of reasonable foreseeable drivers of business risk for LCH include cost overruns (including project overspends), impacts of competition on its revenue, volume and mix of collateral held, regulatory change and foreign exchange exposure.

In order to identify the specific business risks, it faces, LCH SA identifies the business risk drivers, reviews its existing control framework and quantifies the potential financial impact of reasonably foreseeable adverse loss events. Business risk drivers are considered both with and without financial impact-reducing mitigants in place. Business drivers are also considered for potential impact of simultaneous occurrence.

LCH SA faces business risks related to higher than expected costs and lower than expected revenues. This would include impact of increased competition in clearing and timing of clearing mandates for products currently cleared by LCH SA.

The business risk drivers are monitored throughout the year, and a detailed calculation is performed once a year or on a significant change to the business. Business risk is reported to the LCH SA Board through the Internal Capital Adequacy Assessment Process. Annual budgeting, medium term financial plan, and quarterly forecasting processes assist in identifying any change to business risk drivers and in evaluating the impact of these changes.

Key Consideration 2: An FMI should hold liquid net assets funded by equity (such as common stock, disclosed reserves, or other retained earnings) so that it can continue operations and services as a going concern if it incurs general business losses. The amount of liquid net assets funded by equity an FMI should hold should be determined by its general business risk profile and the length of time required to achieve a recovery or orderly wind-down, as appropriate, of its critical operations and services if such action is taken.

LCH SA holds liquid net assets funded by equity so that it can continue operations and services as an ongoing concern if it incurs general business losses. LCH SA's agreed minimum regulatory capital requirement includes a specific provision for business risk, which must be at a minimum equal to three months' operating expenses.

LCH SA maintains a Wind Down Plan setting out, in detail, the steps it would need to take in order to wind down LCH SA in an orderly manner. This assessment includes a conservative estimate – six months – of the time and associated costs to achieve an orderly wind down. LCH SA holds an additional amount equal to six months operating expenses to meet potential wind down costs.

Key Consideration 3: An FMI should maintain a viable recovery or orderly wind-down plan and should hold sufficient liquid net assets funded by equity to implement this plan. At a minimum, an

FMI should hold liquid net assets funded by equity equal to at least six months of current operating expenses. These assets are in addition to resources held to cover participant defaults or other risks covered under the financial resources principles. However, equity held under international risk-based capital standards can be included where relevant and appropriate to avoid duplicate capital requirements.

LCH SA maintains both a Recovery Plan and a Wind Down Plan, both of which are LCH SA Board-approved documents and reviewed at least annually, or following material changes.

The Wind Down Plan sets out the steps it would be necessary to follow should LCH SA need to wind down its clearing services. This plan takes into account the impact on members and the markets of such a wind down. The plan demonstrates how LCH SA can achieve an orderly wind down within six months.

The Recovery Plan sets out the steps that LCH SA should take in order to maintain the continuity of its services, should such continuity be threatened. This plan takes into consideration the triggers for such a plan, the governance steps LCH SA must follow to invoke the plan and a number of recovery tools that are available to LCH SA. Each available tool is assessed for its impacts on LCH SA's clearing members.

LCH SA holds capital equal to the operating expenses for the six-month period required to wind down. LCH SA bases its calculation on the latest audited expenses. LCH SA invests its capital including the capital used to cover general business risks and the wind down plan in very high quality, very liquid instruments with low market risk. LCH SA capital is held on the balance sheet of LCH SA separately from the resources designated to cover clearing member defaults.

Key Consideration 4: Assets held to cover general business risk should be of high quality and sufficiently liquid in order to allow the FMI to meet its current and projected operating expenses under a range of scenarios, including in adverse market conditions.

LCH SA's assets held to cover business risk are invested generally in cash deposited at Banque de France but could also be invested in accordance with the investment policy in short term reverse repos or the purchase of short term highly liquid government securities. All these options are of high quality and liquidity and with low market risk.

LCH SA assesses the quality and liquidity of its liquid net assets through daily monitoring, regular reporting and monthly internal governance reviews of the marked to market value of assets.

Key Consideration 5: An FMI should maintain a viable plan for raising additional equity should its equity fall close to or below the amount needed. This plan should be approved by the board of directors and updated regularly.

LCH SA has in place an LCH SA Board approved strategy setting guidelines for capital management and acting as a recovery planning step following a shock loss or other stress event. The strategy requires that material business decisions be assessed against capital position requirements, cash flow and liquidity, and profitability, so that LCH SA can generate capital via retained earnings. It also lays out other options that would be available to LCH SA and its Board in the event of a short term need for capital.

As a 88.9% owned subsidiary of LCH Group, the LCH SA strategy has been concluded in conjunction with the strategy of its parent.

The LCH SA Board is given regular updates on the capital position of LCH SA through regular reporting from the Chief Financial Officer.

Publicly available resources

[Annual Report and Financial Statements](#)

[Public quantitative disclosure standards for central counterparties](#)

Principle 16: Custody and investment risks

An FMI should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. An FMI's investments should be in instruments with minimal credit, market and liquidity risks.

LCH SA's investment strategy is aligned with its overall risk management approach and regulatory obligations in the jurisdictions where it is permitted to operate. LCH SA maintains counterparty, custodian and (I)CSD relationships only after appropriate due diligence at the outset and satisfactory outcomes from ongoing review.

Key Consideration 1: An FMI should hold its own and its participants' assets at supervised and regulated entities that have robust accounting practices, safekeeping procedures, and internal controls that fully protect these assets.

LCH SA's internal risk policy on payment, settlement and custody sets a preference for safeguarding collateral (whether these are securities provided by members, held as investments, or collateral received in reverse repos) in accounts at central securities depositories (including international central securities depositories). In each case the entity holding the collateral must meet standards set in the policy, including criteria in relation to creditworthiness and operational reliability.

All (I)CSDs are subject to the requirements described in the internal risk policy on payment, settlement and custody, as well as the criteria set out in the internal risk policy on counterparty credit risk. These include a minimum internal credit score, legal review, due diligence (which includes accounting practices and operational aspects) and the application of exposure limits.

LCH SA's monitoring of compliance with its criteria, and the overall suitability of (I)CSDs, is via a regular programme of due diligence which reviews every entity at least every two years. This requires that (I)CSDs complete a template covering all matters referenced in the policy and provide evidence where necessary. (I)CSDs are also subject to periodic onsite due diligence reviews.

Key Consideration 2: An FMI should have prompt access to its assets and the assets provided by participants, when required.

LCH SA ensures it has prompt access to its assets by only maintaining custody arrangements with high quality (I)CSDs as determined under its policy and through its due diligence programme. In addition, (I)CSDs are asked to confirm the legal position in each due diligence exercise.

For Euro cash collateral and thanks to its banking licence, LCH SA has a full access to the ECB. LCH SA has a non-significant deposit in non-euro cash collateral.

