MOODY'S INVESTORS SERVICE

RATING METHODOLOGY

Clearing Houses Methodology

Contents

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This rating methodology replaces the *Clearing Houses* methodology published in May 2018. In this update, we have revised our Operating Environment scoring scales to align them with the scoring scales introduced in the November 2019 update to our rating methodology for sovereigns. We have also clarified that we may assign Baseline Credit Assessments to central counterparty clearing houses that are government-related issuers. In addition, we have made some editorial changes to enhance readability. For example, our approach to assigning instrument ratings was moved to a separate section that follows the "Other Rating Considerations" section.

Introduction

In this rating methodology, we explain our general approach to assessing credit risk for central counterparty clearing houses (CCPs) globally, including the qualitative and quantitative factors that are likely to affect rating outcomes in this sector.

We discuss the scorecard used for this sector. The scorecard[1] is a relatively simple reference tool that can be used in most cases to approximate credit profiles in this sector and to explain, in summary form, many of the factors that are generally most important in assigning ratings to issuers in this sector. The scorecard factors may be evaluated using historical or forward-looking data or both.

We also discuss other rating considerations, which are factors that are assessed outside the scorecard, usually because the factor's credit importance varies widely among the issuers in the sector or because the factor may be important only under certain circumstances or for a subset of issuers. In addition, some of the methodological considerations described in one or more cross-sector rating methodologies may be relevant to ratings in this sector.[2] Furthermore, since ratings are forward-looking, we often incorporate directional views of risks and mitigants in a qualitative way.

As a result, the scorecard-indicated outcome is not expected to match the actual rating for each issuer.

1 In our methodologies and research, the terms "scorecard" and "grid" are used interchangeably.

2 A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Our presentation of this rating methodology proceeds with (i) the scope of this methodology; (ii) our overall approach to rating CCPs; (iii) the Standalone Assessment component; (iv) the Support component; (v) other rating considerations; (vi) the assignment of issuer-level and instrument-level ratings; (vii) methodology assumptions; and (viii) limitations.

In Appendix 1, we describe how we use the scorecard to arrive at a scorecard-indicated outcome. Appendix 2 discusses the weighted average rating factor and idealized probability of default. Appendix 3 provides a summary overview of the International Organization of Securities Commissions (IOSCO) principles for CCPs. Appendix 4 describes our Joint Default Analysis (JDA) framework, and Appendix 5 discusses the use of JDA in assessing affiliate and government support. Appendix 6 describes the relationship between the clearing obligations and the debt obligations of a CCP and related entities.

Scope of This Methodology

This methodology applies to central counterparty clearing houses (CCPs) globally. CCPs have a central role in the risk management of financial markets. A CCP interposes itself between counterparties for securities or contracts traded in financial markets, becoming the buyer to every seller and the seller to every buyer, thereby ensuring the performance of open positions. The process of clearing also requires that the CCP transmit, reconcile and confirm transactions, including the netting of final positions prior to settlement and calculation and collection of collateral. The industry's clearing member default management capabilities include risk management through margining practices, membership eligibility requirements and capital resources to protect against member defaults.

This methodology also applies to central securities depositories (CSDs[3]), which are typically owned by a parent company that also operates CCPs and is accessed by the same clearing members as its affiliated CCPs.

Overall Approach to Rating Central Counterparty Clearing Houses

The CCP scorecard has two components: the Standalone Assessment component and the Support component. The scorecard is oriented to the Clearing Counterparty Rating (CCR). CCRs also incorporate other rating considerations, and any other instrument ratings we assign incorporate these considerations and instrument-specific considerations.

We may assign a CCR to a CCP legal entity or at a clearing service level to the extent that the legal entity operates multiple clearing services. This distinction recognizes the differences of risk across clearing services presented by each service's unique membership, product types, clearing rule books and respective waterfall resources. While these differences of risk are clear, we consider whether the potential for weakness in one service presents a risk of contagion to other services within a CCP. This may be due to the resulting default of a clearing member's participation in both clearing services, a common weakness in margin processes, or clearing member default management capabilities. In addition, failure in one service can affect the confidence of the membership and of end users of the affiliated service that can create "run on the bank" scenarios, subject to the existence of alternative clearing venues where counterparties can transfer their clearing positions.

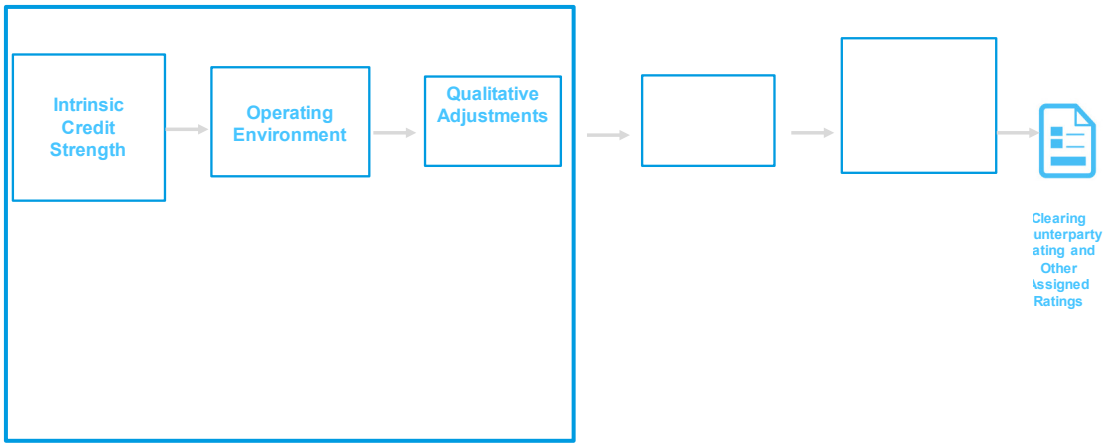
[3] CSDs hold securities in certificate or a dematerialized form, in order to efficiently transfer ownership through a book entry system rather than transfer ownership through physical certificates, and typically hold a lower risk profile than affiliated CCPs.

We typically view a CCP's clearing counterparty obligations as having meaningfully lower probability of default and loss upon default than its other obligations, and we describe our approach to rating these other obligations in the "Assigning Issuer-Level and Instrument-Level Ratings" section.

Our overall approach is illustrated in Exhibit 1.

EXHIBIT 1

Overall Approach to Rating Central Counterparty Clearing Houses



Source: Moody's Investors Service

1. Scorecard Framework

The CCP scorecard is composed of two components: the Standalone Assessment component and the Support component. An example CCP scorecard is provided below (Exhibit 2).

The Standalone Assessment component has three sub-components, all of which have factors and some of which have sub-factors. The first sub-component addresses the CCP's intrinsic credit strength, including its ability to manage defaults by counterparties and its corporate profile. In the second sub-component, we assess the CCP's operating environment and the systemic risks the CCP faces. Here, we consider certain sub-factors pertaining to the sovereign in the country(ies) where the CCP operates, as well industry-specific sub-factors. In the third sub-component, we consider important qualitative credit factors that relate to corporate behavior and operational risk, which could lead to positive or negative adjustments in arriving at the standalone scorecard-indicated outcome.

In the Support component, we consider the potential for credit support or credit drag from the parent and affiliates or the government. Since most CCPs operate as part of an exchange group, the CCP's parent and affiliates can play a significant role in the CCP's level of clearing volumes and can be a potential source of support, but the parent's credit profile can also have a negative effect on a CCP's credit strength. Because CCPs typically operate at the center of a country's financial markets, we also consider the potential for support from the domestic sovereign government. The sovereign's rating may also constrain a CCP's CCR.

Please see Appendix 1 for general information relating to how we use the scorecard and for a discussion of scorecard mechanics. The scorecard does not include every rating consideration.[4]

[4] Please see the "Other Rating Considerations" and "Limitations" sections.

EXHIBIT 2

Example CCP Scorecard

Standalone Assessment Component

Intrinsic Credit Strength

	Observed Data	Initial Score	Assigned Score	Key driver #1	Key driver #2
Default Management Capabilities					
Counterparty Strength (40%)					
Weighted Average Credit Quality	Aa3	Very Strong	**Moderate**	Membership Concentration / Interconnectedness	Forward View of Clearing Membership Quality
Product Risk (20%)					
Product Clearability	4.20	Strong	**Strong**	New Product Risks	Clearing Mandate Supportive
CCP Risk Mitigants (40%)					
CCP Risk Mitigant Strength	Adheres to PFMIs	Moderate	**Moderate**		
Combined Default Management Score			**Moderate**		
Corporate Profile					
Competitive Positioning (50%)					
Clearing House Product Volumes / Industry	85.0%	Very Strong	**Strong**	Rapid Increase / Decrease in Market Share	Emerging Competitive Threats
CCP Liquidity Coverage (50%)					
Liquid Net Assets / Average of 6 Months' Operating Expenses	4.20	Strong	**Strong**		
Combined Corporate Profile Score			**Strong**		
Intrinsic Credit Strength Score			**Moderate**	ICS Score = MIN (DMC, 70%*DMC+30%*CP)	

Operating Environment	Domicile	Score	Comment
Macro Operating Environment			
Economic Strength (25%)	**Country XYZ**	**Aa2**	
Institutions and Governance Strength (50%)		**Aa3**	
Susceptibility to Event Risk (25%)		**Aa**	
Industry Fundamentals			
Strength of Regulatory Oversight		**0**	
CCP Industry Structure		**0**	
Operating Environment Score		**Very Strong**	
Preliminary Standalone Scorecard-indcated Outcome		**A2**	

Qualitative Adjustments	Adjustment	Comment
Corporate Behavior	**0**	
Operational Risk	**0**	
Total Qualitative Adjustments	**0**	
Standalone Scorecard-indicated outcome	**A2**	

Support Component	Adjustment	Comment
Parent / Affiliate Support / Drag	**-1**	Weakness in correlated trading activity
Government Support / Constraint	**0**	
	-1	
Scorecard-indicated Outcome	**A3**	

Source: Moody's Investors Service

2. Measurement or Estimation of Factors in the Scorecard

The information used in assessing the intrinsic credit strength financial metrics is generally found in or calculated from information in company financial statements, regulatory reporting, derived from other observations or estimated by Moody's analysts. We may also use non-public information. The quantitative credit metrics that are derived from financial reporting incorporate Moody's standard adjustments to financial statements in the analysis of non-financial corporates as per our cross-sector methodology.[5] We may also make other analytical adjustments that are specific to a particular CCP.

The initial score for each quantitative sub-factor is based on historical or projected data as outlined in the factor discussions and is a useful starting point for our analysis of the sub-factor. However, the factors in the scorecard can be assessed based on other time periods, using historical or forward-looking data or both. The scorecard provides the ability to show how our forward-looking expectations for financial metrics (which are incorporated into the final scoring) may vary from a CCP's historical results. The assigned score for each quantitative sub-factor incorporates our forward view and other pertinent considerations, which are described in the discussion of the Standalone Assessment component.

Standalone Assessment Component

This component has three sub-components: Intrinsic Credit Strength, Operating Environment and Qualitative Adjustments.

Intrinsic Credit Strength Sub-component

In this sub-component, we assess the CCP's intrinsic credit strength. This sub-component has two factors, which also have sub-factors:

» Default Management Capabilities (DMC) – assesses how the CCP utilizes risk management tools and its waterfall resources to insulate itself from risk presented by clearing members and products cleared.

» Corporate Profile (CP) – assesses the CCP's business and financial profile, with a focus on its competitive position, liquidity coverage and other general business risks.

A CCP's intrinsic credit strength primarily derives from the strength of its clearing member default-management capabilities and its corporate profile. The greatest test of a CCP's solvency is its ability to withstand the shock of a default of a clearing member. Clearing membership access management and monitoring is the first line of defense; but the cornerstone of a CCP's clearing member default-management capabilities is the waterfall, which consists of prefunded and contingent resources with which a CCP covers its credit exposure to each clearing member to protect other clearing counterparties and its own financial standing in the event of a clearing member default. The CCP scorecard, therefore, gives substantial weight to clearing member default management capabilities to insulate a CCP and its members from default risk. In assessing the corporate profile, we consider vulnerabilities in resourcing and support of the clearing service as well as competitive pressures, which may weaken risk management. In scoring the CCP's intrinsic credit strength, the default management capabilities score receives 100% weight if it is weaker than the corporate profile score. Otherwise we

[5] A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

combine the two with 70% and 30% weights, respectively. Please see Appendix 1 for a description of how we combine the elements of the intrinsic credit strength.

Factor: Default Management Capabilities

The strength of a CCP's ability to manage its clearing risk primarily depends on whether the margin resources and the clearing members' default fund contributions are sufficient to offset potential losses that may arise from a clearing member default. In our assessment of these key sources of risk (e.g., counterparty and product risks), we consider the adequacy of mitigants that a CCP has in place, whether operational mitigants or in margin resources, to prevent losses due to a member default from destabilizing the CCP. In balancing the weighting of risks versus mitigants, we place more weight on these key risks, given that, as the level of risk increases, clearing member default management capabilities can be less effective at enabling a CCP to raise sufficient resources to offset the losses arising from difficult-to-predict tail events.[6]

This factor comprises three sub-factors: Counterparty Strength, Product Risk and CCP Risk Mitigants.

Counterparty Strength Sub-factor – Why It Matters

A clearing member default is the single greatest threat to a CCP's creditworthiness, against which the CCP's management of clearing member access and monitoring is the first line of defense. The default of a clearing member exposes the CCP to that member's outstanding cleared positions. Although the CCP can use the defaulted member's initial margin, open positions and default fund resources to mitigate this exposure, closing out these exposures could generate losses that overwhelm not just these resources, but also the mutualized default fund and the CCP's own resources, ultimately posing a risk to the viability of the CCP. Thus the creditworthiness of the members and the robustness of the CCP's clearing member access management and monitoring are important in assessing the CCP's ability to identify and respond to vulnerabilities that could arise among the clearing membership or their underlying clients.

Key considerations in this assessment typically include a review of membership entrance requirements, the CCP's credit surveillance process, the use of watch lists for vulnerable credits, and the use of margin add-ons for increasingly risky counterparties or positions.

