Moody's
INVESTORS SERVICE

Proposed Bank Rating Methodology

Executive Summary

We are proposing material revisions to the form and content of our global bank rating methodology, the core elements of which have been in place since 2007. The proposed modifications reflect insights gained from the global financial crisis and more recent instances of banking sector distress, as well as proposed changes in regulatory supervision and approaches to bank resolution and recovery. The proposed methodology changes would likely impact many bank ratings, including perhaps 40% of all local currency bank deposit ratings globally, with changes heavily concentrated among European and US banks. Here we believe that resolution and recovery techniques will lead to greater discrimination across the capital structure. Deposit ratings would move higher, in some cases diverging from senior unsecured debt ratings, which would be positively affected in Europe but negatively affected in the US, due to differences in liability structures and likely deposit preference. Outside these regions, we expect movements in debt and deposit ratings to be much more limited.

The proposed approach, like our existing methodology, has two main components: an assessment of standalone creditworthiness – defining the likelihood of "failure" – and an analysis of the risks to individual instruments following that failure.

Our standalone analysis incorporates both qualitative and quantitative analysis and retains classic drivers of bank credit risk. These include the bank's asset quality, its capital adequacy and strength of earnings, the appropriateness of its funding structure and its access to liquid assets. Our quantitative analysis draws on ratios chosen for their predictive capacity, which we assess in the context of the macro-economic and financial environment in which each bank operates, while drawing on a broader set of indicators of risks and their mitigants. Within this, we incorporate our forward-looking analysis of asset quality and other key metrics. We further assess other qualitative considerations, including the business model, corporate behavior and the degree of opacity and complexity. Together, these help form a set of analytical judgments that drive the standalone baseline credit assessment (BCA) that we assign to each bank. This BCA expresses our view on the likelihood of an issuer requiring extraordinary support to avoid a default on one or more of its debt obligations, or actually defaulting, at which point we would deem a bank to have "failed"[1]. Overall, we expect the distribution of our BCAs to be little changed.

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[1] Excluding instruments designed to default in advance of such a failure, notably "high trigger" contingent capital instruments.

Beyond this lies our "post-failure" support and structural analysis. We first assess the potential for support from affiliated institutions. Following this, we add a new aspect identifying banks subject to operational resolution regimes, and in these cases we conduct an analysis of each bank's liability structure. This additional component to our methodology follows the dramatic shift in public policy in recent years favouring "resolution regimes," which, in effect, allow banks to selectively default on certain instruments outside of bankruptcy. We consider how the liability structure in a resolution may affect credit risk for investors; specifically, how the amount of debt subordination below each creditor class may provide a source of credit protection to successive debt classes. This new consideration, termed "loss given failure", helps determine for each bank the risk to which different creditors are exposed in the event of a failure, depending on the recovery and resolution techniques employed. In many instances, these considerations would likely drive deposit ratings systematically higher than senior unsecured debt ratings, and some senior unsecured ratings above our BCA.

Finally, as previously, we assess the potential for support from governments, in a way broadly similar to our current application of Joint Default Analysis, but differentiating more clearly between the support available to different debt classes.

Bank creditworthiness will continue to evolve in response to the profound shifts still being felt in the banking industry and its regulation. We have structured our revised framework to provide the flexibility to respond to such changes, and enhance both the accuracy and transparency of our ratings. We are seeking market feedback on our proposed methodology by November 7, 2014.

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What's New in Our Proposals?

> ### Box 1: Summary of Proposed Changes
>
> » We have structured our BCA methodology around a new Scorecard that fully integrates our analytical judgments. Individual scores for different rating factors reflect not only financial ratios, but now also a broad range of qualitative considerations relevant to each credit factor.
>
> » Previously, our Scorecard calibrated to a Bank Financial Strength Rating (BFSR) that "mapped" to a BCA. Under our revised methodology, we will base our ratings directly on BCAs, which express our view of the standalone creditworthiness of a bank on a scale of "aaa" to "c". We will withdraw the less granular BFSRs (from a scale of "A" to "E").
>
> » The new Scorecard focuses on the relatively small number of financial metrics that our back-testing has shown to be strongly predictive of bank failure, i.e., default or the need for support to avoid default. Our analysts and Rating Committees will, however, continue to consider in the BCA analysis additional ratios that they deem relevant for specific banks.
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> » Our forward-looking expectations for key financial metrics would be incorporated directly into the rating factors featured in our Scorecard. Forward-looking scenario analysis would also continue to play an important role in assigning our ultimate scores.
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> » As part of our BCA analysis, we propose to formulate a Macro Profile for each country, which would be based on a range of macro-economic and financial indicators. For each financial factor in the Scorecard, our scoring process is a function of both the ratio itself and the Macro Profile – that is, banks operating in more adverse macroeconomic environments would generally need stronger financial metrics to achieve the same factor scores as banks operating in more favorable environments.
>
> » For the assignment of instrument-specific ratings, the proposal incorporates directly the credit implications of new bank resolution mechanisms in use and proposed around the globe. For banks subject to resolution regimes likely to empower regulators to impose losses on specific liabilities without initiating a more widespread default or bankruptcy, we propose a "Loss Given Failure" component to our analysis. We do this to distinguish between the different risks likely to be experienced by different creditor classes, in response to varying liability structures and forms of resolution and recovery strategies. This includes our recognition that deposits may often be preferred to senior unsecured debt in resolution and that senior unsecured debt may benefit from junior debt cushions. For banks more likely to be resolved through bail-out, bankruptcy, or ad-hoc resolution, we preserve our existing notching practices based on the instrument type.
>
> » We propose to simplify our support framework, while preserving the concepts embedded within our Joint Default Analysis: relative creditworthiness, probability of support, and correlation. We would eliminate the concept of "systemic support indicators", which are estimates of the sovereign's "ability to support", sometimes set above the sovereign's own rating, in favor of the sovereign local-currency rating itself. However, in the application of our JDA framework, we recognize lower correlation between banks and sovereign default risk in some cases; for example, where banking systems are small relative to sovereign resources.

Box 1: Summary of Proposed Changes (continued)

» Based on our preliminary assessment and using current data, we expect 95% of our BCAs to remain unchanged, while 1% may fall by one notch and 4% may increase by one notch or more. Our average BCA will thus remain ba2. Without changing support assumptions, we could see an overall increase in our local currency deposit ratings of about 0.5 notches, the result of 34% being upgraded and 7% being downgraded. We could see a smaller increase in our local currency senior unsecured debt ratings, which could rise an average 0.2 notches, driven by 30% of senior debt ratings rising and 21% declining. Our average deposit and senior unsecured debt ratings would be Baa2. Ultimate rating actions will be determined by Rating Committees following the adoption of our final methodology.

» At the same time, but independent of this proposed methodology, we are considering revising our government support assumptions for a number of banks within the EU, Norway, Liechtenstein and Switzerland (see our Special Comments of May 29, 2014 and 29 July, 2014). While our support assessments are unchanged for now, the probability has risen that we will revise them downwards. Should we determine that the probability of support has materially declined, the positive impact of the above methodological changes, if adopted as proposed, would reduce and – on the whole – would likely leave deposit ratings within these systems broadly unchanged or up to one notch higher, while senior unsecured debt ratings would be approximately unchanged or up to one notch lower.

» In general, we expect our ratings under our revised framework to be more responsive to: (1) changes in the operating environment; (2) changes in the core financial metrics of an individual bank; (3) developments in potential government support and recovery and resolution regimes; and (4) changes in individual bank liability structures.

Request for Comment

This Request for Comment ("RFC") describes proposed changes to the Credit Rating Methodology for Banks. We are seeking feedback on the entire RFC.

If the Credit Rating Methodology is adopted, our preliminary assessment estimates that ratings will be affected as described below.

We invite market participants to comment on the RFC by November 7, 2014, by submitting their comments on the Request for Comment page on www.moodys.com.

Upon appropriate consideration of received comments, once finalized and published, the Credit Rating Methodology will update and replace the Global Banks Rating Methodology published in July 2014.

Box 2: Key Questions

1. Do you have comments on the key metrics selected for our BCA scorecard?

2. Do you have comments on the methodology's proposed use of a banking system Macro Profile and its construction?

3. To the extent to which we include "high trigger" contingent capital instruments within our capitalisation measure in our BCA scorecard, what would be the appropriate way to assign capital credit to such instruments? Should it be different for banks outside an Operational Resolution Regime?

4. Do you have comments on our definition of Operational Resolution Regimes and the resulting scope of application of our Loss Given Failure analysis?

5. Are our initial estimates of mean firm-wide loss rates of 5% and 10% for banks subject to operational resolution regimes reasonable?

6. Is our determination of the scope of a resolution within a banking group reasonable?

7. Do you have comments on our approach to potential depositor preference under the EU's Bank Resolution and Recovery Directive?

8. In the absence of bank-specific data, is our approach to the mix of junior and preferred deposits for EU banks, using EU-wide aggregate data, reasonable? Is it reasonable to take a different view for junior deposits for retail-focused institutions?

9. Are our views on the behavior of different liabilities ahead of failure reasonable? Should we treat derivative liabilities as loss-sharing with senior unsecured debt, and if so, how? Should we treat intra-group funding differently from other interbank funding, and if so, how?

10. Should our thresholds for Loss Given Failure notching feature overlapping bands, allowing discretionary notching within a certain range (e.g., 4.5%-5.5%), or should they be single-point thresholds (e.g., 5%)?

11. To what extent should our Loss Given Failure analysis try to anticipate potential future changes in the debt structure? On what basis?

12. Should our ratings distinguish between Basel III contractual non-viability securities, legacy hybrid capital instruments and "plain vanilla" subordinated debt?

13. Do you have comments on our use of government bond ratings in assessing the creditworthiness of support providers, rather than "systemic support indicators" sometimes set above the sovereign rating?

14. Do you have comments on the combination of parental and cooperative support into Affiliate Support, and the combination of regional / local government support and systemic support into Government Support?

Context for this Request for Comment

The past seven years have marked a period of near-continuous crisis in significant segments of the world's financial industry, in particular in the banking sectors of Europe and North America. The crisis has had profound consequences for bank balance sheets, public policy, banking supervision, regulatory requirements and, not least, for investors in banks. A widespread response to the crisis and its impact on the economies of many systems as well as the finances of numerous sovereigns has been the introduction of new supervisory and capital regimes, together with recovery and resolution mechanisms designed to reduce the risk of bank failures and any financial contagion risk they may create, and to reduce the need for governments to provide financial support to undercapitalized banks. These developments have fundamentally altered the overall risk facing bank creditors as a whole and the distribution of those risks across investors in the different instruments within a bank's liability structure. At the same time, we recognize that many regions have been essentially unscathed and that the global banking industry is highly heterogeneous.

Shortly before the onset of the financial crisis, we introduced our Bank Financial Strength Ratings (February 2007) and Joint Default Analysis methodologies (March 2007) – since combined into the Consolidated Global Banks Rating Methodology in May 2013 and revised in July 2014[2]. That methodology has proven sufficiently flexible to allow us to reflect the pressures from the crisis on bank balance sheets and the changing behavior of bank regulators in response to bank failures. Yet the confluence of shocks, failures, bailouts, defaults and regulatory reforms witnessed since 2007 has prompted a review and revision of the methodology. This RFC sets out proposals for a revised methodology, and proposes important enhancements while building on the strengths and flexibility of our existing methodology.

Our key objectives in this proposed revision are as follows:

» Integrate insights gained from the behavior of bank balance sheets and bank regulators over recent years, as well as reflect the new regulatory and resolution regimes that have been put in place or are currently under consideration in many banking systems.

» Present a transparent assessment of each bank's operating environment and how it impacts our BCA analysis.

» Enhance our BCA analysis to improve their power as predictors of bank failure risk, using financial metrics supported by empirical bank failure experience.

» Provide Rating Committees with the analytical flexibility to tailor our BCA analysis to each issuer by incorporating forward-looking views, additional metrics and qualitative adjustments.

» Introduce our Loss Given Failure analysis to improve the power of our bank ratings as measures of expected loss for banks likely to be subject to resolution mechanisms.

» Maintain a consistent framework for the global application of our methodology while recognizing substantial differences between regions and individual institutions.

The main credit factors we analyze are similar to those we currently use and will be familiar to all bank analysts: solvency and liquidity are at the heart of our standalone analysis. However, our presentation of this analysis differs from that conducted previously. In particular, there is a greater role for potential system-wide pressures conveyed through a Macro Profile. Our Scorecard, which previously provided a

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[2] Our Global Banks Rating Methodology was most recently updated on July 16, 2014 to incorporate a framework for rating high-trigger contingent capital securities issued by banks and to make revisions for to our rating framework for non-viability contingent capital securities.

relatively inflexible "input" into our BCA, now aims fully to capture our Rating Committees' views on the range of credit factors affecting a bank's standalone financials, including adjustments for supplementary ratios and forward-looking assessments as appropriate.

Our ratings will, moreover, continue to incorporate, where appropriate, the benefits of potential support from affiliates or from governments. We will, however, introduce a liability-side analysis into our post-failure risk assessment, reflecting the importance of considering the cushion against loss provided by subordination for successive debt classes in a bank's resolution, whether that takes place via a "going concern" mechanism or in liquidation. This will apply to banks subject to operational resolution regimes, and includes an assessment of firm-wide loss post-failure, our view of the likely perimeter of such a resolution within a group, and the likelihood of loss-sharing between rated deposits and senior unsecured debt. This also allows us to reflect the risk of increased balance sheet encumbrance in our debt and deposit ratings.

Impact on ratings

The proposed changes to our methodology would result in broad but generally modest adjustments to our global bank ratings. The proposed methodology, if implemented in the form set out in this RFC, and absent the potential parallel changes to our support assumptions in Europe announced in our Special Comment of 29 May 2014[3], would likely leave about 59% of our local currency deposit ratings unchanged, with 34% rising and 7% declining. For local currency senior unsecured debt, we estimate that 48% of local currency ratings would be unchanged, with 30% upgraded and 22% downgraded. These actions would lead to an average net upgrade of about 0.5 notches to local currency deposits and 0.2 notches to local currency senior unsecured debt. The resultant average global rating of local currency deposits and senior unsecured debt would be Baa2.

Within this, our BCAs are broadly unchanged, with a median of ba1 and an unweighted average of ba2. The changes to our debt and deposit ratings are, therefore, driven primarily by the application of our new Loss Given Failure framework. The changes would have a particularly positive impact on deposit ratings in the United States, because we are now recognizing the existence of statutory full deposit preference and deposit ratings, therefore, would benefit from the full subordination of senior unsecured debt. This is less the case in the EU, owing to the more ambiguous approach to deposit preference under the Bank Resolution and Recovery Directive (BRRD). For more details, please see Appendix 11, Impact Assessment.

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[3]   See also our Special Comment "Reassessing Systemic Support for Swiss Banks" (173495), published 29 July 2014.

EXHIBIT 1
Summary of Estimated Ratings Impact – Deposits (local currency)[4]

Region	Number in sample	Impact (notches)						Balance up / down	Weighted average notch change	Average rating
		-2	-1	0	1	2	3			
North America	75	0%	0%	12%	8%	75%	5%	88%	1.7	A1
EU and Other Western Europe	275	0%	4%	16%	24%	49%	5%	75%	1.4	Baa1
Asia Pacific	173	3%	5%	88%	3%	1%	0%	-3%	-0.1	A3
CIS and Western Asia	143	0%	2%	95%	3%	0%	0%	1%	0.0	B2
Latin America	112	0%	13%	84%	2%	1%	0%	-11%	-0.1	Ba2
MEA	102	0%	19%	79%	2%	0%	0%	-17%	-0.2	Baa3
WORLD	**880**	**1%**	**6%**	**59%**	**10%**	**22%**	**2%**	**27%**	**0.5**	**Baa2**

Summary of Estimated Ratings Impact – Senior Unsecured Debt (local currency)[5]

Region	Number in sample	Impact (notches)						Balance up / down	Weighted average notch change	Average rating
		-2	-1	0	1	2	3			
North America	72	1%	61%	29%	6%	1%	1%	-54%	-0.5	A3
EU and Other Western Europe	143	0%	14%	24%	36%	21%	3%	48%	0.8	Baa1
Asia Pacific	31	3%	0%	97%	0%	0%	0%	-3%	-0.1	A1
CIS and Western Asia	48	0%	2%	94%	4%	0%	0%	2%	0.0	B1
Latin America	22	0%	9%	86%	5%	0%	0%	-5%	0.0	Ba2
MEA	8	0%	0%	100%	0%	0%	0%	0%	0.0	Ba1
WORLD	**324**	**1%**	**21%**	**49%**	**18%**	**10%**	**2%**	**9%**	**0.2**	**Baa2**

Source: Moody's

However, independent of this proposed methodology, we are considering revising our government support assumptions for a number of banks in the EU, Norway and Liechtenstein (see our Special Comment of 29 May 2014) and Switzerland (see our Special Comment of 29 July 2014). While our support assumptions are unchanged for now, the probability has risen that we will revise them downwards, and this potential reassessment may materially reduce or eliminate the overall positive impact of the methodology itself at some point during our rating outlook horizon.

Should we determine that the probability of support has materially declined, the positive impact of the above methodological changes, if adopted as proposed, would reduce and – on the whole – would likely leave deposit ratings within these systems broadly unchanged or up to one notch higher, while senior unsecured debt ratings would be approximately unchanged or up to one notch lower. For more details on these scenarios, please see Appendix 11.

Implications for instrument and program ratings in Structured Finance and other sectors

The proposed bank rating methodology recognizes that in countries with operational resolution regimes certain key bank operations will continue to function and /or certain payment obligations will be honored at the same time as senior unsecured debt or junior deposits would be bailed in. Therefore the probability of failing to perform such key operations or defaulting on such payment obligations (for example, covered bonds) would be lower than indicated by the senior unsecured or deposit ratings. In certain sectors we may use reference points other than the senior unsecured or deposit ratings, as appropriate, to more accurately reflect this risk.

Scope of methodology

This methodology is intended to cover banks, by which we mean institutions commonly termed as such under national regulation. They tend to be characterised primarily by their regulatory and legal status, are usually licensed to take deposits from the general public, provide credit, are subject to prudential regulation and have access to central bank liquidity. In the EU, this generally means "credit

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4   Sample comprises principal banks with standalone BCAs.

5   In some cases, the average senior unsecured debt ratings in a given region appear higher than the region's deposit ratings. This is typically due to the different populations in each sample, because there are fewer senior unsecured debt ratings than deposit ratings.

institutions". Institutions covered by this methodology will usually bear most of the following characteristics: a bank charter or equivalent; regulatory capital ratios, such as common equity tier 1/ risk-weighted assets; regulation including the application of capital and liquidity standards and on-site inspections; membership of a payments system; material deposit 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 large leveraged balance sheets and engage in the business of borrowing and lending as their core business. This may include some large securities firms, for example. Conversely, in some instances, we may consider that some institutions that are technically "banks" or credit institutions under local regulation are in fact economically closer to finance companies, insurance companies, or sovereign entities, for example. In these cases, we may assess the institution's creditworthiness under a different methodology, or a combination of methodologies, according to what we consider the most appropriate fit to the institution's business and risk profile.

Some institutions are hybrids or financial conglomerates, combining banking, securities, asset management, private equity and insurance activities. In such cases, we will typically employ the methodology that we consider corresponds best to the bulk of the institution's business, as measured by the income statement, balance sheet or both. We may also employ additional methodologies to complement our assessment, as noted in our related press releases. Structured debt securities issued by banks (e.g., covered bonds and asset-backed securities) are typically rated by our Structured Finance Group in accordance with the relevant methodologies.

Our Proposed Approach

Framework underlying our standalone Baseline Credit Assessment (BCA)

Our proposed approach to analysing standalone bank failure risk marks an important extension and enhancement to our existing methodology, as employed by our Rating Committees that remain at the heart of our analytical process. We have substantially modified our Scorecard, which summarises key credit aspects of each issuer, and introduced an explicit Macro Profile – marking an assessment of systemic risks within a banking system. This recognizes the more significant influence that we believe a bank's operating environment plays in its propensity to fail, as shown in the recent crisis, sometimes overwhelming individual banks' apparently strong financial metrics. The determination of this Macro Profile is closely coordinated with the construction of our sovereign ratings and conditions our bank-specific financial ratio analysis. Meanwhile, we have refocused bank-specific elements of our Scorecard on five main credit factors. For each factor, one bank-specific financial ratio serves as the entry point for our more detailed analysis. These quantitative ratios themselves have also been revised, inspired by a failure analysis gauging those factors and ratios that have been shown to be most predictive:

» Asset Quality: Problem Loans / Gross Loans

» Capital: Tangible Common Equity / Risk-Weighted Assets

» Profitability: Net Income / Tangible Assets

» Funding Structure: Market Funds / Tangible Banking Assets

» Liquid Resources: Liquid Assets / Tangible Banking Assets

We continue to use an approach combining the analysis of these simple but effective financial ratios – applying adjustments where necessary to make them as consistent as possible – with forward-looking judgments.[6] This balance is widely considered integral to bank credit analysis, where risks can never be known with certainty ex ante,[7] and tend to materialise with some time lag after the recognition of related earnings. In this regard, a key difference relative to our historical practice is that we will incorporate these judgments *within* the Scorecard itself, while under our existing methodology we typically expressed our judgments by diverging from the Scorecard outcome. For example, we may assign an Asset Quality score different than the ratio-based score to incorporate concerns over concentration risk and cite that factor in our research. We believe this change in presentation offers increased transparency to investors about the nature and extent of our judgments. It is also conceptually similar to the approach already employed under our insurance methodologies.[8]

Basis for methodology and key terms

Our proposed approach incorporates and builds upon our own research, our experience of the recent financial crisis, and academic literature[9]. Our approach to assigning bank ratings will continue to employ a sequential analysis, but we have modified it to take into account new forms of bank "resolution". The sequence, illustrated in Exhibit 2, now comprises:

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[6] An approach set out in Moody's Special Comment, Bank Credit Analysis: Historical Origins and Current Practice, June 1993.

[7] See for example, Basel Committee on Banking Supervision, Consultative Document, Countercyclical capital buffer proposal, July 2010.

[8] See our Property and Casualty insurer methodology and our Life insurer methodology.

[9] See Bibliography.

» An assessment of the standalone financial strength of the bank, resulting in a BCA, meaning the probability of default in the absence of external support, or its probability of standalone failure;[10]

» An assessment of support from affiliates, layered onto the BCA to determine an Adjusted BCA;

» A "loss given failure" analysis, where applicable, of the impact of the bank's failure on the expected loss of each creditor class in response to 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; and

» An assessment of support from governments, specific to each instrument class, to determine the credit rating for each rated instrument.