Non cash collateral is essentially received in Full Title of Transfer by the CCP and thus LCH SA has an immediate access to these assets held in accounts opened under the name of the CCP exclusively.

Key Consideration 3: An FMI should evaluate and understand its exposures to its custodian banks, taking into account the full scope of its relationships with each.

In relation to collateral, LCH SA satisfies itself via the due diligence process and legal review that it would have access to the assets in the event of the (I)CSD's default. Where cash balances are held on account at a (I)CSD temporarily in connection with investment activity, LCH SA manages transactions such that its intraday exposure to the (I)CSD remains below 75 percent of its capital, a limit set in internal risk policy.

LCH SA uses a range of (I)CSDs to diversify where collateral is held. This includes one main ICSD and three domestic Securities Settlement System. LCH SA conducts regular Due Diligence reviews for all the (I)CSDs it has relationships with.

Key Consideration 4: An FMI's investment strategy should be consistent with its overall risk-management strategy and fully disclosed to its participants, and investments should be secured by, or be claims on, high-quality obligors. These investments should allow for quick liquidation with little, if any adverse price effect.

LCH SA's investment risk strategy is set by the LCH SA Board, on the advice of the Risk Committee, and in line with the LCH SA Board's Risk Appetite. The investment strategy is disclosed at an aggregate level and on request, to clearing members of LCH SA. How the total cash received from participants is held/deposited/invested is included in LCH SA's disclosures against the CPMI-IOSCO Quantitative Disclosure Standards. The primary objectives of the investment strategy are capital preservation and liquidity provision, and these objectives are captured in an LCH SA risk policy.

The Policy's key stratagems are to restrict investments to (i) high quality counterparties, (ii) reverse repurchase arrangements against very high quality and liquid collateral using appropriate haircuts, (iii) the purchase of short term high quality, low credit risk and highly liquid securities. The Policy emphasises the preference for secured transactions and highly marketable securities and sets maturity limits based on investment types. Further, it also specifies liquidity risk as an objective and sets investment concentration limits and appropriate haircuts for reverse repurchase collateral. Additionally, the Policy requires that investment limits are reviewed regularly to ensure that they remain in line with risk appetite.

The concentration limits for LCH SA investment activities include restrictions on: exposures to particular counterparties, measured at the counterparty group level; the proportion of investments representing an exposure to a particular issuer; and exposures to reverse repo collateral, by security type and issuer. Additionally, LCH SA sets exposure limits specified at the investment counterparty level by transaction type (e.g. reverse repo,) and by maturity.

Intraday and overnight exposures are monitored against the applicable limits and any breaches are escalated, reported and remediated through internal governance processes.

LCH SA does not invest margin received from a clearing member in securities issued by that clearing member or its affiliates.

LCH SA maintains pre-arranged and highly reliable relationships with a wide range of high quality counterparties enabling execution of transactions with short-dated maturity. LCH SA also tests the ability to liquidate such financial assets with little, if any adverse price effect with these counterparties according to a regular programme.

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| Publicly available resources | Risk Management Overview Public quantitative disclosure standards for central counterparties |
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Principle 17: Operational risk

An FMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfilment of the FMI's obligations, including in the event of a wide-scale or major disruption.

Operational risk management is a key component of the LCH SA risk management framework and encompasses appropriate tools and mechanisms to enable the effective identification, assessment and mitigation of such risk. The operational risk management arrangements incorporate a "three lines of defence" structure that has been endorsed by the LCH SA Board, and places responsibility for managing operational risk on the business as the first line of defence, ensuring that an Accountable Executive from the business is appointed as Risk/Control Owner.

Key Consideration 1: An FMI should establish a robust operational risk-management framework with appropriate systems, policies, procedures, and controls to identify, monitor, and manage operational risks.

LCH SA has in place policies and procedures that form the framework through which operational risk is managed throughout LCH SA.

The Operational Risk policy clearly sets responsibilities across first, second and third lines of defence for the identification, assessment, monitoring and management of operational risks. Regular control testing is undertaken by the first line of defence and is reviewed by the second line of defence.

The policy set a framework through which operational risks can be identified, including through review of audit findings, loss events and near misses, external events which may give rise to increased vulnerabilities and changes to systems or processes. The policy also includes requirements to complete deep dive reviews, which aim to review a specific process and understand how it operates .and scenario analysis, stressing these operational risks. Such exercises and oversight ensure operational procedures are implemented appropriately.

LCH SA has a library in place which provides a comprehensive list of all operational risks for LCH SA. It also provides a list of the core controls required to mitigate the risks. The library ensures a consistent and comprehensive definition of risk and control is used for identification, assessment and management of the risks on inherent and residual basis. Operational risks are monitored through regular review and reporting to the Executive Risk Committee, the Local Management Committee and the LCH SA Board Audit Committee.

LCH SA has a Recruitment Policy and framework which sets rigorous pre-employment screening for all prospective LCH SA employees. Once in role, LCH SA employees are subject to, at least annual, performance reviews. The company also has policies in place which encourage employees to attain qualifications and professional standards linked to their role. Aside from these benefits, and appropriate remuneration, the company has identified tools to endeavour to retain key staff should turnover be identified as a risk.

LCH SA has both operational risk and compliance policies in place designed to identify potential sources of fraud, which set the standards within which potential fraud should be managed. These policies and procedures identify potential sources of fraud, key mitigation techniques and the procedures to follow should a fraud or potential fraud be reported. LCH SA has a governance framework for change management. This framework mitigates the risks that changes and major projects inadvertently affect the smooth functioning of LCH SA by setting out a flexible (by size and complexity of change) structure for

delivery of change. The framework sets out a methodology of categorising change; the category of change then determines the appropriate governance, reporting, minimum testing requirements and finally go-live approvals. Each LCH SA business line maintains oversight of its change portfolio.

Key Consideration 2: An FMI's board of directors should clearly define the roles and responsibilities for addressing operational risk and should endorse the FMI's operational risk-management framework. Systems, operational policies, procedures, and controls should be reviewed, audited, and tested periodically and after significant changes.

Operational risk forms part of the Risk Governance Framework of LCH SA, and is one of 22 types of risk which LCH SA faces. The LCH SA Board has set out through this framework its appetite for operational risk.

The Operational Risk policy, which is approved by the LCH SA Board, clearly defines the key roles and responsibilities for operational risk. These responsibilities are separated between the first, second and third lines of defence; the first line of defence is responsible for the day to day management of operational risks, including maintaining an effective system of internal controls. The first line is within the business lines and support functions. The second line oversees, supports and challenges the first line in its day-to-day management of operational risks. The Operational Risk department which is part of the second line of defence and is also responsible for providing aggregated reporting to internal senior executive committees as well as the LCH SA Board and its Committees. LCH SA's independent internal audit function provides the third line of defence.