Counterparty Strength Sub-factor – How We Assess It for the Scorecard

WEIGHTED AVERAGE CREDIT QUALITY:

In our assessment of weighted average credit quality, we use available information about the CCP's current membership and exposures to develop a forward-looking assessment of its typically dynamic membership roster and exposure profile. Our assessment of a CCP's counterparty risk starts with the calculation or estimation of the weighted average credit quality of the clearing membership in a single clearing service.[7]

In assessing the credit quality of a CCP member, we typically use Moody's ratings and counterparty risk assessments, in particular: (i) for banks, counterparty risk ratings (CRRs) if available, otherwise counterparty risk assessments;[8] (ii) for securities industry market makers, asset managers and investment-grade securities industry service providers, CRRs if available, otherwise issuer ratings or

6 A tail event is an anomalously large loss not captured by a risk management approach that is calibrated against historical data.

7 For a clearing house with separate clearing services, we typically assess each service individually, because clearing member and product risks among services can be different.

8 Please see *Rating Symbols and Definitions* for a description of Counterparty Risk Assessments (for a link, please see the "Moody's Related Publications" section below).

senior unsecured ratings; (iii) for investment-grade corporates, issuer ratings or senior unsecured ratings; (iv) for non-investment-grade securities industry service providers, CRRs if available, otherwise the corporate family rating; (v) for non-investment grade corporates, the corporate family rating; and (vi) Insurance Financial Strength Ratings for insurance firms. For unrated clearing members, we use may credit estimates or an assumption of their aggregate credit profile.[9]

Using ratings, assessments, credit estimates or assumptions described above, in each case expressed as an alphanumeric, we calculate or estimate a Weighted Average Rating Factor (WARF) by clearing member based on the idealized probability of default associated with a rating level. Please see Appendix 2 for more information. We then multiply the WARF of each clearing member by its pro rata risk exposure and sum the resultant products to calculate the clearing membership's weighted average credit quality:

Weighted Average Credit Quality of Clearing Membership = Σ [*clearing member WARF * clearing member Pro rata risk exposure]*

We typically calculate or estimate a clearing member's pro rata risk exposure in one or more of the following three ways.

1. Based on a current list of clearing members from public filings or other verifiable sources and members' respective Moody's ratings or credit assessments, we calculate an equal-weighted average of the individual member WARFs, which according to the number of clearing members.[10] effectively ascribes equal risk exposure to each member). Under this approach, members with weaker credit profiles typically have greater weight in the WARF of clearing membership.
2. We may also use market information to form a view on pro rata exposure to each member. For example, members' shares of the volume of the CCP's key cleared products may be publicly available (e.g., market share of traded product or industry surveys) and may be used as a proxy for pro rata exposure in the weighting of the WARF of clearing membership.
3. Subject to the availability of information, we may also calculate the weighted average credit quality of clearing membership to capture a weighting of each member's share of risk. For example, where information is available, we may use the members' relative contributions (or their requirement to fund a future call) to the default fund, initial margin or stress losses as a proxy for pro rata risk exposure.

For the initial weighted average credit quality of clearing membership score, we typically use the third method if this information is available. If this information is not available, we typically use method 2, which provides important insights into the stability of pro rata exposures since a member's share of risk-based contributions would normally be commensurate with its trading volumes over time. We typically use method 1 in cases where information is not available for methods 2 and 3.

[9] Please see our cross-sector methodology that discusses the use of credit estimates. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section. We typically would expect 80% or more of the clearing members, measured or estimated by exposure, to be rated or assigned a credit estimate. Where the coverage falls short of this threshold, we may not be able to form an opinion on the CCP's credit profile. In assigning the Counterparty Strength sub-factor score, we typically evaluate a variety of scenarios to consider the sensitivity of the sub-factor score to an assumed credit profile of unrated members. We consider a scenario that assumes a significantly lower credit profile than the rated universe or a non-investment-grade credit profile.

[10] This is the sum of the clearing member WARF factors divided by the number of clearing members.

EXHIBIT 3
Sub-Factor Mapping: Counterparty Strength

	5 - Very Strong	4 – Strong	3 – Moderate	2 – Weak	1 - Very Weak
Weighted Average Credit Quality	Aaa-Aa3	A1-Baa1	Baa2-Ba2	Ba3-B3	Caa1-C

Source: Moody's Investors Service

Counterparty Strength Sub-factor Adjustments

In addition to WARF of clearing membership based on methods 2 and 3 above, assigned sub-factor scores incorporate our forward-looking opinion of the potential future credit quality of the clearing membership, and its associated weighted contribution to the risk of the clearing house. A track record of stable clearing member credit quality and effectiveness of the CCP's clearing member access management and monitoring process are at least as important as a point-in-time assessment of membership quality.

We also consider the risks presented by a CCP's clearing or settlement banks and, where relevant, may overweight their pro rata share of risk to capture the risk such institutions pose to the CCP. We may also adjust the Counterparty Strength sub-factor score based on other infrastructure critical to the clearing process, such as the payment system. In our review of counterparty risk, we generally consider whether operational challenges may arise from the settlement banks and critical market infrastructure.

Additional considerations include concentrations and interconnectedness within the clearing membership. For concentrations, we typically consider the percentage contribution of the top five or ten clearing members to the total default fund resources of the CCP, which highlights outsize risks in the clearing membership. We generally assign a lower Counterparty Strength sub-factor score in cases where membership concentrations threaten a CCP's ability to adequately mitigate risks stemming from a clearing member default. As an example, a market dominated by only a few clearing members might not have sufficient liquidity to function without the participation of the larger clearing members. A CCP's use of position limits can help mitigate the risk of firm concentrations in a particular product or contract. We typically also consider the interconnectedness of the CCP's clearing membership, gauging whether a single default is likely to cascade to further defaults.

Product Risk Sub-factor – Why It Matters

Products are different in the types of risks that they can pose to the clearing process. As an example, less-liquid products can pose greater market risk and increase a CCP's margin model risk, potentially opening gaps between the assessed margin and margin adequacy. This increases the likelihood of losses in the event of clearing member default. Less-liquid products also lead to longer close-out periods and greater difficulty marking-to-market. More-liquid products are less likely to be subject to the risk of discontinuous price movements and can shorten the time needed for a CCP to rebalance its positions. In general, the more liquid a product is, the more likely it is to benefit from commitments of interest from surviving clearing members when the CCP auctions off exposures to re-establish a CCP's matched book[11] following a clearing member default. Furthermore, it is more complex for a CCP to hedge the less-standardized products in a defaulted clearing members' open positions, potentially introducing basis risk into the standard hedging tools, such as futures, that a CCP might use to minimize the defaulting member's portfolio-level exposures.

[11] One of a CCP's core objectives is to maintain a matched book at all times, by taking on positions with one counterparty that are offset by opposite positions with a second counterparty.

Thus, the effectiveness of a CCP's clearing member default-management capabilities also depends on its ability to set appropriate margin (collateral) requirements for the products cleared.

Product Risk Sub-factor – How We Assess It for the Scorecard

PRODUCT CLEARABILITY:

We broadly classify the landscape of cleared products into categories of varying degrees of clearability predominantly based on (i) standardization; (ii) volumes; (iii) liquidity; and (iv) reliable pricing. Products with weaknesses on these fronts could exhibit significant price volatility, which can impede the smooth and orderly functioning of markets and adds risk when a CCP needs to close out a defaulting clearing member's exposures. We also assess the duration of settlement or clearing exposure, the ability to hedge products to mitigate risk with limited or no basis risk,[12] and the likely participation of clearing members in the auction process once a clearing member defaults. Our assessment has qualitative elements, and we acknowledge that these considerations can be very dynamic, given ever-changing market conditions.

We assess a CCP's product risk by scoring the relative product clearability of each material product cleared and weight according to each product's relative clearing volume or risk exposure:

$$\Sigma\ [Product\ Score * (Product\ Volumes / Total\ Volumes)]$$

Exhibit 4 shows the description for the five product risk categories, the numeric score associated with each and a variety of examples for each category. In general, our classification attributes greater clearability (i.e., lower product risk) to cash instruments, given the limited timeframe in which the clearing process is exposed to the risk of counterparty default or operational failures. For exchange-traded derivatives and over-the-counter (OTC) derivative products, we consider their benchmark status and the tenor of the contracts. Shorter-dated or benchmark contracts generally exhibit greater levels of liquidity in financial markets. Furthermore, our framework differentiates between the greater depth and liquidity of G4[13] interest-rate swap markets, and relatively less-liquid markets. Trade repository data indicate that these markets have more volume and depth than non-G4 swap markets.

In addition to these distinctions, we also consider the various instruments that have been identified through regulatory clearing mandates. We expect the level of clearability of these products to increase as participants' trading activity converges on these products. Conversely, we expect less overall liquidity for bespoke products, which increases volatility and therefore decreases their clearability.

[12] Basis risk arises when there is an imperfect match between a position and the instruments used to hedge that position, such that the hedge provides some protection but does not entirely offset the underlying position's price movements, creating the potential for losses.

[13] The G4 currencies are the US dollar, euro, Japanese yen and UK pound sterling.

EXHIBIT 4

Sub-factor Mapping: Product Risk

Product Scoring	5 - Very Strong	4 – Strong	3 - Moderate	2 – Weak	1 - Very Weak
Bucket Scoring	> 4.5	4.0 - 4.5	3.5 - 4.0	2.5 - 3.5	≤ 2.5
Characteristics	Plain vanilla products are extremely clearable; very easily hedged and auctioned.	Plain vanilla products are very clearable, longer dated exposures may be less so; easily hedged and auctioned.	Presently cleared; not as easily hedged or auctioned.	Clearing risk; hedging introduces basis risk; auction participation may be limited.	Bespoke products with significant clearing risk, present margin model risk; auction participation questionable, hedging to produce significant basis risk.
Example Products	Cash Equities - listed	OTC[14] mandated to clear: interest-rate swaps – EUR, USD, GBP, JPY; Index CDS	Cash equities - pink sheets	Non-mandated OTC: NDF FX[15], single-name CDS, inflation swaps	Non-flow OTC
	Government bonds/agencies greater than A-rated	Government bonds less than A-rated	OTC considered/ not approved for mandate: IRS – CAD, SEK, CHF	Emerging market government bonds	Bespoke products
	Liquid ETDs[16]		Investment grade corporate bonds	High yield corporate bonds	
	Spot FX		Less liquid ETDs (e.g.: Mexico)		

Source: Moody's Investors Service

Typically, we apply our classification of clearability to all of the products being cleared at each service, weighted by the net exposure or by product volumes cleared[17] by each service. Given that the most commonly cleared products are often the most liquid, CCPs, especially in developed jurisdictions, can often score highly on this measure. However, CCPs that are narrowly focused on less-liquid product categories, whether owing to product specialty or regional focus, typically score lower.

Product Risk Sub-factor Adjustments

Assigned Product Risk sub-factor scores are forward-looking. Where a CCP operates in a highly competitive business environment, the assigned score reflects our view of the likelihood that the CCP will begin to clear more high-risk products in the future. For example, we may assess the likelihood that a CCP could try to boost profits by expanding into new product offerings or by quickly growing its market share of adjacent products. This type of growth can increase product risk because, lacking a sufficient track record, a CCP's margin models might not properly capture and adequately margin for the risk of newly cleared products. The assigned score would typically be lower than the initial score in cases where new products or developments in existing products introduce risks that are difficult to capture through the CCP's current margining technology and processes or where a CCP's less clearable products pose heightened close-out or hedging risks.

[14] OTC: Over-the-counter derivatives are not traded on a formal exchange, rather through a dealer network.

[15] NDF FX: Non-deliverable forward foreign exchange contracts, which are usually settled prior to the expiration date of the contract (typically two days), with the profit or loss being the difference between the agreed settlement price and the spot currency price on the settlement date; i.e., no foreign currency is delivered.

[16] ETD: Exchange-traded derivatives are traded on formal exchanges and are therefore more liquid and often used in hedging strategies.

[17] Or margin resources allocated to each product.

Our forward looking assessment typically includes our view of the impact of clearing mandates. Where mandates are supportive of moving more products to CCPs and we foresee a meaningful increase in the market liquidity and clearability for a CCP's products, the assigned score may be higher than the initial score.

CCP Risk Mitigants Sub-factor – Why It Matters

The greatest test of a CCP's solvency is its ability to withstand the shock of defaulting members. Strong default management processes and financial resources can prevent a CCP's failure in the event of a clearing member default. A CCP can employ a number of risk mitigants in the default management process to counteract key risks, including:

» To counteract counterparty risk, a CCP typically has robust clearing membership access and monitoring policies and procedures.

» The offset to both product and counterparty risk, a CCP typically has a well-developed default management waterfall, as well as rigorous processes and solid infrastructure around its risk management operations.

CCP Risk Mitigants Sub-factor – How We Assess It for the Scorecard

CCP RISK MITIGANT STRENGTH:

We begin our assessment of a CCP's risk mitigants with a qualitative analysis of a CCP's clearing member default management capabilities and adherence with regulatory standards. For the initial score, we consider how a CCP's default management structure is set up relative to the baseline established by the industry's regulatory framework and broader industry best practices. The International Organization of Securities Commissions (IOSCO[18]) has established 24 principles for CCPs to enhance existing regulatory standards given that CCPs play an important role in the financial system and concentrate risk,[19] and therefore pose risks to the system. The IOSCO principles include guidance on OTC derivatives, trade repositories, and risk management. The goal of the IOSCO principles document is to enhance the safety and efficiency of clearing, limit systemic risk, increase transparency, and, thereby, augment financial system stability. (Please see Appendix 3 for summary information on the IOSCO Principles.)

In our assessment, we consider (i) a CCP's adherence to the IOSCO Principles for Financial Market Infrastructure (PFMIs)[20]; (ii) whether it has been recognized as a Qualifying CCP (QCCP)[21] or has received a similar designation; and (iii) the regulatory framework of its local jurisdiction, including progress in implementing central clearing reform. IOSCO requires, at a minimum, that CCPs publish their own self-assessment of their adherence to the PFMIs. Additionally, local regulators, and in some instances, global standard-setters and regulators such as the Financial Stability Board (FSB[22]), publish their assessment of CCPs' adherence to the PFMIs. The public disclosures related to the approval by a CCP's regulator, such as the European Market Infrastructure Regulation (EMIR) application in Europe, to operate as a central counterparty is a typical starting point in our analysis of a CCP's risk mitigants. Absent such public approval, we consider a CCP's own self-assessment.

