

Moody's

INVESTORS SERVICE

RATING METHODOLOGY

Table of Contents:

INTRODUCTION	1
SCOPE OF THIS METHODOLOGY	2
OVERALL APPROACH TO RATING SECURITIES INDUSTRY MARKET MAKERS	3
DISCUSSION OF THE STANDALONE ASSESSMENT SCORECARD	6
STANDALONE ASSESSMENT SUB- COMPONENT: THE FINANCIAL PROFILE	6
STANDALONE ASSESSMENT SUB- COMPONENT: OPERATING ENVIRONMENT	19
STANDALONE ASSESSMENT SUB- COMPONENT: BUSINESS PROFILE AND FINANCIAL POLICY	23
OTHER RATING CONSIDERATIONS	26
ASSIGNING ISSUER-LEVEL AND INSTRUMENT-LEVEL RATINGS	28
ASSUMPTIONS	29
LIMITATIONS	30
APPENDICES	31
MOODY'S RELATED PUBLICATIONS	48

Analyst Contacts:

NEW YORK	+1.212.553.1653
Donald Robertson	+1.212.553.4762
Senior Vice President	
donald.robertson@moodyys.com	
Ana Arsov	+1.212.553.3763
Managing Director - Financial Institutions	
ana.arsov@moodyys.com	
Gregory Bauer	+1.212.553.1498
Managing Director - Global Banking	
gregory.bauer@moodyys.com	
LONDON	+44.20.7772.5454
Frederic Devon	+44.20.7772.5356
Managing Director - Global Banking	
frederic.devon@moodyys.com	
HONG KONG	+852.3758.1300
Stephen Long	+852.3758.1306
Managing Director - Financial Institutions	
stephen.long@moodyys.com	

Securities Industry Market Makers Methodology

This rating methodology replaces the *Securities Industry Market Makers* methodology published in June 2018. In this update, we have revised our Macro-level Indicator 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 securities industry market makers that are government-related issuers.

Introduction

In this rating methodology, we explain our general approach to assessing credit risk for securities industry market makers globally, including the qualitative and quantitative factors that are likely to affect rating outcomes.

We discuss the scorecard used for this sector. The scorecard¹ is a relatively simple reference tool that can be used, together with our joint default analysis (JDA) framework, 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 may be important for ratings but are not included in the scorecard, usually because they can be meaningful for differentiating credit profiles, but only in some cases. 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.

Our presentation of this rating methodology proceeds with (i) the scope of this methodology; (ii) our overall approach to rating securities industry market makers; (iii) a discussion of the standalone assessment scorecard; (iv) other rating considerations not reflected in the scorecard; (v) the assignment of instrument ratings; (vi) methodology assumptions; and (vii) limitations.

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.

In the appendices, we describe (i) how we use the scorecard to arrive at a scorecard-indicated standalone assessment; (ii) our Joint Default Analysis (JDA) framework; (iii) the use of JDA analysis in assessing affiliate and government support; (iv) securities and investments portfolio haircut rates; and (v) recognition rates for off-balance-sheet commitments and contingencies.

Scope of This Methodology

This methodology is applicable to securities industry market makers. Such firms act as market-makers for the broad securities industry, and are active in underwriting, securities sales and trading, lending, and/or principal investing. They commit their own capital to act as principals in dealings with other market participants, and/or tend to be balance sheet intensive and confidence sensitive. Their funding structure tends to include a significant amount of confidence-sensitive, short-term funding, such as securities sold under agreements to repurchase.

We have a separate rating methodology for securities industry service providers.³ Such firms interact with their customers primarily as agents, with limited, if any, principal risk that would be associated with traditional market-making activities. The securities industry service provider sector includes issuers involved in one or more diverse segments of the broad securities industry, from interdealer brokerage, mergers & acquisition advisory, exchanges and other market infrastructure entities to retail brokerage and financial advisory. Issuers in this sector share a characteristic of relying on recurring operating cash flow generation to service their borrowings. Securities industry service providers tend to have relatively simple funding structures with limited reliance on short-term funding, and they typically raise corporate debt for general purposes, including to fund expansions, acquisitions or recapitalizations.

We do not explicitly address the ratings of universal banks with large securities operations, as these universal banks are rated using our rating methodology for banks.⁴ However the broker dealer subsidiaries of these universal banks that engage in market making activities would be rated under the Securities Industry Market Makers methodology.

Some institutions are hybrids or financial conglomerates, combining banking, securities, clearing, asset management, private equity and insurance activities, among others. In such cases, the primary rating methodology used is the one corresponding to the institution's key credit risks and main franchise activities. We may then employ other methodologies to complement and inform our analytical assessment of the institution.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated credit rating action information and rating history.

In cases where a securities firm exhibits significant traits of both a market maker and a service provider, we generally rate it using the Securities Industry Market Makers rating methodology as the primary methodology, and will generally use the Securities Industry Service Providers rating methodology as a secondary input to inform our analytical assessment. Market makers tend to have more complex balance sheets and are often more confidence-sensitive compared with securities industry service providers, and accordingly it is important to ensure that for the firms that exhibit those characteristics, we utilize the Securities Industry Market Makers rating methodology in order to help fully assess credit risks.

³ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

⁴ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Overall Approach to Rating Securities Industry Market Makers

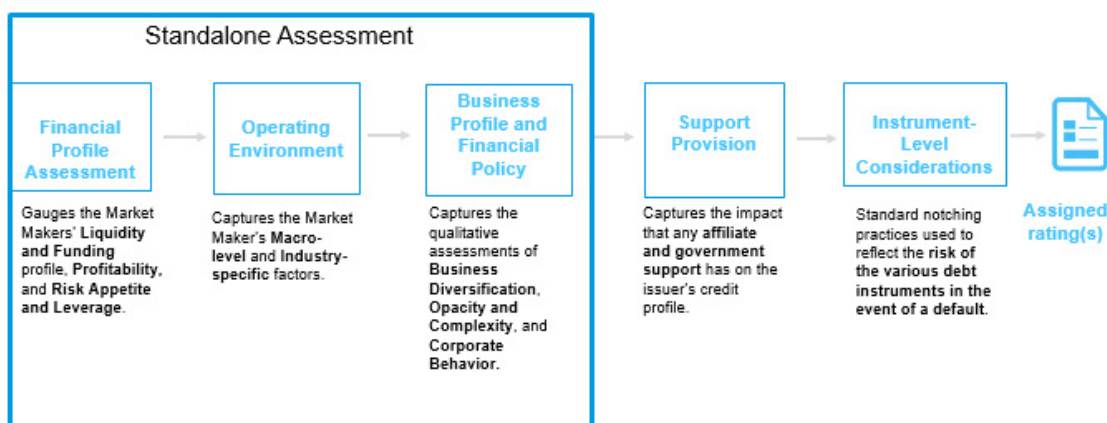
The securities industry market maker scorecard-indicated outcome is expressed as a three-notch range on our rating scale and is oriented to the firm's standalone assessment. The assigned standalone assessment is an alphanumeric score expressed on our 21-point rating scale, which is often but not always within the indicated three-notch range.

We incorporate our JDA framework to the standalone assessment to adjust for affiliate and government support to the extent it is considered likely and would reduce expected loss. We also use our cross-sector methodology for aligning corporate instrument ratings based on differences in security and priority of claim for assigning instrument-level ratings.

Our overall approach is illustrated in Exhibit 1.

EXHIBIT 1

Overall approach to rating securities industry market makers



Source: Moody's Investors Service

1. Scorecard Framework

The scorecard for the standalone assessment is composed of three sub-components, some of which have factors and sub-factors. An example securities industry market maker scorecard is provided below (Exhibit 2).

Please see Appendix 1 for general information relating to how we use the scorecard to arrive at a scorecard-indicated standalone assessment. The scorecard does not include every rating consideration.⁵

⁵ Please see the "Other Rating Considerations" and "Limitations" sections.

EXHIBIT 2

Scorecard Example*¹

Financial Profile						
Factor	Factor Weights	Historic Ratio	Initial Score	Assigned Score	Key driver #1	Key driver #2
Liquidity & Funding						
Liquidity (Liquidity Inflows/Outflows)	20%	106.0%	Ba1	Ba1		
Funding (Long-Term Capital/Uses of Long-Term Capital)	15%	100.0%	Baa3	Ba1	Pro-forma adjustments	
Profitability						
Return on Average Total Assets	10%	0.9%	Baa2	B1	Expected trend	
Pre-Tax Earnings Volatility (1)	15%	64.0%	Ba3	Ba3		
Risk Appetite & Leverage						
Risk Appetite ((Total Higher-Risk Assets + Off-Balance-Sheet Exposures) / Tangible Assets)	20%	27.0%	Baa3	Ba3	Operational risks	
Leverage ((Tangible Assets + Off-Balance-Sheet Exposures) / Tangible Common Equity) (2)	20%	12.6x	Baa3	Baa3		

Financial Profile Score	35%	Ba1	Ba2
--------------------------------	------------	------------	------------

Operating Environment			
Home Country	Factor Weights	Sub-factor Score	Score
Macro Level Indicator	0%		Baa3
Economic Strength	25%	baa2	
Institutions and Governance Strength	50%	baa3	
Susceptibility to Event Risk	25%	ba	
Maturity of Capital Markets	50%		B
Competitive Dynamics	50%		Ba
Home Country Operating Environment Score			B1
Operating Environment Score	65%		B1

ADJUSTED FINANCIAL PROFILE		Score
Adjusted Financial Profile Score		Ba3
Financial Profile Weight	35%	
Operating Environment Weight	65%	

Business Profile and Financial Policy	Adjustment	Comment
Business Diversification		
Opacity and Complexity		
Corporate Behavior	-1	Frequent changes in executive management
Total Business Profile and Financial Policy	-1	

Sovereign or parent constraint	Comments
Aaa	

Standalone Assessment Scorecard-indicated Range	Ba3 - B2	
Standalone Assessment Scorecard-indicated Midpoint	B1	
Assigned Standalone Assessment	B1	

Note: The "key drivers" columns summarize reasons for adjusting the initial score.

Source: Moody's Investors Service

Except where noted, historical financial ratios are calculated as follows:

- » Balance sheet ratios (i.e. liquidity, funding, risk appetite and leverage) in the scorecard are generally calculated based on the weaker of the most recent reported balance sheet and (2) the average from the last three year-end balance sheets.
- » The return on average assets in the scorecard is generally calculated using the most recent reported fiscal year
- » The historical financial ratio for pre-tax earnings volatility in the scorecard is generally calculated using the last eight semi-annual fiscal reported periods.
- » 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) vary from a securities industry market maker's historical results.

The securities industry market maker scorecard outcome is expressed as a three-notch range on our rating scale and is oriented to the firm's standalone assessment. The use of a range acknowledges that factor weights for a particular issuer may vary from fixed weights in the scorecard, due to its individual circumstances. The assigned standalone assessment is expressed as an alphanumeric on our rating scale, which may or may not be within the three-notch range, but is most often within it. Scorecards based on consolidated financial statements are oriented to the standalone assessment for the corporate family.

Where relevant, we apply our JDA framework to incorporate any affiliate support, and then any government support, as detailed in Appendix 2.⁶ Both affiliate support and government support consider the probability that support will be provided and the capacity of the supporter (based on the standalone assessment of the affiliate and/or the long-term local currency rating of the government). Affiliate support is applied to the market maker's standalone assessment and provides an indicated range of positive uplift,⁷ in notches. The assigned post-affiliate standalone assessment typically incorporates a level of upward notching within the affiliate support indicated range, but it may in some cases be outside that range. The application of government support JDA provides a range of suggested upward notching.⁸ The assigned senior debt and/or issuer rating typically incorporates a level of upward notching within the government support indicated range, but it may in some cases be outside that range, and in all cases, the assigned senior debt and/or issuer rating incorporates the local currency country ceiling.

In general, the scorecard outcome after application of JDA is oriented to the senior debt and/or issuer rating at the level of the entity which houses the majority of debt and similar obligations (such as repurchase agreements), which is typically the operating company.

2. Measurement or Estimation of Factors in the Scorecard

The information used in assessing the financial profile sub-factors is generally found in or calculated from information in the securities industry market maker's financial statements or regulatory filings, derived from other observations or estimated by Moody's analysts. We may also incorporate non-public information. All of the quantitative credit metrics incorporate Moody's standard adjustments to financial statements in the

⁶ Some securities industry market makers 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.