The Operational Risk Policy is reviewed annually by senior internal executive level committees as well as Board-level committees. The LCH SA Board approves the policy annually. The Audit Committee as well as LCH SA Board receives quarterly reporting on any operational risks outside appetite, including actions planned or taken to mitigate these risks, and major incidents, including remediation planned or taken to prevent reoccurrence.

LCH SA reviews and tests its systems, policies and procedures with its clearing members in a number of ways. LCH SA involves its clearing members in testing before the launch of new products and systems. An annual data centre failover test is carried out, in which all clearing members, external providers and other third parties (as identified in Business Impact Assessments ("BIA")) are invited to participate. Clearing members are also active in annual default management fire drills, in which the management of a default scenario is rehearsed. In each of these cases, LCH SA actively requests feedback in order that any weaknesses may be addressed.

LCH SA's independent audit function conducts regular reviews of the Operational Risk Framework as such and its application as part of all its reviews, through of a sample of key controls.

Key Consideration 3: An FMI should have clearly defined operational reliability objectives and should have policies in place that are designed to achieve those objectives.

LCH has an objective to be the most trusted clearing house and recognises that to achieve this it must have a robust level of resilience and efficiency. The Board sets a risk appetite and endorses a Risk Management Framework to manage reliance, reliability and stability of the CCP, which is cascaded throughout the firm. LCH has further defined service levels based on the following key performance indicators.

Service availability: The LCH Board has set a monthly service availability tolerance level of 99.7%. LCH tracks any periods of normal operation during which critical clearing services suffer interruption and are not available.

Capacity: Each clearing service must demonstrate 2x the peak of the last 24 months capacity; each clearing service will ensure arrangements are in place to warrant the minimum system capacity is at least 2 times the historically observed peak.

Incidents: LCH's management sets a tolerance level of incidents, aiming to minimise disruption to the clearing services

LCH SA further defines the escalation category of any incident. All incidents with a 'High' or" above materiality rating are escalated to the executive management teams. These incidents are investigated fully with a root causes analysis conducted, and steps identified to prevent reoccurrence.

These are recorded as part of Serious Incident Reviews (SIRs) and reported to senior management as well as regulators, as required.

Key Consideration 4: An FMI should ensure that it has scalable capacity adequate to handle increasing stress volumes and to achieve its service-level objectives.

Each LCH SA clearing service is subject to monthly service reviews. The reviews assess capacity statistics as part of its consideration of key performance indicators. Each clearing service is rated, based on average daily volumes and peak volumes versus the capacity to which it has been tested and database utilisation. Furthermore, ahead of the implementation of new products or significant system changes, LCH SA performs testing to provide assurance that system capacity will be, or will remain, adequate for normal and stressed volumes.

LCH SA systems are subject to regular risk based independent review by the internal audit function; critical systems will be reviewed at least annually.

Should real-time system monitoring and monthly service reviews reveal capacity performance and trends which have or may disrupt operational functioning, action will be taken to investigate the cause and identify necessary timelines for increasing headroom for capacity. If capacity were to be exceeded, this would be investigated and remediated as any other incident in the clearing services. Following remediation LCH SA will investigate the root cause and implement steps to prevent reoccurrence.

Key Consideration 5: An FMI should have comprehensive physical and information security policies that address all potential vulnerabilities and threats.

LCH SA has a number of policies, procedures and controls in place for safeguarding its physical and information security. Regular reviews are undertaken to understand potential vulnerability and threats i.e. physical, intrusion and natural disaster, that LCH SA may be subject to.

Information Security is the protection of information and information systems from unauthorised access, use disclosure, disruption, modification or destruction in order to provide confidentiality, integrity and availability (NIST Definition). LCH SA defines Cyber Security as the defence against the threats, both internal and external, that target these systems. In order to protect our data and assurance of financial assets, we implemented controls that protect the confidentiality, integrity and availability of the Group company assets including preventing unauthorised use or modification.

LCH SA has developed an Information Security Risk Management framework defining how cyber risks are managed within the Group's Risk Appetite. Risk Appetite as defined above is categorised into five risk components:

- Denial of Service risks
- Insider Breach/internal Events
- External Breaches
- Supply Chain Security
- Physical Security Breach/Event

Each of these risk components is aligned to a series of policies and standards that set out the minimum requirements for the management of those risks along with a control framework benchmarked against NIST/BIS-IOSCO. The business units and first line Information Security teams are expected to assess these risks in line with the framework and manage these risks within the defined appetite. Business units are required to develop metrics/key risk indicators that allow the effective management of risks within

agreed tolerance levels. The second line risk team provides oversight and assurance of the effective execution of the framework by the first line.

LCH SA computing and networking are operated in closed facilities with controlled access only for authorized personnel. They are protected from environmental, physical or logical security threats to ensure their continued availability.

Permanent controls on key points of the security requirements, as physical and logical access reviews, hardening guidelines conformity reviews, firewall policies, anti-virus tests and signatures date reviews, are performed on a periodic basis to check the effectiveness and efficiency of the implemented security controls.

Penetration tests are realized regularly, each to test outbound defences or internal security measures.

Outsourcers:

In addition, LCH SA's IT Services suppliers are contractually bound to enforce LCH SA's information system security requirements. Third parties' Information Security Requirements are defined and contractually formalized.

Key Consideration 6: An FMI should have a business continuity plan that addresses events posing a significant risk of disrupting operations, including events that could cause a wide-scale or major disruption. The plan should incorporate the use of a secondary site and should be designed to ensure that critical information technology (IT) systems can resume operations within two hours following disruptive events. The plan should be designed to enable the FMI to complete settlement by the end of the day of the disruption, even in case of extreme circumstances. The FMI should regularly test these arrangements.

The LCH SA Business Continuity Management (“**BCM**”) programme has been developed to provide continuity and timely recovery of its business operations in the event of a major incident or crisis, which impacts, or has potential to impact, business operations. The Business Continuity policy sets a recovery time objective (RTO) of two hours for all critical services; this RTO is in place regardless of the scale of the incident or disruption. A Disaster Recovery Plan is also in place which describes the technical steps that are required in order to affect a timely recovery. Critical operations have been identified through BIA at a clearing service and function level. BIAs also identify which systems, resources and staff will be required to carry on the orderly functioning of LCH SA in the event of a disaster. Each clearing service and function has also created a Business Continuity Plan which enables it to meet the LCH SA RTO. Each clearing service and function includes in its Business Continuity Plan, where relevant, details of actions which include liaison with trade sources and data reconciliations, designed to ensure all transactions can be identified, and any data loss remediated. A CMT, including representatives of all clearing services and functions, will be convened in the event of a crisis. The CMT will work to a predefined Crisis Management Plan, which ensures that the response to and management of a crisis is co-ordinated and effective, minimising the impact on clearing members, suppliers, employees and the reputation of LCH SA. LCH SA has immediate access to work area recovery facilities with a third party supplier. In the event of the loss of the primary office location in Paris, activities are transferred to a secondary business location, with overflow facilities at a third facility where required. Staff in critical roles also have access to remote working facilities which are tested regularly.