We combine these assessments, stage-by-stage, to generate ratings for each creditor class.

EXHIBIT 2
Overall Approach to Rating Bank Securities
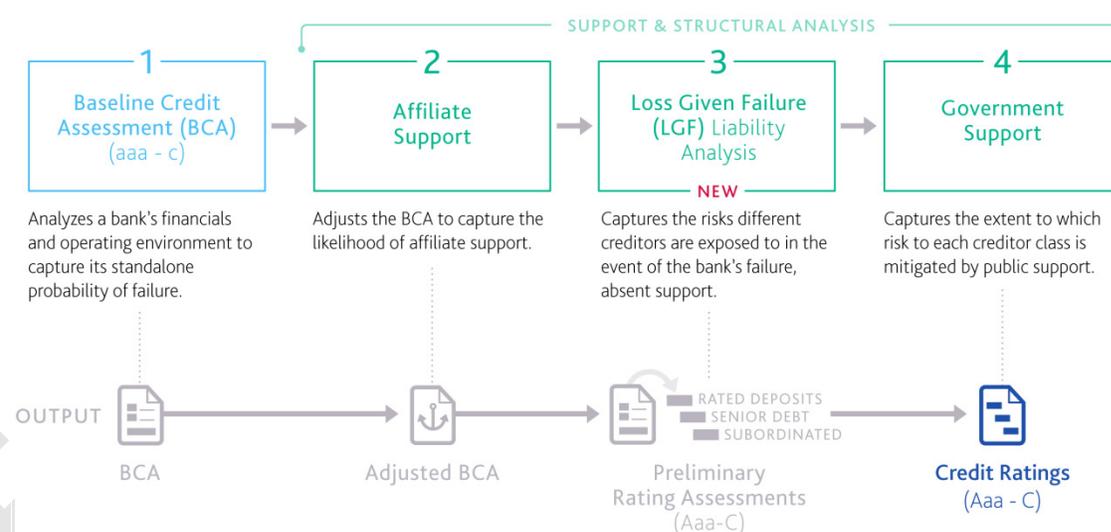
Source: Moody's

A 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.

Our Scorecard is designed to capture, express and explain in summary form our Rating Committee's judgment. When read in conjunction with our research, a fulsome presentation of our judgment is expressed. As a result, the output of our Scorecard may materially differ from that suggested by raw data alone (though it has been calibrated to avoid the frequent need for strong divergence).

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[10] BCAs will be expressed in lower-case alphanumeric form. We will no longer assign a Bank Financial Strength Rating on a separate scale. For more details, see Rating Symbols and Definitions, published August 2014. See Appendix 3: About Our Bank Ratings.

Sources of data

Throughout our analysis, our approach enables us to assign ratings based on public data. Our choice of ratios is oriented towards 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.
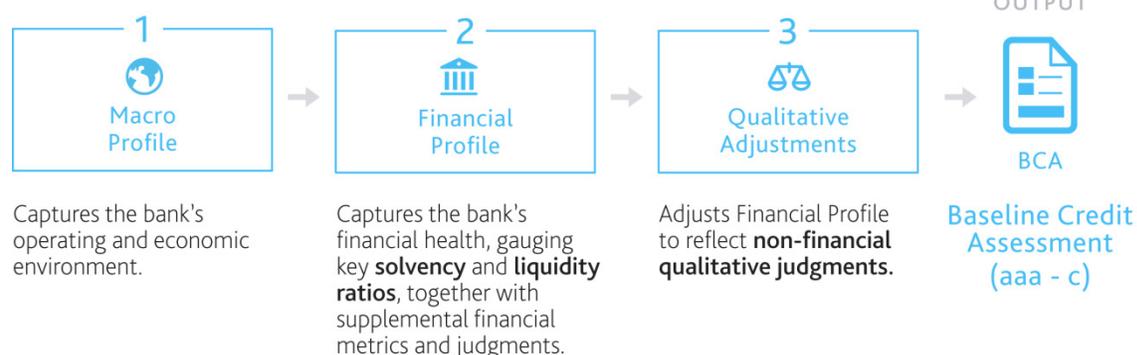
Overview of the BCA

In the following sections, we set out the key factors that influence our BCA, and our approach to their measurement and 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 3
BCA Structure

1 Macro Profile	2 Financial Profile	3 Qualitative Adjustments	OUTPUT BCA
Captures the bank's operating and economic environment.	Captures the bank's financial health, gauging key **solvency** and **liquidity ratios**, together with supplemental financial metrics and judgments.	Adjusts Financial Profile to reflect **non-financial qualitative judgments.**	Baseline Credit Assessment (aaa - c)

Source: Moody's

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, and 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 system. For example, we will 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[11], even if the overlap is not complete[12]. The factors behind banking crises are thus closely linked to, but are not identical to, sovereign and currency crises.

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[11] See our methodology, Sovereign Bond Ratings, published September 12, 2013

[12] IMF Working Paper 12/163: Systemic Banking Crises Database: An Update, Luc Laeven and Fabián Valencia

Drawing together academic research and our own back-testing, we establish 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 Ratings Group and indeed we use components of the Sovereign rating Scorecard as our starting point (see Box 3 below).

Box 3: How We Construct Our Macro Profile
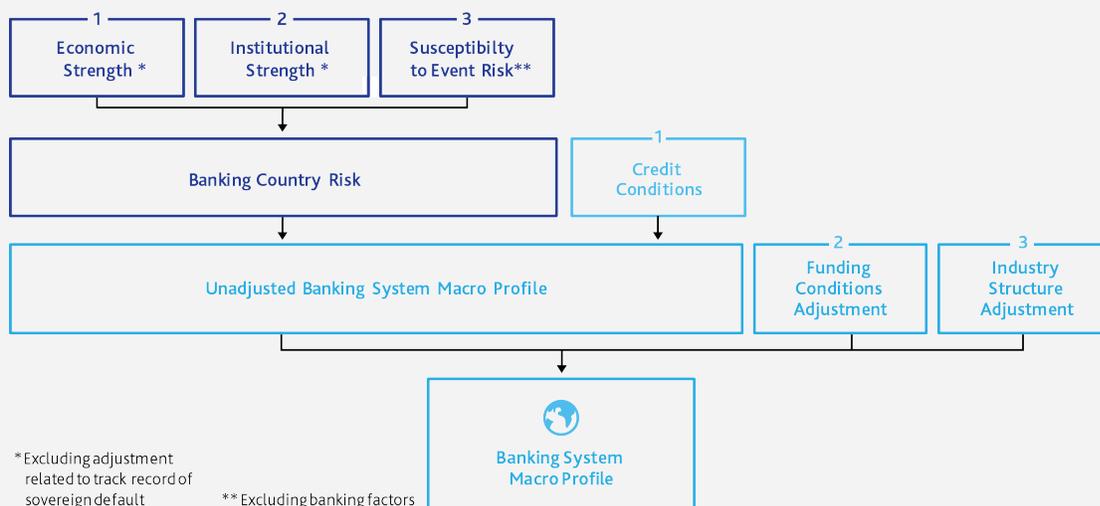
Our Macro Profile draws heavily on the Sovereign scorecard. We construct it in the following way.

Economic Strength (Sovereign Factor 1). We calculate the Economic Strength score for each country using the various factors in the Sovereign Scorecard, excepting adjustments for "credit booms", which we consider separately below.

Institutional Strength (Sovereign Factor 2). We calculate the Institutional Strength factor using the various sub-factors in the Sovereign Scorecard, with the exception of the default track record adjustment factor.

Susceptibility to Event Risk (Sovereign Factor 4). We calculate the Susceptibility to Event Risk factor 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.

We combine these factors in the same way as they are combined in the Sovereign methodology. For more details, see the Detailed Fundamental Credit Factors section below. Note that we do not include Factor 3, Fiscal Strength, 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 output of this process is expressed as a three-notch range, e.g. Baa1-Baa3. We then weigh this output with our **Credit Conditions** factor, which is expressed on a scale from "Neutral" to "Very Weak-". This delivers an Unadjusted Macro Profile on a scale ranging from "Very Strong+" to "Very Weak-".

Finally, we may adjust this Macro Profile up or down to reflect **Funding Conditions** or **Industry Structure** issues. This results in our Macro Profile.

This Macro Profile is expressed on a 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.
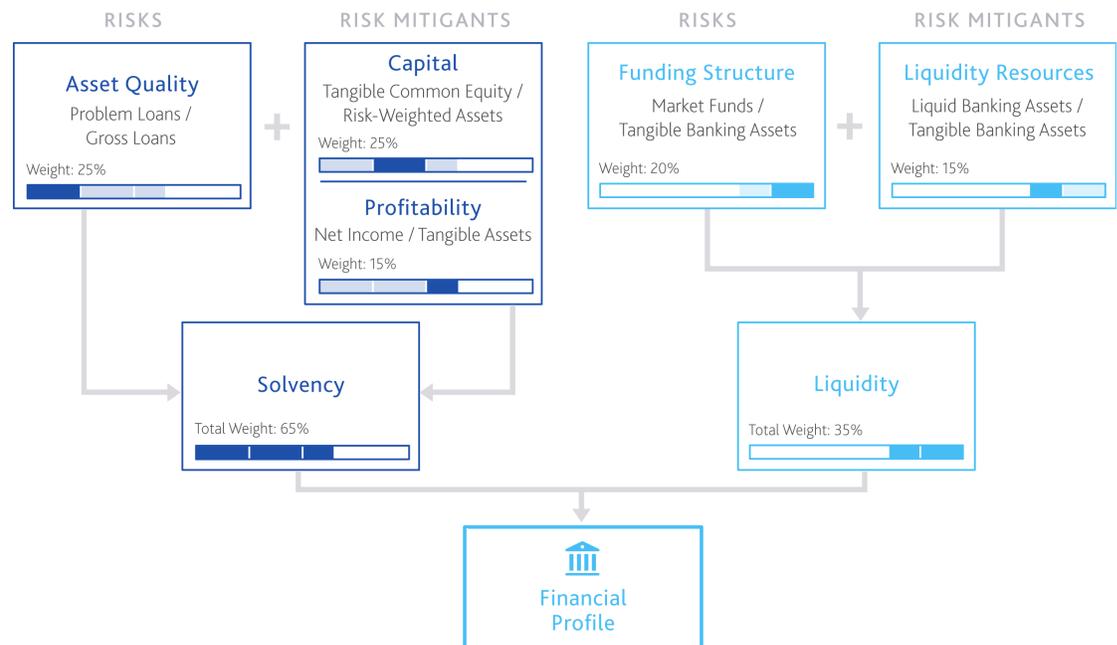
2. Financial Profile

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 absolute and relative financial strength is centred 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 capital) and its liquidity (the degree of a bank's maturity transformation). Solvency can be seen as the combination of asset quality, 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 predictable 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 capitalisation 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. Naturally, the reverse is also true and weak solvency can undermine liquidity.

Our analysis of each bank's financial profile, therefore, centers on the 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 factors (Exhibit 4).

EXHIBIT 4
Schematic of Financial Profile

| RISKS | RISK MITIGANTS | RISKS | RISK MITIGANTS |

Asset Quality
Problem Loans / Gross Loans
Weight: 25%

Capital
Tangible Common Equity / Risk-Weighted Assets
Weight: 25%

Profitability
Net Income / Tangible Assets
Weight: 15%

Funding Structure
Market Funds / Tangible Banking Assets
Weight: 20%

Liquidity Resources
Liquid Banking Assets / Tangible Banking Assets
Weight: 15%

Solvency
Total Weight: 65%

Liquidity
Total Weight: 35%

Financial Profile

Source: Moody's

We assign scores to each of these 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, this 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 will reflect:

» The historical financial metric chosen for each factor;

» Our 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 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 the section below, Assessment of Financial Profile.

3. Qualitative 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 which are either: (1) non-financial in nature; or (2) financial, but which we cannot easily translate into a common standard ratio.

The three factors are:

» **Business diversification**: the breadth of a bank's business activities, whether it is dependent on a single business, or spread across multiple activities, exposing it or protecting it from problems in a single activity;

» **Opacity and complexity**: 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**: 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 expect to use such adjustments relatively sparingly, when there are credit considerations that cannot be readily attributed to any of 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 Factors and the related notching process are detailed later in the section below.

The BCA Scorecard and Rating Committee discretion

We believe that the consideration of the factors described above – Macro, Financial and Qualitative – is sufficiently comprehensive to capture the many features that can influence a bank's standalone creditworthiness. Furthermore, we design our calibration of historical financial ratios to 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, we retain 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 output of our Scorecard is expressed as a three-notch range on our BCA scale and Rating Committees have the discretion to assign a BCA within this range – and, exceptionally, outside it. We expect the majority of BCAs to be assigned at the mid-point of the Scorecard range, but the Rating Committee's ultimate decision will reflect 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 5
Example BCA Scorecard

Baseline Credit Assessment   Bank ABC
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 Quality						
Problem Loans / Gross Loans	2.0%	a1	⇊	**baa**	Geographical concentration	Downward trend
Capital						
Tangible Common Equity / RWA	8.5%	ba2	↔	**b**	Nominal leverage	
Profitability						
Net Income / Tangible Assets	1.0%	a3	↔	**a**	Earnings quality	
Combined Solvency Score		baa1		**baa**		
Liquidity						
Funding Structure						
Market Funds / Tangible Banking Assets	15.0%	a2	↔	**baa**	Maturity transformation	
Liquid Resources						
Liquid Banking Assets / Tangible Banking Assets	20.0%	baa1	↑	**baa**	Intragroup restrictions	
Combined Liquidity Score		a3		**baa**		
Financial Profile				**baa3**		

Qualitative Adjustments

	Adjustment	Comment
Business Diversification	-1	Monoline specialist lender
Opacity and Complexity		n/a
Corporate Behavior		n/a
Total Qualitative Adjustments	**-1**	

		Comment
Sovereign or parent constraint	**Aaa**	n/a

BCA range   **baa3 - ba2**

		Rationale
Assigned BCA	**ba1**	Appropriate position versus peers

Source: Moody's

Overview of Support and Structural Analysis

Our BCA measures the probability of a bank defaulting on its junior-most rated instrument[13], 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 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**, 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.

» **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.

EXHIBIT 6
Applying Support and Loss Given Failure Analysis to Determine Credit Ratings

Source: Moody's

Our overall approach to support is similar to that employed under our previous Joint-Default Analysis (JDA) framework. However, we have simplified our approach.

Stage 1: Affiliate support

The first step in our analysis is to consider support from affiliated entities. The output of this first step results in our 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 our rating as a function of the following four factors:

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

» The probability of the Affiliate's providing support;

» The Affiliate's capacity to provide support; and

» The dependence or correlation between the respective entities.

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[13] Excluding the impairment of " high trigger" contingent capital instruments and preference 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 "Very High", to "High", "Moderate", and "Low". Each of these categories corresponds to a range of support probabilities (see Appendix 8: Use Of Joint Default Analysis In Support).

We 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 Detailed Support and Structural Analysis section below.

Capacity to provide support

To establish the Affiliate's capacity to support the bank, we generally use the Affiliate's own BCA. 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 marshalled to support the subsidiary are limited to its standalone capacity. We generally take this approach because we consider government support separately (see below). However, we may on occasion employ supported ratings (typically, the senior unsecured debt rating) as our measure of support capacity where individual circumstances justify it – for example, if the supported entity is virtually inseparable from the supporting Affiliate and, therefore, government support would almost certainly flow via the Affiliate. This is also the case where the supporting Affiliate is a non-bank entity, for example an insurance company or non-financial corporate.

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.

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

» 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, we might judge the dependence between an African bank and its Asian non-financial conglomerate parent as "Moderate".

Applying support

We employ JDA to provide Rating Committees with an indicative range of potential uplift from the BCA (see Appendix 8: Use Of Joint Default Analysis In Support). The Rating Committee will then employ its 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 Adjusted BCAs, Rating Committees may deviate in either direction from this guidance to reflect idiosyncratic situations. Thus the BCA, together with this uplift, form the Adjusted BCA. This Adjusted BCA reflects the combined probability of a subsidiary requiring support and a group failing to provide that support, allowing the subsidiary to default on its most junior securities in the absence of government support[14].

Stage 2: 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" – 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. Loss Given Failure is not a new concept – for many years we have differentiated subordinated from senior unsecured debt based on our view of higher loss severity for junior debt instruments.

However, the technique we will employ is a more refined addition to our analytical toolkit, the necessity for which follows the dramatic shift in public policy in recent years favouring "resolution regimes," which, in effect, allow banks to selectively default on certain instruments outside of bankruptcy – a process previously difficult or even impossible to achieve. At the same time, regulators are mandating increased levels of loss-absorbing capital that are intended to facilitate resolution. This throws into sharp relief the importance of liability-side analysis in determining risk. We expect to use this approach to help determine the loss severity on all debt instruments. In the absence of this experience and data, this framework allows us to incorporate liability structure analysis into our ratings in a transparent manner utilizing reasonable assumptions of expected regulatory behavior.

This approach allows us to recognize the different implications of likely resolution scenarios for particular banks, including each class of debt as well as deposits. The 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 Loss Given Failure framework takes two forms. We apply a more advanced analysis to banks subject to Operational Resolution Regimes – 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. For banks that are not subject to such resolution regimes, and which we expect to be "resolved" through bail-out, bankruptcy, or ad-hoc resolution measures, we will apply a simpler notching in line with our historical practice. Under this approach, we position the senior unsecured debt and deposits at the Adjusted BCA, before government support and additional notching considerations, and subordinated instruments at one notch below the Adjusted BCA.

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[14] Excluding "high trigger" contingent capital instruments and other instruments designed to be impaired prior to a bank-wide failure.

Key Loss Given Failure variables

In developing our framework, we have used scenario modelling technology to construct a relatively simple notching approach that allows us to capture the major factors that have a bearing on loss given failure,[15] and our analysis focuses on these key variables.

» **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.

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

» **Debt 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 its own expected loss by spreading losses across a larger pool.

We estimate volumes of debt in each instance using our proprietary database of rated issuance. Where our data is incomplete we will undertake to adjust it through analysis of financial statements as well as via interaction with issuers and third-party data agents. 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. In most cases, we expect resolutions to be conducted according to national boundaries. We also recognize that there may be exceptions to these assumptions: within the EU, for example, national boundaries may become less important over time in response to increasing cross-border integration, or large non-domestic entities may be interconnected to such an extent that separate resolution is impractical.

Loss severity notching

The consideration of these three variables leads us to establish a notching differential relative to the Adjusted BCA, representing our view of the likely loss severity as a function of the above three variables. For more details, see the Detailed Support and Structural Analysis 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, or larger volumes of debt at the level concerned, which spreads risk. This results in greater differentiation across the liability structure, with notching ranging from one 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 very low.

Integrated into our approach is the possibility that there may be more than one potential "waterfall" – in other words, the hierarchy is uncertain. In such cases – for example, due to the discretion afforded to authorities under the BRRD – 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 definitive view on loss severity, absent support.

Future considerations

Loss Given Failure marks a new stage in our analysis that we believe responds to the issues raised by the introduction of resolution regimes. Consistent with the development of such regimes, we expect our approach to evolve, and to be extended to other systems as their resolution regimes develop. It is possible that we may in time move to a fully model-based approach, allowing us to integrate a number

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[15] We detail underlying modeling assumptions in Appendix 7.

of other variables, should we be satisfied that the data required is sufficiently reliable. But the above framework nevertheless represents a material progression from previous techniques, and responds to the analytical challenges posed by new forms of bank resolution.

Additional notching and the Preliminary Rating Assessment

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

Stage 3: Government Support

Our approach to government support is similar to that for determining support from an affiliate. We use the same approach, employing Joint Default Analysis, 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;

» Its 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 through the analysis of the following principal factors.

» Public policy and presence of developed resolution regimes

» Market share of domestic deposits and loans

» Market impact

» Nature of activity

» Public involvement

These factors 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 the capacity of the relevant public body 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. We believe that was clearly shown in the recent crisis, where banking sector risks exacerbated sovereign risk, and sovereign risk created banking risks. For some systems, however, the connections between the financial health of 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.

Applying support

We employ JDA to provide Rating Committees with an indicative range of potential ratings uplift from the Preliminary Rating Assessment. The mathematics behind this approach is detailed in Appendix 8: Use Of Joint Default Analysis In Support. The Rating Committee will employ its 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, Rating Committees may deviate in either direction from this guidance to reflect idiosyncratic situations. On the other hand, Rating Committees are likely to exercise caution in assigning many notches of uplift, in the absence of the presence of more tangible support.

Summary output

The above stages describe how our analysis moves progressively from a broad assessment of generic risk in a given country to an instrument-specific credit rating describing expected loss.

» First, the Macro Profile is determined, communicating our view on systemic banking risk.

» The Macro Profile conditions the individual financial metrics that influence the BCA, 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 instrument-specific analysis then incorporates the relative loss severity in the event of failure for different debt or deposit classes. For Operational Resolution Regimes, this takes into account the likely firm-wide loss severity, the outstanding amount of each instrument, and the cushion of subordinated debt. Elsewhere, it is based on a simpler notching based on the instrument type. Taken together with other instrument-specific characteristics, these elements provide a set of Preliminary Rating Assessments 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. Outlooks or reviews are assigned to long-term ratings, indicating the direction of any rating pressures. Short-term ratings are mapped from these long-term ratings.

These steps are summarized as follows.

EXHIBIT 7
Example Summary Credit Fundamentals

Bank ABC   **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
Deposits	2	baa1	2	A2	Stable	Prime-1	A2	Stable	Prime-1
Senior long-term debt (bank)	0	baa3	2	Baa1	Stable	Prime-2	Baa1	Stable	Prime-2
Dated subordinated debt (bank)	-1	ba1	0	Ba1	Stable		Ba1	Stable	
Senior long-term debt (holding company)	-1	ba1	0	Ba1	Stable	Not Prime	Ba1	Stable	Not Prime
Dated subordinated debt (holding company)	-1	ba1	0	Ba1	Stable		Ba1	Stable	
Preference shares (holding company) - non-cumulative	-3	ba3	0	Ba3	Stable		Ba3	Stable	

Source: Moody's

Detailed Fundamental Credit Factors

In the following sections, we discuss in detail the key factors we consider in our BCA analysis, the core ratios that inform our analysis, and our approach to scoring both quantitative and qualitative factors.