⁷ The suggested upward notching may be zero or more notches.

⁸ The suggested upward notching may be zero or more notches.

analysis of financial institutions as per our cross-sector methodology.⁹ We may also make other analytical adjustments that are specific to a particular securities industry market maker.

The initial score for each sub-factor is based on historical or projected financial data as outlined below in the factor discussions and is a useful starting point for our analysis of the sub-factor. The assigned score (the score after all adjustments) for each quantitative sub-factor incorporates our forward view and other pertinent considerations. The magnitude of any adjustment to the initial score is primarily based on our analytical interpretation of the extent to which the initial score is not an accurate reflection of future trends. In our forward-looking expectations, we may consider transactions or events (wide-ranging or issuer-specific) that may recently have occurred, or are likely to occur in the foreseeable future, that could significantly affect the market maker's future results and financial position. In addition, we may also perform revenue, expense and cash flow stress tests, and consider a securities industry market maker's resilience or susceptibility to a stress scenario in our assigned scores.

Some typical reasons why our assigned scores for each of the six financial sub-factors might be different from a score based on historical results are explained in further detail in the factor discussions.

Discussion of the Standalone Assessment Scorecard

The standalone assessment is one of the three main components of our typical overall approach to assessing credit risk for securities industry market makers. This component has three sub-components: the Financial Profile, the Operating Environment, and qualitative notching adjustments for Business Profile and Financial Policy.

In this section, we explain our general approach for scoring each scorecard sub-factor or factor, and we describe why they are meaningful as credit indicators.

Standalone Assessment Sub-component: The Financial Profile

In this sub-component, we assess standalone financial profile. This sub-component has three factors, which also have sub-factors.

1. Liquidity and Funding (35% of the Financial Profile Score)

Why It Matters

When a securities industry market maker fails, its demise tends to be very rapid, and is characterized by inadequate available resources to survive a stressful event (or series of such events), and a rapid loss of confidence in the market maker by its counterparties or customers. Because market makers are inherently confidence-sensitive, they must have adequate available resources to support their daily business activities and their longer-term plans, and to help them meet the challenges of stressful events, which can and have occurred in one form or another in the securities industry.

How We Assess It for the Scorecard

Liquidity: Liquidity Inflows/Outflows: The liquidity ratio measures a market maker's level of preparedness to withstand a liquidity shock.

⁹ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

- The ratio assesses liquidity in a scenario that all of the market maker's funding sources, except long-term debt and equity, become unavailable or are withdrawn, and that it becomes exposed to its off-balance-sheet commitments and contingencies.
 - We compare the magnitude of the firm's exposures with the sum of the reported value of the market maker's securities & investments portfolio, after the application of a set of standard haircuts to reflect loss of value in a stress scenario; and the amount of available funding from undrawn, committed facilities. Our scenario analysis also specifies expected behavior of what we term operating assets and liabilities (i.e. payables and receivables from customers, brokers, dealers and clearing organizations), by applying haircuts to these assets, described below.
 - The higher the liquidity ratio, the better the securities industry market maker is prepared to withstand a liquidity shock. Conversely, the lower the ratio, the more of a challenge the firm might face in surviving such a shock (absent extraordinary external support).
- » When calculating the ratio based on historical financials, we use the weaker ratio outcome from (1) the market maker's most recent reported balance sheet and (2) the market maker's average ratio outcome from its last three fiscal year-end balance sheets. If this period of operating history doesn't exist, the initial score assigned for this sub-factor will be no higher than "B1".
- » Liquidity inflows (the ratio numerator) is the sum of the following:
- Unrestricted cash
 - Amounts due from other financial institutions
 - Securities & investments portfolio balances, net of standard haircuts
 - o The percentage haircut rates we apply to each type of security & investment (including reverse repurchase agreements, securities borrowing assets, sovereign debt, semi-government and government agency debt, state and municipal government debt, other debt securities, equity securities, derivatives, loans and physical commodities) are detailed in Appendix 4, together with details of our utilization of the financial reporting fair value hierarchy disclosures in the calculations.
 - Cash inflows from operating assets
 - o 100% of segregated cash (we consider that this balance is normally offset by payables, for which we have a 100% outflow rate in the ratio denominator - see below)
 - o 50%¹⁰ of receivables from customers (including margin loans), brokers, dealers & clearing organizations.
 - Available funding from undrawn, committed funding facilities. We include the benefit of committed sources of funding such as revolvers and other liquidity facilities that would likely be available for the market maker to draw upon in a time of stress. Often these commitments are from a parent or affiliate, and we include them in the funding ratio (rather than extraordinary support that would otherwise be considered as a factor in our JDA framework - see Appendix 2) because we consider this funding support as an ordinary or contractual support. We don't include uncommitted funding because this may not be available in a time of stress. Similarly, we may not include committed funding if we believe that it will be likely unavailable in a time of stress, based

¹⁰ We limit this benefit to 50%, rather than up to 100%, because some of these receivables (e.g. deposits with clearing organizations and long-standing margin loans) would likely not be able to be liquidated without calling into question the market maker's ability to continue in business as a going concern. Further, in a stress situation, some of the market maker's counterparties would likely reduce the magnitude of their transactions with the market maker, demand increased collateral postings, and potentially slow down their remittances to the market maker. Such eventualities would be largely outside of the market maker's control, and would reduce the ongoing cash inflows from such sources.

upon our analysis of its draw history and terms and conditions (including the representations required to access the facility and covenants).

- » Liquidity outflows (the ratio denominator) is the sum of the following:
 - All short-term funding sources, including:
 - o Securities sold under agreements to repurchase
 - o Securities lending obligations
 - o Trading liabilities
 - o Short-term borrowings
 - o Other financial liabilities at fair value through profit and loss
 - o Other amounts due to other financial institutions
 - o Deposits
 - Cash outflows from operating liabilities
 - o 100% of payables to customers, brokers, dealers & clearing organizations (this treatment compares with the inclusion of 50% of related inflows from these organizations in the ratio numerator, as explained above)
 - Off-balance-sheet exposures
 - In our liquidity outflow scenario, we include off-balance-sheet commitments and contingencies (including rating triggers, maximum exposure to loss in off-balance-sheet structured vehicles, underwriting commitments, letters of credit, lending commitments, equity and lending commitments to related parties, and other commitments & guarantees, but excluding legal exposures), based on standard recognition rates which are detailed in Appendix 5.¹¹
- » Legal exposures (e.g. class-action lawsuits) are not included in the quantitative calculation of off-balance-sheet commitments and contingencies because of their highly specific nature. Instead, we may incorporate these in our Business Profile and Financial Policy assessment of corporate behavior (see below for further detail).

Exhibit 3 illustrates the liquidity ratio construct from a market maker's balance sheet and relevant off-balance-sheet commitments and contingencies.

¹¹ We have opted for standard ratios in order to make the liquidity scenario analysis more consistent across issuers.

EXHIBIT 3

Liquidity ratio construct

NUMERATOR					
DENOMINATOR					
Moody's Adjusted Assets and Liabilities Split Among Four Categories					
	SECURITIES & INVESTMENTS AND SHORT-TERM FUNDING	OPERATING	LONG-TERM	OTHER	
ASSETS	Unrestricted cash	Segregated cash	Goodwill & other intangible assets	Prepayments	
	Amounts due from other financial institutions	50% of Receivables from customers (including margin loans)	Fixed assets (PP&E)	Deferred tax assets	
	Reverse repurchase agreements [net of standard haircut]	50% of Receivables from brokers, dealers and clearing organizations	Investments in associates and other long-term assets	Other miscellaneous non-operating assets	
	Securities & investments [net of standard haircuts]				
LIABILITIES	Repurchase agreements	Customer payables	Long-term debt	Accruals	ISSUER'S UNDRAWN FUNDING SOURCE(S) Available funding from undrawn, committed facilities
	Trading liabilities	Payables to brokers, dealers and clearing organizations		Noncontrolling interest	
	Other short-term debt			Other miscellaneous non-operating liabilities	OFF-BALANCE SHEET RISK Standard recognition rates applied to commitments and contingencies, including (but not limited to) rating triggers, exposure to losses on structured vehicles and lending and underwriting commitments.
EQUITY	Shareholders' equity (excluding noncontrolling interest)				

Source: Moody's Investors Service

Funding: Long-Term Capital/Uses of Long-Term Capital: The funding ratio compares the market maker's long-term funding structure with its asset risk and other obligations.

- » The higher the funding ratio, the better the market maker's long-term funding structure relative to its asset risk and other obligations. Conversely, the lower the funding ratio, the worse is the market maker's long-term funding structure relative to its asset risk and other obligations.
- » When calculating this ratio based on historical financials, we use the weaker ratio outcome from (1) the market maker's most recent reported balance sheet and (2) the market maker's average ratio outcome from its last three fiscal year-end balance sheets. If this period of operating history doesn't exist, the initial score for this sub-factor will be no higher than "B1".
- » Long-Term Capital (the ratio numerator) is the sum of the following:
 - Total common and preferred shareholders' equity
 - Long-term debt (excluding current portion)
- » Uses of Long-Term Capital (the ratio denominator) is the sum of the following:

- The total of the standard haircuts applied to the securities & investments portfolio (see liquidity ratio above for further details)
- 50% of receivables from customers, brokers, dealers & clearing organizations (the remaining 50% is a liquidity ratio inflow - see above for further details)
- Long-term assets (including goodwill & other intangible assets, property, plant and equipment, investments in associates, and other long-term assets)
- Other Assets (including prepayments, deferred tax assets, and other miscellaneous non-operating assets)
- Off-balance-sheet exposures (see liquidity ratio above for further details)

Exhibit 4 illustrates the funding ratio construct from a market maker's balance sheet and relevant off-balance-sheet commitments and contingencies.

EXHIBIT 4

Funding ratio construct

	Moody's Adjusted Assets and Liabilities Split Among Four Categories				
	SECURITIES & INVESTMENTS AND SHORT-TERM FUNDING	OPERATING	LONG-TERM	OTHER	OFF-BALANCE SHEET
ASSETS	Unrestricted cash	Segregated cash	Goodwill & other intangible assets	Prepayments	
	Amounts due from other financial institutions	50% of Receivables from customers (including margin loans)	Fixed assets (PP&E)	Deferred tax assets	
	Standard haircuts applied to Reverse repurchase agreements	50% of Receivables from brokers, dealers and clearing organizations	Investments in associates and other long-term assets	Other miscellaneous non-operating assets	
	Standard haircuts applied to Securities & Investments				
LIABILITIES	Repurchase agreements	Customer payables	Long-term debt	Accruals	ISSUER'S UNDRAWN FUNDING SOURCE(S) Available funding from undrawn, committed facilities
	Trading liabilities	Payables to brokers, dealers and clearing organizations		Noncontrolling interest	OFF-BALANCE SHEET RISK Standard recognition rates applied to Commitments and contingencies, including (but not limited to) rating triggers, exposure to losses on structured vehicles and lending and underwriting commitments.
	Other short-term debt			Other miscellaneous non-operating liabilities	
EQUITY	Shareholders' equity (excluding noncontrolling interest)				

Source: Moody's Investors Service

Liquidity and Funding (35%)

Sub-Factor	Sub-factor Weight	Aaa	Aa	A	Baa	Ba	B	Caa	Ca
Liquidity	20%	≥ 200%	150%-200%	130%-150%	110%-130%	90%-110%	70%-90%	50%-70%	<50%
Funding	15%	≥ 180%	140%-180%	120%-140%	100%-120%	80%-100%	60%-80%	40%-60%	<40%

Source: Moody's Investors Service

Liquidity and funding regulatory ratios

Our liquidity and funding ratios are in some respects similar in construct to the Basel Committee on Banking Supervision's liquidity coverage ratio (LCR) and net stable funding ratio (NSFR), respectively. However, these regulatory ratios were developed for banking supervision and are not routinely calculated/reported by securities industry market makers. Since our ratios are calculated solely using financial reporting disclosures, they are necessarily less granular than the LCR and NSFR. We recognize the limitations of our liquidity and funding ratios compared with the LCR and NSFR, but nevertheless we consider them to be highly useful and relevant for our analytical purposes.