LCH SA has five data centres. These facilities are regularly tested; specifically, the Business Continuity Programme requires at least an annual test of failover.

Key Consideration 7: An FMI should identify, monitor, and manage the risks that key participants, other FMIs, and service and utility providers might pose to its operations. In addition, an FMI should identify, monitor, and manage the risks its operations might pose to other FMIs.

LCH SA has identified operational, financial, credit, market and legal risks that can arise from its clearing members, other FMIs and service and utility providers.

The operational risks of such connections with regards to business continuity are identified and analysed as part of each clearing service and function's BIAs. Identification and management of credit risks in relation to LCH SA's clearing members are included in *Principle 4*. Identification and management of risks related to links to other FMIs are included in *Principle 20*. Risks related to service and utility providers are addressed through an LCH SA Policy. This policy requires that supplier selection is transparent, that due diligence is performed on suppliers, that an appropriate contract is in place for the services and that suppliers agree to a Supplier Code of Conduct. Any extension of current activity with an existing supplier must also comply with this policy. Any supplier which is critical, as identified through the BIA process, undergoes a higher level of due diligence. This allows LCH SA to identify any potential additional risks arising from the supplier and to mitigate where possible.

Outsourced service providers are required to have in place business continuity arrangements equivalent to those in place at LCH SA. Outsourced providers of services required for the successful recovery of LCH SA in the event of a crisis are required to be involved in business continuity testing.

Besides considering the risks posed to LCH SA by FMIs, LCH SA considers the risks it may pose to other FMIs. Consequently, in addition to conducting its own ongoing due diligence, LCH SA cooperates and participates in reciprocal due diligence, for example service review meetings and Business Continuity testing which include external parties. Service providers, exchanges and linked FMIs are invited to participate in the annual failover test.

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| <p>Publicly available resources</p> | <p>Business Continuity Public quantitative disclosure standards for central counterparties</p> |
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Principle 18: Access and participation requirements

An FMI should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access.

LCH SA's participation requirements are designed to be the least restrictive while ensuring that risk to LCH SA and the markets its serves is minimised. Participation criteria are publicly available through the LCH SA Clearing Rules and website, and clearing members are monitored for ongoing compliance with the requirements. The LCH SA Clearing Rules contain provisions to manage circumstances where a clearing member no longer meets the criteria.

Key Consideration 1: An FMI should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.

Requirements for participation in LCH SA are based on risk-based principles, and are designed to ensure that all clearing members are of suitable financial standing with sufficient operational capabilities. Final approval for all participation applications rests with the Executive Risk Committee, subject to the LCH SA Risk Committee being notified of approvals. Where the Executive Risk Committee refuses an application, the applicant may appeal to the Risk Committee. All new members are also subject to an internal LCH SA credit assessment.

Minimum levels of net capital and default fund contributions are required as part of the clearing member admission criteria. These are set out below by service.

| Service | Clearing member type | Minimum Net Capital Requirement | Default Fund | Minimum Default Fund Contribution ³ |
|----------------------------|----------------------------|---------------------------------|---------------------------|--|
| CDSClear | CDSClear clearing member | €37m | CDSClear | €10m |
| EquityClear/CommodityClear | Individual clearing member | €10m | Cash Equity / Derivatives | €100k |
| EquityClear/CommodityClear | General clearing member | €25m | Cash Equity / Derivatives | €100k |
| RepoClear | Individual clearing member | €100 m | €GCPlus or Fixed Income | €2.5 m |
| RepoClear | General clearing member | €400 m | €GCPlus or Fixed Income | €2.5m |

In terms of operational capability, all clearing members must have adequate back office infrastructure to support a high volume of transactions, and must open accounts with eligible PPS banks, to pay and receive cash obligations to and from LCH SA. Typically, this requires appropriate systems to manage the clearing member's clearing activities, and staff with sufficient knowledge and experience with the systems. Prior to going live, all clearing members receive operational capability training if the LCH SA onboarding function deems it necessary.

LCH SA conducts default fire drills twice a year.

For CDSClear and RepoClear, members are asked to bid on auction packs. Participation is mandatory for CDSClear and for RepoClear, members are obliged to make best efforts to bid if asked to do so. The tests

have been designed to demonstrate the clearing member's ability to price and bid on a fixed number of trade sides in auctions held to manage a clearing member default.

The clearing of equities for which a mature electronic price-discovery regulation is in place, LCH SA has arrangements with execution brokers to close positions rather than undertaking auctions. For derivatives both on financial products and commodities, LCH SA has also arrangements with execution brokers to close out positions in the market. However, where possible, an auction may be organised, but current clearing members have no obligation to participate.

LCH SA's Clearing Rules contain specific quality requirements for Clearing Members which comprise organisational, risk management systems and procedure requirements. LCH SA may impose additional risk-based conditions on clearing members which may be required to post additional collateral.

To achieve a balance between open access and risk, LCH SA continuously monitors a wide range of credit indicators for members, including capital-to-risk ratios, and applies real-time risk management controls such as concentration limits and margin multipliers, rather than relying solely on hurdle-based participation criteria. In addition, the default management process seeks to ensure that a member's contingent obligations in the event of default are commensurate with the nature and scale of its cleared activity.

Key Consideration 2: An FMI's participation requirements should be justified in terms of the safety and efficiency of the FMI and the markets it serves, be tailored to and commensurate with the FMI's specific risks, and be publicly disclosed. Subject to maintaining acceptable risk control standards, an FMI should endeavour to set requirements that have the least-restrictive impact on access that circumstances permit.

LCH SA's participation requirements are designed to mitigate the risks that LCH SA faces as a CCP in a way that ensures the least restrictive access that circumstances permit.

Net capital requirements ensure that clearing members have adequate financial resources to withstand unexpected losses.

Default fund contributions for each relevant service are determined with reference to a clearing member's initial margin requirements, which are in turn determined with reference to the nature and scale of a clearing member's cleared activity. The floor for default fund contributions seeks to ensure that all clearing members have enough capital at risk such that they have an appropriate incentive to monitor and control the risks that they bring to the service. See also *Principle 4*.

Membership requirements are risk-based, including the need to have all necessary operational capabilities e.g. access to relevant trading and settlement venues, and to have necessary regulatory permissions.

Different criteria apply depending on the nature of membership being applied for. Broadly, criteria may be differentiated by the service being applied to clear, and whether the applicant would be clearing only for itself or additionally for clients. The differing nature of risk being brought by the applicant is determined by these elements, and criteria are set in a manner proportionate to the risk.

The participation criteria, including restrictions in participation are publicly disclosed on the LCH SA website and are included in the LCH SA Clearing Rules.

Key Consideration 3: An FMI should monitor compliance with its participation requirements on an ongoing basis and have clearly defined and publicly disclosed procedures for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements.