Stage 1: The Macro Profile

The first stage of our BCA analysis is our assessment of the macro environment within which a bank operates. This reflects our view that bank failures are very often closely associated with systemic crises driven by macroeconomic rather than idiosyncratic factors. As discussed above, we categorise these factors as follows:

» Economic Strength

» Institutional Strength

» Susceptibility to Event Risk

» Credit Conditions

» Funding Conditions

» Industry Structure

The first three of these factors come directly from our Sovereign Scorecard,[16] reflecting the commonality between influences of banking sector and sovereign creditworthiness. However, the dependence is not exact, and strong sovereigns may have weak banking systems.[17] This may hold true for countries with healthy government finances, which led us to exclude the Sovereign Scorecard Fiscal Strength Factor from our assessment of a banking system's strength. We also incorporate further, banking-specific factors in our Macro Profile, as described below.

Where a bank operates in a range of countries, the applicable Macro Profile will usually be a weighted average of the Macro Profiles of the principal countries in which the bank operates. We typically weight the individual profiles by balance-sheet presence in each system, i.e., assets, although we may use other measures, such as risk-weighted assets (RWA), loans or revenues where we believe these form a more representative view of the bank's risk profile.

Our Macro Profile gauges these factors as follows.

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 GDP growth are more common means that business cycles are more pronounced, and asset quality and earnings more volatile, posing a greater risk to solvency.

How we measure it

We measure Economic Strength using Factor 1 of our Sovereign methodology. This in turn considers the following sub-factors:

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[16] See our methodology Sovereign Bond Ratings, published September 12, 2013

[17] 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

» Growth Dynamics

» Scale of the Economy

» National Income

Note that while we include adjustments performed by our Sovereign team related to diversification, we do not include adjustments related to "credit booms" because we address these separately in the Credit Conditions factor discussed below.

For more details, please see the Sovereign methodology.

Institutional strength

Why it matters

The strength of a country's institutions matters because banks by their nature depend on a sound legal framework in order 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 this and renders a banking system weaker.

How we measure it

We measure Institutional Strength using Factor 2 of the Sovereign methodology. This in turn considers the following sub-factors:

» Institutional Framework and Effectiveness

» Policy Credibility and Effectiveness

Note that, while we include adjustments performed by our Sovereign team related to general institutional strengths and weaknesses, we do not include adjustments related to the sovereign's own track record of default.

For more details, please see the Sovereign methodology.

Susceptibility to event risk

Why it matters

We believe that the external vulnerabilities of a sovereign have a significant bearing on the vulnerabilities of its banking sector. For example, a large current account deficit is often associated with a generalised increase in credit, which may precede a banking crisis. Government liquidity and political risks can also quickly spread to the banking sector.

How we measure it

We measure Susceptibility to Event Risk using Factor 4 of the Sovereign methodology. This in turn employs a number of sub-factors:

» Political Risk

» Government Liquidity Risk

» External Vulnerability Risk

Note that we exclude from this factor the remaining sub-factor used in the Sovereign Methodology, namely the risk of the banking sector itself, its size and its vulnerabilities[18]. Since the Macro Profile is used to determine our view of the strength of the banking sector, we do not consider it appropriate to include the strength of the banking sector itself in this assessment such that it become a self-referential determinant of its own strength. Other aspects of the banking system – its size and funding vulnerabilities – we consider separately in our Credit Conditions factor below.

For more details, please see the Sovereign methodology.

Credit conditions

Why they matter

High levels of debt or rapid credit expansion can signal credit-quality problems that emerge later, making Credit Conditions an important consideration for our assessment of the strength of the banking sector as a whole.

How we measure them

We measure Credit Conditions using two key metrics.

Level of private-sector credit/GDP

The level of private-sector credit/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 economic activity or shock. This is borne out by academic studies, which demonstrate that the credit/GDP ratio can be correlated with whether a subsequent 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, hence, may be more sustainable for some mature economies than for others.[19] We score this ratio along the same scale as other factors considered in the Sovereign Scorecard, using data collected by our Sovereign Risk Group.

EXHIBIT 8
Scoring Private Sector Credit/GDP

VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	>
20%	25%	30%	35%	40%	50%	60%	75%	100%	125%	150%	175%	200%	400%	400%

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 and this indicator is significant in our study of recent bank failures. Moreover, much academic literature concurs that it is an important indicator of greater risk-taking, which often precedes a crisis. We score this factor using the scale below, using data collected by our Sovereign Risk Group. Once again, the accumulation of debt is sometimes associated with the natural 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.

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[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.

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

EXHIBIT 9
Scoring 3-Year Change in Private Sector Credit/GDP (pp)

VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	>
-30%	-20%	-10%	-8%	-5%	-3%	0%	3%	5%	8%	10%	15%	20%	30%	30%

Initial overall score

We combine our scores for each indicator, weighting the credit/GDP factor at 70%, and the growth in private-sector credit/GDP factor at 30%. This has the effect of placing credit growth in the context of the state of the development of the country's credit market – high growth in credit may be offset by a low stock, for example. Nonetheless, if the combined score exceeds Weak+ we term it "Neutral". This prevents misleadingly high scores, for example when economies are undergoing deleveraging or where credit is small relative to GDP precisely because credit conditions are unfavourable. Therefore, the Credit Conditions score has an asymmetric impact on the Macro Profile and is expressed on a seven-point scale from Neutral to Very Weak-.

Analytical adjustments

As noted above, ratios require careful interpretation. Our assigned score may incorporate more qualitative adjustments reflecting a number of further factors:

» Some countries may exhibit high levels of private-sector debt relative to their GDP, but this may be held predominantly at fixed rates and, hence, be less affected by interest rate rises, or because it is backed by a large stock of financial assets relative to outstanding debt, and hence present less risk.

» Conversely, some countries may exhibit apparently benign levels of private-sector credit to GDP, but this masks considerable concentrations that increase credit risks.

» Some countries may be characterised 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 sector.

» Real estate price inflation, especially in commercial real estate, which often signals incipient credit problems.

» Some countries may show other signs of loose or tight credit conditions not captured by the financial metrics, for example as shown by bank-loan officer surveys.

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

» The "credit boom" adjustment factor assessed within our Sovereign ratings.

» The assessment of Housing Market Attributes considered within our Mortgage Insurance methodology.[20]

» The House Price Stress Rates considered by our Residential Mortgage Backed Securities methodology.[21]

This list is not exhaustive and we may make similar adjustments for other features of a given banking system that evoke credit vulnerability concerns. In some circumstances, other asset-price indicators –

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[20] See Moody's Global Methodology for Rating Mortgage Insurers, published December 11, 2012

[21] For more details, see A Framework for Stressing House Prices in RMBS Transactions in EMEA, published May 28, 2013

commodities, or equities, for example – could be assessed as indicators of an asset-price bubble, signalling potential solvency problems for banks.

Overall credit score

The initial score, together with any adjustments, gives an overall assigned assessment of the credit factor on a seven-point scale from Neutral to Very Weak-.

Unadjusted Macro Profile

We combine the first four factors in the following fashion to arrive at an unadjusted Macro Profile.

» The Economic and Institutional factors are combined in the same way as under the Sovereign methodology, i.e., with equal weight, but without consideration of fiscal strength. This is in turn constrained by the country's Susceptibility to Event Risk, producing a banking country risk range.

» We then combine this banking country risk measure with the Credit Conditions factor. The weighting we accord to the two different components varies according to the Credit Conditions factor (see Exhibit 10 below).

» This has the effect of progressively increasing the influence of credit conditions in our Macro Profile as they worsen, and thereby the likelihood that our BCAs will respond to increased (or reduced) systemic risk.

EXHIBIT 10
Relative Weights of Banking Country Risk and Credit Conditions

Credit Conditions score	Weight – Credit Conditions	Weight – Banking Country Risk
Neutral	0%	100%
Weak+	10%	90%
Weak	20%	80%
Weak-	30%	70%
Very Weak+	40%	60%
Very Weak	50%	50%
Very Weak-	60%	40%

We take into account two further, more qualitative, considerations in determining our final Macro Profile: Funding Conditions and Industry Structure.

Funding conditions

Why they matter

Financial institutions' maturity transformation role makes them highly vulnerable to withdrawals of funding following loss of market confidence. In some cases, that loss of confidence may be idiosyncratic. However, funding problems often develop at the level of a given banking system, when concerns about the health of financial institutions are generic rather than confined to individual banks. This can also reflect the considerable information asymmetry 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., maturity mismatch taken on, 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 measure them

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 a useful insight into the emergence of system-wide problems and can ultimately change banks' fundamentals through eroding profitability or forced deleveraging in response to more costly or scarce funding. In view of the above, we may consider relevant indicators of funding for countries as indicators of system-wide funding stress before it becomes evident in bank-specific indicators.

Indicators may relate to the quantity or cost of funding available to banks. They necessarily 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 LIBOR-OIS spread, which is the difference between a bank borrowing rate (LIBOR), which exposes lenders to counterparty risk, and the overnight indexed swap (OIS), which as a swap does not generate initial counterparty risk. The difference between these rates is, therefore, indicative of the market perception of credit and liquidity risk in the interbank market. Where this measure changes rapidly – as it did in 2007 and 2008, this can be indicative of a market-wide funding problem that can affect all banks funding in the given currency.

» **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 in order to minimise risk. It can also indicate the activation of extraordinary support operations in response to funding stress.

Where any of these factors changes suddenly for the worse, we may adjust downwards the overall Macro Profile to incorporate this funding element. However, we expect to do so only where such changes are material and sustained to the extent that they are likely to impact fundamentals.

We also consider potential upward adjustments. We may upwardly adjust our scores 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).

Industry structure

Banking sectors may exhibit structural characteristics that may indicate strengths or vulnerabilities. These may include under or overcapacity, financial innovation, liberalisation, 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

liberalisation matter because while they can bring long-term benefits, they often act as a trigger for a period of rapid credit expansion.

How we measure it

Overcapacity is difficult to measure; hence, we incorporate this factor as a qualitative adjustment to the overall Macro Profile. One indicator is the level of concentration within a banking sector, with highly fragmented systems often suffering from overcapacity. We consider concentration as measured by Herfindahl-Hirschman indices[22] and the combined domestic market share of the system's five largest banks, for example. However, generalisations are difficult 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 regionalised 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, for example, public sector-owned or sponsored institutions, and some mutual banks. For example, we have observed such effects in Germany (due to the prominent role of the large and historically favoured state-owned Landesbanken) and China, where Local Government Financing Vehicles distort the bank financing market. Again, the extent to which such a presence results in a harmful market distortion depends on its nature, not just its extent. Therefore, where we consider that such an influence has a negative effect on the industry, we may adjust our score.

It is difficult or impossible to set fixed indicators to identify innovation, as by definition each wave of innovation is new. However, significant changes to legislation or increases in innovative structures are typically considered warning signals that may lead us to adjust our score.

We take into account liberalisation and innovation by considering the barriers to entry within a system, modifications to banking regulation that may result in changing underwriting standards, or new channels of credit intermediation. 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 hoarded capital. The ending of capital controls can have a similar impact. This was the case in Sweden in the 1980s and New Zealand in 1984, for example. Use of off-balance-sheet or non-bank vehicles can also indicate innovation related to higher appetite for risk. This was the case during the recent crisis, as shown by the sharp growth in "shadow banking" in the form of securitised credit, especially in the US. "Shadow banking" is intrinsically difficult to identify and measure, and our judgment will be guided by our knowledge of the variety and prevalence of off-balance-sheet vehicles within the banking sector. Current regulatory initiatives may also result in more data being available on the composition and growth of this sector.

Overall Macro Profile

We take the average of our economic, credit and institutional scores together with any adjustments in respect of Funding Conditions and Industry Structure adjustment factors to produce an overall Macro Profile. Below we show our initial estimates of Macro Profiles for the banking systems of selected major economies; for a full list of banking systems, please see Appendix 4: Initial estimates of Macro Profiles.

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[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.

EXHIBIT 11
Estimated Macro Profiles for Selected Major Economies[23]

| Country	Banking Country Risk	Credit Conditions	Funding Conditions	Industry Structure	Macro Profile
AUSTRALIA	Aaa - Aa2	Neutral	-1	1	Very Strong
CANADA	Aaa - Aa2	Weak	0	1	Very Strong -
FRANCE	Aaa - Aa2	Neutral	-1	0	Very Strong -
GERMANY	Aaa - Aa2	Neutral	0	-1	Very Strong -
UNITED KINGDOM	Aaa - Aa2	Neutral	0	-1	Very Strong -
UNITED STATES	Aaa - Aa2	Weak +	1	-1	Very Strong -
JAPAN	Aa1 - Aa3	Weak	0	0	Strong +
KOREA	Aa1 - Aa3	Weak +	-1	0	Strong +
MEXICO	A1 - A3	Neutral	0	0	Strong
SAUDI ARABIA	Aa3 - A2	Weak +	0	0	Strong
BRAZIL	A2 - Baa1	Weak +	0	-1	Moderate +
CHINA	A1 - A3	Weak -	0	0	Moderate +
ITALY	A1 - A3	Weak	-1	0	Moderate +
SOUTH AFRICA	A2 - Baa1	Weak +	-1	0	Moderate +
SPAIN	A1 - A3	Weak	-1	0	Moderate +
INDIA	Baa1 - Baa3	Neutral	0	-1	Moderate
INDONESIA	Baa2 - Ba1	Neutral	0	0	Moderate
TURKEY	A3 - Baa2	Weak	0	0	Moderate
RUSSIA	Baa3 - Ba2	Neutral	0	0	Moderate -
KAZAKHSTAN	Baa3 - Ba2	Neutral	0	-1	Weak +
AZERBAIJAN	B1 - B3	Neutral	0	0	Weak -
ARGENTINA	B3 - Caa2	Weak	0	0	Very Weak +
EGYPT	B2 - Caa1	Very Weak +	-1	0	Very Weak
CYPRUS	Baa2 - Ba1	Very Weak	-3	0	Very Weak -
UKRAINE	Caa2 - C	Weak +	0	0	Very Weak -

Assessment of Financial Profile

The second component of our analysis focuses on the bank's financial fundamentals, as the next step in estimating the institution's exposure to shocks and its capacity to absorb them. Our assessment focuses on the twin fundamentals of solvency and maturity transformation (liquidity):

» "**Solvency**" – The combination of a bank's risks, and its capacity to absorb any resultant losses from capital and profit generation.

» "**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 12). 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 counterparties' perception of the bank's solvency and the quality of its assets. The quality of its assets depends on its ability to fund them: if a bank has to dispose of assets ahead of their contractual maturity, then it may not realise book value for them, resulting in losses and, hence, a reduction in capital. This is a fundamentally unstable equilibrium which, when disturbed, can result in the very rapid erosion of bank creditworthiness.

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[23] As of August 2014.

EXHIBIT 12

Solvency and Liquidity Are Interrelated
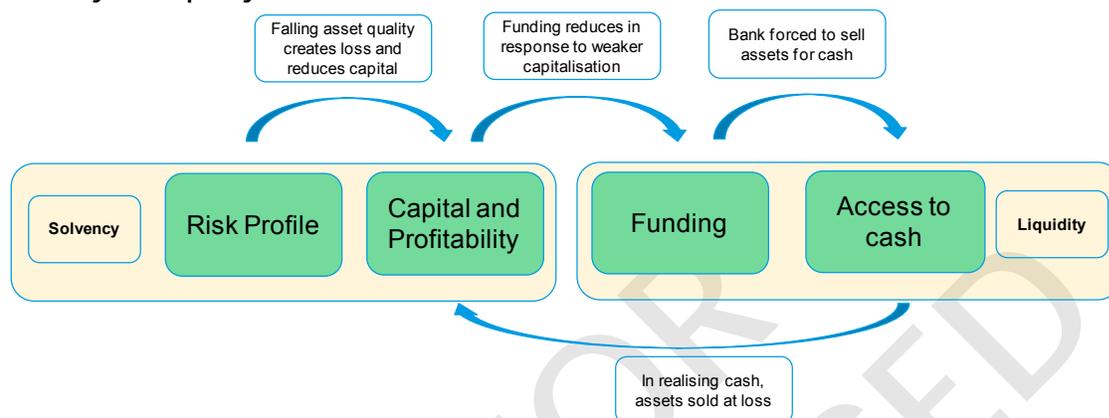
In the first instance, we gauge each factor using broad measures. In so doing, we consider "gross risk", and "risk mitigants". For the solvency factor, gross risk is a measure of loss potential (chiefly from credit, market and operational risks). Its mitigants are the bank's capital and other reserves, which are designed to absorb losses arising from the asset side, and its profitability. For the liquidity factor, we gauge gross risk according to the use of less reliable funding, typically that sourced from professional uninsured counterparties, 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.

In principle, these factors can be assessed in a systematic fashion through an analysis of standard financial ratios with empirical predictive power. In all cases, we seek to strike a balance between the availability and likely consistency of data and the degree to which financial ratios are suitable to the wide variety of banks within our rated universe. This precludes – in the short term at least – the systematic use of certain ratios, such as the Basel Committee on Banking Supervision's Common Equity Tier 1 ratio, proposed Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), pending greater certainty of definition and universality of adoption. Our Rating Committees seek to interpret and understand the ratios selected, and will typically consider additional data that are bespoke to individual banks or systems, where those data are needed to illustrate the risks to which an institution or sector are exposed. Rating committees' opinions, as expressed as scores, are, therefore, reached with due consideration of a variety of relevant measures and other factors. This process is described below.

Historical period

The ratios below are by definition derived from historical financial statements. These necessarily fluctuate over time, and their significance varies. For the problem loan ratio and profitability ratio, we review the latest three year-end ratios as well as the most recent intra-year ratio where applicable, and base our starting point ratio on the weaker of the average of this period and the latest reported figure. This reduces the inherent cyclicality of these ratios while ensuring that we capture sudden deterioration. Improvements thereby have a slower impact, which reflects our view that they should be proven over time. For the capital ratio, we use the latest reported figure. For the funding structure and liquid asset ratios, we use the latest year-end figures as we believe them to be the most representative and reliable.

Integration of the Macro Profile

Each ratio is initially mapped to one of 15 categories, ranging from Very Strong+ to Very Weak-. This provides a *relative* ranking of ratios across the global banking sector. In order to determine the score on the "aaa" to "caa3" scale, we take into account the relevant Macro Profile for the institution. This represents our judgment of the overall Macro Profile of the bank, and is based upon the Macro Profiles of the various countries in which it operates, in proportion to its exposures. In this way, each score incorporates the environment specific to the bank's activities. For example, two banks with the same capital ratio would receive different capital scores depending on their Macro Profile (see Exhibit 13).

This relationship is also structured such that banks in the weakest system do not receive unadjusted scores above b1, while banks in the strongest system can receive unadjusted scores from aaa to caa3. This 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 and, hence, our BCAs are more sensitive to changes in its idiosyncratic credit characteristics. Scores can, however, be adjusted beyond these ranges in either direction, if individual circumstances justify such movement. We will assign individual factor scores of "ca" or "c" in cases where we expect a given factor to lead to the imminent failure of the institution. In such cases, the overall Financial Profile is driven by this "weakest link" and is likewise "ca" or "c".

EXHIBIT 13
Relationship Between Financial Ratio, Macro Profile and Initial Score

		VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
Macro Profile	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

(Financial Ratio — column header spanning all ratio columns)

Our expectations

Each solvency score (asset quality, capital and profitability) is driven not only by historical data, but is also subject to our forward-looking expectations and scenario analysis. We, therefore, expect to use these forward-looking ratios and trends in our scoring process. For example, if a bank has recently raised significant capital, then the post-issuance ratio is more significant than the historical one. On the other hand, where a problem loan ratio is rising rapidly, our score will be heavily influenced by the ratio that we anticipate will be reached over the 12- to 18-month outlook horizon. We expect to develop our framework further for determining expected asset quality, capital and profitability ratios as we refine our forward-looking loss expectations. For more details, please see Appendix 3: About Our Bank Ratings.

We do not routinely produce forward-looking funding and liquidity ratios, but our scoring typically anticipates directional shifts, especially where we anticipate 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, for example, a rapid loss of deposits and/or liquid assets.

Other factors

Moreover, we routinely consider a host of other related metrics and factors in assigning our scores. As each ratio must be seen in its proper context, we consider the underlying factors that have or are likely to influence their evolution, their positioning relative to peers, and the rate at which they are changing. Indeed, it is often sudden changes, whether in financial ratios or strategies, that signal a shift in credit-risk profiles. Such factors can heavily influence our judgments that determine the BCAs we assign.

Below we discuss the individual factors and our scoring in greater detail.

1. Solvency

As described above, we measure solvency as the combination of gross risk (overall Asset Quality, chiefly determined by credit, market and operational risks) and loss mitigants (capital, earnings and provisions). Our analysis is structured accordingly.

EXHIBIT 14
Scorecard Structure – Solvency
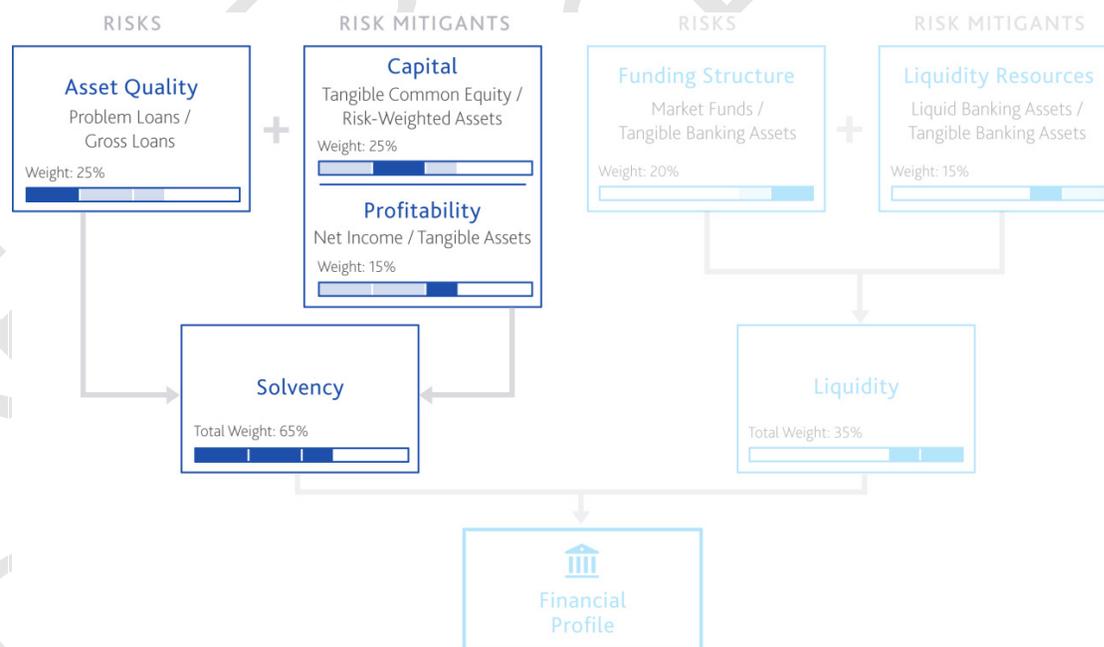
A. Asset Quality (25%)

Why it matters

A bank's asset quality is fundamental to its creditworthiness because its high leverage implies that a small deterioration in the value of its assets 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:

» Deteriorating collateral value backing loans (as seen in the commercial real-estate markets in many countries over long periods).