18 IOSCO is a global cooperative of securities regulatory agencies that aims to establish and maintain worldwide standards for efficient, orderly and fair markets.

19 In fulfilling its clearing function at the center of market trades (i.e., as central counterparty), the CCP accumulates exposures due to the risk of settlement failure.

20 IOSCO Principles: International Organization of Securities Commissions' global risk management, operational and liquidity standards recommended for CCPs to enhance the safety and efficiency of clearing, limit systemic risk, increase transparency and augment financial system stability.

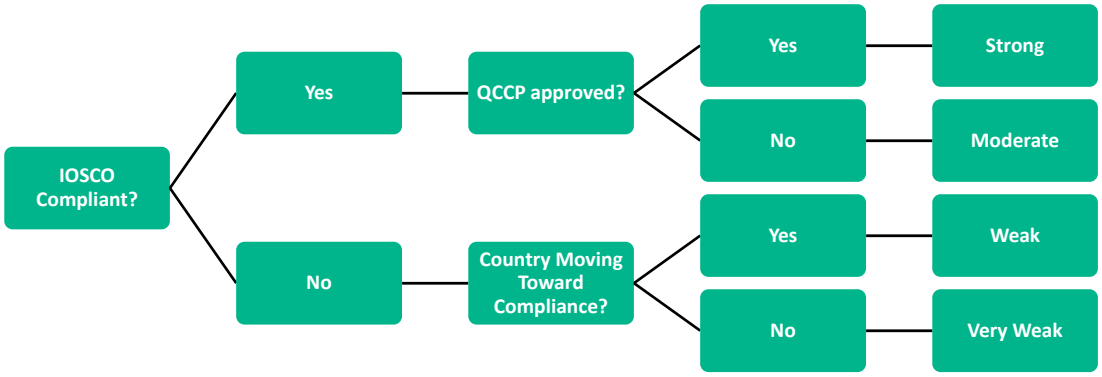
21 QCCP: A qualifying central counterparty (QCCP) is licensed to operate as a CCP for its permitted products, and is subject to the provision that it is based and prudentially supervised in a jurisdiction where the relevant regulator has established and publicly indicated that its rules and regulations are consistent with the PFMIs.

22 The Financial Stability Board (FSB) publishes regular reports on implementation of OTC derivatives market reforms by country.

The decision tree in Exhibit 5 demonstrates how the initial score is derived based on a CCP's adherence with regulatory standards and industry best practices. Exhibit 6 outlines the key differentiating characteristics across the scoring categories.

EXHIBIT 5

Clearing House Rating Analysis: Decision Tree



Source: Moody's Investors Service

EXHIBIT 6

Sub-factor Mapping: CCP Risk Mitigants

Risk Mitigant Scoring	5 - Very Strong	4 – Strong	3 – Moderate	2 - Weak	1 - Very Weak
IOSCO Recognition	IOSCO compliant, QCCP status, and our analysis shows it exhibits industry best practices.	IOSCO compliant and QCCP status.	IOSCO compliant but not QCCP status.	Not IOSCO compliant, but the CCP's jurisdiction is moving toward compliance.	Not IOSCO compliant, and the CCP's jurisdiction is not moving toward compliance.
Characteristics	Super-equivalent standards to IOSCO; industry best practice standard-setter.	QCCP status exceeds IOSCO.	Meets IOSCO; lacks QCCP status or has a history of breaches in the margining framework.	Some areas of weakness versus IOSCO; local regulator moving to meet IOSCO. CCPs with a lack of experience managing a clearing member default, even if meets IOSCO.	Some or many areas of weakness versus IOSCO; local regulator not moving to meet IOSCO.

Source: Moody's Investors Service

CCP Risk Mitigants Sub-factor Adjustments

While the adherence to global regulatory standards provides a public and transparent view of a CCP's default management structure, our assessment of a CCP's default management operations may also consider where gaps might arise in the CCP's clearing member default management capabilities, which may result in a positive or negative adjustment to our initial CCP Risk Mitigants sub-factor score. Additionally, achieving a Very Strong score for this sub-factor is usually dependent on an assessment that CCP has super-equivalent standards relative to IOSCO and is an industry best practice standard-setter.

In our assessment, we typically consider the following:

» Clearing Member Access and Monitoring Policies and Procedures – This is the first line of defense, and we may consider the strength of a CCP's membership requirements, such as: minimum capital levels, operational capacity to handle trade processing and margin cash flows, and the ability to meet reporting and monitoring requirements. CCPs that score highly for this sub-factor employ scoring systems to analyze and monitor members' creditworthiness, as well as possess the contractual rights to impose margin add-ons to a firm showing weakening creditworthiness, or where a firm's position in a product being cleared is unduly concentrated.

  Where a CCP has weak membership requirements or lax monitoring policies in relation to the nature of the risk of its clearing membership or products cleared, the assigned score reflects this weakness in clearing member oversight.

» Default Management Waterfall Structure – The waterfall is a set of pre-funded and contingent resources to cover losses from a defaulting clearing member. A CCP with a high assigned sub-factor score has a waterfall structure that follows the "defaulter pays" approach, whereby the CCP will seek to cover any losses with the defaulting clearing member's own pre-funded financial resources. Margin (both initial and variation) is the first layer of this type of waterfall and the most important default management tool. The goal of "defaulter pays" is to cover the majority, if not all, of the potential losses from a defaulting clearing member through its posted margin. Should the defaulter's margin not be sufficient to cover all open credit exposures to a defaulting member, a CCP can tap into the defaulter's default fund contribution and then proceed into the other layers of the waterfall to cover losses: first by accessing a tranche of the CCP's own capital, which is ring-fenced for the clearing operations, and then the contributions to the default fund from non-defaulting members. After these pre-funded resources, the CCP may have contingent assessment powers requiring that non-defaulting members replenish their required default fund deposits. Finally, should it be necessary, the CCP can access its own remaining capital to address shortfalls arising from member default.

  In cases where a CCP has a weakly structured waterfall, non-defaulting clearing members have a higher likelihood of being subject to a large liability through assessment powers. Weak default management is likely to result in an assigned CCP Risk Mitigants sub-factor score that is lower than the initial score.

» Margin Add-ons – Margin can create an incentive for clearing members to limit excessive risk in their open positions, because they must pay for that risk (via a larger margin requirement). For example, a large position on a trade could create a concentrated position at the CCP, posing risks to the overall CCP membership. To counterbalance this product concentration, a CCP could impose additional margin charges (margin add-ons), so that that the clearing member bears the additional risk of the concentration, although CCPs typically strive to limit the need for large unexpected margin calls at a time of stress by having conservative initial margin requirements.

  A CCP's active use of margin add-ons to address the deteriorating creditworthiness of a clearing member, potential concentration in a product category, reduced liquidity or increased price volatility in a cleared product may have a positive impact on the assigned sub-factor score Conversely, limited intraday margining capabilities or practices or an inability to apply margin add-ons may have a negative impact on the assigned sub-factor score.

» Collateral and Investment Policy – We typically consider a CCP's margin collateral policy, reviewing the asset quality of the collateral accepted for margin and the haircutting policy applied to the collateral. We may also assess a CCP's collateral investment policy, including the types and terms of collateral investments.

An aggressive investment policy reflected in client collateral that is invested in less liquid and lower-quality assets could lead to shortfalls in a CCP's default management resources, and is likely to result in a lower assigned sub-factor score.

» Strength of Waterfall Resources – Using available information and peer analysis, we form an opinion of the quality of the CCP's waterfall resources, typically including the following: (i) the estimated largest aggregate stress loss in excess of the initial margin that would be caused if the largest one or two clearing members were to default; (ii) the actual aggregate credit exposure to the largest one or two clearing members; (iii) the margin collateral amount and haircuts applied; (iv) the results of back-testing the initial margin; (v) the maximum aggregate initial margin call over the last 12 months; and (vi) liquidity risk metrics. Where this information is not available in public disclosures, we may use non-public information in our analysis.

  Shortfalls in margin coverage in back-testing results or large concentrations among a few clearing members typically lead to a lower assigned sub-factor score.

» Liquidity Management – We differentiate the liquidity needed for managing a clearing member default from the operating liquidity needed to function as business as usual. Consistent with the PFMIs, we typically assess whether a CCP holds and has access to sufficient liquidity, in line with a plausible stress, to support clearing and settlement throughout a default management event. As part of this, we may evaluate whether such liquidity is easily realizable in a time of need. While we acknowledge the benefits of a central bank credit line or backstop, in assessing the sufficiency of liquidity for this purpose, we expect that a CCP will not rely on this funding to manage a clearing member default. As part of our assessment of liquid resources, we typically evaluate whether any commitments of liquidity among the clearing membership result in an over-reliance on a single or multiple clearing members.

  Overall, uncertainty around liquidity or a lack of adequate access to liquidity typically leads to a lower assigned sub-factor score.

» Stress Testing - We may assess the adequacy of the CCP's waterfall resources under a range of stress scenarios, subject to available information and disclosures. We may also assess a CCPs own stress tests or regulators' stress tests, subject to available information and disclosure. One area of our stress testing focuses on the amount of pre-funded resources — margin, default fund contributions and the CCP's own capital that would be used to cover potential tail losses — because reliance on contingent resources may be challenging in a time of stress, when other clearing members may also be facing financial distress. A further area we explore in our stress testing is the application of reverse stress tests to gauge the extent that a CCP's buffers can withstand multiple clearing member defaults, however unlikely. Rather than applying a standard stress test, given the unique nature of each clearing service, its membership and its product set, our stress case analysis is typically tailored to the particular characteristics and risks of each CCP. To the extent that a standardized stress testing framework is put in place, or that regulators publish the results of stress tests, we would consider such results in our analysis.

  The goal of stress testing is to assess the potential shortfall between the available pre-funded resources and the CCP's maximum exposure from its membership clearing activity. We may adjust the CCP Risk Mitigant sub-factor score based on the stress case analysis. A significant shortfall would typically lead to a lower assigned sub-factor score.

After applying any positive or negative adjustments to the initial score, we arrive at the assigned CCP Risk Mitigant score.

Factor: Corporate Profile

A CCP's ability to generate sustainable recurring cash flows to meets its obligations, support its commitments to clearing members, contribute to waterfall resources, and invest in the operational resources and expertise it needs to support the clearing franchise is a very important credit consideration. The focus of the corporate profile is primarily on traditional credit metrics as they relate to CCPs. Our analysis of a CCP's corporate profile considers two key areas: competitive positioning and CCP liquidity coverage. We also typically consider a broad array of secondary measures, including profitability and leverage, to inform our analysis of a CCP's corporate profile.

This factor comprises two sub-factors: Competitive Positioning and CCP Liquidity Coverage.

Competitive Positioning Sub-factor – Why It Matters

The CCP business model has been evolving and has a variety of different configurations. A CCP could be privately or publicly owned and operate either at cost (for the benefit of its members) or for profit. Typically, a CCP is vertically integrated with an affiliate exchange, where it clears trades executed on the exchange and benefits from the trading activity of the exchange. Some CCPs also benefit from a natural monopoly status due to the high fixed costs of operation and the benefits arising from economies of scale and network effects, offering a first-mover advantage in a particular region or product. Near-monopoly status could also arise from legislative authority. For example, in the case of some national champions, the regulator may prefer a single-CCP cleared marketplace.

The business model can feed into a CCP's capture and retention of liquidity pools, the ultimate barrier to entry in the exchange and clearing house industry. Further, the larger global CCPs offer clearing for multiple products and can provide cross-margining capabilities for clearing members and clients. Cross-margining reduces the total net margin payment requirement and therefore becomes a key consideration in a market participant's choice of CCP in certain products or regions.

Competitive Positioning Sub-factor – How We Assess It for the Scorecard

CLEARING HOUSE PRODUCT VOLUMES / INDUSTRY:

The initial score for this sub-factor is based on a market share metric, and qualitative adjustments are considered in arriving at the assigned score. Our assessment of competitive positioning takes market share within a CCP's core geographies, using the following ratio for the benchmark products:

Market Share = Clearing House Product Volumes / Industry Product Volumes

The following exhibit outlines how we score CCPs according to market share and the characteristics typically associated with that market share.

EXHIBIT 7

Sub-factor Mapping: Competitive Positioning

Product Scoring	5 – Very Strong	4 – Strong	3 – Moderate	2 – Weak	1 – Very Weak
Market Share	> 80%	60% - 80%	40% - 60%	20% - 40%	≤ 20%
Characteristics	Global or strong regional; dominance in a single or multiple benchmark products.	Strong regional; dominance in regional niche products.	Regional; historical strength but facing threats from new entrants.	Regional; limited pricing power, given market control by a global CCP.	Regional; no core product niche or pricing power, volumes evidence its decline.

Source: Moody's Investors Service

Competitive Positioning Sub-factor Adjustments

Qualitative assessments of competitive positioning may result in assigned scores that are one or more notches higher or lower than the initial sub-factor score.

We assess the CCP's position in its region and in key products cleared, typically over a three-year period. The total trading volume cleared by a CCP relative to the industry informs us of how entrenched the CCP's market position is. Larger size and scale are positive for a CCP, provided they reflect a history of successful operations and clearing member default management capabilities in the clearing franchise.

We also consider whether the CCP is a global or regional player, the competition it faces and its product pricing power.

We may adjust the initial score downward if there has been any rapid increase or decrease in market share that could indicate a change in risk appetite, especially if the CCP responds to competitive threats by lowering pricing or margin standards. In assessing a CCP's competitive positioning, important considerations include barriers to entry and the relative economic importance of the products that the CCP clears. We consider a CCP that has captured market liquidity for financial contracts with significant benchmark status (e.g., interest-rate futures) to have a relatively healthy competitive position.

