



Central Clearing

Proven, Transparent, Regulated
Means of Reducing Systemic Risk

August 2024

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Introduction

Intercontinental Exchange (ICE) owns and operates six clearing houses in North America, Europe and Asia.

ICE Clear US clears a variety of agricultural and financial derivatives and is primarily regulated by the U.S. Commodity Futures Trading Commission (CFTC) and is recognized as a third-country CCP under the European Market Infrastructure Regulations (“EMIR”) by the European Securities and Markets Authority (“ESMA”);

ICE Clear Europe is ICE’s London-based clearing house that clears derivatives in several asset classes, including energy, interest rates, and equity derivatives. ICE Clear Europe is primarily supervised by the Bank of England, in close cooperation with ESMA and the CFTC, and is recognized as a third-country CCP under EMIR;

ICE Clear Credit clears a global set of over the counter (OTC) credit default swaps on indices, single names and sovereigns and is primarily regulated by the CFTC and SEC and is recognized as a third-country CCP under EMIR by ESMA with respect to CFTC regulated products;

ICE Clear Netherlands clears European equity derivatives. ICE Clear Netherlands obtained its EMIR authorization in 2014 and is primarily supervised by De Nederlandsche Bank and the Autoriteit Financiële Markten;

ICE Clear Singapore clears energy and FX derivatives tailored for the Asian market and is overseen by the Monetary Authority of Singapore and is recognized as a third-country CCP under EMIR by ESMA; and

ICE NGX clears North American natural gas and electricity derivatives and is regulated by the Alberta Securities Commission and the CFTC and is recognized as a third-country CCP under EMIR by ESMA.

As the operator of clearing houses that clear a diverse set of exchange-traded and OTC derivatives, we know firsthand that clearing plays an essential risk management role in the financial system and, as a result, is central to financial stability. The risk reducing benefits of central clearing have long been recognized by users of exchange-traded derivatives and were the foundation of the financial reforms put forward over the past decade for OTC derivatives. Clearing, when provided by well-run and well-supervised clearing houses, has historically proven to be a fundamentally safe and sound process for reducing systemic risk.

Importantly, the ICE clearing houses have never suffered a loss to their capital (a/k/a Skin-In-The-Game) or the mutualized guaranty fund resources of the clearing members as a result of a clearing member default. Nor has any ICE clearing house experienced a material non-default loss (NDL).

This paper sets out the role of clearing, the benefits it provides, and the risk control measures and the layers of protection that are in place at ICE clearing houses.¹

Clearing Track Record and Overview

The ICE central counterparty clearing model is effective and has been successfully relied upon by futures and over the counter (OTC) markets around the world. The introduction of regulatory mandated clearing for certain swaps has increased awareness around clearing and the benefits it brings to traded markets. ICE's clearing house risk management practices have been repeatedly tested and have performed as designed in response to clearing member defaults, including:

- Drexel Burnham (1990)
- Woodhouse, Drake & Carey (1991)
- Barings (1995)
- Griffin (1998)
- Refco (2005)
- Lehman Brothers (2008)
- MF Global (2011)

Over the past decade, ICE has invested heavily in our clearing operations including clearing house technology, human resources, and world class risk management models and practices. ICE has kept pace with and often preceded the regulatory reforms, new global rules, and international standards² that are established with respect to the risk controls, levels of protection and proper functioning of clearing houses. We have worked closely with regulators, clearing members and end users to implement a clearing model that meets or exceeds modern regulatory reforms and international standards. The result is an even more robust clearing model that includes many ICE-led initiatives, such as the introduction of "skin-in-the-game," whereby clearing houses and exchanges add an amount of their own capital to the default waterfall.

ICE does not operate its clearing houses in a vacuum. On the contrary, we are highly transparent and inclusive with respect to all of our operations. Our clearing houses are subject to extensive regulatory oversight (by multiple regulators around the world) and strong corporate governance requirements, exercised largely through risk and advisory committees and independent boards.³ Risk committees include representatives from our clearing member firms and, in some cases, end clients. ICE clearing houses regularly conduct margin back-testing, default fund stress testing, and liquidity stress testing, the results of which are reviewed by clearing members and regulators and are publicly available as part of the Public Quantitative Disclosures. In addition, the clearing houses' counterparty credit, margin, guaranty fund and liquidity methodologies are independently validated on a routine basis.

As detailed below, the rules, practices and procedures for ICE's clearing houses are fully transparent and are publicly disclosed in a consistent manner, as set out within the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMIs) and various regulatory requirements. Any material changes to ICE's clearing processes are subject to risk committee review and board approval as well as applicable regulatory review and approval.

Transparency

ICE recognizes the importance of operating highly transparent clearing houses such that all market participants have adequate information to fully understand the clearing process. In addition to fulfilling all regulatory disclosure requirements, ICE clearing houses provide further public information where possible. Each of our clearing houses operate under comprehensive and detailed rule books that are posted on our website.

Disclosure Frameworks (see Appendix B for links)

Each ICE clearing house has posted its respective Disclosure Framework publicly on the ICE website. The Disclosure Framework provides relevant information to market participants with respect to the clearing house's operations and risk methodology, including:

- Legal and regulatory frameworks
- Governance
- Systems design and operations
- Framework for managing legal, credit, liquidity, operational and other risks
- Process for effectively measuring, monitoring, and managing credit exposures to participants and those arising from its payment, clearing and settlement process
- Collateral and haircut requirements
- Margin methodology
- Processes for measuring, monitoring and managing liquidity risk
- Settlement finality
- Default rules and procedures
- Segregation and portability
- Custody and investment risks
- Operational risk
- Access and participation requirements
- Rules, key procedures and market data

Public Quantitative Disclosures (see Appendix A for further detail and Appendix B for links)

ICE clearing houses comply with the Public Quantitative Disclosure requirements issued by CPMI-IOSCO, which include:

- Credit risk - value of default resources and stress test results
- Collateral - eligibility and haircuts
- Margin - rates, models, back-testing
- Liquidity risk - size and composition of assets, stress testing
- Settlements - volume and type
- Default specific information - subject to legal constraints on timing and content
- Segregation and portability
- Custody and investment risks
- Operational risk
- Access and participant requirements

Additional Disclosures (see Appendix B for links)

- Regulatory rule filings
- Clearing members
- Informational circulars
- Cleared products
- Clearing data and financial resources
- Volume and open interest
- Clearing fees

Central Counterparty Clearing

Clearing houses serve as the “central counterparty” to the financial transactions they clear, meaning that the clearing house is the buyer to a clearing member seller and seller to a clearing member buyer. In this manner, the clearing house maintains a balanced book of positions as opposed to taking on single-sided position risk itself.

