MOODY'S INVESTORS SERVICE

RATING METHODOLOGY

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Banks Methodology

This rating methodology replaces the *Banks* methodology published in August 2018. In this update we have revised the appendix on Advanced LGF key rating assumptions (Appendix 3) to increase its clarity and transparency. We have also revised our scoring scales for Banking Country Risk to align them with the scoring scales introduced in the November 2019 update to our rating methodology for sovereigns, and have introduced a three-notch scoring range to express initial scoring for Banking Country Risk. We have removed specific references to LIBOR and replaced them with references to a generic interest rate benchmark. We have also made some limited text edits to increase clarity.

Introduction

This rating methodology explains our general approach to assessing credit risk for banks globally and how this credit assessment leads to our assigning ratings to instruments ranging from bank deposits to preferred stock. Our methodological approach usually includes assigning a Baseline Credit Assessment (BCA), an opinion of a bank's standalone intrinsic strength, and we may also assign a probability of default assessment on certain senior contractual obligations, our Counterparty Risk Assessment (CR Assessment). This report outlines the different stages of the rating analysis we typically employ, and includes the following principal sections:

» Overview: a relatively short summary of the principal analytical components we typically use.

» Fundamental Credit Factors: the discussion of the BCA component generally describes how we determine a bank's BCA, which reflects our opinion of the bank's intrinsic, or standalone, strength absent any extraordinary support from an affiliate or government, relative to the global population of rated banks. The BCA is not a credit rating but an assessment of a bank's probability of requiring support to avoid a default, or actually defaulting on a debt obligation. This fundamental analysis incorporates a bank's operating environment (communicated through a Macro Profile for each system and ultimately each bank), a bank's own financial profile, reflecting our view of its solvency and liquidity, as well as certain qualitative factors.

» Support and Structural Analysis: our approach to incorporating our expectations related to various forms of external support, based upon our Joint Default Analysis (JDA) framework, is described in the discussions of the Affiliate Support component and the Government Support component. We also describe how we determine the resolution regime we expect banks will be exposed to, and how the liability structure and the bank's assets affect the credit risk of debt and deposit instruments, in the event of the bank failure absent any potential support (an analysis we term Loss Given Failure, or LGF). Furthermore, we factor in instrument-specific coupon features that may result in different default probabilities for certain junior instruments.

» Limitations, Assumptions and Other Rating Considerations and Appendices: we describe certain limitations pertaining to our BCA scorecard, models and our overall approach. Appendices include considerations in rating the obligations of related entities such as specialized covered bond issuers and bank holding companies, and bank obligations in failure or default. We also provide certain Key Rating Assumptions for LGF, descriptions of certain models related to our analysis and a glossary of selected terms.

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About the Rated Universe

This rating methodology applies to banks globally. Banks are financial institutions that are subject to prudential regulation, typically at the national level, are usually licensed to take deposits from the general public and to provide credit and typically have access to central bank liquidity.

Issuers rated under this methodology usually have most of the following characteristics: legal status under a bank charter or the equivalent; regulatory oversight, including the application of capital and liquidity standards, examinations and on-site inspections; the calculation and disclosure of capital ratios, such as the ratio of Common Equity Tier 1 (CET1) to risk-weighted assets; membership of a payments system; material deposit funding (usually more than 20% of total funding); and access to central bank funding.

In some instances, we may include within the scope of this methodology institutions that are "bank-like", i.e., they have leveraged balance sheets and engage in borrowing and lending as core business activities, but are not formally classed by regulators as a bank. Conversely, in certain instances, we may consider some institutions that are technically banks or credit institutions under local regulation to have risk characteristics that are closer to those of other sectors, such as finance companies, insurance companies or government entities. In such cases, we may assess the institution's creditworthiness under a different methodology that corresponds more closely to the institution's business profile or the preponderance of its credit risks, or we may use the scorecard of an additional relevant methodology to supplement our analysis.[1]

Some institutions are hybrids or financial conglomerates, combining banking, securities, asset management, private equity and insurance activities. In such cases, we typically employ the methodology that we consider corresponds best to the institution's primary business activities, based on its earnings or assets, unless these are not representative of the preponderance of credit risks. We may also employ additional methodologies to complement our analysis. Please see our methodologies for finance companies, securities industry companies (market makers and service providers), asset managers and insurance companies. Structured debt securities issued by banks (e.g., covered bonds and asset-backed securities) are rated under structured finance methodologies.[2]

Application of the Methodology

The approach set out in this methodology applies to both new ratings and our surveillance of existing ratings. In assigning a new rating, we would typically assess the company's financial history as well as its strategy and business model to arrive at a forward-looking view of the credit profile. We may also consider whether the available historical financial information provides a clear basis on which to form our forward-looking view.

While our surveillance process and rating committees will usually assess all principal components described in this methodology, we may on occasion focus on one or more of its component parts, e.g.:

» A change in a bank's financial ratios or other idiosyncratic elements may lead us to reconsider its Baseline Credit Assessment (BCA) without a re-appraisal of its Macro Profile.

» A change in a bank's liability structure may result in a re-appraisal of the LGF component of our analysis without necessarily reconsidering other components, e.g., the BCA or our support assumptions.

[1] Many financial institutions defined as a "credit institution" in the European Union (EU) fall within the scope of this methodology; however, some do not, based on whether they meet the described criteria.

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

» A change in our view of government support may lead us to review our ratings without necessarily reconsidering the bank's BCA or the Preliminary Rating Assessments (PRAs) of its rated instruments, which are derived from our LGF analysis of rated instruments.

The assignment of a rating to a class of instruments that was previously unrated, such as a contingent capital security, may lead us to assign a rating without a re-appraisal of the other components of our methodology.

This methodology does not include an exhaustive description of all factors that our analysts may consider in assigning ratings in this sector. For instance, our analysis for ratings in this sector covers factors that are common across all sectors but that are not explained in detail in this document, such as ownership, corporate legal structure and governance.[3]

This methodology includes a BCA scorecard, which is a relatively simple reference tool that can be used in most cases, together with our Joint Default Analysis (JDA) and LGF framework, to approximate credit profiles within this sector. The scorecard also explains, in summary form, the factors that are generally most important in assigning BCAs to banks. The scorecard-indicated outcome is expressed as a three-notch range on our rating scale[4] and is oriented to the firm's BCA. Scorecard-indicated outcomes may not map closely to actual ratings. The scorecard is a summary that does not include every rating consideration, and other quantitative or qualitative considerations that may not lend themselves to a transparent presentation in a scorecard format can also affect ratings. In addition, some rating factors that are not important for the sector as a whole may be very important for a specific bank. Furthermore, the weights shown for each factor in the scorecard represent an approximation of their importance for rating decisions, but actual importance may vary substantially.

In addition, ratings are based on our forward-looking expectations, which may vary from historical financial statements, and our long-term forward-looking view may be different from our near-term forward-looking view.

We seek to incorporate all material credit risks into our ratings, whether long-term or short-term risks, with the most forward-looking view that visibility into these risks permits. In most cases, nearer-term risks are more meaningful to issuer credit profiles and thus have a more direct impact on ratings. However, in some cases, our views of longer-term trends may have an impact on ratings. We may from time to time publish scorecards for an issuer using forward-looking metrics, which are typically based on our near-term projections, in part because we may not have sufficient visibility into an issuer's future results beyond this horizon that would enable us to accurately score these factors. Instead, longer-term risks that we can identify may be incorporated qualitatively in our ratings analysis. For example, we may incorporate our forward-looking view of trends in financial results beyond the period of the financial projections included in the scorecard.

As a result, the actual BCA of each bank is not always expected to be at the midpoint of the scorecard-indicated outcome range and may in some cases be outside the range.

In some instances, our analysis is also guided by additional methodologies that describe our approach for analytical considerations that are not specific to any single sector. Examples of such considerations include but are not limited to the assignment of short-term ratings and how sovereign credit quality affects non-sovereign issuers. A link to documents that describe our approach to such cross-sector methodological considerations can be found in the "Moody's Related Publications" section of this report.

[3] Please see the "Limitations, Assumptions and Other Rating Considerations" section of this document.
[4] BCAs are expressed in lowercase letters.

The information used in assessing BCA factors and sub-factors is generally found in or calculated from information in the issuer's financial statements or regulatory filings, derived from other observations or estimated by Moody's analysts. All of the quantitative credit metrics incorporate our standard adjustments to financial statements in the analysis of financial institutions.[5] We may also make other analytical adjustments that are specific to a particular bank, and we may use non-public information to inform our view.

BCA scorecards typically include ratios derived from historical financial statements. For the problem loan ratio and profitability ratio, we start with the weaker of the three-year average and the latest annual or 12-month figure. For the capital ratio, we use the latest reported annual or 12-month figure. For the funding structure and liquid asset ratios, we use the latest fiscal year-end figures. However, the factors in the scorecard can be assessed using other time periods. For example, rating committees may find it analytically useful to examine both historical and expected financial performance for periods of several years or more.

We usually calculate ratios based on consolidated financial data, up to the level of the ultimate holding company. In some circumstances ratios based on a different view of financials better reflect the rated entity's probability of failure, and we may, for example, employ data at the operating bank level, i.e., excluding the holding company, or on an unconsolidated basis, i.e., excluding certain subsidiaries.

Overview of Our Approach

In the following overview sections, we provide a description of the highlights of our overall methodological approach. For more details about this approach, it is necessary to read the more complete discussions that follow the overview. The components of our rating approach are illustrated in Exhibit 1:

- An assessment of the standalone financial strength of the bank, resulting in a Baseline Credit Assessment (BCA), meaning the probability of default in the absence of external support, or its probability of standalone failure;[6]
- An assessment of support from affiliates, layered onto the BCA to determine an Adjusted BCA;
- A Loss Given Failure (LGF) analysis of the impact of the bank's failure on the expected loss of each creditor class in response to (where applicable) different forms of expected resolution, firm-wide loss rates and liability structure, together with additional notching relating to other risks, to arrive at our Preliminary Rating Assessment (PRA); and
- An assessment of potential support from governments, specific to each instrument class, to determine the credit rating for each rated instrument.

We combine these assessments to generate ratings for each instrument class. We also may generate a Counterparty Risk Assessment (CR Assessment), which is an opinion on the likelihood of a default by an issuer on certain operating obligations and other contractual commitments, such as payment obligations associated with covered bonds (and certain other secured transactions), derivatives, letters of credit, third-party guarantees, servicing and trustee obligations and other similar obligations that arise from a bank in performing its essential operating functions. We may also assign a Counterparty Risk Rating (CRR). CRRs are assigned at the issuer level and represent our opinion of the ability of entities to honor the uncollateralized portion of some non-debt counterparty financial liabilities (CRR liabilities) and also reflect the expected financial losses in the event such liabilities are not honored. CRR liabilities represent a sub-set of CR Assessment obligations.

[5] A link to all of our cross-sector rating methodologies can be found in the "Moody's Related Publications" section of this report.

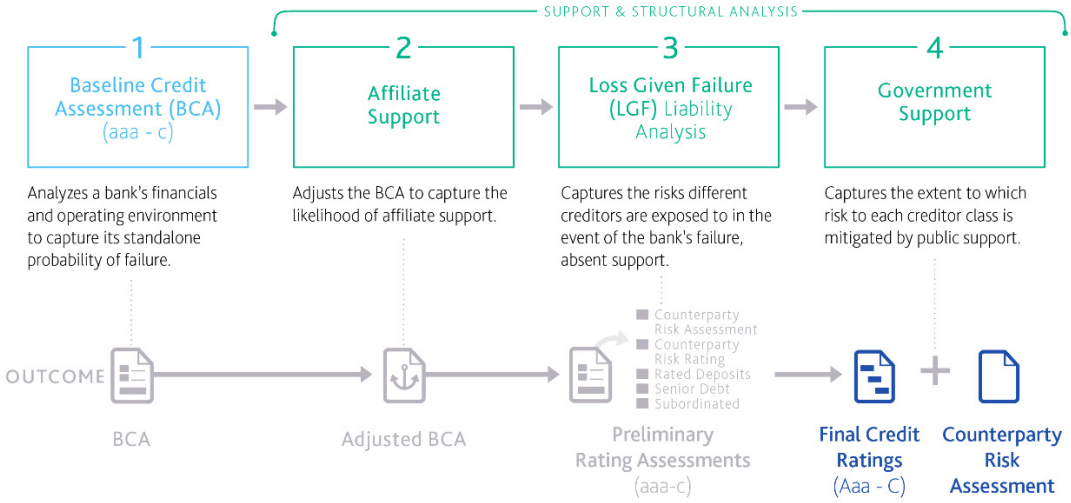
[6] BCAs are expressed in lowercase alphanumeric form. For more details, see Moody's *Rating Symbols and Definitions*.

We may also assign issuer ratings to banks.

Please see the glossary in this document and *Rating Symbols and Definitions*[7] for more details on issuer ratings, CR Assessments, CRRs and CRR liabilities.

EXHIBIT 1

Overall Approach to Rating Bank Instruments



Source: Moody's Investors Service

A BCA scorecard provides us with the structure to express the analysis that determines our BCAs. This scorecard aims to capture and communicate in a systematic fashion the following:

» Historical performance based on core credit metrics;

» Our expectations for future trends in these credit metrics;

» Qualitative adjustments to these ratio-driven scores, capturing other relevant financial ratios, as well as a range of broader considerations that financial metrics do not necessarily capture.

The scorecard is designed to capture, express and explain in summary form our rating committees' judgment. As a result, the outcome of the scorecard may materially differ from that suggested by raw data alone, although it has been calibrated to avoid frequent occurrences of strong divergence.

Sources of Data

Throughout our analysis, our approach is designed to enable us to assign ratings based on public data. Our choice of ratios is oriented toward relatively broad and simple metrics in order to have a consistent, globally comparable analytical framework. This reflects both our analytical view that simple metrics are often more effective than complex ones, as well as the necessity of identifying universally available ratios.

[7] For a link to *Rating Symbols and Definitions*, please see the "Moody's Related Publication" section below.

Overview of the Baseline Credit Assessment (BCA)

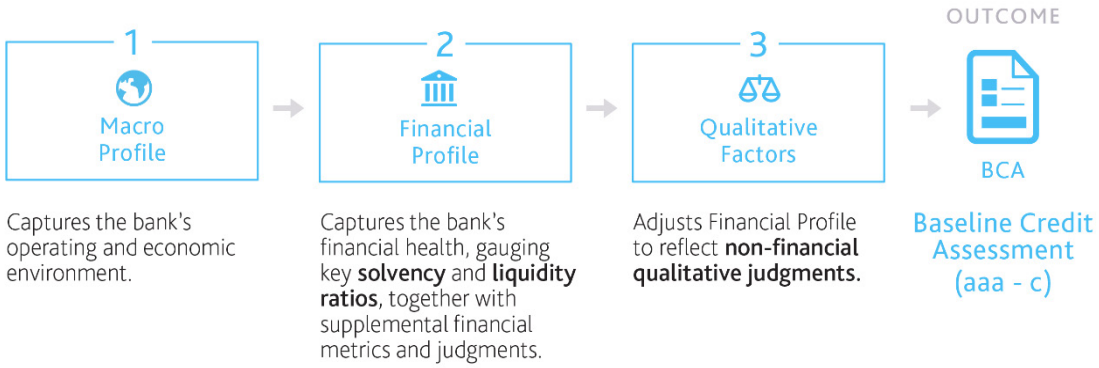
In the following sections, we set out the key factors that influence the BCA, and our approach to their measurement or assessment. We group this analysis around three components:

» Macro Profile;

» Financial Ratios (forming, together with the Macro Profile, the Financial Profile); and

» Qualitative Factors.

EXHIBIT 2
BCA Structure



Source: Moody's Investors Service

1. Macro Profile

We begin our analysis with an assessment of the system-wide factors that we believe are predictive of the propensity of banks to fail. This is the subject of many academic studies, which generally conclude that macro variables significantly affect bank failure rates. This conclusion accords with our experience of recent crises. These include:

» Economic variables, such as GDP growth and real interest rates;

» References to the external sector, including capital flows, reserves and the exchange rate;

» Credit variables, notably private-sector credit relative to GDP and its growth rate; and

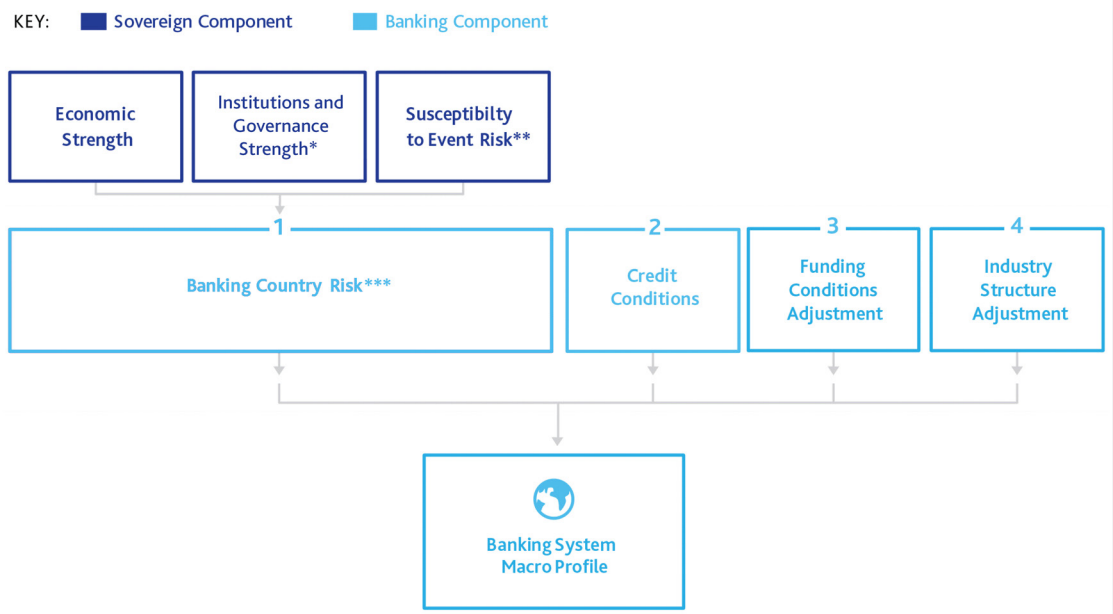
» Asset prices, especially real-estate values.

We also believe that other factors — for which predictive qualities are more difficult to show — play an important role in influencing the resilience or otherwise of a given banking system. For example, we consider the strength and reliability of a country's institutions, its ability to retain law and order and avoid corruption, the presence or absence of system-wide liquidity mechanisms or funding vulnerabilities, and structural advantages or deficiencies. Many of these factors are common to our methodology for analyzing sovereign creditworthiness,[8] even if the overlap is not complete.[9] The factors behind banking crises are thus closely linked to, but are not identical to, sovereign and currency crises.

Drawing together academic research and our own back-testing, we established the elements of a Macro Profile, which we use to help us position the BCAs of banks operating within a given system. This Macro Profile draws heavily on the work of our Sovereign Risk Group, and indeed we use certain components of the sovereign rating scorecard as our starting point (see box).

[8] Please see the "Moody's Related Publications" section of this document for a link to our sector and cross-sector methodologies.
[9] IMF Working Paper 12/163: Systemic Banking Crises Database: An Update, Luc Laeven and Fabián Valencia.

How We Construct the Macro Profile



*Excluding adjustment related to sovereign default history and track record of arrears
**Excluding risks related to the banking sector
***The initial score is expressed as a three-notch range. We then assign a single score that is within this range.
Source: Moody's Investors Service

The Macro Profile draws heavily on the sovereign scorecard. We construct it in the following way.

Economic Strength. We calculate the Economic Strength score for each country using the various sub-factors in the sovereign scorecard.

Institutions and Governance Strength. We calculate the Institutions and Governance Strength score using the various sub-factors in the sovereign scorecard, with the exception of the default history and track record of arrears adjustment factor.

Susceptibility to Event Risk. We calculate the Susceptibility to Event Risk score using the various sub-factors in the sovereign scorecard, excluding the banking sector sub-factor, so that our view of the strength of the banking system does not become a self-referential determinant of its own strength.

For more details, see the "Discussion of the Baseline Credit Assessment Component" section later in this methodology. Note that we do not include the Fiscal Strength factor from the sovereign scorecard at this stage of our bank analysis, which helps us identify weak banking systems in fiscally strong countries. To the extent to which fiscal strength itself constrains bank ratings, we capture this in our consideration of the sovereign rating itself, as further described below.

The outcome of this process is the Banking Country Risk score. We combine this with our **Credit Conditions** factor, which is expressed on a scale from 1-7, which may result in a reduction in the Macro Profile of a number of notches, reflecting credit fundamentals not captured in the sovereign factors. Finally, we may apply further adjustments up or down to reflect **Funding Conditions** or **Industry Structure** issues. This results in our Macro Profile, which is expressed on a 15-point scale ranging from Very Strong+ to Very Weak-.

We use the Macro Profile to position the scores determined by individual bank financial ratios identified within our Financial Profile analysis; for example, a bank with a given capital ratio in a strong system would be assigned a higher initial capital score than a bank with the same capital ratio in a weaker system. The Macro Profile is discussed in more detail later in this methodology.

2. Financial Profile

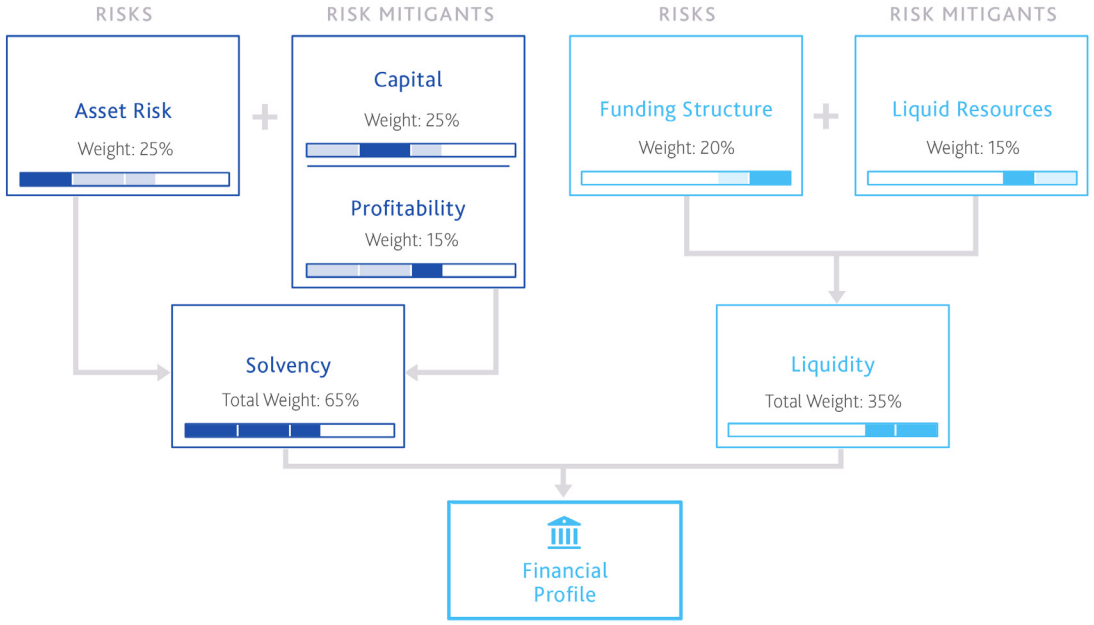
Financial institutions specialize in risk and maturity transformation. By definition, this creates risk for the institution itself. The intrinsic strength of a bank, therefore, depends principally on the extent of the transformation undertaken and the mitigants of the resulting risks. Consistent with this, our approach to determining a bank's intrinsic and relative financial strength is centered on our view that a bank's credit strength, and, hence, its viability, is largely a function of its solvency (indicated by its risk relative to its loss-absorbing resources) and its liquidity (the degree of a bank's maturity transformation). Solvency can be seen as the combination of asset risk, leverage and earnings (the weaker and less predictable the asset quality, the higher the required capital and/or returns), while liquidity is determined by a bank's funding profile together with its ability to access cash (the less reliable the bank's sources of funding, the larger the buffer of liquid assets required).

Moreover, these factors are related: all other variables being equal, stronger capitalization increases the capacity to absorb losses, increasing the confidence of counterparties and reducing the risk of a liquidity problem. Greater liquid assets, meanwhile, indirectly enhance solvency because they imply that a bank is less likely to need to sell illiquid assets at a loss in the event of a funding problem. The reverse is also true, and weak solvency can undermine liquidity.

Our analysis of each bank's financial profile, therefore, centers on these two core characteristics of solvency and liquidity. We assess gross risk against potential mitigants in each case. For solvency, gross risk is the risk of a loss of value in the bank's assets, and in the case of liquidity, the risk of a loss of funding. Potential mitigants include capital and profit generation for solvency, and access to cash and liquid asset reserves, including routine central bank facilities, for liquidity. In this way, we identify five fundamental credit sub-factors (Exhibit 3).

EXHIBIT 3

Schematic of Financial Profile



Source: Moody's Investors Service

We assign scores to each of these sub-factors using a historical financial ratio as a starting point. Our research indicates that each of these financial ratios has predictive capacity. This grounds our analysis empirically and provides a systematic framework for rating banks globally. As explained above, the ratio is then conditioned by our view of the strength or weakness of the banking system(s) in which the institution operates. Moreover, we incorporate our expectation of how each metric is likely to evolve. At the same time, we acknowledge that no single historical ratio or set of such ratios can capture the complexity of a bank's financial profile. Therefore, our assigned score for each factor typically reflects:

- The historical financial metric chosen for each factor;
- The assigned Macro Profile (the weaker the Macro Profile, the lower the assigned score is likely to be for a given financial ratio);
- Our forward-looking expectations, or expected trend, for a given financial ratio; and
- Our assessment of other relevant considerations for each factor, which may not be fully captured in the underlying ratio; for example, exposures to particularly risky segments or borrowers, or reliance on particularly fragile funding sources.

We assign individual sub-factor scores on a range from "aaa" to "c". The combination of these individual scores results in a Financial Profile on the same scale. The Financial Profile factors and the scoring process are detailed later in this methodology.

3. Qualitative Adjustment Factors

We have identified three additional factors beyond those considered in the Financial Profile that are important qualitative contributors to the soundness of a financial institution but that are either: (1) non-financial in nature; or (2) financial, but which we cannot readily assess via a common standard ratio. The three factors are as follows:

- **Business Diversification** includes the breadth of a bank's business activities, whether it is dependent on a single business, or spread across multiple activities, exposing it to or protecting it from problems in a single activity;
- **Opacity and Complexity** includes the extent to which a bank'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** includes the extent to which a bank's strategy, management and its corporate policies may reduce or increase its overall risk profile.

We incorporate these factors in the scorecard as adjustments to the Financial Profile of one or more notches. We typically use such adjustments when there are credit considerations that cannot be readily attributed to the Solvency or Liquidity factors. Adjustments in respect of Business Diversification and Corporate Behavior can be positive or negative; those in respect of Opacity and Complexity are negative only. The Qualitative Adjustment Factors and the related notching process are detailed later in the section below.

The BCA Scorecard and Assigned BCAs

We believe that the consideration of the sub-components described above — Macro Profile, Financial Profile and Qualitative Adjustment Factors — is sufficiently comprehensive to capture many of the features that can influence a bank's standalone creditworthiness. Furthermore, we believe that our calibration of historical financial ratios will often position BCAs that correspond, in broad terms, to our view of the standalone creditworthiness of banks across the world. As such, the calibration provides global consistency and a sound starting point for our analysis. However, our approach retains the necessary flexibility to assign scores reflecting our fuller assessment of the various credit factors, because no mechanical scorecard can anticipate the full range of circumstances and eventualities that may influence the BCA.

Consistent with this, the outcome of our BCA scorecard is expressed as a three-notch range on our alphanumeric scale, and assigned BCAs are usually within this range — although, on occasion, outside it. In considering where to place the BCA relative to the scorecard range, we typically consider the balance of residual risks not otherwise captured in the scorecard itself, as well as the positioning of a bank relative to its peer group.

EXHIBIT 4

Example BCA Scorecard

Baseline Credit Assessment — Banking Group ABC Inc, Country XYZ

Macro Factors

	Country / Region	Macro Profile	Weight
Country 1	Country 1	Very Strong	60%
Country 2	Country 2	Strong	20%
Country 3	Country 3	Moderate +	20%
Weighted Macro Profile		**Strong +**	**100%**

Financial Profile

	Historic Ratio	Initial Score	Expected trend	Assigned Score	Key driver #1	Key driver #2
Solvency						
Asset Risk						
Problem Loans / Gross Loans	2.0%	a1	↓↓	**baa2**	Geographical diversification	Capital market risk
Capital						
Tangible Common Equity / RWA	8.5%	ba2	↔	**b1**	Risk-weighted capitalisation	Nominal leverage
Profitability						
Net Income / Tangible Assets	0.5%	baa2	↔	**a3**	Loan loss charge coverage	
Combined Solvency Score				**baa3**		
Liquidity						
Funding Structure						
Market Funds / Tangible Banking Assets	15.0%	a2	↔	**baa2**	Term structure	
Liquid Resources						
Liquid Banking Assets / Tangible Banking Assets	20.0%	baa1	↑	**baa1**	Expected trend	Intragroup restrictions
Combined Liquidity Score		a3		**baa2**		
Financial Profile				**baa3**		

Qualitative Adjustments	Adjustment	Comment
Business Diversification	0	Highly complex organisation
Opacity and Complexity	-1	
Corporate Behavior	0	
Total Qualitative Adjustments	**-1**	

		Comment
Sovereign or Affiliate constraint	**Aaa**	Government rating
BCA Scorecard-indicated Outcome - Range	**baa3 - ba2**	
		Rationale
Assigned BCA	**ba1**	Appropriate position vs peers

Source: Moody's Investors Service

Overview of Support and Structural Analysis

The BCA measures the probability of a bank defaulting on its junior-most rated instrument,[10] or requiring support to avoid such a default. In this sense it is a measure of the probability of standalone failure. The BCA, however, is not the sole determinant of a credit rating, which is also informed by a series of further analyses into the impact of failure on the various instruments issued by the bank. This collectively forms our Support and Structural Analysis.

This analysis comprises three separate stages in accordance with the sequence in which we typically expect them to occur.

» Affiliate Support, where an entity may be supported by other entities within a group, or occasionally affiliated third parties, thus reducing its probability of default.

» Loss Given Failure (LGF), where we undertake a liability-side analysis to assess the impact of a failure — absent government support — in terms of the potential resultant loss on the bank's rated debt instruments. We also incorporate instrument-specific coupon features.

» Government Support, where an entity may be supported by public bodies, such as local, regional, national or supranational institutions, again reducing the risk for some or all instruments. We assess this using our Joint Default Analysis (JDA).

EXHIBIT 5

Applying Support, LGF Analysis and Additional Notching to Determine Credit Ratings

Source: Moody's Investors Service

Affiliate Support

The next step in our analysis is typically to consider support from affiliated entities. The outcome of this step results in the Adjusted BCA, achieved through an analysis of both the provider of support and its recipient. The Adjusted BCA measures the probability of a bank requiring support to avoid default beyond the support provided by its affiliates.

We integrate affiliate support into the rating using the following four factors:

» The bank's unsupported probability of failure (its BCA);

» The probability of the affiliate providing support;

» The affiliate's capacity to provide support; and

» The dependence or correlation between the respective entities.

[10] Excluding the impairment of high-trigger contingent capital instruments and preferred shares, which by design are impaired in advance of non-viability.

Probability of Support

We classify the probability of the affiliate's provision of support as ranging from "Affiliate-backed" to "Very High", "High", "Moderate", and finally "Low". Each of these categories corresponds to a range of support probabilities (see Appendix 6).

We typically reach this judgment by considering the following main factors:

» Control

» Brand

» Regulation

» Geography

» Documented support

» Strategic fit

» Financial links

» Parental policy

For more details, see the "Discussion of the Affiliate Support Component" section below.

Capacity to Provide Support

To establish the affiliate's capacity to support the bank, we generally use the affiliate's own BCA as opposed to its debt or deposit rating. This approach implies that potential government support that would apply to the affiliate or group may not be extended to the subsidiary in question and that resources marshaled to support the subsidiary are limited to the affiliate's 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 and, therefore, government support would almost certainly flow via the affiliate. Where the supporting affiliate is a non-bank entity, for example an insurance company or non-financial corporate, we usually employ the senior unsecured debt rating or probability of default rating where available. Where this is the case, we do not usually apply government support in a separate step as it is already (indirectly) incorporated into the rating.

Dependence Between Support Provider and Support Recipient

We also take into account dependence, or correlation, between the supported entity and the supporting affiliate. 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. "Affiliate-backed" entities denote those that we consider would be almost certain to receive support, without that support being explicitly guaranteed.

In assessing dependence, we typically consider the following:

» The degree of integration between the affiliates

» The respective operating environments

For example, we would typically judge the dependence between a parent and a subsidiary bank operating in the same country, with similar activities, to be "Very High". On the other hand, for example, we might judge the dependence between an African bank and its Asian non-financial conglomerate parent as "Moderate".

Applying Support

We employ JDA, the outcome of which is an indicative range of potential uplift from the BCA (see Appendix 6). We then typically consider the specific circumstances to assign a given number of notches of support, usually within this range, to reflect a more refined view of support probability as well as peer-group analysis. Reflecting the inherent limitations of a mathematical model in real-life circumstances, in assigning Adjusted BCAs, we may assign higher or lower support in either direction relative to this guidance to reflect idiosyncratic situations. Thus the BCA, together with this uplift, forms the Adjusted BCA. The Adjusted BCA reflects the combined probability of a subsidiary requiring support and a group failing to provide that support, allowing the subsidiary to default in the absence of government support.[11]

Loss Given Failure and Additional Notching

The second step in our Support and Structural Analysis considers the impact of the failure of the bank — any affiliate support having been either denied or exhausted — on its various debt classes, in the absence of any government support. This is an assessment of loss severity that we term "Loss Given Failure" (LGF) — an approach conceptually very similar to a classic loss given default analysis, used by Moody's to rate some corporate debt, but triggered by the failure of a bank, and not necessarily its default. This approach allows us to recognize the different implications of likely resolution scenarios for a particular bank, each class of its debt as well as its deposits. Given the lack of consistently available information, this approach also preserves a degree of simplicity, which acknowledges our view that the inherent uncertainties remain significant enough that a statistical model of loss analysis in resolution would involve a spurious degree of precision.

Scope of Application

Our application of our LGF framework takes two forms. We apply a simple notching approach (Basic LGF) for banks that are not subject to an Operational Resolution Regime (ORR), and which we expect to be resolved through bail-out, bankruptcy or ad hoc resolution measures. Under the Basic LGF approach, we typically position the senior unsecured debt and deposits at the Adjusted BCA level, before government support and additional coupon-related notching considerations, and subordinated instruments at one notch below the Adjusted BCA — again, excluding support and additional notching. We generally apply our Advanced LGF analysis to banks subject to an ORR — that is, systems with legislation specifically intended to facilitate the orderly resolution of failed banks, and which provide a reasonable degree of clarity over the impact of the failure on depositors and other creditors.

Key Factors of Advanced Loss Given Failure

Our Advanced LGF approach focuses on the major factors that have a bearing on loss given failure,[12] and in so doing enables us to express loss severity in terms of the notch differential relative to the Adjusted BCA:

- **Resolution balance sheet.** The scope of any resolution needs to be determined and does not necessarily correspond to the consolidated group considered in the BCA analysis.
- **Loss rate.** The greater the overall firm-wide loss rate in resolution, the more of a bank's liabilities are at risk of loss, all other variables being equal.

[11] Excluding high-trigger contingent capital instruments and other instruments designed to be impaired prior to a bank-wide failure.
[12] We detail underlying modeling assumptions in Appendix 3.

» **Subordination.** The greater the volume of debt and/or equity subordinated to a given instrument class, the greater the protection offered to that instrument and the lower its expected loss.

» **Instrument volume.** The greater the volume of a given instrument class, the lower its loss severity, as more creditors can absorb a given loss. In this way an issue of debt can logically affect the expected loss for the instrument class as a whole by spreading losses across a larger pool.

We estimate the balance sheet at failure. We make forward-looking adjustments to the historical balance sheet where we expect a material change to the liability structure in the near-to-medium term. Such adjustments would typically be made when we have a high degree of confidence regarding the likely change and would generally be oriented toward our view of a balance sheet that will be sustained over time. We also incorporate our estimate of the proportion of deposits ranking pari passu with senior unsecured debt.

This approach enables us to make the necessary distinctions between different legal entities within a banking group, and between different types of debt (unsecured as opposed to secured). In most cases, we expect resolutions to be conducted according to national boundaries and we construct our LGF analysis based on the resulting resolution perimeter, i.e., excluding the balance sheets of entities we believe to be outside resolution or subject to a different resolution type. We also recognize that there may be exceptions to these assumptions: within the EU, for example, or where large non-domestic entities may be interconnected to such an extent that separate resolution is impractical.

Notching under Advanced LGF

The consideration of these four factors leads us to establish a notching differential relative to the Adjusted BCA, representing our view of the likely loss severity. For more details, see the "Discussion of Loss Given Failure and Additional Notching Considerations" section below.

This approach enables us to identify differences in likely loss severity that arise from distinctions in liability structures: essentially those with significant cushions of debt at a more junior level, and/or larger volumes of debt at the level concerned, which spreads risk. This results in greater differentiation across the liability structure, ranging from one notch below the Adjusted BCA, where we expect loss severity to be high in the event of failure, to three notches above the Adjusted BCA, where we expect loss severity to be extremely low.

Integrated into our approach is the possibility that there may be more than one potential "waterfall" — in other words, the relative ranking of instruments may be uncertain. In such cases, we may perform this analysis according to different hierarchies and then weight the outcomes according to our assessment of their likely relative probabilities. It is this probability-weighted outcome that represents our overall view on loss severity, absent support.

Additional Notching and the Preliminary Rating Assessment (PRA)

The above considerations provide our view on relative expected losses on different instruments in the event of the bank's failure, according to whether or not it is subject to an ORR. We then apply additional notching to reflect other instrument-specific characteristics affecting the probability of payment, e.g., coupon skip mechanisms. Taken together, the Adjusted BCA, Loss Given Failure notching and any additional notching result in our measure of intrinsic creditworthiness — absent government support — that we term the Preliminary Rating Assessment (PRA).

Government Support

Our approach to government support is similar to that for determining support from an affiliate. We use Joint Default Analysis (JDA), based on the following inputs:

» The unsupported creditworthiness of each debt class;

» The probability of public sector support being provided to a given debt class;

» The public body's capacity to provide support; and

» The dependence, or correlation, between support provider and bank.

Probability of Support

We assess the probability that a public body (usually a government but sometimes a central bank or supranational institution) will support an institution according to one of five categories, "Government-backed", "Very High", "High", "Moderate", and "Low". We make this assessment primarily through the analysis of the following:

» Public policy and presence of ORRs;

» Market share of domestic deposits and loans;

» Market impact;

» Nature of activity; and

» Public involvement.

These considerations inform our judgment about the level of support willingness for each major debt class, not just for the bank as a whole. This is important because we consider that support may be selective; for example, we may judge it more likely that a given public body provides support to the benefit of senior debt than junior debt. We may similarly consider on occasion that a government may seek to direct support to depositors rather than senior unsecured creditors.

Capacity to Provide Support

In general, we consider that a public body's long-term local-currency rating best reflects its capacity to provide support.

Dependence Between Support Provider and Support Recipient

Similarly to our affiliate support framework, we take into account the dependence or correlation between the supported bank and the relevant public entity. In the same way, we generally judge dependence to fall into one of three broad categories, "Very High", "High" and "Moderate".

In most instances, we assume that the dependence is "Very High". This reflects our judgment that the respective creditworthiness of governments and banking systems are very closely related. For some systems, however, the connections between the financial health of the government and banking system may be looser, resulting in a lower dependence assumption. For example, we may apply a "High" or "Moderate" dependence to banks in a system that is very small relative to government resources, if as a result we judge the default probabilities to be less closely related; or to a single bank within a system which principally operates outside its home country.

Applying Support

We employ JDA to provide an indicative range of potential ratings uplift from the PRA. We detail the mathematics behind this approach in Appendix 6. We typically employ our judgment of the specific circumstances in question to assign a given number of notches of support, usually within this range. Reflecting the inherent limitations of a mathematical model in real-life circumstances, in assigning ratings, the support we incorporate may vary in either direction from this guidance to reflect idiosyncratic

situations. We are likely to exercise caution in assigning many notches of uplift, in the absence of more tangible support.