Our analysis also encompasses the ownership structure, pricing power of the CCP and potential emerging competitive threats.[23] The commitment of a CCP's clearing member-shareholder base can sustain a CCP's market positioning throughout the market cycle. An affiliate exchange and shareholder can protect clearing activity by ensuring all exchange-traded activity is cleared through an affiliate clearing house, as is the case with "vertical silo" affiliate exchange-clearing house relationships. The potential for the clearing membership or an affiliate exchange to introduce risk to a CCP's competitive positioning is also considered.

CCP Liquidity Coverage Sub-factor – Why It Matters

Having sufficient liquidity to cover operating expenses and interest expense is an important indicator of a CCP's financial health. Weak liquidity diminishes a CCP's ability to fund its share of waterfall resources and operate as a going concern if it incurs losses from general business risks. Deteriorating liquidity coverage indicates that the CCP's operating expenses are growing faster than its liquid net assets, which could challenge CCPs that have limited capital resources and that are facing rising growth-related expenses or regulatory and compliance-related costs.

CCP Liquidity Coverage Sub-factor – How We Assess It for the Scorecard

LIQUID NET ASSETS / AVERAGE OF SIX-MONTHS' OPERATING EXPENSES:

Our assessment considers the proprietary liquidity in the business used to support its operations, as compared to liquidity used to support the clearing process. Our calculation of CCP liquidity coverage measures the firm's liquid net assets (LNA) against six months of operating expenses.

LNA equal cash and other highly liquid assets funded by shareholders' equity less a CCP's own capital, which is ring-fenced for the clearing operations). For this metric, we consider LNA that are funded by equity by the CCP operating entity itself and not contingent or subject to a call on a parent's or affiliate's financial resources.

[23] These include new entrants as well as the risk of obsolescence, given that risk management technologies can evolve faster than a CCP's ability to adapt.

Operating expenses, including interest expense, typically reflects the higher of the most recent fiscal half-year period and the average of such fiscal half-year periods over the past three fiscal years.

CCP liquidity coverage = (liquid net assets) / The higher of the most recent fiscal half-year period and the average of such fiscal half-year periods over the past three fiscal years, including interest expenses

EXHIBIT 8

Sub-factor Mapping: CCP Liquidity Coverage

Very Strong	Strong	Moderate	Weak	Very Weak
> 6.0	3.0 - 6.0	1.5 - 3.0	1.0 - 1.5	≤ 1.0

Source: Moody's Investors Service

CCP Liquidity Coverage Sub-factor Adjustments

Additional quantitative and qualitative considerations that affect our view of the CCP's overall corporate profile may result in additional adjustments to the CCP Liquidity Coverage sub-factor score, to arrive at a corporate profile factor score consistent with our view.

Business Risks

In addition to our consideration of liquidity relative to historical operating expenses, we also consider the prospects for further business risks that may consume this liquidity.

Earnings Strength

The CCP business model has significant operational leverage because of its high fixed-cost base, and its profitability typically correlates with financial market activity. Therefore, a CCP's ability to achieve stable earnings is a function of the level of trading activity in the underlying markets it clears, diversification of its product base and tenor of its clearing relationships. Strong and stable earnings are essential to a company's creditworthiness, since they determine its ability to service financial obligations, build capital, as well as maintain competitiveness and investor confidence.

In assessing earnings strength, we typically calculate and analyze the CCP's trailing 12-month pre-tax margin.

Pre-tax margin = Trailing 12 months' pre-tax income / trailing 12 months' net revenue

Net revenue excludes transaction-based expenses. Pre-tax margin greater than 28% would typically be viewed as very strong, whereas a margin less than 18% could be viewed as an indicator of weakness. Pre-tax margins below 10% would raise significant concerns.

We also calculate the coefficient of variation, which compares the standard deviation of a firm's pre-tax margin over the previous 12 quarters to the average of the historical time frame.[24] We may

[24] If quarterly financials are unavailable, we typically use a semi-annual or annual data series to calculate margin volatility.

consider the coefficient of variation for pre-tax margins from various perspectives or over different time periods, for example, or by excluding extraordinary one-time items.

Pre-tax margin volatility = Three-year standard deviation pre-tax margin / average three-year pre-tax margin

Pre-tax margin volatility less than 6% would typically be an indicator of very low risk while pre-tax margin volatility greater than 22% would typically be viewed as an indicator of higher risk.

Relative Earnings Volatility

In addition, we consider a CCP's earnings volatility in comparison to its broader industry peers, typically using a broader industry benchmark over a three-year period.

Future Earnings Capacity

We generally also consider leading indicators of a CCP's earnings capacity, such as trading volume, commission erosion as a result of competition, impact of new technology, and elasticity of a CCP's pricing. In addition, we consider whether the drivers of a CCP's earnings capacity could be short-lived or have durability over the market cycle.

We consider increases to profitability owing to a decline in margining standards to be negative, since this could introduce further risk to the business. Rising profits from non-clearing sources can be positive to the extent that they diversify the CCP's income streams without posing undue risk.

Impact of Ownership Structure on Earnings Volatility and Earnings Capacity

We consider the fee arrangements and organizational status (e.g., for-profit, mutual association) of a CCP in assessing its earnings capacity. A CCP's profitability could be low or high as a result of fee rebates to clearing members that are also mutual owners of the CCP. Furthermore, a CCP operating as a vertical silo as part of a parent exchange group could capture a larger share of the fee income from the clearing and trading relationship than would be the case on a standalone, clearing-only basis. These interdependencies could result in either a positive or negative adjustment. As part of this assessment, we also consider a CCP's ability to set prices.

Leverage Ratio

The ratio of retained cash flow to net debt is an important consideration for cash flow-based firms, as an indicator of the firm's ability to repay its debt and as a reflection of management's financial strategy. The greater the amount of retained cash flow relative to a CCP's debt, the more cash the issuer has to finance its working capital, capital expenditures, growth opportunities, acquisitions or debt payments. Given the desire by regulators to ensure the robust operation of CCPs, CCPs typically do not issue debt at the operating company level. Financial flexibility is critical to a CCP, given the cyclical and capital-intensive nature of the business and potential for volatility in cash flows. Financial flexibility strongly influences a firm's ability to service and refinance its debt, invest in the business, make acquisitions, meet unexpected contingencies and maintain access to the capital markets. A CCP that makes significant use of leverage could constrain its financial flexibility, which in periods of low market activity can hurt the confidence and willingness of market participants to clear through the CCP.

For this ratio, net debt is short-term debt plus long-term debt minus unrestricted cash and cash equivalents. We exclude restricted cash that is committed as part of the waterfall or other regulatory-required liquidity in the clearing operation, as readily available cash and equivalents provide a better proxy. Retained cash flow is cash flow from operations minus the sum of capital expenditure, dividends and other rebates.

A leverage ratio greater than 40% would be an indicator of lower risk whereas a leverage ratio below 20% would indicate a higher risk.

Operating Environment Sub-component

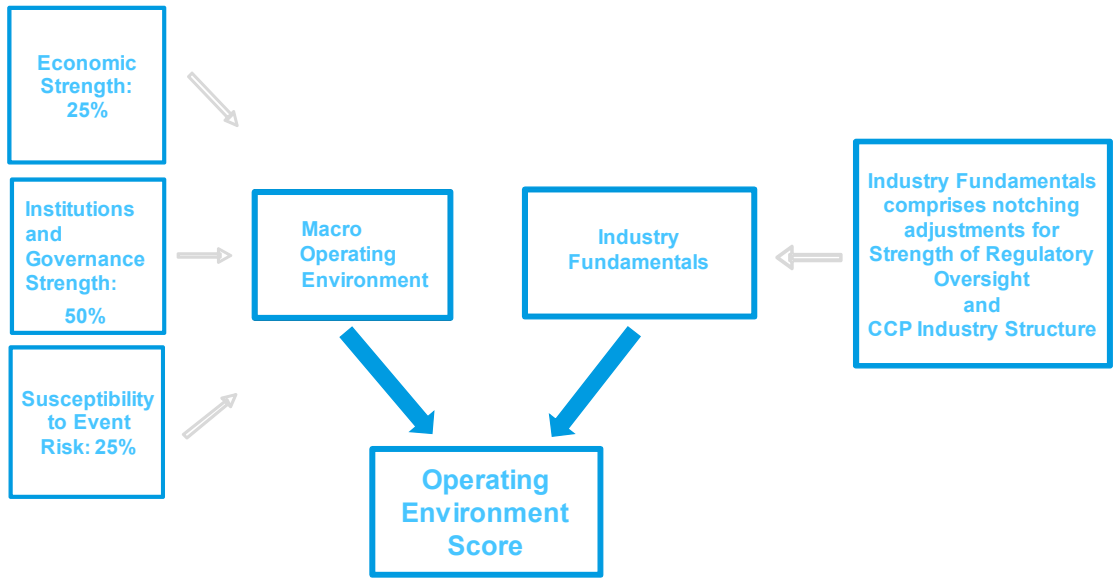
A key component of our analysis, is the extent to which external conditions can have a meaningful influence on a CCP's credit profile.This sub-component has two factors, which also have sub-factors.

» Macro Operating Environment. We use three sub-factors based on three factors from our sovereign rating methodology — Economic Strength, Institutions and Governance Strength, and Susceptibility to Event Risk.

» Industry Fundamentals. We then consider two industry-specific notching sub-factors — Strength of Regulatory Oversight and CCP Industry Structure — which can lead to either upward or downward notches, to arrive at the Operating Environment score.

EXHIBIT 9

CCP Operating Environment Sub-component



Source: Moody's Investors Service

Why It Matters

The Operating Environment sub-component captures relevant economic, judicial/regulatory, institutional and general operating conditions that may impact a CCP's creditworthiness. In some cases, these conditions can over time have as much, if not more, of a bearing on a CCP's viability as its intrinsic credit strength based on a its clearing member default management capabilities and corporate profile. The relative economic development of the CCP's home market, major social or political

developments, legal system, industry structure, and quality of regulatory oversight and enforcement are typically not under a CCP's control.

» Economic Strength: The intrinsic strength of an economy provides critical indications of a sovereign's resilience to external shocks. A sovereign's ability to generate sufficient revenue to service debt over the medium term relies on sustained economic growth and prosperity, i.e., wealth. These considerations have a direct bearing on the ability of CCPs to retain their creditworthiness.

» Institutions and Governance Strength: The strength of institutions and governance are important determinants of a sovereign's creditworthiness because they influence the predictability and stability of the legal and regulatory environment, which is of importance to investors. Institutions and governance provide a strong indication of a government's willingness to repay its debt. They influence the sovereign's capacity and willingness to formulate and implement economic, fiscal and monetary policies that support growth, socioeconomic stability and fiscal sustainability, which in turn protect the interests of creditors over the long term. These considerations are important for the longer-term prospects of CCPs.

» Susceptibility to Event Risk: Susceptibility to sudden, extreme events that could severely impact the country's economy or its institutions, or strain public finances is an important indicator of a sovereign's creditworthiness. Event risks are varied and typically include domestic political and geopolitical risks, government liquidity risk, banking sector risk and external vulnerability risk. We believe that such events could have significant negative implications for financial institutions, including CCPs.

» Strength of Regulatory Oversight: Regulatory oversight affects many aspects of a CCP's operations, including its rules, governance and risk management framework.

» CCP Industry Structure: The way that CCPs in the relevant market(s) are organized, the objectives of their owners, and their linkages to international affiliates and markets, affects a CCP's relationships with customers as well as the nature and extent of competition.

Factor: Macro Operating Environment

How We Assess It for the Scorecard

The Macro Operating Environment factor comprises three sub-factors, the scores for which are the factor scores from Moody's sovereign ratings methodology[25] based on the country in which a CCP operates. If a CCP operates in more than one country, we assign scores for each of the three sub-factors that are representative of the composite scores.

Economic Strength Sub-factor

Our published factor score for the sovereign's Economic Strength contributes 25% of the Macro Operating Environment score.

Institutions and Governance Strength Sub-factor

Our published factor score for the sovereign's Institutions and Governance Strength contributes 50% of the Macro Operating Environment score.

[25] A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Susceptibility to Event Risk Sub-factor

Our published factor score for the sovereign's Susceptibility to Event Risk contributes 25% of the Macro Operating Environment score.

Factor: Industry Fundamentals

How We assess It for the Scorecard

We may notch the Macro Operating Environment score up or down to reflect our assessment of the Industry Fundamentals factor, which has the following industry-specific sub-factors.

Strength of Regulatory Oversight Sub-factor

We assess the extent to which the regulator is engaged in implementing global clearing industry standards and has established monitoring and oversight of CCPs in its jurisdiction. Regulatory scrutiny of the industry is paramount.

We view implementation of the PFMIs and regular compliance assessments by a regulator as a baseline. Regulatory deficiencies would lead to a downward notching of the operating environment score. The super-equivalence of some regimes may result in upward notching, but in most cases only where accompanied by other positive structural features, such as central bank liquidity access.

CCP Industry Structure Sub-factor

The clearing industry structure is frequently dynamic, e.g., business models in some regions may evolve from mutualized structures to for-profit corporations. As a result, we view industry structure — the competitive landscape in particular — as a potentially significant credit driver for CCPs.

We consider the extent of vertical and horizontal links with local and global exchanges that could pressure or support a CCP's ongoing operations. For example, as key players extend their services to new markets, competition to clear particular products in select regions could increase margin pressures, raise product-development costs and erode risk management practices. New entrants could also stretch thin the pool of talent and expertise that is essential to the success of a clearing business, and is especially critical if a member defaults. We typically also consider the potential impact of new entrants on the operating environment for new and existing CCPs, as well as any potential pressure on a CCP's clearing member default management capabilities and financial profile. Our overall forward-looking assessment of these dynamics may lead to upward or downward notching.

Material Operations in More Than One Sector and/or Country

In cases where a CCP has material operations in more than one country, we assign a score that is representative of the composite operating environment for that issuer.

Combining the Intrinsic Credit Strength Score and the Operating Environment Score

We combine the intrinsic credit strength of the CCP with the operating environment profile to arrive at the preliminary standalone scorecard-indicated outcome before qualitative adjustments (expressed on the alphanumeric scale), using a matrix, as shown in Exhibit 14 in Appendix 1. By using this approach, a weak operating environment tends to negatively impact a CCP's scorecard-indicated outcome before qualitative adjustments, even when the intrinsic credit strength is high. Similarly, the score of a CCP operating in a very strong operating environment, where it is more able to perform its duties and manage the risks to which it is exposed, may receive a benefit.