Clearing houses do not themselves contribute risk to the financial system. Nor do clearing houses increase systemic risk by “concentrating” risk as some seem to fear. Instead, clearing houses reduce systemic risk by “centralizing” and managing risk that already exists in the disparate and opaque bilateral marketplace. As opposed to bilateral positions, cleared positions are “centralized” in a clearing house and the positions brought by the clearing members are risk managed by the clearing house in a highly transparent, disciplined, sophisticated, and regulated manner. Most importantly, clearing houses collateralize their cleared positions and mark the cleared positions to market at least daily.

Moreover, interposing a clearing house as the central counterparty to financial transactions provides systemic benefits resulting from the “compression” process known as multi-lateral netting⁴. In the absence of the multi-lateral netting benefit of central clearing, market participants maintain multiple effectively offsetting positions with multiple counterparties that must be unnecessarily processed, and risk managed. Such open positions increase the amount of collateral set aside and frequency of payments and as a result, increase the risk of operational errors, technical defaults, and liquidity shortfalls.

The risk to the clearing house is that one (or more) of its clearing members defaults with respect to their obligations to the clearing house. Accordingly, clearing houses manage the counterparty performance risk associated with their clearing members in the manner described below.

Layers of Protection

ICE clearing houses at all times have a series of comprehensive controls and protections in place to respond to a broad range of extreme but plausible stress events and default scenarios. The range of such controls and protections is robust, as reflected in the PFMLs, and stipulated for European clearing houses in EMIR and US clearing houses in CFTC and SEC regulations that implement the Dodd-Frank Act.

Membership Criteria
Ongoing Creditworthiness
Initial Margin Requirement
Collateral and Liquidity Management
Customer Segregation and Portability
Daily Mark-to-Market / Variation Margin
Intraday Risk Monitoring
ICE Contribution
Default Insurance
Mutualized Guaranty Fund
Powers of Assessment

Membership Criteria and Ongoing Creditworthiness

The first two levels of protection is the clearing houses' initial and ongoing conservative membership standards.

All clearing members must: hold sufficient capital; agree and be bound to the terms of the Clearing Membership Agreement; maintain all applicable regulatory authorizations, licenses, permissions and approvals in which it conducts business, have directors and officers that are fit and proper; maintain appropriate technical and operational systems and controls; have appropriate business continuity procedures; be sufficiently liquid and able to meet margin requirements; have contributed to the Guaranty Fund; and, remain solvent.

Our clearing houses have developed and implemented a sophisticated review and internal credit rating process that assesses and monitors each clearing member's initial and ongoing credit worthiness.

The ICE Credit Risk System (CRS) is a credit rating methodology that estimates a credit score representative of the financial condition of the counterparty. The CRS relies on seven credit risk factors (CRFs) representing a combination of data and performance ratios derived from financial reporting and market information. Assessments performed by external ratings agencies are considered only one of many factors in developing our internal ratings. The CRFs are calibrated based on regulatory requirements or historical information and fitted to scoring functions. Each CRF receives a separate score from 1 (best) to 5 (worst) to reflect the financial condition of the counterparty. The CRF scores are defined as positive numbers and each CRF is subject to its own weighting. The final credit score is the weighted sum of the individual scores and is meant to provide a guide in determining the expected financial stability of each counterparty and the early detection of counterparties that are in greater need of examination.

The ICE clearing houses maintain watch lists for any existing clearing members that might experience weakening credit. The clearing houses' rules provide appropriate authority and discretion to manage any risk associated with a clearing member depending on the extent of the weakening credit, including increased financial reporting, increased margin requirements, capital-to-margin limits, imposition of risk reducing transactions only and suspension of clearing.

Initial Margin Requirement

The third level of protection is the appropriate collateralization of market risk through initial (original) margin. The levels of initial margin are calibrated such that a portfolio the clearing house may be required to liquidate post clearing member default can be closed or auctioned without recourse to resources other than those deposited by the defaulting clearing member, assuming an appropriate risk confidence level and liquidation period.⁵

In addition to the base margin model, each ICE clearing house (depending on its products) employs a number of margin add-ons related to position concentration, clearing member capital, volatility, spread responses, recovery rate sensitivity, jump-to-default, and wrong way risk. Each ICE clearing house also includes an anti-procyclicality (APC) component as part of its margin requirements. All of these margin add-ons result in margin confidence levels that exceed the regulatory minimums.

On top of any margin add-ons, ICE's futures and options clearing houses collect or are considering collecting margin known as shortfall margin. The amount of shortfall margin is determined by stress testing each clearing member's position. To the extent that any stress loss amount exceeds the clearing member's margin plus a predetermined amount based upon the capital of the clearing member, the clearing member is charged a shortfall margin amount.

The combination of the ICE clearing houses' base margins, margin add-ons, APC margins, and shortfall margins, result in a margin process that supports a defaulter pays model.

Extensive member review, board approval, independent model validation, and regulatory approval are critical components of determining our clearing houses' margin methodology.

As noted above, ICE's default resource calculation methodology has withstood the test of time, and no ICE clearing house has been required to utilize its own capital or the default fund contributions of the non-defaulting clearing members. Instead, the margin and guaranty fund contributions of the defaulting clearing members have proven to be sufficient to allow ICE to manage any defaults.

Collateral and Liquidity Management

ICE clearing houses require clearing members to collateralize their credit exposure by depositing cash or highly liquid collateral with the clearing house which has low credit, liquidity and market risk. Conservative haircuts are applied to non-cash collateral in order to manage market risk. Cash and collateral is secured through investment policies which are designed to safeguard the principal (safety), provide sufficient liquidity to meet all operational requirements (liquidity) and obtain a reasonable rate of return (yield) whilst complying with relevant laws and regulations. Cash deposits are secured through reverse repos, direct purchases of government bonds, regulated credit institutions or, where available, Central Banks of Issue. Committed repo facilities have been secured to provide additional means of generating liquidity in extreme circumstances. All ICE clearing houses regularly stress test liquidity needs in order to ensure that adequate resources are in place; the results of which are reviewed by clearing members and regulators and are publicly available as part of the Public Quantitative Disclosures.

Extensive member review, board approval, independent model validation, and regulatory approval are critical components of determining our clearing houses' liquidity frameworks.

Customer Segregation and Portability

Importantly, customer-related margin is segregated from the clearing member's house (proprietary) margin. The purpose of such segregation is to ensure that in no event will customer-related margin deposited at the clearing house be exposed to losses associated with the clearing member's proprietary trading. In addition, the segregation of customer-related margin might serve to facilitate the transfer (porting) of customer-related positions in the event that the clearing member defaults to the clearing house.