» Reduced ability to keep up with mortgage payments on the part of homeowners (for example as seen in the USA in 2007-09).

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

» Changing legal framework and social attitudes to personal debt resulting in higher losses (e.g., on credit cards in South Korea in 2003).

How we measure it: Problem loans/gross loans

We believe that these risks are captured, to a considerable degree, by a single financial ratio, problem loans/gross loans (which we term the problem loan ratio). As loan quality deteriorates, the problem loan ratio rises, signalling potential problems, credit losses and consequent pressure on solvency that disadvantages bondholders by reducing the earnings and equity capital buffers that protect them.

This measure has been shown to be useful in predicting bank failure in a variety of contexts. Our own study shows that during 2006-12, differences between banks' problem loan ratios were an effective way of identifying those banks that subsequently required support.

Similarly, numerous academic studies show that both the relative level and the rate of change of the problem loan ratio were relatively reliable indicators of future distress.

We therefore use the problem loan ratio as the starting point for our analysis and to position our initial score using the grid shown in Exhibit 15.

EXHIBIT 15

Scoring Problem Loans / Gross Loans

VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	>
0.5%	0.75%	1.0%	1.5%	2%	3%	4%	5%	6%	8%	10%	15%	20%	25%	25%

Other Asset Quality considerations

We consider the broader context within which each bank operates, as well as other relevant factors that influence these banks' asset quality. These other aspects are often more difficult to measure objectively and consistently, or are subject to considerable interpretation. For this reason, they are not determined with respect to a fixed scale, but are considered by our Rating Committee and our resulting judgments are included in the assigned Asset Quality score.

Loan growth

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 higher than the market average. Higher-than-average loan-growth rates suggest lower underwriting standards and a more aggressive strategy, the consequences of which in terms of asset quality are only revealed in a downturn.

Loan growth in excess of 10% per annum over a three-year period will typically trigger closer analysis to help us gauge whether this indicates deteriorating asset quality. In this analysis, we will consider both the origin and nature of the growth, together with any mitigating factors, such as rapid nominal GDP expansion. Our analysis will consider in particular the bank's loan growth relative to the relevant markets, and growth in any particular categories we consider to be higher risk in the given

banking system. In general, we would expect to adjust negatively our Asset Quality score where the loan-book growth rate exceeds the relevant market benchmarks by more than 50%. Where high-risk loan categories exhibit absolute growth over 10% per annum or exceed growth in the local market by more than 50%, we may also negatively adjust our Asset Quality score. In assigning the final score, we take 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 already effectively captured in our macro profile factor.

» **Timing**. Faster-than-average growth matters more at the peak of the market than at other times.[24]

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

Banks exhibiting loan growth in excess of 10% or more than 50% above the local market are unlikely to be assigned Asset Quality scores above "baa", without other mitigants. Banks with particularly high loan growth are unlikely to be assigned Asset Quality 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 to be highly prudent.

Credit concentration

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

» A small group of counterparties;

» A single industry sector; and

» A limited geographic area.

This is fundamental to bank analysis 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. Conversely, 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.

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, but measuring the effect it has, reliably and consistently, is not possible due to its inherent complexity. If a bank serves a number of countries, for example, this offers some diversification. However, the extent of diversification will depend on the linkages between the countries, the distribution of the exposures to these countries, and their population (small countries usually offering less diversification than larger ones).

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

We also consider sectoral 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 to certain sectors, including to other firms in the financial sector. However, not all concentrations are equal, as some industry exposures are riskier than others (for example commercial real estate, due to its particular cyclicality that prompts high loss volatility).[25]

Some banks may display other forms of credit concentration, outside the loan book. These assets 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, however, they are held at fair value and as such are not included within non-performing or impaired loan metrics; even so, their risk can be high and "fair values" difficult to measure.[26]

In the absence of standard global industry definitions, it is not possible to define a precise ratio for measuring sector concentrations. For this reason and due to the confidentiality arrangements that exist between banks and borrowing customers, assessing concentration risk is an inexact exercise, and may be informed by discussions with issuers.

A positive adjustment to the Asset Quality 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 TCE), with no single dominant sector exposure (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. Again, this will depend on the starting point score and the nature of the exposures in each case. Banks with low problem loans, a very broad geographic and sectoral spread, and no major single-name concentrations may achieve an Asset Quality score in the "aa" category, in the absence of other constraints.

However, we may reduce our Asset Quality score where we perceive that 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 of such guidelines being met for one or more category of concentration, we would be likely to assign a lower solvency score, and where concentration is considered severe, the assigned Asset Quality score is unlikely to be above the "ba" category, without other mitigants.

Long-run loan-loss performance

Ultimately, the cost of problem loans has to be met through income statement impairment and charge-offs. While the timing of these costs 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, then we would consider adjusting the solvency score to take this into account, because the problem loan ratio may reflect short-term cyclical factors more than long-term fundamentals. This would likely be the case, for instance, for a bank providing credit card finance, which is characterised by high loss rates but not necessarily high problem loans since bad debts are charged-off rapidly. On

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[25] 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.

[26] For example, certain structured credit assets generated significant losses for banks, and were a major factor behind bank failures since 2007.

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 general, by "long-run", we mean approximately 10 years or a period covering a business cycle, i.e., including a period of asset-quality problems. 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 – this suggests that asset quality is generally good and stable and supportive of a relatively high Asset Quality score 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 Quality score in the "ba" range or lower, depending on other factors. Where a bank loses much 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.

Problem loan definition

Our view on coverage is also affected by our judgment of the reliability of the measure of problem loans, which depends, in turn, on local accounting standards, regulatory requirements and a bank's interpretation of them. We may thus adjust scores to take into account differing accounting definitions and supervisory and legal practices. In jurisdictions where we believe definitions of problem loans to be relatively narrow, there is a greater risk of understatement of problem loans, and we may adjust our score accordingly based on our judgment.

Moreover, in some countries, legal practices mean that there is a short time lag between recognition of a problem loan and charge-off. This means that problem loans can be very low at a given point in time, yet problem loan formation is high and thus the problem loan ratio itself understates the riskiness of the portfolio. By contrast in other countries, problem loans tend to be retained on balance sheet for extended periods – in some cases for several years. This leads to high reported problem loans, but assuming they are provisioned appropriately, there may be little residual risk. Adjusting for such differences according to a single global scale is not possible. Therefore, we expect to use our judgment, informed by the rate of problem loan formation, our understanding of local problem loan management and legal practices, and their impact on the bank's economic position.

We may therefore upwardly adjust our solvency score when we consider that problem loans are overstated. On the other hand, where problem loans appear to be understated, we may reduce our Asset Quality score to reflect this underreported risk.

Non-lending credit risk

Banks' credit risk is not always restricted to their loan books. Some banks undertake leasing activity, for example, where risk is principally related to residual value, or hold portfolios of corporate bonds. Risks of this nature are not typically well captured by problem loan or impairment charge metrics.

As such, we consider information on residual value and other forms of non-lending credit risk in order to assess these risks. This may lead to us adjusting our score to incorporate credit risk embedded in leasing or securities portfolios. Where we consider such risks to be material (for example, with long-run losses consuming an average of 10% or more of pre-provision earnings) then we consider reducing our Asset Quality score by one or more notches. This would be particularly relevant where potential losses are well above this threshold, unless the starting point ratio is sufficiently low (e.g., in the "ba" category or below) that we consider that this additional risk does not materially further affect our view of Asset Quality.

Market risk

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 realise 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 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 modelling and valuation approaches,[27] raising concerns about consistency. Indeed, during the recent financial crisis losses often bore little relation to estimated VaR. This partly reflected insufficient data in the VaR models, which did not adequately capture past stresses, and was also because some instruments included in the calculation were assumed to be liquid but subsequently became impaired and illiquid.

Investment risk is typically not subject to trading VaR models because by definition it is for the longer term rather than for trading. Disclosure can be poor and is typically limited to balance-sheet values. The related risk depends on the nature of the instrument held (debt/equity, etc.) and its inherent riskiness.

Structural interest-rate risk can arise in the banking book where there are mismatches in interest 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 modelled impact on either net interest income over a given period or the impact on the net asset value of the bank. It is subject to limited disclosure under Pillar 3 of Basel II but is rarely analyzed or presented on a consistent basis and for this reason, together with the technical difficulties in assessing this risk, it does not currently 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.

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 very long duration and

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

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.

As such, market risks are not captured in our initial Asset Quality score, which therefore implicitly assumes that such risks are not material. Therefore, we may adjust the Asset Quality score downward to take into account our judgment of the extent of market risk. To this end we consider other indicators and guidelines as follows:

» **Size of cash trading book**. A trading book of more than 10% of total assets would typically be indicative of a material source of risk.

» **Contribution of trading revenues**. A bank where more than 10% of revenues over time are derived from trading revenues would typically be indicative of significant market risk. Debt and equity underwriting fees may also be indicative of 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 be indicative of a high level or a significant shift in trading risk.

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

» **Significant investments**. Identified long-term investments totalling more than half the bank's TCE may give rise to 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 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 factors individually and collectively influence our opinion of a bank's Asset Quality. They are all the more important when a bank is relatively less active in lending, and where the core problem loan ratio becomes therefore less relevant. In assessing the various market-risk indicators above, we form a view as to whether they indicate elevated market risk. For a universal bank, or a retail bank with a modest amount of interest-rate risk in the banking book, market risk may not affect the Asset Quality 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 Quality 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 Quality score in the "ba" or "b" category.

Operational risk

Some banking activities carry significant "operational risks". This is commonly defined as "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk but excludes strategic and reputational risk".[28] We do not capture this risk in our initial solvency score and is difficult to measure satisfactorily, with regulatory risk measures varying considerably.[29] Nonetheless, we believe this risk can be material for banks.

For example, in general, we believe that capital markets activities are highly exposed to operational risks, because of the following elements:

» It is common for individuals 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 these fraudulent activities over the last 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. This makes them more inclined 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, this occurs 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 sensitive to reputational issues. Retail banking, as noted above, 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 to most business activities and to a certain extent it is a "given". We are unlikely to adjust our Asset Quality score upwards based 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 environment give rise to an elevated level of operational risk, we may reduce our Asset Quality score. Banks where we consider operational risk to be elevated because of their business model are unlikely to be assigned Asset Quality scores above the "baa" category. We may assign lower scores to banks with exposed operational risk fragilities, depending on the extent and nature of the issues.

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[28] *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".

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

B. Capital (25%)

Why it matters

Capital and Asset Quality go hand-in-hand because the greater the risk of unexpected loss, the more capital a bank needs to hold to shield bondholders. This capital, in turn, generates the creditor confidence enabling the bank to fund itself.

How we measure it: Tangible common equity/risk-weighted assets

There are many different ways of measuring bank capitalisation. Since the introduction of the first Basel Accord in 1988, the most popular measures of determining bank capitalisation 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 for which the regulatory measures of risk, especially those that relied on internal models, gave an overly optimistic view of credit risk (denominator understatement), and gave 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.[30] We recognize that regulatory metrics are still subject to further refinements in the coming years. Nonetheless, we also believe that RWAs merit a place within our lead ratios because:

» In our failure study, the TCE/RWAs measure was the most predictive indicator of failure amongst a number of other measures, including an un-weighted leverage measure;

» There remains in our view a broad correlation between the riskiness of assets and their risk-weighting, despite acknowledged weaknesses and inconsistencies; and

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

Our numerator, TCE, excludes equity credit from hybrid instruments, excepting those that provide equity-like loss-absorption capacity *before* the point of non-viability; i.e., high-trigger contingent capital instruments[31]. This is because our BCA, which is the starting point for rating non-viability contingent capital securities, is informed by this ratio, and is designed to reflect the risk of impairment on those hybrids themselves likely to be impaired at the point of non-viability. However, we do consider all other hybrids in our Loss Given Failure analysis for banks subject to Operational Resolution Regimes, which assesses the varying protection available for subsequent debt classes after a bank's failure. Our TCE measure also caps the contribution of deferred tax assets at 10% of the total and excludes unrealised gains and losses on securities. It is thus close to the narrowest and now most prevalent regulatory measure of capital, Common Equity Tier 1 capital.

In establishing initial scores, we use two scales depending on whether the bank's RWAs are calculated according to Basel I or Basel II, based on the average risk-weighting differentials between the approaches. We expect to establish a definitive scale for banks under Basel III once disclosures allow us to establish a broad equivalence between risk-weighted assets under different approaches, although at this stage we do not expect the difference to be significant.

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[30] See http://www.bis.org/bcbs/basel3.htm.

[31] This definition will lead to certain changes regarding the application to banks of our Cross-Sector Ratings Methodology, *Revisions to Moody's Hybrid Tool Kit*, published July 1, 2010.

EXHIBIT 16
Scoring Tangible Common Equity / Risk-Weighted Assets

	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	<
Basel I	23.8%	21.4%	19.0%	17.1%	15.7%	14.3%	12.9%	11.4%	10.0%	8.6%	7.1%	5.7%	4.3%	2.9%	2.9%
Basel II	25.0%	22.5%	20.0%	18.0%	16.5%	15.0%	13.5%	12.0%	10.5%	9.0%	7.5%	6.0%	4.5%	3.0%	3.0%
Basel III	25.0%	22.5%	20.0%	18.0%	16.5%	15.0%	13.5%	12.0%	10.5%	9.0%	7.5%	6.0%	4.5%	3.0%	3.0%

Other capital considerations

As explained above, we consider our TCE/RWAs ratio to be a strong indicator of capitalisation, but we assign our Capital score in the context of other measures of capitalisation. The following indicators, while not exhaustive, are typical of those considered by our Rating Committees and we incorporate their resulting judgments in our assigned score.

Nominal leverage

In our analysis, we also consider TCE/ Tangible Assets.[32] This offers a complementary, un-weighted view of capitalisation independent of regulatory measures. The ratio ignores risk-measurement but is nonetheless valuable because it is sometimes the case that risk-measurement metrics fail precisely at the point of greatest stress. The ratio also provides a useful "backstop" measure of capitalisation and guards against "model" risk. This is despite the fact that it is distorted by some accounting differences, does not properly capture off-balance-sheet and more exotic risks, and typically overestimates risks from lower risk assets, such as government bonds, reverse repos and mortgages.

» 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 one notch, but occasionally more where we consider that nominal leverage is indicative of a robust level of solvency not fully reflected in our lead TCE/RWAs measure.

» When TCE/ Tangible Assets is less than 5%, this would lead us to consider a negative adjustment and such banks would not usually be scored higher than "baa", even when the lead ratio indicates otherwise.

» When TCE/ Tangible Assets is less than 3%, this would typically lead us to position the capital score not higher than "ba".

» When TCE/ Tangible Assets is less than 2%, this indicates a very high degree of nominal leverage and we would typically position the capital score not higher than "b".

Regulatory minima

In assigning our capital score we consider regulatory minimum requirements. This is important because apparently sound regulatory capital ratios can give a misleading view of the distance to resolution proceedings, broader non-viability concerns and potential default 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 score to take into account that 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 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". And where it is 1% or less, the score would be unlikely to exceed "b". These

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[32] See Appendix 5 for definitions.

considerations would also take into account the kind of actions that we might expect to take place on breach of the minima. 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

Our considerations of capital also take into account the quality of TCE. As TCE only comprises 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 such "ex ante" loss absorption. It excludes items of doubtful ability to absorb losses in a resolution, such as goodwill intangibles and deferred tax assets beyond 10% of total TCE, and hence is restricted to relatively high quality items.

Nonetheless, we may adjust our Capital score where we consider that our base measure under- or over-estimates the value of certain items. For example, we may upwardly adjust our Capital score based on the estimated modified capital ratio, where we believe deferred tax assets have a very high likelihood of being realised[33]. Similarly, where unrealised losses incorporated within TCE are in practice highly unlikely to be realised thanks to sound underlying asset quality and a funding profile allowing a bank to hold them to maturity, then we may likewise adjust the capital score based on the modified capital ratio, neutralising a portion of the losses.

Conversely, we may downwardly adjust our capital score if we believe that unrealised gains incorporated in TCE are of doubtful quality. In this case, we may assign a capital score reflecting the TCE/RWA measure excluding such gains. We may also adjust our score to take into account other items of doubtful quality.

Capital fungibility

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. This means that published 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) limits the proportion of TCE available to support banking risks.

Internal capital fungibility is hard to measure and as such the assessment is essentially qualitative. We may reduce our overall solvency score, if we believe there are significant regulated subsidiaries with higher solo capital requirements than are applicable to the group – resulting in "trapped" capital. The scale of this adjustment depends upon the initial capital score and the extent of the impediments to capital fungibility.

Access to capital

We consider a bank's ability to access fresh capital in the case of need. Where a bank raises fresh capital in the private markets, we do not consider this as an act of "external support" *per se* – although it may indicate that it is close to needing such support. This is because where a bank raises money from private shareholders in a rights issue, for example, it does so based on its own merits; investors have a choice whether to subscribe or not 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.

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[33] 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.

For this reason, a bank's ability to raise private capital is a further consideration – the greater a bank's ability to raise capital, the better able it is to avoid requiring external support. For listed banks, this depends on investor appetite. This can be gauged in part by its market value relative to its book value. The more a bank's market capitalisation exceeds its reported book value, the more easily it can raise capital, other variables being equal. However, when a bank's market capitalisation is below book value, this becomes more difficult as existing shareholders' are diluted to a greater degree by the new investment.

We may adjust our Capital score in view of this. In general, where a bank's market value is below its book value, we may consider a one-notch reduction in our Capital score to reflect the potential hindrance to raising new equity. The likelihood of such a reduction becomes greater, the lower its market value to book and 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 to provide additional funds as well as sufficient self-interest in maintaining capital ratios to facilitate the provision of additional capital in the case of need. Where this is not the case, we may reduce our Capital score. For mutual banks, our Capital score may be adjusted downwards to reflect the institution's potential inability to raise significant fresh capital in case of need, given its corporate structure.

Problem loan coverage

A proportion of a bank's loans will almost certainly become impaired and create losses. This is inherent to banking, and banks thus provide a certain level of provisions in expectation of these losses. Strong loan-loss reserve coverage may mitigate the risk of problem loans, whilst low levels of coverage, conversely, expose banks to the risk that losses may be higher than expected.

Our view takes into account the nature of the impaired assets. 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 not need more than a low level of provision coverage in view of supporting collateral.

Where we perceive that loan-loss provisions and high-quality collateral exceed problem loans by a considerable margin – for example twice the level of problem loans – we may consider this a further source of reserves and loss absorption, and which could lead us to revise our Capital score upwards. We would, however, be unlikely to make an upward adjustment simply because problem loans are very low at a point in time, because small numbers can rapidly change and are less meaningful.

We may, conversely, consider negatively adjusting our Capital score when we assess 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 meaningful relative to capital (for example, over 25% of TCE). However, this notching could widen if we considered that latent losses on reported problem loans were likely to exceed provisions significantly with a material impact on capital.

C. Profitability (15%)

Why it matters

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

How we measure it: Net income/total assets

Our measure of profitability is net income (post-tax and our adjustments) relative to total assets. We found that this ratio had predictive qualities during the recent crisis and score it as follows (see Exhibit 17).

EXHIBIT 17

Scoring Net Income / Total Tangible Assets

VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
>= 2.5%	>= 2.25%	>= 2.0%	>= 1.75%	>= 1.5%	>= 1.25%	>= 1.0%	>= 0.75%	>= 0.5%	>= 0.375%	>= 0.25%	>= 0.125%	>= 0.0%	>= -1.0%	< -1.0%

Other profitability considerations

Our Rating Committees will typically assess a range of other factors in assigning a profitability score, notably in order to assess the quality of earnings, which can strongly influence a bank's long-run ability to absorb losses.

Earnings stability

A relatively high degree of more 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, for example, gives less comfort as there can be less certainty that such earnings will be available to absorb losses at the point of need. In practice this is likely to favour retail and commercial institutions with a stock of income-generating assets over wholesale banks subject to more volatile flows of business.

This consideration can be considered analogous to an assessment of a bank's franchise strength. While we do not consider a high market share to increase a bank's creditworthiness in and of itself, 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 hence the bank's strong position is less favourable from a credit point of view.

This is a qualitative judgment based on our view of a bank's business model and the reliability of its income streams. In each case, we consider both historical performance and our expectation of future performance. This enables us to take into account acquisitions and divestments, as well as changes in the environment.

Where we consider earnings volatility to have 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 – then we may positively adjust our score to integrate this strength. Where we believe earnings volatility to have been relatively high – for example, a standard deviation of 50% or more – then we may negatively adjust our score to reflect this weakness. Such a bank is unlikely to have a Profitability score above "ba".

Overall solvency score

We combine the three sub-factor scores – Asset Quality, Capital and Profitability – to produce the overall solvency score in proportion to their respective weights in the Financial Profile (i.e., 25%, 25% and 15%, respectively). We place greater emphasis on Asset Quality and Capital as we see these as the biggest drivers of solvency problems and their mitigants, respectively. We place less weight on Profitability to avoid over-rewarding high-return, high-risk institutions, and in recognition of the limited cushion Profitability can provide to bank creditors. As explained above, we expect to assign a score of "ca" or "c" to any factor which appears to be the driver of an expected failure of the bank. In this case, the overall Solvency score will be aligned with this score, as indeed will the overall Financial Profile.

2. Liquidity

Our Liquidity assessment is the product of the bank's funding structure (based on which we judge the probability of the withdrawal of funding), mitigated by the presence of liquid resources that enable a bank to "bridge" such episodes without defaulting or recourse to extraordinary support.

Our overall liquidity assessment is therefore divided into two components, funding structure (a liability-side analysis) and liquid resources (an asset-side analysis).