Qualitative Adjustments Sub-component

In this sub-component, we consider some other factors that may affect specific CCPs, namely, corporate behavior and operational risk. The cumulative effect of these qualitatively assessed factors may result in either an upward or downward notching to the scorecard-indicated outcome before qualitative notching factors. In many cases, there may be no notching, or a combined neutral impact.

Corporate Behavior – Why It Matters

Corporate behavior reflects the extent to which a CCP's strategy, management and corporate policies enhance or damage its overall risk profile. As promoted by the board of directors, corporate behavior is important for a CCP's clearing member default management capabilities and credit profile. Aggressive risk-taking could lead to losses, and a firm's inclination toward creditor-unfriendly policies could introduce risks that can undermine a CCP's financial flexibility or long-term viability. A financial policy that distributes a high proportion of profits to shareholders can threaten a CCP's ability to make necessary investments in its clearing infrastructure. An aggressive acquisition strategy that increases leverage and consumes management time to integrate acquisitions can also reduce a CCP's creditworthiness.

Corporate Behavior – How We Assess It for the Scorecard

Our assessment of corporate behavior typically includes the following governance issues: (i) quality of management and relevant experience; (ii) board oversight of clearing member default management capabilities; (iii) executive compensation; (iv) board composition (skill set and clearing member/stakeholder independence); (v) board practices; and (vi) succession planning. We typically also consider the compatibility of a CCP's financial policy with its underlying role in providing greater assurance as a counterparty than traditional bilateral counterparties. Increasing leverage, undue risk-taking and pursuit of ambitious growth targets are likely to result in downward notching.

We typically assess the depth of corporate governance based on the board's independence, expertise and involvement, as well as its ability to align governance practices with proper oversight of the management team, clearing member default management capabilities, and corporate strategy. Independent review of key financial reporting and risk management processes is important, as is oversight of compliance and regulatory issues.

We view compensation plans that reward management and employees for protecting the clearing service's interests and preserving value in the company as fundamental.

We may also consider the interests, track records and resources of large shareholders and clearing members, to assess how they would be likely to act or react during normal times as well as in times of stress. We typically consider the potential for conflicting interests between shareholders and clearing members, and how the board and management team balance these demands. If a board has clearing members who could have competing interests, we view as positive the inclusion of independent, non-participating board members to lead sensitive functions, such as risk management, governance and audit. Cases where a CCP draws upon the expertise of its clearing members through participation in risk committees and risk governance structure are typically also viewed positively.

Operational Risk – Why It Matters

Operational risk is a key factor for the exchange and CCP industry. Other than the default of a clearing member, operational risk is the next biggest threat to a CCP. Frequent or drastic operational failures threaten a CCP's ability to conduct its clearing operations, and a shutdown of clearing services for operational reasons can undermine the confidence of participants in the CCP. Given the need for stable

clearing services, clearing members are likely to seek out alternative CCPs in the event of instability. A loss of members could dilute the CCP's earnings power, thereby negatively impacting its corporate profile. Additionally, as a financial market utility, a CCP's functioning is crucial for the safety of the clearing members' operations in the local financial market. A shutdown in clearing services, which we typically view as having a very low probability of occurrence, would pose significant threats to the financial system.

Operational risk can become increasingly important in cases where a CCP broadens the hours or regions of coverage, because the time frames for maintenance and upgrades to infrastructure become more limited. Additionally, cyber risk is of critical importance to CCPs, given their crucial role in the functioning of capital markets. In addition to potential cyber risks, themselves, there is extensive regulatory scrutiny around cyber security, with many exchanges and CCPs undergoing multiple regulatory exams each year.

Operational Risk – How We Assess It for the Scorecard

In assessing operational risk, we typically assess technical readiness, the strength of contingency planning, and the extent to which a CCP monitors and invests in its systems, including those protecting against cyber threats. Our qualitative assessment typically encompasses the CCP's operations, as well as those of the parent exchange group. Key indicators that inform our assessment a CCP's operational soundness and stability typically include:

» Frequency and types of systems tests the CCP performs to gauge the ability to handle capacity levels greater than historical peaks.

» Number and location of backup centers, i.e., not located in close proximity to the primary location.

» History of glitches or shutdowns, including improvements implemented after these events.

While our forward-looking qualitative assessment may lead to downward notching, we would typically consider it to be uncommon to make such an adjustment. However, we would likely apply downward notching if we believe that a CCP's business practices pose an evident and high level of operational risk, or if we determine that the CCP's operational policies and procedures lack industry best practices.

After applying any upward or downward notching resulting from the Qualitative Adjustments sub-component, we arrive at the standalone scorecard-indicated outcome.

Support Component

The support component incorporates the potential for support, whether explicit or implicit, from an affiliate (e.g., a parent company) or a government, as well as the potential for credit drag from an affiliate or constraint on the CCP's rating based on the sovereign rating.

For support, we use our Joint Default Analysis (JDA), which considers willingness and capacity to provide support, as well as the correlation between the credit quality of the CCP and the relevant support provider. We also consider the actions of the support provider, current public statements of support, and our assessment of the outlook for future support. For more details on the JDA approach, please see Appendix 4.

A CCP can be affected positively or negatively by its relationships with affiliates and governments. Support or drag, once assessed, can result in a scorecard-indicated outcome that is above or below the standalone scorecard-indicated outcome.

Support or Drag from a Parent Company or Other Affiliates

Please see Appendix 5, which describes how we use JDA in assessing affiliate support. In addition to the JDA outcome, we also consider the unique operational linkages of a CCP and its parent. In many cases, a CCP's affiliates, including its parent company, may have a lower rating than the CCP's standalone credit profile. A well-capitalized, profitable CCP with a highly leveraged parent or a weak affiliate might experience drag from such weak affiliates relative to the standalone credit profile, for example if a weaker affiliate places pressure on a CCP's earnings capacity, franchise strength or clearing member default management capabilities. These considerations are more likely to be acute if the CCP is operating as a vertical silo with a weak exchange affiliate with which it shares a significant proportion of its trade and clearing activity. Such highly interrelated activity with a weak or highly leveraged affiliated exchange is likely to cap the CCR at that affiliate's rating. If we do not rate the parent or other material affiliates, we may use credit estimates in assessing the impact of the affiliate's creditworthiness on the CCP.[26]

Conversely, a more moderately capitalized and profitable CCP with a very strong parent or affiliate could receive ratings uplift. In considering the capacity and willingness to support as part of the JDA analysis and the assigned notches for affiliate support, we consider whether support is legally binding in our assessment of material agreements, e.g., capital maintenance agreements (CMAs). We typically also consider regulatory and legislative statutes to assess the durability of support agreements in stress environments. Additional considerations include the supporting company's commitment to the country/region of the CCP; how important the CCP is to the overall business of the group; its size relative to the whole; its geographic proximity to the supporting entity; existence of shared regulatory oversight; full or partial ownership; and its integration with the rest of the organization from a management and operating perspective.

Government Support for the CCP and Sovereign Constraints

Typically, CCPs have operated at the center of most financial markets, as a keystone in the clearing and settlement of securities. The larger the scope and volume of market clearing activity that occurs in CCPs, the greater the systemic importance of these institutions. Please see Appendix 5, which describes how we use JDA in assessing government support.

Sovereign Rating Constraints

CCPs tend to have significant exposures to sovereigns, especially through the collateral/margin resources that correlate with the government's creditworthiness. For this reason, we seldom assign a CCR higher than the long-term local-currency rating of the sovereign country in which the CCP is domiciled or operates. Many sovereign-related risks are generally captured through our Operating Environment assessment. However, if the initial outcome of the CCR is nevertheless higher than the sovereign's rating, the assigned CCR would normally be constrained by the sovereign rating, which takes into account the risk that exposures not captured in our assessment could prove to be material.

In those rare cases when a CCR exceeds the sovereign rating of the country in which the CCP is domiciled or operates, it would typically be by no more than one notch and would reflect our opinion that the CCP's sovereign exposures are mitigated by offsetting haircuts to sovereign collateral, a limited reliance on sovereign debt as margin collateral, and a weak dependency between the creditworthiness of the CCP and the sovereign. A high degree of diversification of cleared products outside the home country would also lower a CCP's dependency on sovereign creditworthiness. For a

[26] Please see our cross-sector methodology that discusses the use of credit estimates. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

description of general principles related to assessing sovereign linkages, please see our cross-sector methodology that describes how we assess the impact of sovereign credit quality on other ratings.[27]

Other Rating Considerations

Ratings may include additional factors that are not in the scorecard, usually because the factors' credit importance varies widely among the issuers in the sector or because the factors may be important only under certain circumstances or for a subset of issuers. Such factors include limited financial history, environmental and social considerations and possible government interference in some countries. Regulatory, litigation, liquidity, technology and reputational risk as well as changes to consumer and business spending patterns, competitor strategies and macroeconomic trends also affect ratings.

Following are some examples of additional considerations that may be reflected in our ratings and that may cause ratings to be different from scorecard-indicated outcomes.

Event Risk

We recognize the possibility that an unexpected event could cause a sudden and sharp decline in a CCP's fundamental creditworthiness. Typical events include sudden changes in regulation, disasters, mergers and acquisitions, asset sales, spin-offs, capital restructuring programs, significant cyber-crime events, litigation and shareholder distributions.

Financial Institutions with Limited Financial History

Most rated CCPs generally have many years of financial history and lengthy operating track records that act as the basis for our forward-looking credit analysis. CCPs and their members with limited financial history may undergo rapid evolution initially, before developing readily distinguishable and stable operating characteristics. Financial institutions are highly confidence-sensitive: a demonstrable track record can be instrumental in building customer and market trust, which creates franchise value and supports the institution's performance during a down-cycle.

The franchise value of start-up CCPs is usually weak, and most tend to lack product depth, market share, operating experience as an institution (rather than as a collection of individuals) and a tested track record of resilience through a full credit cycle. Their systems, policies and procedures tend to be less robust than those of established CCPs.

For start-ups that lack a financial history of at least several years and in cases of a material transformation in a CCP's business, such that its financial history does not provide a good indication of future results (collectively, CCP's with limited financial history), existing financial history provides less insight into their future credit profile. In these cases, our baseline projections may reflect more conservative expectations than management's projections. In addition, we are likely to make downward adjustments to the Default Management Capabilities and Corporate Profile factor scores in order to reflect the considerable uncertainty around our baseline expectations of the CCP's future operations and financial profile. To the extent these risks and uncertainties are not fully captured in the scorecard, they may be reflected in an assigned rating that is lower than the scorecard-indicated outcome.

CCPs with limited financial history may benefit from external support. When material, we would incorporate that support into our ratings. In assessing the level of expected support, we generally consider whether the CCP's status as a start-up could affect the willingness of the support provider to

[27] A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

step in should support be needed. For a highly publicized start-up subsidiary of a parent with a solid credit profile, we may expect a high level of support. Certain parent companies and affiliates, conversely, could be less willing to provide support if the reputational and financial risks attached to failure of an early-stage business venture were lower than for subsidiaries with a long track record and entrenched businesses in their home markets. We generally expect that governmental support for start-ups, typically small players in the early years of operations that are not systemically important, to be low.

Environmental and Social Issues

Environmental, social and governance (ESG) considerations may affect the ratings of CCPs. For information about our general approach to assessing ESG issues, please see our methodology that describes our general principles for assessing these risks.[28]

Environmental issues could affect a CCP's reputation. For CCPs, we also consider social issues that could materially affect the likelihood of default and severity of loss, for example through adverse impacts on business reputation, brand strength and employee relations.

Assigning Issuer-Level and Instrument-Level Ratings

After considering the scorecard-indicated outcome, other rating considerations and relevant cross-sector methodologies, we typically assign a Clearing Counterparty Rating (CCR), which reflects our opinion of a CCP's ability to meet the timely clearing and settlement of clearing obligations by the CCP as well as the expected financial loss in the event the obligation is not fulfilled. A CCR may be assigned at the CCP legal entity level or at the clearing service level to the extent a legal entity operates multiple clearing services.[29] For issuers that benefit from rating uplift from government ownership, we may assign a Baseline Credit Assessment.[30]

This distinction recognizes the differences of risk across clearing services presented by each service's unique membership, product types, clearing rule books and respective waterfall resources. While these differences of risk are clear, we consider whether the potential for weakness in one service presents a risk of contagion to other services within a CCP. This may be due to the resulting default of a clearing member's participation in both clearing services, a common weakness in margin methodologies, or clearing member default management capabilities. Additionally, failure in one service can be expected to affect the confidence of the membership and end users of the affiliated service that can create "run on the bank" scenarios, subject to the existence of alternative clearing venues where counterparties can transfer their clearing positions.

Given our expectations of the lower probability of default and lower loss given default of clearing obligations,[31] we typically rate senior unsecured obligations of the operating company two notches lower than the standalone assessment (before uplift from systemic support, if any). In exceptional cases, we may rate the senior unsecured instrument one notch lower than the standalone assessment, when there is a significant cushion of subordinated obligations that would lower the loss severity for senior unsecured creditors in the event of default or impairment. To reflect structural subordination of

[28] An index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[29] Please see *Rating Symbols and Definitions*. A link to can be found in the "Moody's Related Publications" section.

[30] For an explanation of the Baseline Credit Assessment, please refer to *Rating Symbols and Definitions* and to our cross-sector methodology for government-related issuers. A link to an index of our sector and cross-sector methodologies and a link to *Rating Symbols and Definitions* can be found in the "Moody's Related Publications" section.

[31] Please see Appendix 6 for a discussion of why we think clearing counterparty obligations will have lower probability of default and lower loss severity in the event of default or impairment than senior unsecured debt.

holding company debt obligations (absent material assets at the holding company or equity from other affiliates), we typically rate holding company senior unsecured obligations at least three notches lower than the standalone assessment. Notching of holding company obligations may differ from this convention based on other ratings considerations at the holding company level, such as the negative or positive effects of the credit strength of affiliates or subsidiaries, or material operating activities conducted by the holding company.