Daily Mark-to-Market

Further protection is provided through the revaluation of cleared portfolios, on at least a daily basis, through settlement of mark-to-market margin, frequently referred to as variation margin. This practice of requiring clearing members to pay their losses on at least a daily basis serves to avoid the accumulation of large losses over time. Clearing members with a position loss are held accountable as the market moves.

Intraday Risk Monitoring

ICE's clearing houses monitor positions on a nearly real-time basis and may make additional intra-day margin calls in the event that certain risk thresholds are exceeded. Clearing members are required to provide additional collateral in a timely and prescribed manner in the event of an intra-day call.

ICE Contribution

ICE pioneered the concept of "Skin-In-The-Game" (SITG) and contributed a dedicated amount of our own capital to the default waterfall on a voluntary basis ahead of any regulatory requirements. **Moreover, with respect to ICE Clear Credit, ICE Clear Europe, and ICE Clear US, ICE has volunteered to place all of its skin-in-the-game at the front of the waterfall - meaning ICE's SITG would be utilized prior to the guaranty fund contributions of the non-defaulting clearing members.** Beginning in March 2018, certain of our exchanges are also required to make similar SITG guaranty fund contributions on top of those made by the ICE clearing houses to be utilized pro rata along with the clearing house contributions in the event of a clearing member default. The contribution is calculated per exchange based upon the clearing risk of the exchange's contracts, subject to a minimum contribution of \$10 million for each exchange.

As of July 31, 2024, ICE has contributed a total of \$340 million of its capital. However, it is important to appreciate that in addition to our SITG contribution, ICE has invested substantially in our clearing operations over the years and runs the risk of significant business and reputational loss in the event of a clearing member default that exposes the non-defaulting clearing members' contributions to the guaranty fund. In addition, ICE maintains substantial amounts of operating capital at our clearing houses. **In total, ICE maintains more than one billion dollars (\$1,000,000,000) in skin-in-the-game and operating capital across our clearing houses.**

Notably, the decision to contribute SITG continues to be a commercial rather than a risk-based consideration. **Importantly, the level of SITG at each of our clearing houses is an additional, separate and distinct layer of protection that does not reduce the level of guaranty fund contributions required from each clearing member. The clearing member's contributions are based upon the size of the risk each clearing member's position brings to the clearing house.** Clearing houses, as previously noted, are central counterparties and, as such, are market neutral and do not create risk. The core role and function of a clearing house is to manage the risk associated with its clearing members' positions.

While skin-in-the-game adds an important layer of protection that clearing members may evaluate when determining whether to use a clearing house's services, its purpose is to further align the risk management interests of the clearing house to the interests of its clearing members; it is not intended to replace or reduce the position risk-based amount of the guaranty fund. Accordingly, ICE fundamentally disagrees that a clearing house's skin-in-the-game can be determined based on a risk-based calculation.

Default Insurance

ICE recently made the business decision to add a layer of default insurance to its layers of protection. The default insurance layer has been placed after and in addition to the ICE Clear Credit, ICE Clear Europe, and ICE Clear US SITG contributions and importantly, the default insurance layer resides before the guaranty fund contributions of the non-defaulting clearing members. The default insurance has a three-year term commencing September 17, 2022, for the following clearing houses in the following amounts: ICE Clear Credit - \$75 million; ICE Clear Europe - \$100 million; and ICE Clear US - \$25 million.⁶

Similar to SITG, the default insurance layer is not intended to replace or reduce the position risk-based amount of the guaranty fund. As a result, the default insurance layer is not a factor that is included in the calculation of the clearing members' guaranty fund contribution requirement. Instead, the default insurance layer serves as a new, additional, distinct, and separate default resource that should serve to further protect the non-defaulting clearing members' guaranty fund contributions from being mutualized (utilized) in the event of a default.

Mutualized Guaranty Fund

All of ICE's clearing houses have in place robust default resources and the mechanisms and procedures to cover losses which exceed the resources of a defaulting participant. This layer of protection typically consists of a mutualized default fund, with contributions from clearing members proportional to the risk of their positions and sized pursuant to the clearing house's guaranty fund methodology.

We fully support the international consensus that default resources should be fully pre-funded, highly resilient and able to withstand at least the failure of the two clearing member groups that create the greatest uncollateralized losses under rigorously tested stress conditions representing extreme but plausible scenarios. Extensive member review, board approval, independent model validation, and regulatory approval are critical components of determining our clearing houses' guaranty fund methodology.

Powers of Assessment

As part of the default waterfall, ICE's clearing houses have a contractual right to call for additional contributions from clearing members in the form of assessment rights. Assessment rights are limited to a multiple (normally 1x or 2x) of the clearing member's guaranty fund requirement per clearing member default. Assessment rights provide important additional protections in the event of a clearing member default which exhausts the existing pre-funded resources. We

believe (and as required by EMIR) that the extent of our assessment rights should be clearly defined and limited in order to provide clearing members with certainty as to the extent of their liability. In addition to assessment rights that are limited per default, ICE believes (and EMIR requires) that assessment rights for multiple clearing member defaults should be limited and has implemented its rules accordingly.

Variation Margin Gains Haircutting

We believe that variation margin gains haircutting should only be used as a tool of last resort. We believe that variation margin gains haircutting should be used only in unprecedented circumstances and for a limited period of time. Any use of variation margin gains haircutting should only be on the basis that it is defined and transparent, subject to consultation with members as required by the respective ICE clearing house rules, communication with regulators where possible, and following approval of the clearing house independent board of directors. Whilst it is acknowledged that such a measure could, in extreme circumstances, impact end users which are not clearing members, a predetermined limitation on the use of recovery tools related to only clearing members would sharply focus the burden of recovery in an extreme scenario onto a smaller number of market participants. This could exacerbate systemic risk concerns while substantially reducing the comprehensiveness and, potentially, the effectiveness of clearing house recovery plans.

Recovery Arrangements

To accommodate extreme and unlikely circumstances that result in losses in excess of defaulting clearing members' margin and guaranty fund resources, ICE clearing houses have in place recovery plans.

We agree that a recovery plan should be clear and transparent and provide sufficient detail for members and regulators to anticipate the likely actions and tools of a clearing house during a default. However, it is important that the plan not be so prescriptive that the clearing house is rendered unable to take a set of actions which might otherwise successfully manage a default.

The ICE clearing houses regularly conduct default drills to test their recovery plans with their clearing members. The default drills serve to ensure that the recovery plans are robust, effective, rehearsed and well-understood.