Summary Review and Example of Assigned Instrument Ratings

The above stages, described more thoroughly in the sections that follow, explain how our typical analysis moves progressively from a broad assessment of generic risk in a given country to an instrument-specific credit rating describing expected loss.

» First, we determine the **Macro Profile**, communicating our view on systemic banking risk.

» We then consider bank-specific characteristics — both its **Financial Profile** and more qualitative factors — and combine them with the Macro Profile to produce the **BCA**, which represents our opinion of the likelihood of requiring extraordinary support to avoid default — or actually defaulting — on one or more debt obligations.

» The consideration of **Affiliate Support** determines the **Adjusted BCA**, using JDA.

» Our **LGF** analysis then incorporates the relative loss severity in the event of the bank's failure for different debt or deposit classes. For banks subject to ORRs, Advanced LGF takes into account the likely firm-wide loss severity, the outstanding amount of each instrument and the cushion of subordinated debt. Elsewhere, we employ a Basic LGF approach based on a simpler notching according to instrument type. Taken together with other instrument-specific characteristics, these elements provide a set of **PRAs** for each bank's rated debt or deposit classes.

» Finally, we take into account the potential for **Government Support**, again using JDA, and this results in our **long-term local and foreign currency ratings**, after due consideration of the relevant country ceilings. Short-term ratings are mapped from these long-term ratings.[13]

EXHIBIT 6

Example of Assigned Instrument Ratings

Banking Group ABC Inc.	**Country XYZ**
Macro Profile	**Strong**
Standalone assessment	
Baseline Credit Assessment	**ba1**
Affiliate Support uplift	**1**
Adjusted Baseline Credit Assessment	**baa3**

Debt Class	Instrument notching	Preliminary Rating Assessment	Government Support Notching	Local Currency ratings			Foreign Currency ratings		
				Long-term	Outlook	Short-term	Long-term	Outlook	Short-term
Counterparty Risk Assessment (CRA)	3	a3 (cr)	1	A2 (cr)	--	Prime-1 (cr)	--	--	--
Counterparty Risk Rating (CRR)	3	a3	1	A2	--	Prime-1	--	--	--
Deposits	2	baa1	1	A3	Stable	Prime-2	A3	Stable	Prime-2
Bank senior unsecured long-term debt	1	baa2	1	Baa1	Stable	Prime-2	Baa1	Stable	Prime-2
Holding company senior unsecured long-term debt	-1	ba1	0	Ba1			Ba1		
Bank dated subordinated debt	-1	ba1	0	Ba1			Ba1		
Bank non-cumulative preference shares	-2	ba2	0	Ba2 (hyb)			Ba2 (hyb)		

Source: Moody's Investors Service

[13] Please see our cross-sector methodology that discusses short-term ratings. A link to all of our cross-sector rating methodologies can be found in the "Moody's Related Publications" section of this report.

Discussion of the Baseline Credit Assessment Component

The Baseline Credit Assessment (BCA) is one of the four main components of our typical[14] overall approach to assessing credit risk for banks. In this component, we assess the standalone financial strength of the bank. This component has three sub-components, each of which has factors and some of which have sub-factors.

EXHIBIT 7

Baseline Credit Assessment: Sub-components, Factors and Sub-factors

BCA Sub-components	Factors	Sub-factors
Macro Profile	Banking Country Risk	Sovereign - Economic Strength
		Sovereign - Institutions and Governance Strength
		Sovereign - Susceptibility to Event Risk
	Credit Conditions	Private Sector Credit / GDP
		Growth in Private Sector Credit / GDP
	Funding Conditions	
	Industry Structure	
Financial Profile	Solvency	Asset Risk (Problem Loan Ratio)
		Capital (Tangible Common Equity / Risk-Weighted Assets)
		Profitability (Net Income / Tangible Assets)
	Liquidity	Funding Structure (Market Funds / Tangible Banking Assets)
		Liquid Resources (Liquid Banking Assets / Tangible Banking Assets)
Qualitative Adjustments	Business Diversification	
	Opacity and Complexity	
	Corporate Behavior	

Source: Moody's Investors Service

BCA Sub-component: The Macro Profile

In this sub-component of our BCA analysis, we assess the macro environment within which a bank operates. This assessment reflects our view that bank failures are very often closely associated with systemic crises driven by macroeconomic rather than idiosyncratic factors. We categorize these factors as follows:

» Factor 1: Banking Country Risk

» Factor 2: Credit Conditions

» Factor 3: Funding Conditions

» Factor 4: Industry Structure

The Banking Country Risk factor has three sub-factors that are from our sovereign methodology scorecard,[15] reflecting the shared influences of banking sector and sovereign creditworthiness. We combine these three

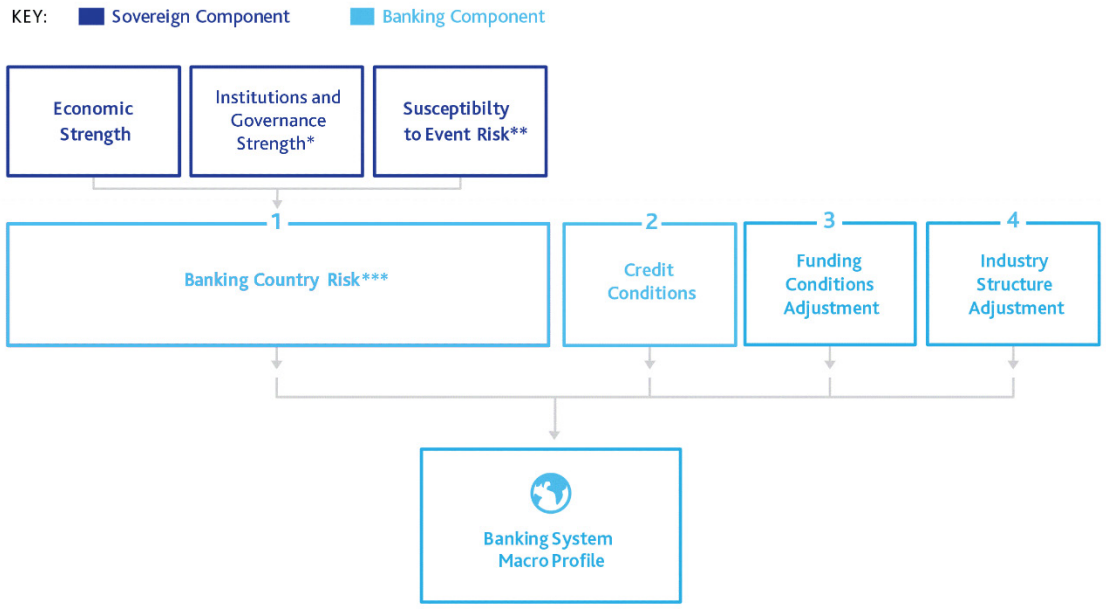
[14] For example, we may not perform a BCA analysis in the case of highly integrated and harmonized entities. Please see Appendix 2.

[15] For more details on our sovereign rating methodology, a link to our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section of this report.

sub-factors to create the Banking Country Risk score, illustrated below. The dependence of banking sector and sovereign creditworthiness is not exact, however, and strong sovereigns may have weak banking systems.[16] For this reason, we also incorporate three banking-specific factors to arrive at the Macro Profile.

EXHIBIT 8

The Macro Profile



*Excluding adjustment related to sovereign default history and track record of arrears

**Excluding risks related to the banking sector

***The initial score is expressed as a three-notch range. We then assign a single score that is within this range.

Source: Moody's Investors Service

1. Macro Profile Factor: Banking Country Risk

Why It Matters

The Banking Country Risk factor provides important indications of the economic and institutions and governance strength of the country within which a bank operates as well as the country's susceptibility to event risk.

How We Assess It

We measure or estimate Banking Country Risk using three sub-factors: Economic Strength, Institutions and Governance Strength (both of which are scored on an alphanumeric scale), and Susceptibility to Event Risk (scored on a broad alpha scale).

BANKING COUNTRY RISK SUB-FACTOR: ECONOMIC STRENGTH

Why It Matters

Economic strength matters because banks are highly exposed to, and their performance closely correlated with, macroeconomic factors. An environment where large swings in the rate of GDP growth are more common results in more pronounced business cycles, making a bank's asset quality and earnings more volatile and posing a greater risk to solvency. Conversely, larger, wealthier and more-diversified economies with better growth prospects also help underpin banking system strength.

[16] See Reinhart and Rogoff, *This Time is Different*, and IMF Working Paper 12/163: *Systemic Banking Crises Database: An Update*, Luc Laeven and Fabián Valencia.

How We Assess It

For this sub-factor, we use the Economic Strength factor score for the country from our sovereign methodology scorecard.[17]

BANKING COUNTRY RISK SUB-FACTOR: INSTITUTIONS AND GOVERNANCE STRENGTH

Why It Matters

The strength of a country's institutions matters because banks depend on a sound legal framework to enforce contracts, which are the basis of credit. An inability to enforce contracts, or a prevalence of corruption or other general institutional weaknesses, undermines the relationships between lenders and creditors and renders a banking system weaker.

How We Assess It

We use the Institutions and Governance Strength sub-factor score for the country from our sovereign methodology scorecard, excluding the adjustment for the sovereign's default history or track record of arrears.

We combine the scores for Economic Strength and Institutions and Governance Strength using equal weights to arrive at the Economic Resiliency score.

BANKING COUNTRY RISK SUB-FACTOR: SUSCEPTIBILITY TO EVENT RISK

Why It Matters

The sovereign's susceptibility to event risk, including political risk, the government's liquidity risk and the risk of external events, such as foreign-exchange shocks, has a significant bearing on the vulnerabilities of its banking sector. For example, a large current account deficit is often associated with a systemic increase in credit, which may precede a banking crisis.

How We Assess It

We use the Susceptibility to Event Risk factor in the sovereign rating methodology scorecard, excluding the Banking Sector Risk sub-factor.[18] Since the Macro Profile is used to assess the strength of the banking sector, we do not include the strength of the banking sector itself in this assessment. We consider other aspects of the banking system — its size, growth, funding vulnerabilities and structure — separately.

The Banking Country Risk Score

We combine the alphanumeric score for Economic Resiliency and the broad alpha score for Susceptibility to Event Risk using the table shown in Exhibit 9 below. The combined score, which is expressed on a scale from Very Strong (VS) to Very Weak Minus (VW-), becomes the midpoint of a three-notch initial Banking Country Risk Score range. The assigned Banking Country Risk Score is a single score that is within the initial range.

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

[18] In addition, we do not explicitly incorporate into our Macro Profile Sovereign Factor 3, Fiscal Strength. This is captured indirectly within BCA or support considerations, which assess the extent to which the BCA or ratings could exceed the sovereign rating.

EXHIBIT 9

Banking Country Risk: Combining Economic Resiliency and Susceptibility to Event Risk

Susceptibility to Event Risk \ Economic Resiliency	aaa	aa1	aa2	aa3	a1	a2	a3	baa1	baa2	baa3	ba1	ba2	ba3	b1	b2	b3	caa1	caa2	caa3	ca
aaa	VS	VS	VS	VS-	VS-	S+	S	S-	S-	M+	M	M	M-	W+	W+	W	W-	W-	VW+	VW+
aa	VS	VS	VS	VS-	VS-	S+	S	S-	S-	M+	M	M-	M-	W+	W	W	W-	W-	VW+	VW+
a	VS	VS	VS	VS-	VS-	S+	S	S-	M+	M	M-	M-	W+	W	W	W-	W-	VW+	VW+	VW
baa	VS	VS	VS	VS-	S+	S	S	S-	M+	M-	M-	W+	W+	W	W-	VW+	VW+	VW+	VW	VW
ba	VS	VS	VS-	S+	S+	S	S-	S-	M	W+	W+	W	W	W-	VW+	VW	VW	VW	VW	VW-
b	VS	VS-	S+	S	S-	S-	M+	M	W+	W+	W+	W	W-	VW+	VW	VW	VW-	VW-	VW-	VW-
caa	VS-	S+	S	S-	S-	M+	M	M-	W+	W	W-	W-	VW+	VW+	VW	VW-	VW-	VW-	VW-	VW-
ca	S+	S	S-	S-	M+	M	M-	W+	W	W-	VW+	VW+	VW+	VW	VW-	VW-	VW-	VW-	VW-	VW-

Source: Moody's Investors Service

We convert the assigned Banking Country Risk score to a numeric equivalent on a scale of 1 to 14, using the map shown in Exhibit 10 below.

EXHIBIT 10

Converting the Banking Country Risk Score to a Numeric Equivalent

Banking Country Risk Score	Numeric Equivalent
Very Strong	1
Very Strong -	2
Strong +	3
Strong	4
Strong -	5
Moderate +	6
Moderate	7
Moderate -	8
Weak +	9
Weak	10
Weak -	11
Very Weak +	12
Very Weak	13
Very Weak -	14

Source: Moody's Investors Service

We then apply the three banking-specific factors (described on the following pages), which can have the effect of adjusting the Banking Country Risk numeric score upward or downward.

2. Macro Profile Factor: Credit Conditions

Why It Matters

Credit conditions are important considerations for our assessment of the strength of the banking sector as a whole because high levels of debt or the rapid expansion of credit can signal credit quality problems that may emerge later.

How We Assess It

We measure or estimate Credit Conditions using two sub-factors.

CREDIT CONDITIONS SUB-FACTOR: PRIVATE SECTOR CREDIT / GDP

The ratio of private sector credit to GDP is a basic measure of leverage. The greater the stock of debt in relation to national income, the harder borrowers are likely to find it to repay that debt, other things being equal, and the more debtors are exposed to a reduction in economic activity or other shock. This is borne out by certain academic studies, which demonstrate that the credit/GDP ratio has been correlated with whether a credit boom turns into a credit bust with damaging consequences. The ratio requires careful interpretation: Higher levels of debt are the natural consequence of financial deepening as economies develop and may be more sustainable for some mature economies than for others.[19] We score this ratio along a scale of 1 to 15, typically using data published by the World Bank and other sources. All ratios that fall within each threshold are scored the same. For example, a ratio of 52% and a ratio of 58% would both have a score of 7.

EXHIBIT 11

Scoring Private Sector Credit / GDP

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
≤ 20%	20%-25%	25%-30%	30%-35%	35%-40%	40%-50%	50%-60%	60%-75%	75%-100%	100%-125%	125%-150%	150%-175%	175%-200%	200%-400%	> 400%

Source: Moody's Investors Service

CREDIT CONDITIONS SUB-FACTOR: GROWTH IN PRIVATE SECTOR CREDIT / GDP

Rapid growth in private sector credit is a classic indicator of an economic boom because it marks a deviation between credit and economic activity. Our observations concur with academic studies that have concluded it is an important indicator of greater risk-taking, which often precedes a crisis.

We score this ratio along a scale of 1 to 15, typically using data published by the World Bank and other sources. All ratios that fall within each threshold are scored the same. As with private sector credit/GDP, the accumulation of debt is sometimes associated with the process of financial deepening in developing economies, or sustainable increases in asset prices, and rapid growth does not necessarily signal the same risks in different economies.

EXHIBIT 12

Scoring 3-Year Change in Private Sector Credit / GDP

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
≤ -30%	-30%--20%	-20%--10%	-10%--7.5%	-7.5%--5%	-5%--2.5%	-2.5%-0%	0%-2.5%	2.5%-5%	5%-7.5%	7.5%-10%	10%-15%	15%-20%	20%-30%	> 30%

Source: Moody's Investors Service

[19] See IMF Staff Discussion Note, *Policies for Macrofinancial Stability: How to Deal with Credit Booms*, June 7, 2012.

Credit Conditions: Initial Overall Score

We combine our scores for each of the two ratios using a table, as set out in Exhibit 13 below. The combination of the two scores is positioned on a reduced scale of 1 to 7, rather than 1 to 15.

EXHIBIT 13

Combining Private Sector Credit and Its Rate of Change

Private sector credit / GDP \ Change in private sector credit / GDP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
9	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3
10	1	1	1	1	1	1	1	1	2	2	2	3	3	3	4
11	1	1	1	1	1	2	2	2	2	3	3	3	4	4	4
12	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5
13	1	2	2	2	3	3	3	4	4	4	4	5	5	5	6
14	2	2	3	3	3	4	4	4	5	5	5	5	6	6	6
15	3	3	3	4	4	4	5	5	5	6	6	6	6	7	7

Source: Moody's Investors Service

This approach has the effect of placing credit growth in the context of the state of development of the country's credit market — high growth in credit may be offset by a low stock, for example.

Using the table shown in Exhibit 14, we combine the outcome from the table above with the Banking Country Risk score. Exhibit 14 shows the number of notches that are subtracted from the numeric equivalent Banking Country Risk score based on any given combination of Banking Country Risk score and Credit Conditions score. For example, if the Banking Country Risk score is Strong (with a numeric equivalent of 4, per Exhibit 10 above) and the Credit Conditions score from Exhibit 13 above is 4, then there are 2 negative notches. We subtract -2 from 4 (4 minus negative 2), yielding an adjusted score of 6.

EXHIBIT 14

Credit Conditions Notching

Banking Country Risk	Credit Conditions Score 1	2	3	4	5	6	7
Very Strong	0	-1	-2	-3	-4	-6	-8
Very Strong -	0	-1	-2	-3	-4	-6	-7
Strong +	0	-1	-1	-2	-4	-5	-7
Strong	0	-1	-1	-2	-3	-5	-6
Strong -	0	0	-1	-2	-3	-4	-5
Moderate +	0	0	-1	-2	-2	-4	-5
Moderate	0	0	-1	-1	-2	-3	-4
Moderate -	0	0	0	-1	-2	-3	-4
Weak +	0	0	0	-1	-1	-2	-3
Weak	0	0	0	0	-1	-2	-2
Weak -	0	0	0	0	0	-1	-2
Very Weak +	0	0	0	0	0	-1	-1
Very Weak	0	0	0	0	0	0	-1
Very Weak -	0	0	0	0	0	0	0

Source: Moody's Investors Service

This has the effect of capping the benefit of either very low levels of debt (which usually indicate structural impediments to the growth of credit, rather than a healthy level) and rapidly decreasing credit (which is usually associated with deflation, which is often credit negative).

The notching relative to the Banking Country Risk score determines the extent to which Credit Conditions affect the overall Macro Profile. A country with a very strong Banking Country Risk score but with very poor credit dynamics will be affected more than a country with similar dynamics but with a very weak Banking Country Risk score.

Credit Conditions: Analytical Adjustments

The Credit Conditions adjustments may also incorporate qualitative considerations:

- Some countries may exhibit high levels of private sector debt relative to their GDP. However, this debt may be held predominantly at fixed rates and, hence, be less affected by interest rate rises, or the debt may be backed by a large stock of financial assets relative to the amount of debt outstanding, and, hence, present less risk. In general, where household financial assets exceed 300% of GDP, we would consider adjusting the Credit Conditions notching upward.
- Conversely, some countries may exhibit apparently benign levels of private sector credit relative to GDP, but this may mask considerable concentrations that increase credit risks.
- Some countries may be characterized by a large degree of foreign-currency lending that embeds a degree of exchange-rate sensitivity in lending, which, in turn, raises credit risk for the banking sector.
- Real estate price inflation, especially in commercial real estate, often signals incipient credit problems.
- The nature of key lending products and the kind of recourse or other protections offered to creditors may be considerations.
- Some countries may show other signs of loose or tight credit conditions not captured by the financial metrics, as shown by bank-loan officer surveys, for example.

In assigning this score, we may also consider analysis that we conduct in our other sectors:

» The "credit boom" adjustment sub-factor assessed within our sovereign ratings

» The assessment of housing market attributes as described in our methodology for mortgage insurers[20]

» The house price stress rates as described in our methodology for residential mortgage backed securities[21]

This list is not exhaustive, and we may make similar adjustments for other features of a given banking system that indicate vulnerability or evoke credit concerns. In some circumstances, other asset-price indicators — commodities or equities, for example — could be assessed as indicators of an asset-price bubble, signaling potential solvency problems for banks.

3. Macro Profile Factor: Funding Conditions

Why It Matters

The role of financial institutions as intermediaries between relatively short-term deposits and longer-term loans makes them highly vulnerable to withdrawals of funding following a loss of market confidence. In some cases, the loss of confidence may be idiosyncratic. However, funding problems often develop at the level of a given banking system, when concerns are not confined to individual banks. This can also reflect the considerable asymmetry of information between investors and issuers, and the uncertainty about banks' solvency when doubts arise over asset quality. In highly interconnected systems, a problem with one institution can be swiftly transmitted to another through counterparty exposures.

As such, funding problems can both reflect and create systemic vulnerabilities. While we reflect the strengths or weaknesses of banks' individual funding profiles (e.g., the maturity mismatch taken on, the liquid assets held) in our Financial Profile analyses, we believe it is important to consider the pressures on the system as a whole.

How We Assess It

Funding conditions, while informed by certain quantitative indicators, are primarily assessed qualitatively. Our assessment can lead to upward or downward notching of the Banking Country Risk score. Transient changes in market prices are of little relevance to our fundamental risk analysis; however, broad indicators of actual or potential sustained changes in the aggregate supply (quantity or cost) of funding to the banking system provide useful insight into the emergence of system-wide problems that can ultimately change banks' fundamentals through eroded profitability or forced deleveraging in response to scarce or costly funding. In view of the above, we may consider indicators of system-wide funding stress before they affect bank-specific metrics.

Indicators may relate to the quantity or cost of funding available to banks. They often vary from country to country, but may include the following:

» **Market funding measures**. We may consider relevant indices of market funding cost and availability, for example the spread between a bank's borrowing rate (e.g., an interbank rate), which exposes lenders to counterparty risk, and the overnight indexed swap (OIS). The difference between these rates is indicative of the market perception of credit and liquidity risk in the interbank market. Rapid changes in this measure can indicate a market-wide funding problem that can affect all banks' funding in the given currency.

[20] A link to our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section of this report.
[21] A link to our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section of this report.

» **Central bank balance sheets**. Sharp increases in the balance sheet of a national central bank may indicate that, faced with funding stress, banks themselves are depositing cash at central banks to minimize risk. It can also indicate the activation of extraordinary support operations in response to funding stress. Expansion may also be a result of quantitative easing, which could be positive for banks.

Where any of these factors changes suddenly for the worse, we may adjust downward the overall Macro Profile to incorporate our view of the emergence of a material funding constraint. However, we expect to do so only where such changes are material and sustained to the extent that they are likely to affect fundamentals.

We also consider potential upward adjustments. We may adjust the scores upward in cases where a country displays idiosyncratic features that may bolster the liquidity of its banking system (e.g., countries with particularly large foreign-exchange reserves, or where there are unusual mechanisms for providing liquidity to banks), to the extent that these are not already captured through other indicators.

4. Macro Profile Factor: Industry Structure

Banking sectors may exhibit structural characteristics that indicate strengths or vulnerabilities. These may include under- or overcapacity, financial innovation, liberalization and other competitive distortions, such as a dominant government role.

Why It Matters

Overcapacity and other competitive distortions matter because when too much loan capital chases a fixed amount of business volume, it can result in irrational pricing and weak underwriting standards, ultimately resulting in higher credit costs to the banking system. Financial innovation and liberalization matter because, while they can bring long-term benefits, they often act as a trigger for a period of rapid credit expansion. For example, in some countries, credit is subject to government restrictions. If suddenly lifted, this can unleash a risky credit boom as banks seek to deploy capital more quickly. The ending of capital controls can have a similar impact.

How We Assess It

We incorporate the Industry Structure factor qualitatively as a notching adjustment to the Banking Country Risk score. One indicator is the level of concentration within a banking sector, with highly fragmented systems often suffering from overcapacity. We may consider concentration as measured by Herfindahl-Hirschman indices[22] and the combined domestic market share of the system's five largest banks, which may be supplemented by other observations. These quantitative indicators may not reveal a complete picture because the impact on the country's banking industry of a given level of concentration depends on the nature of the market structure. For example, heavily regionalized banking systems that appear fragmented may in reality be concentrated within local markets with high barriers to entry and display stable returns.

Another source of competitive distortion is the significant role of institutions operating on non-commercial terms. Examples may include certain public-sector-owned or sponsored institutions, and some mutual banks. The degree to which such a presence results in a harmful market distortion depends on its nature, not just its extent. Where we consider that competition from such institutions has a negative effect on the industry, we may adjust the score. Our assessment of innovation is also qualitative because innovation is situation- and time-specific; thus, indicators are varied. However, significant changes to legislation or increases in innovative financing structures are typically considered warning signals that may lead us to adjust the score downward. Innovations that benefit the banking system on a sustained basis may lead to an upward adjustment.

[22] The Herfindahl-Hirschman Index (HHI) is commonly used (notably by US anti-trust authorities) to measure market concentration. The HHI of a market is calculated by summing the squares of the percentage market shares held by the respective firms.

We typically assess the likely impact of liberalization and innovation by considering the barriers to entry within a system, modifications to banking regulation that may result in changing underwriting standards, new channels of credit intermediation or demonstrated changes in appetite for risk in the system. Use of off-balance-sheet or non-bank vehicles can also indicate innovation related to a higher appetite for risk. Examples have included a sharp growth in "shadow banking" in the form of securitized credit. Shadow banking is intrinsically difficult to identify and measure, and our assessment is guided by our understanding of the variety and prevalence of off-balance-sheet vehicles within the banking sector.

Combining Funding Conditions and Industry Structure

Funding Conditions and Industry Structure are scored as direct adjustments to the Banking Country Risk score, after adjusting for Credit Conditions. For Funding Conditions and Industry Structure, there is no limit to the number of positive or negative notching adjustments; however, the resultant numeric score cannot be lower than 0 or higher than 14. The result of these further adjustments is subtracted from the adjusted numeric Banking Country Risk score.

For example, if the numeric Banking Country Risk score after adjusting for Credit Conditions is 6, and the adjustment for Funding Conditions is two negative notches and the adjustment for Industry Structure is one positive notch, the net effect of Funding Conditions and Industry Structure is one negative notch, yielding a Macro Profile numeric score of 7.

The Macro Profile

Assigning the Overall Macro Profile for Banks Operating in a Single Country or Region

The resultant numeric score for Banking Country Risk, after the adjustments for Credit Conditions, Funding Conditions and Industry Structure, is mapped back to the Very Weak Minus to Very Strong Plus scale using Exhibit 15 to produce an overall Macro Profile for a given banking system. If we carry over our example from above, the Macro Profile numeric score of 7 maps back to a score of Moderate.

EXHIBIT 15

Assigning the Overall Macro Profile

Macro Profile Score	Numeric Equivalent
Very Strong +	0
Very Strong	1
Very Strong -	2
Strong +	3
Strong	4
Strong -	5
Moderate +	6
Moderate	7
Moderate -	8
Weak +	9
Weak	10
Weak -	11
Very Weak +	12
Very Weak	13
Very Weak -	14

Source: Moody's Investors Service

Assigning the Overall Macro Profile for Banks Operating in Multiple Countries or Regions

Where a bank operates in a range of countries, the applicable Macro Profile is usually a weighted average of the Macro Profiles of the principal countries in which the bank operates, in proportion to the bank's risk exposure in those countries. We typically weight the individual country profiles by balance-sheet presence in each system, as measured by exposure-at-default (EAD), although we may use other measures, such as risk-weighted assets (RWAs), loans, revenue or a bank's liability structure where EAD is not available or where we believe alternative measures form a more representative view of the bank's risk profile.

In cases where geographical reporting is on a regional rather than a country basis, we would typically assign regional scores that are informed by the weighted average (e.g., by nominal GDP) of the underlying country scores.

The Macro Profile influences a bank's financial ratio scores in the Financial Profile analysis — for example, a bank in a strong system with a given capital ratio would be assigned a higher initial capital score than a bank in a weaker system with the same capital ratio.

BCA Sub-component: Financial Profile

In this sub-component of our BCA analysis, we assess the bank's financial fundamentals. Our assessment focuses on the twin fundamentals of solvency and liquidity, which are important indicators of an institution's exposure to shocks and capacity to absorb them.

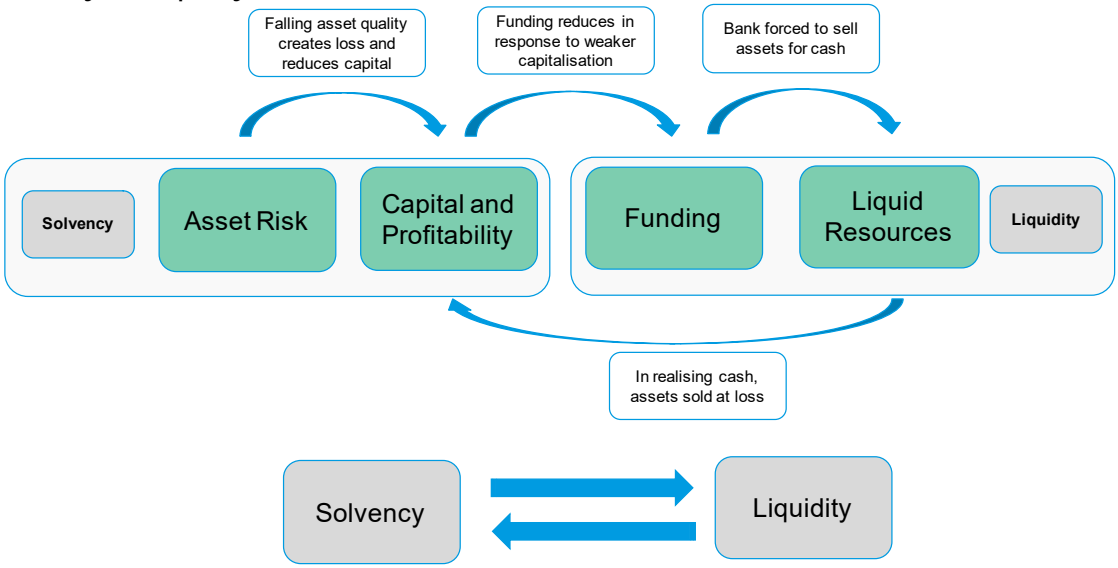
» Factor 1: Solvency: The combination of a bank's risks (credit, market, operational and other risks) and the extent to which its capital and earnings create capacity to absorb any resultant losses.

» Factor 2. Liquidity: The combination of the mismatch between the maturity of a bank's assets and its liabilities, the reliability of its funding and its capacity to meet cash outflows from liquid reserves.

These two factors are, moreover, fundamentally and closely interrelated (see Exhibit 16). A bank's liquidity depends on its ability to fund itself, which, in turn, depends on the confidence of its counterparties. The latter depends on the counterparties' perception of the bank's solvency and the quality of its assets. The quality of its assets depends in part on its ability to fund them: If a bank has to dispose of assets ahead of their contractual maturity, then it may not realize book value for them, resulting in losses and, hence, a reduction in capital. If this equilibrium is disturbed, bank creditworthiness can erode very rapidly.

EXHIBIT 16

Solvency and Liquidity Are Interrelated



Source: Moody's Investors Service

In assessing both factors, we consider gross risk and risk mitigants. For the solvency factor, gross risk is a measure or estimate of loss potential (chiefly from credit, market and operational risks). Mitigants are the bank's capital and reserves, which are designed to absorb losses, and its earnings capacity. For the liquidity factor, we assess gross risk according to the use of less reliable funding, typically wholesale funding sourced from institutional investors that do not benefit from deposit insurance, rather than retail insured deposits. Its mitigants are the bank's reserves of liquid assets and asset/liability matching, which enable it to bridge periods of funding instability.

Underlying each factor are sub-factors, which consist of a ratio, a Macro Profile overlay and other sub-factor considerations. We typically assess each sub-factor using broad, publicly available measures before making adjustments that incorporate a more nuanced, forward-looking view and lead to an assigned score.

We use financial ratios that are generally available based on publicly available data. As further described below, we may incorporate in our adjustments to the solvency and liquidity ratios other metrics or ratios that may not be universally or publicly available. For instance, our scoring adjustments would typically consider the Basel Committee on Banking Supervision's Common Equity Tier 1 ratio, Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), where available.

All of our ratios are adjusted in accordance with our cross-sector rating methodology that discusses our financial statement adjustments for financial institutions.[23] We may also make other analytical adjustments that are specific to a particular bank.

Scorecards typically include ratios derived from historical financial statements. For the problem loan ratio and profitability ratio, we start with the weaker of the three-year average and the latest annual or 12-month figure. For the capital ratio, we use the latest reported annual or 12-month figure. For the funding structure and liquid resources ratios, we use the latest fiscal year figures.

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

We usually calculate ratios based on consolidated financial data, up to the level of the ultimate holding company. In some circumstances, ratios based on a different view of financials better reflect the rated entity's probability of failure, and we may, for example, employ data at the operating bank level, i.e., excluding the holding company, or on an unconsolidated basis, i.e., excluding certain subsidiaries.

Integration of the Macro Profile

Each ratio is initially mapped to one of 15 categories, ranging from Very Strong Plus (VS+) to Very Weak Minus (VW-), yielding a raw score. In order to determine the initial ratio score, we integrate the raw score (e.g., Medium Plus, or M+) with the relevant Macro Profile for the institution using a dynamic relationship, shown in Exhibit 17, and the result is an alphanumeric expressed on our "aaa" to "caa3" BCA scale. (As described below, assigned scores also reflect adjustments that may be made to initial scores.)

Based on the dynamic weighting, banks in the weakest systems do not receive initial scores above b1, while banks in the strongest systems can receive initial scores from aaa to caa3. Thus, for example, two banks with the same ratio of tangible common equity to risk-weighted assets could receive different initial capital scores depending on their Macro Profiles (see Exhibit 17).

EXHIBIT 17

Relationship Between Financial Ratio Raw Score, Macro Profile and Initial Score

Macro Profile \ Financial Ratio	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
VS+	aaa	aaa	aa1	aa1	aa2	aa3	a1	a3	baa1	baa2	ba1	ba3	b2	caa1	caa3
VS	aaa	aa1	aa1	aa2	aa3	a1	a2	a3	baa1	baa3	ba1	ba3	b2	caa1	caa3
VS-	aa1	aa1	aa2	aa2	aa3	a1	a2	baa1	baa2	baa3	ba2	b1	b2	caa1	caa3
S+	aa1	aa2	aa2	aa3	a1	a2	a3	baa1	baa2	ba1	ba2	b1	b3	caa1	caa3
S	aa2	aa2	aa3	a1	a2	a3	baa1	baa2	baa3	ba1	ba3	b1	b3	caa1	caa3
S-	aa3	aa3	a1	a2	a3	a3	baa2	baa3	ba1	ba2	ba3	b2	b3	caa2	caa3
M+	a1	a1	a2	a3	a3	baa1	baa2	baa3	ba2	ba3	b1	b2	b3	caa2	caa3
M	a2	a2	a3	baa1	baa1	baa2	baa3	ba1	ba2	ba3	b1	b3	caa1	caa2	caa3
M-	a3	a3	baa1	baa2	baa3	baa3	ba1	ba2	ba3	b1	b2	b3	caa1	caa2	caa3
W+	baa1	baa2	baa2	baa3	ba1	ba2	ba2	ba3	b1	b2	b3	b3	caa1	caa2	caa3
W	baa2	baa3	ba1	ba1	ba2	ba3	ba3	b1	b2	b3	b3	caa1	caa2	caa2	caa3
W-	baa3	ba1	ba2	ba3	ba3	b1	b2	b2	b3	b3	caa1	caa1	caa2	caa2	caa3
VW+	ba1	ba3	ba3	b1	b2	b2	b3	b3	caa1	caa1	caa2	caa2	caa2	caa3	caa3
VW	ba3	b1	b2	b3	b3	caa1	caa1	caa1	caa2	caa2	caa2	caa2	caa3	caa3	caa3
VW-	b1	b3	caa1	caa1	caa2	caa2	caa2	caa3	caa3	caa3	caa3	caa3	caa3	caa3	caa3

Source: Moody's Investors Service

This treatment reflects our view that even banks with very strong financials are considerably constrained where macro conditions are very poor, while banks can fail even in the strongest of systems. Our BCA for a bank in a strong system is thus more sensitive to changes in its idiosyncratic credit characteristics.

Other Sub-factor Considerations

Each score is driven not only by historical data but also typically reflects our forward-looking expectations and scenario analysis. For example, if a bank has recently raised significant capital, then the score is more likely to be different from the score based on the historical ratio. As another example, where a problem loan ratio is rising rapidly, the score will typically be heavily influenced by the ratio that we expect will be reached over the 12- to 18-month outlook horizon, or in some cases, a longer horizon. For more details, please see Appendix 5.

Our scoring of Financial Profile sub-factors may be influenced by directional shifts, especially where we expect a significant structural change, e.g., resulting from a merger or acquisition, or where we expect a

major adjustment in the bank's balance sheet dynamics, e.g., a rapid loss of deposits or liquid assets. We may also consider non-public information.

We also may incorporate other related metrics and considerations that provide important context in assigning final sub-factor scores. We may consider the underlying dynamics that have or are likely to influence the evolution of the ratios, their positioning relative to peers and the rate at which they are changing. Sudden changes, whether in financial ratios or strategies, can signal a shift in future ratios and credit risk profiles. For instance, we generally assign individual sub-factor scores of "ca" or "c" in cases where we expect a given factor to lead to the imminent failure of the institution.[24]

We consider the broader context within which each bank operates, as well as other relevant dynamics that influence these banks' asset risk, capital, profitability, funding structure and liquid resources. The importance of these other considerations can vary, as can their combined impact. The initial score itself can also affect the degree of any adjustment.[25] For these reasons, we typically assess their impact as a whole on each sub-factor, rather than with respect to a fixed weight or set of thresholds, and the assigned alphanumeric sub-factor score incorporates this qualitative assessment. Each financial profile sub-factor thus has a raw ratio score, an initial score and an assigned score. Below we discuss the individual factors and our scoring of sub-factors in greater detail.

[24] In such cases, this weakest assigned sub-factor score will cause the scorecard to yield an overall Financial Profile of "ca" or "c".

[25] For example, if two banks in the same country have similarly high exposure to the real estate sector, but the initial asset risk score for one bank is significantly lower than for the second bank, there may be a lesser sector concentration adjustment incorporated in the first bank's assigned asset score.

Combining Sub-factor Scores into Factor Scores and an Overall Financial Profile Score

Initial and assigned sub-factor scores are then converted to numeric values of 1 to 19, based on the table below (Exhibit 18).

EXHIBIT 18

Financial Profile Sub-factor Score Numeric Equivalents

Sub-factor Score	Numeric Equivalent
aaa	1
aa1	2
aa2	3
aa3	4
a1	5
a2	6
a3	7
baa1	8
baa2	9
baa3	10
ba1	11
ba2	12
ba3	13
b1	14
b2	15
b3	16
caa1	17
caa2	18
caa3	19

Source: Moody's Investors Service

The numeric score for each sub-factor initial score and assigned score is multiplied by the weight for that sub-factor, which is shown in Exhibit 19, with the results in each case then summed to produce two aggregate weighted factor scores. Each aggregate weighted factor score is then rounded to the nearest integer. The numeric equivalents of each factor score are then multiplied by the weight for that factor, with the result then summed to produce an aggregate weighted factor score. The number is rounded to the nearest integer and mapped back to an alphanumeric equivalent based on the table above (Exhibit 18) to arrive at a Financial Profile alphanumeric score. For example, a bank with an aggregate financial profile score of 11.7 would have a Ba2 Financial Profile score.

However, in cases where any assigned Financial Profile sub-factor score is "ca" or "c", it causes the scorecard to yield an overall Financial Profile score of "ca" or "c".