Individual debt instrument ratings may be notched up or down from the entity's senior unsecured rating to reflect our assessment of differences in expected loss related to an instrument's seniority level and collateral. The document that provides broad guidance for such notching decisions is the rating methodology for notching corporate instrument ratings based on differences in security and priority of claim, and the methodology for assigning short-term ratings.[32]

Assumptions

Key rating assumptions that apply in this sector include our view that sovereign credit risk is strongly correlated with that of other domestic issuers, that legal priority of claim affects average recovery on different classes of debt sufficiently to generally warrant differences in ratings for different debt classes of the same issuer, and the assumption that access to liquidity is a strong driver of credit risk.

Our forward-looking opinions are based on assumptions that may prove, in hindsight, to have been incorrect. Reasons for this could include unanticipated changes in any of the following: the macroeconomic environment, general financial market conditions, industry competition, disruptive technology, or regulatory and legal actions.

Limitations

In the preceding sections, we have discussed the scorecard factors, many of the other rating considerations that may be important in assigning ratings, and certain key assumptions. In this section, we discuss limitations that pertain to the scorecard and to the overall rating methodology.

Limitations of the Scorecard

There are various reasons why scorecard-indicated outcomes may not map closely to actual ratings.

The scorecard in this rating methodology is a relatively simple tool focused on indicators for relative credit strength. Credit loss and recovery considerations, which are typically more important as an issuer gets closer to default, may not be fully captured in the scorecard. The scorecard is also limited by its upper and lower bounds, causing scorecard-indicated outcomes to be less likely to align with ratings for issuers at the upper and lower ends of the rating scale.

The weights for each sub-factor and factor in the scorecard represent an approximation of their importance for rating decisions across the sector, but the actual importance of a particular factor may vary substantially based on an individual company's circumstances.

Factors that are outside the scorecard, including those discussed above in the "Other Rating Considerations" section, may be important for ratings, and their relative importance may also vary

[32] A link to an index of our sector and cross-sector rating methodologies can be found in the "Moody's Related Publications" section.

from company to company. In addition, certain broad methodological considerations described in one or more cross-sector rating methodologies may be relevant to ratings in this sector.[33] Examples of such considerations include the following: how sovereign credit quality affects non-sovereign issuers, the assessment of credit support from other entities, the relative ranking of different classes of debt and hybrid securities, and the assignment of short-term ratings.

We may use the scorecard over various historical or forward-looking time periods. Furthermore, in our ratings we often incorporate directional views of risks and mitigants in a qualitative way.

General Limitations of the Methodology

This methodology document does not include an exhaustive description of all factors that we may consider in assigning ratings in this sector. Companies in the sector may face new risks or new combinations of risks, and they may develop new strategies to mitigate risk. We seek to incorporate all material credit considerations in ratings and to take the most forward-looking perspective that visibility into these risks and mitigants permits.

Ratings reflect our expectations for an issuer's future performance; however, as the forward horizon lengthens, uncertainty increases and the utility of precise estimates, as scorecard inputs or in other rating considerations, typically diminishes. In any case, predicting the future is subject to substantial uncertainty.

[33] A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Appendix 1: Using the Scorecard to Arrive at a Scorecard-Indicated Outcome

1. Assigning the Intrinsic Credit Strength (ICS) Factor Scores and Mapping to an Intrinsic Credit Strength Numeric Score

ICS sub-factor scores, both the initial scores (i.e., unadjusted scores) and assigned scores, are expressed on a five-point scale ranging from Very Strong to Very Weak (i.e., Very Strong, Strong, Moderate, Weak and Very Weak) and correspond to integer numeric equivalents from five to one, respectively.[34] The initial score for each ICS metric can be adjusted as described in the "Discussion of Scorecard Factors" section. Each metric thus has an initial score and an assigned score.

The numeric score for each ICS sub-factor[35] is multiplied by the weight for that sub-factor, with the results then summed to produce an assigned factor score.[36] The numeric value of the assigned ICS factor score, which falls on a continuum ranging from one to five (inclusive), is then mapped back to the scoring scale shown in Exhibit 10. Each ICS factor score (i.e., Default Management Capabilities and Corporate Profile) is expressed on a scale ranging from Very Strong to Very Weak, including +/- modifiers.

The ICS score is based on a combination of the Combined Default Management numeric score and the Combined Corporate Profile numeric score. If the Combined Corporate Profile score is greater than or equal to the Combined Default Management score, the latter receives a 100% weight in our scoring of ICS. Otherwise, the scoring of ICS reflects a 70% weight for the Combined Default Management Capabilities score and 30% for the Combined Corporate Profile score. In other words, the numeric value of the ICS score may be computed according to the following formula based on the numeric values of the Combined Default Management Capabilities (DM) score and the Combined Corporate Profile (CP) score:

$$ICS = MIN\ (DM,\ 70\% * DM + 30\% * CP)$$

The numeric value of the assigned ICS factor score, which falls on continuum ranging from one to five (inclusive), is then mapped back to the scoring scale shown in Exhibit 10. The assigned ICS score is expressed on a scale ranging from Very Strong to Very Weak, including +/- modifiers.

[34] For clarity, the numeric equivalents corresponding to Very Strong, Strong, Moderate, Weak, and Very Weak are 5, 4, 3, 2 and 1, respectively.

[35] Numeric scores for each ICS sub-factor are based on the assigned score.

[36] For example, Counterparty Strength, Product Risk and CCP Risk Mitigants are combined to produce the Combined Default Management score. Similarly, the Combined Corporate Profile score is based on the weighted average of numeric scores of its sub-factors.

EXHIBIT 10

Scoring Scale Numeric and Alphanumeric Equivalents

Intrinsic Credit Strength *1	Numeric Equivalent
Very Strong	5.00
Very Strong -	4.67 – 5.00
Strong +	4.33 – 4.67
Strong	4.00 – 4.33
Strong -	3.67 – 4.00
Moderate +	3.33 – 3.67
Moderate	3.00 – 3.33
Moderate -	2.67 – 3.00
Weak +	2.33 – 2.67
Weak	2.00 – 2.33
Weak -	1.67 – 2.00
Very Weak +	1.33 – 1.67
Very Weak	1.00 – 1.33

*1 There are no +/- modifiers at either end of the scoring scale (i.e., for Very Strong and for Very Weak) because scores for combined CP and the combined DM, on which the ICS score is based, reflect the averaging of sub-factors that are scored on a scale without modifiers (i.e., Very Strong, Strong, Moderate, Weak and Very Weak). These averages therefore cannot produce a score above Very Strong or below Very Weak.

Source: Moody's Investors Service

2. Assigning the Operating Environment Score

The Operating Environment comprises two factors: Macro Operating Environment and Industry Fundamentals.

» The Macro Operating Environment comprises three country-specific macro-level indicators from our sovereign rating methodology – Economic Strength (25%), Institutions and Governance Strength (50%) and Susceptibility to Event Risk (25%) – to assess the strength of the Macro Operating Environment in which the CCP operates.

  In scoring the macro-level indicators, we start with the published factor scores for the sovereign's Economic Strength and Institutions and Governance Strength, which are expressed on an alphanumeric scale, and Susceptibility to Event Risk, which is expressed on a broad alpha scale. We then convert these scores to numeric scores using the two mapping tables below (Exhibits 11 and 12), and we combine them according to the weights described in the prior paragraph. Specifically, the numeric equivalent score for each sovereign methodology factor assigned score is multiplied by its weight, with the results then summed to produce an aggregate numeric value for the Macro Operating Environment.

» In assessing a CCP's Industry Fundamentals, we consider two additional industry-specific sub-factors – strength of regulatory oversight and CCP industry structure – which can lead to notching adjustments either upward or downward in whole notch increments – to the aggregate numeric value for the Macro Operating Environment to produce a value that, when truncated, is the numeric score for the Operating Environment. Using the table in Exhibit 13, this value is mapped back to the score for the Operating Environment, which is expressed on the scale ranging from Very Strong + through Very Weak -.

EXHIBIT 11

Mapping a Sovereign's Factor Scores for Economic Strength and Institutions and Governance Strength[*1]

Economic Strength and Institutions and Governance Strength – Sovereign Scoring Scale	Numeric Equivalent
aaa, aa1	15
aa2, aa3	14
a1	13
a2	12
a3	11
baa1	10
baa2	9
baa3	8
ba1, ba2	7
ba3	6
b1	5
b2	4
b3	3
caa1, caa2	2
caa3, ca	1

*1 The effect of this mapping is to compress the alphanumeric sovereign factor scores and convert them to numeric scores for use in CCP scorecards.

Source: Moody's Investors Service

EXHIBIT 12

Mapping a Sovereign's Factor Score for Susceptibility to Event Risk

Susceptibility to Event Risk– Sovereign Scoring Scale	Numeric Equivalent
aaa	15
aa	14
a	13
baa	10
ba	8
b	5
caa	2
ca	1

Source: Moody's Investors Service

EXHIBIT 13

Operating Environment Numeric Equivalents

Macro-level indicators or Operating Environment	Numeric Equivalent
Very Strong +	15
Very Strong	14
Very Strong -	13
Strong +	12
Strong	11
Strong -	10
Moderate +	9
Moderate	8
Moderate -	7
Weak +	6
Weak	5
Weak -	4
Very Weak +	3
Very Weak	2
Very Weak -	1

Source: Moody's Investors Service

3. Determining the Standalone Scorecard-Indicated Outcome

We use the matrix shown in Exhibit 14 to combine the ICS score (vertical axis) with the Operating Environment score (horizontal axis) to arrive at the preliminary standalone scorecard-indicated outcome before qualitative adjustments, which is expressed on an alphanumeric scale. For example, if a CCP's ICS score is M-, and its Operating Environment score is VW- then its preliminary standalone scorecard-indicated outcome before qualitative adjustments is Caa3 (highlighted below).

We consider qualitative adjustments for Corporate Behavior and Operational Risk, which can lead to whole notch upward or downward adjustments to the standalone assessment before qualitative adjustments to arrive at the scorecard-indicated standalone outcome.

EXHIBIT 14

Arriving at the Preliminary Standalone Scorecard-indicated Outcome

	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
VS+	Aaa	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A3	Baa1	Baa2	Ba1	Ba3	B2	Caa1	Caa3
VS	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa3	Ba1	Ba3	B2	Caa1	Caa3
VS-	Aa1	Aa1	Aa2	Aa2	Aa3	A1	A2	Baa1	Baa2	Baa3	Ba2	B1	B2	Caa1	Caa3
S+	Aa1	Aa2	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Ba1	Ba2	B1	B3	Caa1	Caa3
S	Aa2	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba3	B1	B3	Caa1	Caa3
S-	Aa3	Aa3	A1	A2	A3	A3	Baa2	Baa3	Ba1	Ba2	Ba3	B2	B3	Caa2	Caa3
M+	A1	A1	A2	A3	A3	Baa1	Baa2	Baa3	Ba2	Ba3	B1	B2	B3	Caa2	Caa3
M	A2	A2	A3	Baa1	Baa1	Baa2	Baa3	Ba1	Ba2	B1	B1	B3	Caa1	Caa2	Caa3
M-	A3	A3	Baa1	Baa2	Baa3	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3
W+	Baa1	Baa2	Baa2	Baa3	Ba1	Ba2	Ba2	Ba3	B1	B2	B3	B3	Caa1	Caa2	Caa3
W	Baa2	Baa3	Ba1	Ba1	Ba2	Ba3	Ba3	B1	B2	B3	B3	Caa1	Caa2	Caa2	Caa3
W-	Baa3	Ba1	Ba2	Ba3	Ba3	B1	B2	B2	B3	B3	Caa1	Caa1	Caa2	Caa2	Caa3
VW+	Ba1	Ba3	Ba3	B1	B2	B2	B3	B3	Caa1	Caa1	Caa2	Caa2	Caa2	Caa2	Caa3
VW	Ba3	B1	B2	B3	B3	Caa1	Caa1	Caa1	Caa2	Caa2	Caa2	Caa2	Caa3	Caa3	Caa3
VW-	B1	B3	Caa1	Caa1	Caa2	Caa2	Caa2	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3

= Intrinsic Credit Strength Score

= Operating Environment Score

Source: Moody's Investors Service

4. Applying Affiliate and Government Support

Where relevant, we apply our JDA framework to incorporate any support from a parent or other affiliate, and then any government support.[37] Affiliate support is applied to the issuer's preliminary standalone scorecard-indicated outcome and provides an indicated range of positive uplift,[38] in notches. We also consider credit drag from the parent or affiliate. The assigned notching adjustment incorporates our overall view of support, which is typically within the affiliate support range, but it may in some cases be outside that range, or credit drag. The application of government support JDA provides a range of suggested upward notching.[39] The assigned CCR typically incorporates a level of upward notching within the government support range, but it may in some cases be outside that range, and in all cases, the assigned CCR/corporate family/issuer rating incorporates the local currency country ceiling.

Appendix 4 describes our JDA framework. Appendix 5 describes how we use JDA to determine the upward ratings impact (if any) of affiliate and government support on the assigned standalone assessment.

5. Determining Instrument Ratings

Please see the "Assigning Issuer-Level and Instrument-Level Ratings" section.

[37] Some CCPs that have direct government ownership may be designated as government-related issuers. Please see our rating methodology for government-related issuers, which describes how we incorporate support in these cases. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[38] The suggested upward notching may be zero or more notches.

[39] The suggested upward notching may be zero or more notches.

Appendix 2: Weighted Average Rating Factor and Idealized Probability of Default (PD)

As described in the discussion of the Counterparty Strength sub-factor, we use the Weighted Average Rating Factor (WARF) of the clearing members in calculating or estimating the initial score for the weighted average credit quality of the clearing membership. Each WARF value is indexed by rating level, as shown in the table below, and reflects the corresponding 10-year idealized default probability multiplied by 10,000. We map each member's rating (or our assessment of its equivalent credit quality) to the WARF.

A majority of CCPs publish lists of their clearing membership. We use the ratings of the members where available, as described in the discussion of the Counterparty Strength sub-factor, to arrive at the WARF.