In developing the standard haircut rates we apply to a market maker's securities & investments portfolio, the standard rates we use to recognize its off-balance-sheet commitments and contingencies, and the treatment of operating assets and liabilities, we applied our own analytic judgment and reference the Basel Committee's LCR, NSFR and consultative document on haircut floors for non-centrally cleared securities financing transactions. However, in many cases our constructs are not directly comparable to those laid out in the Basel Committee's documents, primarily because of the limitations of public financial reporting. In our ratio constructs (in particular, the asset classes, haircut rates and use of the fair value hierarchy as detailed in Appendix 4, and off-balance-sheet commitments and contingencies recognition rates as detailed in Appendix 5), further granular distribution beyond the existing components is impractical due to financial reporting limitations. However, when more granular financial reporting disclosures and information is available for a particular firm (including non-public information that which is provided to us privately), we utilize the information to inform our analysis and make factor adjustments where appropriate. Similarly, we also consider Basel framework and other regulatory ratios and similar information when it is available for a particular firm, as well as its internal risk management framework and other pertinent matters.

Sub-factor adjustments

Please see the "Measurement or Estimation of Factors in the Scorecard" section above for a general description of how adjustments are employed in the scorecard. Typical considerations that may lead to adjustments for both the liquidity and funding sub-factor scores include:

- » **Heightened risk in securities & investments portfolio.** We may adjust downwards the initial liquidity and funding sub-factor scores if we consider that the market maker's securities & investments portfolio has heightened risk, often due to unusual concentrations. Indicators of heightened risk may include:
 - Significant holdings of developing country sovereign debt, corporate debt and equities, in order to reflect the higher price volatility risk in such securities that may not be fully reflected in our standard haircut rates
 - Concentration in highly volatile securities
 - Concentrated position in a single security or group of securities that represents a significant part of the total market for such security or group of securities

- Propensity for large concentrated positions (to provide liquidity, or on their own initiative, market-makers occasionally take-on large concentrated positions. These can range from a position equivalent to several days' trading volume in a stock, to a private equity investment, to a large loan underwriting to fund a merger)
 - Concentration in a single asset type or small group of asset types
 - Concentration of transactions with a single counterparty or small group of counterparties
 - Significant maturity mismatches or utilization of higher-risk securities in repurchase agreements and/or securities borrowing and lending arrangements
 - Excessive or unusual asset encumbrance
 - Reliance on concentrated non-central clearing (bilateral) short-term financing arrangements
 - Concentrated dependence on prime broker(s), with a consequent limited ability to ward off demands for significantly increased collateral postings that could adversely affect liquidity and funding profile
- » **Lower risk in securities & investments portfolio.** We may adjust upwards the initial liquidity and funding scores (and also the risk appetite sub-factor score – see later) if we consider that the market maker's securities & investments portfolio has lower risk. Indicators of lower risk may include holding a broad portfolio of high quality investment-grade debt securities.
- » **Lower risk in repurchase agreements and/or securities borrowing and lending arrangements.** We may adjust upwards the initial liquidity and funding ratio scores if a significant part of the market maker's balance sheet is comprised of longer-term repurchase agreements and/or securities borrowing and lending arrangements, for example those with matched long-term maturities.
- » **Concerns with validity of fair value hierarchy reporting.** We may adjust downwards the initial liquidity and funding ratio scores for market makers whose financial reporting is prepared using "local GAAP" (i.e. not IFRS or US GAAP, or if the local interpretation of IFRS or US GAAP may not be in compliance with international norms) in cases where we consider that the reported fair value hierarchy classification of securities & investments is not consistent with IFRS/US GAAP norms. In such cases, we reallocate the classification of each type of security & investment in the fair value hierarchy using our analytical judgment based on available information, and we update the ratio haircut calculations based on the adjusted classifications.
- » **Operating assets and liabilities.** On limited occasions, we may adjust upwards the initial liquidity and funding ratio scores to reflect different expectations of the behavior of payables and receivables from customers, brokers, dealers and clearing organizations than are factored into the two ratio definitions. For example, this could be the case if, based on a securities industry market maker's particular circumstances, we project that the inflow rate for receivables may be higher than 50% (for example, if it is abundantly clear from financial reporting disclosures that there is a clear matching between the receivables amounts and related payables, and most of the receivables balance are short-term transactional in nature and not subject to longer-term constraints).
- » **Pro-forma adjustments.** We may adjust upwards or downwards initial sub-factor scores calculated from historical financials due to the effects of pro-forma adjustments for recent or anticipated acquisitions and/or divestitures, and other market maker-specific or industry-related events that may influence the historic ratios.
- » **Financial assets and financial liabilities offsetting.** A market maker may report on a gross basis significant assets and liabilities with the same counterparty pertaining to repurchase and reverse repurchase agreements, and/or securities borrowing & lending agreements, which respective balances

may be subject to offset in a legally enforceable master netting agreement(s). We may adjust upwards the initial liquidity and funding sub-factor scores to recognize such netting. Separately, in cases where we know that derivative assets and liabilities are reported on a gross basis, but there is no disclosure of the potential for netting, we may adjust upwards the initial liquidity and funding sub-factor scores based on an estimate of the impact of netting using peer comparisons and analytical judgment.

- » **Payables to and receivables from related parties.** Market makers that are subsidiaries of or affiliated with a larger financial institution can often have significant amounts of payables to and receivables from related parties. These balances can arise from a range of different types of activities. In cases where the nature and purpose of these balances is not disclosed in the financial statements, in our initial liquidity ratio, we treat payables to related parties as short-term funding, and in our initial funding ratio, we treat receivables from related parties as a long-term asset. In such cases, we may adjust upwards the assigned liquidity and funding sub-factor scores where further relevant information provided by the market maker indicates that a portion or all of the payables to related parties is a long-term funding source, and/or that a portion or all of the receivables from related parties can be realized in the short-term.
- » **Sovereign rating cap.** We typically cap the assigned liquidity and funding sub-factor scores at the level of the market maker's sovereign long-term local currency rating for market makers that trade primarily local equity or debt securities, in order to reflect the general systemic risks of the securities that are traded in the country.

Typical considerations for the liquidity sub-factor score (only) include:

- » **Liquidity Inflows and Outflows Trend.** We may adjust the liquidity sub-factor score upwards or downwards to reflect important trends in this ratio that we believe are not fully captured in the initial score. We would typically consider the potential for the trend to accelerate, decelerate, or reverse.

Typical considerations for the funding sub-factor score (only) include:

- » **Funding benefit from undrawn, available committed facilities.** We may adjust upwards the initial funding ratio score to reflect the benefit to the ratio numerator of a long-term committed funding source that the market maker may draw upon. While the liquidity ratio numerator already includes this as a cash inflow benefit (based on the conditions outlined previously); we don't include this benefit in our funding ratio definition since some committed funding sources may be short-term or transaction-based. Accordingly, to the extent a material committed funding source that meets our criteria to be recognized in the liquidity ratio would be available to the market maker for long-term general corporate purposes, we typically adjust the funding sub-factor score.
- » **Long-term Capital Trend and Use (Outflows) of Long-term Capital Trends.** We may adjust the funding sub-factor score upwards or downwards to reflect important trends in this ratio that we believe are not fully captured in the initial score. We would typically consider the potential for the trend to accelerate, decelerate, or reverse.

2. Profitability (25% of the Financial Profile Score)

Why It Matters

The strength and stability of a market maker's earnings reflect its ability to generate capital to absorb losses and recover from shocks and thus its long-term viability.

The strength of earnings provides an indication of the level and sustainability of a market maker's competitive position, including its ability to sufficiently reinvest in human capital, technology and other important contributors to sustained success. In this respect, return on average total assets reflects its ability

to generate a return on its chosen asset base, and its franchise strength and competitive position within its line(s) of business. We consider return on assets a highly informative measure of earnings strength that, unlike a return on revenues ratio, takes into account the magnitude of the market maker's asset-base that is its core earnings-generator.

Earnings strength also reflects a market maker's ability to generate revenue and keep expenses in check, and thus generate capital. For most market makers, compensation tends to be the dominant expense category, as well as the one with the highest degree of variability. Achieving a close link between revenues and compensation expense is often not an easy task, and the quality of management's ongoing ability to manage and properly adjust for risk in the level of compensation expense, and at the same time avoid the exit of talented human capital, can be an important factor in a market maker's longer-term success. Market makers' non-compensation expenses tend to have a higher fixed component (such as technology, communications and real estate costs), although some expenses (such as brokerage clearing, exchange fees, and marketing expenses) do fluctuate, depending on the level of business activity. Just as with compensation-related expense, flexibility in managing variable non-compensation expenses is clearly important in maintaining critical earnings measures.

The stability of earnings provides an indication of the market maker's ability to adapt to changes in economic and business environments in the sector(s) in which it operates.

A market maker's ability to generate capital internally from earnings on a consistent basis, and successfully navigate the highs and lows of a business cycle is an important contributor to its relative credit strength. A market maker that generates excessively high earnings in good times, but excessively low earnings or losses in bad times, may be taking greater balance sheet risk and is generally less creditworthy than a market maker that generates more consistent and reasonable earnings throughout the cycle, since volatile earnings can adversely affect confidence sensitivity. A large, diversified earnings stream is a good indicator of future earnings stability, and can act as a shock absorber against risks that cannot be foreseen, but will inevitably occur.

How We Assess It for the Scorecard

Return on Average Total Assets:

- » The numerator of the ratio is the market maker's net income or loss (after tax). For ratios calculated on a historical basis, we typically use the latest reported fiscal year.
- » The denominator of the ratio is average total assets for each reporting period within the period utilized in the numerator. For ratios calculated on a historical fiscal year basis, we sum the total assets for each reporting period within the fiscal year (i.e. start of year, each interim period, and fiscal year-end), divided by the number of reporting periods.

Pre-Tax Earnings Volatility:

- » We use the market maker's pre-tax earnings coefficient of variation for the eight semi-annual fiscal reporting periods. For ratios calculated on a historical basis, we use the most recent trailing eight periods. The pre-tax earnings coefficient of variation is the standard deviation of the market maker's pre-tax earnings divided by the mean of its pre-tax earnings.
- » If the market maker's operating history is less than the four years needed to calculate the ratio, or the market maker reports only on an annual basis, the initial ratio score for this sub-factor will be assigned using the lowest score from all other quantitative ratios, but no higher than "B1".

Profitability (25%)

Sub-Factor	Sub-factor Weight	Aaa	Aa	A	Baa	Ba	B	Caa	Ca
Return on average total assets	10%	≥ 2.50%	1.50% - 2.50%	1.00% - 1.50%	0.75% - 1.00%	0.50% - 0.75%	0.25% - 0.50%	0.13% - 0.25%	<0.13%
Pre-tax earnings volatility ^{*1}	15%	< 10%	10%-20%	20%-30%	30%-50%	50%-70%	70%-100%	100%-130%	≥130%

^{*1} Negative Pre-tax Earnings Volatility ratios are scored "Ca"

Source: Moody's Investors Service

Sub-factor adjustments

Please see the "Measurement or Estimation of Factors in the Scorecard" section above for a general description of how adjustments are employed in the scorecard. Typical considerations that may lead to adjustments for both the return on average total assets and pre-tax earnings volatility sub-factor scores include:

- » **Pro-forma adjustments.** Our assigned scores for each of the two sub-factors might differ from sub-factor scores calculated from historical financials due to the effects of pro-forma adjustments for recent or anticipated acquisitions and/or divestitures, and other market maker-specific or industry-related events that may influence the historic ratios.
- » **Stress tests.** We may perform revenue, expense and cash flow stress tests, and consider the results of these in our assigned scores.
- » **Transactions with affiliates.** A market maker that is owned by or affiliated with a larger financial institution may have significant volumes of intercompany transactions with its affiliates. In some cases, the transfer pricing mechanisms in place for intercompany transactions could have the effect of increasing the market maker's reported revenues and/or decreasing its expenses, in comparison with similar transactions conducted on an arm's length basis. We may adjust downwards the initial profitability sub-factor scores in cases where the market maker's reported profit margins appear to be higher than peers' as a result of its intercompany transactions. (It is possible that such intercompany transactions could also artificially reduce a market maker's revenues and/or increase its expenses; however we would likely not adjust upwards the profitability sub-factor scores in such cases.)
- » **Expected Trend.** We may adjust the profitability sub-factor scores upward or downward to reflect important trends and trajectory in these ratios that we believe are not fully captured in the initial score. We would typically consider whether average returns on average total assets are improving or deteriorating for the issuer or for the sector, and whether the initial score represents an anomaly. For pre-tax earnings volatility, we would typically consider the potential for the trend to accelerate, decelerate, or reverse.