EXHIBIT 19

Financial Profile Weighting

Rating Factors	Factor Weighting	Sub-factors	Sub-factor Weighting
Solvency	65%	Asset Risk	25%
		Capital	25%
		Profitability	15%
Liquidity	35%	Funding Structure	20%
		Liquid Resources	15%
Total	**100%**	**Total**	**100%**

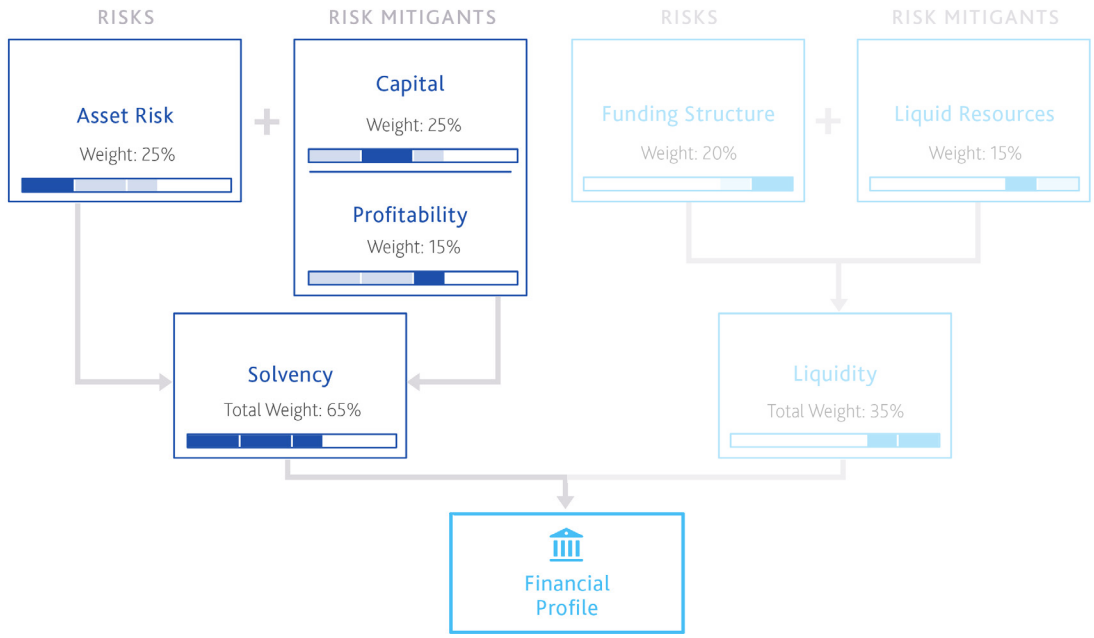
Source: Moody's Investors Service

1. Financial Profile Factor: Solvency

In assessing solvency, we consider a combination of gross risk (overall asset risk, chiefly determined by credit, market and operational risks) and loss mitigants (capital, earnings and provisions). This factor has three sub-factors.

EXHIBIT 20

Scorecard Structure — Solvency Factor



Source: Moody's Investors Service

SOLVENCY SUB-FACTOR: ASSET RISK (25% WEIGHT)

Why It Matters

A bank's asset risk is fundamental to creditworthiness because banks have high leverage, which implies that a small deterioration in asset value has a large effect on solvency. Credit quality problems are typically at the root of most bank failures, even though these problems can take a variety of forms, for example:

» A deteriorating value of the collateral that is backing loans

» A reduced ability to keep current with mortgage payments on the part of homeowners

» Depressed economic activity resulting in lower revenue for a bank's corporate customers, reducing customers' ability to pay back their loans

» Changing legal framework and social attitudes toward personal debt, resulting in higher losses

How We Assess It

We use the ratio of problem loans to gross loans (the problem loan ratio), calculated or estimated as follows:

Problem Loans / Gross Loans and Leases to Customers

As loan quality deteriorates, the problem loan ratio rises, signaling potential problems, credit losses and consequent pressure on solvency, reducing the earnings and equity-capital buffers that protect bondholders. We score the ratio using the grid shown in Exhibit 21.

EXHIBIT 21

Scoring Problem Loans / Gross Loans

Sub-factor	Sub-factor Weight	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
Asset Risk	25%	≤ 0.5%	0.5%-0.75%	0.75%-1%	1%-1.5%	1.5%-2%	2%-3%	3%-4%	4%-5%	5%-6%	6%-8%	8%-10%	10%-15%	15%-20%	20%-25%	> 25%

Source: Moody's Investors Service

Other Considerations for the Asset Risk Sub-factor

Loan Growth (adjustment to Asset Risk sub-factor score)

The rate of historical loan growth can be a leading indicator of asset-quality deterioration. Many cases of bank failure show a rate of loan growth that is higher than the market average. Higher-than-average rates of loan growth suggest lower underwriting standards and a more aggressive strategy, the consequences of which in terms of asset quality may only be revealed in a downturn.

Loan growth in excess of 10% a year over a three-year period typically triggers closer analysis to gauge whether this growth indicates deteriorating asset quality. In this analysis, we typically consider the origin and nature of the growth, together with any mitigating factors, such as rapid nominal GDP expansion, the bank's loan growth relative to its markets and growth in any particular categories we consider higher risk. In general, we adjust downward the Asset Risk score where the bank's loan growth rate exceeds the relevant market benchmarks by more than 50%. Where high-risk loan categories exhibit absolute growth that exceeds 10% a year or exceed local-market growth by more than 50%, we may also adjust the Asset Risk score downward. In arriving at the assigned score, we typically take the following into account:

» The starting point score. If this is already very low, e.g., in the "b" or "caa" categories, we may not adjust the score because the problem loan ratio may already reflect the consequences of high loan growth.

» The economic growth dynamics. In a faster growing emerging economy, faster credit growth may be less cause for concern or may already be captured in the Macro Profile sub-component.

» Timing. Faster-than-average growth matters more at the peak of the credit market than at other times.[26]

[26] See *The early 1990s small banks crisis: leading indicators*, Bank of England Financial Stability review.

» **Composition**. Sometimes an overall modest rate of loan growth conceals significant and risky growth in sub-portfolios that subsequently represent significant risk.

Banks that exhibit absolute loan growth in excess of 10% a year, or growth that is more than 50% higher than growth in the local market, are unlikely to be assigned Asset Risk scores above "baa", without other mitigants. Banks with particularly high loan growth are unlikely to be assigned Asset Risk scores above "ba", even where problem loans are relatively low. We would not expect the score to exceed "b" where this growth is heavily driven by high-risk asset classes. In all cases, we may take into account other mitigants, for example where we believe underwriting standards are highly prudent.

Credit Concentration (adjustment to Asset Risk sub-factor score)

We assess the extent to which a bank's credit exposures are concentrated in:

» A small group of counterparties;

» A single industry sector; or

» A limited geographic area.

Counterparty credit concentration is important because banks lend to individuals and companies whose individual creditworthiness is often low. The smaller the number of exposures, and the more correlated, the greater the risk. A large, granular and imperfectly correlated portfolio of assets will result in asset quality considerably superior to a small, concentrated one, even where the individual creditworthiness of the loans is the same.

We also consider sector concentration to be important. These exposures matter because companies in the same industry tend to be correlated as they are exposed to the same market forces. For this reason, we take into account large concentrations in certain sectors, including in other firms in the financial sector. However, not all concentrations are equal, as some industry exposures are riskier than others (e.g., commercial real estate, due to its particular cyclicality that prompts high volatility in loss rates).[27] Geographic concentration matters because a group of borrowers in a small geographic area are likely to be more correlated than those dispersed across different regions or countries, due to the inherently tighter interrelationships between different borrowers' customers. Geographic diversity lessens this risk, although the relationship has inherent complexity. The extent of the benefit of diversification depends on the linkages between the countries in which the bank operates, the bank's relative exposure to these countries and their population (with smaller countries usually offering less diversification than larger ones). We may assess geographic concentration by using the composition of each bank's Macro Profile.

We may adjust this sub-factor due to other forms of credit concentration, outside the loan book. These other asset risks can take a variety of forms, ranging from corporate bonds to structured credit assets and even sovereign debt, all potentially presenting credit risk and thus affecting asset quality. Typically, they are held at fair value and as such are not included in non-performing or impaired loan metrics. Nonetheless, their risk can be high and fair values may be difficult for a bank's accountant to measure and for analysts to assess, leading to a potential for rapid write-downs that can erode a bank's capital.[28]

In the absence of standard global industry definitions or disclosure standards, there is no standard ratio for measuring counterparty, sector or geographic concentrations, and we typically use judgment and available

[27] See for example *An analysis of the impact of the Commercial Real Estate Concentration guidance*, published by the Office of the Comptroller of the Currency and the Board of Governors of the Federal Reserve System, April 2013. This shows that US banks which exceeded certain thresholds of concentration to commercial real estate and certain levels of growth in their exposure displayed failure rates considerably in excess of those below these levels.

[28] For example, certain structured credit assets generated significant losses for banks and have been a major factor behind bank failures.

information, including discussions with issuers and other market participants, in assessing these risks and assigning the Asset Risk sub-factor score.

A positive adjustment to the Asset Risk sub-factor score is possible if a bank's exposures are spread globally or across many diverse geographic regions, and where the bank's largest exposures are modest relative to capital (e.g., less than 100% of tangible common equity, or TCE), with no single dominant sector exposure (i.e., largest exposure to a single sector of less than 200% of TCE), and no concentrations to a single sector we consider to be high risk (e.g., commercial real estate) of more than 50% of TCE. Banks with low problem loans, very broad geographic and sector diversification, and no major single-name concentrations may achieve an Asset Risk score in the "aa" category, in the absence of other constraints.

We may reduce our Asset Risk score where exposures are concentrated within a region or a relatively small undiversified economy, where the bank's largest 20 exposures are collectively large (e.g., 200% of TCE), where exposures to a single sector are material (e.g., 500% of TCE) or where there are more modest concentrations to a high-risk sector (e.g., 100% of TCE). In the event that such guidelines are met for one or more categories of concentration, we would likely assign a lower Asset Risk score, and where concentration is considered severe, the assigned Asset Risk score is unlikely to be above the "ba" category, without other mitigants.

Problem Loan and Collateral Coverage (adjustment to Asset Risk sub-factor score)

A proportion of a bank's loans will almost certainly become impaired and create losses. This is inherent in banking, and banks make varying levels of provisions in expectation of these losses. Strong loan-loss reserve coverage may mitigate the risk of problem loans, while low levels of coverage may expose banks to the risk of volatility in provisioning and unexpected losses that erode capital.

The nature of the impaired assets is important to our assessment of the sufficiency of loan loss provisions. For example, we might expect a credit card lender to make provisions covering the vast majority of its problem loans, depending on local market practices and recovery techniques, because such unsecured loans are seldom repaid in full once seriously delinquent. By contrast, a mortgage lender operating in a market with full recourse to the borrower, stable expected house prices and low loan-to-value ratios may need only a relatively low level of provision coverage, due to the supporting collateral.

Where loan-loss provisions and high-quality collateral (e.g., physical assets, cash or securities) exceed problem loans by a considerable margin on a sustainable basis — for example, twice the level of problem loans — we may consider this a further source of reserves and loss absorption, which could lead us to adjust our assigned Asset Risk sub-factor score upward. We would, however, be unlikely to make an upward adjustment simply because problem loans are very low at a point in time, because such small numbers can rapidly change and may not be sustainable.

We may consider negatively adjusting our Asset Risk sub-factor score if we conclude that problem loans are not fully covered by provisions, expected recoveries and collateral. Such an adjustment would typically be one notch when the shortfall is relatively modest (e.g., a shortfall of 10% of problem loans). However, this downward notching could widen if we considered that latent losses on reported problem loans were likely to significantly exceed provisions with a material impact on capital.

Long-Run Loan-Loss Performance (adjustment to Asset Risk sub-factor score)

The cost of problem loans results in income statement impairments and charge-offs. While the recognition of these costs in financial statements can vary due to the reasons discussed above, over the long run the true economic credit losses in a portfolio should be visible through the income statement. For this reason,

we also consider the long-run credit costs relative to a bank's portfolio as a guide to its through-the-cycle riskiness.

For example, where problem loan ratios are very low, but the long-run loss rate is high, we would consider adjusting the Asset Risk sub-factor score downward to take this into account, because the problem loan ratio may not fully reflect the short- and long-term asset risk fundamentals. This dynamic of a low problem-loan ratio but high credit costs would likely be the case, for instance, for a bank providing credit card finance, which is typically characterized by high loss rates but not necessarily high levels of problem loans on the balance sheet, because bad debts are often charged off rapidly. On the other hand, a mortgage lender may exhibit high problem-loan ratios, but face little risk of loss due to superior recoveries, reflected in low loan-loss charges over the long term.

In this context of credit costs, by long run we generally mean approximately 10 years or a period covering a business cycle, i.e., including a period of asset-quality problems and recoveries. If, over such a time period, loan-loss charges consume less than 40% of pre-provision earnings — and do not exceed 60% of pre-provision earnings in any single year — then this suggests that asset quality is generally good and stable and supportive of a relatively high Asset Risk score, which may be in the "baa" category or higher, depending on other factors.

However, where loan-loss charges over such a time period consume more than 50% of pre-provision earnings, we would typically consider this indicative of an Asset Risk score in the "ba" category or lower, depending on other factors. Where a bank loses substantially more than 50% of its pre-provision earnings in credit costs and/or these charges are very volatile, the assigned score could be placed in the "b" category or lower.

Differences in Problem Loan Recognition (adjustment to Asset Risk sub-factor score)

Our view of asset risk is also affected by our assessment of the reliability of the reported level of problem loans, which depends, in turn, on local accounting standards, regulatory requirements and a bank's interpretation of them. We may adjust scores to take into account different accounting definitions and supervisory and legal practices. In jurisdictions where definitions of problem loans are relatively narrow or where we believe a bank's interpretation restricts recognition, there is a greater risk of understatement of problem loans, and we may adjust our Asset Risk sub-factor score downward accordingly.

Moreover, due to legal practices in some countries, there is a short time lag between recognition of a problem loan and charge-off. As a result, problem loans can be very low at a given point in time even if problem loan formation is high; thus, the problem loan ratio itself may understate the riskiness of the portfolio. In other countries, problem loans tend to be retained on balance sheet for extended periods, in some cases for several years. This can lead to high reported problem loans even when problem loan formation is moderate, and, assuming they are provisioned appropriately, there may be little residual risk. Therefore, we use our judgment in assigning the Asset Risk sub-factor score, informed by the rate of problem loan formation, our understanding of local accounting standards, problem loan management and legal practices, and their impact on the bank's economic position.

We may therefore adjust upward our Asset Risk sub-factor score when we consider that the problem loan ratio overstates risk and reduce our Asset Risk score where we consider that the problem loan ratio understates risk.

Non-lending Credit Risk (adjustment to Asset Risk sub-factor score)

Banks' credit risk may not be restricted to their loan books. Some banks may, for example, undertake leasing activity, where risk is principally related to residual value, or hold bond portfolios. Risks of this nature are not typically well captured by problem loan or impairment charge metrics. As such, we typically consider information on lease residual value and other forms of non-lending credit risk as part of our overall assessment of asset risk. This may lead us to adjust our Asset Risk sub-factor score to incorporate credit risk embedded in leasing or securities portfolios. Where we consider these risks to be material (for example, with long-run losses consuming an average of 10% or more of pre-provision earnings), we consider reducing our Asset Risk score by one or more notches. This would be particularly relevant where potential losses are well above the 10% threshold, unless we considered the initial score already sufficiently low (e.g., in the "ba" category or below) and it fully reflected our view of asset risk.

Market Risk (adjustment to Asset Risk sub-factor score)

Market risk is an inherent financial risk for many institutions and can arise in the following main ways:

» Trading risk. Origination, market-making, proprietary trading and hedging activities can result in losses arising from changes in the market value of positions.

» Investment risk. A bank makes 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.

» Interest-rate risk in the banking book. A bank may be exposed to a steepening or flattening of the yield curve, for example, or to basis risk where loans are priced relative to one benchmark and liabilities relative to another.

» Foreign-exchange risk. A bank may be exposed to movements between two or more currencies.

» Pension risk. A bank may be exposed to potential movements in the assets of a pension fund relative to its liabilities, requiring it to inject cash to protect scheme/plan members.

» Insurance risk. A bank may be exposed to changes in the market value of assets in its insurance subsidiary.

The related risks can be assessed in a variety of different ways. Value at Risk (VaR) is a commonly used measure of trading risk and is the basis for regulatory capital charges for market risk for many large banks. Yet it has been shown to be subject to significant differences in modeling and valuation approaches,[29] raising concerns about consistency. This partly reflects data limitations and different assumptions about the liquidity of trading assets.

Assets held for investment are typically not subject to trading VaR models because, by definition, they are holdings for the longer term rather than for trading. Disclosure can be poor and is typically limited to balance-sheet values.

Structural interest-rate risk can arise in the banking book where there are mismatches in interest rates (or benchmarks for setting rates) between assets and liabilities. These risks are typically measured by reference to a given interest-rate shock (usually a parallel shift in the yield curve) and the modeled impact on either net interest income over a given period or the impact on the net asset value of the bank. Structural interest-rate risk is subject to limited disclosure under Pillar 3 of Basel II and is rarely presented on a consistent basis.

[29] See Regulatory consistency assessment programme (RCAP) – Analysis of risk weighted assets for market risk, published by the Basel Committee on Banking Supervision, January 2013.

For these reasons, together with the technical difficulties in assessing this risk, it does not usually form part of Basel Pillar 1 capital requirements.

Foreign-exchange risk arises where, for example, there are mismatches between the currencies in which the bank funds itself and those in which it lends or invests. Additionally there can be mismatches between the currencies in which it receives income and those in which it pays expenses. These risks are subject to relatively limited disclosure and as such can be difficult to assess and compare.

Defined-benefit pension fund risk can be material but, in many cases, its risk management is not integrated within the bank's overall framework, in part because the nature of the risk is typically of a very long duration; hence, short-term variations in assets and liabilities have more limited significance. As pension funds are legally distinct from the bank, funding questions are typically the subject of discussion between bank management and fund trustees and are thus less contractual in nature. We may make an adjustment in circumstances in which our standard adjustments for pensions do not fully reflect the risk they pose.

Market risks are not captured in our initial Asset Risk sub-factor score. Therefore, we may adjust the Asset Risk score downward to reflect the extent of market risk, and the assigned score may incorporate other indicators and guidelines, including the following:

» Size of cash trading book. A trading book of more than 10% of total assets typically indicates a material source of market risk.

» Contribution of trading revenues. Generating more than 10% of revenues over time from trading revenues typically indicates significant market risk. The level of debt and equity underwriting fees may also indicate market risk.

» Changes in VaR and market RWAs. Notwithstanding the limitations described above, very high levels of VaR or market RWAs relative to TCE, or rapid changes in their level or composition, may indicate a high level or a significant shift in trading risk.

» Significant derivative exposures. Accounting measures of derivatives vary significantly, but net derivatives totaling more than the bank's TCE or gross derivatives of more than five times the bank's TCE may indicate material market risk.

» Significant investments. Identified long-term investments totaling more than half of the bank's TCE may indicate material market risk.

» Interest-rate risk in the banking book. We may consider there to be elevated interest-rate risk where (1) the combined impact of a 100bp shift in the yield curve across the major currencies used by a bank results in a loss of more than 5% of the bank's net interest income; or (2) the change in the present value of the balance sheet resulting from the same shift would amount to more than 5% of TCE.

» Foreign-exchange risk. Where a 10% change in an exchange ratio would impact a bank's TCE/RWAs capital ratio or earnings by more than 5%, we would likely consider this to be a material structural foreign-exchange risk.

» Level 3 (mark-to-model) assets. In many jurisdictions, fair-value accounted assets are divided into categories depending on how they are valued. "Level 3" assets are those that are valued in accordance with a model rather than by reference to traded instruments and can therefore be considered a measure of market "model risk". Where the value of Level 3 assets exceeds 50% of TCE, we would likely consider this to be a material source of such model risk.

These considerations individually and collectively influence our opinion of whether a bank has elevated market risk and inform the assigned Asset Risk sub-factor score. Market risk is all the more important when a bank is relatively less active in lending, and where the core problem loan ratio therefore provides less information. For a universal bank or a retail bank with a modest amount of interest-rate risk in the banking book, market risk may not materially influence the Asset Risk score unless the initial score is very high, e.g., in the "a" category or above. For banks with more elevated market-risk levels, we are unlikely to assign an Asset Risk score above the "baa" category, and the more skewed an institution's business model is to market risk, the more likely we are to assign an Asset Risk score in the "ba" or "b" category.

Operational Risk (adjustment to Asset Risk sub-factor score)

Some banking activities carry significant operational risks, which Basel II defines as "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events."[30] This definition includes legal risk but excludes strategic and reputational risk.[31] Like problem loans, operational risks can lead to losses that erode the capital base. Because the problem loan ratio may not reflect them, they are incorporated via an adjustment to the Asset Risk sub-factor score. Banks' disclosures of operational risks do not permit standardized measurement, with regulatory risk measures varying.[32] Thus, we typically assess these risks qualitatively, based on available information, which may include discussions with issuers.

In general, we believe that capital-market activities are highly exposed to operational risks, given the following:

» It is common for individual employees to carry out transactions involving very large nominal amounts. As these individuals often receive remuneration based on their trading performance, there is a temptation to conceal losses or generate artificial gains. We believe that however sophisticated a bank's systems and controls, individuals intent on fraud will often find a way to circumvent them, as shown by the remarkable similarity of some large fraudulent incidents over the past 20 years or more.

» Similarly, because transactions are typically of large size, errors of an unintentional nature (rather than fraud) have larger consequences relative to the associated revenue than in retail banking, for example.

» Capital markets activities are typically conducted with sophisticated counterparties, who are more inclined than other counterparties to litigate when they suffer financial loss. The potential for such litigation also depends on the jurisdiction. In the US, for example, class action litigation, regulatory investigations, and related large financial settlements or fines are relatively common. In many other countries, these occur infrequently, and fines and settlements are typically more modest.

Other activities are also subject to operational risk. Custody operations and asset management, for example, bear little direct credit or market risk. Yet the large size of transactions and their frequency increase both the risk of error and the consequences of such an error. Private banking clients can be litigious, and operational risk may be higher as a consequence. Retail banking can also expose a bank to regulatory redress, for example in the UK, where regulators have required banks to make substantial consumer redress payments.

Operational risk is inherent in most business activities. We are unlikely to adjust a bank's Asset Risk sub-factor score upward based solely on a view that operational risks are relatively low. However, where we consider that the combination of business activity, business practice, and the regulatory and legal

[30] From Basel Committee on Banking Supervision, *Principles for the Sound Management of Operational Risk*.

[31] *International Convergence of Capital Measurement and Capital Standards*, Basel Committee on Banking Supervision, June 2006. This is the document commonly referred to as "Basel II".

[32] Basel II offers the "Basic Indicator Approach", the "Standardized Approach" and the "Advanced Measurement Approach".

environment gives rise to an elevated level of operational risk, we may adjust the Asset Risk sub-factor score downward. Where we consider a bank's operational risk to be elevated because of its business model, assigned Asset Risk sub-factor scores are unlikely to be above the "baa" category. We may assign lower scores to banks with clear operational risk fragilities, depending on the extent and nature of the issues.

SOLVENCY SUB-FACTOR: CAPITAL (25% WEIGHT)

Why It Matters

Asset risk and the need for capital go hand in hand. The greater the risk of unexpected loss, the more capital a bank needs to hold in order to retain the confidence of creditors, which enables the bank to fund itself and to shield bondholders from loss.

The ratio of tangible common equity (TCE) to risk-weighted assets (RWAs) is important because:

» In our back-testing study (see Appendix 7), the TCE/RWAs measure was the most predictive indicator of failure among a number of other measures, including an unweighted leverage measure;

» In our view, there is a broad correlation between the riskiness of assets and their risk-weighting, despite certain acknowledged weaknesses and inconsistencies; and

» Regulatory measures, while imperfect, have real-world significance because decisions by the authorities relating to the point of non-viability are closely tied to regulatory assessments of capitalization.

How We Assess It

We use the ratio of TCE to RWAs, calculated or estimated as follows:

((Tangible Common Equity – Deferred Tax Assets) + min(Deferred Tax Assets, 11.1% * (Tangible Common Equity – Deferred Tax Assets))) / Risk-Weighted Assets

The numerator, TCE, focuses on pure common equity and excludes hybrid instruments, except those that provide equity-like loss-absorption capacity *before* the point of non-viability, i.e., high-trigger contingent capital instruments.[33] We do not include non-viability capital instruments in the capital measure within our BCA assessment because these instruments do not become capital until there is a failure event.[34] Our TCE measure also caps the contribution of deferred tax assets at 10% of the total[35] and excludes minority interests. It is thus close to one of the most prevalent regulatory measures of capital, Common Equity Tier 1 capital.

For mapping raw scores, we use the three scales shown in Exhibit 22, depending on whether the bank's RWAs are calculated according to Basel I, Basel II or Basel III. Our scoring scales reflect differentials in average risk-weighting among the Basel approaches.

[33] We may, however, limit the proportion of high-trigger contingent capital instruments within TCE, e.g., at 25% of the total.

[34] Non-viability hybrids are incorporated in our LGF analysis for banks subject to Operational Resolution Regimes (ORRs), which assesses the varying protection available for subsequent debt classes after a bank's failure.

[35] Certain deferred tax assets that we expect to be realized regardless of future earnings are not subject to this limitation.

EXHIBIT 22

Scoring Tangible Common Equity / Risk-Weighted Assets

Sub-factor	Sub-factor Weight	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
Capital (Basel I)	25%	≥ 19.7%	17.7%-19.7%	15.8%-17.7%	14.8%-15.8%	13.8%-14.8%	12.8%-13.8%	11.8%-12.8%	10.8%-11.8%	9.9%-10.8%	8.9%-9.9%	7.9%-8.9%	6.9%-7.9%	5.9%-6.9%	4.9%-5.9%	< 4.9%
Capital (Basel II)	25%	≥ 20.7%	18.6%-20.7%	16.6%-18.6%	15.5%-16.6%	14.5%-15.5%	13.5%-14.5%	12.4%-13.5%	11.4%-12.4%	10.4%-11.4%	9.3%-10.4%	8.3%-9.3%	7.2%-8.3%	6.2%-7.2%	5.2%-6.2%	< 5.2%
Capital (Basel III)	25%	≥ 20%	18%-20%	16%-18%	15%-16%	14%-15%	13%-14%	12%-13%	11%-12%	10%-11%	9%-10%	8%-9%	7%-8%	6%-7%	5%-6%	< 5%

Source: Moody's Investors Service

There Are Different Ways to Measure Bank Capitalization

Since the introduction of the first Basel Accord in 1988, the most popular measures of determining bank capitalization have been regulatory-based measures, the principal metric for many years being Tier 1 capital/RWAs.

This measure has been considerably refined over the years under subsequent Basel accords and national regulation. However, the crisis provided many instances where the regulatory measures of risk, especially ones that relied on internal models, gave an overly optimistic view of credit risk (denominator understatement) and too much credit to elements of capital that were not fully loss-absorbing (numerator overstatement).

Since then, regulatory reforms have been initiated with the intent of correcting these problems, particularly via the Basel III Accord.* We recognize that regulatory metrics are still subject to further refinements in the coming years.

* See http://www.bis.org/bcbs/basel3.htm

Other Considerations for the Capital Sub-factor

Recognition of Risk-Weighted Assets (adjustment to Capital sub-factor score)

Due to potential differences in the calculation of RWAs among banks and banking systems, the thresholds for the ratio of TCE to RWAs may not fully reflect our view of the sufficiency of capital for an individual bank. In these cases, we may adjust the Capital sub-factor score accordingly.

Nominal Leverage (adjustment to Capital sub-factor score)

In our analysis of the Capital sub-factor, we also consider TCE/Tangible Assets.[36] This offers a complementary, unweighted view of capital sufficiency independent of regulatory measures. The ratio is valuable because it is sometimes the case that the risk-measurement metrics a bank uses in determining RWAs, including any modeling assumptions, can fail precisely at the point of greatest stress. However, the ratio has limitations. It can be distorted by some accounting differences, does not capture off-balance-sheet and more exotic risks, and typically overestimates risks from lower-risk assets, such as government bonds, reverse repos and mortgages.

[36] For clarity, the numerator of this ratio, TCE, is calculated in the same way as the numerator of the TCE/RWA ratio described above. The denominator, Tangible Assets, excludes goodwill and other intangibles.

» When TCE/Tangible Assets exceeds 10%, we would typically consider this a trigger for a possible positive adjustment to our Capital score. This could be by one notch, but occasionally more where we consider that nominal leverage is indicative of a robust level of solvency not fully reflected in the TCE/RWAs ratio.

» When TCE/Tangible Assets is lower than 5%, we would typically consider a negative adjustment in the range of 1-3 notches.

» When TCE/Tangible Assets is less than 3%, we would typically consider a negative adjustment to the Capital score in the range of 3-6 notches.

» When TCE/Tangible Assets is less than 2%, which indicates a very high degree of nominal leverage, we would typically consider a negative adjustment to the Capital sub-factor score in the range of six or more notches.

Regulatory Minimum Requirements (adjustment to Capital sub-factor score)

In assigning a bank's Capital sub-factor score we typically consider regulatory minimum requirements. These are important because apparently sound regulatory capital ratios can give a misleading view of the distance to resolution proceedings, broader non-viability concerns and potential for failure in the absence of external support. Typically we would consider the minimum capital requirement to be around the 5.125% "point of non-viability" considered by Basel III. However, where local thresholds are higher, we may downwardly adjust our Capital sub-factor score, when the buffer between the expected capital ratio and the point at which resolution proceedings may be expected is relatively small.

In general, we would be unlikely to assign a Capital sub-factor score higher than "baa" where the regulatory buffer is less than 3% of RWAs. Where the buffer falls to under 2%, we would be unlikely to assign a score higher than "ba". The assigned score incorporates case-specific considerations. In some cases, such a breach may be very unlikely to be prejudicial to bondholders, but in other cases, a regulator may seek to impose losses.

Capital Quality (adjustment to Capital sub-factor score)

Assigned Capital sub-factor scores also take into account the quality of TCE. Since TCE comprises only the capital components we consider to be loss-absorbing in advance of a BCA event, it is by definition composed only of common equity and high-trigger contingent capital instruments that provide loss absorption ahead of failure. It excludes items of doubtful ability to absorb losses in a resolution, such as goodwill, intangibles, and unrealized gains and losses. Deferred tax assets are capped at 10% of total TCE, reflecting their potential reliance on future earnings and hence the uncertainty about their loss-absorption capacity.

We may adjust a bank's Capital sub-factor score where we consider that it otherwise would under- or over-estimate the value of loss-absorbing elements of the capital structure. For example, we may adjust upward the Capital sub-factor score based on an estimated modified capital ratio where we believe deferred tax assets[37] have a very high likelihood of being realized. Similarly, where there are unrealized gains not recognized in TCE that we believe are highly likely to be realized, we may adjust the Capital sub-factor score based on the modified capital ratio, including some or all of the gains. We may also give credit to minority interests where we believe they are substantively loss-bearing.

[37] Being principally driven by timing differences in booking profits rather than future earnings-dependent net operating loss carry-forwards, or where they are economically equivalent to a general government claim.

We may downwardly adjust our capital score if we believe that unrealized losses not included in TCE are likely to be realized. In this case, we may assign a capital score reflecting the TCE/RWAs measure including such expected losses. We may also adjust the score downward to take into account other items of doubtful quality.

Capital Fungibility (adjustment to Capital sub-factor score)

A bank's ability to absorb loss within its capital is influenced not just by its overall capital ratios but also by the location of that capital within its group structure. Consolidated capital ratios can be misleading by implying perfect capital fungibility, while in reality there can be regulatory, accounting or tax impediments to such intra-group capital mobility. For example, the presence of other non-bank regulated activities (such as insurance subsidiaries with their own capital requirements) may limit the proportion of TCE available to support banking risks.

There is no standard ratio to capture internal capital fungibility, and our assessment is essentially qualitative. We may reduce a bank's Capital sub-factor score when there are significant regulated subsidiaries with higher solo capital requirements than are applicable to the group — resulting in capital that is effectively trapped in those units. The degree of this adjustment depends on the initial Capital sub-factor score and the extent of any impediments to capital fungibility.

Access to Capital (adjustment to Capital sub-factor score)

We typically consider a bank's ability to access fresh capital in the case of need. A bank may raise fresh capital in the private markets for a variety of reasons, and the capital issuance may not be an indication of the need for external support. For example, when a bank raises money from private shareholders in a rights issue, it often does so based on its own merits, and investors have a choice whether or not to subscribe to the capital increase. By contrast, if a bank is only able to source new capital from the official sector, i.e., a government or its agents, then we would very likely view this as a manifestation of an extraordinary support event.

A bank's ability to raise private capital is an important additional consideration in assigning the Capital sub-factor score — the greater a bank's ability to raise capital, the better able it is to avoid requiring affiliate or government support. For listed banks, this ability depends on investor appetite, which can be gauged in part by the bank's market value relative to its book value. The more a bank's market capitalization exceeds its reported book value, the more easily it can raise capital, other variables being equal. However, when a bank's market capitalization is below book value, capital raising is more difficult, because existing shareholders are diluted to a greater degree by the new investment.

Where a bank's equity market value is persistently and materially below its book value, we may consider a one-notch downward adjustment in its assigned Capital sub-factor score to reflect the potential hindrance to raising new equity. The likelihood of such a reduction becomes greater the lower the bank's market to book value. The downward adjustment could be more than one notch in cases where a bank has a pressing need to raise capital but cannot do so.

For privately held banks or partnerships, we assess whether owners have the wherewithal and willingness to provide additional funds. Sufficient self-interest is generally necessary for parents to choose to provide additional capital in the case of need to maintain bank subsidiaries' capital ratios. Where wherewithal or willingness are not present, we may reduce the bank's Capital sub-factor score. For mutual banks, the Capital sub-factor score may be adjusted downward to reflect the institution's potential inability to raise significant fresh capital in case of need, given its ownership structure.

SOLVENCY SUB-FACTOR: PROFITABILITY (15% WEIGHT)

Why It Matters

Profitability is an important indicator of an institution's ability to generate capital, and is hence another measure of its ability to absorb losses and recover from shocks. A bank with weak or negative profitability has less ability to absorb asset risks than one with strong internal capital generation capacity, other things being equal.

How We Assess It

We use the ratio of net income (post-tax)[38] relative to tangible assets. For mapping raw scores, we use the scale shown in Exhibit 23.

EXHIBIT 23

Scoring Net Income / Tangible Assets

Sub-factor	Sub-factor Weight	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
Profitability	15%	≥ 2.5%	2.25%-2.5%	2%-2.25%	1.75%-2%	1.5%-1.75%	1.25%-1.5%	1%-1.25%	0.75%-1%	0.5%-0.75%	0.375%-0.5%	0.25%-0.375%	0.125%-0.25%	0%-0.125%	-1%-0%	< -1%

Source: Moody's Investors Service

Other Considerations for the Profitability Sub-factor

Earnings Stability (adjustment to Profitability sub-factor score)

A relatively high degree of overall stable earnings can help a bank absorb shocks arising from some business lines. For example, a retail-based model with a high degree of net interest income and a low and stable cost base can help absorb occasional earnings volatility arising from riskier activities. By contrast, a high degree of reliance on activities subject to greater swings in customer confidence, investor sentiment or individual trades typically gives less comfort, due to less certainty that such earnings will be available to absorb losses at the point of need. In general, retail and commercial institutions with a stock of income-generating assets are more likely to have stronger assigned Profitability sub-factor scores than wholesale banks subject to more volatile flows of business.

Analysis of earnings stability is analogous to an assessment of a bank's franchise strength. While we do not consider a high market share in itself to increase a bank's creditworthiness, we do believe that a bank with strong positions in attractive markets will likely demonstrate higher and more stable earnings over time. On the other hand, high earnings volatility for a bank with high market shares suggests that the business lines themselves are less reliable and the bank's strong position is less favorable from a credit point of view.

Earnings stability is a qualitative, forward-looking assessment based on our view of a bank's business model and the reliability of its income streams, informed by historical performance. We typically also take into account acquisitions and divestments, as well as changes in the operating environment.

Where earnings volatility has been limited over an extended period (including a downturn) — for example, a standard deviation from the mean ratio of pre-provision earnings/total assets of around 20% or less — and we expect the stability to be sustainable, we may positively adjust the Profitability sub-factor score to integrate this strength. Where earnings volatility has been relatively high — for example, a standard deviation of 50% or more — or we expect that it will be relatively high in future, then we may negatively

[38] Please see our cross-sector methodology that discusses financial statement adjustments in the analysis of financial institutions. Please see the "Moody's Related Publications" section of this document for a link to our sector and cross-sector methodologies.

adjust the Profitability sub-factor score to reflect this weakness. Such a bank is unlikely to have a Profitability score above "ba".

The Solvency Score

We combine the three assigned sub-factor scores — Asset Risk, Capital and Profitability — in proportion to their respective weights to produce the overall weighted-average Solvency score. As explained above, we typically assign a score of "ca" or "c" to any sub-factor that appears to be the driver of an expected failure of the bank, and such a score effectively caps the overall Solvency score and the overall Financial Profile.

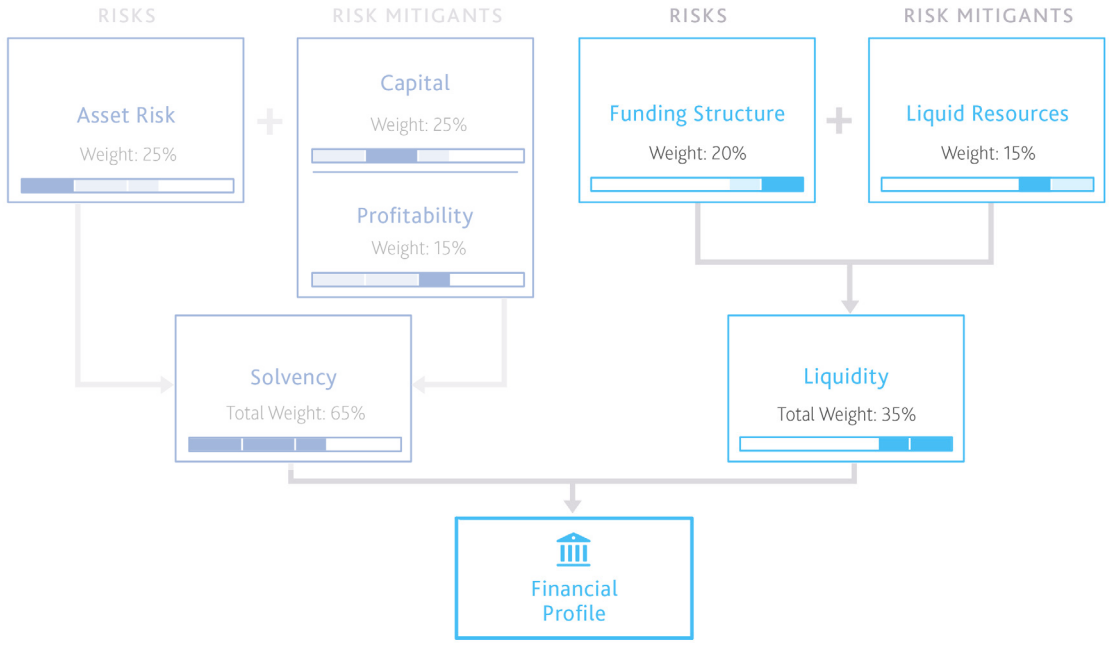
2. Financial Profile Factor: Liquidity

Our liquidity assessment incorporates the risks posed by the bank's funding structure (including potential episodes of losing access to funding) as well as the presence of liquid resources that mitigate such risks and may enable a bank to bridge such episodes without defaulting or requiring extraordinary support.

This factor comprises two sub-factors, Funding Structure (which focuses on liabilities) and Liquid Resources (which focuses on assets).

EXHIBIT 24

Scorecard Structure — Liquidity Factor



Source: Moody's Investors Service

LIQUIDITY SUB-FACTOR: FUNDING STRUCTURE (20% WEIGHT)

Why It Matters

A bank's funding structure has a strong bearing on its probability of failure or requiring assistance, because some sources of funds are less reliable than others. A bank that makes significant use of an unreliable funding source — perhaps short-term in nature, or from particularly risk-sensitive counterparties — is more likely to suffer periodic difficulties in refinancing its debt, putting it at greater risk of needing support.

There are many different sources of funding, each with its own characteristics. At the most granular level, each retail depositor has a different tolerance for risk and each deposit behaves differently. However, in aggregate, a well-diversified deposit base is typically relatively stable under most conditions. This is principally due to the presence of deposit insurance, a feature of most countries, which provides government backing for most depositors up to a certain amount. This backing in theory insulates an insured depositor from the credit risk of the institution — although in practice, deposit runs can still occur due to the lack of ex ante funding for deposit-protection schemes and the resultant potential for deposits to be temporarily unavailable.

Overall, retail deposits are typically more "sticky" (i.e., stable) than wholesale sources of funding, such as interbank funding, bonds and short-term commercial paper, which are more sensitive to changes in risk aversion and creditworthiness, and hence less stable.[39]

Our back-testing study (see Appendix 7) found that the ratio of market funds to tangible assets showed predictive qualities during the financial crisis of the late 2000s: banks with relatively high reliance on market funding had a higher tendency to require support. This ratio expresses the proportion of the balance sheet that credit-sensitive investors and counterparties fund, providing an important indicator of liability-side volatility and the resultant liquidity risk.