LCH SA monitors compliance with participation requirements on a continuous basis. The clearing membership Agreement requires clearing members to notify LCH SA if they no longer meet the participation requirements.

The LCH SA Clearing Rules contain notification and disclosure requirements to ensure compliance with the financial requirements for participation in each service. All clearing members must provide LCH SA with their annual accounts, and must promptly notify LCH SA of any development which would materially affect the clearing member's ability to comply with the participation requirements. Fire drills (see under Key

Consideration 1) assess whether clearing members' operational capabilities continue to meet LCH SA's minimum standards.

Clearing Rules outline the actions that LCH SA can take if there is an indication that a member no longer meets the membership requirements or if its risk profile deteriorates, including: more detailed monitoring, increased margin requirements, prior authorisation for trades above a specified size, position reduction, position transfer to other members, trading for liquidation only, and the declaration of default. LCH SA has the authority to declare a member in default as soon as it has grounds to suspect the membership requirements are breached or are likely to be breached. Where a clearing member is in breach of the membership requirements, but has not defaulted on payments to LCH SA, LCH SA may allow a grace period for the clearing member to remedy the breach before issuing a Default Notice. Once a default notice has been issued, withdrawal of the membership occurs in accordance with the Default Procedures.

In the case of a voluntary withdrawal by a clearing member, at least ten Clearing Days prior notice is required for EquityClear, CommodityClear and RepoClear and 25 Business Day notice is required for CDSClear subject to all positions being closed out or transferred.

The clearing member must terminate all open contracts registered with LCH SA within this period. If after the period the portfolio has not been closed out, LCH SA may liquidate the portfolio or require the clearing member to remain in the service until there are no remaining contracts. PPS arrangements must be maintained until all fees have been collected and to enable repayment of the member's default fund contribution(s).

LCH SA has procedures in place to facilitate the suspension and orderly exit of members; these are disclosed in the Clearing Rules publicly available on the LCH SA website.

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| <p>Publicly available resources</p> | <p>Clearing Rules</p> <p>Membership</p> <p>Training</p> <p>Public quantitative disclosure standards for central counterparties</p> |
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Principle 19: Tiered participation arrangements

An FMI should identify, monitor, and manage the material risks to the FMI arising from tiered participation arrangements.

Clearing members act as principals to LCH SA for both proprietary and client business, including under the FCM model. This means that there is no direct exposure to the default of a clearing member's client. LCH SA takes steps to mitigate risk from tiered participation by calculating margins for each client structure separately and offering porting to all clients.

Key Consideration 1: An FMI should ensure that its rules, procedures, and agreements allow it to gather basic information about indirect participation in order to identify, monitor, and manage any material risks to the FMI arising from such tiered participation arrangements.

LCH SA has no direct exposure to the default of a clearing member's client. Obligations to LCH SA arising from the activities of indirect participants are in all cases principal obligations of the relevant clearing member, and the risk management processes referred to under *Principles 3-10* apply to risk arising from positions recorded in clearing members' proprietary and client accounts. LCH SA requires clearing members that clear for clients, affiliates or other third parties to hold segregated house and client accounts for positions and collateral. Therefore, LCH SA offers a choice of Individually Segregated Accounts ("ISA"), Net Omnibus Segregated Accounts ("NOSA") and Gross Omnibus Segregated Accounts ("GOSA") to its members. This model supports clearing of direct clients (client of clearing member) as well as indirect clients (client of client of clearing member).

For the CDSClear Service, LCH SA also offers a FCM model that is compliant with CFTC requirements for clearing members that have US-based clients.

A more detailed discussion on LCH SA's segregation and portability arrangements can be found at *Principle 14*.

LCH SA has information in the case of clients selecting ISAs, or more generally when the Clearing member declares a client as a "known client". In the other cases, LCH SA has very little or no information on clients and Indirect client ("client-of-client") but both are subject to the same level of scrutiny and monitoring. Therefore, indirect client clearing risks are identified in each account similarly to direct client clearing risks. Margin models have been developed and implemented to measure these risks on an overnight and intraday basis.

The material risk arising at LCH SA from tiered participation is the default of a client, which disrupts or materially adversely affects a clearing member. In the event of a clearing member default, LCH SA could face risks, should position and collateral held for clients of a defaulting clearing member not be able to be ported. LCH SA may therefore, under these circumstances, liquidate client positions and apply collateral in the same way as for proprietary accounts. Following the completion of default management processes (the closing or transfer of positions and the realisation of collateral) LCH SA may apply surpluses in a clearing member's house account(s) to offset losses in the clearing member's client account(s), but not vice versa.

LCH SA mitigates these risks through setting appropriate membership criteria for its clearing members, by monitoring client portfolios and accounts, and by setting rules which allow the efficient and timely porting of clients in default scenarios.

Key Consideration 2: An FMI should identify material dependencies between direct and indirect participants that might affect the FMI.

LCH SA monitors the activity of its clearing members and the activity in each of its client accounts, be they in omnibus or individual accounts. LCH SA monitors the proportion of house to client activity for its clearing members, and where clients are known, LCH SA is able to establish an account of the activity with named clients in total, by clearing service.

LCH SA can apply margin multipliers where a clearing member's aggregate client portfolio is overly concentrated. The LCH SA margin methodology (in terms of initial, liquidity and concentration margin) increases margin requirements progressively with large positions in both proprietary and client accounts.

Key Consideration 3: An FMI should identify indirect participants responsible for a significant proportion of transactions processed by the FMI and indirect participants whose transaction volumes or values are large relative to the capacity of the direct participants through which they access the FMI in order to manage the risks arising from these transactions.

As outlined above, LCH SA monitors the activity of its clearing members and the activity in each of its client accounts, be they in omnibus or individual accounts. LCH SA monitors the proportion of house to client activity for its clearing members, and where clients and indirect clients are known by LCH SA is able to build a picture of the exposure to named clients in total, by clearing service and by client.

Activity, whatever its source, in all clearing services is monitored on a daily basis.

LCH SA produces daily reports which are used to monitor client positions and associated cash flows. LCH SA has the ability to apply margin multipliers, where a clearing member's client portfolio is overly concentrated.

Key Consideration 4: An FMI should regularly review risks arising from tiered participation arrangements and should take mitigating action when appropriate.

Risk management policies and procedures covering indirect participation are reviewed at least annually.

LCH SA produces daily reports to monitor client positions and associated cash flows. LCH SA can apply margin multipliers, where a clearing member's client portfolio is overly concentrated.

LCH SA reviews the risks it accepts within the LCH SA Board's appetite for risk.

Publicly available resources

[Clearing Rules](#)

[Public quantitative disclosure standards for central counterparties](#)

Principle 20: FMI links

An FMI that establishes a link with one or more FMIs should identify, monitor and manage link-related risks.