Treatment of unrated entities:

» When the direct CCP member is not rated but is an affiliate of a rated entity, we typically use the counterparty risk rating, counterparty risk assessment or senior unsecured rating of its rated parent/affiliate. However, we may adjust this rating based on the relative importance of the CCP member to its corporate group and our understanding of its financial and operating profile.

» For unrated members that are not affiliates of a rated entity, we may use a credit estimate,[40] or we may use an assumption of a credit profile that is significantly lower than the rated universe of members (typically, we consider the average credit quality weighted by exposure and lower that by three alphanumeric notches, or we may assume a non-investment-grade credit profile).

WARF	RATING	10 YEAR PD
1	Aaa	0.0100%
10	Aa1	0.1000%
20	Aa2	0.2000%
40	Aa3	0.4000%
70	A1	0.7000%
120	A2	1.2000%
180	A3	1.8000%
260	Baa1	2.6000%
360	Baa2	3.6000%
610	Baa3	6.1000%
940	Ba1	9.4000%
1,350	Ba2	13.5000%
1,766	Ba3	17.6600%
2,220	B1	22.2000%
2,720	B2	27.2000%
3,490	B3	34.9000%
4,770	Caa1	47.7000%
6,500	Caa2	65.0000%
8,070	Caa3	80.7000%

Source: Moody's Investors Service

[40] Please see our cross-sector methodology that discusses the use of credit estimates. A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section. We typically would expect 80% or more of the clearing members, measured or estimated by exposure, to be rated or assigned a credit estimate. Where the coverage falls short of this threshold, we may not be able to form an opinion on the CCP's credit profile. In assigning the Counterparty Strength sub-score, we typically evaluate a variety of scenarios to consider the sensitivity of the sub-factor score to an assumed credit profile of unrated members.

Appendix 3: Summary Overview of International Organization of Securities Commissions (IOSCO) Principles for CCPs[41]

With the determination that CCPs play an important role in the financial system, concentrate risk,[42] and therefore pose risks to the system, IOSCO laid out principles for CCPs to enhance existing regulatory standards, including guidance on OTC derivatives, trade repositories, and risk management. The goal of this document was to enhance the safety and efficiency of clearing, limit systemic risk, increase transparency, and, thereby, augment financial system stability.

Below, we summarize the key points of the IOSCO Principles.

General Organizational Structure

A CCP should operate with a sound legal structure, including enforceability of netting and novation agreements. It should have a transparent corporate governance configuration, ensuring that the decisions of affiliates or a parent are not detrimental to the CCP. CCPs should be efficient and effective in meeting the requirements of clearing members and markets, with a structure dependent upon the products it clears. It should have clear and comprehensive publicly-available rules and procedures to enable clearing members to understand the risks and costs associated with membership.

Risk Management Operations – the Waterfall

A CCP should have a comprehensive risk management framework to identify, monitor, and manage credit, liquidity, operational, legal, and other risks. Business continuity planning should aim for a timely recovery of operations, even in a wide-scale disruption.

Financial Resources and Stress Testing

A CCP should maintain prefunded financial resources to fully cover its credit exposure to each clearing member, i.e., the waterfall. The CCP should have explicit rules defining the waterfall, allocation of uncovered credit losses, repayment of borrowed liquidity sources, and process to replenish financial resources.

A CCP should maintain additional resources to withstand the default of its largest clearing member in terms of credit exposure. Regulatory-determined complex or systemically important CCPs or those operating in multiple jurisdictions should include the default of its two largest clearing members under extreme market conditions. Stress scenarios should include (a) peak price volatilities, (b) shifts in market factors (prices, yield curve), (c) multiple defaults over time periods, (d) simultaneous pressures in funding and asset markets, (e) forward-looking stress scenarios, and (f) breakdowns in correlations of cleared products.

Stress tests should be performed daily, with monthly assessments and annual validations of models. If volatility increases, products become less liquid, or the concentration of a clearing member's position increases significantly, a CCP should increase the frequency of its model testing. Stress tests should identify financial resource shortfalls at the tails and should act as a risk management tool, not the final calculation of required financial resources.

[41] IOSCO principles also apply to payment systems, central securities depositories, and securities settlement systems. In this appendix, we focused solely on CCPs.

[42] In fulfilling its clearing function at the center of market trades (i.e., as central counterparty), the CCP accumulates exposure to the risk of settlement failure.

Margin Models and Management

Margin (collateral) should have low risk characteristics (credit, liquidity, and market) and be accessible in a stress environment, even across jurisdictions: otherwise, haircuts and concentration limits should be applied. Clearing members should not be able to post their own debt or equity securities, or those of closely-linked companies. CCPs should mitigate wrong-way risk by limiting the use of collateral that could lose value as the clearing member defaults. The margin management system should be able to calculate margin calls, handle margin disputes, and provide daily reporting on initial and variation margin. A CCP should have transparent rules for rehypothecation of collateral and should not use rehypothecation to increase profitability.

Initial margin models should have a single-tailed confidence interval of at least 99%, calculated at either the portfolio or product level, and inputs should be disclosed to clearing members. Margin models should have a reliable source of timely price data. These models should incorporate the effect of price volatility during close-out and should account for correlations across product prices, market liquidity, and potential non-linear risk exposures (jump-to-default). Estimated close-out periods should reflect historical price and liquidity data plus reasonably estimated market events, given the default of a large clearing member (decreased trading or other market disruptions).

If practicable, a CCP should attempt to limit procyclicality[43] through conservative margin requirements – increasing steady-state margins and limiting the need for large unexpected margin calls under stress.

A CCP may cross-margin[44] with another CCP if the product risks are equal but opposite. When cross-margining, CCPs should have coordinated risk management systems (margin methodologies, margin segregation, and default management plans). These arrangements should be legally robust, and systems should be reviewed periodically to ensure operational effectiveness for peak and projected volumes.

Default Management

The CCP should have clearly defined and publicized rules to manage a member's default, including the definition and determination of default, which address: (a) minimizing losses for the CCP and non-defaulting members, (b) accessing liquidity facilities, (c) closing out the defaulting member's open positions (hedging, auctions), and (d) regular default simulation exercises with members.

CCPs should have legally enforceable rules to enable identification, segregation, and portability of members' positions and collateral across all jurisdictions. A clearing member's client collateral should be segregated from its own house collateral; CCPs may choose to segregate client accounts individually. CCP rules should require members to facilitate the transfer of a customer's portfolio and collateral upon request. A CCP needs to be able to legally disclose client information in order for other members to assess the risk and therefore the feasibility of accepting the new portfolio.

Liquidity Buffers at the CCP

CCPs should hold sufficient liquid net assets to cover losses and continue operating in the event of a clearing member default. This includes: (a) cash at banks, (b) committed lines of credit, foreign exchange swaps, or repos, (c) highly liquid collateral held in custody, and (d) investments convertible

[43] Margin rules increase haircuts in stress periods, at the same time asset prices are falling. This increases market stress, further driving down prices and requiring additional margin calls.

[44] Cross-margining is a procedure for margining related securities, options, and futures contracts jointly when different CCPs clear each side of the position. This enables clearing members to reduce the total amount of margin required within their portfolio, thereby decreasing costs.

into cash with prearranged funding arrangements. Emergency central bank credit should not be included in the CCP's liquidity plan.

The amount of liquid net assets held should be determined by the (a) size of the CCP, (b) scope of its activities, (c) types of actions in the recovery plan, and (d) length of time needed to implement the plan. At a minimum, a CCP should hold liquid net assets equal to six months of current operating expenses. A CCP should provide a capital plan, including a plan to raise additional equity should levels fall close to or below required amounts. A CCP should regularly stress test its liquidity position.

Membership Access and Criteria

CCPs should enable fair and open access, based on objective, risk-based, and publicly disclosed membership requirements, allowing for tiered membership. A CCP must balance open access with ensuring its own safety and soundness. A CCP should monitor its clearing members and have the ability to impose enhanced risk controls on clearing members with a deteriorating credit profile. Clearing members should have the operational capacity, financial resources, and risk management expertise to meet obligations on a timely basis, as well as be able to monitor the risk exposures of the firms for which they act as agent (clients).

As not all firms will be able to pass CCP membership requirements, IOSCO considered alternative (non-direct) access points to CCPs to widen access:

» Tiered participation arrangements – When indirect clearing members (clients) access a CCP through a direct clearing member, the CCP has limited ability to influence client behavior. It should monitor this risk via clearing members.

» Links to other CCPs – A link between CCPs should have a legal basis in all jurisdictions (ring-fenced, unencumbered collateral). CCPs should manage potential spillover effects by ensuring coverage of daily exposures to the linked CCP and its own clearing members.

Regulation of CCPs

Relevant authorities should have the power and resources to regulate CCPs in their jurisdiction in adherence with the IOSCO principles. Regulators should apply the principles consistently, albeit local rules may exceed minimum requirements, and should cooperate with each other domestically and internationally. Since the disorderly failure of a CCP could lead to systemic disruptions for financial institutions and markets, IOSCO noted that recovery and resolution planning should be similar to the Financial Services Board (FSB) directives for financial institutions, with a focus on recovery.

Appendix 4: Joint Default Analysis (JDA) Framework

Our support estimates are determined by our JDA framework. JDA operates on the principle that the risk of default (and, therefore, loss) for certain obligations depends upon the performance of both the primary obligor and another entity (or entities) that may provide support to the primary obligor. The chief benefit offered by JDA is a consistent, transparent approach to the incorporation of (typically uncertain) non-contractual external support. That said, assigned ratings will continue to be determined through judgment, not through models.

The JDA framework for CCPs evaluates potential support in a "building block" approach. The intention of this approach is to replicate the likely sequence in which external support for a CCP would be forthcoming. Each support provider is assessed for its capacity and willingness to support the CCP. The first is based on the CCP's supporter's own standalone assessment, and the local-currency rating in the case of a public sector entity. The second is based on our opinion of the probability that support will be forthcoming when needed. The probability that two parties will jointly default depends on a) the probability that one of them defaults, and b) the probability that the second will default, given that the first has already defaulted. Expressed algebraically, one can write this for events A and B as:

$$P(A \text{ and } B) = P(A \mid B) \times P(B) \quad (1)$$

Or equivalently,

$$P(A \text{ and } B) = P(B \mid A) \times P(A) \quad (2)$$

We define A as the event "obligor A defaults on its obligations" and B as the event "obligor B defaults on its obligations." Likewise, "A and B" is the joint default event "obligors A and B both default on their obligations." The operator P(x) represents the probability that event "x" will occur and P(x | y) is defined as the conditional probability of event "x" occurring given that event "y" has occurred.

To estimate the conditional default probabilities P(A | B) and P(B | A), one must take into account the relationship between the drivers of default for both obligors. Each of these four probabilities – P(A), P(B), P(A | B) and P(B | A) – are intended to represent unsupported risk measures. That is, they represent the likelihood of an obligor default in the absence of any joint support or interference.

Although one can tackle this problem directly by estimating either one of the conditional default probabilities described in equations (1) and (2), it may be more intuitive to focus on the product of the conditional probability of default for the lower-rated, or supported, firm and the unconditional probability of default for the higher-rated, or supporting, firm. Using L to denote the event "lower-rated obligor L defaults on its obligations" and H to denote "higher-rated obligor H defaults on its obligations," we can rewrite equation (1) as:

$$P(L \text{ and } H) = P(L \mid H) \times P(H) \quad (3)$$

It is not difficult to imagine situations where the conditional probability P(L | H) might be at its theoretical maximum (i.e., 1) or at its minimum (i.e., P(L)). Let us consider these extreme outcomes in turn by way of example.

P(L | H) = 1. Suppose that the financial health of an issuer is crucially linked to the operations of another, higher-rated entity. For example, the default risk of a distributor in a competitive

distribution market dominated by a single supplier may be highly dependent on the financial health of that supplier. In other words, the conditional probability of the distributor's default given a default by the higher-rated supplier, P(L | H), is equal to one. Under such a scenario, the joint default probability P(L and H) in equation (3) above is simply P(H). That is, the rating applied to such jointly supported obligations would equal the supplier's rating, without any ratings lift, regardless of issuer L's standalone rating.

P(L | H) = P(L). Suppose a highly rated European bank provides a letter of credit to a lower-rated agribusiness in the US. While there may be circumstances in which the agribusiness might face financial difficulties on its own, its intrinsic operational health is generally unrelated to the circumstances that might lead the European bank to default on its obligations. Under this scenario, the conditional probability of a default by the agribusiness, given a default by the bank – i.e., P(L | H) – is simply the standalone default risk P(L) of the agribusiness. That is, events L and H are independent of one another and thus uncorrelated. In this case, their joint-default probability is the product of their standalone default probabilities, P(L)*P(H). The jointly supported obligation rating implied by such a relationship is generally higher than the rating of the supporting entity H. In practice, the conditional default risk of the lower-rated entity, given a default by the stronger entity, will vary somewhere between these two extremes, full dependence (i.e., where P(L | H) = 1) and independence, (i.e., where P(L | H) = P(L)).

Intermediate Level of Correlations

We propose here a simple tool for modeling intermediate cases of default risk linkage. Let us denote the variable W as a correlation weighting factor, where W = 1 corresponds to a maximum dependence of the default of the lower-rated entity on that of the higher-rated entity; and W = 0 corresponds to complete independence (i.e., zero correlation) between default events. Fractional values of W indicate intermediate levels of dependence between the two default events.

Using the correlation weighting concept, we can express the joint-default probability between obligors L and H as:

$$P(L \text{ and } H) = W^* P(L \text{ and } H \mid W=1) + (1-W)^* P(L \text{ and } H \mid W=0) \quad (4)$$

Or more compactly:

$$P(L \text{ and } H) = W^*P(H) + (1 - W)^*P(L)^* P(H) \quad (5)$$

In other words, once we have determined standalone ratings for the two obligors, the task of assigning a rating to a jointly supported obligation may be reduced to the assignment of a correlation weight.

Standard assumptions

We typically use the following assumptions in our JDA.