How We Assess It

MARKET FUNDS / TANGIBLE BANKING ASSETS:

We use the ratio of market funds to tangible banking assets. The numerator, market funds, is calculated or estimated as:

> Due to Financial Institutions + Short-term borrowings + Trading Liabilities + Other Financial Liabilities at Fair Value + Senior Bonds + Due to Related Parties – 50% * Covered Bonds

The denominator, tangible banking assets, is calculated or estimated as:

> Total Assets – Goodwill and Other Intangibles – Insurance Assets

By comparing market funds to tangible banking assets, rather than total liabilities, the ratio takes into account equity (the difference between total assets and total liabilities), a permanent funding source. We typically exclude 50% (or in some cases, a higher percentage) of covered bond or equivalent funding based on our view that it is materially less sensitive than market funding more generally, due to its typically long-dated and over-collateralized nature. Subordinated debt is excluded entirely from market funds because it is usually long-dated and hence poses limited refinancing risk.

For mapping raw scores, we use the scale shown in Exhibit 25.

EXHIBIT 25

Scoring Market Funds / Tangible Banking Assets

Sub-factor	Sub-factor Weight	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
Funding Structure	20%	≤ 2.5%	2.5%-3.75%	3.75%-5%	5%-7.5%	7.5%-10%	10%-15%	15%-20%	20%-25%	25%-30%	30%-35%	35%-40%	40%-50%	50%-60%	60%-70%	> 70%

Source: Moody's Investors Service

[39] See, for example, IMF Working Paper 09/152.

Other Sub-factor Considerations for Funding Structure

Quality of Market Funding (adjustment to Funding Structure sub-factor score)

The ratio of market funds to tangible banking assets is a broad measure of a bank's exposure to funding sources/counterparties that are typically confidence-sensitive. However, within this category, some market-based funding sources are more confidence-sensitive than others; thus, composition of funding affects the assigned Funding Structure sub-factor score. The drivers of the extent of confidence sensitivity are many and varied, and we assess the quality of market funding qualitatively, typically based on the characteristics of the different funding instruments and investor types used by each bank.

Following are some of our general views on the confidence sensitivity of various instrument types.

» **Money market funds.** These can be quite volatile because of their open-ended nature, short-term horizon (often investing overnight or for very short terms), sensitivity to credit ratings and the credit-sensitive nature of their own investor base.

» **Interbank funding.** Relationships can often be reciprocal, affording a certain stickiness (stability) to interbank deposits. However, because interbank funding is typically unsecured, it tends to be withdrawn in periods of stress. Moreover, due to the typically high correlation among banks, distress at one bank is often shared by others, meaning that all banks in a given system tend to withdraw funding at the same time and reduce their exposure to others.

» **Foreign investors**. These can be less stable because investor/issuer relationships are often less developed. When risk aversion is higher, investors tend to repatriate cash, making such funding inherently less reliable than funding from domestic investors. Domestic investors may extend beyond national boundaries in a single-currency area.

» **Domestic unsecured local-currency investors**. These can be relatively sticky because relations between investor and issuer are often stronger, and investors may have relatively limited choice. Hence, a larger proportion of such investors within the market-funds base tend to improve the quality of this funding. As noted above, domestic investors may extend beyond national boundaries in a currency union.

» **Repo funding.** This kind of secured funding has traditionally been considered to be insensitive to concerns about the creditworthiness of the counterparty, because it is collateralized by securities. However, in practice, even this kind of funding has been withdrawn or shortened when there are counterparty credit concerns, particularly when the agreement is secured by non-traditional collateral.

» **Covered bond investors**. These are relatively sticky because they benefit from collateral and are thus less sensitive to credit developments. In some banking systems, covered bond funding is the primary form of institutional investment and hence more reliable because investors have little choice but to invest in these instruments. The funding is also typically long term (discussed further below).

» **Small denomination bonds.** Such bonds are often held by retail investors and hence behaviorally are similar to retail deposits. Sometimes they benefit from deposit insurance, further reducing the credit sensitivity of the bondholders. Where the information is available, we may reclassify such bonds as deposits rather than as market funds.

Where we believe that a material component of market funds are of a higher-quality nature — e.g. small denomination bonds, domestic or covered bond investors — we may adjust the Funding Structure sub-factor score upward, for example where the initial score is relatively low and we believe it underrepresents the reliability of funding. However, where we believe that market funding is skewed toward the most credit-sensitive investors — money market funds, for example — we may adjust the Funding Structure sub-factor

score downward. Where these unreliable sources are a dominant part of the funding profile, we are unlikely to assign scores above the "ba" category, without substantial mitigants.

Intra-group funding is typically included in our calculation or estimate of market funding, as the counterparty is usually a bank. The nature and reliability of such funding varies considerably, and in some cases strongly influences our Funding Structure sub-factor score. For example, such funding may be highly discretionary and short-term in nature, and therefore of weak contractual reliability.[40] On the other hand, some groups have structural arrangements — the "pass-through" of retail deposits, for example — which make this funding extremely stable in practice. In such cases, the assigned Funding Structure sub-factor score may reflect the ratio excluding this kind of financing, i.e., we may reclassify intra-group funding as deposits.

We may also reflect in the assigned Funding Structure sub-factor score the diversity of a bank's funding across a variety of sources, which can lead to greater overall stability than any individual source, or, conversely, the concentration of a bank's funding in a single type or location of investor.

Quality of Deposit Funding (adjustment to Funding Structure sub-factor score)

Deposits are not included in the market funds/tangible banking assets ratio, but there is considerable variation in the reliability of different deposit types, which may lead to adjustments to the Funding Structure sub-factor score.

We typically base any such adjustments on an analysis of public information and market characteristics, as well as on discussions with issuers and our estimates. We may adjust the Funding Structure sub-factor score upward where deposit funding is predominantly composed of small-denomination retail customers benefiting from deposit insurance, with a high proportion of checking accounts, and where large, high-net-worth institutional or corporate deposits are immaterial. We may adjust the Funding Structure sub-factor score downward where a material portion of deposit funding comes from more credit-sensitive investors, for example institutional and corporate depositors, high-net-worth individuals, Internet-based accounts, or where there are significant concentrations in small numbers of individuals.

Following are some of our general views on the confidence sensitivity of various deposit types.

- Current/checking accounts. While individually these accounts are perhaps the most volatile, fluctuating daily as payments are received and made, they are often in aggregate the most stable source of funding because customers depend on them for their daily transactions.
- Small denomination savings accounts. These are relatively stable and are often not touched by customers for extended periods, in part because small balances are less sensitive to changes in interest rates and as such, customers lose little through inaction.
- Tax-advantaged savings accounts. These can be relatively stable even at large denominations because there are often fiscal impediments to drawing down savings.
- Large personal deposits. These funds are typically less stable because they are more sensitive to changes in interest rates. Because greater sums are controlled by fewer individuals, the impact of withdrawal is higher. Moreover, if they exceed deposit insurance limits, they will be more sensitive to credit developments. This category includes deposits by affluent and high-net-worth individuals.

[40] Depending on the circumstances, we may consider intra-group funding, even when structured as a source that provides low reliability to the recipient, as evidence of affiliate support.

» **Origination channel.** Postal-based accounts or branch-based accounts tend to be stickier than deposits sourced via brokers or over the Internet.

» **Corporate depositors.** These deposits are often more credit-sensitive than retail deposits, and they increase refinancing risks because they are typically larger and uninsured, and potentially subordinated to retail deposits. However, these deposits are sometimes at least partly related to long-term customer relationships, e.g., the provision of cash management, lending or other services that lend them some stickiness. Deposits by small businesses tend to behave more like retail current/checking accounts, because business owners tend to rely on these accounts for transactional purposes.

» **More sophisticated investors.** Some investors, e.g., banks, insurance companies, central banks and local governments, make substantial deposits with banks. These deposits behave in a similar way to interbank funds and money market instruments, because these investors are typically highly sensitive to rates and risk.

Term Structure (adjustment to Funding Structure sub-factor score)

Banks generally undertake maturity transformation by borrowing short term (either in the form of deposits or wholesale funding) and lending long term, a source of inherent vulnerability. However, the extent of such maturity mismatches varies, as does the extent of disclosure. We thus use a qualitative assessment that may be informed by publicly available information, discussions with issuers or our estimates.

The Net Stable Funding Ratio (NSFR) defined by the Basel Committee[41] can provide useful insights into the degree of matching/mismatching of long- and short-term funding. We usually consider this ratio when it is available. When it is not, we typically consider the relationship between "core" stable funding and illiquid assets. This is conceptually close to the NSFR. We typically assess the extent to which an institution has an excess (or deficit) of stable funding (core deposits, long-term debt and equity) relative to its long-term and illiquid assets (typically loans, illiquid investments, haircuts on trading inventory and goodwill).

Contingent off-balance-sheet commitments are another source of maturity transformation. For example, a bank may have extended significant undrawn lines of credit to customers or other banks that could present a contingent cash outflow. These potential outflows cannot reliably be assessed according to a fixed scale because they depend on the specific nature of the commitments the bank may have received or extended, and the likely behavior of counterparties. Some financing commitments a bank has made may be more likely to be drawn down when the bank is facing stress than others. For example, funding lines to unconsolidated special-purpose vehicles with which the bank is closely associated may well be drawn down. On the other hand, undrawn mortgage commitments are generally less sensitive to difficult circumstances at the bank.

Where funding gaps are immaterial and, therefore, assets and liabilities are fully matched — also indicated by a Net Stable Funding Ratio of well over 100% — we may adjust the Funding Structure sub-factor score upward. However, we are unlikely to assign high Funding Structure sub-factor scores to wholesale-financed entities even when match-funded, because we expect in practice their matching policy to be compromised when funding dries up. In these circumstances, a bank often tries to defend its franchise by continuing to lend and/or maintain trading inventories even while it suffers shortening maturities.

Conversely, where a bank's wholesale funding is heavily skewed toward the short term (less than 12 months duration) and without corresponding liquid assets, this shows that the bank can only repay its wholesale liabilities falling due within 12 months by restricting new business and/or by selling less liquid assets, which could result in losses. Such reliance would also likely be evidenced by a deficit of stable funding relative to

[41] See http://www.bis.org/publ/bcbs188.htm

long-term and illiquid assets, and in such instances, we may adjust our Funding Structure score downward. Where we consider that this deficit presents significant risks, we would likely assign the Funding Structure sub-factor score in the "ba" category or lower, in the absence of mitigants.

Market Access (adjustment to Funding Structure sub-factor score)

In the normal course of business, a bank that has significant wholesale borrowing also has access to funding markets. However, at times, due to idiosyncratic or broader, systemic concerns, banks suffer restricted access to unsecured or even secured funding markets. This can result in:

» a higher cost of funding, affecting profitability and/or restricting a bank's capacity to write new business on economic terms;

» a shortening duration of liabilities, resulting in increased mismatches; or

» a need to sell assets ahead of maturity, potentially resulting in losses and reducing capital.

Information available to assess market access can vary, especially for debt issues that are settled privately. However, observed spreads, either on bonds or on credit default swaps, provide a good indication of market appetite for a bank's paper.

Where these indicators suggest that a bank is paying a significantly higher interest rate than would be expected at its rating level, we may adjust the Funding Structure sub-factor score downward to reflect the apparently restricted access to the market. We may use our Market Implied Ratings (MIR), based on bond or credit default swaps, in order to help us gauge a bank's access to the funding markets. Where the MIR is suggesting distress, either showing a major gap with respect to the issuer rating, or a low absolute level, we may judge that its market access is impaired, but this may be subject to an analysis of trends in the MIR, local market conditions and peer comparisons.

Where MIRs are not available or we consider them to be unrepresentative of a bank's fundamental credit profile, perhaps due to illiquidity in the issuer's bonds or credit default swaps, we may consider the bank's funding spreads, market reception of its recent issuances, or a lack of issuance in the context of our knowledge of local markets, in order to assess market access. This analysis may lead us to assign a lower Funding Structure sub-factor score. For example, where we believe a bank is unable to raise cash in the market and its funding is thus severely compromised, to the extent that it relies on this source of funding to run its business, we are unlikely to assign a score higher than the "b" category. The score could be as low as "ca" or "c" where the lack of funding is expected to lead to the failure of the bank.

LIQUIDITY SUB-FACTOR: LIQUID RESOURCES (15% WEIGHT)

Why It Matters

To provide a full picture of liquidity, an assessment of the funding structure of a bank has to be viewed in the context of the composition of its assets. Liquid resources are enhanced when a bank has high-quality liquid assets that can both be readily sold or pledged for cash in private markets in response to its funding counterparts' changing behavior, or that can in extremis be repoed with central banks under standard terms. Our bank failure study shows that banks with relatively low levels of liquid assets had a higher tendency to require support in the financial crisis of the late 2000s.

How We Assess It

LIQUID BANKING ASSETS / TANGIBLE BANKING ASSETS

We use the ratio of liquid banking assets / tangible banking assets. The numerator, liquid banking assets, is calculated or estimated as:

> Cash with Central Bank + Due from Financial Institutions + Trading Securities + AFS Securities + Other Securities + HTM Government Securities – Unearned Income – Derivative Assets

The denominator, tangible banking assets, is calculated or estimated as:

> Total Assets – Goodwill and Other Intangibles – Insurance Assets

We score the raw ratio in accordance with the table in Exhibit 26.

EXHIBIT 26

Scoring Liquid Banking Assets / Tangible Banking Assets

Sub-factor	Sub-factor Weight	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
Liquid Resources	15%	≥ 70%	60%-70%	50%-60%	40%-50%	35%-40%	30%-35%	25%-30%	20%-25%	15%-20%	10%-15%	7.5%-10%	5%-7.5%	3.75%-5%	2.5%-3.75%	< 2.5%

Source: Moody's Investors Service

Other Sub-factor Considerations for Liquid Resources

Quality of Liquid Assets (adjustment to the Liquid Resources sub-factor)

While the numerator of the ratio of Liquid Banking Assets to Tangible Banking Assets includes the components of a bank's balance sheet that are typically most liquid, considering other aspects of these assets, including their quality and how easily they can be realized, may be necessary to augment the analysis of liquid resources.

For example, we may adjust the Liquid Resources score after considering a version of the ratio that excludes from the numerator encumbered liquid assets and assets used in the course of market trading. Encumbered assets cannot be liquidated to meet maturing unsecured obligations. Assets used in the course of market making and trading may not be encumbered but may have limited liquidity value, because they cannot always be sold or pledged for cash without damaging the bank's ability to serve its customers in its capital market activities.

We may adjust the Liquid Resources sub-factor score downward, usually by up to three notches, where we believe that the liquid asset ratio overstates liquidity because it includes: (1) substantial encumbered assets; (2) assets held for market-making purposes; (3) assets that are not readily marketable, or of weak credit quality; or (4) assets not eligible at central banks. Level 3 assets (those with the least observable pricing data, which may be fair-valued on a mark-to-model basis) may provide an indication of less liquid assets.

We may adjust the Liquid Resources sub-factor score upward, usually by up to three notches, where we believe that the liquid asset ratio understates liquidity because it does not include: (1) reliable committed lines of credit; (2) assets that are of a very high-quality nature (typically Aaa or Aa government or government-related bonds); or (3) assets that can be readily converted to cash, for example through internal securitizations.

Assigned Liquid Resources sub-factor scores may also incorporate a consideration of a bank's regulatory Liquidity Coverage Ratio (LCR) or equivalent,[42] and in particular the High Quality Liquid Assets (HQLA) component of the LCR, when these ratios are available. The LCR measures the available liquid assets relative to assumed outflows of liabilities and is a measure of short-term maturity transformation. In general, we expect HQLA to be closely related to our estimate of liquidity based on the considerations set out above. However, where the LCR depicts a different liquidity profile from our own estimate and indicates a potential strength or weakness not captured in the liquid banking assets/tangible banking assets ratio or other sub-factor considerations, we may adjust the Liquid Resources sub-factor score accordingly. For example, we may consider potential cash outflows, such as the draw-down of lending commitments.

Intra-group Restrictions (adjustment to the Liquid Resources sub-factor)

Sometimes a bank displays strong consolidated funding metrics, but intra-group restrictions may materially reduce the bank's ability to maintain its liquidity and funding. For example, a banking group may primarily collect deposits at a subsidiary but lend at the parent level. This creates significant intra-group exposures — the subsidiary that upstreams resources has a large credit exposure to its parent, while the parent depends on the subsidiary for funding. While, in general, subsidiaries and parents in the same jurisdiction are unlikely to be subject to restrictions in intra-group transfers, risk is heightened where the subsidiary and parent are subject to different regulatory standards, perhaps in different countries. In these cases, regulators may impose new restrictions to the possible detriment of the parent, which may be forced to use less reliable market funding for its own balance sheet, despite the deposits at its subsidiary that are included in its consolidated financial reports.

We typically assess intra-group restrictions qualitatively, based on our understanding of the attitudes of different regulators as well as the respective funding positions of banks within the group. We may adjust the Liquid Resources sub-factor score downward, usually by up to three notches, or occasionally more in severe cases, where we identify material barriers to intra-group funding (for example, as evidenced by large discrepancies in the funding profiles of different entities within the bank's consolidation that may be subject to restrictions in times of stress).

The Liquidity Score

We combine the two assigned sub-factor scores — Funding Structure and Liquid Resources — in proportion to their respective weights to produce the overall weighted-average Liquidity score. As explained above, any sub-factor that appears to be the driver of an expected failure of the bank is scored at ca or c, and such a score effectively caps the overall Liquidity score and the overall Financial Profile.

The Financial Profile

We combine the scores for Solvency (65%) and Liquidity (35%) in proportion to their respective weights to produce a weighted average, which is the overall Financial Profile score, expressed on our BCA scale from "aaa" to "c".

[42] For further details of this regulatory ratio, see http://www.bis.org/publ/bcbs238.htm

BCA Sub-component: Qualitative Adjustments

In this sub-component of our BCA analysis, we assess qualitative factors that are specific to individual banks.

While the Macro Profile and the Financial Profile generally drive our credit assessments of banks, there are occasionally other bank-specific considerations that we believe can influence core fundamentals. These additional factors are typically qualitative in nature, although in some cases our assessments may be informed by certain quantitative indicators. These factors are scored in upward and downward notches to the Financial Profile score.

This sub-component comprises three factors:

» Factor 1: Business Diversification

» Factor 2: Opacity and Complexity

» Factor 3: Corporate Behavior

1. Qualitative Adjustment Factor: Business Diversification

Business diversification is an important gauge of a bank's sensitivity to stress in a single business line. It is related to earnings stability in the sense that earnings diversification across distinct and relatively uncorrelated lines of business increases the reliability of the bank's earnings streams and thus its potential to absorb unexpected shocks affecting its income statement.

Business diversification is different from asset diversification (which is considered under the Solvency factor). Moreover, business diversification is not the same as earnings stability, because some monoline business models may demonstrate high stability over a number of years. A bank with a single line of business is clearly vulnerable to an eventual problem because it does not have other income streams to fall back on. Hence, we consider a bank with monoline activities to be weaker than one with diverse businesses, even where both have similar observed earnings volatility.

We may adjust the Financial Profile score to take this assessment into account. In general, we would consider a bank that typically derives more than three-quarters of its revenues or earnings from a single activity (for example, mortgage lending, credit cards or capital markets) to be relatively undiversified, which could lead to one downward notch, or potentially more when the business concentration is severe or the line of business is very volatile. We do not consider full service retail banking to be a single business, because it comprises various activities and offers some degree of inherent diversity.

On the other hand, we may consider a bank with an exceptional spread of businesses as benefitting from a high degree of diversity that in turn benefits creditors. To the extent that this benefit is not already reflected in the earnings stability adjustment to the Profitability sub-factor score, we may adjust the Financial Profile score upward, usually by one notch, to reflect it. In some circumstances, we may also apply an upward adjustment for business diversification to reflect the benefit of an entrenched and well-protected franchise that supports public policy.

2. Qualitative Adjustment Factor: Opacity and Complexity

A bank's riskiness increases with its complexity, other things being equal. Complexity increases the challenges for management and heightens the risk of strategic and business errors (as distinct from classic operational risk already described above). In addition, complex organizations tend to be more opaque, because public disclosures tend to provide a more simplified view of their operations.

By contrast, a relatively simple bank can achieve more transparency with less disclosure. Simplicity does not guarantee transparency, however. Some business activities are inherently more opaque than others. For example, capital markets activities (trading), while often highly complex, can also be relatively simple (in the case of an equity brokerage, for example). Nonetheless, the associated balance sheet may still change rapidly, meaning that public disclosures rapidly lose relevance, resulting in higher opacity. Some products are inherently more complex than others, notably derivatives and highly structured instruments.

Meanwhile, even the simplest of businesses can become opaque if their accounting disclosures are so weak or so unreliable that they impede our insight into the bank's fundamentals.

Institutions with higher-than-average opacity 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.

» **Significant exposure to derivatives.** Where an institution's net derivative assets or liabilities exceed the bank's TCE, this may indicate a degree of complexity and opacity detrimental to creditors.

» **Complex legal structure.** An institution may have a complex legal or ownership structure (for example, multiple minority ownership interests, offshore holding companies or pyramid structures).

» **Complex or long-dated exposures to other financial institutions.** Such exposures can render the risk profile more difficult to assess due to the inherent correlation of financial institutions and potential for contagion to affect many different trades. This can introduce vulnerabilities, as problems at one institution can be quickly transmitted to other institutions.

» **Unreliable accounting.** Some accounting standards provide greater confidence than others. Generally, we believe that US Generally Accepted Accounting Principles (US GAAP) and International Financial Reporting Standards (IFRS) are 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 quality of securities regulation in a particular jurisdiction, the maturity of auditing standards and practices, and idiosyncratic concerns about the quality of an issuer's financial reporting controls can also raise questions about the completeness and accuracy of financial statements and related disclosures.

The above-mentioned features are often those of very large banking groups. Although we do not necessarily consider size itself to be a negative credit factor, we may consider absolute balance sheet size a potential indicator of complexity, potentially causing a more detailed analysis.

We may make a downward notching adjustment for Opacity and Complexity, typically by one notch but occasionally by more in extreme cases, if a bank displays any of these characteristics.

3. Qualitative Adjustment Factor: Corporate Behavior

A bank's creditworthiness can be influenced by its corporate behavior, which can also signal other concerns. We consider a number of factors, as follows:

» **Key-person risk.** A bank's high dependence on a single executive or group of executives can pose increased risks, because the loss of a single person could adversely affect the bank's future fundamentals. For example, a bank whose institutional customers closely associate the chief executive with the institution itself could suffer a loss of business, a loss of earnings and ultimately reduced capital if the chief executive were to leave, absent adequate succession planning.

- **Insider and related-party risks.** Where a bank lends significantly to insiders, e.g., bank management, in the form of related-party loans, this can create conflicts of interest, damage the bank's reputation and ultimately the bank's ability to fund itself.
- **Strategy and management.** A radical departure in strategy, a shake-up in management or an untested team all can herald sudden change that increases the uncertainty about a bank's risk profile. An aggressive growth plan can also signal an elevated risk appetite, while clear weaknesses in risk management can increase a bank's exposure to adverse developments. Any concerns regarding the rigor of board or management oversight may also be considered in this factor.
- **Dividend policy.** An aggressive dividend policy may imply reduced financial flexibility. Bank management teams are often slow to reduce established dividend levels out of concerns over negative signaling and an adverse impact on share prices. (The same can be said of share buybacks, although to a lesser extent, as the timing and certainty of execution of even announced buyback programs leave room for greater management discretion).
- **Compensation policy.** Similarly, an aggressive compensation policy, for example, widespread use of high bonus payments relative to salaries, especially when skewed toward cash, may encourage short-term risk-taking behavior to the detriment of bondholders.
- **Accounting policies.** Some banks, although subject to more demanding accounting standards (e.g., US GAAP or IFRS) adopt more aggressive policies. This can sometimes be a strong indication of issues with corporate culture and compliance practices that could be detrimental to creditors' interests. Accounting restatements also raise questions about the efficiency of accounting controls and, hence, the accuracy of financial ratios. For instance, if a bank is required to restate its earnings, consequences can include a loss of confidence in management and the institution generally among the bank's funding counterparties.

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 bank's overall risk profile. Typically, downward notching would be one notch, but could be more if we perceive multiple or more deep-seated and serious issues. For example, we may notch downward if we see an aggressive dividend policy combined with rapid growth in a new or volatile business line. Upward notching would generally be limited to one notch. We may notch upward where we perceive sustained, exemplary stewardship over time, and where there is a tangible impact on the bank's risk profile.

Constraints on BCAs

Sovereign Ratings

Banks by their very nature tend to have significant exposure to sovereigns. This can be direct, via liquidity-related exposure to central banks and government bonds, and indirect, via lending book exposures to the real economy, which is itself correlated to the government's creditworthiness.

For this reason, we seldom assign a BCA higher than the long-term local-currency rating of the sovereign country within which it is based. Sovereign-related risks are generally captured through, in the first instance, the Macro Profile, and second, where relevant, adjustments to the Asset Risk sub-factor. However, where the initial outcome of the BCA is nevertheless higher than the sovereign, the assigned BCA may be constrained by the sovereign rating. This captures the risk that indirect exposures not captured in our concentration assessment may prove material.

On the other hand, a BCA may in some cases exceed the sovereign ratings of the bank's home country. This would typically not be by more than one notch, but could occur if direct exposures to the government are

relatively small (for example, less than 50% of TCE), if the bank has a high degree of diversification outside its home country, and if the bank has a low degree of dependence on confidence-sensitive funding from international capital markets. These characteristics reduce the dependency between the creditworthiness of the bank and the sovereign.

Parental or Group Financial Strength

Deterioration in the credit quality of a parent entity or a broader financial group can directly and indirectly affect the credit standing of bank subsidiaries. Following are four ways that credit issues at a parent entity can transmit risk to its subsidiaries:

» Upstream support. Increased/special dividends or intercompany cash transfers (loans and deposits) from the subsidiary could bolster the capital or liquidity position of the parent at the expense of capital or liquidity strength at the subsidiary.

» Confidence sensitivity/contagion. Parent credit issues could trigger a loss of confidence in other entities in the group, leading to a loss of market access or franchise damage at the subsidiary. In addition, subsidiary banks may have more limited options to raise third-party capital when needed, and confidence sensitivity/contagion resulting from issues at the parent bank may further limit those options.

» Event risk. The failure of a parent (or deterioration in its credit quality) could necessitate the sale or spin-off of a subsidiary. This could have negative credit implications depending on a number of variables, including the credit quality of the purchaser in a sale transaction, incremental leverage taken on in a sale or spin-off transaction, or the ability of a subsidiary to effectively operate as a standalone entity in a spin-off transaction.

» Shared infrastructure. Parents and subsidiary banks often share key infrastructure, such as information technology systems and key control and operating functions, including risk management and treasury. Breakdowns in these systems and business functions could have effects across an entire organization.

We consider parent credit risk in our analysis of scorecard metrics. Notably, a large parental exposure could lead to a downward credit concentration adjustment to the Asset Risk sub-factor score. Liquidity concerns at the parent level could lead to a downward adjustment of the Liquid Resources sub-factor score due to intra-group restrictions, while our capital concerns for a subsidiary that is not well ring-fenced may lead to downward access to capital or capital fungibility adjustments to the Capital sub-factor score. Forward-looking scores in many sub-factors could reflect the potential for upstream support that the parent might require.

In some cases, however, risks related to the parent's creditworthiness may not be fully captured in the Financial Profile. For example, risks related to confidence-sensitivity contagion or heightened event risk related to parent credit risk issues may carry more weight in the BCA than is reflected in Financial Profile sub-factor scores. When we consider that parental risks are not otherwise fully reflected in the Financial Profile, the parent's BCA itself may constrain the assigned BCA for subsidiary banks.

It is very unusual for the BCA of a subsidiary bank to exceed the standalone rating of a parent bank by more than three notches. However, the notching between a parent and its subsidiary may widen as the parent's BCA moves into the "b1" to "c" range, when it is more likely that we will have information that provides greater clarity into the likely impact of its potential failure on the credit profile of the subsidiary. For example, progress toward the sale of the subsidiary to a higher-rated entity could support a higher BCA for the subsidiary bank and, thus, wider notching from the parent's BCA.

The Baseline Credit Assessment

We sum any positive or negative notches from the three Qualitative Adjustment factors and apply them to the Financial Profile alphanumeric score to arrive at an adjusted financial profile score. Upward notching adjustments raise the Financial Profile alphanumeric equivalent score (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 Financial Profile alphanumeric equivalent score (e.g., from baa1 to baa2) and increase the numeric score (e.g., from 8 to 9). The sum of the Financial Profile numeric score and the Qualitative Adjustments is mapped to an alphanumeric equivalent using Exhibit 27, which is the adjusted financial profile score.

EXHIBIT 27

Adjusted Financial Profile Score Numeric Equivalents

Adjusted Financial Profile Score	Numeric Equivalent
aaa	1
aa1	2
aa2	3
aa3	4
a1	5
a2	6
a3	7
baa1	8
baa2	9
baa3	10
ba1	11
ba2	12
ba3	13
b1	14
b2	15
b3	16
caa1	17
caa2	18
caa3	19

Source: Moody's Investors Service

We then consider whether that score should be constrained by the rating of the sovereign or the bank's parent, as described above, to arrive at an adjusted financial profile score after constraints, which becomes the midpoint of a three-notch alphanumeric range that is the outcome of the BCA scorecard. The assigned BCA is usually within this range. In considering where to place the BCA relative to the scorecard range, we typically consider a bank's overall strengths and weaknesses relative to peers. In addition, a BCA may reflect weightings for certain factors that are different for a particular bank than the fixed weights used in the scorecard, or considerations not captured in the scorecard.

EXHIBIT 28

Example of a BCA Scorecard

Baseline Credit Assessment — Banking Group ABC Inc, Country XYZ

Macro Factors

	Country / Region	Macro Profile	Weight
Country 1	Country 1	Very Strong	60%
Country 2	Country 2	Strong	20%
Country 3	Country 3	Moderate +	20%
Weighted Macro Profile		Strong +	100%

Financial Profile

	Historic Ratio	Initial Score	Expected trend	Assigned Score	Key driver #1	Key driver #2
Solvency						
Asset Risk						
Problem Loans / Gross Loans	2.0%	a1	↓↓	**baa2**	Geographical diversification	Capital market risk
Capital						
Tangible Common Equity / RWA	8.5%	ba2	↔	**b1**	Risk-weighted capitalisation	Nominal leverage
Profitability						
Net Income / Tangible Assets	0.5%	baa2	↔	**a3**	Loan loss charge coverage	
Combined Solvency Score				**baa3**		
Liquidity						
Funding Structure						
Market Funds / Tangible Banking Assets	15.0%	a2	↔	**baa2**	Term structure	
Liquid Resources						
Liquid Banking Assets / Tangible Banking Assets	20.0%	baa1	↑	**baa1**	Expected trend	Intragroup restrictions
Combined Liquidity Score		a3		**baa2**		
Financial Profile				**baa3**		

Qualitative Adjustments	Adjustment	Comment
Business Diversification	0	Highly complex organisation
Opacity and Complexity	-1	
Corporate Behavior	0	
Total Qualitative Adjustments	**-1**	

		Comment
Sovereign or Affiliate constraint	**Aaa**	Government rating
BCA range	**baa3 - ba2**	
		Rationale
Assigned BCA	**ba1**	Appropriate position vs peers

Source: Moody's Investors Service

Discussion of the Affiliate Support Component

In this component of our overall approach to assessing credit risk for banks, we consider support from affiliated entities. The outcome of this analysis results in an Adjusted BCA, which is our opinion of the probability of a bank requiring support to avoid a default after exhausting support from its affiliates.

Overall, most banking groups have meaningful incentives to support banking entities within their consolidation, e.g.:

» **Entities within a group represent an investment.** Groups often have an incentive to provide support to entities in order to protect the value of their investment.

» **Entities within a group are often interconnected via direct and indirect exposures.** A failure of one group entity could lead to the failure of another, without further support.

» **Groups often seek synergies by inter-entity customer referrals.** Allowing a group entity to fail could destroy a source of potential value.

» **Many entities are not designed to stand alone.** Various operating entities may perform specialized tasks, provide particular services or operate in a specific geographic area that fits into a broader group strategy.

» **Regulatory requirements**. Groups may be obliged by regulation or law to support their affiliates.

» **Reputational risk.** This can be a powerful incentive to provide support, because the failure of one affiliate could make funding difficult for other affiliates.

A banking group typically provides support when it is in its overall self-interest and when the banking group has the capacity to provide it. Willingness and capacity may vary from entity to entity and situation to situation.

This component of our overall approach has four sub-components:

» The bank's probability of failure, excluding support (its BCA)

» The probability of support[43]

» The capacity to provide support

» The dependence between the respective entities

Affiliate Support Sub-component: Probability of Support

We classify the probability of the affiliate's provision of support in five categories: "Affiliate-backed", "Very High", "High", "Moderate", and "Low". Each of these categories corresponds to a range of support probabilities (see Appendix 6).

In assessing the probability of support, our considerations may include the following:

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

» **Brand.** An entity that carries the group's name and logo is more likely to be supported in order to preserve the group's reputation.

[43] We sometimes refer to probability of support as level of support.

- **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.** A supporting entity may be constrained from providing support to a foreign subsidiary due to political or regulatory considerations.
- **Documented support.** Comfort letters and 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 important strategically than small ones.
- **Financial links.** In assessing whether a banking group may support an operating subsidiary, we typically consider the impact of a potential sale on the group's financials and corporate strategy. When the impact is more negative to the group, a sale to a potentially less creditworthy banking group is generally less likely. Where significant intra-group funding links exist, the entity may also be more likely to receive support.
- **Group policy.** Although groups are very often supportive of their affiliates, this is not always the case. For groups that have previously failed to support an entity or that have disposed of an entity undergoing distress, we may view support as being less likely.

We typically assess the overall impact of the relevant considerations, and support is generally expected to be higher when there are multiple ties between the bank and the group, e.g.:

- We would likely consider an entity that is 100% controlled and owned by a group, carries the group's brand and logo, and conducts activities considered core to the group's strategy as having a "Very High" probability of specific support.
- If the same entity were only 51% owned and controlled by the group, we would likely consider the probability of specific support to be "High".
- Where a 100%-controlled entity operates in geographies or sells products that we consider relatively peripheral to the group's operations, and a disposal of the entity would not have a major impact on the group, we may consider the probability of specific support to be "Moderate".
- If the same entity operated under a separate brand and was not obviously part of the same group, then we may consider the probability of specific support to be "Low" in the absence of other mitigating factors.
- "Affiliate-backed" entities are those that we consider would be almost certain to receive support, without that support necessarily being explicitly guaranteed.

Note that parental support for government-owned banks is generally considered under Government Support, rather than Affiliate Support.

Affiliate Support Sub-component: Capacity to Provide Support

To establish the affiliate's capacity to provide support to the bank, we generally use the affiliate's own BCA. Since BCAs are generally based on consolidated financial statements, i.e., including subsidiaries, we may on occasion modify this BCA to more closely reflect the affiliate's financial strength excluding the supported subsidiary, and avoid incorporating the strengths or weaknesses of the subsidiary 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 BCA of that group. This is the BCA that we would assign if the group were a single legal entity, i.e., based on its consolidated activities and financials. Again, on occasion we may modify this to exclude the supported entity.

This approach acknowledges that potential government support that would apply to the group or certain subsidiaries may not be extended to the subsidiary in question, and that resources available to support the subsidiary are limited to the group's standalone capacity. We generally take this approach because we consider government support separately.

However, we may on occasion use ratings that incorporate government support (typically, the senior unsecured debt rating) to measure the capacity to provide support where individual circumstances justify it — for example, if the supported entity were virtually inseparable from the supporting affiliate due to complex inter-linkages such that government support would almost certainly flow to the supported affiliate. Where this is the case, we do not usually apply government support in a separate step because it is already indirectly incorporated into the rating.

When the supporting affiliate is a non-bank entity, such as an insurance company or non-financial corporate, we similarly choose the rating or assessment of the supporter that is most relevant, based on the specifics of the situation (considering any support or priority of claim incorporated into the supporter's rating). The most relevant rating or assessment may be the supporting entity's probability of default rating or assessment, where available, or we may adjust the rating (e.g., if the supporter's only rating is senior secured, we may choose the senior unsecured equivalent).

Affiliate Support Sub-component: Dependence Between Support Provider and Support Recipient

We also take into account dependence between the supported entity and the supporting affiliate. Formally speaking, this dependence is expressed as a percentage in our JDA calculation and can theoretically vary between 0% and 100%.

However, in practice we usually expect dependence to be high, given that banks within a group typically operate within the same broad sector and often in close geographic proximity. For this reason, problems at one entity are likely to be accompanied by problems elsewhere in the group, reducing the group's capacity to provide support when needed. This phenomenon reduces the benefit of support from a stronger entity to a weaker one.

Typically, we classify dependence in three broad categories, "Very High", "High" and "Moderate" although we may on occasion diverge from this classification to reflect a different view.

In assessing the dependence between a supporting affiliate and a supported affiliate, we typically consider the following:

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

For example, we would very likely consider a retail bank that operates in the same country and the same markets as its parent, and receives the majority of its funding from its parent, to have Very High dependence with its support provider.

As another example, we would likely consider a US retail bank that is owned by a predominantly European universal banking group and that sources its own funding to have High dependence with its support provider.

On some occasions, we may consider dependence to be Moderate. This might be the case, for example, between a large Asian non-financial conglomerate and a small African retail banking subsidiary.

The Adjusted BCA

Our assessment of affiliate support is determined by our JDA framework, which is described in Appendix 6. The outcome of our JDA approach is an indicative range of potential uplift from the BCA.

This range consists of the number of notches of potential uplift corresponding to the lowest probability of support within the selected range (e.g., 30% for "Moderate" probability of support), the mid-point (e.g., 40%) and the highest probability of support (e.g., 49.9%). We also consider the specific circumstances of the supporting and supported entities to assign a given number of notches of support, which is usually but not always within this range.

The BCA, together with this assigned uplift, form the Adjusted BCA. The Adjusted BCA expresses our opinion of the probability that a bank will default on one or more of its obligations or will require extraordinary government support to prevent a default – i.e., the Adjusted BCA expresses our opinion of a bank's probability of failure, after having exhausted any support from affiliates.

The Adjusted BCA also reflects the combined probability that a subsidiary will require support and that a group will fail to provide this support, allowing the subsidiary to default on its non-viability securities.

EXHIBIT 29

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

BCA	Level of support	Notching guidance (Min - Mid - Max)	Assigned notching	Assigned Adjusted BCA
ba1	High	1 - 1 - 2	1	baa3

Source: Moody's Investors Service

Discussion of Loss Given Failure and Additional Notching Considerations Component

This component of our overall approach to assessing credit risk for banks considers the impact of the failure of the bank — with any support from affiliates having been either denied or exhausted — on its various debt classes, in the absence of any government support.

Additionally, this component includes important loss considerations related to hybrid securities arising from the potential timing differences between the bank's failure and missed coupon payments or from write-downs imposed on hybrid securities. As such, this component has two sub-components, Loss Given Failure, or LGF, and Additional Notching Considerations that apply to hybrid securities.[44]

The application of LGF and Additional Notching Considerations results in the Preliminary Rating Assessment (PRA), a measure of intrinsic creditworthiness, absent support. PRAs are not credit ratings but rather assessments of the intrinsic credit risk of each instrument prior to potential government support. The PRA is usually assigned on a scale from aaa to caa3; i.e., we do not typically position PRAs at ca or c unless the instruments are in default or the risk of default or impairment is imminent. For more details, see Appendix 4.

Loss Given Failure Sub-component

The LGF approach is conceptually very similar to a classic loss given default analysis, but the trigger is the failure of a bank and not necessarily its default. This distinction between default and failure is necessary due to resolution regimes, which, in effect, allow banks to selectively default on certain instruments outside of bankruptcy.

In this sub-component, we assess the impact of the bank's failure on different debt instruments by applying either Basic LGF analysis or Advanced LGF analysis, described below.

Basic LGF Applies to Banks in Jurisdictions Without Operational Resolution Regimes

For many banks globally, resolution is of limited relevance, because going-concern resolutions are not part of the public policy framework in their banking systems. In these jurisdictions, resolution procedures may be used on occasion but tend to be defined on an ad hoc basis, rather than clearly defined ex ante. Government support, or indeed bankruptcy, remain more likely outcomes for a failed bank than such a resolution. For banks in such systems, there is usually much less clarity into the potentially differentiated impact that a failure could have on each debt class, and we apply a Basic LGF approach as described below and summarized in Exhibit 30.