EXHIBIT 18
Scorecard Structure – Liquidity
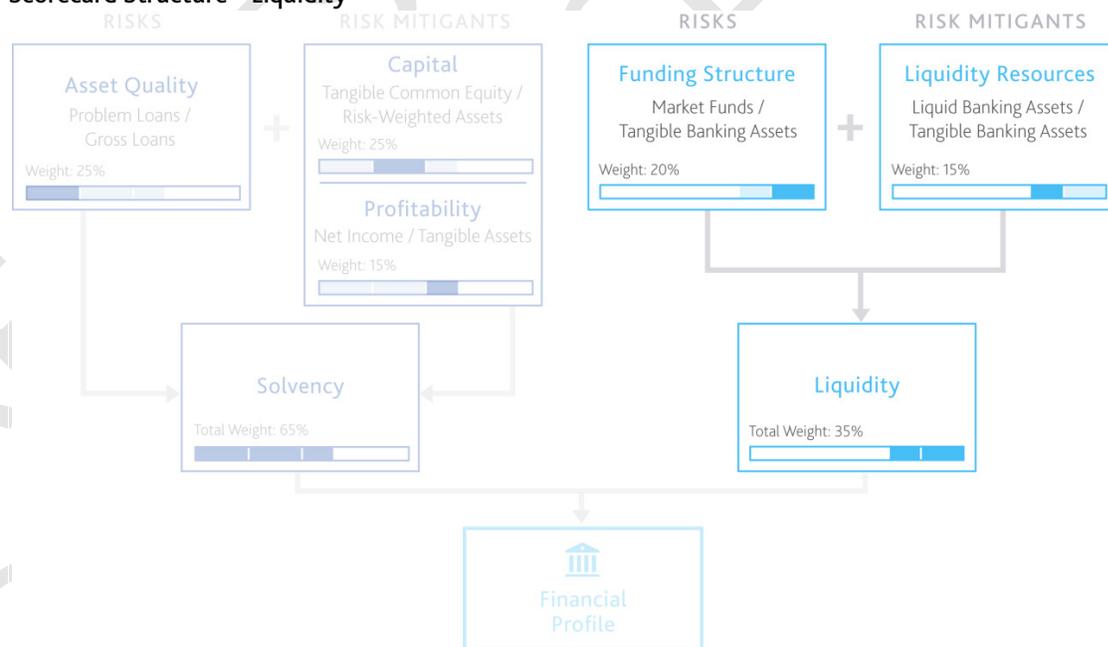
A. Funding structure (20%)

Why it matters

A bank's funding structure has a strong bearing on its potential need for assistance because some sources of funds are less reliable than others. This implies that a bank making significant use of an unreliable funding source – perhaps short-term in nature, from particularly risk-sensitive counterparties – is more likely to suffer periodic difficulties in refinancing its debt. All other variables being equal, this puts it at greater risk of needing support.

There are many different sources of funding, each with their own characteristics. At its most extreme, each retail depositor has a different tolerance for risk and as such 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 state backing for most depositors up to a certain amount. This backing implies that an insured depositor is theoretically indifferent to the riskiness 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.

However, we believe that, overall, retail deposits are typically more "sticky" (stable) than "wholesale" sources of funding, i.e., interbank funding, bonds and short-term commercial paper, which are more sensitive to changes in risk aversion and creditworthiness, and hence less stable.[34]

How we measure it: market funding/tangible assets[35]

Our primary ratio is market funds/tangible total assets. This ratio expresses the proportion of the balance sheet that credit-sensitive investors and counterparties fund; as such, it measures liability-side volatility and the resultant liquidity risk. We measure market funding with respect to adjusted total assets, rather than total liabilities, in order to give credit to equity (the difference between total assets and total liabilities) which is by definition a permanent funding source. This measure treats all sources of market funding as the same, except covered bond or equivalent funding of which we typically exclude 50% based on our view that it is materially less sensitive than market funding more generally, thanks to a combination of its typically long-dated and over-collateralized nature.

Our study has found that this ratio showed predictive qualities during the crisis: banks with relatively high reliance on market funding had a higher tendency to require support. We score this metric as follows (Exhibit 19).

EXHIBIT 19
Scoring Market Funding / Tangible Banking Assets

VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	>
2.5%	3.75%	5.0%	7.5%	10%	15%	20%	25%	30%	35%	40%	50%	60%	70%	70%

Source: Moody's

Funding structure adjustment factors

As noted above, the ratio that determines our overall initial Funding Structure score is not expected to capture the subtleties of a bank's funding structure. For this reason, we consider a series of other factors that influence the overall quality of a bank's funding position and hence our final score. Our framework for the assessment of these factors is set out below.

Quality of market funding

As already noted, our market funds assets ratio is a broad measure of the sensitivity of a bank's liabilities to more confidence-sensitive funding counterparties. It assumes that market-based funding is less reliable than deposit funding, which we believe is generally true. However, within the broad category of market funds, some are more credit sensitive than others. The drivers for the extent of this sensitivity are many and varied, and as such our assessment is based on more qualitative judgments derived from our perception of the characteristics of the different funding instruments and investor type.

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34   See, for example, IMF Working Paper 09/152.
35   See definition in Appendix 5.

We therefore aim to distinguish between different kinds of market funding as follows.

» **Foreign investors**. These are generally 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 that from domestic investors.

» **Money market funds.** These are relatively 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 between banks, distress at one bank is often shared by others, meaning that all banks tend to withdraw funding at the same time and reduce their exposure to others.

» **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.

» **Repo funding.** This kind of secured funding is supposed to be insensitive to the creditworthiness of the counterparty, being collateralised by securities, and hence conceptually reliable. 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 – small denomination bonds, domestic or covered bond investors – then we may increase our Funding Structure score, for example where the initial score is relatively low yet we believe this under-represents the reliability of funding. However, where we believe that market funding is skewed towards the most credit-sensitive investors – foreign money market funds, for example – we may reduce our overall liquidity score. 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 accounted for as 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 score. For example, some funding may be highly discretionary and short-term in nature, and therefore of weak contractual reliability – although we may consider provision of such funding as a form of Affiliate support. On the other hand, some groups have structural arrangements – for example, the "pass-through" of retail deposits – which make this funding extremely stable in

practice. In such cases, we may base our Funding Structure score on a ratio excluding this kind of financing.

Quality of deposit funding

Within deposit funding, we also distinguish based on the likely reliability of the depositors.

» **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 as customers depend on them for their daily transaction needs.

» **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. Simply by being larger, greater sums are controlled by a few individuals and, hence, the impact of withdrawal is higher. Moreover, if they exceed deposit insurance limits, they will be more sensitive to credit developments. This includes deposits by affluent and high net worth individuals.

» **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, being typically larger and uninsured. Their managers are, therefore, more credit sensitive than retail depositors. 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 which lend them certain stickiness. Deposits by small business 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 are typically behaviorally similar to interbank funds and money market instruments as their managers are typically highly sensitive to rates and risk.

We seek to gain an understanding of banks' funding bases through an analysis of public information and market characteristics, as well as discussions with issuers.

Based on this information, we may adjust the Funding Structure score. Where we believe that deposit funding is predominantly composed of small-denomination retail customers benefiting from deposit insurance, with a high proportion of checking accounts, and large, high net worth, institutional or corporate deposits are immaterial, we may raise our Funding Structure score. Where deposit funding is significantly composed of more credit-sensitive customers, for example institutional and corporate depositors, high net worth individuals, internet-based accounts, or there are significant concentrations to individuals, then we may reduce our Funding Structure score.

Term structure

By their very nature, banks tend to undertake maturity transformation, that is, borrowing short term (either in the form of deposits or wholesale funding) and lending long term. This is a source of inherent vulnerability, as explained above. However, the extent of such maturity mismatches varies.

Financial statements often, but not always, disclose the maturity of assets and liabilities by time band. Constructing a global scale for this mismatch is not possible as disclosure is inconsistent and, moreover, the behavior of assets frequently does not correspond to contractual maturities, and is in any case subject to considerable uncertainty.

The degree of matching of long- and short-term funding can also be measured by the Net Stable Funding Ratio (NSFR) envisaged by the Basel Committee.[36] However, this is not yet available on a consistent basis. We, therefore, consider the relation between "core" stable funding and illiquid assets. This is conceptually close to the NSFR and indeed the Net Cash Capital/Liquid Net Assets ratio that we use in our Global Securities Industry Methodology.[37] As such, we measure 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).

Off-balance-sheet commitments are another source of (contingent) 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 increase our Funding Structure score. This is because by design, the bank is able to run off its liabilities as its assets mature. However, we are unlikely to award high Funding scores to wholesale-financed entities even when match-funded. This is because we expect in practice their matching policy to be compromised when funding dries up as the bank 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 towards 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 ratio relative to long-term and illiquid assets, and in such instances, we could reduce our Funding Structure score. Where we consider that this deficit presents significant risks, we would likely position the Funding Structure score in the "ba" category or lower, in the absence of mitigants.

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[36] See http://www.bis.org/publ/bcbs188.htm
[37] See Global Securities Industry Methodology, published May 24, 2013.

Market access

We assume that where a bank has significant wholesale borrowing, it has access to funding markets in the normal course of business.

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, impacting profitability and/or restricting a bank's capacity to write new business on economic terms

» a shortening duration of liabilities, resulting in increased mismatches

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

A bank's funding capacity is sometimes hard to monitor accurately due to the fact that many debt issues 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 significantly more than would be expected for its rating, we may adjust our liquidity score 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 our issuer rating, or a low absolute level, we may judge that its market access is impaired, but this is subject to an analysis of local market conditions and interpretation. Where MIRs are not available or we deem them unreliable, perhaps due to illiquidity, we may consider funding spreads, reception of recent issues, or lack of issuance in the context of our knowledge of local markets, in order to judge market access. This analysis may lead us to reduce our overall liquidity 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 and indeed 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.

B. Liquid resources (15%)

Why it matters

An assessment of the liability-side structure of a bank has to be seen in the context of its asset side. A bank can reasonably borrow from credit-sensitive investors if it has corresponding assets in the form of high-quality liquid instruments that it can sell or repo for cash in response to its funding counterparts' changing behavior.

How we measure it: liquid assets/tangible banking assets[38]

Again, our starting point is a broadly defined ratio that we believe can be reliably calculated for banks globally. The primary ratio we use as our starting point is liquid assets/ tangible banking assets. This provides an offset to the market funding/ total tangible asset ratio above. Again, our own study shows that banks with relatively low levels of liquid assets had a higher tendency to require support (see Exhibit 20).

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[38] See definition in Appendix 5.

EXHIBIT 20
Scoring Liquid Assets / Total Tangible Banking Assets

VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW-
>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	<
70%	60%	50%	40%	35%	30%	25%	20%	15%	10%	7.5%	5.0%	3.75%	2.5%	2.5%

Source: Moody's

Liquidity resources adjustment factors

As noted above, the ratio that determines our overall initial Liquid Resources score is not expected to capture the subtleties of a bank's liquidity profile. For this reason, we consider a series of other factors that influence the overall quality of a bank's liquidity position and, hence, our final score. Our framework for the assessment of these factors is set out below.

Quality of liquid assets

On the asset side we believe it is important to take into account the quality and realisability of liquid assets, which are not homogenous.

For example, we disregard in our analysis assets that are encumbered, and assess the bank's access to high-quality unencumbered liquid assets that can both be readily sold or pledged for cash in private markets under virtually all market conditions, or in extremis be repoed with central banks under standard terms. Assets used in the course of market making and trading may not be encumbered but may have limited liquidity value as they cannot always be sold or pledged for cash without damaging the bank's ability to service its customers in its capital market activities, and as such may be partially excluded from our analysis.

We may reduce our Liquid Resources score, 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.

We may increase our Liquid Resources score, 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; or (2) assets that are of a very high quality nature (typically Aaa or Aa government or government-related bonds).

This analysis may also include a consideration of a bank's regulatory Liquidity Coverage Ratio (LCR) or equivalent[39], and in particular the High Quality Liquid Assets (HQLA) component of the LCR. 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 own assessment of liquidity based on the considerations set out above. However, where the LCR is at odds with our own assessment and, therefore, is indicative of a potential strength or weakness not recognized elsewhere, we may adjust our liquidity score to take such factors into account in our overall assessment. For example, we may consider potential cash outflows, such as the draw-down of lending commitments.

We perform this analysis based on public information, informed by a range of communications with rated issuers.

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

Intra-group restrictions

Sometimes a bank displays strong consolidated funding metrics but these conceal intra-group restrictions that materially reduce the bank's ability to maintain its liquidity and funding. For example, it may collect deposits substantially in a subsidiary but lend at the parent level. This creates a significant intra-group exposure as the subsidiary upstreams resources to its parent. While, in general, subsidiaries in the same jurisdiction as the parent bank are unlikely to be subject to restrictions, where the subsidiary is subject to different regulatory standards, perhaps in a different country, that regulator may impose different standards to the possible detriment of the parent. This may require a parent to seek less reliable market funding for its own balance sheet, despite the deposits at its subsidiary that are included in its consolidation.

This consideration is subject to considerable judgment as it depends on the attitudes of different regulators as well as the respective funding positions of banks within the group. It is thus not appropriate to design a global scale. However, we may reduce our overall liquidity score, 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.

Overall liquidity score

The overall Liquidity score is derived from the average of the Funding Structure and Liquid Resources scores, weighted proportionately to their respective weights in the overall Financial Profile, i.e., 20% and 15%, respectively. We place greater emphasis on Funding Structure relative to Liquid Resources in order to capture our view that a given increase in market funding entails an increase in the bank's credit risk profile beyond the mitigation offered by an equivalent increase in the bank's liquid resources. In this way, deposit-funded banks with low liquid assets but minimal market funding achieve higher overall liquidity scores than capital-market funded banks with high liquid assets but extensive market funding – reflecting our view that the latter are overall more vulnerable.

3. Overall Financial Profile Score

The above assessments of solvency and liquidity and the sum of the related adjustments result in combined scores for each factor. We combine these to produce an overall Financial Profile, expressed on our BCA scale from "aaa" to "c". In combination, Solvency factors account for 65% of the Financial Profile, while Liquidity factors make up the remaining 35%. This reflects our view that first, solvency factors are typically the root cause of banking failures, and liquidity problems the symptoms; and second, that even idiosyncratic liquidity risks are partially mitigated by central bank actions in the course of business.

Qualitative factors

As already noted, we believe that bank fundamentals can mostly be distilled to the two factors discussed above, Solvency and Liquidity. However, there are occasionally other bank-specific factors that we believe can influence these core fundamentals and which are less readily attributed to the various Solvency and Liquidity factors. These are typically qualitative in nature and, therefore, are not subject to ratio-based scoring, although in some cases our judgments may be informed by certain ratios. These are as follows:

» Business Diversification

» Opacity and Complexity

» Corporate Behavior

We discuss these other factors and our assessment of them below.

Business diversification

Business diversification matters because it gauges a bank's sensitivity to stress in a single business line. It is related to earnings stability in the sense that earnings diversification across different lines of business without strong correlation increases the reliability of the bank's earnings streams and, thus, its potential to absorb unexpected shocks within the income statement. However, it is distinct from asset diversification (considered under Solvency above). Moreover, it is important to consider business diversification separately from earnings stability because some "monoline" business models may demonstrate high stability over a number of years, but are clearly vulnerable to an eventual problem in the bank's chosen field of business as it has no other income streams to fall back upon. 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, therefore, adjust the Financial Profile 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 and would consider reducing the Financial Profile by a notch or potentially more in some cases. However, we do not consider full service retail banking to be a single activity, as it offers some degree of inherent diversity.

On the other hand we may consider a bank with an exceptional spread of businesses to benefit from a high degree of diversity that benefits creditors because the businesses lead to an overall more reliable earnings stream and, hence, greater certainty of capital generation and loss absorbency. To the extent to which this benefit is not already reflected in our earnings stability adjustment within our solvency score, we may increase the Financial Profile by one notch to reflect it.

Opacity and complexity

We believe that an institution's riskiness increases with its complexity, other things being equal. This is because complexity increases management challenges and heightens the risk of strategic and business errors (as distinct from classic operational risk already described above). In addition, complex organisations tend to be more opaque because public disclosures necessarily provide a simplified view of their operations. By contrast, a relatively simple bank can achieve more transparency with less disclosure.

Simplicity does not guarantee transparency, however. Some business activities are inherently more opaque than others, in our view. For example, we believe that capital markets activities (trading) while often highly complex, can also be relatively simple (in the case of equity brokerage, for example). Yet the associated balance sheet may still change rapidly, meaning that public disclosures rapidly lose relevance, resulting in higher opacity. We also believe 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.

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

» **Numerous business lines across many geographies and legal entities.** This brings diversification benefits discussed above, but also organisational 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 and/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 resulting "wrong-way risk". This can introduce vulnerabilities as problems at one institution are quickly "exported" to other institutions.

» **Unreliable accounting.** Some accounting standards offer greater confidence than others. Generally, we believe that US GAAP and IFRS offer high standards. However, some accounting standards are less demanding and, therefore, raise questions about the true value of a bank's assets and, hence, its solvency. 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 true value of a bank's assets.

We note that these features are often those of very large banking groups. While we do not necessarily consider size itself to be a negative credit factor, we may consider absolute balance sheet size as a potential indicator of complexity, which we would consider in more detail.

We may reduce our Financial Profile of an institution displaying any of these characteristics, typically by one notch but occasionally by more in extreme cases.

Corporate behavior

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

» **Key man 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 customers closely associate the chief executive with the institution itself could suffer loss of business, 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 and damage the 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 can all 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 rigour of Board or management oversight may also be considered here.

» **Dividend policy.** An aggressive dividend policy may imply reduced financial flexibility. Bank management teams are often slow to reduce established dividend levels out of concern over negative signalling and adverse share price impact. (The same can be said of share buybacks,

though to a lesser extent, as the timing and certainty of execution of even announced buyback programs leaves greater management discretion).

» **Compensation policy.** Similarly, an aggressive compensation policy, for example, widespread use of high bonus payments relative to salaries, and skewed towards cash, may encourage short-term risk-taking behavior to the detriment of bondholders.

» **Accounting policies.** Some banks, although subject to more demanding accounting standards (e.g., US GAAP or IFRS) adopt more aggressive policies. Accounting restatements also raise questions about the efficiency of accounting controls and, hence, the accuracy of financial ratios; in extreme cases, if a bank is required to restate its earnings then this can lead to funding counterparties losing confidence in management and the institution generally.

We may reduce our Financial Profile if we judge that any of these factors has a material bearing on the bank's overall risk profile. Typically, this would be one notch but could be more if we perceive multiple and/or more deep-seated and serious issues. We may also adjust our Financial Profile upwards, for example where we perceive sustained exemplary stewardship over time with 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 will seldom assign a BCA higher than the long-term local-currency rating of the sovereign country within which it is based.[40] Sovereign-related risks are generally captured through, in the first instance, our Macro Profile, and secondly, where relevant, our concentration adjustment. However, where the initial outcome of the BCA is nevertheless higher than the sovereign, the assigned BCA may nevertheless be constrained by the sovereign rating. This captures the risk that indirect exposures not captured in our concentration assessment may prove to be 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. This is because these factors 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. Credit issues at a parent entity can transmit risk to its subsidiaries through a number of channels. Four of the primary channels are:

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

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[40]   For more details, see our Cross-Sector Ratings Methodology, *How Sovereign Credit Quality May Affect Other Ratings*, published February 13, 2012.

» **Confidence sensitivity/contagion.** Parent credit issues could trigger a loss of confidence in other entities in the group, triggering a loss of market access and/or franchise damage at a subsidiary level. 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 factors, including the credit quality of the purchaser in a sale transaction, incremental leverage taken on in a sale/spin-off transaction or the ability of a subsidiary to effectively operate as a truly standalone entity in a spin-off transaction.

» **Shared infrastructure**. Often a parent and subsidiary bank will share key infrastructure, such as information technology systems and key control/operating functions including risk management and treasury. Breakdowns in these systems and business functions could have effects across an entire organisation.

We consider parent credit risk in our analysis of Scorecard metrics: notably, a large parental exposure would be considered as a potential adjustment factor in our consideration of credit concentration. Liquidity concerns at the parent level could lead us to adjust our liquidity score downward at the subsidiary, whilst our capital scores for a subsidiary that is not well ring-fenced may reflect the potential for upstream support that the parent might provide.

In some cases, however, we may judge that key methodology factors for the subsidiary do not fully capture risks related to parent credit issues. For example, risks related to confidence sensitivity contagion or heightened event risk related to parent credit risk issues may not be fully captured in our scores. In these circumstances, the parent rating might constrain the rating outcome for subsidiary banks. This requires a case-by-case qualitative assessment to ensure that the positioning of the subsidiary rating fully reflects the risk of parent credit issues.

In practice, we expect there will be very few cases where the BCA of a subsidiary bank exceeds the standalone rating of a parent bank by more than three notches. We may, however, see the notching between a parent and its subsidiary widen as the parent's BCA moves into the b1 to c range and evidence begins to emerge that provides greater clarity over the likely impact of its potential failure on the credit profile of the subsidiary. For example, progress towards the sale of the subsidiary to a more highly-rated entity could support a higher BCA for the subsidiary bank and, thus, wider notching from the parent's BCA.

Arriving at the BCA

Our BCA is essentially a function of three analytical components:

» Macro Profile;

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

» Qualitative Factors.

The BCA is expressed as a point on our BCA scale from "aaa" to "c". We expect to publicly disclose individual factor scores on a category basis, e.g., "aaa", "aa", "a", "baa", etc.

EXHIBIT 21
Example of a BCA Scorecard

Baseline Credit Assessment

Bank ABC
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 Quality						
Problem Loans / Gross Loans	2.0%	a1	↓↓	**baa**	Geographical concentration	Downward trend
Capital						
Tanigble Common Equity / RWA	8.5%	ba2	↔	**b**	Nominal leverage	
Profitability						
Net Income / Tangible Assets	1.0%	a3	↔	**a**	Earnings quality	
Combined Solvency Score		baa1		**baa**		
Liquidity						
Funding Structure						
Market Funds / Tangible Banking Assets	15.0%	a2	↔	**baa**	Maturity transformation	
Liquid Resources						
Liquid Banking Assets / Tangible Banking Assets	20.0%	baa1	↑	**baa**	Intragroup restrictions	
Combined Liquidity Score		a3		**baa**		

Financial Profile	**baa3**

Qualitative Adjustments

	Adjustment	Comment
Business Diversification	-1	Monoline specialist lender
Opacity and Complexity		n/a
Corporate Behavior		n/a
Total Qualitative Adjustments	**-1**	

		Comment
Sovereign or parent constraint	**Aaa**	n/a

BCA range	**baa3 - ba2**

		Rationale
Assigned BCA	**ba1**	Appropriate position versus peers

Source: Moody's

Detailed Support and Structural Analysis

Our BCA measures the probability of a bank defaulting on its junior-most rated instrument[41], 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 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**, 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

» **Government Support**, where an entity may be supported by public bodies, such as local, regional, national or supranational institutions, again reducing the risk of some or all instruments

EXHIBIT 22

Applying Support and Loss Given Failure Analysis to Determine Credit Ratings

Source: Moody's

What do we mean by support?