Contents of Clearing House Recovery Plans

Continuity of Clearing Service

Achieving continuity of critical clearing services is, correctly, a key objective in the recovery arrangements for clearing houses. For this reason, a fundamental principle of any clearing house recovery arrangement must be to incentivize existing clearing members to continue to support the clearing house instead of relinquishing membership. This is necessary for the clearing house to continue to fulfill its core function of facilitating risk management by providing central counterparty clearing services and to allow clearing members to provide market access, payment and collateral transformation facilities for end users.

Robust Recovery Plan

Position Transfer (Portability)
Mandatory Auction or Voluntary Auction
Final Auction
Partial Tear-up
Short-Term Moratorium
Full Tear-Up

Position Transfer (Portability)

If permitted and provided that the clearing house will not be exposed, non-defaulting customer-related positions and associated collateral assets should be transferred (ported) to a non-defaulting clearing member as soon as practicable.

Auctions

All of the ICE clearing house defenses support the fundamental principle that the clearing house is designed to operate as a central counterparty with a balanced position. Accordingly, the layers of protection are designed with the specific purpose of restoring a clearing house's position to a balanced book of positions in the event of clearing member default. In the event that an ICE clearing house is unable to liquidate a defaulting clearing member's portfolio in the market, the ICE clearing houses may decide to conduct an auction.

Mandatory Auction - the clearing house may decide that the defaulter's portfolio will be subject to a mandatory auction whereby all or certain clearing members are required to bid for the portfolio. In order to incentivize clearing members to bid and to bid competitively, clearing members who fail to bid or who bid poorly will have their contributions to the guaranty fund and any assessments subordinated (juniorized) meaning that the guaranty fund contributions and any assessments of such clearing members will be utilized prior to the contributions or assessments of the clearing members who bid more competitively.

- **Client Participation** - in order to facilitate a more robust auction, we support non-clearing member (Client) participation in the mandatory auction.⁷ Clients may participate indirectly through their clearing member. In this instance, Clients will not have direct access to the clearing house's auction platform and they will receive information about the defaulter's portfolio from the clearing member. The clearing member will enter an auction bid or bids on behalf of any indirectly participating Clients. Alternatively, a clearing member may "sponsor" a Client's direct access and participation. Such sponsored access in the mandatory auction requires the consent of the Client's clearing member, the Client formally agreeing to be bound by ICE clearing house's rules related to the default auction process including confidentiality and insider trading and, the Client having previously participated in default drill and platform training. Any Sponsored Client bids will be credited to the clearing member's minimum bidding requirement and will be factored into the clearing member's juniorization

calculation. Finally, a Client may become a “Direct Participant” in a mandatory auction. Such access includes all requirements of Sponsored participation in addition to the Client contributing an amount to the guaranty fund that is subject to juniorization. A Direct Participant’s bids in the mandatory auction will not be credited toward the clearing member’s minimum bidding requirement and will not be factored into the clearing member’s juniorization calculation. In either the case of Sponsored or Direct Participation, the Client will be required to clear (with its designated clearing member) any position that results from a successful bid.

Voluntary Auction - the clearing house may decide to conduct a voluntary auction. A voluntary auction is open to any invited clearing members and any invited clients. A voluntary auction may be appropriate in situations where the clearinghouse believes that it is an efficient way to restore the clearinghouse’s position to a balanced book, in the event that there are a limited number of clearing members able to participate in a mandatory auction, or as a final auction in the event that a mandatory auction is unsuccessful.

Partial Tear-up

In the unlikely event that the auction process does not result in the close-out in full of the remaining portfolio, then we believe it is appropriate for a clearing house to include the possibility of limited and partial position tear-up in its recovery plans. This is a last resort recovery tool to be used in the event that other tools have not been successful in re-establishing a balanced book of positions. The scope and magnitude of such a partial tear-up should be limited to that necessary to avoid entry into resolution. As is the case with respect to variation margin gains haircutting, the use of partial tear-up would be subject to consultation with members as required by the respective ICE clearing house rules, communication with regulators, and the approval of the clearing house independent board of directors.

ICE believes that partial position tear-up is preferable to forced position allocation. The possibility of forced position allocation creates additional difficulty for clearing members in determining their potential risk exposure. And in the event that positions are forced upon the clearing member, the clearing member could be exposed to risk in contracts that exceed the clearing member’s risk limits or that the clearing member is not qualified or authorized to risk-manage.

Short-Term Moratorium

The complete tear-up of all of the clearing house’s open contracts and the resulting termination of clearing would be a very unattractive result especially given the likely state of the marketplace at the time. Accordingly, ICE believes that a brief clearing “moratorium” (sometimes referred to as a “false weekend”) is an important tool that could be utilized (if permitted by the regulator) as an absolute last step prior to effecting complete contract tear-up and the end of clearing. Such a tool would provide time for other measures outside the framework of the clearing house’s recovery arrangements to take effect and to thoroughly consider any remaining alternatives.

Full Tear-Up

Should a partial tear-up fail (as a result of insufficient default resources to pay for the torn-up contracts) the clearing house will have reached the end of its recovery plan and the rules provide for the closing out of all outstanding cleared contracts with all of the clearing members. In the absence of the intervention of a resolution authority, ICE would close out all outstanding cleared contracts by simply tearing up the contracts and paying out the remaining default resources (to the extent there are any remaining default resources) to the non-defaulting clearing members on a pro rata basis. This process is also known as complete or full tear-up.

Operational Risk

Operating capital

The ICE clearing houses meet or exceed their applicable regulatory operating capital requirements. The capital regulations require the ICE clearing houses to maintain sufficient capital to: allow for an orderly wind down or restructuring; cover operational, legal and business risks; and cover credit and market risks not covered by the clearing

members' margin and guaranty fund deposits. The ICE clearing houses (including the non-EMIR ICE clearing houses) adhere to the most conservative of the regulatory capital requirements (i.e., the regulatory capital required by the European Market Infrastructure Regulation).

NDLs (Non-default losses)

As a general principle the ICE clearing houses agree that they are responsible for any losses that they directly control (i.e., general operating loss events). However, with respect to losses that result from certain activities conducted on behalf of our clearing members and their customers (i.e., the investment of cash collateral) or services controlled by third parties that have been disclosed to our clearing members (i.e., settlement banks, depositories, and custodians) the ICE clearing houses disclaim liability or assume or plan to assume a limited amount of liability (known as a "first loss" amount) and any remaining liability and associated losses are or will be borne by the clearing members.

ICE advocates the use of accounts at central banks as "safe harbor" accounts, for ongoing deposits in order to avoid over reliance on repo markets or commercial banks and in order to enhance management of short-term liquidity risk. ICE also advocates the availability of fully secured access to central bank liquidity facilities in extreme circumstances. ICE encourages central banks to make such accounts readily available for clearing houses. For the avoidance of doubt, ICE does not expect such access to include any form of taxpayer bailout.