- Senior unsecured debt and rated deposits have generally similar loss characteristics in failure and are likely to experience loss severity consistent with an experience of around 60% loss given default,[45] which suggests a PRA in line with the Adjusted BCA.
- Subordinated debt is likely to experience higher loss severity, consistent with a PRA one notch below the Adjusted BCA, although hybrid securities are subject to additional notching, as set out below.
- Holding-company senior unsecured debt is usually structurally subordinate to debt at banking subsidiaries, and is thus likely to experience higher loss severity consistent with a PRA, prior to government support, one notch below the Adjusted BCA. This also applies to holding company junior securities, which in some cases are subject to additional notching set out below.

[44] High-trigger contingent capital securities do not form part of our LGF analysis because they are designed to absorb losses in advance of a bank-wide failure.
[45] Please see our default and recovery information for financial institutions, which can be found on Moodys.com.

» For banks not subject to an Operational Resolution Regime (ORR), and for banks subject to a liquidation or receivership resolution within an ORR, senior Operating Obligations and other contractual commitments are not likely to default at the same time as the bank failure and will more likely be preserved in order to minimize banking system contagion, minimize losses and avoid disruption of critical functions. For this reason, we assign the CR Assessment,[46] prior to government support, one notch above the Adjusted BCA and above senior unsecured and deposit ratings, reflecting our view that its probability of default is lower than that of the probability of failure.

» CRR liabilities[47] of a bank are a sub-set of the senior Operating Obligations and other contractual commitments that are the subject of CR Assessments. We believe that their probabilities of default will typically be similar, and that they will be lower than the probability of default of a bank's senior unsecured debt in a resolution or receivership scenario. Thus, for banks not subject to an ORR, we would typically assign the CRR, prior to government support, one notch above the adjusted BCA, at the same level as the CR Assessment.

From time to time we may deviate from this where we have reason to believe that our loss expectations are not consistent with these assumptions. We may also apply the Advanced LGF framework in response to idiosyncratic situations, or more generally use it as a supplemental tool.

EXHIBIT 30

Basic LGF Notching Guidance for Banks in Jurisdictions Without Operational Resolution Regimes

Instrument Type	Basic LGF Notching
Counterparty Risk Assessment (CR Assessment)[48]	Adjusted BCA +1
Counterparty Risk Rating (CRR)	Adjusted BCA +1
Bank deposits	In line with Adjusted BCA
Senior unsecured bank debt*	In line with Adjusted BCA
Other senior obligations	In line with Adjusted BCA
Dated subordinated bank debt	Adjusted BCA -1
Junior subordinated bank debt	Adjusted BCA -1
Cumulative bank preference shares	Adjusted BCA -1
Non-cumulative bank preference shares	Adjusted BCA -1
Senior unsecured holding company debt	Adjusted BCA -1
Dated subordinated holding company debt	Adjusted BCA -1
Junior subordinated holding company debt	Adjusted BCA -1
Holding company cumulative preference shares	Adjusted BCA -1
Holding company non-cumulative preference shares	Adjusted BCA -1

* In the event that multiple classes of senior unsecured were introduced in a regulatory regime without an ORR, e.g., senior senior unsecured bank debt or junior senior unsecured bank debt, notching would be based on our analytical judgment of the expected loss given failure of these instruments relative to other instruments in the capital structure, taking into account the terms, conditions and regulatory treatment of the security in the relevant jurisdiction. In the absence of such information, or where we conclude that any differences among these debt classes are not sufficiently material to warrant a differentiation in ratings, these additional classes would be rated at par with senior unsecured debt. In cases where we assign differentiated senior unsecured ratings to a bank in a non-ORR jurisdiction, we would assign a bank's issuer rating at the level of the most senior unsecured debt class available to that bank for issuance in the relevant jurisdiction that is plain vanilla (or ordinary), meaning that it does not have special structural features.

Source: Moody's Investors Service

[46] For a description of CR Assessments please see the glossary and *Rating Symbols and Definitions* (for a link to the latter, please see the "Moody's Related Publications" section below). Please see the glossary for a description of Operating Obligations.

[47] For a description of CRRs and CRR liabilities please see the glossary and *Rating Symbols and Definitions* (for a link to the latter, please see the "Moody's Related Publications" section below).

[48] The notching for the CR Assessment also applies to banks in Operational Resolution Regimes subject to full receivership or bankruptcy, as opposed to a going-concern resolution that preserves critical functions.

Advanced LGF Applies to Banks in Operational Resolution Regimes

» We apply our Advanced LGF approach in systems where banks are likely to be subject to ORRs, which generally have the following key characteristics:

» **Specific legislation.** We look for specific legislation that enables the orderly resolution of a failed bank;

» **Clarity of impact.** The enabling legislation provides a reasonably clear understanding of the impact of a bank failure and resolution on depositors and other creditors; and

» **Reduced government support.** To consider that a resolution regime is operational, we would also expect that regulators are committed to implementing it and that the probability of government support will be reduced or in some cases eliminated.

Where these conditions are fulfilled, we typically designate a bank as subject to an ORR. In these cases we apply our Advanced LGF approach, described below.

The Advanced LGF Factors

There are a multitude of considerations that affect the loss that may be suffered by different creditors in a failure scenario, in the absence of government support. We have used scenario modeling to construct a relatively simple notching approach that allows us to capture the major factors that have a bearing on Loss Given Failure.[49] Our analysis focuses on four factors, discussed below:

» **Factor 1: Resolution balance sheet.** The scope of any resolution needs to be determined and does not necessarily correspond to the consolidated group considered in the BCA analysis.

» **Factor 2: Loss rate.** The greater the overall loss rate on its assets, the more of a bank's liabilities are at risk of loss, other things being equal.

» **Factor 3: Subordination.** The greater the volume of debt and/or equity subordinated to a given instrument class, the greater the protection offered to that instrument and the lower its expected loss.

» **Factor 4: Instrument volume.** The greater the volume of a given instrument class, the lower its loss severity, as a given loss is absorbed by more creditors.

1. Advanced LGF Factor: Resolution Balance Sheet

This factor is important because it allows us to establish the balance sheet that corresponds to the perimeter of the resolution regime. This requires us to look beyond the consolidated group financials upon which we typically base the BCA and to consider the impact of resolution on different entities within a group.

Typically, we expect resolutions to be conducted along national boundaries, as a regulator's authority usually does not extend beyond its borders. This means that, in the case of a multi-national banking group, we may divide the consolidated whole into sub-groups according to their jurisdictions. Within these sub-groups, we consolidate debt and deposit data and assume that equivalent creditors at different entities are treated equally.

For example, we typically expect that a foreign subsidiary of a bank would usually be subject to resolution in its own jurisdiction, not that of the parent. In these cases, subject to the limitations of the data available to us, we model the parent's home country resolution balance sheet by de-consolidating the principal rated

[49] We detail underlying modeling assumptions in Appendix 3.

foreign entities, as well as the non-bank domestic subsidiaries not subject to banking resolution. We do this by deducting the assets, deposits and debt issues of these subsidiaries from the consolidated whole.

However, we typically retain overseas special-purpose funding vehicles within the perimeter of the home country resolution. These vehicles usually provide back-to-back funding up to their parent and can thus normally be considered economically equivalent to domestically issued debt.

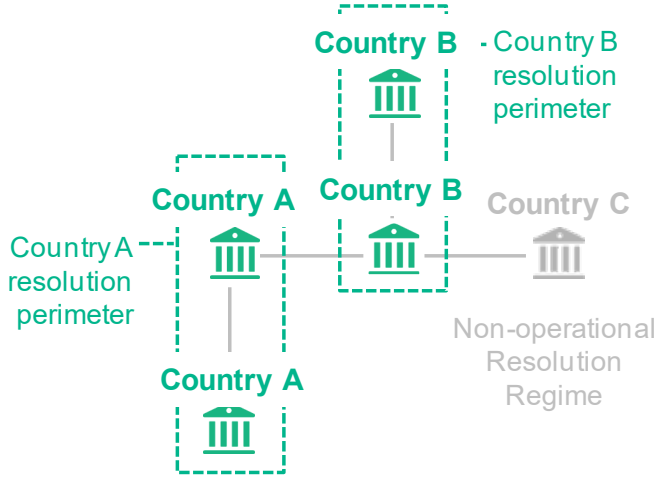
We typically also include debt and deposits booked to overseas branches, since these are part of the same legal entity balance sheet, and we recognize that some foreign-branch issued debt or deposits may be subject to foreign law that makes their inclusion in a resolution more difficult. However, since we expect that changing contractual terms or reciprocal legal arrangements will overcome obstacles to bail-in, we do not typically treat these liabilities differently from domestic branch liabilities.

We may also include the assets and liabilities of entities to which guarantees have been extended, or which we consider to be highly integrated and harmonized (see Appendix 2).

The determination of the resolution perimeter is thus judgment-based, according to our perception of the scope of regulatory jurisdiction. While as noted above we typically assume this to be along national boundaries, there may be instances where cooperation between national regulators enables cross-border resolution, implying equal treatment of creditors of banks within different countries. On the other hand, there may be instances where we conduct separate Advanced LGF analyses for domestic institutions within the same group, where, for example, regulation imposes ring-fencing between domestic entities. Once the perimeter is determined, we estimate a balance sheet at failure, because a bank's liability structure in resolution may be different from its structure when failure is distant.

EXHIBIT 31

Example of Loss Given Failure Perimeter Definition



Source: Moody's Investors Service

In estimating the balance sheet at failure, we consider the role of deposit preference. In particular, we distinguish between deposits that rank pari passu with senior unsecured debt (junior deposits) and preferred deposits that rank senior. The breakdown of deposits for each bank is based on individual bank data where reliably and publicly available, or is estimated based on system-wide data otherwise. We then assume that a proportion of deposits roll off prior to failure, as depositors respond to the deterioration of the bank's standalone health and seek to avoid loss. We typically use a common set of run-off assumptions; however, in some cases we may use issuer-specific assumptions when we believe the standard assumptions are not

representative of the likely failure scenario. We also make some estimates related to short-term debt and intra-group liabilities. For more details, please see Appendix 3.

As part of our adjustments to the current balance sheet, we may reverse recent balance-sheet changes that we believe are temporary in nature, or look beyond current balance sheets in expectation of a material change to the structure of liabilities.

We make forward-looking adjustments to the historical balance sheet where we expect a material change to the liability structure in the near-to-medium term. Such adjustments would typically be made when we have a high degree of confidence regarding the likely change and would generally be oriented toward our view of a balance sheet that will be sustained over time. Regulatory developments, such as the finalization of Total Loss Absorbing Capacity (TLAC) requirements by global regulators, applicable to Global Systemically Important Banks (G-SIBS), provide a material increase in the probability of certain future balance sheet developments. There may be other changes driven by regulation (or by management's strategic decisions) that engender a high confidence level and that we also incorporate in our balance sheet adjustments. Important considerations that influence any such adjustments include:

» **Regulatory Requirements:** An existing or expected regulation that requires or is likely to require a meaningful change in the size of a given debt class generally gives us greater confidence about the likelihood of medium-term changes in the balance sheet, which we would capture in our adjustments. We typically expect that a bank's balance sheet will evolve to comply with, but not exceed, the required regulatory thresholds, unless there are compelling reasons for including a higher level of issuance in our forward-looking view.

» **Public Commitment:** We are generally more likely to make adjustments for banks that have committed publicly to investors or regulators to execute on an issuance or divestiture in a specified time frame. Management's track record of strategic consistency and delivering on its plans also plays a role.

» **Ability to Issue/Close:** We incorporate our view of the issuer's access to markets and other sources of capital, which can be influenced by considerations that include the issuer's credit profile, the terms and conditions of the offered instrument, and our view of credit and equity markets. For instance, we might view that market access would be much more certain when an issuer is planning to refinance existing debt than when an issuer is contemplating a new debt issuance or a new debt class. For acquisitions and divestitures, considerations include the ability to close and finance the transaction, dependencies such as regulatory approvals, and the potential for volatility in asset prices and in the perceived value of the transaction.

» **Timing:** As with all projections, we have greater confidence in nearer-term events. We can recognize some situations as genuinely temporary, such as a transitory jump in a particular class of debt due to pre-financing ahead of an upcoming maturity. However, uncertainties may remain, e.g., management's priorities may change over time, regulatory requirements with deferred implementation may be reversed before they take effect, and there may be greater variations between market conditions and original expectations as time progresses. Timing thereby influences our confidence in projections, and by the same token our confidence level based on other considerations also influences how far forward we are willing to incorporate projected events into our Advanced LGF analysis. Typically we expect to incorporate into our projected balance sheet the changes that we anticipate will occur within a two-to-three-year period when our confidence in these expected changes is high. However, this period could be shorter when our confidence is lower; conversely, it could be longer when our confidence is higher.

2. Advanced LGF Factor: Loss Rate on Assets

In this factor, we estimate the appropriate loss rate for the entity or entities determined to be within the same consolidation. We express the loss rate in terms of the percentage of tangible banking assets. This means that conceivably, the loss rate can range from 100% (in the unlikely event that a bank's assets are completely worthless in resolution) to zero (in the unlikely event that even a bank's equity does not suffer losses in resolution). This estimated loss rate is primarily based on our consideration of two variables:

» **Asset volatility.** The more volatile the recovery values on a bank's assets in failure, the greater the likely capital shortfall and the higher the loss rate likely to be imposed on the bank in resolution. Volatility is affected by many variables, including the operating environment, local experience and asset mix. The Macro Profile of each bank is the primary indicator of asset volatility, although we may include other indicators in some circumstances.

» **Resolution approach.** Some forms of resolution are likely to result in higher losses than others, in our view, independent of the quality of the assets. For example, we expect that going-concern resolution, where the bank's operational functions are preserved, should improve overall enterprise value and reduce losses relative to full receivership or bankruptcy, where the bank's activities are wound down, resulting in a loss of value.

Our judgement of the overall loss rate may also reflect the following considerations: (i) the extent of regulatory recapitalization requirements (which may result in a higher loss rate for larger, systemically important banks than for banks that can be wound up without wider consequences); (ii) the likely market valuation of equity or other instruments that creditors receive in resolution under the terms of the conversion; (iii) the extent and nature of one bank's investments in other banks' capital instruments; and (iv) business model considerations — for example, a bias toward activities likely to lose franchise value rapidly in resolution — which may also lead to a higher loss rate. For details of specific loss rates employed, please see Appendix 3.

3. Advanced LGF Factor: Subordination and Loss Sequencing

The amount of debt or equity subordinated to a given instrument class determines the degree of protection provided to the latter, and the larger the layer of debt and/or equity junior to a given instrument, the lower the likelihood of loss for that instrument in resolution. The amount of subordination depends on the ranking of respective liabilities, which depends, in turn, on local legislation and the likely behavior of resolution authorities.

For details of the rankings we use, see Appendix 3. We may modify these assumptions if we believe they do not represent the likely hierarchy, based on entity- and system-specific analysis. For example, in some jurisdictions, we may consider holding company debt likely to be treated pari passu with equivalent bank-issued debt under a resolution. Similarly, our treatment of government-guaranteed debt and intra-group debt may vary depending on the applicable legislation.

4. Advanced LGF Factor: Instrument Volume

As part of our forward-looking construction of the estimated balance sheet at failure (in Advanced LGF Factor 1, above), we estimate the volumes of instruments in each material debt class. The greater the volume of a given instrument class, the lower its loss severity, because a given amount of loss is diluted by a greater mass of debt/deposits relative to the given loss.

Advanced LGF Notching Guidance Tables

Our assessment of the impact of the above-mentioned factors on expected loss is captured in the tables below (Exhibits 32, 33 and 34), providing guidance on the Advanced LGF notching applied to each instrument class.

For every given instrument class, the applicable notching relative to the Adjusted BCA is determined by the combination of the volume of the subordination cushion as a percentage of tangible banking assets (which increases down the vertical axis) and the sum of the subordination and the volume of the instrument itself, again as a percentage of total tangible banking assets (which increases across the horizontal axis). The benefit of subordination and volume depends in turn on the applicable loss rate as a percentage of tangible banking assets, so the notching thresholds in each case are expressed in terms of multiples of this loss rate.

EXHIBIT 32

Advanced LGF Notching Guidance vs. Adjusted BCA for Banks in Operational Resolution Regimes

		Volume and subordination as multiple of loss rate						
Subordination as multiple of loss rate	Thresholds as multiple of loss rate	>= 0 <0.75 x	>= 0.75 <1 x	>= 1 <1.25 x	>= 1.25 <1.5 x	>= 1.5 <1.75 x	>= 1.75 <2 x	>= 2 x
	>= 0 < 0.75 x	-1	-1	0	0	1	1	2
	>= 0.75 < 1 x	na	0	0	1	1	2	2
	>= 1 < 1.25 x	na	na	1	1	2	2	3
	>= 1.25 < 1.5 x	na	na	na	2	2	3	3
	>= 1.5 x	na	na	na	na	3	3	3

Source: Moody's Investors Service

EXHIBIT 33

Advanced LGF Notching Guidance Example for an 8% Loss Rate

		Volume and subordination % Tangible Banking Assets						
Subordination % Tangible Banking Assets		>= 0 <6 %	>= 6 <8 %	>= 8 <10 %	>= 10 <12 %	>= 12 <14 %	>= 14 <16 %	>= 16 %
	>= 0 <6 %	-1	-1	0	0	1	1	2
	>= 6 <8 %	na	0	0	1	1	2	2
	>= 8 <10 %	na	na	1	1	2	2	3
	>= 10 <12 %	na	na	na	2	2	3	3
	>= 12 %	na	na	na	na	3	3	3

Source: Moody's Investors Service

EXHIBIT 34

Advanced LGF Notching Guidance Example for an 13% Loss Rate

		Volume and subordination % Tangible Banking Assets						
		0	0.75	1	1.25	1.5	1.75	2
Subordination % Tangible Banking Assets		>= 0 <10 %	>= 10 <13 %	>= 13 <16 %	>= 16 <20 %	>= 20 <23 %	>= 23 <26 %	>= 26 %
	>= 0 <10 %	-1	-1	0	0	1	1	2
	>= 10 <13 %	na	0	0	1	1	2	2
	>= 13 <16 %	na	na	1	1	2	2	3
	>= 16 <20 %	na	na	na	2	2	3	3
	>= 20 %	na	na	na	na	3	3	3

Note: For clarity of illustration, thresholds shown in this table are rounded to the nearest integer.
Source: Moody's Investors Service

The overall maximum upward notching from the Adjusted BCA is three. Conceptually, further upward notching can be justified as loss severity diminishes further. We believe, however, that extremely low expected LGF rates are unrealistic because there is usually some uncertainty about how regulators will treat such claims during the resolution period, and priority of claim may not be absolutely upheld.

In addition, the maximum upward notching for an instrument is two notches above the Adjusted BCA when the subordination cushion below that instrument, expressed as a percentage of tangible assets, is less than the loss rate. This reflects our judgment that an instrument benefiting from maximum subordination should be rated more highly than an instrument with low subordination but with maximum volume. Thus, an instrument would not receive the maximum three notches of uplift, whatever its volume, unless it were protected by subordination at least equal to the mean loss rate.

The maximum downward notching from the Adjusted BCA is one notch, which applies to instruments when the combined volume of the subordination cushion below that instrument and the volume of the instrument itself is lower than the applicable loss rate. This typically applies, therefore, to instruments at the

bottom of the liability structure, which have little protection against loss and are themselves thin in terms of volume. This describes most subordinated instruments,[50] but the senior unsecured debt or even deposits of some banks could also fall in this category. In some cases, bank subordinated debt, holding company senior debt, and holding company dated subordinated debt may all fall into this category and attract the same notching. Conversely, some banks' subordinated debt may benefit from significant holding company debt and be lifted above this category.

Exhibit 35 below shows an example of such a table, here using an 8% loss rate, with the thresholds for subordination and volume, plus subordination set accordingly.

» Case 1: An instrument benefitting from a subordination cushion equal to 1% of tangible banking assets, and which itself comprises 3% of tangible banking assets, would be positioned at the Adjusted BCA minus one notch, because it would very likely face a high loss severity in the event of a failure (most often being entirely wiped out).

» Case 2: An instrument benefitting from a subordination cushion equal to 1% of tangible banking assets, and which itself comprises 50% of tangible banking assets, would be positioned at the Adjusted BCA, plus two notches. If the bank failed with a firm-wide loss rate of 8%, the instrument would incur a loss due to the relatively small amount of subordination, but this loss would be small, because of its significant volume.

» Case 3: An instrument benefitting from a subordination cushion equal to 12% of tangible banking assets, and which itself comprises 3% of tangible banking assets, would be positioned at the Adjusted BCA plus three notches, because the instrument would only default if the firm-wide loss were at least 50% higher than the assumed mean of 8%.

EXHIBIT 35

Example Advanced LGF Notching Table for an 8% Loss Rate

Subordination % Tangible Banking Assets	Volume and subordination % Tangible Banking Assets						
	>= 0 <6 %	>= 6 <8 %	>= 8 <10 %	>= 10 <12 %	>= 12 <14 %	>= 14 <16 %	>= 16 %
>= 0 <6 %	-1	-1	0	0	1	1	2
>= 6 <8 %	na Case 1	0	0	1	1	2 Case 2	2
>= 8 <10 %	na	na	1	1	2	2	3
>= 10 <12 %	na	na	na	2	2	3	3
>= 12 %	na	na	na	na	3	3 Case 3	3

Source: Moody's Investors Service

Counterparty Risk Assessment Under Advanced LGF

For banks under an ORR, but which in our judgment are subject to full receivership or bankruptcy resolution, we assign the CR Assessment using the Basic LGF approach (see Exhibit 30). This would apply for example to banks where a resolution regime envisages that a bank is likely to be wound down and liquidated. For banks subject to a going-concern resolution (in which a bank maintains its critical operations) within an ORR, we employ our Advanced LGF approach, but with certain differences from that described above.

Because the CR Assessment captures the probability of default on certain senior obligations, rather than expected loss, we focus purely on subordination (which provides a cushion against default) and take no account of the volume of the instrument class (which affects loss given default).[51] Similarly, because the CR Assessment is an opinion on probability of default, we do not notch down from the Adjusted BCA when there is little subordination; furthermore, because we believe that such obligations will not default before the bank fails, the CR Assessment cannot be lower than the Adjusted BCA. The CR Assessment notching thus typically follows the examples set out in Exhibits 36, 37 and 38 below. For details about the position of

[50] Hybrid securities may, however, be subject to additional notching for their other characteristics. Please see "Additional Notching Guidelines" below.

[51] We capture this by using the table in Exhibit 32, setting the volume of the instrument class to zero, using the appropriate loss rate and raising the number by one notch but capping the uplift at a maximum of three notches. This resultant notching is illustrated in Exhibits 36, 37 and 38.

the CR Assessment in the liability ranking and hence the calculation of total subordination, please see Appendix 3.

EXHIBIT 36

Advanced LGF Notching Guidance for CR Assessment

	Thresholds as multiple of loss	Notching
Subordination % Tangible Banking Assets	>= 0 < 0.75 x	0
	>= 0.75 < 1 x	1
	>= 1 < 1.25 x	2
	> 1.25 x	3

Source: Moody's Investors Service

EXHIBIT 37

Advanced LGF Notching Guidance for CR Assessment

	8% loss rate	Notching
Subordination % Tangible Banking Assets	>= 0 <6 %	0
	>= 6 <8 %	1
	>= 8 <10 %	2
	>= 10 <12 %	3

Source: Moody's Investors Service

EXHIBIT 38

Advanced LGF Notching Guidance for CR Assessment

	13% loss rate	Notching
Subordination % Tangible Banking Assets	>= 0 <10 %	0
	>= 10 <13 %	1
	>= 13 <16 %	2
	>= 16 <20 %	3

Note: *For clarity of illustration,* thresholds shown in this table are rounded to the nearest integer.
Source: Moody's Investors Service

Counterparty Risk Ratings Under Advanced LGF

For a bank under an ORR, but which in our judgment is subject to full receivership or bankruptcy resolution, we would typically assign the PRA of the CRR one notch below the level of the CRA. However, we would not expect the CRR to be below a bank's senior unsecured debt rating. This placement reflects our general expectation that, while CRR liabilities are less likely to default than senior unsecured debt, they would likely face high loss severity in default, because we expect the volume of this tranche of liabilities will be very small as default or failure approaches and the amount of subordination benefit provided by more junior ranking liabilities would also be limited. From time to time we may adjust the initially indicated CRR where we have reason to believe that expected CRR losses differ from our initial assumptions. Examples could include banks with higher levels of debt funding or junior capital or where we expect greater volume of CRR liabilities at failure, based on our understanding of a bank's activities related to CRR liabilities.

For a bank subject to going concern resolution under an ORR, we apply the Advanced LGF framework, and we typically make an assumption about the volume of the tranche, as described in Appendix 3.

Assigning Issuer Ratings Under Advanced LGF

Issuer ratings are opinions of the ability of banks to honor senior unsecured debt and debt like obligations.[52] In jurisdictions with an ORR, multiple classes of senior unsecured debt can co-exist and have different credit ratings under the Advanced LGF. In these cases, we assign a bank's issuer rating at the level of the most senior unsecured debt class available to that bank for issuance in the relevant jurisdiction that is plain vanilla (or ordinary), meaning that it does not have special structural features.

Incorporating Alternative Liability Rankings

Under some resolution regimes, the sequencing of the imposition of losses is clear. In these cases, we apply the appropriate hierarchy as set out in Appendix 3 to the estimated balance sheet at failure, and the resultant balance sheet ratios allow us to determine the instrument notching by referencing the relevant notching table.

However, under some resolution regimes there is greater inherent uncertainty about the appropriate hierarchy. For example, some legislation explicitly provides resolution authorities with discretion to modify the hierarchy subject to certain conditions, such as awarding preference to some deposits relative to senior unsecured debt, even though they would otherwise rank pari passu. Were this to occur, it could result in materially different loss expectations for both rated deposits (which would benefit from a larger cushion of subordination) and senior unsecured debt (which would suffer higher losses due to the lack of loss-sharing with deposits). Similarly, distressed exchanges may distinguish between instruments that are otherwise pari passu.

We incorporate such uncertainty by establishing one or more separate parallel hierarchies, according to the alternative sequence, and comparing the outcomes. Where there are two scenarios, we refer to them as "de jure", which is our baseline expectation of the resolution hierarchy,[53] and "de facto", where greater regulatory discretion is incorporated in the treatment of certain classes of obligations, e.g. deposits.

We then assign probabilities to the expected loss implied by each outcome. We take the weighted average of these two expected losses, and then map this expected loss to a rating and, therefore, a level of notches relative to the Adjusted BCA. Our assumptions regarding the application of such alternative liability rankings are set out in Appendix 3, and are based on our analysis of legal frameworks and related rulemaking that govern bank resolution in the relevant jurisdictions. Our estimates are likely to evolve over time as the legal frameworks and the related rulemaking continue to develop and change, and as precedents are set for how the resolution frameworks are applied in practice. In some circumstances, estimates vary between financial institutions in the same ORR if we believe that those institutions will be treated differently by regulators, e.g., if some are systemically important and others are not.

Responding to Changes in Financials

The nature of our approach means that, at times, notching may be sensitive to changes in the liability structure (e.g., changes in the stock of debt outstanding, which can change the Advanced LGF notching). In general, our Advanced LGF notching is unlikely to be sensitive to short-term volatility in balance sheets. As a practical matter, we expect to perform a new LGF assessment at least annually following the publication of each set of fiscal year financial statements. We may also review the appropriateness of our LGF assumptions concurrently with our regular reviews of banks' standalone BCAs and ratings more generally, as well as in response to interim financial statements or major changes in capital structure, for example.

[52] For more details, please see Moody's *Rating Symbols and Definitions*. A link can be found in the "Moody's Related Publications" section of this report.

[53] In broad terms, a jurisdiction's resolution hierarchy is typically based on the general liquidation hierarchy, although the two may be different in some respects, in part because the aim of resolution is to avoid a liquidation, and regulators have broader discretion than they would in an liquidation.

LGF and Additional Notching Sub-component: Additional Notching Considerations

The LGF analysis described above — basic or advanced — only provides notching guidance for loss severity considerations. In this sub-component, we take into account other instrument features that could increase expected loss but that are not always related to failure of the bank.

Such features are specific to deeply subordinated and hybrid securities. We use additional notching to further distinguish between different instruments on the basis of their individual default probabilities, i.e., the potential timing differences between the bank's failure and the potential for missed coupon payments or write-downs on securities that contain these features. These securities can include bank hybrid securities, contingent capital instruments (contingent capital instruments, or CoCos, including both non-viability and high-trigger securities) and deeply subordinated debt.

Using the outcome of our LGF analysis as a starting point, we consider such features and apply any additional notching to reach a PRA for each instrument class. PRAs are an assessment of the intrinsic credit risk of each instrument prior to potential government support.

Additional notching is important, as evidenced during the financial crisis when default[54] probability for hybrids was clearly higher than for bank senior debt, because losses can occur in a restructuring outside liquidation or resolution through coupon suspension, equity conversion, principal write-downs, "good bank"/"bad bank" structures, and distressed exchanges. Consequently, as well as capturing the risk of loss from subordination, additional notching incorporates the incremental default probability resulting from the suspension of coupon payments and the potential for a principal loss outside of failure or resolution. The main considerations are the timing of a possible default or impairment event (which could vary on a security-by-security basis even within the same bank's capital structure) and the severity of loss given impairment.

For rating high-trigger CoCos, we use a model that captures the probability of a bank-wide failure event, the probability of a trigger-breach event, and loss severity if either or both of these events happen. We capture the risk of coupon suspension, if applicable, in the notching for the related non-viability security. The assigned high-trigger rating also incorporates analytical judgment based on case-specific characteristics and may be different from the model-indicated outcome, and we typically cap the high-trigger security rating at the level of the non-viability security rating.[55] The bank's Adjusted BCA is an important component in the high-trigger CoCo model.

We may also use this model for all securities with coupon-skip features, when we see a meaningful potential for coupon skip outside of bank failure. In these cases, we may run the model using the capital ratio associated with the coupon-skip trigger.

As described in more detail below, our approach also incorporates analytical judgment when we believe that the model outcome, or the typical notching range shown in Exhibit 39, does not fully capture the security's credit risk.

[54] Under their terms, hybrids allow for missed coupon payments or principal write-downs or equity conversions, which do not result in an event of default. If these events occurred, there would not be a breach of contract, but a significant credit event that could result in investor losses. We consider these events to be impairments.

[55] If the bank does not have any rated non-viability securities, we would use this methodology to determine what the rating of that class of security would be if the bank were to issue such a security (consistent with the form, e.g., subordinated debt, non-cumulative preferred and others, of the high-trigger security being issued).

Additional Notching Guidelines: Summary Table

Our additional notching guidelines for subordinated debt, hybrids[56] and contingent capital instruments (including both non-viability and high-trigger securities) are summarized in Exhibit 39.

EXHIBIT 39

Additional Notching Guidelines: Observed Types of Subordinated Debt, Hybrids and CoCos

	Security Type	Typical Regulatory Treatment	Coupon-Skip Mechanism*	Typical Range of Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)
1.	**Plain Vanilla Subordinated Debt (may or may not be subject to a statutory bail-in regime)**	Lower Tier 2 or Tier 2	None	0	-1
2.	**Hybrid Subordinated Debt (with coupon-skip mechanisms)**	Tier 2 and Tier 3	Mandatory, weak triggers, cumulative, subject to maturity extension	0 or -1	-1
3.	**Junior Sub. Debt**	Upper Tier 2	Optional, cumulative	0 or -1	-2
4.	**Contractual Non-Viability Sub. Debt**	Tier 2	None	0 or -1	-2
5.	**Dated‡ Junior Sub. Debt with Principal Write-down**	Upper Tier 2	Optional/mandatory, cumulative	-1 to -3	-2
6.	**Preferred Securities**	Tier 1	Optional/mandatory, cumulative, non-cumulative, or non-cash cumulative (ACSM) settlement	-1 to -3§ May use model for coupon skips**	-3
7.	**Contractual Non-Viability Preferred Securities**	Additional Tier 1 (AT1)	Optional, non-cumulative	-2 May use model for coupon skips**	-3
8.	**High-Trigger Sub. Debt or Pref. Securities and Other AT1 Securities With Coupon Deferral Features**	Tier 2 or AT1	Optional, non-cumulative for AT1 securities	Use a model-based approach. For high-trigger securities, we rate to the lower of the model-indicated outcome and the non-viability security rating.	Not Applicable

* Optional coupon skips can be imposed at the issuer's option. The issuer is required to impose mandatory coupon skips whenever it fails to meet a certain triggering ratio.

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

‡ These securities are frequently referred to as dated, which means they have a maturity date, i.e., are non-perpetual. Securities in several other categories may also be dated.

§ Capped at a maximum of Baa1 for non-cumulative Tier 1 securities with a net loss trigger.

** For all securities with coupon-skip features, we may use the high-trigger CoCo model to estimate the potential for a coupon-skip, which, in combination with other quantitative tools and our view of the likely duration of any coupon-skip, may inform our ratings of these securities. Non-cumulative coupon skips are most likely to be present in preferred securities, high-trigger CoCos and other Additional Tier 1 securities.

Source: Moody's Investors Service

[56] Hybrids may also take the form of preferred securities issued by a trust where proceeds are on-lent to the bank through either preferred securities or junior subordinated debt. For these structures, our analysis focuses on both the features of the obligation issued by the trust to investors and the features of the obligation between the bank or bank holding company and the trust.

Additional Notching Based on Table

For rating certain types of instruments, as shown in the table above, we provide guidance on assigning the PRA within the specified notching ranges. For each of the ranges presented, there is a standard level of notching that we expect will be the outcome in most circumstances.

However, we may assign the PRA at a different point within these ranges based on specific security features, including triggers, judgments on the bank's capital position and the likelihood of coupon omission, if applicable. We also assess past demonstrated regulatory intervention and non-intervention practices for insight into future regulatory behavior.

One of the reasons ranges are necessary is that securities that are Basel III-compliant for regulatory capital purposes convert to equity or suffer a principal write-down tied to regulatory discretion or the breach of regulatory capital triggers. Basel III-compliant securities can take the form of Tier 2 (subordinated debt) or Additional Tier 1 (non-cumulative preferred) securities, which could have principal or coupon losses, if applicable, imposed either well in advance of, or close to, the point of non-viability.[57] We expect other subordinated instruments to be discontinued over time in most countries.

In certain circumstances, assigned notching may be outside the typical range. For example, if a coupon skip or principal loss in a restructuring outside resolution or liquidation is imminent, we use an expected loss analysis, which is explained in Appendix 4, that could result in a rating lower than that suggested by the notching ranges.

The amount of notching of junior obligations, except high-trigger contingent capital securities, remains fixed across most of the Adjusted BCA spectrum of the banks that issue them, because the structural risks of these securities remain the same, regardless of the bank's financial strength.[58] However, when the bank's financial condition weakens and the probability increases that losses will be imposed on junior obligations, ratings typically include idiosyncratic differences in loss expectation based on conditions that may not be apparent until the bank's financial condition is stressed.

Additional Notching Based on Model

For rating high-trigger securities, we use a model that incorporates our view of the issuing bank's current financial strength as expressed through its Adjusted BCA, its current capital level (generally adjusted for our forward-looking view of capital), the capital level associated with the point of non-viability and the distance to trigger breach (this distance being the difference between the actual or forward-looking capital and the capital level associated with the trigger in the security being rated).

The model captures the dual credit risks of a high-trigger security, including the risk that a bank reaches the point of non-viability and the risk that the trigger is breached well in advance of the point of non-viability, leading to coupon suspension. The rating assigned to the instrument is informed by the model (see Appendix 8). The estimate of expected loss we incorporate into the ultimate rating of these instruments may also reflect further quantitative analysis, based on our view of the likely duration of a coupon suspension.

[57] To determine whether a security has a high trigger, we generally use Basel III's threshold for regulatory capital treatment of Common Equity Tier 1 (CET1) to risk-weighted assets less than 5.125% as the cut-off point. Discretion may be applied in limited cases, on a system-by-system basis, to set the point of non-viability at a level above or below 5.125%, e.g., when local regulatory minimums are different from the Basel guidance.

[58] For banks with a BCA of b1 and below, we may also consider using an expected loss analysis depending on the factors driving the bank's low intrinsic strength rating in the first place.

The bank-wide failure risk is captured in the notching for the related non-viability security rating and, for high-trigger securities, we usually rate to the lower of the model-indicated outcome and the non-viability security rating.

Our additional notching may reflect analytical judgments not incorporated in the model, including country-specific regulations and case-specific characteristics, such as specific bond terms. Particularly when assessing the potential impact of government support on a given instrument type, we may consider each jurisdiction's particular regulatory environment. As a result, assigned additional notching may not match the model-indicated outcome.

Using the Model to Assess Coupon-Skip Risk of Other Instruments

In assigning additional notching, we generally incorporate an assessment of the headroom in a bank's regulatory capital above the point at which regulators may intervene to conserve capital. When headroom is limited, we typically perform further analysis. As a guide, we generally consider that headroom is limited when there is less than 200 basis points between the relevant capital metric and the trigger.

» Our assessment of appropriate notching for securities (other than high-trigger) that have coupon-deferral features[59] (including Additional Tier 1 instruments) may be informed by a quantitative analysis of the risk of suspension based on the model we use for high-trigger CoCos in order to estimate the probability of a coupon skip, and we may also perform further quantitative analysis to estimate loss, based on our view of the likely duration of a coupon suspension.

» Ratings assigned to instruments with coupon-skip features also incorporate our qualitative assessment of the bank's ability to manage and maintain its capital position, including its organic capital generation capacity, its ability to reduce instrument-specific risk, its ability to attract outside capital via capital issuance, likely gains from business unit/asset disposals and other issuer-specific considerations.

» Other idiosyncratic factors, including local regulatory or accounting requirements and the potential flexibility of the legal regime to allow time to resolve a breach prior to mandatory coupon suspension, are also taken into consideration.

On the following pages, we explain in further detail how we determine the additional notching applied to each security type and some of the reasons behind our approach.

Additional Notching Guidelines: Security Types

Below we present the typical range of additional notching for each subordinated security type, the standard level of additional notching within this range that we expect will be the outcome in most circumstances, and the considerations for determining the assigned level of additional notching.

In certain circumstances, assigned notching may be outside the typical range. For example, if a coupon skip or principal loss in a restructuring outside resolution or liquidation is imminent, we use an expected loss analysis, which is explained in Appendix 4, that could result in a different instrument rating than that suggested by the notching ranges.

1. Plain Vanilla Subordinated Debt

Subordinated or "plain vanilla" subordinated debt (including most lower Tier 2 securities) has no coupon-skip mechanism and generally absorbs losses only in liquidation. This suggests that the probability of default

[59] While in theory any security could be structured with coupon-skip features, they are most likely to be found in categories 6, 7 and 8 shown in Exhibit 39.

is typically aligned with the Adjusted BCA. Loss severity is captured by our LGF analysis and therefore there is generally no additional notching for these instruments beyond that derived from the LGF analysis.

In certain jurisdictions, there are explicit laws in place that allow authorities to impose losses on subordinated debt through a bank resolution framework or statutory bail-in regime. In assigning the PRA, we treat dated subordinated debt equally regardless of whether a resolution framework is in place, because experience has shown that one can quickly be put in place. In addition, Basel III has made it clear that regulatory capital needs to absorb losses either contractually or through the use of regulatory powers that bail in subordinated securities.

EXHIBIT 40

Plain Vanilla Subordinated Debt

Security Type	Typical Range of Additional Notching	Standard Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)	Comments
Plain Vanilla Subordinated Debt (may or may not be subject to a statutory bail-in regime)	0	0	-1	No additional notching; loss severity is already incorporated in our LGF analysis.

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

Source: Moody's Investors Service

2. Hybrid Subordinated Debt (with Coupon-Skip Mechanisms)

For the most part, hybrid subordinated debt does not have coupon-skip mechanisms; however, some hybrid subordinated debt does.

For example, in Latin America, hybrid subordinated debt is short-dated and, if minimum regulatory capital thresholds are not met, coupons must be skipped on a cumulative basis. In Europe, Tier 3 securities, which are short-dated and pari passu with Lower Tier 2 securities, have similar triggers which, if breached, result in coupon suspension and the extension of maturity.