Typical considerations for the return on average total assets sub-factor score (only) include:

- » **Financial assets and financial liabilities offsetting.** A market maker may report on a gross basis significant assets and liabilities with the same counterparty pertaining to repurchase and reverse repurchase agreements, and/or securities borrowing & lending agreements, which respective balances may be subject to offset in a legally enforceable master netting agreement(s). We may adjust upwards the return on average total assets sub-factor score to recognize such netting. Separately, in cases where we know that derivative assets and liabilities are reported on a gross basis, but there is no disclosure of the potential for netting, we may adjust upwards the unadjusted sub-factor score based on an estimate of the impact of netting using peer comparisons and analytical judgment.

Typical considerations for the pre-tax earnings volatility sub-factor score (only) include:

- » **Group Reporting.** For market makers that provide only annual financial reporting, the initial score is the lowest score from all other quantitative ratios, but no higher than "B1" (as detailed above). However, we may make an upward adjustment to the initial pre-tax earnings volatility sub-factor score if the market maker is part of a larger group of companies that reports on a quarterly or semi-annual basis, and there is sufficient segment disclosure information in the group consolidated financial statements to indicate the market maker's earnings that we can use to calculate the ratio.

3. Risk Appetite and Leverage (40% of the Financial Profile Score)

Why It Matters

Understanding a market maker's risk appetite is fundamental to assessing its creditworthiness. Since market-making is inherently confidence sensitive and balance sheet intensive, a market maker with a heightened risk appetite, for example where demonstrated via holding less liquid, concentrated, outsized or stale positions, can result in financial stresses that can challenge its viability and result in direct risk to its creditors.

Managing risk is therefore a core attribute of any market maker, due to the inherent complexity of securities markets, where the activities and sentiments of a wide range of parties (governments, regulators, market makers, counterparties, and end customers) have a direct and often rapid influence on pricing, volumes and liquidity.

The first sub-factor, the ratio of a firm's higher-risk assets and its off-balance-sheet exposures relative to the size of its balance sheet, provides an important numerical gauge of a market maker's appetite for business risks that translate into an asset mix. The second sub-factor, an assessment of balance sheet leverage, provides an important gauge of the firm's exposure to reduced asset values that could make it insolvent or cause confidence-sensitive counterparties to be concerned about its solvency.

How We Assess It for the Scorecard

Risk Appetite: $(\text{Total Higher-Risk Assets} + \text{Off-balance-sheet Exposures}) / \text{Tangible Assets}$

- » The lower the ratio, the lower is the inherent risk in the firm's assets and exposures, relative to the size of its balance sheet.
- » The numerator is the sum of the reported value of the market maker's higher-risk securities & investments (consisting of some specified fair value hierarchy "level 2" securities & investments and all fair value hierarchy "level 3" securities & investments) and our measure of its exposure to off-balance-sheet commitments and contingencies.
 - Total higher-risk assets include the total of securities & investments reported as "level 2" in the fair value hierarchy, except those that we consider to have generally lower risk (including sovereign debt, semi-government and government agency debt, and state and municipal government debt), and all securities & investments reported as "level 3" in the fair value hierarchy. In some cases, a market maker may report what is typically a minority of its securities and investments measured on a basis other than at fair value. We include these in our calculations, by conservatively estimating their fair value hierarchy allocations (as outlined in Appendix 4).
 - Our measure of off-balance-sheet exposures is as defined earlier under the liquidity ratio.
- » The denominator is total Tangible Assets.
 - Tangible Assets is total assets less goodwill & other intangible assets.

- » For ratios calculated on a historical fiscal year basis, we use the weaker ratio outcome from (1) the market maker's most recent reported balance sheet and (2) the market maker's average ratio outcome from its last three fiscal year-end balance sheets. If this period of operating history doesn't exist, the initial score assigned for this sub-factor will be no higher than "B1".

Leverage: (Tangible Assets + Off-balance-sheet Exposures)/Tangible Common Equity

- » The higher the leverage ratio, the more the firm is leveraging its equity in pursuing its business activities.
- » The numerator is the sum of the market maker's tangible assets and our measure of its exposure to off-balance-sheet commitments and contingencies.
 - Tangible Assets is total assets less goodwill & other intangible assets.
 - Our measure of off-balance-sheet exposures is as defined earlier under the liquidity ratio.
- » The denominator is the firm's tangible common equity (TCE).
 - Tangible common equity (TCE) for securities industry market makers is total shareholders' equity (excluding positive non-controlling interests, and general reserves and fixed asset revaluation reserves reported as part of accumulated other comprehensive income), less goodwill & other intangible assets.
- » For ratios calculated on a historical fiscal year basis, we use the weaker ratio outcome from (1) the market maker's most recent reported balance sheet and (2) the market maker's average ratio outcome from its last three fiscal year-end balance sheets. If this period of operating history doesn't exist, the initial score assigned for this sub-factor will be no higher than "B1".

Risk Appetite and Leverage (40%)

Sub-Factor	Sub-factor Weight	Aaa	Aa	A	Baa	Ba	B	Caa	Ca
Risk appetite	20%	< 5%	5%-10%	10%-20%	20%-30%	30%-40%	40%-50%	50%-60%	≥60%
Leverage	20%	< 1.5x	1.5x-2.5x	2.5x-7.5x	7.5x-13x	13x-20x	20x-30x	30x-40x	≥40x

Negative leverage ratios are scored "Ca"

Source: Moody's Investors Service

Sub-factor adjustments

Please see the "Measurement or Estimation of Factors in the Scorecard" section above for a general description of how adjustments are employed in the scorecard. Typical considerations that may lead to adjustments for both the risk appetite and leverage sub-factor scores include:

- » **Excessive growth.** The rate of a market maker's growth (whether measured by revenues, earnings or assets) can be a leading indicator of increased risk appetite. Higher than industry-average growth rates are suggestive of a more aggressive strategy. We may adjust downwards the risk appetite sub-factor score when a market maker's growth rate is significantly higher than its operating regions' peers, and such adjustments are more likely when the market maker's growth rate is exceeding or is likely to exceed its growth in capital. In some cases, where the entire market in a particular country is growing rapidly, we may adjust downwards the risk appetite (and possibly leverage) sub-factor score(s) for all market makers in that country.
- » **Pro-forma adjustments.** Our assigned scores for each of the two sub-factors might differ from sub-factor scores calculated from historical financials due to the effects of pro-forma adjustments for

recent or anticipated acquisitions and/or divestitures, and other market maker-specific or industry-related events that may influence the historic ratios.

- » **Financial assets and financial liabilities offsetting.** A market maker may report on a gross basis significant assets and liabilities with the same counterparty pertaining to repurchase and reverse repurchase agreements, and/or securities borrowing & lending agreements, which respective balances may be subject to offset in a legally enforceable master netting agreement(s). We may adjust upwards the unadjusted risk appetite and leverage sub-factor scores to recognize such netting. Separately, in cases where we know that derivative assets and liabilities are reported on a gross basis, but there is no disclosure of the potential for netting, we may adjust upwards the unadjusted liquidity and funding sub-factor scores based on an estimate of the impact of netting using peer comparisons and analytical judgment.
- » **Expected Trend.** We may adjust the risk appetite and leverage sub-factor scores upward or downward to reflect important trends in these ratios that we believe are not fully captured in the initial score. We would typically consider the potential for the trend to accelerate, decelerate, or reverse.

Typical considerations for the risk appetite sub-factor score (only) include:

- » **Heightened risk in securities & investments portfolio.** We may adjust downwards the initial risk appetite sub-factor score if we consider that the market maker's securities & investments portfolio has heightened risk, often due to unusual concentrations. Indicators of heightened risk may include:
 - Significant holdings of developing country sovereign debt, corporate debt and/or equities, in order to reflect the higher price volatility risk in such securities that may not be fully reflected in our standard haircut rates
 - Concentration in highly volatile securities
 - Concentrated position in a single security or group of securities that represents a significant part of the total market for such security or group of securities
 - Propensity for large concentrated positions (to provide liquidity, or on their own initiative, market-makers occasionally take on large concentrated positions. These can range from a position equivalent to several days' trading volume in a stock, to a private equity investment, to a large loan underwriting to fund a merger)
 - Concentration in a single asset type or small group of asset types
 - Concentration of transactions with a single counterparty or small group of counterparties
 - Significant maturity mismatches or utilization of higher-risk securities in repurchase agreements and/or securities borrowing and lending arrangements
 - Excessive or unusual asset encumbrance
 - Reliance on concentrated non-central clearing (bilateral) short-term financing arrangements
 - Concentrated dependence on prime broker(s), with a consequent limited ability to ward off demands for significantly increased collateral postings that could adversely affect liquidity and funding profile
- » **Lower risk in securities & investments portfolio.** We may adjust upwards the initial risk appetite sub-factor score if we consider that the market maker's securities & investments portfolio has lower risk. Indicators of lower risk may include holding a broad portfolio of high quality investment-grade debt securities.

- » **Operational risks.** Market making carries significant operational risks (meaning the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events). It may be common for individuals to carry out transactions involving very large nominal amounts, which combined with significant speed and frequency of execution can result in unintended miscalculated exposures. As such, errors of an unintentional nature (exclusive of fraud) can have significant consequences. Also, history has shown that market makers have suffered losses due to insider/employee activities related to concealing of losses or generating artificial gains. However sophisticated a market maker's systems and controls, individuals intent on fraud will often find a way to circumvent them. Also, market making activities are typically conducted with sophisticated counterparties, making them more inclined to litigate when they suffer financial loss due to a firm's error or negligence (actual or alleged). Other activities are also subject to operational risk, such as high frequency trading. Where the combination of business activities and practices and the regulatory and legal environment give rise to an elevated level of operational risk, we may adjust downwards our risk appetite sub-factor score. A market maker with elevated operational risk is unlikely to be assigned a risk appetite score above the "Ba" category. We may assign lower scores to market makers with exposed operational risk fragilities, depending on the extent and nature of the issues.
- » **Market risk.** Market risk is an inherent financial risk for market makers. This includes trading risk (origination, market-making, proprietary trading and hedging activities can result in losses arising from changes in the market value of positions) and investment risk (long-term investments in other companies or assets, e.g., in private equity activities or real estate, where the investment value may fluctuate materially and/or may not realize its anticipated level). Market makers use a variety of different ways to assess and report these risks. Value at Risk (VaR) is a widely used public disclosure indicating a measure of trading risk, but almost by definition excludes important tail risks and is also subject to significant differences in modeling and valuation approaches, raising concerns about consistency. This partly reflects data limitations and differing assumptions about the liquidity of trading assets. Firms may also manage VaR to different confidence levels, and stress scenarios as part of the risk management process may vary from firm to firm. We may adjust downwards the risk appetite sub-factor score to reflect our overall assessment of the extent of market risk.
- » **Sovereign rating cap.** We typically cap the assigned risk appetite sub-factor score at the level of the market maker's sovereign long-term local currency rating, for market makers that trade primarily local equity or debt securities, in order to reflect the general systemic risks of the securities that are traded in the country.

Standalone Assessment Sub-component: Operating Environment

A key component of our analysis – particularly in developing markets – is the extent to which external conditions can have a meaningful influence on securities industry market makers' credit profiles.

Why It Matters

The Operating Environment serves to capture relevant economic, judicial/regulatory, institutional and general operating conditions that may impact securities industry market makers' creditworthiness. In some cases, these conditions can over time have as much, if not more, of a bearing on securities industry market makers' long-term viability as the intrinsic strength of their own operations.

Macro-level indicators are Economic Strength, Institutions and Governance Strength and Susceptibility to Event Risk.

- » **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 securities industry market makers 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 securities industry market makers.
- » **Susceptibility to Event Risk:** Susceptibility to sudden, extreme events that could severely impact a 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 securities industry market makers.