Support for banks can be hard to define precisely. Some aspects of support we do not consider as "extraordinary" and are, thus, incorporated into the BCA. For example:

» A bank may be able to fund itself more easily because of an affiliation with a strong parent. The resultant benefits to profitability and funding are very difficult to gauge. Therefore, we consider these benefits to be part of the BCA.

» Banks often have arrangements with affiliates for the provision of cash; where these are contractual, we include them within the BCA, even if these arrangements are not apparently on commercial terms.

» Banks typically have access to central bank funding as part of their day-to-day operations.

» Deposit insurance is a form of system-wide support for a banking sector; without it, deposits would surely be less stable, banks would have to carry more liquid assets to protect themselves against runs, and profitability would therefore be lower, other things being equal.

We also note that there are often less formal arrangements between group entities to provide capital or liquidity in case of need. Their activation is not necessarily a sign of a need for extraordinary support – where this support arises, we aim to consider whether or not it was necessary to prevent default.

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[41] Excluding the impairment of " high trigger" contingent capital instruments and other instruments which by design are impaired in advance of non-viability.

Other kinds of support we consider "extraordinary" in nature and, thus, are considered outside the BCA analysis. These include:

» provision of liquidity from a third party (parent, affiliate or central bank) beyond standard or contractual terms

» generation of supplementary capital via write-downs of junior obligations triggered by "non-viability"

» provision of capital from a third party to prevent a regulatory shortfall or a crisis of market confidence

» official sector or intra-group risk relief schemes that would not be available commercially.

» Idiosyncratic forbearance, e.g., waiving accounting or regulatory standards in order to delay loss recognition or resolution proceedings

» mergers or acquisitions arranged or supported by governments

We recognize that the distinction between "ordinary" and "extraordinary" is often blurred. Moreover, sometimes banks receive such "extraordinary" support without there being an obvious risk of default in its absence, at least in the short term. This is all the more so in the case of support within a group, where capital and liquidity support that goes beyond the legal contracts between the affiliates are relatively common. There is, therefore, necessarily an element of judgment involved in this distinction. However, for the most part, we believe it is possible to discern whether or not extraordinary support extended to banks has been necessary to prevent default.

Structure of our support framework

Our overall approach to support is similar to that currently employed under our Joint-Default Analysis (JDA) framework (see Appendix 8: Use Of Joint Default Analysis In Support). However, we have simplified our approach.

As set out above, our approach to assigning support expectations is judgmental. By definition, future support is subject to uncertainty, except in cases of guarantees, for example.[42]

For this reason we provide below a framework for this judgment, but the circumstances surrounding support are often highly specific and involve factors that we cannot readily anticipate. The benefit we assign to debt instruments from anticipated support may, therefore, on occasion deviate from the approach set out below. Moreover, there is often a certain ambiguity between *expected* support and *received* support, which blurs the boundary between the standalone and the supported creditworthiness of the institution. For example, the announcement of the nationalization and/or state guarantee for a bank may immediately improve its chances of funding itself, ahead of the contractual arrangements being put in place. Yet its improved funding is purely a function of the expectation of support.

We believe that typically, groups are likely to extend support to their affiliates *before* the declaration of a point of non-viability that would result in default in the absence of government support. As such, we consider affiliate support before our Loss Given Failure analysis. On the other hand, we generally expect public-sector support to follow a BCA event, and such support to be increasingly specific to certain debt classes, so our assessment of public-sector support usually follows our Loss Given Failure analysis.

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[42] For further discussion of how we rate entities or instruments benefiting from guarantee or equivalent legally binding forms of credit support, please see our related Special Comment, Moody's Identifies Core Principles of Guarantees for Credit Substitution.

Stage 1: Affiliate support

The first step in our analysis is to consider support from affiliated entities. The output of this first step results in our 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.

In principle, most groups can be expected to support banking entities within their consolidation. This is because of a number of considerations:

» **Entities within a group represent an investment.** Groups, therefore, have an incentive to provide support to entities in the case of need 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 this source of potential value.

» **Many entities are not designed to be purely "standalone".** Various operating entities may perform specialised 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 provides an overall powerful incentive to support, because failure of one group entity could make funding difficult.

Nonetheless, the extent of this willingness may vary from entity to entity.

Probability of support

We classify the probability of the Affiliate's provision of support as ranging from "Very High", to "High", "Moderate", and "Low". Each of these categories corresponds to a range of support probabilities (see Appendix 8: Use Of Joint Default Analysis In Support).

We reach this judgment by assessing the following considerations:

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

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

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

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

» **Documented support.** Comfort letters, public or private "keep-well" agreements can evidence likelihood of support.

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

» **Financial links.** We consider the impact of a potential sale on the group's financials and corporate strategy – the greater this is, the less likely a sale to a potentially credit supportive institution. An entity where significant intra-group funding links exist may also be more likely to receive support.

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

The more of these criteria that are met, the higher the support consideration. For example, 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 is likely to be considered to have a "Very High" probability of specific support.

The same entity, but only 51% owned and controlled by the group, is likely to be considered to have a "High" probability of support.

Where a 100%-controlled entity operates in geographies or products that we consider to be relatively peripheral to the group's operations, and as such a disposal would not have a major impact on the group, we may consider the probability of specific support to be "Moderate".

Where the same entity operates under a separate brand and is not obviously part of the same group, then we may consider the specific support probability to be "Low" in the absence of other mitigating factors.

Note that "parental" support for government-owned banks is generally considered under Government Support rather than Affiliate Support (see below).

Capacity to provide support

To establish the Affiliate's capacity to support the bank, we generally use the Affiliate's own BCA. As 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 were the group to be a single legal entity, i.e., based on its consolidated financials. Again, on occasion we may modify this to exclude the supported entity.

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

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, therefore, theoretically vary between 0% and 100%. However, in practice we expect dependence to be positive and high, given that banks within a group typically operate within the same broad industry and often in close geographic proximity. For this reason, problems at one entity are likely to be accompanied at problems elsewhere in the group, reducing the latter's capacity to provide support when it is required. This phenomenon reduces the benefit of support from a stronger entity towards a weaker one.

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

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

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

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

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 display Very High dependence with its support provider.

On the other hand, we would likely consider that a US retail bank owned by a predominantly European universal banking group, and that sources its own funding, to display High dependence with its support provider.

On rare 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.

Applying support

We, therefore, integrate affiliate support into our rating as a function of the following four factors:

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

» The *probability* of the Affiliate's providing support;

» The Affiliate's *capacity* to provide support; and

» The *dependence* between the respective entities.

For details of the mathematics behind this approach, please see Appendix 8: Use Of Joint Default Analysis In Support. We employ JDA to provide Rating Committees with an indicative range of potential uplift from the BCA. This notching range consists of the number of notches of uplift corresponding to the lowest probability of support within the selected range (e.g., 30% for "Moderate" support probability), the mid-point (e.g., 40%), and the highest probability of support (e.g., 49%). The Rating Committee will employ its 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 Adjusted BCAs, Rating Committees may deviate in either direction from this guidance to reflect idiosyncratic situations. Thus, the BCA, together with this uplift, form the Adjusted BCA. Our Adjusted BCA thereby establishes the

probability that a given bank will either default on one or more obligations or will require extraordinary government support to prevent a default – i.e., its probability of failure, having exhausted any support from affiliates.

EXHIBIT 23
Example Affiliate Support Worksheet

Assumptions	Input	Comment
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

The Adjusted BCA also reflects the combined probability of a subsidiary requiring support and a group failing to provide that support, allowing the subsidiary to default on its non-viability securities.

Stage 2: 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. Together with consideration of other factors – notably, the capacity to skip coupons in advance of a failure – this results in a measure of intrinsic creditworthiness, absent support, that we term the Preliminary Rating Assessment (PRA).

We term our assessment of loss severity "Loss Given Failure" – an approach conceptually very similar to a classic loss given default analysis, but triggered by the failure of a bank, and not necessarily its default. Loss Given Failure is not a new concept – for many years we have differentiated subordinated from senior unsecured debt based on our view of differing loss severity.

However, we employ a new technique to address this concept in a more refined manner, the necessity for which is made clear by the dramatic shift in public policy in recent years favouring "resolution regimes," which, in effect, allow banks to selectively default on certain instruments outside of bankruptcy – a process previously difficult or even impossible to achieve. This makes a more advanced liability-side analysis an important element in determining risk and ratings. We expect to use this approach to help determine the loss severity on all debt instruments for banks subject to an Operational Resolution Regime.

Our approach has been informed by our own review of data relating to failed or defaulted banks. This includes a long and rich time series offered by the FDIC in the US, our own database of bank bond defaults, and our own study of "failed" banks since 2007. Taken together, these offer insight into likely losses in the event of failure, taking into account extraordinary capital injections received and losses imposed on various creditors, usually via distressed exchanges. However, these data are subject to limitations – for example, the FDIC data have limited applicability in our view because the population of failed banks is very largely composed of small community banks characterised by limited operations

and high asset concentration.[43] Bank liquidations in Europe and elsewhere have been relatively rare, limiting the availability of loss data on defaulted banks, and our database of bank senior unsecured defaults is populated by just a handful of issuers. Many countries are only in the process of introducing resolution regimes, and while details are now becoming available, the implications of such regimes in practical application remains subject to considerable uncertainty. As such, future behavior and consequent losses will likely diverge from the limited historical experience, in part because the objective of emerging resolution regimes is precisely to break from past resolution approaches.

Given this, we have constructed an approach that allows us to recognize the different implications of likely resolution scenarios for particular banks, including each class of debt as well as rated deposits. The 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. Furthermore, for many banks globally, resolution remains of limited relevance, as "going concern" resolutions are not part of the public policy framework, and government support remains a more likely outcome for a failed bank than such a resolution.

Application to banks in Operational Resolution Regimes

» We apply our advanced Loss Given Failure approach in systems where we consider it to be most relevant; specifically, to banks likely to be subject to Operational Resolution Regimes. These we define with reference to the following key characteristics:

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

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

» **Reduced government support.** Where we believe a resolution regime is operational, we expect that there is a policy and regulatory conviction to utilize enabled legislation and the probability of government support to be reduced or in some cases eliminated.

Where these conditions are fulfilled, we will typically designate a bank as subject to an Operational Resolution Regime (ORR). In these cases we apply our developed Loss Given Failure approach described below. We expect the initial application to be limited to the EU, Norway and Liechtenstein, (in anticipation of the Bank Resolution and Recovery Directive or equivalent legislation), the US (in recognition of the Dodd-Frank Act Titles I and II) and Switzerland (reflecting the Banking Insolvency Ordinance). As legislation is developed elsewhere, we expect application to spread to other systems, such as South Africa, Hong Kong and Canada.

Application to banks in jurisdictions without Operational Resolution Regimes

However, for many banks globally, resolution is of limited relevance, as going concern resolutions are not part of the public policy framework in a large number of banking systems. Resolution procedures may be used on occasion but tend to be defined on an ad-hoc basis rather than being 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, we are unlikely to have a clear view of the impact of failure on the different debt classes. In recognition of this, we will in such cases maintain our existing assumptions that:

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[43] The median total assets of failed banks resolved by the FDIC since 1986 was just $73 million. We rate banks globally with median total assets of $29 billion.

» Senior unsecured debt and rated deposits have generally similar loss characteristics and are likely to experience loss severity in failure consistent with our experience of around 60% loss given default[44], 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 will be subject to additional notching as set out below.

» Holding company senior unsecured debt, due to its structural subordination to banking subsidiaries, is likely to experience higher loss severity consistent with a PRA, prior to support, one notch below the Adjusted BCA. This also applies to junior holding company securities, which will in some cases be subject to additional notching set out below.

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 Operational Resolution Regime framework in response to idiosyncratic situations, or more generally use it as a supplemental tool.

Key Loss Given Failure variables for banks in Operational Resolution Regimes

There are a multitude of factors 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 modelling technology to construct a relatively simple notching approach that allows us to capture the major factors that have a bearing on loss given failure,[45] and our analysis focuses on these key variables.

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

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

» **Debt volume.** The greater the volume of a given instrument class, the lower its loss severity, as a given loss is absorbed by more creditors. In this way an issue of debt can logically affect its own expected loss by spreading losses across a larger pool. This also allows us to react to increased balance sheet encumbrance, which would generally result in a shrinking layer of unsecured liabilities.

These variables require consideration of a number of further factors, which are detailed below.

1. Resolution balance sheet

The first stage in our loss given failure analysis is to establish the appropriate balance sheet. This requires us to look beyond the consolidated financials upon which we typically base our 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 expect that a foreign subsidiary of a bank would usually be subject to resolution in its own jurisdiction, not that of the parent. As a result, subject to the limitations of the data available to us, we "de-consolidate" principal rated foreign entities where we believe this to be true, as well as non-

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[44] See our Special Comment, Defaults and Recoveries for Financial Institution Debt Issuers, 1983-2010, published February 10, 2011.

[45] We detail underlying modeling assumptions in Appendix 7.

bank domestic subsidiaries not subject to banking resolution. On the other hand, we will typically retain within this 'perimeter' overseas special-purpose funding vehicles, which usually provide back-to-back funding up to their parent and can thus normally be considered to be economically equivalent to domestically-issued debt. We also include debt and deposits booked to overseas branches.

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. In time this may be the case within the euro area, for example, but the BRRD allows for both national and cross-border resolution, and it remains unclear how the latter will operate. On the other hand, there may be instances where we conduct separate loss given failure analyses for domestic institutions within the same group – where, for example, regulation imposes ring-fencing between domestic entities.

EXHIBIT 24

Example of Loss Given Failure Perimeter Definition
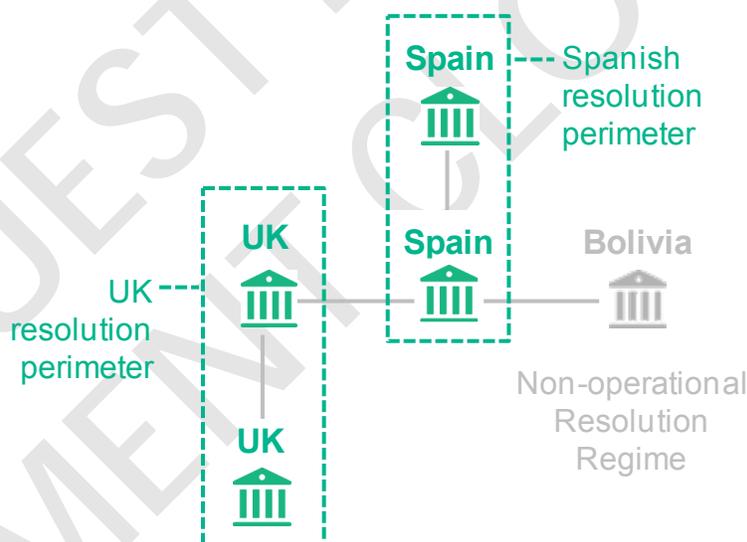
Source: Moody's

Once the scope is determined, we recognize that a bank's liability-side may differ in resolution from its structure when failure is distant. Typically, we treat secured debt, interbank deposits, and short-term debt as "other liabilities", meaning that they do not share losses with other rated instruments, chiefly senior debt. This is because we believe that they are likely to roll off or become secured ahead of a resolution. In addition, we may treat derivative liabilities similarly, 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, although this treatment may vary between banks[46].

In establishing the balance sheet, we consider the role of deposit preference. In particular, we distinguish between deposits that rank pari passu with senior unsecured debt ("junior deposits"), and those that are preferred and thus rank senior.

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[46]   In the United States, we believe that the unsecured portion of derivative liabilities at the subsidiary level would likely suffer losses alongside senior unsecured debt in the event more junior debt is insufficient to absorb firmwide losses, while this is less clear in the EU.

» In the United States, we assume that all deposits rank senior to senior unsecured debt. While the national depositor preference statute currently does not extend to foreign deposits, we believe that the movement towards dually payable deposits means that in practice, practically all deposits are preferred[47].

» In the EU, the BRRD establishes deposit preference for those deposits made by households and small and medium enterprises eligible for deposit guarantee schemes (i.e., deposit insurance)[48]. Other deposits, i.e., those made by large corporates or financial institutions, are generally not preferred and rank pari passu with senior unsecured debt in liquidation.

» The proportion of EU bank deposits benefiting from preference is currently unclear, due to a general lack of disclosure on the part of banks, deposit guarantee schemes and regulators. Given that this is critical information for market participants, we ultimately expect public disclosures to improve to an extent that will allow us to calculate the relevant deposit base from verified bank-specific data. In the meantime, we use an EU average (74%) of the proportion of deposits eligible for guarantee schemes to determine those deposits preferred under the BRRD[49]. For certain institutions that we judge to have deposit bases essentially retail in nature, we assume that 90% are preferred.

» In Switzerland, we assume that all deposits are preferred, as per the Banking Insolvency Ordinance, but that guaranteed deposits benefit from further preference. We assume the same proportion of senior (guaranteed) deposits as in the EU.

We then assume that a proportion of deposits roll off prior to failure, in response to the deterioration of the bank's standalone health and the risk of loss in the event of its resolution. Our assumptions may vary in individual instances, but in general we assume the following:

» "Junior", wholesale 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.

» "Preferred", retail and SME deposits shrink by 5%. Again, this is in line with the outflow assumptions of 3-5% for stable deposits under the LCR.

» For deposits in systems without preference amongst themselves (e.g., the United States), we assume an overall run-off of 10%, which is consistent with a 75%/25% division between retail/SME deposits (5% outflow) and wholesale deposits (25% outflow).

2. Loss rate

The second stage is to establish the appropriate loss rate for the entity or entities determined to be within the same consolidation. This loss rate determines the extent to which subordination and volume influence the expected loss of each rated instrument. We express the loss rate in terms of the percentage of total liabilities, excluding common equity. 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 event that a bank's losses can be contained within equity, and despite entering resolution, liabilities do not suffer losses). The loss rate can even be negative, if there is positive equity value in resolution.

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[47] See for example press notice by the Federal Deposit Insurance Corporation, September 10, 2013.

[48] As well as a further preference for those deposits covered by Deposit Guarantee Schemes.

[49] See EU estimates of eligible and covered deposits, published by the Joint Research Centre of the European Commission, 2014. We apply the same approach to Norway and Liechtenstein.

We believe that, in turn, this loss rate is essentially a function 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 upon the bank in resolution. This, in turn, is informed by a multitude of factors including the operating environment, local experience, asset mix, and equity capitalisation. Initially, we expect to use the Macro Profile of each bank as the primary indicator of asset volatility. In time, we may develop our loss estimates to include other factors.

» **Resolution approach.** In addition, 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 overall loss is a judgment based on these variables. In general, we believe that banks typically have lower firm-wide loss rates, given their failure, than the family loss given default rates displayed by non-financial corporates, the counterpoint to their intrinsic high leverage and funding mismatch, which means banks can default following a small reduction in the value of their assets. By way of example, we expect to employ the following guidelines in determining our loss rates initially.

EXHIBIT 25
Initial Mean Loss Given Failure Rate Selection

Going concern		Receivership / Bankruptcy	
Macro Profile		**Macro Profile**	
Very Strong / Strong / Moderate	**Macro Profile** **Weak / Very Weak**	**Very Strong / Strong / Moderate**	**Macro Profile** **Weak / Very Weak**
5%	10%	10%	n/a

These loss rates result, in so far as possible, from empirical data regarding loss rates in bank failures. For more information, please see Appendix 7: Loss Given Failure: Underlying Assumptions.

These are mean loss rates, and incorporate the considerable uncertainty surrounding the actual loss rates banks are likely to face. As such, we are unlikely to routinely deviate from these assumptions, although we may do so under specific circumstances (e.g., an impending or actual resolution) in response to additional information. We may also introduce further loss rates as more banks become subject to Operational Resolution Regimes in different systems, subject to satisfactory data.

3. Subordination

The amount of debt subordinated to a given instrument class determines the degree of protection provided to the latter. Logically, the larger the layer of debt junior to a given instrument, the lower the likelihood of loss for that instrument in resolution.

Our assessment of subordination generally follows the sequence below, in ascending order of priority:

» Preference shares (holding company)

» Junior subordinated debt (holding company)

» Dated subordinated debt (holding company)

» Senior long-term debt (holding company)

» Preference shares (bank)

» Junior subordinated debt (bank)

» Dated subordinated debt (bank)

» Senior long-term debt (bank) and pari passu (junior) deposits

» Preferred deposits

» Other liabilities (including secured borrowing)

Hence, for example, when assessing senior long-term debt and pari passu deposits, we estimate subordination to be the sum of all holding company debt together with all junior debt issued by the bank(s) within the resolution scope. We express this as a percentage of total liabilities.

We may modify the balance-sheet structure further where we believe the structure is unrepresentative of the hierarchy. For example, we may on occasion in some jurisdictions consider that holding company debt is likely to be treated as 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 applicable legislation.

4. Debt volume

The greater the volume of a given debt class, the lower the loss severity, as a given loss is diluted by the greater mass of debt relative to the given loss.

Loss severity notching guidance tables

The above factors are brought together in the form of a table (Exhibit 26) providing guidance on the loss given failure 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 total liabilities (which increases down the vertical axis), and the volume of the instrument itself as a percentage of total liabilities (which increases across the horizontal axis). The benefit of subordination and volume depends in turn on the applicable loss rate as a percentage of liabilities, so the notching thresholds in each case are expressed in terms of multiples of this loss rate. Subordination thresholds rise in increments of 0.5x the loss rate, while volume thresholds rise in increments of 1x the loss rate. This means that an additional 1pp of subordination (which reduces the probability of default of a given instrument) gives twice as much benefit to an additional 1pp of pari passu volume, which only reduces loss in the event of default.

EXHIBIT 26

Operational Resolution Regimes: Notching Logic relative to Adjusted BCA

x = loss rate as % of liabilities		Volume of instrument class (% of liabilities)			
		>=0 <x	>=x <2x	>=2x <3x	>=3x
Subordination to instrument class (% of liabilities)	>=0 <0.5x	-1	0	1	2
	>=0.5x <1x	0	1	2	2
	>=1x <1.5x	1	2	3	3
	>=1.5 <2x	2	3	3	3
	>=2x	3	3	3	3

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 loss given failure rates are unrealistic because of potential violations of absolute

priority of claim and uncertainty about how regulators will treat such claims during the resolution period.