In these cases, the probability of a trigger breach is low. In addition, if the trigger is breached, the incremental loss associated with a coupon skip is also low because the bank will either be close to liquidation or included in a restructuring outside liquidation, and skipped coupons will likely not have accumulated over a long period of time.

As a result, the loss potential is not much higher than the risk of plain vanilla subordinated debt and, therefore, no additional notching would result beyond that derived from the LGF analysis.

EXHIBIT 41

Hybrid Subordinated Debt (with Coupon-Skip Mechanisms)

Security Type	Typical Range of Additional Notching	Standard Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)	Comments
Hybrid Subordinated Debt (with coupon-skip mechanisms)	0 or -1	0	-1	Tied to the breach of weak regulatory capital triggers, a cumulative coupon skip is a low-probability, low-severity event. As a result, risk is roughly in line with plain vanilla subordinated debt and would be treated similarly.

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

Source: Moody's Investors Service

3. Junior Subordinated Debt

Based on its terms, junior subordinated debt (including upper Tier 2 and some Tier 1 securities issued under Basel I or II) is typically structured to allow the bank to skip coupon payments at its option on a cumulative basis. Reflecting the risk of a missed coupon payment and the timeliness of payments, junior subordinated debt ratings are typically subject to one additional notch downward from that derived from LGF analysis.

However, in cases where the issuer has restricted deferral options — where a coupon skip is tied to the breach of a weak trigger, such as a minimum regulatory capital ratio — there may be no additional notching, because the probability of such a trigger breach is remote (unless a bank is close to liquidation or to a restructuring outside liquidation).

EXHIBIT 42

Junior Subordinated Debt

Security Type	Typical Range of Additional Notching	Standard Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)	Comments
Junior Subordinated Debt	0 or -1	-1	-2	If coupon suspension is non-cumulative, then -1 additional notch. Junior subordinated debt with restricted deferral options may not be subject to additional notching.

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

Source: Moody's Investors Service

4. Contractual Non-Viability Subordinated Debt

Contractual non-viability subordinated debt — classified as Tier 2 under Basel III's regulatory-eligible capital — is typically dated and has no coupon-skip mechanism. With language written directly into its contractual terms, the security absorbs losses through conversion to equity or a principal write-down at the point of non-viability.

The PRA for contractual non-viability subordinated debt is, therefore, in most cases one notch below the PRA of plain vanilla subordinated debt to reflect the potential greater uncertainty associated with the timing to equity conversion or principal write-down.

One reason for the additional notching is the risk that the securities may be forced to absorb losses near (but before) the point of non-viability as a way for a bank to avoid a bank-wide resolution. For example, if regulators want to forestall a broad market disruption event, all banks within a system could be forced to trigger equity conversion or principal write-down at the same time.

Although the intent of Basel III regulation is to treat contractual non-viability securities the same as those subject to a bail-in regime, it remains to be seen if this will be achieved consistently in practice. If it is highly likely that contractual non-viability securities would not be singled out and losses would be imposed only at the point of non-viability, when all other junior bank securities will be taking losses, we would consider assigning the PRA at the same level as plain vanilla subordinated debt.

To classify subordinated debt as non-viability for additional notching purposes, the non-viability terms need to be clear. For instance, when the offering memorandum's risk factors explain that the security is subject to an existing or future bail-in regime, we do not typically consider that this risk, in itself, indicates contractual non-viability terms. This is also the case for contractual non-viability securities whose terms simply reference the risk that regulatory powers under existing law or statute for resolving failed (non-viable) banks could be used to impose losses on the securities at the point a regulator determines the bank to be non-viable. Assuming that these securities do not include a quantitative loss trigger, we may view them as equivalent to plain vanilla subordinated debt for the purposes of assigning the PRA.

EXHIBIT 43

Subordinated Debt with Contractual Non-viability Loss Trigger

Security Type	Typical Range of Additional Notching	Standard Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)	Comments
Subordinated Debt with Loss Triggered at Point of Non-viability on a Contractual Basis	0 or -1	-1	-2	Relative to plain vanilla subordinated debt, a further notch is typically deducted to reflect the potentially greater uncertainty associated with timing of equity conversion or principal write-down. Where regulators are highly unlikely to differentiate the timing of a bail-in between contractual non-viability securities and those without a contractual loss feature, we may not apply additional notching (see text).

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

Source: Moody's Investors Service

5. Dated Junior Subordinated Debt with Principal Write-down

European banks have issued short-dated junior subordinated debt with coupon-skip and principal write-down features tied to the breach of triggers.[60] Although generally cumulative, any skipped payments and subsequent principal write-ups following a write-down must occur prior to maturity.[61] Consequently, if a

[60] There can be net loss or balance-sheet loss triggers. In contrast to a net loss trigger, which is income-based, a balance-sheet loss trigger typically includes retained earnings, reserves and the latest fiscal year's earnings. We consider a balance-sheet loss trigger less likely to be breached than an income-based trigger, because a bank will likely experience several years of losses and substantial capital depletion before a balance-sheet loss is reported. However, if a bank has experienced several years of net losses, the probability of a balance-sheet loss trigger breach increases.

[61] Genussscheine issued by German banks and Ergänzungskapital issued by Austrian banks are examples of this type of security. Most Genussscheine are cumulative junior subordinated debt with a balance-sheet loss trigger. If the trigger breach results in coupon suspension and a principal write-down, the written down amount is due at maturity. However, some types of Genussscheine require the bank, if subsequently profitable, to repay any accumulated coupons and written down amounts for up to four years after the original maturity. Ergänzungskapital has net loss triggers, but the securities are typically non-cumulative.

coupon skip or principal write-down occurs and the bank is unable to make up the skipped coupons or reverse the write-down before maturity, these securities could bear additional coupon risk while the bank remains a going concern and outside of a resolution. These securities are typically subject to additional notching within a range of one to three notches depending on the trigger type and whether the hybrid is cumulative or non-cumulative, the latter of which typically has wider notching.

EXHIBIT 44

Dated Junior Subordinated Debt with Principal Write-down

Security Type	Typical Range of Additional Notching	Standard Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)	Comments
Dated‡ Junior Subordinated Debt with Principal Write-down	-1 to -3	-1	-2	Will be positioned within the range, depending on the trigger type and whether the hybrid is cumulative (less downward notching) or non-cumulative (greater downward notching).

‡ These securities are frequently referred to as dated, which means they have a maturity date, i.e., are non-perpetual. Securities in several other categories may also be dated.

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

Source: Moody's Investors Service

6. Preferred Securities

Preferred securities or, in some jurisdictions, such as the EU, junior subordinated debt with a priority of claim senior only to common equity are loss-absorbing under their terms. Preferred securities can be subject to principal write-downs resulting from the breach of certain financial triggers, and they can be excluded from the restructuring of a bank outside liquidation, or subject to an exchange into common equity at a deep discount when a bank is in financial distress. Typically undated (or perpetual), preferred securities do not have to be repaid, and a skipped coupon will never result in an event of default.[62]

Skipped coupons are generally non-cumulative and an extended period of non-payment could result in the risk of significant loss. As such, a non-cumulative preferred security may become impaired ahead of a bank's failure, and its PRA therefore incorporates additional notching, typically of two downward notches. Cumulative preferred securities, which are less frequently issued, are typically notched down by only one additional notch.

Additional notching of three downward notches is generally reserved for non-cumulative preferred securities with net loss triggers to reflect the possibility of greater loss associated with a missed coupon payment. The PRA is subject to a ceiling of baa1 because all banks, regardless of their financial strength and how well they are capitalized, may experience profit volatility, potentially resulting in the breach of a net loss trigger.

[62] In contrast, even if a coupon on junior subordinated debt is deferred until a later date, non-payment of the accumulated amount will result in an event of default.

EXHIBIT 45
Preferred Securities

Security Type	Typical Range of Additional Notching	Standard Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)	Comments
Preferred Securities	-1 to -3§ May use model for coupon skips**	-2 Subject to jurisdictional considerations	-3	If the coupon skip is cumulative, then -1 notch. If the coupon skip is non-cumulative with a net loss trigger, then -3 notches, with the PRA not to exceed baa1.

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

§ Capped at a maximum of Baa1 for non-cumulative Tier 1 securities with a net loss trigger.

** For all securities with coupon-skip features, we may use the high-trigger CoCo model to estimate the potential for a coupon-skip. We may use this analysis, in combination with other quantitative tools and our view of the likely duration of any coupon-skip, to inform our ratings of these securities.

Source: Moody's Investors Service

Jurisdictional Considerations for Preferred Securities

In Europe, many banks issue non-cumulative trust preferred securities with a preferred claim in liquidation. These hybrids typically only have a mandatory coupon-skip mechanism tied to the breach of weak triggers, such as minimum regulatory capital requirements. The probability of a trigger breach is less likely, particularly for a systemically important bank that has received government support to bolster its capital position and avoid insolvency. As a result, the PRA is typically notched down by only one additional notch, rather than the standard two notches.

Common hybrids issued by Australian banks are non-cumulative preferred securities with net loss triggers. The bank has the option, which may or may not be explicit, to override a trigger breach and pay the coupon anyway. Given the dependence of Australian banks on foreign wholesale funding, there is a high probability that the breach of a net loss trigger would be overridden by the bank or regulators despite the absence of explicit language. As a result, the PRAs for these securities, in certain cases, may typically be notched down by two instead of three additional notches and may be excluded from the baa1 cap.

Where we consider a bank very unlikely to skip a coupon payment — for example, a bank in a weak environment with significant government support but with strong capital ratios — the PRA on non-cumulative preferred securities may be notched down by only one notch within the one-to-three notch range above, depending on the factors that drive the bank's weak intrinsic financial strength rating.

7. Contractual Non-Viability Preferred Securities

Contractual non-viability preferred securities — classified as Additional Tier 1 under Basel III's regulatory-eligible capital — are typically perpetual with a non-cumulative, optional coupon-skip mechanism. With language written directly into its contractual terms, the security absorbs losses through conversion to equity or a principal write-down at, or close to, the point of non-viability. Unlike contractual non-viability subordinated debt, losses can also be triggered by the breach of a 5.125% Common Equity Tier 1 (CET1) trigger,[63] which has been suggested by Basel III, as well as at the point of non-viability, as determined by national regulators.

We view Basel III's suggested trigger as meeting the threshold for a trigger that is close enough to the point of non-viability. For securities with triggers set at other levels, we determine on a jurisdiction-by-jurisdiction

[63] The Common Equity Tier 1 (CET1) ratio is defined as Common Equity Tier 1 / Risk-Weighted Assets.

basis if they are sufficiently close to the point of non-viability for us to rate them as non-viability securities.[64] Viewed as "gone" concern securities, they would likely absorb losses after the bank has exhausted all its other options, including cessation of common dividends, deleveraging and the sale of assets. The bank would also have likely failed its stress tests.

We typically assign two additional downward notches, in line with the notching for traditional non-cumulative preferred securities, in order to capture the probability of impairment associated with non-cumulative coupon suspension (which could happen before the bank reaches the point of non-viability).

EXHIBIT 46

Contractual Non-viability Preferred Securities

Security Type	Typical Range of Additional Notching	Standard Additional Notching	Typical Notching Differential Between the Adjusted BCA and the PRA (including one negative notch for LGF†)	Comments
Contractual Non-viability Preferred Securities	-2 May use model for coupon skips**	-2	-3	The additional notching for these securities is the same as for traditional non-cumulative preferred securities.

† The typical LGF notching included in this table is aligned with Basic LGF notching for subordinated debt and with the typical result of Advanced LGF notching. However, Advanced LGF notching can vary depending on the bank's capital structure.

** For all securities with coupon-skip features, we may use the high-trigger CoCo model to estimate the potential for a coupon-skip. We may use this analysis, in combination with other quantitative tools and our view of the likely duration of any coupon-skip, to inform our ratings of these securities.

Source: Moody's Investors Service

8. High-Trigger Contingent Capital Securities

High-trigger contingent capital securities are usually either Tier 2 subordinated debt, typically without coupon-skip mechanisms, or Additional Tier 1 non-cumulative preferred securities. Upon the breach of a trigger set at a level well above the point of non-viability, they convert to equity or can face a full, partial, permanent or temporary principal write-down. The conversion/write-down features of these securities are designed to shore up the bank's capitalization in order to avoid a bank-wide failure.

Regardless of the form this security takes, it has multiple risks: the risk of having a junior debt/preferred equity claim should the bank become non-viable; the risk of having losses imposed upon a coupon skip trigger breach well in advance of the point of non-viability; and, for Additional Tier 1 securities, the risk of coupon suspension on a non-cumulative basis, likely before the conversion write-down trigger is breached. These securities do not form part of our LGF analysis because they are designed to absorb losses in advance of a bank-wide failure.

We use a model-based approach for rating high-trigger securities. In simple terms, the incremental risk of a high-trigger security is the distance to trigger breach, which is captured through a model rather than a simple notching-based approach. Another important aspect of these securities, in addition to severity of loss upon trigger breach, is the incremental risk of the security's default relative to the probability of failure of the bank as expressed through its BCA.

To capture both risks (firm-wide failure and the incremental risk associated with trigger breach), our model incorporates our view of the bank's current financial strength as expressed through its BCA, which is an indicator of bank-wide failure, and its last-reported CET1 ratio, generally adjusted for our forward-looking

[64] If we believe the trigger is set at a level in advance of the point of non-viability, we would rate the security according to our guidance for rating high-trigger securities.

view of capital, to determine the probability of a trigger breach as well as the probability of a bank-wide failure. The model uses the distance from the bank's current CET1 ratio to the capital level set as the trigger for imposing losses on the security.[65]

The model generates an outcome taking the probability of a bank-wide failure and the probability of a trigger breach ahead of a bank-wide failure, then mapping to an alphanumeric on our rating scale, using the four-year idealized default table. For securities with a full principal write-down, we may deduct an additional notch unless the non-viability security rating cap applies. For more details on the high-trigger CoCo model, including how to request it, please see Appendix 8.

We usually cap the high-trigger security rating at the level of the non-viability security rating.[66,67]Since a high-trigger security rating incorporates the credit risk of its non-viability component and the credit risk associated with a pre-failure trigger breach, a high-trigger instrument rating cannot be above the non-viability security rating. The model-indicated outcome considers only the probability of a trigger breach and does not necessarily factor in the risk of the security's other features, such as non-cumulative coupon suspension. However, the rating of the relevant non-viability instrument, which acts as a cap, already captures the loss severity in the event of a bank-wide failure and the possibility of an impairment event through coupon suspension ahead of a bank-wide failure.[68,69] Therefore, in assigning ratings to high-trigger securities, we are effectively rating to the greatest credit risk among a trigger breach, bank-wide failure and impairment associated with coupon suspension, in the case of a high-trigger security. By incorporating the cap of the non-viability rating, we capture two separate, but related risks: high loss severity in the event of a bank-wide failure and the possibility of an impairment event through coupon suspension ahead of a bank-wide failure (i.e., there is a higher probability of default than implied by a BCA event where a bank requires extraordinary support to avoid default).[70]

The assigned high-trigger rating incorporates analytical judgment based on case-specific characteristics, and the assigned rating may be different than the model-indicated outcome. Some of the other factors that we may consider in rating high-trigger securities are discussed below.

Other Considerations for Additional Notching

Beyond the features of the specific security, we may also factor in other circumstances of a particular bank, such as its ability to issue new equity or take other remedial measures, including deleveraging or selling off business units, to address a capital problem and avoid a trigger breach. We may also consider how close a

[65] The trigger is typically expressed as a certain level of the ratio of CET1 to risk-weighted assets. The documents may stipulate that CET1 be "fully loaded" and incorporate all Basel III deductions, or "transitional," where not all deductions have been taken. In our approach, the distance to trigger breach is based on how the CET1 ratio is defined at the time of issuance.

[66] If the bank does not have any rated non-viability securities, or the form of non-viability security is different than the high-trigger security, we would use this methodology to determine what the rating of that class of security would be if the bank were to issue such a security (consistent with the form, e.g., subordinated debt, non-cumulative preferred, and others, of the high-trigger security being issued).

[67] Model outcomes higher than the rating of a non-viability security are technically possible. Although the high-trigger security rating outcome could never be higher than the bank's BCA, our ratings for non-viability ratings are notched down from the bank's Adjusted BCA, typically two to three notches below this anchor point, as shown in Exhibit 39.

[68] As discussed above, we may use the high-trigger CoCo model to assess coupon-skip risks for a non-viability security, which is incorporated into its rating.

[69] Assuming loss severity of at least 70% (leading to loss severity notching of -1 relative to the Adjusted BCA), the positioning of non-viability ratings implies that coupon suspension is at least 2.5 times more likely to occur than a bank-wide failure.

[70] Assuming that the risk of coupon suspension has normal loss severity (55% loss severity compared with 100% for a bank-wide failure), the typical notching of -3 for non-viability implies that coupon suspension is more than four times more likely to occur than a bank-wide failure. For example, the probability of default for a bank with a BCA of baa3 is 2.38% (on the four-year idealized default table) while the probability of default associated with a Ba3 rating – where we would typically rate such a bank's non-viability Additional Tier 1 securities, assuming that the Adjusted BCA is the same as the BCA – is 9.79%, suggesting that the risk is adequately captured.

bank is to breaching its capital buffers. While these factors also influence a bank's BCA, they could have a greater impact on the rating for junior securities.

For high-trigger securities, among other considerations, our ratings incorporate specific security features that may prompt certain behaviors. For example, if a high-trigger security requires equity conversion at a low price upon a trigger breach, absent a contractual non-dilution option for existing shareholders, a bank may do everything it can to avoid triggering equity conversion and its related dilution. In contrast, if a high-trigger security has a full principal write-down, a bank may be more willing to allow the trigger breach to occur, which would make it a riskier security than one with equity conversion,[71] regardless of their respective loss severities.

Preliminary Rating Assessment, Before Government Support

The combination of the Adjusted BCA, notching resulting from our LGF analysis and any additional notching for junior securities, results in our PRA. The domestic sovereign rating of the bank's domicile constrains the PRA as follows:

» For debt, deposit and Counterparty Risk ratings, we constrain the PRA to two notches above the sovereign rating, reflecting our view that expected loss is likely to be higher under a sovereign default.

» The CR Assessment typically does not exceed the sovereign's rating by more than one notch, or two notches where the Adjusted BCA is already above the sovereign rating. This reflects our view that there is a reasonable likelihood that banking authorities would be able to manage any coinciding bank failures in an orderly manner and that the operational obligations that the CR Assessment represents are more likely to avoid a default. In certain circumstances, e.g., in recognition of support from foreign affiliates, the CR Assessment may be above these levels.

Exhibit 47 shows a hypothetical example of how the PRA could be assigned for each instrument for a bank that is under an ORR and has an Adjusted BCA of baa3. For each instrument class, the LGF analysis produces a notching outcome for each of the two scenarios, de jure and de facto, which are weighted to produce the assigned LGF notching. Additional notching is then applied to each instrument, where applicable, according to its characteristics. LGF and additional notching combine to give the total instrument notching, relative to the Adjusted BCA, which in turn leads to the PRA.

[71] A 2014 paper written by Charles P. Himmelberg (Goldman Sachs & Co.) and Sergey Tsyplakov (University of South Carolina), "Incentive Effects and Pricing of Contingent Capital", made the point that contingent capital securities with a principal write-down have a higher likelihood of being triggered (as well as perhaps a higher loss severity) than equity conversion securities. The increased triggering probability can lead to greater risk-taking by bank managers and greater incentive to "burn cash" if the bank is already near the trigger level. Alternatively, it can encourage the use of more aggressive accounting/loss recognition. Regulators may also assume the bank desires to hasten loss recognition. These incentives are present for contingent capital securities with principal write-downs, but not for equity dilutive securities.

EXHIBIT 47

PRA Hypothetical Example: Adjusted BCA of baa3, Operational Resolution Regime (going concern)

Instrument class	LGF Notching			Additional notching	Total Instrument Notching	Preliminary Rating Assessment
	De jure	De facto	Assigned LGF notching			
Counterparty Risk Assessment (CRA)	3	3	3	0	3	a3 (cr)
Deposits	2	3	2	0	2	baa1
Bank senior unsecured long-term debt	2	0	1	0	1	baa2
Holding company senior unsecured long-term debt	-1	-1	-1	0	-1	ba1
Bank dated subordinated debt	-1	-1	-1	0	-1	ba1
Bank non-cumulative preference shares	-1	-1	-1	-2	-3	ba3

Source: Moody's Investors Service

Exhibit 48 shows an example for a bank, also with an Adjusted BCA of baa3, but in a jurisdiction without an ORR. Basic LGF notching is assigned according to instrument type, based on Exhibit 30. Additional notching is then applied to each instrument, where applicable, according to its characteristics. LGF and additional notching combine to produce the total instrument notching, relative to the Adjusted BCA, which in turn leads to the PRA.

EXHIBIT 48

PRA Hypothetical Example: Adjusted BCA of baa3, Non-Operational Resolution Regime

Instrument class	LGF Notching			Additional notching	Total Instrument Notching	Preliminary Rating Assessment
	De jure	De facto	Assigned LGF notching			
Counterparty Risk Assessment (CRA)	na	na	1	0	1	baa2 (cr)
Deposits	na	na	0	0	0	baa3
Bank senior unsecured long-term debt	na	na	0	0	0	baa3
Holding company senior unsecured long-term debt	na	na	-1	0	-1	ba1
Bank dated subordinated debt	na	na	-1	0	-1	ba1
Bank non-cumulative preference shares	na	na	-1	-2	-3	ba3

Source: Moody's Investors Service

Discussion of the Government Support Component

In this component of our overall approach to assessing credit risk for banks, we consider support from the government. Our approach to government support is Joint Default Analysis similar to that for determining support from an affiliate.

The extent of support incorporated into our ratings reflects the probability of each government's committing public funds to support a financial institution, and that government's capacity to provide support. The probability of support is not static and can evolve, sometimes diminishing rapidly, especially in a financial crisis. It may also vary among debt classes for a given institution; for example senior unsecured debts are typically more likely to be supported than junior instruments.

This component has three sub-components: Probability of Support, Capacity to Provide Support and Dependence Between Support Provider and Support Recipient.

Government Support Sub-component: Probability of Support

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".[72] Our assessment – which is ultimately specific to each instrument class of each bank – is made through the analysis of a number of considerations. Certainty of government support is almost never absolute. We do not assume that governments will never support a given set of bank creditors, nor do we assume that they will always support such creditors. Rather, our opinions on the likelihood of support are credit judgments made at a point in time based on multiple considerations that include current government law and regulations, past governmental actions, public policy statements, developments in other countries, and changing political sentiment.

The first factor we assess is the public policy framework at large. In assessing the probability of government support for a given rated instrument, we typically consider the overall attitude of the relevant public bodies and any constraints they may face, beyond their own creditworthiness, in providing support.

» Public policy. We consider the domestic and, on occasion, pan-national public policy framework to be important indicators of the likelihood of support. The presence of an ORR, comprising a clear legal framework for the imposition of losses on creditors while at the same time preserving the ongoing operations of the bank, will often indicate a probability of support no higher than Moderate, and more likely Low, irrespective of market share or systemic importance. However, support can vary by debt class, and the policy framework may allow for exceptions. Governments may also be subject to constraints on their ability to provide support, however willing they may otherwise be – for example, supranational rules prohibiting state aid, or practical impediments on a country's financial flexibility due to dollarization. We also generally take into account public and political opinion, which can be a leading indicator of the public policy framework, and the government's track record in supporting banks. In some cases, developments in other countries may affect public sentiment and policy choices. Some countries may have clearly declared, credible and consistent supportive policies.

We then assess the following more bank-specific factors, allowing higher probabilities of support.

» Market share of domestic deposits and loans. In general, the larger the bank's market share, the more important it is to the national economy and the functioning of the domestic financial system, and the more inclined politicians will be to provide support. Conversely, a government is more likely to allow small banks to default on their senior unsecured debt, because such an event is less likely to cause depositor panic or have material consequences for the national economy and financial system. In general, a country's largest commercial banks, with markets shares of 3% or more, are likely to be considered of "High" or "Very High" systemic importance, in the absence of an ORR as described above. In some cases, we also take into account regional market shares: for example, a bank may have a low national market share but a dominant regional role. In this case, we may consider the bank to have a higher degree of importance than that suggested by nationwide statistics.

» Market impact. For most commercial banks, systemic importance is likely to be adequately captured by each bank's market share in domestic deposits and loans. However, some wholesale banks are so large and/or complex, and some systems so interconnected, that despite a bank having a negligible presence in the domestic savings and loans markets, its default would likely have consequences for other market agents (other banks, insurance companies, etc.). In such cases, a default could affect market confidence generally in a way that could undermine financial stability and/or be considered

[72] Certainty of government support for a given set of bank creditors is almost never absolute; however, in most circumstances some expectation of support is warranted due to the importance that banks have in a well-functioning economy.

politically unacceptable. In some cases, imposition of losses on creditors, while theoretically possible, may simply be too difficult to achieve without creating severe uncertainty and the potential for disruption. Some instruments of such institutions may be considered as having a "High" or even "Very High" probability of support in the absence of public policy constraints.

» **Nature of activity.** In some cases, a government may be influenced in its decision to provide support to an institution by the nature of the bank's activity. For example, politicians may deem a private bank with more wealthy clients (taking large deposits and providing Lombard lending, for example) to be less deserving of support. On the other hand, a small bank with a perceived or actual public policy role (e.g., taking deposits from disadvantaged citizens) may be more likely to receive support than its market share alone would suggest.

» **Public involvement.** Government ownership typically results in increased likelihood of support. The debt of a bank in which the public sector has chosen to maintain 100% ownership for public policy reasons (as opposed to where ownership is a consequence of previous support or where changing policy may lead to a sale) is often considered as "Government-backed", implying greater public importance and, in the absence of constraints, higher probability of support. The government may provide support due to the bank's policy role, or because allowing a publicly owned bank to default would risk harming market perceptions of the government's own creditworthiness. Where public officials have executive or non-executive capacities at a bank, the implicit shared responsibility for the bank's actions may likewise suggest a higher probability of support.

These factors inform our judgment about the level of support willingness for each rated instrument class, not just for the bank as a whole. This is because support may be selective; for example, we usually expect that a given public body will be more likely to support senior debt than junior debt. We may similarly consider that a government may seek to direct support to depositors rather than to senior unsecured creditors (for example, by transferring deposits to a "good bank" and leaving debt in a "bad bank").

We typically assign the same support assumptions to our CR Assessment as we do to deposits and senior unsecured debt. This reflects our view that any support provided by governmental authorities to a bank which benefits senior unsecured debt or deposits is very likely to benefit operating activities and obligations reflected by the CR Assessment as well, consistent with our belief that governments are likely to maintain such operations as a going-concern in order to reduce contagion and preserve a bank's critical functions. Based on our observations, we typically consider that junior securities, including "plain vanilla" subordinated debt, have a low probability of government support. However, there may be countries where governments continue to have a strong willingness to support this creditor class, and in these exceptional cases, the probability of support assumption may be higher. This could result in some junior debt ratings being positioned higher than their PRAs and, therefore, at or higher than their Adjusted BCAs.

In addition, our government support probability assumptions may differ between otherwise equivalent securities issued by a bank and its holding company. We may conclude that support is less likely at the holding company in cases where public authorities have the ability to provide support to an operating bank, bypassing the holding company. Thus, in ORRs we usually assign support for senior unsecured holding company debt at least one category below that for bank-issued senior unsecured debt, e.g., "Low" for the holding company and "Moderate" for the bank. For banks in other jurisdictions, the probability of government support may not differ materially between the operating company and the holding company, and we may assume the same support probabilities for equivalent instruments issued by each entity. For instance, we may make this support assumption where the entities are regulated by the same authority and it is difficult to clearly separate their creditors, given the intrinsic links between the bank and the holding company.

Government Support Sub-component: Capacity to Provide Support

In general, we consider that the capacity of the relevant public body to provide support is best represented by its long-term local-currency rating, which incorporates contingent liability risk from the banking sector.[73] In some rare cases we may use a different rating where, for example, we consider there to be additional sources of support, or constraints upon support, which are not reflected in the long-term local-currency rating. For example, in exceptional circumstances, a country may be able to extend support to its banking sector beyond its capacity to repay its own debt, because of specific country support from multi-national organizations. In these cases, we may determine that the support provider is an entity other than the sovereign itself, or we may employ a measure of support capacity superior to that of the government itself, to reflect the additional resources available to the banking sector.

Government Support Sub-component: Dependence Between Support Provider and Support Recipient

Similarly to our affiliate support framework, we take into account dependence between the creditworthiness of the supported bank and that of the relevant public entity.

We generally classify this relationship in one of three broad categories, "Very High", "High" and "Moderate". In most instances, we assume that the dependence is Very High. This reflects our judgment that the creditworthiness of governments and of banking systems is generally very closely related. In a crisis, banking sector risks can exacerbate sovereign risk, and sovereign risk can create banking risks.

For some systems, however, the connections between the financial health of government and banking system may be looser. We assess this relationship on a country-by-country basis, based on a range of factors, including:

- the size of the banking sector relative to the government's resources, which is an important indicator of the potential call on the government's resources in the event of a systemic crisis;
- the level of stress in the banking system and in the economy, which is an indicator of the probability of a systemic crisis emerging; and
- the foreign currency obligations of the banking system relative to the government's own foreign currency resources – an indicator of the government's ability to provide the necessary support.

The above factors may lead us to judge that dependence is "High", rather than "Very High", for example where a banking system is relatively small compared to the domestic economy and government resources. On more limited occasions, where for example a banking system is very small compared to the government, and as a result the relationship between their respective creditworthiness is weak, we may judge dependence to be "Moderate". We may also conclude that dependence between a government and an individual bank – rather than the system as a whole – is "Moderate" or "Low", if, for example, the bank operates principally outside its domestic market. In these circumstances, the probability of support is unlikely to be high, of course, because the bank would have a limited domestic market share.

Use of Joint Default Analysis for Government Support

We use a Joint Default Analysis approach, which is detailed in Appendix 6, and a government support scorecard shown in Exhibit 49. The outcome from the scorecard is a range of suggested uplift in notches reflecting government support. Assigned ratings generally incorporate a level of notching within the range, but in certain cases incorporated support may be outside the range due to idiosyncratic circumstances of

[73] We may assign and use internal monitored ratings or private monitored ratings when we do not maintain public ratings for the supporter.

the supporter and the issuer. Furthermore, we typically exercise caution in assigning many notches of uplift for support, unless there has been actual support for this issuer or it is highly systemically important.

Dynamic Nature of Support

Our support assumptions are not static. The likelihood of governments being both willing and able to provide financial support to different creditor classes of financial institutions may change over time. Our opinions on the likelihood of support are credit judgments made at a point in time based on multiple considerations, and most of these considerations are highly dynamic. Support assumptions are opinions about future behavior of supporters, and the future is subject to substantial uncertainty.

Incorporating Ceilings

Instrument-level ratings and CR Assessments may be constrained by the country's local currency (LC) and foreign currency (FC) ceilings (please see our cross-sector methodology that discusses these ceilings[74]). Where FC and LC ceilings differ, the impact of these ceilings may lead to different ratings for a bank's LC deposits, debt, and other instruments relative to its FC instruments. Where the ceilings are not a constraint, or where they are at the same level, the bank's respective FC and LC instruments (e.g. FC deposits and LC deposits) are typically rated at the same level.

EXHIBIT 49

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

Instrument class	Preliminary Rating Assessment	Level of support	Notching guidance (Min - Mid - Max)	Assigned notching vs PRA	LC Country ceiling impact	Assigned LC rating	FC Country ceiling impact	Assigned FC rating
Counterparty Risk Assessment (CRA)	a3 (cr)	Moderate	1 - 1 - 1	1	0	A2 (cr)	--	--
Deposits	baa1	Moderate	1 - 1 - 1	1	0	A3	0	A3
Bank senior unsecured long-term debt	baa2	Moderate	1 - 1 - 1	1	0	Baa1	0	Baa1
Holding company senior unsecured	ba1	Low	0 - 0 - 1	0	0	Ba1	0	Ba1
Bank dated subordinated debt	ba1	Low	0 - 0 - 1	0	0	Ba1	0	Ba1
Bank non-cumulative preference	ba2	Low	0 - 0 - 1	0	0	Ba2 (hyb)	0	Ba2 (hyb)

Source: Moody's Investors Service

[74] Please see the "Moody's Related Publications" section of this document for a link to our sector and cross-sector methodologies.

Limitations, Assumptions and Other Rating Considerations

Scorecard-indicated outcomes may not map closely to actual ratings. In this section, we discuss limitations and assumptions that pertain to the overall rating methodology and some of the additional factors that are not included in the scorecard but can be important in determining ratings.

Limitations

Our ratings incorporate expectations for future performance. In some cases, our expectations for future performance may be informed by confidential information that we cannot disclose. In other cases, we estimate future results based on past performance, industry trends, competitor actions or other considerations. In any case, predicting the future is subject to substantial uncertainty.

In addition, our forward-looking expectations may vary from historical financial statements, and our long-term forward view may be different from our near-term forward view.

We seek to incorporate all material credit risks into our ratings, whether long-term or short-term risks, with the most forward-looking view that visibility into these risks permits. In most cases, nearer-term risks are more meaningful to issuer credit profiles and thus have a more direct impact on ratings. However, in some cases, our views of longer-term trends may have an impact on ratings. We may from time to time publish scorecards for an issuer using forward-looking metrics, which are typically based on our near-term projections, in part because we may not have sufficient visibility into an issuer's future results beyond this horizon that would enable us to accurately score these factors. Instead, longer-term risks that we can identify may be incorporated qualitatively in our ratings analysis. For example, we may incorporate our forward-looking view of trends in financial results beyond the period of the financial projections included in the scorecard.

While our ratings reflect both the likelihood of a default on contractually promised payments and the expected financial loss suffered in the event of default, the BCA scorecard and LGF guidance in this rating methodology is principally intended to capture fundamental characteristics that drive going-concern credit risk. As a debt instrument becomes impaired or defaults, or is very likely to become impaired or to default, ratings typically include additional considerations that reflect our expectations for recovery of principal and interest, as well as the uncertainty around that expectation.

The weights for each factor in the BCA scorecard represent an approximation of their importance for rating decisions, but the actual importance of a particular factor may vary substantially based on the circumstances. This variation in the relative importance of rating considerations can also apply to factors that are not represented in the scorecard.

In the "Other Rating Considerations" section below, we provide examples of factors that may be important to ratings but are not included in the scorecard.

Assumptions

Assumptions that may cause our forward-looking expectations to be incorrect include unanticipated changes in any of the following: the macroeconomic environment and general financial market conditions, industry competition, disruptive technology, and regulatory and legal actions.

Certain key ratings assumptions for Advanced LGF are found in Appendix 3. Other 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.

Other Rating Considerations

Ratings reflect a number of additional considerations. The rating factors in the scorecard do not constitute an exhaustive treatment of all of the considerations that may be important for ratings of banks. In choosing factors and metrics for the rating methodology scorecard, we did not explicitly include certain important factors that are common to all issuers in any industry, such as the assessments of corporate governance, and the quality of financial reporting and information disclosure, among others.

Ratings may also include additional factors that are difficult to quantify or that have a meaningful effect in differentiating credit quality only in some cases, but not all. Such factors include but are not limited to financial controls, exposure to uncertain licensing regimes and possible government interference in some countries. Regulatory, litigation, liquidity, technology and reputational risk as well as changes to consumer and business spending patterns, competitor strategies and macroeconomic trends also affect ratings.

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

Additional Metrics

The metrics included in the scorecard are those that are generally most important in assigning ratings to companies in this industry; however, we may use additional metrics to inform our analysis of specific companies. These additional metrics may be important to our forward-looking view of metrics that are in the scorecard or other rating factors.

Event Risk

We also recognize the possibility that an unexpected event could cause a sudden and sharp decline in an issuer's fundamental creditworthiness, which may cause actual ratings to be lower than the scorecard-indicated outcome. Event risks — which are varied and can range from leveraged recapitalizations to sudden regulatory changes or liabilities — can overwhelm even a stable, well-capitalized firm. Some other types of event risks include mergers and acquisitions, asset sales, spin-offs, litigation, significant cyber-crime events and shareholder distributions.

Financial Institutions with Limited Financial History

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

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

For start-ups that lack a financial history of at least several years and in cases of a material transformation in a bank's business, such that its financial history does not provide a good indication of future results (collectively, banks 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 the Financial Profile sub-factor scores and in the Qualitative Adjustment factors in order to reflect the considerable uncertainty around our baseline expectations of the bank's future operations and financial profile. To the extent these risks and uncertainties are not fully captured in the scorecard, they may be reflected in an assigned BCA that is lower than the scorecard-indicated range.

Banks with limited financial history may benefit from external support. When material, we would incorporate that support into our ratings. In assessing the level of expected support, we generally consider whether the bank'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 a long track record and entrenched businesses in their home markets. We generally expect that governmental support for start-ups, typically small players in the early years of operations that are not systemically important, to be low. Exceptions could include government-owned start-ups and start-up banks of long-term strategic importance to government policy initiatives.

Appendix 1: Approach to Specialized Covered Bond Issuers

The purpose of this section is to help investors, issuers and other market participants understand how we assign credit ratings or Counterparty Risk Assessments (CR Assessments) to financial institutions whose core business is restricted to the issuance of covered bonds or similar financial instruments (e.g., Pfandbriefe). This approach applies only to those financial institutions that specialize in the issuance of covered bonds on behalf of an owner bank or a grouping of banks. In addition to this core business, the institution may also have very limited lending activities. For the purposes of this section of the methodology we refer to such an entity as a Specialized Covered Bond Issuer (SCBI). The SCBI's CR Assessment is an important input in the rating process of the covered bond instruments, because our rating methodology for covered bonds relies on an Anchor Rating, which is based upon the SCBI's CR Assessment. We may also assign credit ratings (e.g., a senior unsecured bond rating) to an SCBI in the same fashion.

In many countries, banks are allowed to issue covered bonds from their own balance sheet. However, in certain countries banks are instead required to establish specific funding vehicles for this purpose. In certain instances banks may also opt to tap the covered bond market through a special funding vehicle. In addition, banks that may not individually have the ability to set up an SCBI due to the limited size of their funding needs may decide to establish a venture that will collectively give them more-efficient access to the covered bond market.

The strength of the link between a bank and an SCBI can vary greatly depending on whether the bank has full ownership and control of its funding vehicle or whether the SCBI is a joint venture established by a group of banks that may have various levels of shared interests.

Despite their very specific activity, SCBIs are usually subject to regulatory or prudential supervision on a standalone and/or a consolidated basis. The fact that these financial institutions are supervised and required to comply with a set of prudential provisions is by itself a positive element. Furthermore, the covered bond issuance may itself also be governed by a specific law aimed at providing an even higher level of legal and financial protection to investors.

As these entities are not deposit-taking institutions and as a result of their narrow and specifically defined franchise, we take a different approach to assessing an SCBI's intrinsic financial strength. Since an SCBI is intrinsically linked to either a bank or a group of banks, we assign ratings or CR Assessments to SCBIs based on the likelihood, magnitude and features of the parental support expected to be provided by the support provider(s). An SCBI's own CR Assessment or instrument rating is capped at the support provider's CR Assessment or equivalent instrument rating and, depending on the characteristics of the support, it may be below that level. The following section discusses the elements we analyze in assessing the level of parental support that can be expected for these entities.

Methodology for Rating or Assigning CR Assessments to SCBIs

The starting point for the SCBI's CR Assessment is the CR Assessment or equivalent instrument rating of the support provider.

An SCBI's CR Assessment cannot exceed the CR Assessment of the supporter. We typically assign an SCBI's CR Assessment at the same level as the support provider's CR Assessment or one to two notches below that level, depending on the likelihood and strength of affiliate support. In certain circumstances, the SCBI's CR Assessment could be lower, for example if affiliate support is not granted directly by a group of banks but instead by a holding company owned by the banks. If there is insufficient evidence of affiliate support and of

the importance of the SCBI to the parent company, we may not be able to assign a CR Assessment to the SCBI.

To conclude our analysis, a legal opinion may be requested that comments on the enforceability of the proposed arrangements and the level of discretion that the support provider may exercise.

The following sections provide detail into characteristics of SCBIs rated at the level of the supporter, one notch below the supporter, or two or more notches below the supporter. We also describe our approach to rating an SCBI with multiple supporters.