EXHIBIT 15

Support Probability Assumptions by Category

Support levels	Lower	Upper
Government- or Affiliate-backed	95%	100%
Very High	70%	94.9%
High	50%	69.9%
Moderate	30%	49.9%
Low	0%	29.9%

Source: Moody's Investors Service

EXHIBIT 16

Dependence Assumptions by Category

Dependence	
Very High	90%
High	70%
Moderate	50%

Source: Moody's Investors Service

Relative Risk and Ratings

We map ratings to risk measures. The multiple separating successive risk measures is approximately 0.62. For example, this means that – for the purposes of JDA – a one-notch uplift means that, on average, the risk is reduced by approximately 38%. This relationship holds across the rating scale, with the exception of Aaa/Aa1. As Aaa ratings are assigned only to obligations that we consider to be of the highest quality, subject to the lowest level of credit risk, the multiple of Aaa relative to Aa1 is 0.10. This means that to obtain a notch of uplift to Aaa from Aa1, we must consider that the risk is one-tenth of its previous level. This also means that the uplift from a Aaa support provider under JDA is proportionately stronger than that from an Aa1 rated support provider.

We then map a range of risk measures back to ratings, where the range is given by the geometric mean of risk values of a rating category and the category below it. For example, if we associate Baa2 with 0.62% and Baa3 with 1.00%, the geometric mean (the square root of their product) is 0.79%, meaning that if the joint default event P(L and H) has a risk measure less than 0.79% but greater than 0.49% (the geometric mean of Baa1 and Baa2), we would map it back to Baa2, but if it had a value greater than 0.79% but less than 1.27% (the geometric mean of Baa3 and Ba1), we would map it back to Baa3.

The risk values and thresholds for JDA uplift are reproduced in Exhibit 17 below.

EXHIBIT 17

Relative Risk		Reverse rating lookup	
Standalone assessment	Risk Measure (%) (Baa3 = 1)*1	Upper bound threshold (%)*2	Supported assessment
Aaa	0.00	0.01	Aaa
Aa1	0.02	0.03	Aa1
Aa2	0.03	0.04	Aa2
Aa3	0.06	0.07	Aa3
A1	0.09	0.11	A1
A2	0.15	0.19	A2
A3	0.24	0.30	A3
Baa1	0.38	0.49	Baa1
Baa2	0.62	0.79	Baa2
Baa3	1.00	1.27	Baa3
Ba1	1.62	2.06	Ba1
Ba2	2.62	3.33	Ba2
Ba3	4.24	5.39	Ba3
B1	6.85	8.72	B1
B2	11.09	14.11	B2
B3	17.94	22.83	B3
Caa1	29.03	36.93	Caa1
Caa2	46.98	59.76	Caa2
Caa3	76.01	96.69	Caa3
Ca	122.99	156.45	Ca
C	199.01		

*1 Rounded to two decimal places.

*2 The upper-bound threshold for a given rating level is derived by calculating the geometric mean of (i) the risk value associated with this rating level, and (ii) the risk value associated with the lower adjacent rating level. For the presentation of this table, the upper-bound threshold has been rounded to two decimal places.

Source: Moody's Investors Service

Appendix 5: Use of Joint Default Analysis in Assessing Affiliate and Government Support

Probability of Affiliate Support

We classify the probability of the affiliate's provision of support as ranging from "Affiliate-backed" to "Very High," "High," "Moderate," and "Low." Each of these categories corresponds to a range of support probabilities.

We reach this judgment by assessing the following considerations:

» Control: An entity that is 100% owned and controlled by a group is more likely to be supported.

» Brand: An entity carrying a group's name and logo is more likely to be supported due to the group's self interest in preserving its reputation.

» Regulation: An entity subject to the same regulator is more likely to be supported due to regulatory compulsion, provided there are no regulatory barriers to support.

» Geography: Conversely, a supporting entity may be constrained by home political or regulatory considerations in providing support to its foreign subsidiary.

» Documented support: Comfort letters, public or private "keep-well" agreements or capital maintenance agreements (CMAs) can evidence likelihood of support.

» Strategic fit: An entity that is important to the strategy of the group is less likely to be sold and, therefore, support is more likely to be durable. Larger subsidiaries are often - but not always - more strategically important than smaller ones.

» Financial links: We consider the impact of a potential sale of the rated entity on the group's financial statements and corporate strategy – the more adverse the impact, the less likely a detrimental sale to a potentially less creditworthy institution will occur. An entity where significant intra-group funding links exist may also be more likely to receive support.

» Parental policy: Our assumption is that groups are supportive of their affiliates by nature; however, this may not always be the case. Where groups have previously failed to support an entity, or disposed of an entity shortly prior to a default, then this may reduce our assessment of the likelihood of support.

Affiliate's Capacity to Provide Support

To establish the affiliate's capacity to support the entity, we generally use the affiliate's own standalone assessment. Since standalone assessments are generally based on consolidated financial statements – i.e., including subsidiaries – we may on occasion modify this standalone assessment to more closely reflect the affiliate's financial strength excluding the supported entity, and avoid incorporating the strengths or weaknesses of the entity itself into the affiliate's capacity to provide support.

Where we consider that support is derived from a group more generally, rather than a specific entity within the group, we may use a "notional" standalone assessment of that group. This is the standalone assessment that we would assign were the group to be a single legal entity, i.e., based on its consolidated financials. Again, on occasion we may modify this to exclude the supported entity.

This approach implies that potential government support that would apply to the affiliate or group may not be extended to the entity in question, and that resources marshaled to support the entity are limited to its standalone capacity. We generally take this approach because we consider government support separately (see below). However, we may on occasion employ supported ratings (typically, the senior unsecured debt rating) as our measure of support capacity where individual circumstances justify it – for example, if the supported entity is virtually inseparable from the supporting affiliate due to complex inter-linkages and government support would therefore almost certainly flow via the affiliate.

Where the affiliate is a non-bank entity, for example an insurance company or nonfinancial corporate, we may also use a probability of default rating where available.

Dependence between Support Provider and Support Recipient

Typically, we judge dependence to fall into one of three broad categories, "Very High," "High," and "Moderate," - although we may on occasion diverge from this to reflect a different view.

Our choice of dependence is based on the following principal factors:

» The degree of integration between the affiliates: The higher the reliance of an entity on intra-group funding, the more likely we are to consider dependence to be Very High rather than High.

» The respective operating environments: The closer the links between the markets in which the affiliates operate, the more likely we are to consider their dependence to be Very High rather than High. In this assessment, we consider business lines and product types, as well as the geographic location.

An example of the Affiliate Support Worksheet is shown in Exhibit 18. The JDA model provides an indicative range of notches of support from the unsupported creditworthiness of the CCP, and rating committees assign a specific level of support, which is typically within that range, but may be outside the range.

EXHIBIT 18

Example Affiliate Support Worksheet

Assumptions

Country of supporting affiliate	Country XYZ
Supporting affiliate	Parent Bank Inc
Reference creditworthiness	BCA
Creditworthiness of support provider	baa1
Dependence	Very High

Standalone Assessment	Level of support	Notching guidance (Min - Mid - Max)	Assigned notching	Standalone Assessment post Affiliate Support
Ba1	High	1 - 1 - 2	1	Baa3

Source: Moody's Investors Service

Probability of Government Support

Our approach to assessing government support is designed to be qualitative and flexible in nature, enabling us to incorporate the often subtle real-world shifts that define support for CCPs and other systemically important financial market infrastructure.

The extent of support incorporated into our ratings reflects the probability of a government committing public funds to support a CCP, and the capacity to provide that support. However, the probability of support is not static and can change rapidly.

We assess the probability of support from a public body (usually a government but sometimes a central bank or supranational institution) according to which of the following five categories best reflects the CCP's importance to the public: Government-backed; Very High; High; Moderate; and Low.

We incorporate our view of the public policy framework. Our overall assessment of the probability of government support is typically based on the overall attitude of the relevant public bodies and any constraints they could face, beyond their own creditworthiness, in providing support.

» Public policy. We consider the domestic and, on occasion, pan-national public policy framework to be important indicators of the likelihood of support. A framework that emphasizes recovery of the CCP rather than resolution will often indicate a probability of support of "Very High" to "High," although this can vary according to the importance and systemic nature of the financial instruments cleared by the CCP. Governments could also be subject to constraints on their ability to provide support, however willing they might be. We also take into account public and political opinion, which can be a leading indicator of the public policy framework, and the government's involvement in overseeing CCPs and other financial market infrastructure.

We also assess the following more CCP-specific considerations, adjusting for higher or lower probabilities of support.

» Market share. In general, the larger a CCP's market share of cleared products, the more important it is to the national economy and the functioning of the domestic financial system, and the more politicians will be inclined to provide support. Conversely, a government is more likely to allow a small CCP to default, provided such an event is less likely to impact the national economy and financial system. In some cases, we will take into account a dominant market share in markets and cleared products fundamental to the local economy.

» Market impact. For most CCPs, systemic importance is likely to be adequately captured by market share in clearing economically important financial instruments. A default could affect market confidence generally in a way that could undermine financial stability or be considered politically unacceptable. In some cases, public support would be necessary to prevent the potential disruption of financial markets critical to the functioning of the national economy. Such CCPs could be considered as having a High or even Very High probability of support in the absence of public policy constraints.

» Public involvement. Government ownership is likely to result in a greater likelihood of support. A CCP in which the public sector has chosen (for public policy reasons) to maintain 100% ownership (which it is unlikely to divest) will often be considered government-backed, implying greater public importance and, in the absence of constraints, a higher probability of support. The reason for this probability could be the importance of the policy role, or because, in allowing a publicly owned CCP to default, the state would risk harming market perceptions of its own creditworthiness. If public officials have executive or non-executive capacities at a CCP, the implicit shared responsibility for the CCP's actions could likewise suggest a higher probability of support.

Government's Capacity to Provide Support

In general, we consider that the capacity of the relevant public body (typically a sovereign or central bank) to provide support is best represented by its long-term local-currency rating. In some rare cases,

we might use a different rating, for example: (a) if we believe there are additional sources of support or constraints to support that are not reflected in the government's rating, or (b) in exceptional circumstances, a government entity might be able to extend support to a CCP beyond its capacity to repay its own debt, because of specific support from multi-national organizations. In these cases, we may consider that the support provider is an entity other than the sovereign/sub-sovereign, or we may use a support capacity superior to that of the government itself, to reflect the additional resources available to the CCP and payments system.

Dependence between Government and Support Recipient

We take into account dependence or correlation between the creditworthiness of the supported CCP and that of the relevant public entity. We generally assess dependence as falling into one of three broad categories: Very High; High; and Moderate. In most instances, we assume that the dependence for CCPs is Very High. This reflects our judgment that the creditworthiness of a government and its clearing houses is generally very closely related. One reason for this is that the circumstances that are likely to lead one or two of the CCP's largest counterparties to default are likely to often increase the risk that the government will default. Thus, the ability to support may be weaker just when it is most needed. For some CCPs, the connection with the financial health of the government could be looser, resulting in less of a dependence assumption.

The connections between the financial health of a government and the CCP are assessed by country, based on a range of considerations, including the following:

» The amount of the CCP's stressed risk exposures relative to the government's resources, an important indicator of the potential call on the government's resources in the event of a systemic crisis; and

» The level of stress in the CCP, local financial system and the economy, an indicator of the likelihood of a systemic crisis.

These considerations could lead us to assess that dependence is High, rather than Very High; for example, if a CCP is small compared to the domestic economy and government resources. As another, likely rarer example, if a CCP is very small compared to the government, and as a result the relationship between their respective creditworthiness is weak, we might assess the dependence to be Moderate. We may also conclude that the dependence between a government and a particular CCP – rather than the system as a whole – is Moderate or Low, if, for example, the CCP clears risks largely unrelated to the domestic financial system. In these circumstances, the probability of support is unlikely to be High or Very High because of the CCP's limited exposure to the domestic economy.

Applying Support

We apply affiliate support, as described above, then government support. The JDA model provides an indicative range of notches of support from the creditworthiness of the CCP before government support, and rating committees assign a specific level of support, which is typically within that range, but may be outside the range to reflect idiosyncratic situations.

Appendix 6: Relationship between Clearing Obligations and Debt Obligations of a CCP and Related Entities

The risks[45] that could result in a CCP's inability to meet its clearing obligations could be significantly different from the risks resulting from not honoring the debt obligations issued at either the operating clearing house or at any holding company that is above it in the corporate structure.

Lower Probability of Default for Clearing Obligations versus Debt Obligations

The probability of default for clearing obligations is likely to be lower than for corporate debt obligations that are outside of the clearing process, given the following:

» We expect that a CCP will be able to continue to operate in the event of a default by its holding company entity or on operating debt within the clearing entity itself, owing largely to the ring-fencing of the clearing service from the general business risks of the larger group entity;

» Because clearing obligations benefit from the structural support from the clearing members' waterfall resource contributions and commitments – a resource to which corporate debt obligations do not have recourse – they are relatively more insulated from default; and

» Systemic support, if provided, is more likely intended to support clearing activities than to meet corporate debt service.

Lower Loss-Given Default Expected for Clearing Obligations versus Debt Obligations

Additionally, the loss-given default for clearing obligations is likely to be significantly lower than for corporate debt obligations that are outside of the clearing process, given the following:

» The potential size of a loss on a clearing obligation is limited to the amount of a market movement in the positions cleared that is in excess of the margin that the CCP maintains, as well as its other waterfall resources. We expect that this will be very small relative to the total size of the members' outstanding exposures. This loss would typically be generated and realized as a result of the incremental collateral needed to transfer the clearing members' positions to a viable CCP.

» In the run-up to a broad corporate collapse affecting both clearing and debt obligations, we believe that holding company resources would be marshalled to help support the core clearing functions. This would heighten loss severity for holding company creditors for the benefit of clearing creditors.

[45] For example, risks outlined in our assessment of clearing member default management capabilities and corporate profile.

Moody's Related Publications

Credit ratings are primarily determined by sector credit rating methodologies. Certain broad methodological considerations (described in one or more cross-sector rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments. An index of sector and cross-sector credit rating methodologies can be found here.

For data summarizing the historical robustness and predictive power of credit ratings, please click here.

For further information, please refer to *Rating Symbols and Definitions*, which is available here.

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