Insurance for NDLs

The ICE clearing houses are covered by a comprehensive insurance program that includes, but is not limited to, the following policies; Directors & Officers liability, Errors & Omissions (professional services including technology liability), Cyber, Financial Institutions (crime), Property, General Liability, Employment Practices Liability, and Workers Compensation.

Enterprise Risk Management

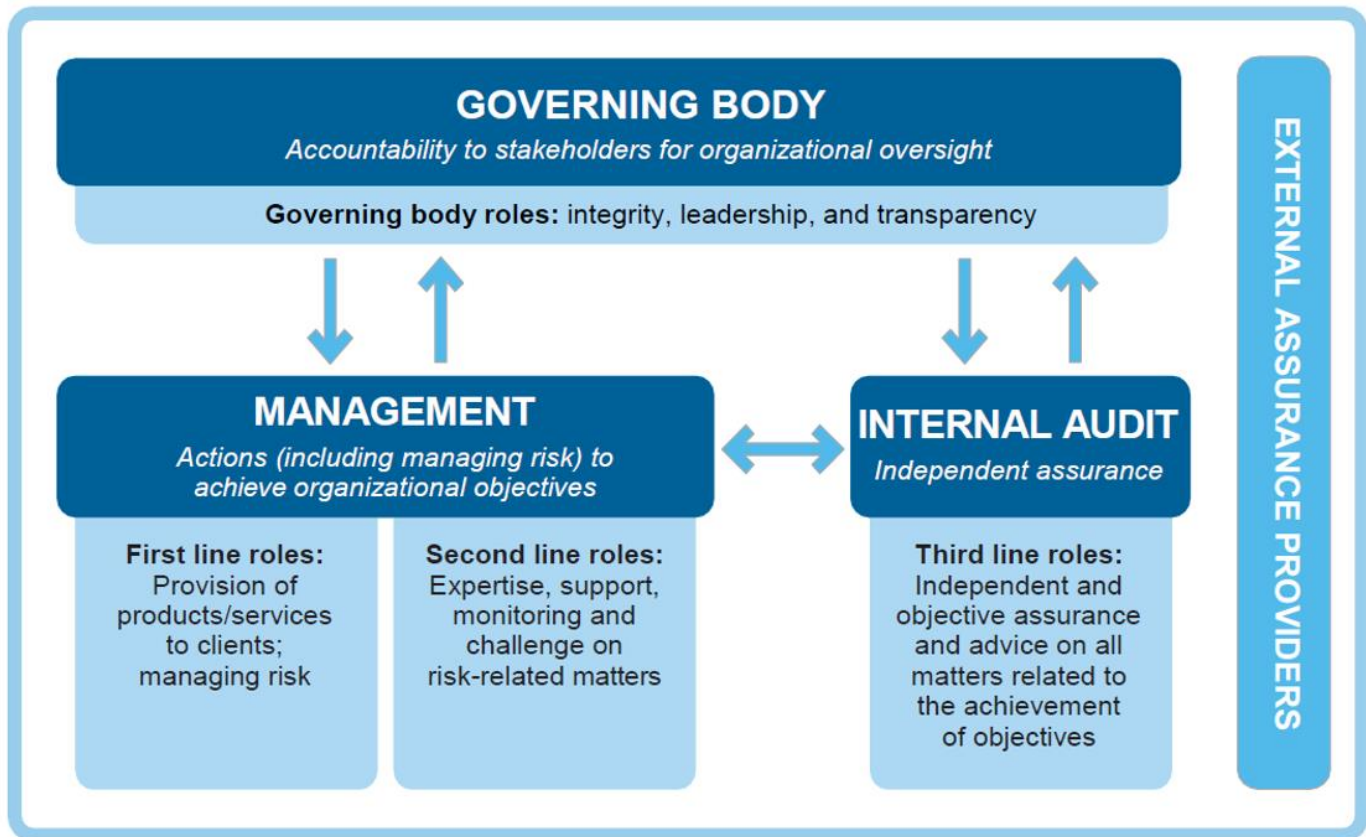
ICE employs a "Three Lines Model" for managing the risks of our clearing houses, including operational risks. The Three Lines Model helps organizations better identify and structure interactions and responsibilities of key players toward achieving more effective alignment, collaboration, accountability and, ultimately, objectives. It clearly outlines the roles of various leaders within an organization, including oversight by the board or governing body; management and operational leaders including risk and compliance (first and second-line roles); and independent assurance through internal audit (third line) and the position of external assurance providers.

The First Line consists of the business areas and the related operational support functions. The First Line is directly responsible for the provision of products/ services to clients and management of the company's risk. Any issues, problems or threats (IPTs) identified by the First Line are entered, analyzed, tracked and monitored for remediation via the workflow detailed in the IPT workflow procedure. A summary of findings is also regularly presented at the quarterly Risk and Incident Review (RIR) meeting, the Operational Oversight Committee (OOC) meeting and the ICE, Inc. Risk Committee meeting.

The Second Line is comprised of Enterprise Risk Management (ERM) Chief Risk Officers (CRO) and other specialist risk and control functions and subject matter experts. The ERM CROs report to their respective subsidiary Risk & Audit Committees (or in the absence of a subsidiary Risk & Audit Committee, to their respective subsidiary Board) and the ICE Inc. Corporate Risk Officer. The ICE Inc. Corporate Risk Officer reports to the ICE Inc. Risk Committee. The CROs administer the risk management framework that provides the process for identifying, assessing, managing, monitoring and reporting risks.

The Third Line is Internal Audit. The Third Line provides independent and objective assurance of the risk management undertaken by the First and Second Lines, and maintains primary accountability to the CCPs' governing bodies.