Category 1: SCBI CR Assessment at the Same Level as That of the Support Provider

The SCBI's CR Assessment may be positioned at the same level as that of the support provider if: (a) parental support takes the form of a full, irrevocable and unconditional, and timely obligation to ensure that the SCBI will meet all of its obligations; and (b) the support provider is not entitled to exercise any discretion when providing support. For example, this would be the case where the SCBI benefits from an unconditional, irrevocable and enforceable guarantee for the duration of the covered bond program; or where there is legislation, regulation or a set of inter-company arrangements, independent from the covered bonds program, that requires the support provider to support the SCBI in a full and timely manner (e.g., affiliation in France).

Category 2: SCBI CR Assessment One Notch Below That of the Support Provider

The SCBI's CR Assessment may be positioned one notch below that of the support provider if its affiliate support meets all of the following criteria:

» Structured to ensure that the SCBI's liquidity and solvency are adequate at all times, and these terms are made clear in the documentation and are not subject to conditions. This is not as wide a commitment as Category 1 (i.e., the difference between ensuring full, timely payment of obligations and ensuring only that the SCBI is solvent and liquid).

» Publicly disclosed. The affiliate support is embedded in a publicly disclosed document, for example, by inclusion in the issuer's prospectus or in a press release.

» Legally binding. For example, the failure of a parent to ensure that the SCBI is liquid and solvent would entitle the SCBI and or the holders of the debt instruments issued by the SCBI to a claim against the parent. In the absence of a specific provision entitling the holders of the debt to recourse against the parent, we assess the likelihood that the SCBI will be able to enforce its claim against the parent (based, for example, on the corporate structure of the SCBI, the existence of reserves covering the reasonable costs associated with the exercise of the claim against the parent, etc.).

» Documentation does not permit any withdrawal of support for the affiliate prior to the full repayment of the covered bonds.

» Structured to ensure that the supporter cannot exercise any discretion regarding when to provide support.

Additionally, the following characteristics are required:

» Full strategic fit. Based on available information, we consider it unlikely that the support provider could use an alternative platform for the purpose of funding its loan book.

» Reputational risk to support provider. This requirement is typically met if we consider that the default of the SCBI is expected to do significant harm to the franchise of the support provider and could jeopardize the support provider's ability to successfully access wholesale market funding. For example, the SCBI carries the same logo as its parent(s), or it is well known that the SCBI is part of the parent's group.

» High level of operational integration. For example, the SCBI has outsourced its corporate functions and the servicing of its assets to the support provider.

Category 3: SCBI CR Assessment Two or More Notches Below That of the Support Provider

The SCBI's CR Assessment is typically positioned two notches (in some cases more than two notches) below that of the support provider if any of the following applies:

» There is a support commitment from the support provider, but it is subject to restrictive limitations (for example, affiliate support in the form of an obligation to insure a portion of the portfolio against possible credit losses; or to replace certain assets if they cease to satisfy pre-determined eligibility criteria) or the support is not publicly disclosed.

» Affiliate support can terminate upon occurrence of certain events. Examples would include a keep-well agreement that can be unilaterally terminated by the support provider, or a credit line that can be revoked either at the discretion of the credit provider or as a result of certain termination events in respect of the SCBI (i.e., failure to repay advances; insolvency, etc.).

» Affiliate support is structured in a manner that would allow the support provider to exercise some discretion regarding when or whether to provide support. For example, a support mechanism under which affiliate support is provided only to the extent it is deemed necessary by the support provider or a third party in order to ensure that the SCBI is liquid and solvent.

Additional characteristics that typically lead to two or more downward notches of differential:

» Partial (not full) strategic fit with the support provider. For example, the support provider could use a different platform for the purpose of funding its loan book.

» Reputational risk. This requirement is deemed to be satisfied, inter alia, if the default of the SCBI is expected to do significant harm to the franchise of the support provider and could jeopardize the support provider's ability to successfully access wholesale market funding. For example: the SCBI carries the same logo as its parent(s) or it is well known that the SCBI is part of the affiliate's group.

» Partial operational integration. This would be the case, for example, if either the corporate functions or the servicing of assets were outsourced to an entity other than the support provider.

CR Assessments of SCBIs that exhibit more than one of the characteristics described above could be positioned more than two notches below the support provider's CR Assessment, depending on our assessment of the overall extent of weakness in support. In addition, where the linkages between the SCBI and the parent(s) are unclear, we may decide that we cannot assign a CR Assessment to the SCBI using this methodology.

SCBIs with Multiple Parents

In some markets, SCBIs have been established and are supported by a group of banks (member banks). The SCBI provides access to the covered bond market for the member banks, which may be unable to tap this market on their own given their limited size and funding needs.

When an SCBI has multiple parents/supporters, we first determine the supporter CR Assessment-equivalent for the group of supporting banks, based on a case-by-case analysis focusing on the nature and strength of the SCBI's legal arrangements, the relative importance and credit profiles of the supporting entities, and the government support that such SCBIs might attract given the importance they may have to the financing of the local mortgage market.

Our analysis typically includes a review of the legal documentation and structure of the SCBI to determine the capital and liquidity available based on the vehicle's constitutional documents, the nature of the obligations of each support provider and whether there is joint and several liability. Depending on the strength of the documents and the relative credit profiles of the supporters, supporter CR Assessment-equivalent could be:

(1) the CR Assessment of the weakest supporting entity if, for example, a default of that supporting bank could lead to a cross-default on all instruments issued by the SCBI;

(2) the average of the supporting banks' CR Assessments, typically weighted by their percentage of the total contractual support obligations (or, in some cases, based on our view of their effective support percentages); or

(3) the highest CR Assessment of the supporting banks if the entities are jointly and severally liable vis-à-vis the SCBI.

If a bank supporter does not have a CR Assessment, we may assign an internal CR Assessment using our methodology for banks. If we cannot determine a CR Assessment for the entities providing support, or if the obligations of each participant are not clearly stated in the documentation, we may not be able to assign a CR Assessment to the SCBI.

Once we have determined the supporter CR Assessment-equivalent, we apply the SCBI approach above to determine whether the SBCI falls in category 1, 2 or 3 above, and we assign a CR Assessment accordingly.

SCBIs' Own Liability Analysis

In some circumstances, an SCBI itself may have issued debt, for example senior unsecured debt, which may provide the operating obligations that are the subject of a CR Assessment with further protection in the event of a failure of the SCBI itself. We may therefore incorporate uplift to the CR Assessment of the SCBI, based on the same approach we employ in the LGF sub-component of our methodology for banks.

Other SCBI Instrument Ratings

In order to assign a rating to an SCBI other than a CR Assessment, we follow the same approach as described above, but we substitute the equivalent rating of the supporting bank(s) for the CR Assessment in our analysis. For example, to determine the senior unsecured rating of the SCBI, we would use the senior unsecured rating of the supporting bank (or, for multiple supporters, the supporters' senior unsecured rating equivalent).

Appendix 2: Related Entity Ratings

Highly Integrated and Harmonized (HIH) Entities

In certain cases, a subsidiary bank may be so highly integrated into its parent's operations that separate standalone analysis of the subsidiary would not result in a meaningful BCA. For example, we may consider a non-domestic subsidiary established for tax or regulatory reasons that does not have a franchise of its own and is heavily or entirely dependent on services provided by other group affiliates to be an HIH. A virtual booking entity for conducting a group's business in a given location may also be an HIH. In these cases, standalone financial ratios are largely irrelevant. For an HIH, we typically directly assign the BCA of the bank's parent, or the notional BCA of the group, to reflect our view that the bank is economically indistinguishable from its parent or broader group.

An HIH is likely to show most of the following characteristics:

» a small balance sheet outside of the parent's home country (e.g., less than 5% of the assets or income of the parent)

» a role as a booking vehicle, typically with a significant regulatory license, for conduct of a global business

» significant intercompany assets and liabilities (e.g., where either represents more than 20% of the subsidiary's balance sheet)

» significant interest income from affiliates or interest expenses paid to affiliates (e.g., where either represents 20% of the total)

» significant transfer pricing of revenues and expenses with affiliates (e.g., where either represents 20% of the total)

» significant risk-management support (e.g., back-to-backing of almost all credit and interest-rate risks with affiliates)

» significant product and marketing support (e.g., deposits or loans originated through the parent's brokerage sales force, or key products are designed and priced by related entities within the group)

» unusually low efficiency ratios (indicating a high degree of parent reliance)

» little proprietary franchise and, hence, likely to be difficult to sell to a third party

Credit Substitution

When an entity benefits from credit substitution, i.e., a guarantee or an equivalent form of credit support, we do not typically assign a BCA and use our methodology that discusses our approach to rating based on credit substitution, including guarantees, letters of credit and credit insurance.[75]

Branch Obligations

Bank branches are not assigned independent BCAs or Adjusted BCAs, because the branch forms part of the same legal entity. Usually, obligations of a bank's branch are assigned the same rating as those we assign to the bank itself. Sometimes, however, the branch's deposit rating, debt rating or CR Assessment may be different from that of the bank due to a different ceiling for deposits or bonds in the country where the branch is located.

[75] Please see the "Moody's Related Publications" section of this document for a link to our sector and cross-sector methodologies.

Notional Group BCAs

While we do not formally assign BCAs to groups, consolidated financial strength is important and we may, therefore, make an assessment of the notional BCA of the whole group as part of our analysis. Where the group is predominantly composed of banking entities, this notional BCA is based on its consolidated fundamentals as if it were a single banking entity. In assigning this notional group BCA, we take into account the group's diversification benefits. As we believe the benefits of such diversification may in practice be limited, we typically compare this notional BCA with the average of the individual entities' BCAs (most likely weighted by assets or risk-weighted assets), and constrain the notional BCA to no more than one notch from the weighted average.

Where the group is hybrid in nature, e.g., composed of bank and insurance activities, our starting point is generally the weighted average of the BCA of the banking subsidiaries and the senior debt rating of the insurance subsidiaries (excluding any external support). The weighting is informed by an analysis of the relative assets, capital and revenues, and we typically use the resulting lowest weighted-average BCA, reflecting our view that the strength of the group tends to be more influenced by weaker rather than stronger subsidiaries.

Bank Holding Company Obligations

Many banking groups are structured under a holding company. This legal entity often has little or no activities of its own, but instead exists as the ultimate owner of the group's businesses. For the simplest holding company, assets are its investments in subsidiaries, financed by the holding company's own equity. A pure holding company thus relies on upstreamed dividends from its investments to pay dividends to its own external shareholders.

Sometimes a holding company itself may issue debt or hybrid securities. We do not usually assign a BCA to a holding company. Instead, our approach to rating holding company obligations is as follows.

PRAs of Holding Company Obligations

Generally, we believe that a holding company is inherently connected with its banking subsidiary or subsidiaries. Therefore, the starting point is either the banking subsidiary's BCA or the notional BCA of the group. We do not apply any Affiliate Support, but we do apply our LGF and Government Support analysis.

For banks subject to an ORR, we assign the PRA of holding company obligations using the Advanced LGF approach, as for any other bank security, and then apply Additional Notching. Where we believe that the holding company will be subject to the same resolution process, we place the holding company obligation at the appropriate position in the hierarchy and calculate subordination and instrument volume accordingly. The position of holding company debt in the liability ranking is set out in Appendix 3.

Where we believe that a holding company in an ORR will be subject to a separate resolution process — due to prevailing legislation or the expected behavior of resolution authorities — then we may establish a separate Advanced LGF analysis, specific to the holding company. The loss rate and notching thresholds would in this case be determined by the holding company's own exposures to the bank and expected losses, as well as any other assets it may have.

For banks not subject to an ORR, we would typically position the PRA of holding company obligations using Basic LGF, according to Exhibit 30 in the "Discussion of Loss Given Failure and Additional Notching Considerations Component".

After applying Basic or Advanced LGF, we then apply Additional Notching to arrive at the PRA.

Applying Government Support to Holding Company Obligations

Our government support probability assumptions may be different among otherwise equivalent securities issued by a bank and its holding company. Where public authorities have the ability to provide support to an operating bank, bypassing the holding company, we may conclude that support is less likely at the holding company. Therefore, in ORRs, we usually assign support for senior unsecured holding company debt at least one category below that for bank-issued senior unsecured debt, e.g., "Low" for the holding company and "Moderate" for the bank. Elsewhere, this may not be the case — for example where the bank and the holding company are regulated by the same authority and where it may be difficult to separate in a clean fashion the different creditors, given the intrinsic links between the bank and holding company. In such cases, we may assume the same support probabilities for equivalent instruments issued by each entity.

Other Holding Company Considerations

Sometimes holding companies demonstrate standalone risk profiles that are no longer purely a function of the subsidiary BCAs. Typically, this is when the holding company undertakes maturity transformation within its own balance sheet. For example:

» The holding company may not match the maturities of its lending book and its borrowings, for instance by funding longer-term loans with shorter-term borrowings (creating liquidity risk).

» The holding company may lend at a different level of seniority, for instance by issuing senior debt to fund subordinated loans (creating additional credit risk).

» The holding company may borrow to invest in the equity of its subsidiaries (double leverage), creating reliance on dividends to finance interest expense. This has the effect of creating intragroup equity beyond the equity that exists on a consolidated basis, thereby raising capital ratios at the subsidiary level through the issuance of holding company debt.

These features can, of course, occur in combination. For example, a holding company may issue three-year bonds to invest in the equity of its subsidiaries as well as in deeply subordinated perpetual capital instruments. A holding company may not be a purely financial vehicle; it may also have business activities in its own right that may increase, or reduce, the risks presented by its subsidiaries.

Disclosure at the bank holding company level is typically limited, with simple, consolidated balance sheets published on an annual basis. A key element to our analysis is the extent of double leverage, which offers a simple means of measuring the incremental liquidity risk taken on by the holding company. The double leverage ratio is the combined value of the ultimate holding company's equity and hybrid equity investments in subsidiaries divided by the holding company's own equity. The higher the ratio, the greater the degree of double leverage. However, accounting presentation varies — notably, some holding companies present their equity investment accounts on a cost basis (i.e., excluding subsidiaries' retained earnings), and others on a net asset value basis (i.e., including retained earnings), which we typically include in our analysis and comparison of double leverage among peers. Other important considerations include:

» Some double leverage is hidden, i.e., participation in the subordinated hybrid capital instruments of a subsidiary can be presented as a loan. The holding company financial statements may, therefore, show no double leverage, but this masks the transformation of senior debt into deeply subordinated equity-like instruments.

» Holding company financial statements are typically of lower quality than those of operating companies, and their reporting is often less frequent, providing less information for monitoring of double leverage than for operating company leverage. In addition, management can freely transfer funds between legal entities between reporting periods.

As a guideline, where double leverage is over 115%, we typically review in more detail the structure of capital and dividend flows among operating and holding companies to assess the extent of structural subordination. Where we consider that double leverage or the structure of capital and dividend flows gives rise to a material weakness for the holding company that is not otherwise captured in our LGF analysis, we typically introduce one further downward notch to holding company obligations in addition to the subordination-based notching set out above. In cases where we believe that the structural subordination risks are exacerbated or mitigated by other risks not evident in the double leverage ratio (for example, other sources of credit risk, and the extent to which liquid assets cover short-term maturities), the differential between holding and operating company ratings may widen or narrow. For example, a very high level of double leverage, very strong impediments to cash from subsidiaries and/or a high degree of maturity mismatch at the holding company may lead us to reduce the relevant holding company obligations by two notches, or occasionally more.[76]

Assigning a Counterparty Risk Assessment to Holding Companies

We may assign a CR Assessment to bank holding companies. In these cases, the CR Assessment reflects the extent to which the holding company provides critical operating functions that could create operating obligations and commitments under the scope of the CR Assessment.

Generally, we do not expect CR Assessments to be common for holding company obligations, given that CR Assessments are opinions on the risk of operational obligations and commitments, which are related to activities the banking and other operating subsidiaries in a banking group usually perform. Because we do not assign a BCA to a holding company, in most cases the CR Assessment is at the same level as the holding company's senior unsecured debt ratings. Any positive differential between the CR Assessment and the holding company's senior unsecured ratings level depends on our view of the likelihood that these operating obligations will receive preferential treatment relative to the senior unsecured debt in their resolution regimes.

Assigning a CRR to Holding Companies

We may assign a CRR to bank holding companies. In these cases, the CRR would reflect the extent to which the holding company has CRR liabilities. Generally, CRR liabilities arise from activities typically performed by banking subsidiaries. Any positive differential between the CRR and the holding company's senior unsecured ratings level depends on our view of the likelihood that CRR liabilities will receive preferential treatment relative to the senior unsecured debt in their resolution regimes.

[76] For example, where there are additional idiosyncratic barriers to support being extended from subsidiary to holding company or regulatory concerns. This can be the case with bancassurance groups, for example.

Appendix 3: Consideration of Legal Aspects of Resolution Regimes and Related Key Rating Assumptions in the Application of Advanced LGF

For banks subject to ORRs, we generally use our Advanced LGF framework to assess issuer-level or instrument-level ratings and for CR Assessments.

This appendix describes the considerations incorporated into our framework. We organize these considerations into two broad categories: (i) factual considerations, which pertain directly to enacted law, regulation, case law, or regulatory decisions and (ii) Key Rating Assumptions (KRAs) that underlie our Advanced LGF framework. Our view of the relative priorities of claim in a resolution regime is based on the relevant factual considerations, which may change over time, in combination with the KRAs, which form part of our methodological approach.[77]

Consideration of the Legal Aspects of Resolution Regimes and Bankruptcy Law

The contractual terms and conditions and the legislative frameworks underpinning an issuer's obligations are important elements of our LGF analysis. For example, the foundation for our LGF analysis is that an issuer's subordinated debt will, in a failure-and-resolution scenario, remain legally subordinated and absorb loss before that issuer's senior debt. Under our Advanced LGF approach, the de jure[78] waterfall reflects this legal priority of claim. Similarly, where legislation establishes preference for all deposits, we treat them as senior to senior unsecured debt. The creation of new classes of debt (for example, debt that is senior to subordinated debt but junior to senior unsecured debt) would similarly lead to a modification of the priority of claim used in our de jure scenario. Where the legal framework provides that certain types of deposits are pari passu with senior unsecured debt, we observe that parity in the de jure resolution hierarchy, and we make assumptions about the composition of deposits at failure, as described in the Key Rating Assumptions section that follows.

Following are some examples of factual elements of resolution legislation that, provided they remain in effect, would be considered in the application of Advanced LGF:

- In the US, national depositor preference ranks all domestic deposits senior to senior unsecured debt.
- In the EU, unless superseded by national legislation, the Bank Recovery and Resolution Directive (BRRD) establishes preference for certain deposits, including deposits made by individuals and small and medium enterprises (SMEs) eligible for deposit guarantee schemes (i.e., deposit insurance). Other deposits are generally not preferred and rank pari passu with senior unsecured debt in a resolution or liquidation.
- In Canada, the short-term senior debt (as defined in the regulation) and legacy unsecured senior debt (longer-term unsecured senior debt issued prior to the implementation date) of banks subject to the ORR (as defined in the regulation)[79] are expressly exempt from "bail-in" in the event of resolution. Canadian statutes do not provide for depositor preference relative to senior debt.
- In Switzerland, all deposits are preferred to senior unsecured debt, as per the Banking Insolvency Ordinance, but guaranteed deposits benefit from further preference.

[77] For clarity, changes in legal frameworks or in contractual terms do not constitute changes in Key Rating Assumptions but changes in factually based considerations underpinning our ratings, combined with our judgments related to those factual changes.

[78] In resolution regimes where there is inherent uncertainty about the appropriate hierarchy, we incorporate such uncertainty by establishing one or more separate parallel hierarchies, according to the alternative sequence, and comparing the outcomes. Where there are two scenarios, we refer to them as "de jure" where the liquidation hierarchy is observed, and "de facto" where regulatory discretion is incorporated.

[79] For banks in Canada not subject to the ORR per the regulation, we apply basic LGF.

» In Hong Kong, all deposits covered by the Hong Kong deposit protection scheme are preferred and thus rank senior to all other liabilities. Junior deposits (i.e., deposits not covered by the deposit protection scheme) rank pari passu with senior unsecured bank debt.

Similar factual considerations would form the basis of the de jure waterfall in other countries with Operational Resolution Regimes (ORRs). When factual considerations change, for example material changes in law or regulation concerning the treatment of deposits or different types of debt, we incorporate those changes into the waterfalls we use.

Key Rating Assumptions

Other important elements of the Advanced LGF framework include our KRAs, as described below. These form our starting point assumptions used in most cases, but in certain cases we may modify these assumptions to reflect our view of the most likely failure scenario based on issuers' specific circumstances, for instance their different business models.

Ranking of Liabilities

The de jure liability ranking is typically based on the following assumptions, in conjunction with the relevant factual considerations.

Holding Company Debt

In jurisdictions where, based on the regulatory framework or legal precedent, we expect all holding company obligations to absorb losses before any operating bank obligations incur losses, we treat all holding company obligations as junior to all operating bank obligations.

In other jurisdictions, we generally assume that if a holding company forms part of the same resolution as the bank, holding company senior obligations benefit from the subordination of bank subordinated instruments, as well as holding company subordinated instruments. In these jurisdictions, we expect the regulatory capital instruments[80] issued by banks and their holding companies to absorb losses on a pari passu basis before other liabilities in the waterfall are affected. However, we believe that senior unsecured holding company obligations are nevertheless likely to be junior to bank-issued senior unsecured debt. This reflects our view that regulators will generally expect holding company senior debt to fund inter-company debt that is subordinated to the bank's senior unsecured debt.

Foreign Deposits

In jurisdictions where deposit preference does not extend to foreign deposits, we believe that the concept of dually payable deposits typically means that, in practice, essentially all deposits, including foreign deposits, are preferred.

[80] We typically consider regulatory capital to be instruments that qualify as Tier 1 or Tier 2 capital but in some circumstances regulatory capital may include certain legacy instruments that no longer qualify but retain important loss-absorbing characteristics.

Certificates of Deposits

Where all deposits, including junior deposits, are explicitly preferred to senior unsecured debt, we typically assume that certificates of deposit rank pari passu with senior unsecured debt, including commercial paper and equivalent debt instruments. Elsewhere, we usually assume that certificates of deposit rank pari passu with other rated corporate and institutional deposits.

In Hong-Kong, we assume that certificates of deposit rank pari passu with senior unsecured debt.

CR Assessment Obligations

In a going-concern ORR, we assume that the operational obligations that the CR Assessment represents will benefit from the loss absorption that the bank's capital and debt instruments provide. This expectation is based partly on the formal position of liabilities in insolvency and partly on our judgment that, in practice, some obligations will receive preferential treatment regardless of the liquidation hierarchy.[81] This applies to:

- Where the regulatory framework provides for a distinction between preferred deposits and junior deposits, we assume that operational obligations benefit from the subordination of both senior debt (including any senior-senior debt) and junior deposits, but not preferred deposits.
- Where the regulation provides clear preference for all deposits and no explicit provisions for the authorities to deviate from this preference, we assume that operational obligations benefit from the subordination of senior unsecured debt, but not deposits.
- Where the regulatory framework provides that operational obligations are excluded from bail-in, we assume they will be pari passu with deposits that are likewise excluded.

CRR Liabilities

We would normally consider the probability of default for CRR liabilities to be the same as the probability of default for CR Assessment obligations. In a going-concern ORR, we typically assume that CRR liabilities have nominal volume at failure. In some cases, based on our understanding of a bank's activities related to CRR liabilities, we may make an assumption of greater volume at failure.

In jurisdictions where we assume that CRR liabilities are pari passu with other obligations (e.g. deposits), they benefit from the volume of other pari passu obligations in the waterfall.

Proportion of Preferred versus Junior Deposits

In some jurisdictions, the proportion of deposits benefiting from preference may be unclear, typically due to a lack of disclosure on the part of banks, deposit guarantee schemes and regulators.

For banks in systems where the proportion of junior deposits is unclear from disclosures, we typically assume that 26% of deposits are junior. For specific banks or banking systems where this information is similarly lacking but where we consider that deposit bases are essentially retail in nature, we generally assume that junior deposits comprise 10% of total deposits.

[81] For purposes of the Advanced LGF scorecard, operational obligations (many of which are contingent in nature) are not included in the waterfall of estimated liabilities at failure, because, as explained more thoroughly in the "Counterparty Risk Assessment Under Advanced LGF" section, our CR Assessment is an opinion of the probability of default, rather than estimated loss. However, the scorecard does consider that the subordination of more junior obligations provides a cushion against default.

Run-off Assumptions for Deposits

We assume that a proportion of deposits leaves the bank prior to failure, thus affecting its liability structure at failure and the proportion of losses absorbed by different liabilities in resolution. This run-off rate depends on the structure of the deposit base.

Where junior deposits are mainly composed of large corporate and institutional deposits, we usually assume that these deposits shrink by 25%. This is broadly consistent with the assumptions of the regulatory Liquidity Coverage Ratio (LCR), which envisages outflows of 20% - 40% for most deposits from non-financial institutions. We also apply this run-off assumption for junior deposits in Hong Kong.

For deposits in systems without preference among themselves, we assume an overall run-off of 10%.

We may vary these assumptions in specific instances if the nature of a bank's deposit base suggests that a higher or lower deposit run-off rate is a more accurate reflection of likely depositor behavior when the bank is approaching resolution.

Secured, Short-term and Intra-group Debt

Typically, we treat secured debt, interbank deposits and short-term debt as "other liabilities", meaning that we expect they will not share losses with other rated instruments. We believe other liabilities are likely to roll off or become secured ahead of a resolution and are thus unlikely in practice to share losses with longer-term instruments ranking pari passu. We may also treat derivative liabilities in a similar manner, since we believe they may become secured ahead of resolution or may be too technically challenging or too prone to creating systemic risk to include in a bail-in. However, our treatment of a particular bank's derivatives is also informed by our view of the relevant legislation and that bank's balance sheet characteristics.

Our treatment of intra-group liabilities is also case-specific. In order not to double-count debt, we usually eliminate debt that is issued internally, e.g., from an operating bank to a holding company, where we consider them to be under the same resolution scope. Where debt is issued from one entity to another within a group, and we consider them likely to be resolved separately, we may include within each estimated balance sheet only the debt that is issued externally, in order not to double-count the benefit an entity derives from potential affiliate support and the benefit from debt issued internal to the group. Exceptions to this may occur under specific circumstances, for example where a subsidiary has a BCA superior to that of its parent or the broader group.

Mean Loss Rates on Assets

We establish loss rates according to the bank's Macro Profile score and our expectation of whether its resolution will occur as a going concern or in bankruptcy, receivership or similar legal proceeding (see Exhibit 50).[82] The assumed loss rate is applied to the tangible banking assets of the entities within the failure scope of the bank.

[82] For clarity, a change in a banks' Macro Profile scores or a change in our expectation of whether the bank would be resolved as a going concern or in a receivership/bankruptcy is not a change in assumptions. For example, changes in a bank's circumstances, changes in regulation, regulatory pronouncements or our observations of regulators' actions could change our view of the expected resolution treatment for a bank.

EXHIBIT 50

Examples of Assumed Loss Rates / Tangible Banking Assets

Going Concern		Receivership / Bankruptcy	
Macro Profile Very Strong / Strong / Moderate	Macro Profile Weak / Very Weak	Macro Profile Very Strong / Strong / Moderate	Macro Profile Weak / Very Weak
8%	13%	13%	n/a

Source: Moody's Investors Service

These are mean loss rate assumptions, and there is considerable uncertainty surrounding the actual loss rates banks are likely to face. While we do not expect to routinely alter these loss rate assumptions for a specific bank, we may do so under specific circumstances (e.g., an impending or actual resolution) in response to additional information. We may also vary the assumed loss rate for a specific bank to reflect specific characteristics of its business model or balance sheet (e.g., a concentration in capital market activities which may rapidly lose franchise value, exposures to loss-bearing instruments issued by affiliated entities that would likely be subject to high loss in resolution, or different regulatory recapitalization requirements).

Assumed Equity at Failure

We include our estimate of the residual TCE remaining at failure within the total loss absorption capital that will benefit creditors. Typically, we assume this to be 3% of tangible banking assets, which broadly corresponds to minimum regulatory requirements, but we may vary this assumption for a specific bank depending on our view of the likely point of intervention. For example, where the bank is expected to fail due to its association with a weaker affiliate, despite stronger standalone fundamentals, we may assume a higher residual equity ratio. Similarly, certain banks or banking systems may be subject to early regulatory intervention that in our view will result in the retention of more equity capital at the point of failure. We may also take into account additional sources of value available to an entity at failure (e.g., assets that may be less affected by its failure and thus provide a source of additional equity beyond our standard assumption). The residual TCE as a proportion of tangible banking assets is, however, unlikely to exceed 1.25x the assumed loss rate (e.g., 10% equity with a loss rate of 8%). Conversely, where TCE/Tangible Banking Assets is already less than 3%, we typically assume this lower figure in our Advanced LGF analysis.

Alternative De Facto Liability Rankings

Some legislation allows resolution authorities to employ their discretion in establishing ranking (e.g., the exemption of certain instruments from a bail-in for financial stability reasons). Where we believe such a scenario may be relevant, we establish an alternative liability ranking for banking systems that have not adopted resolution legislation that provides for full depositor preference relative to senior unsecured debt. This suggests that, in practice, junior deposits may be preferred to senior unsecured debt in a resolution (de facto), despite their pari passu ranking in liquidation (de jure). The probabilities we assume for such an alternative may vary among regulatory jurisdictions according to our observations of regulators' actions and our view of legislation.

In systems without full depositor preference, ineligible (junior) deposits rank pari passu with senior unsecured debt under a liquidation (this pari passu treatment is the de jure scenario for systems without formal junior depositor preference), but we believe they may benefit from discretionary preference in a resolution.[83] We usually assign a 25% probability to this latter de facto scenario. This weighting also reflects the probability of a distressed exchange, which is more likely to be imposed on bondholders than depositors.

[83] In Canada, we assume that deposits will be preferred ahead of legacy senior unsecured debt in a resolution.

In systems with full deposit preference, the de jure and de facto scenarios will usually be one and the same, and assigning probabilities to each ceases to be relevant.

We estimated this probability for the de facto scenario based on our analysis of the frameworks of laws and related rulemaking that govern bank resolution in the relevant jurisdictions. In cases where the circumstances of an individual institution differ from the generally applied probabilities for that jurisdiction, for example if a bank were close to resolution and we had information indicating regulators would choose a particular approach, we would reflect that expectation in our advanced LGF analysis.

Illustrative Liability Rankings for Operational Resolution Regimes

Exhibit 51 below shows illustrative liability rankings by ORR. In ORRs where there is greater inherent uncertainty about the appropriate hierarchy, there may be more than one potential waterfall. In such cases, the illustrations below may include both de jure waterfalls and de facto waterfalls. Both the de jure and the de facto scenarios typically incorporate both factual considerations related to law or regulatory frameworks, as well as KRAs, although the de jure scenarios are generally more oriented to legal priority of claim and the de facto scenarios typically contemplate greater regulatory discretion.

For example, in EU countries that have adopted full depositor preference,[84] the EU full deposit preference scenario is the de jure scenario; thus this scenario is weighted at 100%. If additional countries adopted resolution regimes providing full depositor preference, we would treat them in a similar fashion. Likewise, if a country that had full depositor preference removed such preference, we would reflect that change in selection of the waterfalls.

[84] Examples have included Italy, Portugal, Cyprus, Bulgaria and Slovenia, and this would be the case for any other countries (EU or non-EU) that adopt full depositor preference. In a similar fashion, if Italy, Portugal, Cyprus, Bulgaria, Slovenia or any other country were to remove previously existing depositor preference, we would reinstate a de jure waterfall that reflected the stated regulatory priority for deposits and a de facto waterfall based on depositor preference.

EXHIBIT 51

Operational Resolution Regimes: Illustrative Liability Ranking by Region[85]

UNITED STATES*

1	DEPOSITS	
2	CR ASSESSMENT	CRR
3	SENIOR UNSECURED BANK DEBT	
4	DATED SUBORDINATED BANK DEBT	
5	JUNIOR SUBORDINATED BANK DEBT	
6	PREFERRED BANK STOCK	
7	SENIOR UNSECURED HOLDCO DEBT	
8	DATED SUBORDINATED HOLDCO DEBT	
9	JUNIOR SUBORDINATED HOLDCO DEBT	
10	PREFERRED HOLDCO STOCK	

EU† PARI PASSU (de jure)

1	PREFERRED DEPOSITS	
2	CR ASSESSMENT	CRR
3	SENIOR SENIOR UNSEC. BANK DEBT	
4	JUNIOR DEPOSITS	SENIOR UNSECURED BANK DEBT
5	JUNIOR SENIOR UNSEC. BANK DEBT	SENIOR UNSECURED HOLDCO DEBT
6	DATED SUB BANK DEBT	DATED SUB HOLDCO DEBT
7	JUNIOR SUB BANK DEBT	JUNIOR SUB HOLDCO DEBT
8	PREF. BANK STOCK	PREFERRED HOLDCO STOCK

EU† FULL DEPOSIT PREFERENCE (de facto)

1	PREFERRED DEPOSITS	
2	CR ASSESSMENT	CRR
3	JUNIOR DEPOSITS	SENIOR SENIOR UNSEC. BANK DEBT
4	SENIOR UNSECURED BANK DEBT	
5	JUNIOR SENIOR UNSEC. BANK DEBT	SENIOR UNSECURED HOLDCO DEBT
6	DATED SUB BANK DEBT	DATED SUB HOLDCO DEBT
7	JUNIOR SUB BANK DEBT	JUNIOR SUB HOLDCO DEBT
8	PREFERRED BANK STOCK	PREFERRED HOLDCO STOCK

SWITZERLAND*

1	PREFERRED DEPOSITS	
2	JUNIOR DEPOSITS	
3	CR ASSESSMENT	CRR
4	SENIOR UNSECURED BANK DEBT	
5	SENIOR UNSECURED HOLDCO DEBT	
6	DATED SUB BANK DEBT	DATED SUB HOLDCO DEBT
7	JUNIOR SUB BANK DEBT	JR. SUB HOLDCO DEBT
8	PREF. BANK STOCK	PREF. HOLDCO STOCK

HONG KONG (de jure)*

1	PREFERRED DEPOSITS	
2	CR ASSESSMENT	CRR
3	JUNIOR DEPOSITS	SENIOR UNSECURED BANK DEBT
4	JUNIOR SENIOR UNSEC. BANK DEBT	SENIOR UNSEC. HOLDCO DEBT
5	DATED SUB BANK DEBT	DATED SUB HOLDCO DEBT
6	JUNIOR SUB BANK DEBT	JUNIOR SUB HOLDCO DEBT
7	PREF. BANK STOCK	PREF. HOLDCO STOCK

HONG KONG (de facto)*

1	PREFERRED DEPOSITS	
2	CR ASSESSMENT	CRR
3	JUNIOR DEPOSITS	
4	SENIOR UNSECURED BANK DEBT	
5	JUNIOR SENIOR UNSEC. BANK DEBT	SENIOR UNSEC. HOLDCO DEBT
6	DATED SUB BANK DEBT	DATED SUB HOLDCO DEBT
7	JUNIOR SUB BANK DEBT	JUNIOR SUB HOLDCO DEBT
8	PREF. BANK STOCK	PREF. HOLDCO STOCK

CANADA (de Jure)‡*

1	DEPOSITS	CR ASSESSMENT	CRR	SENIOR SENIOR UNSEC. BANK DEBT	SENIOR UNSECURED BANK DEBT
2	JUNIOR SENIOR UNSEC. BANK DEBT				
3	JUNIOR SUB BANK DEBT			DATED SUB BANK DEBT	
4	PREFERRED BANK STOCK				

CANADA (de facto)‡*

1	DEPOSITS	CR ASSESSMENT	CRR	SENIOR SENIOR UNSEC. BANK DEBT
2	SENIOR UNSECURED BANK DEBT			
3	JUNIOR SENIOR UNSEC. BANK DEBT			
4	JUNIOR SUB BANK DEBT			DATED SUB BANK DEBT
5	PREFERRED BANK STOCK			

[85] The illustrative liability ranking is subject to change for the entire region, or for individual countries within the region (e.g., in the case of the EU), as resolution frameworks change. For example, legislation that introduces a new class of senior long-term debt that could be bailed in ahead of other senior unsecured obligations would have an impact on the liability ranking actually considered in our ratings for banks within the country or region that adopted such a framework.

* For the purposes of Advanced LGF in the scorecard, senior senior unsecured bank debt, should this debt class be introduced in the US and in the absence of information that would permit a more informed ranking, would be placed between senior unsecured bank debt and the CR Assessment. Likewise, junior senior unsecured bank debt would be placed between senior unsecured bank debt and dated subordinated bank debt. In Switzerland, senior senior unsecured bank debt would be ranked between the CR Assessment and senior unsecured bank debt, whereas junior senior unsecured bank debt would be pari passu to senior unsecured holding company debt. In the Hong Kong de jure scenario, senior senior unsecured would be placed between the CR Assessment and junior deposits, while in the Hong Kong de facto scenario, senior senior unsecured would be pari passu to junior deposits. In Canada, instruments issued by bank holding companies would rank junior to preferred bank stock, with the following ranking from most senior to most junior: senior unsecured holdco debt, dated sub holdco debt and junior sub holdco debt (pari passu to each other), and holdco preferred stock. Should such debt classes be introduced, actual notching would take into account analytical judgment based on the terms, conditions and regulatory treatment of the security in the relevant jurisdiction. For the US, we consider that all deposits have the same rank.

† European Union, Norway, Liechtenstein. In EU countries that have adopted full depositor preference, the EU full deposit preference scenario is the de jure scenario; thus this scenario is weighted at 100%. If additional EU or non-EU countries adopted national resolutions providing full depositor preference, we would treat them in a similar fashion. Likewise, if a country currently with full depositor preference removed such preference, the waterfall we would use for that country would reflect that change.

‡ For the purposes of Advanced LGF in the scorecard, instruments issued that are contemplated under the Canadian ORR map to the following liabilities: short-term debt maps to senior senior unsecured bank debt, legacy unsecured senior debt maps to senior unsecured bank debt, senior unsecured bail-in-eligible debt maps to junior senior unsecured bank debt, NVCC subordinated debt maps to junior sub bank debt, legacy (non-NVCC) subordinated debt to dated sub bank debt, NVCC preferred shares, and perpetual subordinated NVCC additional tier 1 capital notes and legacy preferred shares map to preferred stock.

Source: Moody's Investors Service

Appendix 4: Bank Ratings Following a Failure or Resolution Action

Rating Positioning at the Point of a Bank Failure

Our ratings of banks are forward-looking opinions of the relative credit risks of their financial obligations. In our ratings and CR Assessments, we focus on expected loss for an entity's creditors, which for a bank means the probability of failure and loss given failure. At the point of a bank failure, the BCA, ratings on long-term debt and deposits, and CR Assessments are typically adjusted to reflect this failure.

The BCA is normally positioned at "ca" or "c" at the point where we believe default (or extraordinary support preventing default) is inevitable or has occurred. Debt instrument ratings and the CR Assessment are typically assigned based on our expectations of the likely results of resolution proceedings on default avoidance or loss given default, as discussed below. Our LGF framework may be adapted to help position individual instrument ratings, based on the specific circumstances of the failure.

Ratings Following a Resolution

Governments and other authorities, particularly those in ORRs, may also apply alternative tools to traditional corporate insolvency procedures to enable the orderly resolution of a failed bank, including using bail-in to recapitalize a bank, the separation of non-performing or risky assets from good assets and the preservation of critical banking functions.

These tools, which may be applied before, or after, any bail-in or write-down of rated liabilities, include the following:

» "Bad Banks" — whereby parts of the failed bank may be placed into a new structure specifically designed to be wound down over time with the resolution authorities supplying funding (or potentially capital) as required.

» "Sale or Transfer" — other parts of the bank, such as performing loans, together with deposits, may be sold or transferred to competitor.

» "Good Banks" — the authorities may choose to establish a new bank or other legal entity with a "clean" balance sheet that continues to provide the financial services that the failed entity previously supplied.

» "Bridge Banks" — may be created to hold some of the assets and liabilities of the failed bank, pending a sale to a third party or decision to wind-down the business.

The use of a resolution tool generally leads us to position the BCA as if a default had occurred.

More broadly, where debt and other obligations are already rated, our goal is to ensure the continuity of ratings, whether or not the appropriate liabilities are transferred to a new entity. However, uncertainty around the actual impact of any resolution action may be very high, and may only be resolved some months after any resolution. Our ratings and CR Assessments in a failure may also reflect that uncertainty.

Rating 'Bad Banks'

If defaulted or impaired securities are transferred to another entity such as a "bad" bank, we would expect to take a similar approach to the one we use in rating any other defaulted or impaired debt. The main difference would be that the ratings would be assigned to the new legal entity responsible for the securities. As with other ratings, they may be affected by changing circumstances or additional information. For instance, if the uncertainties around resolution were resolved and we viewed the eventual loss to creditors as less pronounced than initially expected, the likely result would be upward pressure on the associated debt ratings.