The maturity of capital markets is important because systemic risks can affect all market participants. Immature capital markets can trigger, amplify and prolong adverse economic events and trading losses, and can result in a broad and prolonged loss of confidence among market participants, thereby adversely affecting a market maker's credit profile. Some important attributes of maturity include:

- » The existence of a sound and well-established financial infrastructure (including exchanges, central clearing entities and securities depositories) that facilitate trading and the exchange of information, and that can help the market recover from stressful events.
- » A diverse and reasonably sophisticated group of market participants (such as numerous brokerage firms, banks and asset managers, of various sizes, that have weathered multiple credit cycles or stress events), which can contribute to the availability of liquidity and stability of capital markets.
- » A sound regulatory framework with clearly articulated supervisory and enforcement powers that have been demonstrated to be effective, which helps to promote healthy capital markets.
- » A sufficient recurring level of market liquidity, in terms of the size and magnitude of trading activities by a diverse number of market participants, which facilitates price discovery and stability.
- » Government participation or intervention in capital markets that seeks to manage pricing or volatility can be helpful to market makers in some cases; conversely, government intervention in less mature markets can sometimes prevent efficient price discovery and affect investor confidence in a manner that exacerbates market cycles.

A market makers' competitive environment can have a profound impact on its financial and operating strategy as well as on current and future profitability. Similarly, the fundamental characteristics of the sector (or sectors) in which a market maker operates, including the extent of barriers to entry, and the pervasiveness of secular change, can present significant risks and opportunities that are important considerations in assessing its credit profile.

Intense competition – for customers and talented employees – while generally beneficial to customers, usually puts pressure on market makers' margins, and requires constant nimbleness and innovation to stave off market share erosion and obsolescence.

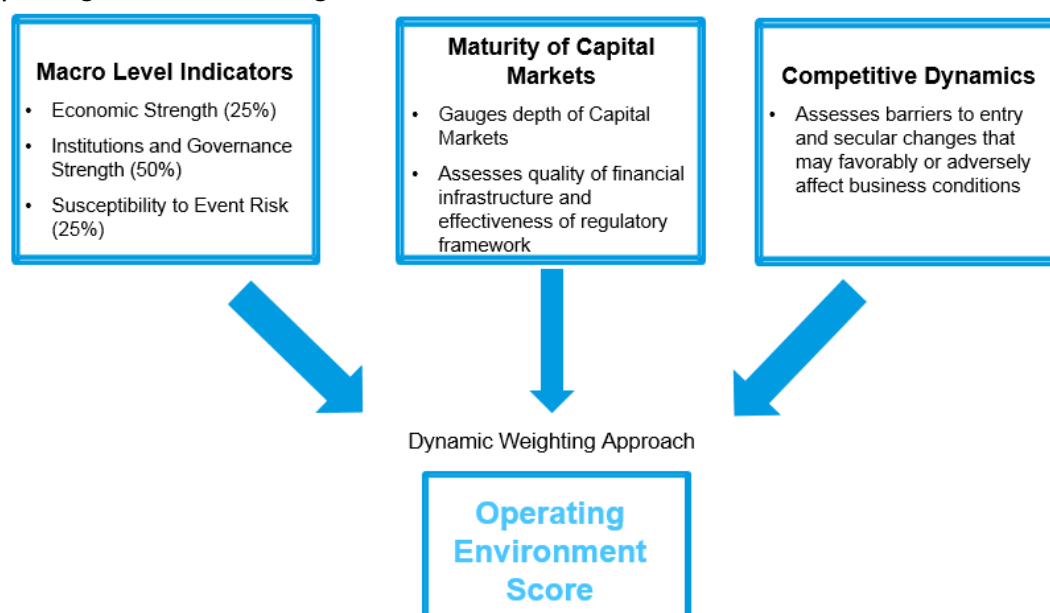
Market makers that have established significant barriers to entry typically face less competitive pressure and command greater long-term pricing power, although in practice such characteristics are extremely rare. Barriers to entry may include high customer switching costs, proprietary services or technologies that reduce the threat of new entrants, and extensive regulatory standards with rigorous supervision and enforcement mechanisms.

How We Assess It for the Scorecard

Exhibit 5 summarizes our process for assessing the Operating Environment score.

EXHIBIT 5

Operating Environment scoring construct



Source: Moody's Investors Service

The Operating Environment incorporates three sub-factors: Macro-Level Indicator, Maturity of Capital Markets and Competitive Dynamics.

Macro-Level Indicator

The Macro-Level Indicator sub-factor score is based on three factors from our sovereign rating methodology,¹² and is assigned based on the country/countries in which a securities industry market maker operates.

- » **Economic Strength:** Our published factor score for a sovereign's Economic Strength contributes 25% of the Macro-Level Indicator score.
- » **Institutions and Governance Strength:** Our published factor score for a sovereign's Institutions and Governance Strength contributes 50% of the Macro-Level Indicator score.
- » **Susceptibility to Event Risk:** Our published factor score for Susceptibility to Event Risk contributes 25% of the Macro-Level Indicator score.

¹² A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Maturity of Capital Markets

In evaluating the maturity of capital markets, we typically consider the depth and breadth of the capital market(s) in which the market maker operates, in terms of the magnitude and frequency of transactions, underlying liquidity, and the level of sophistication and diversification of market participants. We also typically assess the quality of the capital markets infrastructure that facilitates trading, the exchange of information, and the orderly functioning of the financial system, as well as the quality of instrument disclosures, safeguards against misuse of confidential information and the regulatory and supervisory framework compared with global best practices. For market makers operating in the same country, the same score is assigned to their market-making business in that country.

Our assessment of the maturity of capital markets is informed by relevant quantitative metrics and broad indicators. Examples may include:

- » The amount of outstanding debt and equity securities as a percentage of GDP to gauge market depth
- » Turnover of domestic shares traded to gauge market efficiency and liquidity
- » The level of institutional investor presence in a given market and market capitalization concentration by top listed entities to gauge market accessibility
- » The role and utilization of exchanges and clearing houses to facilitate the spectrum of products traded in the local market as a benchmark for the level of development of the market and its infrastructure, including from the perspective of attractiveness to institutional investors (more mature markets should have greater activity by sophisticated institutional investor, which contribute not only to greater liquidity, but also to improved corporate governance)
- » The penetration and availability of hedging products such as derivatives; more mature markets provide access to more complex products that afford a broad range of suitable hedging opportunities to meet investors' varying needs
- » The existence and implementation of global regulatory standards for securities firms, for which we would assess the implementation of IOSCO's¹³ principles for securities regulation as a starting point in our analysis

Aaa	Aa	A	Baa	Ba	B	Caa	Ca
Maturity of Capital Markets							
Extraordinarily sound market infrastructure supports an extremely broad range of diverse market participants. Extraordinary levels of market liquidity even in stressful conditions. Extraordinary regulatory involvement supports and enhances market functionality.	Exceptionally sound market infrastructure supports a broad range of diverse market participants. Exceptional levels of market liquidity even in stressful conditions. Exceptional regulatory involvement supports and enhances market functionality.	Excellent market infrastructure supports a reasonably broad range of diverse market participants. Excellent levels of market liquidity even in some of the most stressful conditions. Excellent regulatory involvement supports and enhances market functionality.	Favorable market infrastructure supports a reasonably broad range of diverse market participants. Favorable levels of market liquidity even in some stressful conditions. Favorable regulatory involvement generally supports and enhances market functionality.	Adequate market infrastructure supports a fairly diverse range of market participants. Generally adequate levels of market liquidity, although trading volumes and price discovery can weaken in some stressful conditions. Adequate regulatory involvement is generally supportive of market functionality, but regulatory or government intervention may impair market performance or increase uncertainty.	Somewhat adequate market infrastructure supports a limited range of market participants. Market liquidity can weaken even in less stressful scenarios. Somewhat adequate regulatory involvement, although regulatory roles and functions may not be clearly defined or well-established, with evidence that regulatory or government intervention has impaired market performance or	Inadequate market infrastructure, with a very limited range of market participants. Weak liquidity often results in volatility and problems with price discovery. Insufficient or inadequate regulatory involvement; regulatory roles and functions are not clearly defined or well-established, and intervention impairs market performance or increases uncertainty.	Wholly inadequate market infrastructure, with an extremely limited range of market participants. Extremely weak liquidity frequently results in volatility and problems with price discovery. Insufficient or inadequate regulatory involvement; regulatory roles and functions are not clearly defined or well-established, and intervention often impairs market

¹³ International Organization of Security Commissions: <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD154.pdf>

increased
uncertainty.

performance or
increases
uncertainty.

Source: Moody's Investors Service

Competitive Dynamics

Scoring relates to the issuer's core market-making business. In assessing competitive dynamics, we generally consider the issuer's competitive landscape and barriers to entry. For market makers operating in the same country, the same score is assigned to their market-making business in that country.

Our assessment of competitive dynamics is informed by metrics and qualitative indicators that may include the extent of revenue concentration in the securities industry, the level of participation by security firms versus other market participants in generating capital markets revenues, as well as analysing secular, cyclical and regulatory trends that may influence the level of the "industry wallet" and its distribution among the various market participants.

Aaa	Aa	A	Baa	Ba	B	Caa	Ca
Competitive Dynamics							
Multiple strong barriers to entry eliminate possibility of new competitors. Secular changes in progress are having an extremely positive influence on business conditions.	New entrants are rare due to strong barriers to entry. Oligopolistic industry profile. Secular changes in progress are having a positive influence on business conditions.	Barriers to entry provide sustainable protection of market share. Potential for secular changes to have a positive influence on business conditions.	Barriers to entry or high switching costs limit new entrants. Low risk of adverse secular changes having a detrimental effect on business activities.	Limited barriers to entry or low switching costs encourage new entrants. Moderate risk of adverse secular changes having a detrimental effect on business activities.	Ineffective barriers to entry or absence of switching costs permit large number of new entrants. Heightened risk of adverse secular changes having a detrimental effect on business activities.	No barriers to entry, and/or poor regulatory standards. Adverse secular changes are having a detrimental effect on business activities.	No barriers to entry and poor or non-existent regulatory standards. Adverse secular changes are having an extremely detrimental effect on business activities.

Source: Moody's Investors Service

Material Operations in More Than One Country

In cases where a securities industry market maker has material operations in more than one country, we assign a score that is representative of the composite operating environment for that issuer. Further details are provided in Appendix 1.

Standalone Assessment Sub-component: Business Profile and Financial Policy

In this sub-component, we consider how a particular securities industry market maker's business profile and financial policy affect its credit profile. We have identified three qualitative factors that supplement those considered in the Financial Profile and Operating Environment sub-components and that are important contributors to the creditworthiness of a securities industry market maker.

The three factors are:

- » **Business diversification:** the breadth of a market maker's business activities, whether it is dependent on a single business, or spread across multiple activities or geographies, exposing it or protecting it from problems in a single activity or geography.

- » **Opacity and complexity:** the extent to which a market maker's inherent complexity may heighten management challenges and the risk of strategic errors, and the degree to which financial statements are a reliable guide to its fundamentals.
- » **Corporate behavior:** the extent to which a market maker's strategy, management and its corporate policies may reduce or increase its overall risk profile.

We incorporate these factors in the Scorecard as one or more direct notching adjustments to the Adjusted Financial Profile. For clarity, these adjustments are credit considerations that have not been attributed to any of the Financial Profile sub-factor scores, or whose effects are not fully-reflected in the Financial Profile sub-factor scores (i.e. they are not double-counted). Notching adjustments in respect of business diversification and corporate behavior may be upwards or downwards; whereas those in respect of opacity and complexity are downward only. The Business Profile and Financial Policy adjustments and the related notching process are detailed below.

Business diversification

Business diversification matters because it gauges a market maker's sensitivity to stress in a single business line, asset class, or a narrow customer base. It is related to earnings stability in the sense that earnings diversification across different lines of business or geographies without strong correlation increases the reliability of a market maker's earnings streams and, thus, its potential to absorb unexpected shocks. However, it is important to consider business diversification separately from earnings stability because some "monoline" business models may demonstrate high stability over a number of years, but are clearly vulnerable to an eventual problem in the market maker's chosen field of business, since it has no other income streams to fall back upon. Hence, we consider a market maker with monoline activities to be weaker than one with diverse businesses, even where both have similar observed pre-tax earnings volatility.

We may, therefore, make a Business Diversification notching adjustment to reflect this assessment. In general, we would consider a market maker that typically derives more than three-quarters of its revenues or earnings from a single activity or asset class to be relatively undiversified, and would consider a downward notching adjustment in such cases (typically by one notch, but potentially more in some cases). Similarly, we may notch down a market maker with operations in a distinct and limited geographical area, or with an oversized dependence on a small group of customers (typically by one notch, or potentially more in some cases).