In addition, the maximum upward notching for instruments with subordination of less than the loss rate is two. This reflects our judgment that an instrument benefiting from maximum subordination should be rated higher than an instrument with low subordination but with maximum volume. This means that an instrument would not receive the maximum three notches of uplift, whatever its volume, if it is not protected by subordination at least equal to the mean loss rate.

The maximum downward notching is one notch, which applies to instruments with subordination of less than half the applicable loss rate, and volume of less than the loss rate. This will, therefore, typically apply 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, but the senior unsecured debt for 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 27 below shows an example of such a table, here using a 5% loss rate. The thresholds for subordination thus increase in increments of 2.5pp of total liabilities (half the loss rate). The thresholds for volume increase in increments of 5pp of total liabilities (one times the loss rate).

» Case 1: An instrument with subordination of 1% of total liabilities, and which itself comprises 3% of total liabilities, would be positioned at Adjusted BCA-1 because it would very likely face high loss severity in the event of a failure.

» Case 2: An instrument with subordination of 1% of total liabilities, and which itself comprises 50% of total liabilities, would be positioned at Adjusted BCA+2. If the bank failed with a firm-wide loss rate of 5%, the instrument would incur a loss due to the relatively small amount of subordination – albeit small, thanks to its significant volume.

» Case 3: An instrument with subordination of 10% of total liabilities, and which itself comprises 3% of total liabilities, would be positioned at Adjusted BCA+3 because the instrument would only default if the firm-wide loss was at least double the assumed mean of 5%.

EXHIBIT 27
Example Loss Given Failure Notching Table for a 5% Loss Rate

Loss Rate	5%			
		Volume of instrument class (% of liabilities)		
	=>0 <5	=>5 <10	=>10 <15	=>15
Subordination to instrument class (% of liabilities) =>0 <2.5	-1 Case 1	0	1	Case 2 2
=>2.5 <5	0	1	2	2
=>5 <7.5	1	2	3	3
=>7.5 <10	2	3	3	3
=>10	3 Case 3	3	3	3

Source: Moody's

Data considerations

The amounts in question are estimated based upon a number of sources:

» **Rated debt:** Our starting point for debt instruments is the volume of rated debt outstanding. On the whole this provides superior information to published financial statements, because we are able to distinguish between issuing entities and maturity. We exclude short-term debt (less than one year's original maturity) and other liabilities on the basis that such counterparties are likely to obtain collateral prior to a failure and thus not be loss absorbing alongside long-term senior unsecured debt.

» **Financial statements:** Our view of the size of the total balance sheet and the size of the deposit base is determined by financial statements, adjusting where appropriate for the resolution scope, i.e., deducting the liabilities of entities outside the scope, as well as deducting where appropriate volatile items, such as derivative liabilities.

Where appropriate, we will adjust these data to produce the most accurate picture. For example, we will add unrated senior unsecured bond issues to senior unsecured debt. In time, we expect disclosure to improve in response to market pressure, given the importance of this information to investors.

Loss sequencing

Under some resolutions, there is little ambiguity about the sequencing of the imposition of losses. In such cases, the hierarchy established above and the resultant balance-sheet ratios are straightforward and the instrument notching can be determined by referencing the relevant notching table.

However, under some resolution regimes there is greater inherent uncertainty about the appropriate hierarchy. For example, under the BRRD, we believe that authorities may exercise their discretion and award preference to "ineligible" deposits versus senior unsecured debt, even though they rank pari passu in a liquidation. Were this to occur, it may result in materially different loss expectations for both rated deposits (which would benefit from greater subordination) and senior unsecured debt (which would suffer higher losses due to the lack of loss sharing with deposits).

We incorporate this uncertainty by establishing one or more separate parallel hierarchies, according to the alternative sequence, and comparing the outcome with the original outcome. We term these two scenarios "de jure" (where the liquidation hierarchy is observed) and "de facto" where the regulatory discretion is incorporated.

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 initial estimates of the probabilities assigned to the "de facto" scenario of deposit preference are as follows.

» EU, Norway and Liechtenstein: 50%. Here ineligible deposits rank pari passu with senior unsecured debt under a liquidation, but we believe they may benefit from discretionary preference in a resolution.

» Switzerland: 100%. We believe that the Swiss resolution regime establishes preference for non-privileged deposits relative to senior unsecured debt[50], so the de jure and de facto scenarios are the same.

» United States: 100%. As noted above, deposits are preferred under existing legislation, so again, the de jure and de facto scenarios are the same.

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[50] Please see our Banking System Outlook on Switzerland, published 31 July, 2014.

These initial estimates for the de facto scenarios were developed based on analysis of legal frameworks and related rulemaking governing bank resolution in the relevant jurisdictions. Our estimates will evolve over time and could vary between institutions in some circumstances 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.   We also expect to employ the same approach in assigning such probabilities in other systems as further resolution regimes are put in place.

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 Loss Given Failure). By design the liability-side ratio ranges that determine uplift are broad, and so unlikely to be sensitive to short-term volatility in balance sheets. Moreover, as already noted, our Loss Given Failure assessment is ultimately judgmental in nature. Rating Committees may, therefore, diverge from the suggested notching to "override" changes driven by balance sheet changes which are expected to be temporary in nature, or indeed look beyond current balance sheets in anticipation of material structural change, for example in response to regulation.

As a practical matter, we expect to perform a new loss given failure assessment at least annually following the publication of each set of financial statements, but may also review the appropriateness of our Loss Given Failure assumptions concurrently with our regular reviews of banks' BCAs and ratings more generally, as well as in response to material changes in the capital structure independently of such occasions.

Determining the Preliminary Rating Assessment: Additional Notching Considerations

The above Loss Given Failure analysis provides notching guidance for loss severity considerations only, whether in an Operational Resolution Regime or otherwise. We also consider further notching adjustments, which we term "additional notching" to take into account other features specific to certain debt classes. In this section, we explain our methodology for further distinguishing between different instruments on the basis of their default probability, i.e., the potential timing differences between the bank's failure (the probability of which is represented by the Adjusted BCA) and the potential for missed coupon payments or write-down on bank hybrid securities, contingent capital securities, or Contingent Capital instruments (CoCos, including both non-viability and "high trigger" securities), and subordinated debt). Using the outcome of our Loss Given Failure analysis as a starting point, we consider such factors, apply any additional notching and thereby assign a PRA to each instrument class. These are not credit ratings but rather an assessment of the overall credit risk of each instrument prior to potential government support.

As evidenced during the financial crisis, hybrid "default"[51] probability is clearly higher than for bank senior debt, and losses can occur in a restructuring outside liquidation through coupon suspension, equity conversion, principal write-downs, good bank/bad bank structures, and distressed exchanges. Consequently, in addition to capturing the risk of loss from subordination, our hybrid ratings factor in the additional default probability resulting from the suspension of coupon payments and the potential for a principal loss outside resolution. To position the PRAs, we consider 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 loss severity, given impairment.

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[51] Under their terms, hybrids allow for missed coupon payments and/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.

For rating "high trigger" contingent capital securities, we use a model-based approach that captures the probability of a bank-wide failure and/or trigger breach, 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 rating and, for "high trigger" securities, we rate to the lower of the model-implied rating and the non-viability security rating. Since the bank's BCA is an important factor in the analysis, the end result is an analytical framework consistent with our overall credit assessment of bank risk. Similar to the way we assign bank ratings generally, Rating Committees have the flexibility to use their judgment if they believe a model-based approach fails to capture the security's credit risk.

Consistent with our rating practices generally, our rating decisions may be complemented by country-specific and case-specific credit judgment. Particularly when assessing the potential for systemic support, we consider the particular facts and circumstances of each jurisdiction's regulatory environment in making our determination.

Additional notching guidelines

Our additional notching guidelines for hybrids,[52] contingent capital securities (including both non-viability and "high trigger" securities), and subordinated debt are summarised in Exhibit 28. This additional notching – on top of loss severity notching – capture the risk of differential probabilities of default across different instruments.

Securities that are Basel III compliant for regulatory capital purposes convert to equity or suffer a principal write-down tied to regulatory discretion and/or the breach of regulatory capital triggers. They can take the form of Tier 2 (subordinated debt) or Additional Tier 1 (non-cumulative preferred) securities and have principal and/or coupon losses, if applicable, imposed either well in advance of or close to the point of non-viability.[53] All other listed subordinated securities will likely be discontinued over time in most, if not all, countries.

EXHIBIT 28

Our Additional Notching Guidelines for Subordinated Debt, Bank Hybrids, and Contingent Capital Securities

	Security Type	Typical Regulatory Treatment	Coupon-skip Mechanism	Additional Notching
1	**"Plain Vanilla" Subordinated Debt** (may or may not be subject to a statutory bail-in regime)	Lower Tier 2 or Tier 2	None	Generally, 0
2	**Hybrid Subordinated Debt**	Tier 2 and Tier 3	Mandatory, weak triggers, cumulative, subject to maturity extension	Generally, 0 or -1
3	**Junior Subordinated Debt**	Upper Tier 2	Optional, cumulative	0 or - 1
4	**Contractual Non-viability Subordinated Debt**	Tier 2	None	0 or -1
5	**Dated Junior Subordinated Debt with Principal Write-down**	Upper Tier 2	Optional/mandatory, cumulative	- 1 to - 3

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[52] 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.

[53] 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. Any trigger above this level is generally considered to be a high trigger for rating purposes. 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%.

EXHIBIT 28

Our Additional Notching Guidelines for Subordinated Debt, Bank Hybrids, and Contingent Capital Securities

	Security Type	Typical Regulatory Treatment	Coupon-skip Mechanism	Additional Notching
6	**Preferred Securities**	Tier 1	Optional/mandatory, cumulative, non-cumulative, or non-cash cumulative (ACSM) settlement	- 1 to - 3*
7	**Contractual Non-Viability Preferred Securities**	Additional Tier 1	Optional, non-cumulative	- 2
8	**"High trigger" Subordinated Debt or Preferred Securities**	Tier 2 or Additional Tier 1	Optional, non-cumulative for Additional Tier 1 securities	Use model to determine probability of a trigger breach and bank-wide failure, if either or both of these events happen. Coupon-suspension risk, if applicable, is captured in the notching for the related non-viability security rating and, for "high trigger" securities, we rate to the lower of the model-implied rating and the non-viability security rating.

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

In the following sections, we explain our rationale for determining the PRA of each type of subordinated debt, hybrids, and contractual non-viability and "high trigger" contingent capital securities. For rating subordinated debt, hybrids, and non-viability contingent capital securities, we provide guidance on positioning the PRA within the specified notching ranges. For each of the ranges presented, there is a "standard" position, which we expect to be the outcome in most circumstances. However, Rating Committees have the flexibility to position the PRA 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.

The notching ranges for junior obligations, except "high trigger" contingent capital securities, issued by banks with Adjusted BCAs across the ratings spectrum are fixed because the structural risks of these securities remain the same, regardless of the bank's financial strength.[54] When the bank's financial condition weakens and the probability increases that losses will be imposed on junior obligations, ratings will generally be downgraded because they are linked to the intrinsic strength of the bank. However, if a coupon skip and/or principal loss in a restructuring outside liquidation is imminent, we will use an expected loss analysis, which we explain later in the report, that could result in a rating lower than that suggested by the notching ranges.

For rating "high trigger" securities, while ratings assigned will ultimately reflect Rating Committee judgment, the framework uses a model-based approach incorporating our view of the issuing bank's current financial strength as expressed through its BCA, its current capital level (possibly adjusted for our forward view of capital), the capital level associated with the point of non-viability, and the capital level associated with the trigger in the security being rated which determines the distance to trigger

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[54] 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.

breach. 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.

We also capture the risk of coupon suspension, if applicable, which could occur earlier than a trigger breach and/or bank-wide failure. This risk is captured in the notching for the related non-viability security rating and, for "high trigger" securities, we rate to the lower of the model-implied rating and the non-viability security rating.

'Plain vanilla' subordinated debt

Subordinated or "plain vanilla" subordinated debt (including most lower Tier 2 securities issued under Basel I or II) has no coupon-skip mechanism and generally absorbs losses only in liquidation. Since the financial crisis, the regulatory and political willingness to impose losses on subordinated creditors as a pre-condition for an ailing bank to receive public-sector support has become clear. As a result, there is an increasing expectation that subordinated debt will share in the cost of bank resolutions.

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 positioning the PRA, we treat dated subordinated debt equally regardless of whether or not a resolution framework is in place, because experience during the financial crisis has shown that one can quickly be put in place. In addition, expectations are for more resolution frameworks to be put in place, and 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.

This suggests that the probability of default is typically aligned with the Adjusted BCA. Loss severity is captured by our Loss Given Failure analysis, as described above, and there is, therefore, generally no additional notching for these instruments.

EXHIBIT 29
Subordinated Debt

Security Type	Additional Notching Range	Standard Additional Notching
"Plain Vanilla" Subordinated Debt (may or may not be subject to a statutory bail-in regime)	0	0

Hybrid subordinated debt with coupon-skip mechanisms

For the most part, subordinated debt does not have coupon-skip mechanisms. However, in certain regions, such as Latin America, Europe and Asia, it does in some cases. 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.

EXHIBIT 30
Hybrid Subordinated Debt

Security Type	Additional Notching Range	Standard Additional Notching	Comments
Hybrid Subordinated Debt	0 or -1 notch	0 notch	Tied to the breach of to 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.

In all 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 greater than the risk of "plain vanilla" subordinated debt and, therefore, no additional notching would result beyond that derived from the Loss Given Failure analysis.

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, most junior subordinated debt ratings are subject to additional notching of a further notch beyond that derived from the PRA.

EXHIBIT 31
Junior Subordinated Debt

Security Type	Additional Notching Range	Standard Additional Notching	Comments
Junior Subordinated Debt	0 to -1 notch	-1 notch	If coupon suspension is non-cumulative, then -1 notch. Junior subordinated debt with restricted deferral options[55] may not be subject to additional notching.

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 and/or a principal write-down at the point of non-viability.

EXHIBIT 32
Subordinated Debt with Contractual Non-Viability Loss Trigger

Security Type	Additional Notching Range	Standard Additional Notching	Comments
Subordinated Debt with loss triggered at the point of non-viability on a contractual basis	0 or -1 notch	-1 notch	Relative to "plain vanilla" subordinated debt, a further notch is deducted to reflect the potentially greater uncertainty associated with timing of equity conversion/principal write-down. If we believe that regulators in a given jurisdiction are highly unlikely to differentiate between contractual non-viability securities and legacy securities (without a contractual loss feature that are subject to a statutory bail-in regime in terms of timing to the imposition of losses), then we would not apply additional notching.

The PRA for contractual non-viability subordinated debt will, therefore, in most cases be one notch below the PRA of "plain vanilla" subordinated debt to reflect the potential greater uncertainty associated with timing to equity conversion/principal write-down. For example, the securities may be forced to absorb losses before the point of non-viability as a way for a bank to avoid a bank-wide resolution or, 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.

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[55] Restricted deferral options are those where a coupon skip is tied to the breach of a weak trigger such as a minimum regulatory capital ratio. The probability of such a trigger breach is remote unless a bank is close to liquidation or a restructuring outside liquidation.

While 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 in practice. If it can be demonstrated that contractual non-viability securities would not be singled out and losses would only be imposed at the point of non-viability, when all other junior bank securities will be taking losses, we would consider positioning the PRA at the same level as "plain vanilla" subordinated debt.

» For the avoidance of doubt, if the offering memorandum's risk factors explain that the security is subject to an existing or future bail-in regime, we do not consider this to be part of the security's contract. In addition, we may make an exception 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 purposes of positioning the PRA.

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.[56] Although generally cumulative, any skipped payments and subsequent principal write-ups following a write-down must occur prior to maturity.[57] Consequently, depending on the time relative to maturity when a principal write-down occurs, these securities could bear additional coupon risk while the bank remains a going concern and outside resolution. They may, therefore, be 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.

EXHIBIT 33
Dated Junior Subordinated Debt with Principal Write-down

Security Type	Additional Notching Range	Standard Additional Notching	Comments
Dated Junior Subordinated Debt with Principal Write-down	- 1 to -3 notches	- 1 notch	Will be positioned within the range depending on the trigger type and whether the hybrid is cumulative or non-cumulative.

Preferred securities

Preferred securities or, in some jurisdictions, such as the EU, junior subordinated debt with a priority of claim only senior to common equity, is loss absorbing by its terms. Preferred securities can be subject to principal write-downs resulting from the breach of certain financial triggers, 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 perpetual in nature, preferred securities do not have to be repaid and a skipped coupon will never result in an event of default.[58]

Skipped coupons are generally non-cumulative and an extended period of non-payment could result in the risk of significant loss. As such, non-cumulative preferred securities may become impaired ahead of

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56 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 to be weaker 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.

57 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.

58 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.

a bank's failure and its PRA will therefore incorporate additional notching. Cumulative preferred securities, which are less frequently issued, are typically notched down by only one additional notch.

EXHIBIT 34
Preferred Securities

Security Type	Additional Notching Range	Standard Additional Notching	Comments
Preferred Securities	- 1 to -3 notches	- 2 notches	If coupon skip is cumulative, then - 1 notch.
			If coupon skip is non-cumulative with a net loss trigger, then - 3 notches, with the PRA not to exceed Baa1.

Additional notching of three notches is reserved for non-cumulative preferred securities with net loss triggers to reflect the possibility of greater transition risk 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 capitalised, may experience profit volatility potentially resulting in the breach of a net loss trigger.

Jurisdictional considerations

In Europe, 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 will typically be notched down by only one additional notch.

A common hybrid issued by Australian banks is 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 be excluded from the Baa1 cap.

Where we judge a bank to be very unlikely to skip a coupon payment, for example some banks in weak environments 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.

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-suspension mechanism. With language written directly into its contractual terms, the security absorbs losses through conversion to equity and/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,[59] which has been suggested by Basel III, in addition to at the point of non-viability, as determined by regulators.

Our view is that Basel III's suggested trigger meets the threshold for a trigger that is "close enough" to the point of non-viability. For securities with triggers set at other levels, we will determine on a

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

jurisdiction-by-jurisdiction basis if they are sufficiently close to the point of non-viability for us to rate them under our non-viability security rating framework.[60] Viewed as "gone" concern securities, they would likely absorb losses after a troubled 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.

EXHIBIT 35
Contractual Non-Viability Preferred Securities

Security Type	Additional Notching Range	Standard Additional Notching	Comments
Contractual Non-viability Preferred Securities	n/a	- 2 notches	The additional notching for these securities is the same as for traditional non-cumulative preferred securities.

Two additional downward notches, in line with the notching for traditional non-cumulative preferred securities, captures the probability of impairment associated with non-cumulative coupon suspension. This could happen before the bank reaches the point of non-viability, as well as the probability of a bank-wide failure.

"high trigger" contingent capital securities

"High trigger" contingent capital securities can be either Tier 2 subordinated debt, typically without coupon-suspension 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, or temporary principal write-down. The conversion/write-down features of these securities are designed to shore up the capitalisation of the bank in difficulty 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 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 trigger is breached. These securities do not form part of our Loss Given Failure analysis because they are designed to absorb losses in advance of a bank-wide failure. Therefore, in contrast to non-viability securities, our approach incorporates considerations of both loss severity and timeliness of payment.

In a departure from our usual notching approach for rating hybrid and non-viability contingent capital securities, we use a model-based approach for rating "high trigger" securities. Simply stated, the absolute risk of a "high trigger" security is the distance to trigger breach, which is best captured through a model than through a simple notching-based approach. However, this distance only captures one aspect of these securities' risks, the second being the risk of the security relative to the fundamental strength of the bank as expressed through its BCA.

To capture both risks, our framework uses a model-based approach that incorporates our view of the bank's current financial strength as expressed through its BCA and its last-reported CET1 ratio, potentially adjusted for our forward-looking view of capital, to determine the probability of a trigger breach as well as the probability of a bank-wide failure. The model measures the distance from the bank's current CET1 ratio to the capital level set as the trigger for imposing losses on the security.[61]

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[60] 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.

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

It takes the probability of a bank-wide failure and adds to it the probability of a trigger breach ahead of a bank-wide failure, which is then mapped to our horizon-free vector (as used in our JDA analysis; see Exhibit 47 below). After factoring in loss severity, the model generates a rating that is the starting point for the rating discussion. For securities with a full principal write-down, we will add an additional notch unless the non-viability security rating cap applies. See Appendix 12 for step-by-step guidance on positioning "high trigger" security ratings.

The model can be accessed by sending an e-mail to figmodels@moodys.com or a fax to +1.212.658.9475 requesting it. 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.

We will cap the "high trigger" security rating at the level of the non-viability security rating if the model-based rating outcome points to a "high trigger" security rating that is above the bank's non-viability security rating.[62] That is because a "high trigger" security rating is comprised of the credit risk of its non-viability component **_and_** that associated with the distance to trigger breach, which means the "high trigger" rating could never be above the non-viability security rating.

In some cases, a bank may not have a rated non-viability security outstanding with the same host as the "high trigger" security. To determine the non-viability security rating cap in this situation, we would assume that the bank issued a non-viability security consistent with the form or 'host' of the "high trigger" security being issued – either Tier 2 or Additional Tier 1. We would then apply the relevant Loss Given Failure analysis (under Operational Resolution Regime, or otherwise) and the additional notching to determine the cap.

The model-implied rating outcome only considers 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, this risk is already captured in the notching for the related non-viability security rating and, for "high trigger" securities, we rate to the lower of the model-implied rating and the non-viability security rating. The rating of the relevant non-viability Additional Tier 1 security 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 (i.e., there is a higher probability of default than implied by a BCA event where a bank requires extraordinary support to avoid default).[63] 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 an Additional Tier 1 "high trigger" security.

The model-implied rating is only the starting point in the determination of the "high trigger" security rating and would not necessarily be the final rating outcome. Consistent with the way we assign ratings generally, Rating Committees have the flexibility to use their judgment if they believe a model-based approach (or scorecard, as the case may be) fails to adequately capture the security's credit risk. Among other factors, we would consider 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

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[62] This is possible because, although the "high trigger" security rating outcome could never be higher than the bank's BCA, our ratings for non-viability ratings are notched from the bank's Adjusted BCA, typically two to three notches below this anchor point, depending on whether the security is a Tier 2 or Additional Tier 1 security.

[63] 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.

would make it a riskier security than one with equity conversion,[64] regardless of their respective loss severities.

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 bank is to breaching its capital buffers. While these factors will also influence a bank's BCA, they could have a greater impact on the positioning of the rating for a "high trigger" security.

Preliminary Rating Assessment

The combination of our Loss Given Failure analysis, and any additional notching results in our PRA. This is equivalent to an unsupported rating.