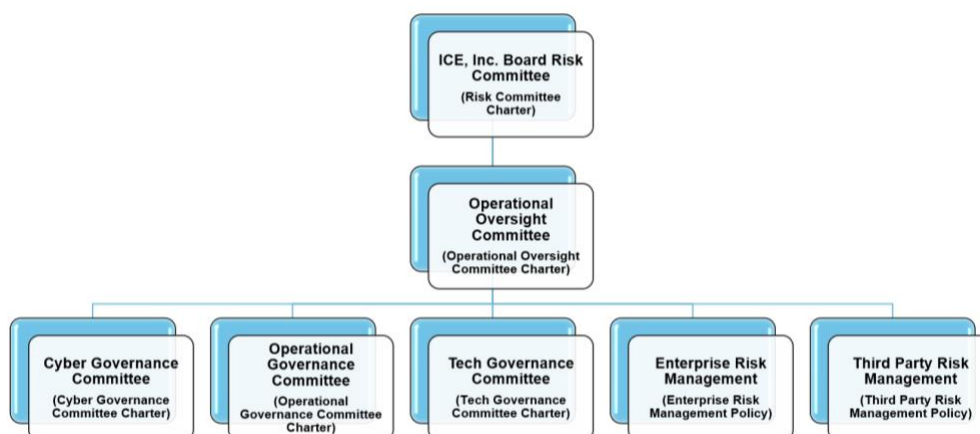
The IIA's Three Lines Model



KEY: ↑ Accountability, reporting ↓ Delegation, direction, resources, oversight ↔ Alignment, communication, coordination, collaboration

Each clearing house's ERM Risk Management Framework is comprised of five components: (1) a Risk Register that serves as an inventory of the material risks faced by the clearing house.; (2) a Risk Assessment that serves to evaluate the likelihood and impact of risks; (3) an Emerging Risk Assessment that serves to identify and assess potential, undefined or unfamiliar one-off risk events (e.g., Brexit) that may have a detrimental impact on the firm (financially, operationally and/or on its reputation); (4) Scenario Analyses that assess risks posed by extreme but plausible events, ICE's strategy and preparedness to respond to such events, and recommended areas for improvement; and, (5) a Board-level Risk Appetite Framework that establishes the Board's risk appetite in relation to risks that the company faces in order to achieve its business objectives and business plan.

Operational Risk Governance



ICE's Operational Oversight Committee (OOC) assists the ICE Board of Directors and the Management and Board of Directors of each ICE regulated business unit in fulfilling their responsibilities with respect to: (i) providing guidance to the Cybersecurity Governance, Operations Governance, and Technology Governance Committees; (ii) approving cybersecurity, operations, and technology policies; (iii) reviewing reports on implementation of and compliance with the Policies; (iv) reviewing the summary of findings related to technology-related Issues, Problems, and Threats (IPTs); (v) reviewing performance against the established operational risk appetite metrics; and, (vi) performance of such other functions as the ICE Board may assign from time to time.

Information Security

ICE clearing houses have adopted information security programs which include: IT security risk assessments; Cybersecurity Strategy; Information Security Policy and Procedures; threat and vulnerability testing regimes; and, physical and environmental controls policy and procedures. The ICE clearing houses operate within ICE's Corporate Information Security Policy and the Global Physical Security Policy. The policies cover all information environments operated by the clearing houses or contracted with a third party; and, include methodologies to ensure compliance with regulatory and legal requirements. The ICE clearing houses protect their information resources through implementation of sound physical, environmental, and administrative security controls designed to reduce the risk of physical failure of infrastructure components, damage from natural or fabricated environmental hazards, and use by unauthorized personnel. ICE's Global Physical Security Policy and the group-wide Cybersecurity Strategy are developed having regard to relevant guidelines of the National Institute of Standards and Technology ("NIST"). The Cybersecurity Strategy is a forward-looking document and is designed to maintain the highest possible levels of confidentiality, integrity, availability, and performance for all systems of ICE and its subsidiaries and relies upon the "Threat Objective Lifecycle" to capture threat intelligence and enable governance to set priorities. It sets out high level functions of managing cybersecurity including the development and implementation of safeguards and control activities to ensure the following:

- identification of cyber risks and threats;
- protection of ICE systems, information assets and infrastructure;
- detection of cyber incidents and events; and
- response and recovery from a cybersecurity event.

The Information Security department is organized into two major teams. The Cybersecurity team is defensive in nature, and operates detection, prevention, and response controls. The Security Assurance group housing GRC (Governance, Risk and Compliance), Application Security, and the "ethical hacker" Red Team proper - is responsible for proactive work including program testing, issue identification, and longer-term improvements. Talent is a fundamental component of the ICE's Cybersecurity Strategy, and as such significant efforts are spent to find, develop and sustain the right cybersecurity talent. Continuing education for all ICE Information Security resources is required via classroom training

and cybersecurity conferences to maintain knowledge of cutting-edge developments in the industry and ICE regularly hosts and participates in information sharing sessions with industry peers.

The Information Security Department is responsible for implementation of security mechanisms, interfacing with clients and documenting policies and procedures. A rigorous Service Organization Control audit is performed annually to produce independent verification and testing of ICE's controls for external parties and auditors that rely on ICE.

Business Continuity Planning / Disaster Recovery

The objective of the ICE BCP and Disaster Recovery ("DR") framework is to ensure timely recovery of operations and fulfillment of clearing obligations, including in the event of a wholesale or major disruption; and effective coordination among affected parties during a BCP/DR event.

The ICE clearing houses have established BCP and DR programs which are supported by an annual Business Impact Analysis. Oversight over the programs is provided by the OOC and the ICE clearing houses' Board of Directors or their nominated committees. The ICE clearing houses have designed their BCP and DR testing regimes to support incident management, continuity, and recovery from operational events such as loss of site / facilities or technology outages. The ICE clearing houses conduct annual BCP exercises to ensure their business can effectively respond to large scale disruptions and maintain continuity of its operations. DR testing is also completed at least four times per year to verify the ICE clearing houses' ability to recover their technology operations and systems within the recovery time objective of two hours.

The disaster recovery strategy employed by the ICE clearing houses is a warm site strategy. The production site which hosts all the production servers is replicated at a remote alternate / recovery site. The Clearing Application Programming Interface incorporates strategies to enable third parties (i.e., clearing members) to establish the last successful transaction and re-transmit any uncollected transactions. This is tested as part of clearing member system implementation and as part of one of the annual in-flight DR tests. The Crisis Communications and Management Plan provides a structure for managing communication with Clearing Members of the clearing house at a time when the clearing house is suffering severe financial stress and/or operational losses. In the case of an office-based disruption, each ICE clearing house has a range of actions that it can take, including: re-allocating specific duties to staff based in other ICE affiliated clearing houses; using secure remote capability via VPN; and, relocating staff to a secondary site. Extensive review, audit, and testing are conducted with Clearing Members and participants, both when a new service is introduced and on an on-going basis.

Third Party Risk Management

As an operating principle, ICE attempts to minimize its reliance on third parties. Where feasible, we design and build our own systems and write our own software programs since we believe that having control over our technology allows us to be more responsive to our customers' needs, better support the dynamic nature of our business, provide the highest quality markets and deliver relevant, timely and actionable data to the markets and customers we serve.

To the extent that ICE relies on third parties, ICE has implemented a formal Third-Party Risk Management Framework along with supporting procedures designed to ensure third parties operate in a manner consistent with the Company's obligations to regulators, customers and shareholders, and at a level commensurate with the Company's approach to risk. The ICE Third Party Risk Management Policy framework is comprised of five main elements: (i) program review and planning; (ii) due diligence; (iii) risk assessment; (iv) onboarding and offboarding; and (v) ongoing governance and oversight. The Policy's objectives are to identify, mitigate, monitor and report on vendor risk and performance.