LCH SA has multiple and varied FMI links: specifically, LCH SA maintains links with (I)CSDs, Trade Repositories, Exchanges, Payment Systems and another CCP. All such arrangements are considered within the LCH SA risk management framework and subject to rigorous detailed due diligence and rigorous internal governance processes.

Key Consideration 1: Before entering into a link arrangement and on an ongoing basis once the link is established, an FMI should identify, monitor, and manage all potential sources of risk arising from the link arrangement. Link arrangements should be designed such that each FMI is able to observe the other principles in this report.

LCH SA maintains FMI links with (I)CSDs, CCP, Trade Repositories and Payment Systems. Such link arrangements are governed by contractual agreements.

Connecting to a new FMI is subject to LCH SA internal policies and procedures which set out requirements and the governance approval process to be followed. LCH SA policies identify the criteria to be met, set out certain risks posed, and assign responsibility for monitoring, analysis and escalation of such risks. LCH SA will assess a new FMI through onsite due diligence and review of documentation and information acquired both directly and indirectly. The review will include assessment against criteria such as corporate structure, credit risk, operational and technical resilience, legal structure and associated risk, operational risk and contingency arrangements. Findings with a final recommendation will be presented through the LCH SA internal risk governance process for approval.

Ongoing due diligence of FMI links that are intermediaries such as (I)CSDs, and others that give rise to settlement, payment or custody risks is performed at least every two years, or may be sooner if there have been significant changes. This type of FMI will be assessed against criteria and risks set out in a Group Policy and will consider applicable conditions of *Principles 8, 11 and 17*.

The key risks brought about by links to Trade Repositories are regulatory and reputational, and Trade Repositories will be assessed against such risks in accordance with the Group Procurement Policy, at least every two years or sooner if there have been significant changes.

Interoperating CCPs are considered as part of the Group Counterparty Credit Risk Policy, which sets the standards for the management of the credit risk that could be posed by various parties and intermediaries of LCH SA. The policy describes the Internal Credit Scoring (“**ICS**”) Framework applied to such parties, including interoperating CCPs. The ICS is set between 1 and 10, whereby 1 represents low default probability in line with the AAA public ratings and 10 is equivalent to a defaulting counterparty. The factors, metrics and adjustments used to determine the scoring for a particular party are subject to review on at least an annual basis and independently validated in accordance with the Group Model Governance Validation and Review policy. In the case of interoperating CCPs, the factors used to determine their ICS are Financial Analysis and Operational Capability. To note, all new or revised interoperating CCP arrangements are subject to internal governance processes and regulatory non objection.

LCH SA's recovery planning process also reviews the impact to itself and its FMI links in the event either party enters into a recovery scenario. At a minimum, FMI link due diligence considers the impact from operational failures, liquidity issues and overall creditworthiness, and any risk mitigants such as contingency processes. The results of ongoing due diligence are presented for review through the LCH SA internal risk governance process.

Finally, LCH SA's Clearing Rules and settlement finality rules are intended to mitigate the risks associated with payments and securities settlement (see *Principle 8* for further information). Any new FMI link is established and maintained in accordance with LCH SA internal risk policies which are aligned to the

PFMIs. The policies are subject to annual review, and each FMI link arrangement is subject to ongoing monitoring and periodic review.

Key Consideration 2: A link should have a well-founded legal basis, in all relevant jurisdictions, that supports its design and provides adequate protection to the FMIs involved in the link.

As set out above, LCH SA conducts detailed due diligence prior to establishing a new FMI link. At the time of writing LCH SA maintains links with FMIs in the UK, USA, and other European countries. LCH SA's arrangements with FMI links are governed by contractual agreements, which specify the law governing such an agreement. A component of LCH SA's due diligence is the review and assessment of the applicable legal framework in the jurisdiction where such FMI is located, and the review and assessment of the FMI's terms and conditions where LCH SA's agreement and adherence is required. For interoperating arrangements with an FMI that is a CCP, the legal framework governing such agreements adheres to the ESMA Guidelines on Interoperability, and to establish enforceability, LCH SA obtains appropriate legal opinions such as in respect of insolvency, inter-CCP pledge agreements, treatment of collateral, and LCH SA's netting rules.

Key Considerations 3-6 are not applicable to CCPs.

Key Consideration 7: Before entering into a link with another CCP, a CCP should identify and manage the potential spill-over effects from the default of the linked CCP. If a link has three or more CCPs, each CCP should identify, assess, and manage the risks of the collective link arrangement.

LCH SA's interoperable-CCP link is governed and managed on a bilateral basis.

LCH SA will only consider entering into a CCP interoperable arrangement where the other CCP is recognised by its home regulators as a central counterparty and that CCP adheres to CPMI-IOSCO principles via the local regulatory regime.

The terms of reference of the LCH SA Risk Committee mandates that interoperable CCP links must be reviewed and approved prior to acceptance, and all interoperable arrangements must meet established LCH SA risk standards which are set out in various internal risk policies. In assessing the spill-over risk from the default of a linked CCP, consideration is given to the presence of default waterfall and default management procedures within the interoperating CCP's rules and procedures, and that risk is fully collateralised through exchange of margin. In addition to contagion risk, LCH SA also assesses the market and credit risk posed by the interoperating CCP, and ensures additional margin is called where necessary. For its ongoing review LCH SA conducts quarterly meetings with the interoperating CCP's Risk Manager to obtain information on any material changes such as changes to the interoperating CCP's margin methodologies, operational risk framework or third party relationships.

Key Consideration 8: Each CCP in a CCP link arrangement should be able to cover, at least on a daily basis, its current and potential future exposures to the linked CCP and its participants, if any, fully with a high degree of confidence without reducing the CCP's ability to fulfil its obligations to its own participants at any time.

The LCH SA risk framework takes into account exposures to interoperating CCPs. In accordance with a Group Policy, Interoperable CCP arrangements are subject to threshold and other monitoring on an ongoing basis. Changes to certain data and threshold breaches are escalated for action, such as additional margin being called. The Policy sets out guideline escalation triggers thus ensuring that current and potential future exposures are covered with a high degree of confidence. Moreover, stress testing procedures ensure LCH SA's margin models maintain at least a 99.7 percent confidence level, and margin posted to cover inter-CCP risk is held in a bankruptcy remote structure.

In accordance with the ESMA Guidelines on Interoperability, LCH SA does not require an interoperating CCP to contribute to any LCH SA default fund, and nor does LCH SA contribute to the default fund of any interoperable CCP. LCH SA has, however, a number of processes in place to manage inter-CCP risk, for example Variation Margin calls and End of Day Margin calls. Further, the rights and obligations set out in the legal documents govern the process by which each CCP ensures that risk is managed.

LCH SA consults with its Clearing Members of the respective clearing service, where there is material change to any interoperable CCP arrangement, and publically discloses on its website any interoperable CCP arrangements, and the general risks of participating in such a service in relation to sharing of uncovered losses and uncovered liquidity shortfalls resulting from a CCP link arrangement, and as set out in the LCH SA Default Rules.