On the other hand, we may notch upwards (typically by one notch, or potentially more in some cases) a market maker with an exceptional spread of businesses to recognize the benefit to creditors from a high degree of diversity that results in an overall more reliable earnings stream and, hence, greater certainty of strong, recurring cash generation.

Opacity and complexity

A market maker's riskiness increases with its opacity and complexity, other things being equal. This is because opacity and complexity increases management challenges, heightens the risk of strategic and business errors, and heightens operational risk. In addition, complex organisations tend to be more opaque because public disclosures necessarily provide a simplified view of their operations. By contrast, a relatively simple market maker can achieve more transparency with less disclosure.

We consider that market makers with higher-than-average opacity and/or complexity may exhibit the following characteristics:

- » **Numerous business lines across many geographies and legal entities.** This brings diversification benefits discussed above, but also organizational complexity.

- » **Complex legal structure.** A market maker may have a complex legal or ownership structure (for example, multiple minority ownership interests, offshore holding companies or pyramid structures).
- » **Unreliable accounting and controls.** Some accounting standards offer greater confidence than others. Generally, we believe that US GAAP and IFRS offer high standards. However, some "local GAAP" accounting standards are less demanding and, therefore, raise questions about the completeness and accuracy of financial statements and related disclosures. Beyond the accounting standards themselves, the maturity of auditing standards and practices, and idiosyncratic questions about the quality of a market maker's financial reporting and internal controls, can also raise concerns.

We may make a downward Opacity and Complexity notching adjustment of a securities industry market maker displaying any of these characteristics, typically by one notch but occasionally by more in extreme cases.

Corporate Behavior

A market maker's creditworthiness can be influenced by what we term its "corporate behavior," which can also signal other concerns. We consider a number of factors as follows:

- » **Strategy and management.** A radical departure in strategy, a shake-up in management, or an untested team can each herald sudden change that increases the uncertainty about a market maker's risk profile. An aggressive growth plan can also signal an elevated risk appetite, while clear weaknesses in risk management can increase a market maker's exposure to adverse developments. Any concerns regarding the rigor of Board or management oversight and governance may also be considered here. Litigation, regulatory and reputation risks are inherent to market makers. These risks are often open-ended in nature, and the potential losses may not be easily quantified. Market makers that have been subject to either sizable or frequent regulatory and legal penalties also raise concerns that may be reflected in downward notching.
- » **Key person risk.** A market maker's high dependence on a single owner, executive or group of executives can pose increased risks, because the loss of a single person could adversely affect its future fundamentals. For example, a market maker whose customers closely associate the owner or chief executive with the institution itself could suffer loss of business, earnings and ultimately reduced debt service capacity if the owner or chief executive were to leave or become unavailable, absent adequate succession planning. Ownership by or reliance on any single individual or group of individuals can also create conflicts of interest and lead to reputational damage by association with such persons, should they become embroiled in adverse publicity from other unrelated activities.
- » **Financial policies.** An aggressive dividend policy may imply reduced financial flexibility. Management teams are often slow to reduce established dividend levels out of concern over negative signalling and adverse share price impact. Similarly, debt-funded acquisitions, and borrowing to fund share repurchases, are also signals of aggressive financial policies. On the other hand, we may recognize a strong and consistent record of creditor-friendly financial policies (evidenced via a successful focus on organic growth and capital accumulation and retention) by an upward notching adjustment.
- » **Compensation policy.** Similarly, an aggressive compensation policy, for example, widespread use of high bonus payments relative to salaries, and skewed towards cash, may encourage short-term risk-taking behavior, to the detriment of creditors.
- » **Accounting policies.** Some market makers, although subject to more demanding accounting standards (e.g., US GAAP or IFRS) may choose to adopt aggressive accounting policies. This can sometimes be a strong indication of more widespread issues with corporate culture and compliance that could be detrimental to creditors' interests.

- » **Demonstrated weak or strong risk management capabilities and responsiveness under stress.** We may apply a downward adjustment if a market maker has demonstrated inadequate risk management capabilities and is not adept at anticipating and managing through a stressful environment. On the other hand, we may apply an upward adjustment if a market maker has strongly demonstrated exemplary risk management capabilities in anticipating and managing through a stress environment.
- » **Legal exposures.** Significant exposure to ongoing, pending or threatened litigation, and/or known unasserted claims raise concerns that may be reflected in downward notching.

We may make an upward or downward notching adjustment to reflect our view of the impact of corporate behavior, if we judge that any of these factors has a material bearing on a securities industry market maker's overall risk profile. Typically, downward notching would be one notch, but could be more if we perceive multiple and/or more deep-seated and serious issues. Upward notching would generally be limited to one notch. For example, we may notch downwards if we see an aggressive dividend policy combined with rapid growth in a new business line; and we may notch upwards where we perceive sustained exemplary stewardship over time, and where there is a tangible impact on the securities industry market maker's risk profile.

The Impact of the Sovereign or Other Supporting Government's Rating

We seldom assign a standalone assessment higher than the sovereign long-term local-currency rating of the country within which it is based. Sovereign-related risks are generally captured through, in the first instance, our operating environment assessment, and, secondly, through the cap assigned to our liquidity and risk appetite factors.

However, a standalone assessment may in some limited cases exceed the sovereign long-term local currency ratings of the market maker's home country. This would typically not be by more than one notch. For more details, please see our cross sector methodology that discusses how sovereign credit quality can affect other issuers.¹⁴

Highly Integrated and Harmonized Entities (HIH)

In certain regions, sometimes due to regulatory requirements/restrictions, an entity whose operations are market making in nature is legally required to be separated from its parent. In some of these cases though, the entity may be so highly integrated into its parent's operations that separate standalone analysis of the market maker will not produce a meaningful result. These market makers generally have no franchise of their own and are heavily or entirely dependent on services provided by other group affiliates. The market maker may simply be a virtual booking entity for conducting a group's business in a given location. In these cases, standalone financial ratios are largely irrelevant or without meaning, and the operations of the market maker is generally incorporated into the parent's ratings. As such, we may instead choose to focus entirely on the affiliate support mechanisms, both explicit and implicit, in order to assign ratings to the market maker.

Other Rating Considerations

Ratings may include additional factors that are not in the scorecard, usually because they may have a meaningful effect in differentiating credit quality, but only in some cases. Such factors include environmental and social considerations, and limited financial history. Regulatory, litigation, liquidity,

¹⁴ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

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 an issuer'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

Many rated securities industry market makers have many years of financial history and lengthy operating track records that generally act as the basis for our forward-looking credit analysis. Securities industry market makers with limited financial history may undergo rapid evolution initially, before developing readily distinguishable and stable operating characteristics. Securities industry market makers 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 securities industry market makers 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 record of resilience through a full credit cycle. Their systems, policies and procedures tend to be less robust than those of established securities industry market makers.

For start-ups that lack a financial history of at least several years and in cases of a material transformation in a securities industry market maker's business, such that its financial history does not provide a good indication of future results (collectively, securities industry market makers with limited financial history), existing financial history provides less insight into the 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 several factors in our scorecard in order to reflect the considerable uncertainty around our baseline expectations of 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 standalone assessment that is lower than the scorecard-indicated outcome.

Securities industry market makers with limited financial history may benefit from external support. When material, we incorporate that support into our ratings. In assessing the level of expected support, we generally consider whether the securities industry market maker's status as a start-up could affect the willingness of the support provider to 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 long track records 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. Exceptions could include government-owned start-ups and start-up securities industry market makers of long-term strategic importance to government policy initiatives.

Environmental Considerations

Environmental issues could affect the reputation of a securities firm.

Social Issues

For issuers in this sector, 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

In general, the scorecard-indicated outcome after application of JDA is oriented to the senior debt and/or issuer rating at the level of the entity which houses the majority of debt and similar obligations (such as repurchase agreements), which is typically the operating company. For government-related issuers, we may assign a Baseline Credit Assessment.¹⁵

For holding companies, ratings also typically incorporate structural subordination considerations. Structural subordination is typically insignificant when liquidity and capital are freely fungible within the group and the amount of debt and similar obligations (such as repurchase agreements) at the holding company's subsidiaries is small relative to the total. When the movement of liquidity or capital is constrained or potentially constrained,¹⁶ structural subordination considerations typically include the amount and relative levels of debt, assets and cash flows at each operating company and at the parent. In some circumstances, the diversity of cash flows available to the parent is a mitigating factor to structural subordination. The laws and legal practices in the legal jurisdiction(s) in which the market maker operates are considered when evaluating structural subordination; debt and similar obligations at the holding company's subsidiaries that could or would receive preferential treatment in the event of failure would normally be considered structurally superior. To the extent that a holding company's subsidiaries have meaningful debt or debt-like obligations (creating structural subordination), or that there are limitations on the movement of liquidity or capital within the group, the holding company's issuer and/or instrument rating may be lower than the scorecard-indicated outcome for the corporate family.

We generally assign instrument ratings based on seniority and collateral in accordance with our cross-sector methodology that discusses notching for bonds, preferred stocks and hybrid equity securities of corporate issuers, and we employ the additional notching considerations described in the following paragraphs.

Typically, issuer ratings and senior unsecured debt ratings are at parity, senior subordinated debt is rated one notch below the senior unsecured debt, and preferred stock is rated two notches below the senior unsecured debt. Please see also our cross-sector methodology on hybrid equity credit. Generally, the higher the level of equity credit in a security, the greater the degree of downward notching from the senior unsecured rating. In very rare cases, assigned instrument ratings may fall outside the typical notching guidelines, when the specific situation of the market maker or its debt terms (including collateral) cause our assessment of the relative expected loss of the security classes to be at variance with these guidelines, for instance where the proportion of each class of instrument falls markedly outside industry norms.

For securities firms that are subsidiaries or affiliates of banks rated under our methodology for banks, and that we believe are likely to be included within an operational bank resolution regime (typically those with large capital markets operations), we may include an uplift in their instrument-level or issuer ratings due to lower loss-given-default assumptions. Similarly, for CR Assessments there may be uplift due to an

¹⁵ For an explanation of the Baseline Credit Assessment, please refer to Rating Symbols and Definitions and our methodology that discusses 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.

¹⁶ Examples of constraints include regulatory capital requirements, specific features of the corporate and funding structure (e.g. covenants that restrict distributions from an operating company), or an operating company's requirements to make dividends outside the corporate family.

expectation that these obligations are less likely to default than senior unsecured debt. This rating uplift would be driven by the application of our loss-given-failure analysis in our banking methodology. The level of uplift would generally depend upon the availability of bail-in resources in the form of subordinated or holding company debt which we believe during resolution would be available to absorb losses at the securities industry market maker and support the securities industry market maker's obligations in order to avoid systemic contagion and value destruction.

We may also assign a Counterparty Risk Rating (CRR) to a securities industry market maker.^{17, 18} CRRs may be assigned at the operating company level or at the holding company level. For securities industry market makers that we expect would be subject to a standard corporate insolvency or bankruptcy process, the CRR would typically be assigned at the same level as the entity's issuer rating or senior unsecured debt rating, and any positive differential between the CRR and the issuer rating or senior unsecured debt rating would depend on our view of the likelihood that CRR liabilities would receive preferential treatment relative to other senior unsecured debt and debt-like obligations. For securities industry market makers affiliated with banks whose CRR liabilities we believe would be included by the relevant authorities in a bank resolution regime, CRRs would typically be assigned in accordance with the approach in our methodology for banks.¹⁹

CRR liabilities typically reside at an operating company but may in some circumstances also reside at the securities industry market maker's holding company. CRRs assigned to a holding company would reflect the extent to which the holding company has CRR liabilities, and any positive differential between the CRR and the holding company's issuer rating or senior unsecured debt rating would depend on our view of the likelihood that CRR liabilities would receive preferential treatment relative to the holding company's senior unsecured debt.

An example of how instrument ratings could be assigned is provided below (Exhibit 6).

EXHIBIT 6

Instrument ratings, an example

Instrument class	Assigned Standalone Assessment	Affiliate Support Notching	Government Support Notching	Individual debt class notching	Assigned rating
Senior Unsecured (Operating Company)	Ba3	1	0	0	Ba2
Senior Unsecured (Holding Company)	Ba3	1	0	-1	Ba3

Source: Moody's Investors Service

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

¹⁷ Please see *Rating Symbols and Definitions* for a description of CRRs and CRR liabilities (for a link, please see the "Moody's Related Publications" section below).