The Operational Oversight Committee provides oversight and direction to the Company's Third-Party Risk management program. The governance framework provides monitoring for significant performance and risk assessment deterioration in third parties, with emphasis on the higher risk or essential/critical third parties. A comprehensive risk assessment of third parties is conducted by looking at critical risk exposures based on scope of service and other dependencies. These risk domains may include compliance, legal, operational, security, IT, disaster recovery, business continuity, supply chain, reputation, and contractual.

Appendix A

A brief description of information included in ICE's Public Quantitative Disclosures (Links to disclosures in Appendix B):

Disclosures	Brief Description on Requirement
Credit Risk	
4.1 Total Value of default resources	<ul style="list-style-type: none"> Aggregate Participant Contributions – Required GF and On Deposit GF Own Capital that forms a part of default waterfall, Own Committed Resources to address default Aggregate Participant Commitments to address initial and subsequent round of defaults
4.2 KCCP	<ul style="list-style-type: none"> KCCP CCP's hypothetical capital requirement due to its counterparty credit risk exposures to all of its clearing members
4.3 Pre-funded Default Resources	<ul style="list-style-type: none"> Value of pre-funded default resources posted by members and in the form they are held, i.e. secured cash (reverse repos, sovs), unsecured cash, non-cash assets (govt. bonds, gold, corporate bonds etc.) Pre-Haircut Amounts and Post Haircut Amounts
4.4 Stress Exposures	<ul style="list-style-type: none"> Cover 1 and Cover 2 – Default of any single or any two participants and affiliates Estimated largest aggregate stress loss (in excess of initial margin) in extreme but plausible conditions (Peak and Average) Number of business days the amount exceeded actual pre-funded default resources Amount which exceeded the actual pre-funded default resources Actual largest aggregate credit exposure (in excess of initial margin) in extreme but plausible conditions (Peak and Average)
Collateral	
5.1 Assets eligible as IM	<ul style="list-style-type: none"> Assets eligible as initial margin and the respective haircuts applied
5.2 Assets eligible for pre-funded contributions	<ul style="list-style-type: none"> Assets Eligible for pre-funded participant contributions to the default resources, and the respective haircuts applied
5.3 Testing of haircuts	<ul style="list-style-type: none"> Confidence interval targeted through calculation of haircut Assumed/ holding liquidation period for assets accepted Look-back period used for testing the haircuts Number of days during the look-back period on which the fall in value during the assumed holding/liquidation period exceeded the haircut on an asset.
Margin	
6.1 Total Required IM	<ul style="list-style-type: none"> Required Initial Margin, Split by House and Client, Split by Net or Gross Margin Treatment
6.2 Initial Margin Posted and Held	<ul style="list-style-type: none"> Value of Initial Margin resources posted by members and in the form they are held, i.e. secured cash (reverse repos, sovs), unsecured cash, non-cash assets (govt. bonds, gold, corporate bonds etc.) House and Client Breakdown Pre-Haircut and Post-Haircut Amounts
6.3 Initial Margin rates	<ul style="list-style-type: none"> Initial margin rates on individual contracts, where the CCP sets such rates
6.4 Initial Margin Model Used	<ul style="list-style-type: none"> Type of initial margin model used (e.g. portfolio simulation or risk aggregation) for each clearing service and the key model design parameters for each initial margin model applied to that clearing service

6.5 Results of Back-testing of Initial Margin	<ul style="list-style-type: none"> • Number of times over the past twelve months that margin coverage held against any account fell below the actual • marked-to-market exposure of that member account • Number of observations; Achieved Coverage Level • Peak and Average Size of the uncovered exposure
6.6 Average Variation Margin pays	<ul style="list-style-type: none"> • Average Total Variation Margin Paid to the CCP by participants each business day
6.7 Max Variation Margin pays	<ul style="list-style-type: none"> • Maximum total variation margin paid to the CCP on any given business day over the period
6.8 Initial Margin Calls	<ul style="list-style-type: none"> • Maximum aggregate initial margin call on any given business day over the period

Liquidity Risk

7.1 Resources for Cover 1 and 2	<ul style="list-style-type: none"> • Size and Composition of qualifying liquid resources for each relevant currency; breakdown by secured cash, unsecured cash, secured and unsecured committed lines of credit, highly marketable collateral etc.
7.2 Supplementary liquidity risk resources	<ul style="list-style-type: none"> • Any supplementary resources
7.3 Payment Obligations	<ul style="list-style-type: none"> • Cover 1 only – Caused by default of any single participant and its affiliates in extreme but plausible conditions • Estimated largest payment obligation in total and in each relevant currency • # of business days on which estimated payment obligation in extreme but plausible market conditions exceeded its • qualifying liquid resources and by how much (amount) • Actual largest payment obligation of a single participant and its affiliates

Default Rules & Procedures

13.1 Quantitative default info	<ul style="list-style-type: none"> • Reported in the case of actual default only. • Amount of losses vs. amount of initial margin • Amount of other financial resources used to cover losses • Proportion of client positions closed-out / ported
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Segregation & Portability

14.1 Total client positions	<ul style="list-style-type: none"> • % total client position as a share of notional values cleared; split by • Individually segregated accounts, Omnibus client-only accounts, LSOC accounts, comingled house and client accounts
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General Business Risk

15.1 Net assets and Operating expenses 15.2 Financial disclosures	<ul style="list-style-type: none"> • Value of liquid net assets funded by equity, 6 months of current operating expenses • Total revenue, total expenditure, profits, total assets, total liabilities
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Custody & Investment Risk

16.1 Total cash received from members 16.2 How total cash received 16.3 Rehypothecation of participant assets	<ul style="list-style-type: none"> • Total cash received from members, split by IM or GF • How total cash received is held, deposited, invested (Percentages) • % split by currency, weighted average maturity of deposits/ investments • Estimate of risk on the investment portfolio (99% one-day VaR) • Limits set within investment portfolio and size of that limit • Number of times the limit exceeded
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Operational Risk

17.1/ 17.2 Operational Availability of core systems
17.3 Core system failures
17.4 Recovery time objectives

- Targeted availability and Actual availability
- # and duration of failures
- Recovery time objective (e.g. within 2 hours)

Access & Participation

18.1 Number clearing members

- # of clearing member split by category of membership, type of participant

18.2 Open positions

- Percentage of open positions held by the largest five & ten clearing members; Average and Peak over the quarter