Key Consideration 9 is not applicable to CCPs.

Publicly available resources

[Public quantitative disclosure standards for central counterparties](#)

Principle 21: Efficiency and effectiveness

An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.

LCH SA maintains an operating structure that considers its clearing members, the products cleared and is designed to be efficient and effective. The mechanisms within this operating structure are subject to periodic review to ensure that they remain productive and continue to facilitate the goals and objectives of participants and the markets LCH SA serves.

Key Consideration 1: An FMI should be designed to meet the needs of its participants and the markets it serves, in particular, with regard to choice of a clearing and settlement arrangement; operating structure; scope of products cleared, settled, or recorded; and use of technology and procedures.

LCH SA is a global multi-asset class clearing house, serving a broad number of major exchanges and platforms as well as a range of OTC markets. LCH SA's commitment to the horizontal model ensures a clear growth path for clearing across multiple markets, exchanges, venues and geographies.

LCH SA is partly owned by Euronext and indirectly by its clearing members and, as a consequence, the exchange and the clearing members are part of the governance process and are represented in relevant committees. The LCH SA Board, Risk Committee and Audit Committee include Euronext, users and independent representation. LCH SA also has a number of advisory and risk working groups, which relate to specific products or projects and through these forums and member consultations ensures consideration of clearing member needs in terms of products and technology.

Any change which may fundamentally affect the way LCH SA operates will involve a change to the LCH SA Clearing Rules. Changes to the Clearing Rules are considered by the Rules Change Committee, which includes representatives of the compliance and legal functions and a clearing business representative. This Committee will independently assess changes and set a minimum time for clearing member consultation. Feedback received from clearing members is assessed and any further changes made will be considered by the Rules Change Committee before it can be made live. Further, LCH SA is an active market participant, providing thought leadership into industry-wide initiatives to promote financial stability and to improve the effectiveness and efficiency of the markets. Any significant changes that fundamentally affect the way that LCH SA operates are made only after clearing member consultation. Additionally, clearing members are involved in the development and testing of new releases of technology relating to new products or systems.

The LCH SA client management functions collect and collate enhancement and change requests from clearing members and submit to senior management for consideration.

Key Consideration 2: An FMI should have clearly defined goals and objectives that are measurable and achievable, such as in the areas of minimum service levels, risk- management expectations, and business priorities.

LCH SA's principal objectives are:

- To provide market leading risk management and clearing solutions
- To manage our members' and clients' risk by providing effective and efficient clearing services
- To promote a safe and stable financial market foremost in all that we do

The strategy for achieving these objectives is to continue to offer our proven risk management capabilities across a range of asset classes with a commitment to partner with our members to develop the services that make markets more efficient and safer.

The LCH SA Board supports the highest standards in corporate governance and through its internal governance process creates and maintains well defined strategic and financial plans. Progress against

goals and objectives are included in the publicly available consolidated LCH SA Group report and accounts.

LCH SA maintains dialogue with its clearing members through product specific user working groups and regularly consults its clearing members to obtain feedback.

LCH SA senior management reporting enables the LCH SA Board to assess and have oversight of the progress of LCH SA against its goals and objectives, including the strategy and the priorities for its senior executive. LCH SA management assesses performance against its annual Corporate Strategic Objectives on a quarterly basis. Performance against these objectives is reported to the LCH SA Group Board and the LCH SA Remuneration Committee. In addition, LCH SA management regularly reviews its Risk Governance Framework, and reports to the Board on the extent to which risks are managed within the LCH SA Board's tolerance. LCH SA's financial performance against budgets, targets and multi-year financial plans is also regularly reviewed and reported to the Board.

Key Consideration 3: An FMI should have established mechanisms for the regular review of its efficiency and effectiveness.

LCH SA has carried out a number of reviews of its operating model with a view to improving efficiency and effectiveness. LCH SA has implemented a range of initiatives including outsourcing of shared corporate and technology services under separate legal contracts with LSEG, its majority shareholder. This has resulted in a number of employees transferring from LCH SA Group to LSEG functions with direct cost reduction achieved and reduced headcount. In 2017, LCH SA also transferred some technology support functions to a new LSEG captive provider which delivers an identical service at a reduced cost.

LCH SA also utilises a LSEG Procurement function to achieve a reduction in procuring services through the buying power of the larger group. This has been a continuing effort since 2014 and the initiative continues today.

LCH SA operates a number of project boards that review the efficiency and effectiveness of its strategic and improvements plans during project life-cycle. Significant projects may also have independent reviews undertaken which are reported to the Board.

LCH SA continues to review its operating models to ensure they are fit for purpose to support LCH SA's business whilst being lean and efficient. This includes organisation design reviews of all operating units.

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| <p>Publicly available resources</p> | <p>LCH SA Committee Terms of Reference</p> <p>CDSClear</p> <p>EquityClear</p> <p>Repoclear</p> <p>€GCPlus</p> |
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Principle 22: Communication procedures and standards

An FMI should use, or at a minimum accommodate, relevant internationally accepted communication procedures and standards in order to facilitate efficient payment, clearing, settlement, and recording.

LCH SA uses internationally accepted communication procedures and standards where they are existing and practicable. Where such standards and procedures are not defined, LCH SA may facilitate use of proprietary messaging.

Key Consideration 1: An FMI should use, or at a minimum accommodate, internationally accepted communication procedures and standards.

LCH SA works to internationally-recognised procedures and standards wherever possible.

For payments, LCH SA uses SWIFT ISO15022 and ISO20022 standards for all payment instructions. For securities settlement, LCH SA uses a combination of SWIFT ISO 15022 and ISO20022 standards and the CSD/Custodian's proprietary GUI interfaces.

Clearing members may provide settlement instructions to LCH SA either through LCH SA's proprietary GUI interface (CMS) or via SWIFT ISO 20022 standard Collateral Proposal message. LCH SA sits on the ISO 20022 Securities Evaluation Group and contributes to defining international standards.

As well as providing proprietary reporting to clearing members, LCH SA provides wherever possible standards based reporting. This is the case for cash and securities reconciliation messages and more recently margin calls messaging. These messages can be provided directly to clearing members or to nominated third parties i.e. collateral managers or custodians.

Where industry standard interfaces for custodians and (I)CSDs are not available LCH SA either develops to third party specifications or defines a proprietary interface.

Publicly available resources

[Member Connectivity Guide](#)

Principle 23: Disclosure of rules, key procedures, and market data

An FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks, fees, and other material costs they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed.

The LCH SA website discloses the publicly available LCH SA Clearing Rules, the fees and risks associated with becoming a clearing member of LCH SA, as well as details of the LCH SA default waterfalls. Details of accepted eligible collateral including haircuts, and clearing member participation criteria are also disclosed on the publicly available LCH SA website, as is volume and value transaction data for each service.