¹⁸ Securities industry market makers that are affiliated with banks may have a Counterparty Risk Assessment (CR Assessment), which is assigned in accordance with our methodology for banks. For a link to our sector and cross-sector methodologies, please see the "Moody's Related Publications" section.

¹⁹ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

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 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.²⁰ 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.

²⁰ 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 Standalone Assessment

1. Assigning the Financial Profile Scores and Mapping to a Financial Profile Numerical Score

Except where noted, historical financial ratios are calculated as follows:

- » Balance sheet ratios (i.e. liquidity, funding, risk appetite and leverage) in the scorecard are generally calculated based on the weaker of the most recent reported balance sheet and (2) the average from the last three year-end balance sheets.
- » The return on average assets in the scorecard is generally calculated using the most recent reported fiscal year
- » The historical financial ratio for pre-tax earnings volatility in the scorecard is generally calculated using the last eight semi-annual fiscal reported periods.

Quantitative metrics are scored on an alphanumeric scale. For each metric, the scoring grid shows the range by alpha category. To arrive at an unadjusted sub-factor score, the alpha range is divided into three equal alphanumeric ranges, to which the metric is mapped. For example, if the scoring grid indicates that a Ba range for a particular metric is 3 to 4.5x (with 4.5x being strongest), the alpha range is divided into a range of 3 to 3.5x corresponding to a score of Ba3, a range of 3.5 to 4x corresponding to a score of Ba2, and a range of 4 to 4.5x corresponding to a score of Ba1. The scorecard shows the corresponding unadjusted alphanumeric score for the sub-factor. The sub-factor score may be adjusted as described in the "Measurement or Estimation of Factors in the Scorecard" section and in the factor discussion. Each sub-factor thus has an unadjusted score (or "initial" score) and an assigned score.

Unadjusted and assigned sub-factor scores are then converted to numerical values of 1 to 20, based on the table below (Exhibit 7).

EXHIBIT 7

Rating Scale Numeric Equivalents

Alphanumeric	Broad Alpha	Numeric Equivalent
Aaa	Aaa	1
Aa1		2
Aa2	Aa	3
Aa3		4
A1		5
A2	A	6
A3		7
Baa1		8
Baa2	Baa	9
Baa3		10
Ba1		11
Ba2	Ba	12
Ba3		13
B1		14
B2	B	15
B3		16
Caa1		17
Caa2	Caa	18
Caa3		19
Ca	Ca	20

Source: Moody's Investors Service

The numeric score for each sub-factor assigned score is multiplied by the weight for that sub-factor, with the results then summed to produce an aggregate weighted factor score. The aggregate weighted factor score is then rounded to the nearest integer, and mapped back to an alphanumeric equivalent based on the table above (Exhibit 7) to arrive at a Financial Profile alphanumeric score.

For example, a securities industry market maker with an aggregate weighted factor score of 11.7 would have a Ba2 Financial Profile score.

Special calculation considerations:

- » When calculating the liquidity, funding, risk appetite and leverage sub-factor scores based on historical financials, we use the weaker ratio outcome from (1) the market maker's most recent reported balance sheet and (2) the market maker's average ratio outcome from its last three fiscal year-end balance sheets. If this period of operating history doesn't exist, the initial score assigned for this sub-factor will be no higher than "B1".
- » We typically cap the assigned liquidity and funding sub-factor scores at the level of the market maker's sovereign long-term local currency rating for market makers that trade primarily local equity or debt securities, in order to reflect the general systemic risks of the securities that are traded in the country.
- » The same sovereign capping mechanism is used for the risk appetite sub-factor score.
- » Negative Pre-tax Earnings Volatility ratios are scored "Ca"
- » Negative Leverage ratios are scored "Ca"

2. Assigning the Operating Environment Factor Score

The Operating Environment incorporates three sub-factors: Macro-Level Indicator, Maturity of Capital Markets and Competitive Dynamics.

- » The Macro-Level Indicator sub-factor score is based on three factors from Moody's methodology for rating sovereigns:²¹ Economic Strength (25%), Institutions and Governance Strength (50%), and Susceptibility to Event Risk (25%).

For the Macro-Level Indicator, 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 Sovereign Rating Methodology Scoring tables below (Exhibits 8 and 9), 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 weighted Macro-Level Indicator sub-factor score. This numeric score is then rounded to the nearest integer and mapped back to an alphanumeric equivalent using the table in Exhibit 7.

EXHIBIT 8

Mapping Sovereign Rating Methodology Scoring for Economic Strength and Institutions and Governance Strength*

Economic Strength and Institutions and Governance Strength	Numeric Equivalent*
aaa, aa1	1
aa2, aa3	2
a1	4
a2	5
a3	6
baa1	7
baa2	9
baa3	10
ba1, ba2	11
ba3	13
b1	14
b2	15
b3	16
caa1, caa2	18
caa3, ca	19

*The effect of this mapping is to compress the alphanumeric sovereign factor scores and convert them to a numeric score for use in the scorecard for market makers.

Source: Moody's Investors Service

²¹ A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

EXHIBIT 9

Mapping Sovereign Rating Methodology Scoring for Susceptibility to Event Risk

Susceptibility to Event Risk	Numeric Equivalent
aaa	1
aa	2
a	4
baa	7
ba	10
b	14
caa	18
ca	19

Source: Moody's Investors Service

Both the Maturity of Capital Markets and Competitive Dynamics sub-factor scores are assigned based on the table in that section. The resultant broad rating category scores (Aaa, Aa, A, Baa, Ba, B, Caa or Ca) are then converted to numeric values based on the table in Exhibit 7.

Material Operations in More Than One Country

In cases where a securities industry market maker has material operations in more than one country, we assign a score that is representative of the overall operating environment for that issuer, according to the size and importance of operations in each country. Our scoring is often informed by the weighted average of the country-level Operating Environment sub-factor scores. Operating Environment scores for each sector in each country are calculated as described above. Weighting is representative of the geographic allocation of risk and returns and is typically based on our forward-looking view of sustainable revenue levels; however, we may adjust the weighting in cases where revenues are not proportionate to profits or risks. The resulting weighted average is rounded and converted to a factor score, based on Exhibit 7. In some limited cases, the assigned score may differ from the weighted average score, for instance to reflect risks in a specific country that have an out-sized impact on the firm's operating and business risk profile.

For countries that represent a large portion of the issuer's business and when the relevant information is available, we typically calculate a separate operating environment score. We then assign an overall operating environment score that is informed by the weighted average of the underlying scores. For sectors that are less material, or when an issuer's sector-level reporting is less precise or we expect that the sector mix will change materially, we may assign Competitive Dynamics and Maturity of Capital Markets scores based on our estimate of the sector breakdown in that country or region.

In cases where geographical reporting is on a regional rather than a country basis, we take one of the two following approaches. If the macro-level indicators are quite similar for the countries in the region that represent the preponderance of the issuer's business, we would typically use the Macro-Level Indicator score that we consider to be most representative among those countries and assign Competitive Dynamics and Maturity of Capital Markets scores to the region. If the macro-level indicators are quite disparate for the countries in the region that represent the preponderance of the issuer's business, we would typically estimate the proportion of the business in each country. We would then assign an overall operating environment score that is informed by the weighted average of the underlying scores.

3. Determining the Adjusted Financial Profile

The Operating Environment score is determined using a dynamic weighting, shown in Exhibit 10, to combine the Macro-Level Indicator and the combined Maturity of Capital Markets and Competitive Dynamics sub-factor scores. These two sub-factors are equally weighted in their combined score and the weighted average of their numerical values is rounded, and converted to an alphanumeric score based on Exhibit 7. The dynamic weighting is based on the Macro-Level Indicator score; as this sub-factor becomes weaker it is assigned progressively more weight, such that it does not affect the Operating Environment score unless it has a downward-influence upon it. The weight assigned to the combined Maturity of Capital Markets and Competitive Dynamics sub-factor scores is derived by subtracting the weight assigned to the Macro-Level Indicator score from 100%. The numeric value for each sub-factor score is multiplied by the weight for that sub-factor, with the results then summed to produce an aggregate weighted factor score. To demonstrate the impact of dynamic weighting, Exhibit 10 shows the effect expressed in alphanumeric terms.

EXHIBIT 10

Combination of Operating Environment sub-factor scores to form the Operating Environment Score^{*1}

		Macro-Level Indicator Score and Weighting																		
		Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3
		0%	0%	0%	0%	0%	0%	0%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%
Maturity of Capital Markets and Competitive Dynamics Score	Aaa	Aaa	Aaa	Aaa	Aaa	Aaa	Aaa	Aaa	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Ba1	Ba2	B1	B2	Caa1
	Aa1	Aa1	Aa1	Aa1	Aa1	Aa1	Aa1	Aa1	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba3	B1	B3	Caa1
	Aa2	Aa2	Aa2	Aa2	Aa2	Aa2	Aa2	Aa2	A1	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba3	B1	B3	Caa1
	Aa3	Aa3	Aa3	Aa3	Aa3	Aa3	Aa3	Aa3	A1	A2	A3	Baa1	Baa1	Baa2	Ba1	Ba2	Ba3	B1	B3	Caa2
	A1	A1	A1	A1	A1	A1	A1	A1	A2	A3	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B2	B3	Caa2
	A2	A2	A2	A2	A2	A2	A2	A2	A3	A3	Baa1	Baa2	Baa2	Baa3	Ba1	Ba2	B1	B2	B3	Caa2
	A3	A3	A3	A3	A3	A3	A3	A3	A3	Baa1	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa2
	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa2	Baa3	Baa3	Ba1	Ba2	Ba3	B1	B2	Caa1	Caa2
	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa3	Ba1	Ba1	Ba2	Ba3	B1	B2	Caa1	Caa2
	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Ba1	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2
	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba2	Ba2	Ba3	B1	B2	B3	Caa1	Caa2
	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba3	Ba3	B1	B2	B3	Caa1	Caa2
	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	B1	B1	B2	B3	Caa1	Caa2
	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B2	B3	B3	Caa1	Caa3
	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	Caa1	Caa2	Caa3
	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	Caa1	Caa2	Caa3
	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa2	Caa3
	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa3
	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3
	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca

^{*1} Weight of Macro-Level Indicator is 0% if Macro-Level Indicator score is higher than the combined Maturity of Capital Markets and Competitive Dynamics sub-factor scores

Source: Moody's Investors Service

A similar dynamic weighting concept is used to combine the Financial Profile and the Operating Environment factor scores to determine the Adjusted Financial Profile score. The dynamic weighting is based on the Operating Environment score as show in Exhibit 11; as this sub-factor becomes weaker it is assigned progressively more weight. The numeric value for each factor score is multiplied by the weight for that factor, with the results then summed to produce an aggregate weighted Adjusted Financial Profile score. As shown in Exhibit 11, the Operating Environment score contributes to a securities industry market

maker's scorecard credit profile only to the extent that it exerts a downward influence on the Financial Profile score. Accordingly, the Operating Environment is assigned a 0% weight if the Operating Environment score is "A" or higher, or is higher or equal to the Financial Profile score. However, if the Operating Environment score is "Baa" or lower, and is weaker than the Financial Profile score, it exerts a downward influence on the Adjusted Financial Profile.