18.3 IM posted

- Percentage of initial margin posted by the largest five & ten clearing members; Average and Peak over the quarter

18.4 Percentage of participant contributions

- Percentage of contributions to default fund by the largest five & ten clearing members; Average and Peak over the quarter

Tiered Participation Arrangements

19.1 Measures of concentration

- Number of clients, # of members that clear for clients, % of client transactions attributable to top 5 or top 10 clearing members

FMI Links

20.1 – 20.7
FMI Links and Cross Margining

- Value of Trades cleared through each link or subject to cross margining as a share of total notional cleared
- Reduction in total initial margin held by CPP as a result of cross margining

Disclosure of Rules, Key Procedures, Market Data

23.1 – 23.3
Average Daily volumes and Notional Values by new trades cleared

- Average daily volumes & notional values of new trades cleared, by product/ asset class
- Stock of novated trades not yet settled per asset class (quarter end)
- Average daily volumes/ notional contract value submitted by each exchange

Appendix B

Links to ICE's PFMI Disclosure Frameworks:

ICE Clear Europe
https://www.theice.com/publicdocs/clear_europe/ICE_Clear_Europe_Disclosure_Framework.pdf

ICE Clear Credit
https://www.theice.com/publicdocs/clear_credit/ICEClearCreditDisclosureFramework.pdf

ICE Clear U.S.
https://www.theice.com/publicdocs/clear_us/ICUS_DisclosureFramework.pdf

ICE Clear Netherlands
https://www.theice.com/publicdocs/Clear_Netherlands_FMI_Disclosure.pdf

ICE Clear Singapore
https://www.theice.com/publicdocs/ICSG_Disclosure_Framework.pdf

ICE NGX
https://www.theice.com/publicdocs/ICE_NGX_Principle_for_Financial_Market_Infrastructures_Disclosure.pdf

Links to ICE's Public Quantitative Disclosures:

ICE Clear Europe
<https://www.theice.com/clear-europe/regulation#quantitative-disclosures>

ICE Clear Credit
<https://www.theice.com/clear-credit/regulation#quantitative-disclosures>

ICE Clear U.S.
<https://www.theice.com/clear-us/regulation#quantitative-disclosures>

ICE Clear Netherlands
<https://www.theice.com/clear-netherlands/regulation#quantitative-disclosures>

ICE Clear Singapore
<https://www.theice.com/clear-singapore/regulation#quantitative-disclosures>

ICE NGX
<https://www.theice.com/ngx/documents#Clearing>

Links to ICE's Rule Books:

ICE Clear Europe
<https://www.theice.com/clear-europe/regulation#rulebook>

ICE Clear Credit
https://www.theice.com/publicdocs/clear_credit/ICE_Clear_Credit_Rules.pdf

ICE Clear U.S.
https://www.theice.com/publicdocs/rulebooks/clear/ICE_Clear_US_Rules.pdf

ICE Clear Netherlands
https://www.theice.com/publicdocs/ICNL_Clearing_Rules.pdf

ICE Clear Singapore
https://www.theice.com/publicdocs/ICE_Clear_Singapore_Rules.pdf

ICE NGX
https://www.theice.com/publicdocs/ICE_NGX_Contracting_Party_Agreement.pdf

Links to ICE's Circulars and Notices:

ICE Clear Europe
<https://www.theice.com/clear-europe/circulars>

ICE Clear Credit
<https://www.theice.com/clear-credit/circulars>

ICE Clear U.S.
<https://www.theice.com/clear-us/notices>

ICE Clear Netherlands
<https://www.theice.com/clear-netherlands/notices>

ICE Clear Singapore
<https://www.theice.com/clear-singapore/circulars>

ICE NGX
<https://www.theice.com/ngx/notices>

End Notes

¹ ICE NGX is a non-traditional clearing house and therefore a number of the points discussed in this paper are not applicable. Protection is provided through the revaluation of cleared portfolios on at least a daily basis through settlement or collateralization of variation margin or mark-to-market margin. ICE NGX requires participants to maintain cash or letters of credit to serve as collateral in the event of default. ICE NGX does not maintain a mutualized guaranty fund. Instead, the ICE NGX capital and a default insurance policy in the amount of \$200,000,000 serves as the default resources beyond any defaulter's margin.

² Committee on Payment and Settlement Systems, International Organization of Securities Commissioners (CPSS-IOSCO), **Principles of Financial Market Infrastructures** (April 2012).

³ An overview of the risk governance at ICE clearing houses can be found online: ICE Clear Europe: **Risk Governance**; ICE Clear US: **Disclosure Framework**; ICE Clear Credit: **Regulation & Governance**; ICE Clear Netherlands: **Governance**; ICE Clear Singapore: **Disclosure Framework**; ICE NGX: **Disclosure Framework**

⁴ In the simplest example, participant A bought from participant B and sold to participant C. On a net risk basis, participant A's risk exposure is zero given that it is long and short. However, since participant A has two open positions, participant A has counterparty risk to both participant B and participant C. If these transactions were centrally cleared, participant A's long and short position would face the clearing house and would be netted to zero and participant A would no longer have any open positions. The clearing house would become the buyer to participant B and the seller to participant C. In short, multilateral netting reduces systemic risk (especially during times of payment system stress) by significantly reducing the amount of counterparties and associated payment flows.

⁵ The PFMI's set out in principle 6 minimum standards a clearing house should adhere to in ensuring it holds adequate initial margin commensurate with the risk a clearing member brings to the clearing house. Key considerations in setting appropriate initial margin levels include the expected liquidation time of a defaulter's portfolio and anti-pro-cyclicality criteria. ICE is fully supportive of these standards, and believes it is crucial that such standards are implemented in a consistent manner across all jurisdictions.

⁶ ICE has negotiated and procured default insurance coverage that satisfies ICE's conditions related to: the creditworthiness of the underwriters; the legal terms and operation of the policies; the location within the default waterfall; and, the cost. As indicated above, the term of the existing coverage is three years. ICE is not in a position to represent that suitable coverage will be available or that ICE will have the business appetite to continue the coverage after the three-year term.

⁷ The ICE clearing houses are at various stages with respect to implementing their rules related to Client participation in mandatory and voluntary auctions.

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Disclaimer

Intercontinental Exchange (NYSE: ICE) is a Fortune 500 company formed in the year 2000 to modernize markets. ICE serves customers by operating the exchanges, clearing houses and information services they rely upon to invest, trade and manage risk across global financial and commodity markets. A leader in market data, ICE Data Services serves the information and connectivity needs across virtually all asset classes. As the parent company of the New York Stock Exchange, the company is the premier venue for raising capital in the world, driving economic growth and transforming markets.

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