Key Consideration 1: An FMI should adopt clear and comprehensive rules and procedures that are fully disclosed to participants. Relevant rules and key procedures should also be publicly disclosed.

LCH SA Clearing Rules govern the rights and responsibilities of LCH SA and its clearing members in respect of the clearing services provided by LCH SA, set out the main principles of business operations and deal with the management of a clearing member's default. LCH SA makes its Clearing Rules, membership criteria and risk disclosures available to the public via its website.

The Rules Change Committee oversees LCH SA's Clearing Rules' implementation process. Following a determination by the Committee, based on materiality, a period of consultation with LCH SA's clearing members or information of the latter will commence in order to provide clearing members with the opportunity to comment on proposed rule amendments or be informed sufficiently in advance. Prior to presentation at the Committee there is an internal peer review with Legal and Compliance Staff. The Rules Change Committee ensures that rules are clear and comprehensive by discussing each rule change in full and by means of challenge.

All proposed rule changes that have been filed with the CFTC and SEC are made publicly available on LCH SA's website.

LCH SA's key policies are reflected in information available on LCH SA's website. This includes the expected coverage of initial and variation margin requirements, acceptable collateral and haircuts, and participation requirements.

Key Consideration 2: An FMI should disclose clear descriptions of the system's design and operations, as well as the FMI's and participants' rights and obligations, so that participants can assess the risks they would incur by participating in the FMI.

The Clearing Rules set out LCH SA's and clearing members' rights and obligations and include, notably, developments regarding the management, by LCH SA, of a Clearing Member's default and default waterfall are published on the website. In addition, LCH SA provides its clearing members access to margin calculation tools to estimate initial margin obligations for certain markets. For each service that LCH SA offers, key service features are published on its website. User guides and technical specifications are available on request.

Key Consideration 3: An FMI should provide all necessary and appropriate documentation and training to facilitate participants' understanding of the FMI's rules and procedures and the risks they face from participating in the FMI.

LCH SA business lines provide all the required documentation to each new clearing member during its onboarding process. Training sessions are set up with the new CCP participants to ensure a full understanding and interaction with the CCP operational teams. The clearing member on-boarding training covers risk management, margining, collateral operations and reporting. Furthermore, refresher

operational training is provided for any existing clearing member on an ad hoc basis, as required. Bespoke training for any element of clearing may be formulated and delivered on request.

Examples of documentations: Service Description document, Connectivity Guide are available on the secured area of the CCP website.

Outside of formal training, LCH SA staff are available to its clearing members and dedicated teams are in place to assist clearing members, where necessary. Contact details are available on the LCH SA website.

Key Consideration 4: An FMI should publicly disclose its fees at the level of individual services it offers as well as its policies on any available discounts. The FMI should provide clear descriptions of priced services for comparability purposes.

Fees and descriptions of services are disclosed on the LCH SA website at the level of its individual services and, where relevant, volume-based discounts or fee holidays are clearly stated on the fee page for that service and are offered to all eligible clearing members on a non-discriminatory basis.

LCH SA issues circulars regarding material changes to fees prior to changes being made. In addition, notifications are also posted publicly on the website. This allows for easy comparison across CCPs offering similar services.

Key Consideration 5: An FMI should complete regularly and disclose publicly responses to the CPSS-IOSCO disclosure framework for financial market infrastructures. An FMI also should, at a minimum, disclose basic data on transaction volumes and values.

In accordance with LCH SA's policy of complete disclosure in accordance with the CPMI-IOSCO Disclosure Framework, LCH SA will publish this self-assessment of compliance with the PFMI and makes quarterly quantitative disclosures under the "Public quantitative disclosure standards for central counterparties".

Quantitative data such as transaction volumes, notional outstanding values and end of day mark-to-market prices is made available to the public on the LCH SA website.

General information on LCH SA's activities and operations is publicly disclosed on LCH SA's website. This information includes a list of clearing members, the set of products cleared, acceptable collateral, and an overview of the overall risk management framework. Also disclosed are clearing fees, minimum default fund and contribution requirements.

This information is disclosed to the public on the LCH SA website in English.

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| <p>Publicly available resources</p> | <p>Governance</p> <p>Clearing Rules</p> <p>Risk Management Overview</p> <p>Membership</p> <p>Training</p> <p>CPMI-IOSCO Quantitative Disclosure</p> <p>Public quantitative disclosure standards for central counterparties</p> |
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Principle 24 (Disclosure of market data by trade repositories) is not applicable to CCPs.

Appendix: Key terms and abbreviations

| Abbreviation | Full name |
|----------------|---|
| ACPR | Autorité de Contrôle Prudentiel et de Résolution |
| AMF | Autorité des Marchés Financiers |
| BCM | Business Continuity Management |
| BIA | Business Impact Assessment |
| CaLM | Collateral and Liquidity Management |
| CATS | LCH SA Treasury Banking System |
| CCP | Central counterparty |
| CFTC | US Commodity Futures Trading Commission |
| Clearing Rules | LCH SA Rulebooks, Instructions / Procedures and Notices |
| CMS | Collateral Management System |
| CMT | Crisis Management Team |
| CPMI | Committee on Payments and Market Infrastructures |
| CPSS | Committee on Payment and Settlement Systems |
| CSD | Central Securities Depository |
| DCMT | Default Crisis Management Team |
| DCO | Derivatives Clearing Organization |
| DFAM | Default Fund Additional Margin |
| DMG | Default Management Group |
| DMP | Default Management Process |
| DVP | Delivery Versus Payment |
| EMIR | European Markets Infrastructure Regulation |
| EWMA | Exponentially Weighted Moving Average |
| FCM | Futures Commission Merchant |
| FINMA | Swiss Financial Market Supervisory Authority |
| FMI | Financial Market Infrastructure |

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| FX | Foreign Exchange |
| GCM | General Clearing Member |
| GMRA | Global Master Repurchase Agreement |
| GOSA | Gross Omnibus Segregated Accounts |
| ICSD | International Central Securities Depository |
| IOSCO | International Organization of Securities Commissions |
| ICS | Internal Credit Score |
| ISA | Individually Segregated Account |
| LCH Group | LCH Group Holdings Limited |
| LCH SA | Banque centrale de compensation |
| LCR | Liquidity Coverage Ratio |
| LSEG | London Stock Exchange Group |
| LVPS | Large Value Payment System |
| NOSA | Net Omnibus Segregated Accounts |
| OTC | Over-The-Counter |
| PPS | Protected Payments System |
| RTS | Regulatory Technical Standards |
| SEC | Securities Exchange Commission |
| Settlement Finality Directive | Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems |
| T2S | Target2 Securities :The Trans-European Automated Real-time Gross Settlement Express Transfer System 2 |
| TORs | Terms of Reference |
| VaR | Value-At-Risk |