Rating a Bank Taking on Certain Activities from a Failed Bank

In instances where another institution (the transferee) takes on assets or liabilities from a failed institution, the impact on ratings depends on the nature and scale of the activities that are transferred. If the transfer does not materially affect the balance sheet or business strategy of the transferee bank — for instance, when a small volume of retail deposits are transferred from the failed bank to a competitor — there may be no rating impact on the bank that takes on those deposits. On the other hand, if the transferee bank takes on material activities that it previously did not engage in or otherwise changes its risk profile, there would be potential rating implications for the transferee bank. Our analysis of these changes to the business profile would normally be similar to our assessment of the case-specific consequences of any M&A activity on credit risk.

Rating New and Restructured Going-Concern Institutions (Including Bridge Banks and 'Good Banks')

Ratings for going-concern institutions created or restructured during the resolution process depend on a number of factors. If the new/restructured entity assumes the vast majority of assets and liabilities from the failed bank, our rating analysis would take into account the original bank's circumstances and the substantial degree of uncertainty associated with rating a newly established institution. At the same time, both from a solvency and liquidity perspective, our rating analysis would incorporate the relevant measures taken to support the going-concern bank, particularly those measures that could leave it in a stronger position than the original bank was in before intervention. However, any burden-sharing by junior creditors may increase the size of potential losses from a second default event.

The information communicated by resolution authorities is a critical input to any such rating analysis. Ideally, this information would include the structure of the new entity's balance sheet, including capital, exposures and other elements. It would also include details of any transitional or ongoing support that the authorities, or any new or prospective parent, might offer to the new entity.

The absence of sufficient clarity and detail on the new entity's financial structure may negatively affect ratings. In addition, we would consider whether there is sufficient information to determine a BCA and credit ratings. If we ultimately believe that we have inadequate or unreliable information, we may withdraw outstanding ratings or decline to rate new obligations until we have sufficient, reliable information to issue an informed rating. In these circumstances, we may engage with resolution authorities and other parties to obtain sufficient information to form a credit opinion.

For these reasons, in the absence of formal guarantees or support, credit ratings that we assign to going-concern entities during resolution processes may initially be low, reflecting the volatility that is inherent to the failure and resolution process.

Generally, we would not expect to assign investment-grade ratings to a newly established "good bank" in the absence of financial guarantees from another highly rated entity. While visibly problematic assets may be transferred to other institutions, it will likely be difficult for resolution authorities to accurately gauge asset quality in short time frames. The underlying problems that lead to a transfer of assets/liabilities are rarely simple or quick to address; the risk of further such events may remain high, and new problems may emerge over time. These risks and uncertainties are likely to affect our forward-looking view and dampen our confidence level in the future credit profile of the "good bank", which may in some cases counterbalance the impact of regulatory measures that are put in place to stabilize the new bank. As a result, we may not immediately raise a bank's BCA following a transfer event, and any transition toward higher rating categories may be gradual.

Sufficiently ample capital and liquidity to withstand unexpected scenarios are among the most important considerations in rating a new institution. In these cases, capital ratios are a signal of the entity's soundness, as well as an initial indication of the degree of commitment to the bank from regulatory authorities or any new shareholders. A rating higher than the transferor bank would require capital ratios to be very strong and sufficient liquidity to be in place to absorb any subsequent shocks.

Use of Expected Loss Analysis to Position Ratings Subject to a Default or Impairment Event

There may be circumstances where securities or deposits face losses imminently. Examples could include a hybrid instrument's coupon skip or principal loss clause that is close to being triggered; a bank that opts to skip a non-cumulative coupon payment for an extended period of time to build capital; or a regulator that steps in to prevent a coupon payment or forces conversion to equity or a principal write-down; or a bank that fails and enters resolution. Such circumstances are considered default or impairment events where investors receive — or expect to receive with near certainty — less value than would be expected if the obligor were not experiencing financial distress or not otherwise prevented from making payments to a third party, even if the contract does not provide the investor with a natural remedy, such as the right to press for bankruptcy.

In these cases, ratings primarily reflect an expected recovery analysis, which factors in the anticipated period of coupon non-payment, or the potential for the imposition of principal losses outside liquidation, and the severity of loss, if these events happen.[86] We may employ the guidance and tools described in the "Discussion of Loss Given Failure and Additional Notching Considerations" section of this document; however, ratings very near default or failure reflect our overall opinion of loss and recovery, which may vary from that guidance. If a junior instrument skips coupon payments and subsequently resumes them, we generally consider an upgrade and the use of normal notching guidelines only when the bank's financial condition stabilizes and there is a high likelihood that the bank is able to make coupon payments for an extended period.

For securities where the principal is written down and subsequently written back up, we assess the likelihood, if any, that full principal will be recovered. For contingent capital securities that may convert to equity or suffer a principal write-down, we are likely to assign ratings in the low Caa to C range, depending on our estimation of losses at that time, based on the security's features and the bank's actual circumstances.

Outstanding hybrids and subordinated debt have also been subject to exchanges into other forms of debt or equity at a substantial discount to par, which we may view as a distressed exchange[87] constituting a default. In these cases, we also typically use a loss and recovery approach, and the rating primarily reflects expected recovery relative to par value, which is the bank's original promise to pay. The rating also incorporates the uncertainty around that expectation.

[86] We may also consider using recovery analysis for banks with a BCA of b1 and below, depending on the features of the bank's junior securities and the factors driving such a weak BCA.

[87] For a description of distressed exchanges and our definition of default, please see Moody's *Rating Symbols and Definitions*. A link can be found in the "Moody's Related Publications" section of this document.

Appendix 5: Forward-Looking Analysis of Asset Quality

For banks, an important component of any forward-looking judgment about credit quality is the expected performance of the loan portfolio and its impact on banks' capital and solvency.

Our approach assesses the likely path of asset quality, expressed in terms of profiles for non-performing loan ratios and loan loss rates over the coming years. We focus on a range of broad asset classes, such as residential mortgages, commercial real estate, corporate loans and other retail lending. As part of this assessment, we select leading indicators we believe can inform the likely development of asset quality in different regions. While our choice of leading indicators varies from one system to another — taking into account a country's economic structure and key growth drivers, as well as the banking system's loan book composition and the availability of time series data — there are often similarities in terms of the types of leading indicators that we track across regions. We select indicators (and may from time to time change them) according to our view of their ability to anticipate trends in banks' asset quality, with non-performing loans as the reference series.

Apart from leading indicators, our assessment of how asset quality will develop typically considers a variety of factors, including the macroeconomic outlook, secular trends in asset quality, and structured finance data on delinquencies and loss rates. In addition, we may consider local laws and regulations governing delinquencies and creditor protection, accounting practices, and other relevant quantitative indicators and qualitative information. Our assessment of individual banks' future asset quality may also be informed by the bank-specific data that are collected as part of the regular monitoring and assessment process. Judgments about likely loss given default (LGD) or LGF rates are often based on academic literature and local experience and knowledge. Where data limitations are present, our forward-looking view of banks' credit loss rates may be more conservative to reflect greater uncertainty around outcomes.

Using these indicators, outlooks and associated expected credit loss rates, we develop forward-looking views on how banks' income and loan and securities portfolios will evolve, and the likely evolution of their balance sheets. These views inform our forward expectations for the three ratios in the Solvency factor of the BCA Scorecard in particular, although they may also inform other aspects of our analysis.

Moving from Central Case to Stress Tests

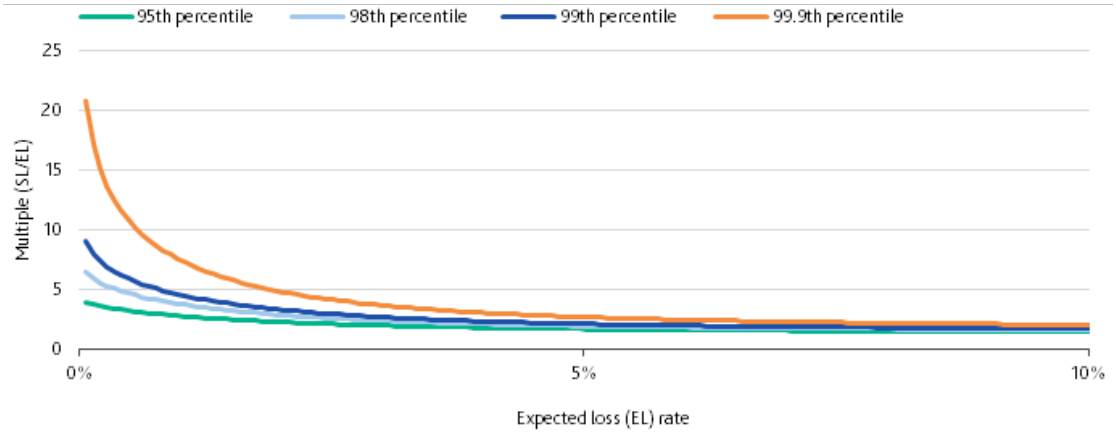
These granular assessments of future asset quality inform our assessment of how banks' capital bases will evolve. They also inform our benchmark stress tests. Stress testing is an important tool in financial institutions' risk-management process, providing a guide to the possible impact of unexpected but severe events. In order to be effective, stress testing must be transparent and highlight the assumptions on which the analysis is based, and be clear about how losses impact different portfolios. Our stress tests currently focus on potential credit and market risks associated with banks' activities, assessing the resilience of institutions to unexpected developments. We may incorporate global as well as local elements to foster comparability across regions.

We typically link our systemic stress tests to the forward-looking expected loss rates that inform our central outlook for banks' capital. The key step in the process is that expected loss rates are enlarged by some multiplier to generate stressed loss rates. These stresses are then incorporated into our forward-looking views of banks' balance sheets, as described above.

These multipliers are broadly based on the Basel II internal ratings-based (IRB) approach to risk measurement; however, the precise calibrations in this framework have been adjusted in light of the subsequent financial crisis in advanced economies. While the exact shape of each multiple curve varies depending on the particular asset class, the multiples that are used tend to reflect the illustrative curves shown in Exhibit 52. We use multipliers based on the 96th percentile of the implied loss distribution, roughly corresponding to a 1-in-25 year event.

EXHIBIT 52

Illustrative Multiplier Curve



Source: Moody's Investors Service

We use asset-specific multiplier curves to construct stressed loss rates, which we then apply to banks' loan portfolios. In addition to stressing the loan portfolio, we assume that banks' securities portfolios will suffer losses based on our idealized loss tables in the case of bonds, after notching down from current ratings, or on the basis of past declines in prices for equities. Banks' income streams — such as net interest income, fee and commission income, trading income and non-interest expenses — also have haircuts, which are broadly consistent with 1-in-25 year events. As with the central case, the initial key outputs are the three ratios that inform the Solvency factor of the BCA Scorecard.

In addition to these systematic stress tests, we conduct supplementary analysis of banks' resilience as required for individual banks and systems. This can include the scenario analysis tests often favored by regulators, based on our models or banks' own internal processes. The results of these analyses can play a significant role in the Asset Risk, Capital and Profitability sub-factor scores that we assign.

Appendix 6: Joint Default Analysis in Support

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 on 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 banks 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 bank would be forthcoming. Each support provider is assessed for its capacity and willingness to support the bank. The first is based on the bank's supporter's own standalone assessment, and the local-currency rating in the case of a public sector entity. The second is based on our opinion of the probability that support will be forthcoming when needed. The probability that two parties will jointly default depends on the following: a) the probability that one of them defaults; and b) the probability that the second will default, given that the first has already defaulted. Expressed algebraically, one can write this for events A and B as:

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

Or, equivalently:

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

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

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

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

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

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 practical minimum (i.e., P(L), since we are discounting the possibility that defaults might be negatively correlated). Let us consider these extreme outcomes in turn by way of example.

P(L | H) = 1. Suppose that the financial health of an issuer is crucially linked to the operations of another, higher-rated entity. For example, the default risk of a distributor in a competitive distribution market dominated by a single supplier may be highly dependent on the financial health of that supplier. In other words, the conditional probability of the distributor's default given a default by the higher-rated supplier, P(L | H), is equal to one. Under such a scenario, the joint default probability P(L and H) in equation (3) above is simply P(H). That is, the rating applied to such jointly supported obligations would equal the supplier's rating, without any ratings lift, regardless of issuer L's standalone rating.

P(L | H) = P(L). Suppose a highly rated European bank provides a letter of credit to a lower-rated agribusiness in the US. While there may be circumstances in which the agribusiness might face financial difficulties on its own, its intrinsic operational health is generally unrelated to the circumstances that might lead the European bank to default on its obligations. Under this scenario, the conditional probability of a default by the agribusiness, given a default by the bank — i.e., P(L | H) — is simply the standalone default risk P(L) of the agribusiness. That is, events L and H are independent of each other 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 use a simple tool for modeling intermediate cases of default risk linkage. Let us denote the variable W as a correlation weighting factor, where W = 1 corresponds to a maximum dependence of the default of the lower-rated entity on that of the higher-rated entity; and W = 0 corresponds to complete independence (i.e., zero correlation) between default events. Fractional values of W indicate intermediate levels of dependence between the two default events.

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

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

Or, more compactly:

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

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

Standard Assumptions

We typically use the following assumptions in our JDA.

EXHIBIT 53

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 54

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 support provider.

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

The risk values and thresholds for JDA uplift are reproduced in Exhibit 55 below.

EXHIBIT 55

Relative Risk		Reverse Rating Lookup	
BCA	Risk Measure (%) (baa3 = 1)*1	Upper-Bound Threshold (%)*2	Local-Currency Deposit Rating*3
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.

*3 For affiliate support, the outcome would be the Adjusted BCA.

Source: Moody's Investors Service

Appendix 7: Calibration and Back-testing

The 2008-12 financial crisis saw a historically large number of events in which banks either defaulted or required extraordinary support from a government or commercial parent to avoid default. As part of the work underpinning the 2015 revision of our methodology for banks and the selection of the Macro Profile factors and Financial Profile ratios we use in the BCA scorecard, we looked for indicators that would have helped to predict ex ante which banks were more likely to default or receive support from a parent, local or national government. This appendix describes a model of the one-year probability of experiencing a BCA event for the universe of banks we rated, conditional on bank financial data and macro variables.

Data

Data comprise annual financial statements and macro variable observations drawn over the period 2006-12 covering 1,019 banks in just under 100 countries for a total of 5,182 bank-year observations. Of the 1,019 banks, 165 (16%) either defaulted or received extraordinary support to avoid default (a BCA event). Exhibit 56 summarizes the number of banks and BCA events per country in the sample.

EXHIBIT 56

Number of Banks and BCA Events in Sample, by Country

Domain	Number of Banks	BCA Event
UKRAINE	31	29
UNITED STATES	94	17
SPAIN	43	18
UK	33	10
IRELAND	14	11
GERMANY	36	9
RUSSIA	111	8
GREECE	9	8
BRAZIL	44	6
AUSTRIA	16	5
FRANCE	15	5
NETHERLANDS	11	5
OTHER	562	34
TOTAL	1,019	165

Source: Moody's Investors Service

The data source on banks' balance sheets and ratios was Moody's Banking FM. The dataset covered the majority of rated banks, although coverage was somewhat limited in the earlier years when the database was first being populated. Macroeconomic data were sourced from the IMF and the World Bank.

The Model

We define the binary variable, I, taking the value of 1 if a bank has a BCA event in a given year (in this case between 1 July Year X and 30 June Year X+1) and 0 otherwise. Of interest is whether any variables, known on the 30 June Year X, can predict whether a bank has a BCA event over the following year. The model we used focuses on balance sheet and income statement data and ratios of banks as well as certain macro variables.

There is typically a significant lag in the reporting of bank and aggregated macroeconomic data. For this reason, we use bank and macro data as of 31 December Year X-1 to predict BCA events over year X (which, again are defined from mid-Year X to mid-Year X+1), which allows a minimum six-month reporting lag for bank and macro data.

The relationship between a BCA event and the explanatory variables is specified as a logit model where the probability of an event is a nonlinear function of financials and macro data, as follows:

$$P(I_{t+1}=1)=\Psi\left(\alpha+\sum_{j=1}^{N}\beta_j Z_{j,t}+\sum_{j=1}^{N}\gamma_j Y_{j,t}\right)$$

where P() is the probability that a bank has an event in a given year, Z is a list of bank balance-sheet data and ratios, Y is a list of macroeconomic variables and $\Psi(\ )$ is the Logistic Cumulative Distribution Function (CDF).[88]

Due to the binary nature of the BCA event indicator, standard ordinary least-squares regression techniques cannot be used. Parameters have been estimated using Maximum Likelihood methods.

Results

Having conducted a search over a large number of bank balance-sheet elements (and ratios) and macro variables, the estimated parameters of the preferred model can be found in Exhibit 57 below.

The Global Factor

The estimated coefficients on the annual indicator variables were highly significant. Searching for observable variables, we found that including the change in the US unemployment rate was strongly significant, highly correlated with the parameters estimated on the annual indicator variables, and gave almost identical results. The significance of the change in the US unemployment rate is likely to be that the crisis originated in the US in 2007-08 and spread globally, coinciding with a strong deterioration in the US unemployment rate and a material increase in the BCA event rate in a large number of countries. As the US unemployment rate fell back in later years, it coincided with a proportionate fall in the number of BCA events. This effectively means that for a given balance sheet, the probability of a BCA event was higher if the US unemployment rate increased over that year.

Sovereign Ratings

The sovereign rating is found to be an important variable correlated with BCA events. In particular, if the sovereign is deep speculative grade or below, meaning B1 or lower, the chance of a BCA event in that country was higher. This indicator variable largely captures the high number of BCA events in Ukraine early in the crisis and in euro area periphery later in the crisis. Moreover, if the sovereign had been downgraded by two notches or more over the past year, a bank in that country was more likely to default.

Bank Characteristics

A number of bank characteristics are found significant in predicting BCA events in the preferred specification. The following characterizes banks that had a high probability of a BCA event: large banks

[88] If no variables can help explain why a bank had a BCA event, we would simply get a probability equal to the unconditional average:

$$P(I_{BCA,t+1}=1)=\Psi(\hat{\alpha})=\frac{165}{5182}=3.18\%$$

measured by total assets, banks with a higher ratio of market funds (long- and short-term debt, including amounts due to other banks) to total assets, banks with a lower ratio of liquid assets to total assets, banks with a higher ratio of problem loans relative to total loans, banks with a lower ratio of TCE to RWAs, and banks with a lower return on equity and a lower ratio of net income to total assets.

The finding that larger banks were more likely to have a BCA event may be counterintuitive, but is a reflection of the 2008-2012 crisis, when the majority of BCA events were support events rather than direct default/bankruptcy events; larger banks were more likely to receive support as they were considered more systemically important.

Negative earnings was an important indicator. While a lower return on equity predicted a higher chance of a BCA event, the probability increased materially if return on equity was negative; if in addition net income to total assets was less than -1%, a bank would have a very high probability of a BCA event over the following year.

The Macro Economy

Including a larger set of macroeconomic variables in the model, the following set of variables were found significant:

- Five-year growth in private sector debt to GDP: The number of BCA events was higher in countries where private sector debt grew strongly relative to GDP.
- The volume of traded stocks to GDP: Countries with an active stock market relative to the size of the economy were more likely to experience a larger number of BCA events.
- Trailing five-year volatility of GDP: The more volatile real GDP, the more likely the country was to experience more BCA events.[89]
- Short-term (one year) country-specific real GDP growth: Once real GDP slows materially, the country was likely to see more near-term BCA events among its banks.

Of all the country-specific macro variables, the two that were found to improve the fit of the model the most were growth in private sector debt to GDP and real GDP volatility.

In the US, for example, it is worthwhile to emphasize the role of the change in the US unemployment rate. For illustrative purposes, assume there are two banks. Bank A has a capital ratio of 8% in a year when the US unemployment rate is expected to increase 2 percentage points over the following year. Bank B has a capital ratio of 8% in a year when the US unemployment rate is expected to remain unchanged over the following year. Other things being equal, bank A has a higher probability of a BCA event, even if it has the same capital ratio; it is likely to suffer more since the US economy is likely to deteriorate over the coming year, which could have an impact on (or be correlated to a deterioration in) the global economy. In our sample, the banks with deteriorating balance sheets in 2007 were considerably more likely to have a BCA event between mid-2008 and mid-2009 than in any other year.

Model Fit

The model has a very good in-sample fit.[90] For 80.6% of the BCA event observations, the model predicted a BCA event with a probability higher than 3.18% (the unconditional probability of a BCA event in the sample). For 82.9% of the non-BCA event observations, the model had a BCA event probability of less than

[89] Similar results are obtained using the volatility of real growth over 10 or 20 years. The 5-year volatility estimate, however, gives a better in-sample fit.

[90] One caveat to this analysis is the high degree of correlation between explanatory variables, known as multicollinearity. While this does not reduce the fit of the model as a whole, it can affect the interpretation of individual explanatory variables, such as which data series are more or less relevant than others.

3.18%. Overall, the model correctly classified 82.8% of the observations relative to the unconditional average probability of a BCA event.

It is possible that the 2008-2012 cycle of BCA events was unique and is unlikely to be repeated. However, there is no reliable way of predicting as-yet unseen transmission channels for future shocks, and it is still important to understand the past role that different factors may have played. All the significant variables in the model have intuitive signs, and most have been found to be significant in other studies, which provides further support for our analysis.

Model Robustness

The results of the model are remarkably robust to estimation on a number of sub-samples of the entire universe of banks, such as excluding the smaller banks or largest banks. On the size of the bank, one interesting finding is that, once estimated over the entire universe of banks, the TCE to RWAs is found to be strongly significant. There are also variables found significant in other empirical studies of bank failures, such as the current account, real exchange rates and other import-export related variables. These variables were included in the model but found only to be borderline significant and much less so than the variables included in the specification.

EXHIBIT 57

Estimation Results for the BCA Event Model

	Estimate	Std	Z
Intercept	-5.21	1.52	-3.43
I - Sovereign Deep Spec Grade	2.60	0.33	7.78
I - Year Change in Sovereign Rating > 1	1.37	0.38	3.61
Change in US Unemployment (t:t+1)	0.72	0.06	11.14
Growth in Country Real GDP (t:t+1)	-10.79	2.91	-3.71
Growth in Private Sector Debt to GDP (t-5:t)	1.07	0.31	3.50
Log GDP Volatility (t-5:t)	1.09	0.18	6.18
Volume Traded Stock to GDP (t)	0.20	0.09	2.24
Log Total Assets	0.31	0.06	5.02
Log Market Funds to Total Assets	0.64	0.16	3.94
Log Liquid Assets to Total Assets	-0.24	0.12	-1.97
Problem Loans to Loans	3.24	1.18	2.74
TCE to RWAs	-10.64	2.74	-3.88
I - Net Income to Total Assets < -1%	0.81	0.43	1.87
Return on Equity	-0.39	0.10	-3.94
I - Return on Equity < 0%	0.78	0.31	2.47
Cost to Income Ratio	0.65	0.49	1.32
P(+,+)			80.6%
P(+,-)			19.4%
P(-,+)			17.1%
P(-,-)			82.9%
Correctly Classified			82.8%

Note: Explanatory variables starting with I – are binary (0, 1) indicator variables.

Source: Moody's Investors Service

Appendix 8: High-Trigger CoCo Model

Our approach to rating high-trigger securities is discussed in "Additional Notching Considerations". The following is a description of the model used in rating high-trigger CoCos. For all securities with coupon-skip features, we may use the high-trigger CoCo model to estimate the potential for a coupon-skip. We may use this analysis, in combination with other quantitative tools and our view of the likely duration of any coupon-skip, to inform our ratings of these securities.

Modeling the Probability of a High-Trigger Breach

For a high-trigger security issued by a specific bank, we assume in this example a trigger breach event occurs if the bank's CET1 ratio falls below 7%. To estimate the probability of a trigger breach, we also assume that the distribution of a bank's future CET1 ratios follows a normal distribution,[91] which can be derived from two bank-specific data inputs:

» The bank's last reported CET1 ratio, possibly adjusted for our forward-looking view of capital, is the mean of the distribution of forward-looking CET1 ratios. On the curve, this is represented by the dark blue line (CET1 of 10% in Exhibit 58). Since we assume a normal distribution, a bank's CET1 ratio has a 50% chance of being on either side of this point.

» The bank's BCA, reflecting the likelihood that the bank will fail absent extraordinary support. Since regulators give Tier 1 regulatory capital credit for contingent capital securities with a trigger no lower than 5.125%, we take the probability that the CET1 ratio falls to a level at or below 5%[92] to represent the same probability captured in our BCA — the probability that the bank will fail. If we believe that a bank's point of non-viability is higher than 5.125%, determined on a jurisdiction-by-jurisdiction basis and applied in limited cases, we would adjust the model accordingly. Using our idealized default table,[93] we then determine the probability of failure associated with the bank's BCA and assign it to the region of the curve below the 5% threshold (in Exhibit 58, this is area A).

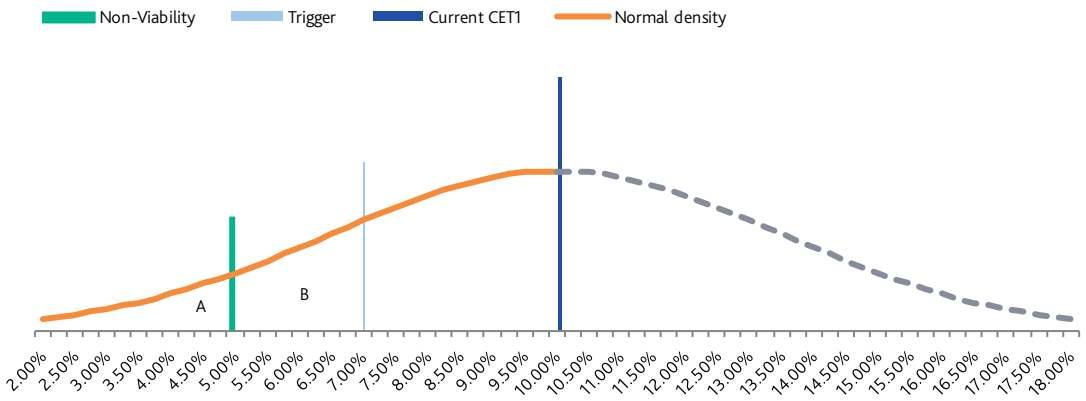
[91] Before deciding to use a normal distribution in the forward-looking capital model, we considered a number of alternatives, each of which had its own limitations. Although using a normal distribution has some drawbacks, it does produce reasonable and consistent results. Although the normal distribution shows positive capital movements beyond the mean (which is the last reported CET1 ratio in the model, possibly adjusted for our forward-looking view of capital), it is irrelevant because the model assumes that all capital increases will be distributed in the form of dividends, which is what occurs in practice. We also assume that banks will react to downward shocks by cutting compensation, reducing staff, and reducing or eliminating dividends and junior security payments. In the end, management's response to extreme upside and downside movements would likely result in a thinner-tailed normal distribution.

[92] For simplicity, we are using 5% in our model rather than using Basel III's ratio of CET1 to risk-weighted assets of less than 5.125%.

[93] We consult the four-year horizon of the idealized default table, which is described in *Rating Symbols and Definitions,* a link to which can be found in the "Moody's Related Publications" section of this report.

EXHIBIT 58

Modeling Contingent Bank Capital Securities



Source: Moody's Investors Service

Having calculated area A, we compute the distribution's volatility consistent with the already-determined mean and the probability of landing in area A. With the volatility and the mean, we draw the bank-specific curve and can then identify the probability of the bank's CET1 ratio moving to any level, including the probability of landing in the area at or below the 7% threshold of interest in this case — which is the light blue line in Exhibit 58. The area under the curve to the left of that line, represented by the sum of areas A and B, represents the probability of the bank's CET1 ratio falling below 7%, which corresponds to the probability of a trigger breach.

Mapping the Probability of a Trigger Breach to a Model-Indicated Outcome

Once we have assessed the probability of a trigger breach, we can map to a model-indicated outcome using the four-year idealized default table. The model-indicated outcome incorporates normal expected loss severity for a particular rating level, which we believe should generally effectively capture the loss associated with conversion to equity or a partial or temporary principal write-down feature. For a full principal write-down, we may add an additional downward notch to reflect the potential for greater severity relative to these features, unless the rating is subject to the non-viability security cap as explained in sub-section "8. High-Trigger Contingent Capital Securities" of the section "Additional Notching Considerations."

Accessing the Model

The model can be accessed by sending a request by email to figmodels@moodys.com. The model does not reflect all additional factors that we may take into consideration in determining the actual inputs to our rating analysis or the ratings we would assign to any particular securities.

Appendix 9: Glossary of Selected Terms

Adjusted Baseline Credit Assessment (Adjusted BCA). The Adjusted BCA is the outcome of the second component of our analysis for banks, Affiliate Support. The Adjusted BCA provides an opinion on the probability that a bank will require support beyond that which is likely to be provided by its affiliates in order to avoid default.

Affiliate Support. The second component of our analysis for banks, Affiliate Support begins from the bank's unsupported probability of failure (i.e., its BCA), then considers the 1) probability of support from the bank's affiliates; 2) capacity of those affiliates to provide support; and 3) dependence or correlation between the bank and its affiliates. The end-product of this analysis is the Adjusted BCA.

Anchor Rating. The rating of either (1) the covered bond issuer; or (2) the support provider.

Asset Risk. One of five sub-factors considered in the Financial Profile sub-component of the BCA Scorecard, with a 25% weighting. The scorecard ratio used for the Asset Risk sub-factor is Problem Loans/Gross Loans. Other Asset Risk sub-factor considerations may include loan growth, credit concentrations, problem loan and collateral coverage, differences in problem loan recognition, non-lending credit risk, market risk and operational risk.

Baseline Credit Assessment (BCA). Baseline Credit Assessments (BCAs) are opinions of issuers' standalone intrinsic strength, absent any extraordinary support from an affiliate or a government. For banks, BCAs are essentially an opinion on the likelihood of a bank requiring extraordinary support to avoid a default on one or more of its debt obligations or actually defaulting on one or more of its debt obligations in the absence of such extraordinary support. As probability measures, BCAs do not provide an opinion on the severity of a default that would occur in the absence of extraordinary support. BCAs are expressed in lowercase on our alphanumeric scale. For more details, please see Moody's *Rating Symbols and Definitions*.[94]

BCA Component. The first component of our analysis for banks, the BCA Component comprises three sub-components: the Macro Profile, the Financial Profile and Qualitative Adjustments. We employ the BCA scorecard in our analysis of a bank's standalone credit strength.

BCA Event. A BCA event is the failure of an issuer, which for banks we define as a default (please see Moody's *Rating Symbols and Definitions* for our definition of default), or the requirement by the bank for support from an affiliate or government in order to avoid default.

Indications of a bank failure/BCA event include:

- Default on point of non-viability contingent capital or similar instruments
- Capital injections in the form of common or preferred stock from a third party (parent, affiliate or central bank), in the absence of which the bank's solvency or viability would be in doubt
- Liquidity support beyond that normally associated with the particular class of institutions (e.g., collateralized loans to banks from the central bank)
- Unusual direct loans from the support provider
- Assumption of existing debt by the support provider

[94] A link can be found in the "Moody's Related Publications" section of this report.

- Guarantee of existing or newly issued debt by the support provider
- The provision of risk-relief transactions (through asset guarantees, for example) on terms unlikely to be available commercially
- Forbearance, e.g., waiving accounting or regulatory standards in order to delay loss recognition or resolution proceedings
- Mergers or acquisitions that are effectively mandated by governments on terms unlikely to be available commercially (accompanied by guarantees, for example) to address viability concerns

Our BCAs themselves include the tangible and intangible benefits of "ordinary" support, which is a structural and necessary feature of banking, such as regulation, deposit insurance and central bank access. Access to central bank funding, liquidity or government guarantee programs on universally available terms are unlikely to be considered in themselves to be BCA events, unless we believe that in their absence, a bank would likely face default.

BCA Scorecard. An analytic tool focused on the quantitative and qualitative considerations that are generally most important in assigning BCAs to banks. The scorecard is a summary that does not include every rating consideration; other quantitative or qualitative considerations that may not lend themselves to a transparent presentation in a scorecard format can also affect BCAs. These other considerations may be reflected in adjustments to Financial Profile sub-factor scores or reflected outside the scorecard, and they may lead to BCAs that are not at the midpoint of the BCA scorecard outcome range or, in some cases, BCAs that are outside of that range. Please see the "Application of the Methodology" and "Limitations, Assumptions and Other Rating Considerations" sections.

Capital. One of five sub-factors considered in the Financial Profile sub-component of the BCA Scorecard, with a 25% weighting. The scorecard ratio used for the Capital sub-factor is Tangible Common Equity / Risk-Weighted Assets. Other Capital sub-factor considerations may include recognition of risk-weighted assets, nominal leverage (Tangible Common Equity / Tangible Assets),[95] regulatory minimum requirements, capital quality, capital fungibility within the banking group, and access to additional capital.

CoCo. A CoCo is a contingent capital security or instrument.

Counterparty Risk Assessment (CR Assessment). CR Assessments are opinions on the likelihood of a default by an issuer on certain senior Operating Obligations and other contractual commitments. CR Assessments are assigned to legal entities in banking groups and, in some instances, other regulated institutions with similar bank-like senior obligations. CR Assessments address the likelihood of default and do not take into consideration the expected severity of loss in the event of default. Our consideration of this probability of default takes into account the issuer's intrinsic standalone strength, the likelihood of affiliate and government support. In addition, we consider the impact that the anticipated seniority of the Operating Obligations in the liabilities waterfall and other steps regulatory authorities can take to preserve the key operations of a bank in a resolution will have on the probability of default on those obligations. The CR Assessment is not a rating and is denoted on our long-term alphanumeric scale with a (cr) modifier, e.g., Baa1(cr), and does not bear an outlook. The short-term CR Assessment is derived from the long-term CR Assessment based on the guidance in our cross-sector methodology for short-term ratings, and also bears a (cr) modifier, e.g., Prime-1(cr). The CR Assessment is constrained by the country's local currency deposit ceiling.

[95] For clarity, Tangible Common Equity excludes deferred tax assets, and Tangible Assets excludes goodwill and other intangibles.

Counterparty Risk Rating (CRR). CRRs are opinions of the ability of entities to honor the uncollateralized portion of non-debt counterparty financial liabilities (CRR liabilities) and also reflect the expected financial losses in the event such liabilities are not honored. CRR liabilities typically relate to transactions with unrelated parties. Examples of CRR liabilities include the uncollateralized portion of payables arising from derivatives transactions and the uncollateralized portion of liabilities under sale and repurchase agreements. While CRRs reflect the risk that CRR liabilities are not serviced on a timely basis, they do not reflect the risk that a CRR liability will be subjected to a commercial dispute. For clarity, CRRs are not applicable to funding commitments or other obligations associated with covered bonds, letters of credit, guarantees, servicer and trustee obligations, and other similar obligations that arise from a bank performing its essential operating functions.

Financial Profile. One of the three sub-components of the BCA component of our analysis. The Financial Profile comprises two factors: Solvency (composed of Asset Risk, Capital and Profitability sub-factors) and Liquidity (composed of the Funding Structure and Liquid Resources sub-factors).

Funding Structure. One of five sub-factors considered in the Financial Profile sub-component of the BCA Scorecard, with a 20% weighting. The scorecard ratio used for the Funding Structure sub-factor is Market Funds/Tangible Banking Assets. Other Funding Structure sub-factor considerations include quality of market funding, quality of deposit funding, term structure and market access.

Government Support. The fourth component of our analysis of banks, the Government Support component has three sub-components: Probability of Support, Capacity to Provide Support and Dependence Between Support Provider and Support Recipient. Government support may be from local, regional, national or supranational authorities and may reduce the risk of losses on some or all of a bank's debt instruments.

Gross Risk. For the Solvency factor, the risk of a loss of value in a bank's assets, before taking into consideration the mitigating effects of the bank's capital, earnings and provisions. For the Liquidity factor, the risk of a loss of funding, before taking into consideration the mitigating effects of the bank's access to cash and liquid asset reserves.

Liquid Resources. One of five sub-factors considered in the Financial Profile sub-component of the BCA Scorecard, with a 15% weighting. The scorecard ratio used for the Liquid Resources sub-factor is Liquid Banking Assets/Tangible Banking Assets. Other Liquid Resources sub-factor considerations may include quality of liquid assets and intragroup restrictions.

Liquidity. One of the two factors of the Financial Profile sub-component. Our liquidity assessment incorporates the risks posed by the bank's funding structure (including potential episodes of losing access to funding) as well as the presence of liquid resources that mitigate such risks and may enable a bank to bridge such episodes without defaulting or requiring extraordinary support. This factor comprises two sub-factors, Funding Structure (which focuses on liabilities) and Liquid Resources (which focuses on assets).

Loss Given Failure (LGF). LGF is a sub-component of Loss Given Failure and Additional Notching, the third component in our analysis of banks. LGF considers the effect of the bank's failure on its various classes of debt, after affiliate support has been exhausted (or denied) and in the absence of any government support. We use the simpler Basic LGF approach to notching for banks not subject to Operational Resolution Regimes, based on instrument type. For banks subject to an Operational Resolution Regime, we use Advanced LGF to assess the potential loss to different rated instruments of taking into account the resolution method (e.g., a going-concern bail-in would likely result in lower losses than receivership), the extent of loss-absorbing capital below that instrument class (which helps determine priority of claims and protection from loss), and the volume of the debt class itself (the greater the volume, the lower the loss severity).

Macro Profile. A sub-component of the BCA component in our bank analysis, the Macro Profile is an assessment of the system-wide factors that we believe are predictive of the propensity of banks to fail. The first Macro Profile factor —Banking Country Risk — incorporates three factors from our sovereign methodology scorecard, with minor adjustments: Economic Strength, Institutions and Governance Strength and Susceptibility to Event Risk. We also incorporate three banking-specific factors into the Macro Profile: Credit Conditions, Funding Conditions and Industry Structure.

Operating Obligations. Obligations and commitments that are the subject of our CR Assessment include payment obligations associated with covered bonds (and certain other secured transactions), derivatives, letters of credit, third-party guarantees, servicing and trustee obligations and other similar obligations that arise from a bank in performing its essential operating functions.

Operational Resolution Regime (ORR). We define a system with an Operational Resolution Regime as one that has specific legislation enabling the orderly resolution of a failed bank, providing us with clarity of impact of a bank failure and resolution on depositors and other creditors. Where we believe a resolution regime is operational, we expect the probability of government support to be reduced or in some cases eliminated.

Preliminary Rating Assessment (PRA). An assessment of the long-term creditworthiness of a rated instrument assigned on a lowercase alphanumeric scale from aaa to c, representing our view of the expected loss of a given instrument, in the absence of government support and before considerations of debt and deposit ceilings. The PRA incorporates the bank's Baseline Credit Assessment, Affiliate Support, Loss Given Failure and Additional Notching Considerations.

Profitability. One of five Financial Profile sub-factors considered in the Financial Profile sub-component of the BCA Scorecard, Profitability (15% weighting) is measured by Net Income/Tangible Assets. It helps determine an institution's ability to generate capital and is a complementary indicator of its ability to absorb losses and recover from shocks. Our analysis may also consider earnings stability, which typically favors retail and commercial institutions with a stock of income-generating assets over wholesale banks subject to more volatile flows of business.

Qualitative Adjustments. A sub-component of the BCA component, Qualitative Adjustments are incorporated into our BCA Scorecard as upward or downward notches to the Financial Profile. They include the institution's Business Diversification, Opacity and Complexity, and Corporate Behavior.

Solvency. A factor in the Financial Profile sub-component of our BCA analysis, comprising the Asset Risk, Capital and Profitability sub-factors. Solvency addresses the combination of a bank's risks (credit, market, operational and other risks), and the extent to which its capital and earnings create capacity to absorb any resultant losses.

Support. Resources external to a bank's standalone credit strength, measured by the BCA, that reduce the probability that a bank will default on some or all of its debt instruments. Support from the bank's affiliated entities is considered first, resulting in an Adjusted BCA. Then, following a Loss Given Failure and Additional Notching analysis, we incorporate our analysis of potential government support to arrive at the final instrument ratings for the bank.

Support Provider. With respect to a Special Covered Bond Issuer (SCBI), a support provider is a rated member of the SCBI's group that is expected to provide parental support to the SCBI.

Moody's Related Publications

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

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

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

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