EXHIBIT 11

Combination of Operating Environment and Financial Profile scores to form the Adjusted Financial Profile score^{*1}

		Operating Environment Score and Weighting																				
		Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca	
		0%	0%	0%	0%	0%	0%	0%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	
Financial Profile Score	Aaa	Aaa	Aaa	Aaa	Aaa	Aaa	Aaa	Aaa	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Ba1	Ba2	B1	B2	Caa1	Caa3	
	Aa1	Aa1	Aa1	Aa1	Aa1	Aa1	Aa1	Aa1	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba3	B1	B3	Caa1	Caa3	
	Aa2	Aa2	Aa2	Aa2	Aa2	Aa2	Aa2	Aa2	A1	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba3	B1	B3	Caa1	Caa3	
	Aa3	Aa3	Aa3	Aa3	Aa3	Aa3	Aa3	Aa3	A1	A2	A3	Baa1	Baa1	Baa2	Ba1	Ba2	Ba3	B1	B3	Caa2	Caa3	
	A1	A1	A1	A1	A1	A1	A1	A1	A2	A3	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B2	B3	Caa2	Caa3	
	A2	A2	A2	A2	A2	A2	A2	A2	A3	A3	Baa1	Baa2	Baa2	Baa3	Ba1	Ba2	B1	B2	B3	Caa2	Caa3	
	A3	A3	A3	A3	A3	A3	A3	A3	A3	Baa1	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa2	Caa3	
	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa1	Baa2	Baa3	Baa3	Ba1	Ba2	Ba3	B1	B2	Caa1	Caa2	Caa3	
	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa3	Ba1	Ba1	Ba2	Ba3	B1	B2	Caa1	Caa2	Caa3	
	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Baa3	Ba1	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Ca	
	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba1	Ba2	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Ca	
	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba2	Ba3	Ba3	B1	B2	B3	Caa1	Caa2	Ca	
	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	Ba3	B1	B1	B2	B3	Caa1	Caa2	Ca
	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B2	B3	B3	Caa1	Caa3	Ca	
	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B3	Caa1	Caa2	Caa3	Ca	
	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	Caa1	Caa2	Caa3	Ca	
	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa1	Caa2	Caa3	Ca	
	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa2	Caa3	Ca	
	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Caa3	Ca	
	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	Ca	

^{*1} Weight of Operating Environment is 0% if Operating Environment score is higher than Financial Profile score

Source: Moody's Investors Service

4. Determining the Overall Scorecard-Indicated Standalone Assessment

We incorporate three sub-factors in the scorecard as one or more direct notching adjustments to the Adjusted Financial Profile, as detailed in the Business Profile and Financial Policy section of this report. The four factors are:

- » Business diversification
- » Opacity and complexity
- » Corporate behavior

Notching adjustments in respect of business diversification and corporate behavior may be upwards or downwards; whereas those in respect of opacity and complexity are downward only. All notches are in whole numbers.

Upward notching adjustments raise the alphanumeric equivalent (e.g. plus one notch from Baa1 to A3) and decrease the numeric value of the score (e.g. from 8 to 7). Downward notching adjustments lower the alphanumeric equivalent (e.g. from Baa1 to Baa2) and increase the numeric score (e.g. from 8 to 9).

Application of the notching adjustments to the Adjusted Financial Profile results in the scorecard-indicated standalone assessment, prior to the local-currency sovereign rating impact. The standalone assessment may be pushed down as a result of the sovereign local-currency rating. Please see our cross sector methodology that discusses how sovereign credit quality can affect other issuers.²² The resultant post-cap alphanumeric equivalent is the scorecard-indicated standalone assessment.

The securities industry market maker standalone assessment scorecard outcome is expressed as a three-notch range on our alphanumeric rating scale, for which the midpoint is the scorecard-indicated standalone assessment. The assigned standalone assessment is expressed a single alphanumeric on our rating scale, which may or may not be within the three-notch range, but is most often within it. Scorecards based on consolidated financial statements are oriented to the standalone assessment for the corporate family.

5. Applying Affiliate and Government Support

Where relevant, we apply our JDA framework to incorporate any affiliate support, and then any government support. Affiliate support is applied to the issuer's standalone assessment and provides an indicated range of positive uplift,²³ in notches. The assigned post-affiliate standalone assessment typically incorporates a level of upward notching within the affiliate support range, but it may in some cases be outside that range. The application of government support JDA provides a range of suggested upward notching.²⁴ The assigned corporate family/issuer rating 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 corporate family/issuer rating incorporates the local currency country ceiling.

Appendix 2 describes our JDA framework. Appendix 3 describes how we use JDA to determine the upward ratings impact (if any) of affiliate and government support²⁵ on the assigned standalone assessment.

6. Determining Instrument Ratings

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

²² A link to an index of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

²³ The suggested upward notching may be zero or more notches.

²⁴ The suggested upward notching may be zero or more notches.

²⁵ Some securities industry market makers 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.

Appendix 2: 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 securities industry market makers 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 securities industry market maker would be forthcoming. Each support provider is assessed for its capacity and willingness to support the securities industry market maker. The first is based on the securities industry market makers' 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:

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

Or equivalently,

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

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:

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

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 $P(L \text{ and } H)$ 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:

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

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 12

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 13

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 $P(L \text{ and } H)$ 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 14 below.

EXHIBIT 14

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 3: 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 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.

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 interlinkages and government support would therefore almost certainly flow via the affiliate.

This is also the case where the affiliate is a non-bank entity, for example an insurance company or nonfinancial corporate, in which case 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 15.

EXHIBIT 15

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

Government support

Our approach to government support is similar to that for determining support from an affiliate. Our assessment is designed to be qualitative and flexible in nature, enabling us to incorporate the often subtle real-world shifts that define attitudes to support for financial institutions.

We assess the probability of support from a public body (usually a government but sometimes a central bank or supranational institution) for a class of creditors according to which of the following five categories best reflects that instrument's importance to the public: "Government-backed," "Very High," "High," "Moderate," and "Low." Our assessment – which is ultimately specific to each instrument class of each firm – is made through the analysis of a number of considerations.

Firstly, we incorporate the public policy framework at large. Our overall assessment of the probability of government support for a given rated instrument is significantly conditioned by an understanding of the overall attitude of the relevant public bodies and any constraints they may face, beyond their own creditworthiness, in providing support.

We then assess several industry- and entity-specific matters, including market share, market impact, nature of activity and public involvement, and may assess higher probabilities of support in some cases.

An example of the Government Support Worksheet is shown in Exhibit 16.

EXHIBIT 16

Example Government Support Worksheet

Assumptions

Supporting authority	Country XYZ
Creditworthiness of support provider	Aa2
Dependence	Very High
Local Currency bank deposit ceiling	Aaa
Local Currency country ceiling	Aaa
Foreign Currency bank deposit ceiling	Aaa
Foreign Currency country ceiling	Aaa

Standalone Assessment post Affiliate Support	Level of support	Notching guidance (Min - Mid - Max)	Assigned notching	LC Country ceiling impact	Assigned LC rating	FC Country ceiling impact	Assigned FC rating
Baa3	High	2 - 3 - 5	3	0	A3	0	A3

Source: Moody's Investors Service

Appendix 4: Securities & Investments Portfolio Haircut Rates

We utilize standard haircut rates for each major type of security & investment for the purpose of calculating inputs to the funding and liquidity ratios. Our calculations are based on fair value classification disclosures required under US GAAP and IFRS. We believe these fair value classifications, detailed below, provide a benchmark measure of relative liquidity, allowing for consistency and comparability across market makers.

- » **“Level 1”** financial assets are those with fair values based on unadjusted quoted prices in active markets for identical assets. Accordingly, Level 1 financial assets tend to be the most liquid securities & investments, and therefore, we apply the most favorable haircut rates to these.
- » **“Level 2”** financial assets are generally less liquid than Level 1 assets. Their fair values are determined based on observable inputs other than Level 1 prices, such as quoted prices for similar assets, quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets. Accordingly, we apply less favorable haircut rates to these financial assets compared with those that are classified as Level 1.
- » **“Level 3”** financial assets are the least liquid of the three categories, in that their fair values are determined based on unobservable inputs that are supported by little or no market activity. Their fair values are typically based on subjective internal financial models, which use the best information available to the market maker. Accordingly, we apply the least favorable haircut rates (100%) to these financial assets, compared with those that are classified as Level 1 and Level 2.

The haircut rates we apply to each broad category of securities & investments are detailed below in Exhibit 17, together with our base estimated allocations when there is insufficient reporting of fair value classifications in the footnotes.

- » Under a minority of local accounting jurisdictions, fair value classifications are not disclosed in the footnotes, or the classifications may be disclosed in less detail than is typically presented under US GAAP and IFRS. In such cases, we utilize all available information to estimate the fair value classifications of the market maker's securities & investments portfolio. Our estimates are based on Exhibit 17; however, in some cases we may adjust these percentages, based on our review of other related disclosures and information, and using our general knowledge of the market maker and its activities. Typically, the percentages employed are more conservative as information becomes less complete.
- » A market maker may measure what is typically a minority of its securities & investments on a basis other than at fair value. We include these financial assets in our calculations, but our estimates of their fair value classifications are typically more conservative when normal disclosures are not provided in the financial statement footnotes.
- » For derivative assets, the amounts provided under the fair value classification disclosures reconcile to amounts reported on the balance sheet. Therefore, the amounts do not reflect additional offsetting that may be available under legally enforceable master netting agreements. When applying our standard adjustment for balance sheet offsetting of derivatives, we first net Level 1 derivative assets, then any remaining amounts are netted with Level 2 derivative assets, and finally any remainder is applied to Level 3 derivative assets.
- » Under US GAAP, reporting entities can elect to use net asset value (NAV) per share as a practical expedient for measuring the fair value of certain investments. For investments measured using the NAV per share practical expedient, US GAAP no longer requires reporting entities to disclose in their financial statements the fair value classifications for those investments. We estimate the haircut for such investments based on the investment's redemption frequency, as follows: (1) for investments that can

be redeemed on a daily basis, we will assign a haircut equivalent to that for Level 1 equity securities (i.e. 20%); for investments that can be redeemed on a monthly or quarterly basis, we will assign a haircut equivalent to that for Level 2 equity securities (i.e. 50%); and (3), for investments that have longer redemption periods, we will assign a haircut equivalent to that for a Level 3 equity security (i.e. 100%). We will treat investments measured using the NAV per share practical expedient, but for which the redemption frequency is not disclosed, as Level 3. We may over-ride these estimates based on review of other disclosures and issuer & market knowledge.

EXHIBIT 17

	Fair Value Hierarchy % Haircut Rates			Fair Value Hierarchy Allocations		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
Sovereign government debt securities	3%	20%	100%	75%	25%	0%
Semi government/government agencies debt securities	3%	20%	100%	0%	100%	0%
State/municipal government debt securities	3%	20%	100%	0%	100%	0%
Other debt securities	10%	30%	100%	0%	90%	10%
Equity securities	20%	50%	100%	80%	20%	0%
Derivatives	10%	30%	100%	0%	100%	0%
Loans and receivables measured at fair value and held for sale	20%	50%	100%	0%	50%	50%
Physical commodities	20%	50%	100%	0%	80%	20%
Treatment of specific classifications when no further detail is reported:						
"Trading securities"	10%	30%	100%	0%	100%	0%
"Investments"	20%	30%	100%	0%	20%	80%
"Government, corporate and other debt securities"	8%	25%	100%	25%	75%	0%
"Other"	20%	30%	100%	0%	0%	100%
"Financial assets designated at fair value through profit or loss"	20%	50%	100%	0%	50%	50%
	% Haircut Rate					
Securities purchased under resale agreements (i.e. Reverse Repos), including securities borrowed	3%					

Note: these assets are normally measured at contractual amounts rather than at fair value, and accordingly are typically not reported in the fair value hierarchy tables.

Source: Moody's Investors Service

Appendix 5: Recognition Rates for Off-Balance-Sheet Commitments and Contingencies

	Total
Maximum exposure to loss in off-balance sheet structured vehicles (e.g. Variable Interest Entities and Special Purpose Entities), net of amounts recognized on-balance sheet	5%
Lending commitments	10%
Underwriting commitments	30%
Letters of Credit	30%
Commitments to related party (e.g. equity commitments and lending commitments)	100%
Rating triggers (i.e. outflows due to rating downgrade)	100%
Other commitments & guarantees	10%

Source: Moody's Investors Service

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](#).

Report Number: 1187332

Authors

Donald Robertson
Pano Karambelas
Ana Arsov

© 2019 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT OR IMPAIRMENT. SEE MOODY'S RATING SYMBOLS AND DEFINITIONS PUBLICATION FOR INFORMATION ON THE TYPES OF CONTRACTUAL FINANCIAL OBLIGATIONS ADDRESSED BY MOODY'S RATINGS. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY ANY PERSON AS A BENCHMARK AS THAT TERM IS DEFINED FOR REGULATORY PURPOSES AND MUST NOT BE USED IN ANY WAY THAT COULD RESULT IN THEM BEING CONSIDERED A BENCHMARK.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY CREDIT RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for ratings opinions and services rendered by it fees ranging from \$1,000 to approximately \$2,700,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657 AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for ratings opinions and services rendered by it fees ranging from JPY125,000 to approximately JPY250,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.