Exhibit 36 shows an example of how the PRA is derived for each instrument for a bank that is under an Operational Resolution Regime 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.

EXHIBIT 36
Preliminary Rating Assessment Example: Adjusted BCA of baa3, Operational Resolution Regime

Instrument class	LGF Notching		Assigned LGF notching	Additional notching	Total Instrument Notching	Preliminary Rating Assessment
	De jure	De facto				
Deposits	1	3	2	0	2	baa1
Senior long-term debt (bank)	1	0	0	0	0	baa3
Dated subordinated debt (bank)	-1	-1	-1	0	-1	ba1
Senior long-term debt (holding company)	-1	-1	-1	0	-1	ba1
Preference shares (holding company) - non-cumulative	-1	-1	-1	-2	-3	ba3

Exhibit 37 shows an example for a bank, also with an Adjusted BCA of baa3, but in a non-operational resolution regime. LGF notching is assigned according to instrument type, and additional notching as above. Together these result in the total instrument notching relative to the Adjusted BCA, and hence the PRA.

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[64] In 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", the point was made that contingent capital securities with a principal write-down have a higher likelihood of being triggered (as well as perhaps a higher loss severity, depending on their terms), 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 (or, at that point, the use of more aggressive accounting/loss recognition and, for regulators, they may also suppose the bank's desire to hasten loss recognition). These incentives are present for contingent capital securities with principal write-downs, but not for equity dilutive securities.

EXHIBIT 37
Preliminary Rating Assessment Example: Adjusted BCA of baa3, Non-Operational Resolution Regime

Instrument class	Assigned LGF notching	Additional notching	Total Instrument Notching	Preliminary Rating Assessment
Deposits	0	0	0	baa3
Senior long-term debt (bank)	0	0	0	baa3
Dated subordinated debt (bank)	-1	0	-1	ba1
Senior long-term debt (holding company)	-1	0	-1	ba1
Preference shares (holding company) - non-cumulative	-1	-2	-3	ba3

Used of expected loss analysis to position ratings subject to an impairment event

There may be circumstances under which securities or deposits face losses imminently. For example, a hybrid instrument's coupon skip and/or principal loss clause is close to being triggered; a bank opts to skip a non-cumulative coupon payment for an extended period of time to build capital; or a regulator steps in to prevent a coupon payment and/or forces conversion to equity or a principal write-down. These are all considered 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 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,[65]

In these cases, we will position the rating using an expected loss 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.[66] If necessary, we may adjust the rating downward, beyond the level that the methodology suggests. If a hybrid skips coupon payments and subsequently resumes them, we will consider an upgrade and the use of normal notching guidelines only when the bank's financial condition stabilises and there is a high likelihood that the bank is able to make coupon payments for an extended period of time.

For securities where principal is written down and is subsequently written back up, we assess the likelihood that full principal will be recovered, if at all. For contingent capital securities that may convert to equity or suffer a principal write-down, the ratings will likely be positioned in the low Caa to C range, depending on our estimation of losses at that time based on the security's features.

Outstanding hybrids and subordinated debt have also been subject to exchanges into other forms of debt or equity at a substantial discount to par. If the exchange is viewed as avoiding a bankruptcy filing or payment default, it is tantamount to a restructuring outside liquidation and considered a distressed exchange, another type of impairment event, for rating purposes. In these cases, we also use an expected loss approach to position the rating and determine the potential for loss relative to par value, which is the bank's original promise to pay.[67]

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[65] See Moody's *Rating Symbols and Definitions* (this document is updated regularly and the most recent version is available on moodys.com).

[66] We may also consider using an expected loss analysis for banks with a BCA of b1 and below depending on the hybrid's features and the factors driving such a weak BCA.

[67] Refer to "Moody's Approach to Evaluating Distressed Exchanges", dated March 2009.

Stage 3: Government Support

Our approach to government support is similar to that for determining support from an affiliate. Our assessment is changing in format more than in substance, and is designed to be more qualitative and more flexible in nature. This should enable us to incorporate the often subtle real-world shifts that define attitudes to support for bank creditors.

The extent of support incorporated into our ratings will reflect the probability of each government's committing public funds to support a financial institution, and its own capacity to provide that support. However, the global financial crisis has demonstrated that the probability of support is not static and can evolve rapidly, sometimes diminishing rapidly. 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.

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". Our assessment – which is ultimately specific to each instrument class of each bank – is made through the analysis of a number of considerations.

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

» **Public policy.** We consider the domestic and, on occasion, pan-national public policy framework to be important indicators of the likelihood of support. A clear legal framework permitting 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 – although this can again vary by debt class and the policy framework may allow exceptions to this. Governments may also be subject to constraints on their ability to provide support, however willing they may otherwise be – for example, state aid rules in the EU, or practical impediments on a country's financial flexibility due to dollarization. We also 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. On the other hand, some countries may have clearly declared and credible supportive policies.

We follow this by assessing the following more bank-specific considerations.

» **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 and because the consequences for the national economy and financial system are more limited. 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, depending on the relevant Public Policy 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 the 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.) or for market confidence generally that undermine financial stability and/or be considered politically unacceptable. In some cases, imposition of losses on creditors, while theoretically possible, may simply be too practically 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, a private bank with more wealthy clients (taking large deposits and providing Lombard lending, for example) may be deemed 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 is likely to result in increased support likelihood. The debt of a bank in which the public sector has chosen, for public policy reasons (as opposed to where ownership is a consequence of previous support) to maintain 100% ownership (which it is not expected to divest) will often be considered as "government backed", implying greater public importance and, in the absence of constraints, higher probability of support. This may be because the importance of the policy role (see above), or because in allowing a publicly-owned bank to default, the state would risk harming market perceptions of its 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 suggests 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 important because we consider that support may be selective: for example, we may judge it more likely that a given public body provide 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.

It is, for example, evident that beyond hybrids and contingent capital securities, there is increasing regulatory and political willingness to impose losses on subordinated or "plain vanilla" subordinated debt as a pre-condition for an ailing bank to receive public sector support. As a result, we typically assume that junior securities will not benefit from government support, which has been removed from these ratings in a number of jurisdictions. However, on an exceptional basis, there may be countries where governments continue to have a strong willingness to support this creditor class and have the ability to do so within the fiscal constraints of their sovereign balance sheets. If we have an affirmative belief that such willingness exists, we may reflect this through assigning support. 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 support probability assumptions may differ between otherwise equivalent securities issued by a bank and its holding company. Public authorities in some jurisdictions may view some or

all holding company debt as loss absorbing and hence unlikely to receive government support. Others may take a very different view.

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. This itself incorporates, via the Sovereign methodology, contingent liability risk from the banking sector. In some rare cases we may deviate from this rating where, for example, we consider there to be additional sources of support, or constraints upon support, which are not reflected in the country 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 organisations. 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.

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 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 creditworthiness of governments and of banking systems is generally very closely related. We believe that was clearly shown in the recent crisis, where banking sector risks exacerbated sovereign risk, and sovereign risk created banking risks.

For some systems, however, the connections between the financial health of government and banking system may be looser. Our sovereign and banking analysts 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 measure 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 a measure of the probability of a systemic crisis emerging

» the foreign currency obligations of the banking system relative to the government's own foreign currency resources - a measure 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".

Applying support

We therefore integrate government support into our debt ratings based on the factors below:

» The unsupported creditworthiness of each debt class;

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

» Its *capacity* to provide support; and

» The *dependence* between support provider and bank.

The mathematics behind this approach, which is detailed in Appendix 8: Use Of Joint Default Analysis In Support, provides Rating Committees with an indicative range of notches of support from the unsupported creditworthiness of each instrument (see Exhibit 38). The Rating Committee will employ its 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, Rating Committees may deviate in either direction from this guidance to reflect idiosyncratic situations. On the other hand, Rating Committees are likely to exercise caution in assigning many notches of uplift, in the absence of its tangible presence.

EXHIBIT 38

Example Government Support Worksheet

Assumptions	Input	Comment
Supporting authority	Country XYZ	
Creditworthiness of support provider	Aaa	
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	

Debt 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
Deposits	baa1	High	1 - 2 - 2	2	0	A2	0	A2
Senior long-term debt (bank)	baa3	High	1 - 2 - 2	2	0	Baa1	0	Baa1
Dated subordinated debt (bank)	ba1	Low	0 - 0 - 1	0	0	Ba1	0	Ba1
Senior long-term debt (holding company)	ba1	Low	0 - 0 - 1	0	0	Ba1	0	Ba1
Preference shares (holding company) - non-cumulative	ba3	Low	0 - 0 - 1	0	0	Ba3	0	Ba3

Dynamic nature of support

It is important to note that our opinions on the likelihood of governments being both willing and able to provide financial support to different creditor classes of financial institutions are not assumptions, but probabilistic credit judgments, which may change over time. 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.

As such, our opinions on support are dynamic and can be expected to change over time – within a specific country or within groups of countries with similar regulatory policy drivers – just as rapidly as these underlying driving factors. Moreover, the relative importance of these factors cannot be pre-determined and will vary case-by-case . For example, in some circumstances, developments in other countries are not very important (consider, say, North Korea) and in other cases the "demonstration effect" of changes in one country might have a very strong effect on others (consider, say, countries in the euro area). Our approach to determining the probability of support is intended to be both

transparent and simple – an assessment of willingness and capacity to support – and flexible, in order to allow us to change our credit judgments in response to external shifts. Consistent with our practice elsewhere, we will generally set out the reasons for changes in credit judgments in commentary associated with particular rating actions.

Appendix 1: Approach To Rating Financial Entities Specialised In Covered Bonds

Introduction

The purpose of this section is to help investors, issuers and other market participants understand how We rate financial institutions whose core business is restricted to the issuance of covered bonds or similar financial instruments (e.g., Pfandbriefe). The approach is intended to apply only to those financial institutions that specialise 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 will refer to such entities as a Special Covered Bond Issuer (SCBI).

In many countries, banks are allowed to issue covered bonds from their own balance sheet. However, in certain countries banks are not permitted to do so and instead are required to establish specific funding vehicles for this purpose. In certain instances banks may also opt to tap the covered bond market through a dedicated entity. In addition, banks that may not individually have the ability to set up an SCBI because of the limited size of their funding needs or simply because they are too small, 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 venture established by a group of banks that may have various levels of shared interests ("affectio societatis").

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 in and 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, our approach to assessing a bank's intrinsic financial strength (discussed earlier in this methodology document) may not be applicable for rating such entities; hence, the need for a different approach. As an SCBI is intrinsically linked to either a bank or a group of banks, we will rate SCBIs based on the likelihood, magnitude and features of the parental support expected to be provided by the "Support Provider". Depending on the characteristics of this support, the rating of an SCBI may be at the same level or below the Support Provider's rating. The next section discusses the elements we analyse to determine the level of parental support that can be expected for these entities, which will then impact the rating of the SCBI.

The SCBI's rating is an important input in the rating process of the covered bond instruments as our rating methodology for covered bonds relies on an Anchor Rating, which is the SCBI rating.

Methodology for rating SCBIs

The starting point for the SCBI's rating is the rating of the Support Provider ("Support Provider's Rating"). If the Support Provider directly issued covered bonds, the Anchor Rating would be the senior unsecured rating of the Support Provider.

The SCBI may be rated at the same level as the Support Provider or one to two notches below the Support Provider's rating depending on the likelihood and strength of the parental support. In certain

circumstances, the final rating could be lower, for example if the parental support was not granted directly by a group of banks but instead through a holding company owned by the banks. If there is insufficient evidence of the support and of the importance of the SCBI to the parent company, we may be unable to assign a rating 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.

An SCBI's rating will be determined based on the following three categories:

Category 1: SCBI rating at the same level as the support provider

The SCBI may be rated at the same level as the Support Provider if the parental support takes the form of a full, irrevocable and unconditional, and timely obligation to ensure that the SCBI will meet all its obligations. The Support Provider should not be entitled to exercise any discretion when providing support. For example, this would be the case where (1) the SCBI benefits from an unconditional, irrevocable and enforceable guarantee for the duration of the covered bond program; or (2) there is legislation, regulation or a set of inter-company arrangements, independent from the covered bonds program, that would require the Support Provider to support the SCBI in a full and timely manner (e.g., affiliation in France).

Category 2: SCBI rating one notch below the support provider's rating

The SCBI may be rated one notch below the Support Provider rating if:

The parental support meets all of the following criteria:

» Structured to ensure that the SCBI's liquidity and solvency are adequate at all times (these conditions are expected to be referred to in the documentation). This is not as wide a commitment as that which would lead to the positioning of the SCBI under Category 1 (i.e., ensure full payment of obligations versus an obligation to ensure only that the SCBI is solvent and liquid). Furthermore, the provision of the parental support should not be subject to any conditions.

» Publicly disclosed. The parental support should be embedded in a publicly disclosed document, for example, by inclusion in the Issuer's prospectus or by a press release.

» Legally binding. Using the example under (a) above, the failure of the parent to ensure that the SCBI is liquid and solvent should 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 a claim against the parent, we will analyse (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) the likelihood that the SCBI will be able to enforce its claim against the parent.

» Documented in such a way that excludes any provision which could result in the parental support being withdrawn prior to the full repayment of the covered bonds.

» Structured in such a way as to ensure that the parent cannot exercise any discretion when providing the parental support.

Additionally, there is:

» Full strategic fit. It appears unlikely that the Support Provider could use an alternative platform for the purpose of funding its loan book.

» Reputation 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 jeopardise 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. This requirement is deemed to be satisfied, for example, if the SCBI has outsourced the corporate functions and the assets servicing to the Support Provider.

Category 3: Rating of SCBI two or more notches below the support provider's rating

The SCBI may be rated two notches (in some cases more than two notches) below the Support Provider rating if any of the following conditions apply:

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

» Parental support is documented to allow certain events to cause its termination. 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.).

» Parental support is structured in a manner that would allow the Support Provider to exercise some discretion when providing support. For example, a support mechanism under which parental support is only provided 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.

Additionally, there is:

» Good, but 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.

» Reputation 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 jeopardise 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.

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

If the support provided exhibits a number of the characteristics described above, the SCBI could be rated more than two notches below the Support Provider's rating. In addition, we may decide that we cannot rate the SCBI using this methodology in particular where the linkages between the SCBI and the parent(s) are unclear.

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 as they may be unable to tap this market on their own given their limited size and funding needs.

In such cases of multiple parents, the provisions of Category 1, 2, and 3 above would also apply. However, the determination of the Support Provider's Rating is more complex as support is provided by a group of banks and, therefore, the question arises as to which Support Provider's rating should drive the analysis.

Our analysis would start with 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 results of this analysis the Support Provider's Rating could be (1) the rating of the "weakest entity" if for example a member bank default could lead to a cross default on all instruments issued by the SCBI; (2) the average or the highest rating of the member banks if the entities are jointly and severally liable vis-à-vis the SCBI, depending on the contractual obligations of each member bank; or (3) if all entities are not rated or the obligations of each participant are not clearly stated in the documentation, we may not be able to assign a rating to the SCBI.

Consequently the Support Provider's Rating for these type of transactions would be derived based on a case-by-case analysis focusing on the nature and strength of the legal arrangements, the relative importance of participating entities, and the government support that such SCBIs might attract given the importance they may have to the financing of the local mortgage market.

Appendix 2: Related Entity Ratings

Highly integrated and harmonised (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 will not result in a meaningful BCA; for example, a subsidiary established in a region for tax or regulatory regions, but which does not have a franchise of its own and is heavily or entirely dependent on services provided by other group affiliates. It may simply be a virtual booking entity for conducting a group's business in a given location. In these cases, financial ratios are largely irrelevant or without meaning. We may instead choose directly to 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.

Such an entity 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., greater than 20% of either)

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

» significant transfer pricing of revenues and expenses with affiliates (e.g., 20% of either)

» 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 parent's brokerage sales force, or key products are designed and priced by related entities within the group)

» unusually low efficiency ratios (indicating plenty of parent reliance)

» little proprietary franchise and, hence, likely to be difficult to sell to a third party

Entities not assigned individual BCAs

We assign BCAs to most but not all rated banks. Where we consider that an entity benefits from credit substitution, i.e., a guarantee of an equivalent form of credit support, then we do not typically assign a BCA.[68]

Use of monitored ratings as an input in the application of JDA

Regular access to information on support providers is pivotal to an informed assessment of any credit uplift that should be incorporated in the rating of issuers benefiting from such support. It is therefore necessary to ensure informed and timely monitoring of the creditworthiness of support providers. Regular access to and flow of relevant information does not necessarily require the participation of the support provider's management. We consider that the rated issuer is responsible for ensuring the regular flow of information to the extent that this is relevant to our analysis. However, a lack of regular and relevant information on support providers could lead to a removal of the incremental support-

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[68] For more details, please see our Special Comment, *Moody's Identifies Core Principles of Guarantees for Credit Substitution*.

provider uplift, but not (in the absence of other negative factors) a withdrawal of issuer ratings, as our standalone BCA, assisted by government support assumptions, if applicable, would constitute the lower rating boundary.

Monitored ratings will either be public monitored ratings or private monitored ratings. Nonetheless, the regular flow of relevant information on support providers is pivotal in continuing to give any credit uplift on rated issuers. This does not necessarily include the participation of and access to the support-provider's management.

In terms of process, we envisage that the information needed to assess the support provider would be provided via the issuer, unless otherwise requested or arranged by the issuer. Conversely, a lack of continuous and relevant information on support providers could lead to a removal of the incremental-support provider uplift. However, potential removal of support, in the absence of other negative factors, should not result in a withdrawal of issuer ratings, as our standalone BCA, assisted by government support assumptions, if applicable, would constitute the lower rating boundary.

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. Note that in using this notional group BCA, we take into account diversification benefits, which may not be evident at the level of the subsidiary banks themselves. Where the group is "hybrid" in nature, e.g., composed of bank and insurance activities, our starting point is the average of the BCA of the banking subsidiaries and the senior debt rating of the insurance subsidiaries (excluding any external support). Our weighting is informed by an analysis of the relative assets, capital, revenues, and we typically use the lowest-weighted average resulting, reflecting our view that the strength of the holding company tends to be more influenced by weaker rather than stronger subsidiaries. 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 difference to one notch.

Bank holding company obligations

Many banking groups are structured under a holding company. This legal entity will often have little or no activities of its own, but instead exists simply as the ultimate owner of the group's businesses. At its simplest, a holding company's assets are its investments in subsidiaries, financed by the holding company's own equity. A pure holding company thus relies on up-streamed dividends from its investments to pay dividends to its own external shareholders.

Sometimes a holding company may issue debt and hybrid securities under its own name. Our approach to rating holding company obligations is as follows.

Holding company solo analysis

The purpose of these entities varies in accordance with strategy, local practice and regulation: sometimes holding companies are nothing more than a shell, and other times they are economic operations in their own right. On occasions we may conclude that the specific fundamentals of the holding company may increase (or reduce) its own propensity to failure, relative to the BCA of the bank of which it is the owner. This analysis is usually focussed around an analysis of the liquidity risk taken on by the holding company. For example, a holding company that borrows in the market and then on-lends to its banking subsidiary on identical terms takes no marginal liquidity risk, and is in

essence a pass-through funding vehicle. For holding companies whose unconsolidated activities do not in our judgment pose material marginal default risk, we position the Preliminary Rating Assessment (PRA) in accordance with our view that such holding company obligations are structurally subordinated to bank debt, as follows:

» If subject to an Operational Resolution Regime, we would determine their PRA using the Loss Given Failure approach described above, and assign support if appropriate according to our approach to government support.

» If not subject to an Operational Resolution Regime, we would typically position the PRA of senior long-term holding company and dated subordinated debt one notch below the Adjusted BCA, and assign support if appropriate according to our approach to government support.

Sometimes, however, holding companies go beyond this and their standalone risk profiles 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 lend at different terms to which it borrows, for instance longer term (creating liquidity risk).

» The holding company may lend at a different level of seniority, for instance issuing senior debt to fund subordinated debt (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" intra-group 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 also have activities of its own, i.e., is not a purely financial vehicle but has business activities in its own right which may increase, or reduce, the risks presented by its subsidiaries.

Measuring holding company risk

Disclosure at the bank holding company level is typically limited, with simple 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. We calculate double leverage as the ratio between the ultimate holding company's equity and the value of its investments in subsidiaries. However, accounting presentation varies – notably, some holding companies present their accounts on a cost basis (i.e., excluding retained earnings), and others on a net asset value basis (i.e., including retained earnings) – and further caution is required:

» 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 accounts may, therefore, show no double leverage, but this masks the transformation of senior debt into deeply subordinated equity-like instruments.

» Holding company accounts are typically of low quality and their reporting is infrequent, making monitoring of double leverage unreliable (management can freely transfer funds between legal entities between reporting periods).

As a guideline, where double leverage is over 115%, we will review in more detail the structure of capital and dividend flows between operating and holding companies. Where we consider this gives rise to a material weakness for the group, we would typically introduce a further one notch differential to holding company obligations in addition to the subordination-based notching set out above. We may deviate from this where we have reason to believe that the 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. 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 a further notch or occasionally more.[69]

Assessing potential government support

We may assign government support to holding company obligations in the same way as we do for bank-issued instruments. In some cases, we do not expect there to be a difference between support for bank and holding company creditors. This is because they are often regulated by the same authority and it is in practice difficult to separate in a clean fashion the different creditors, given the intrinsic links between the bank and holding company. In other cases, the regulatory and support environment may lead us to a quite different view – where, for example, regulation designed to allow holding company creditors to suffer losses, suggesting low support, but support for bank creditors is still plausible.

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[69] 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: About Our Bank Ratings

Baseline credit assessments (BCAs) are opinions of issuers' standalone intrinsic strength, absent any extraordinary support from an affiliate[70] or a government. BCAs are essentially an opinion on the likelihood of an issuer 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.

Contractual relationships and any expected ongoing annual subsidies from the government or an affiliate are incorporated in BCAs and, therefore, are considered intrinsic to an issuer's standalone financial strength. Extraordinary support is typically idiosyncratic in nature and is extended to prevent an issuer from becoming nonviable.

Our bank BCAs describe the probability of a bank defaulting on any of its rated instruments, in the absence of external support. This excludes impairments on certain instruments designed to absorb losses ahead of a BCA event, notably "high trigger" contingent capital instruments, or certain preference shares.

BCAs are not ratings, but inputs in the process of determining ratings. Their definitions by rating level are provided in Exhibit 39 below, and are expressed on a lower-case alpha-numeric scale that corresponds to the alpha-numeric ratings of the global long-term rating scale.

EXHIBIT 39
BCA Definitions

aaa	Entities rated aaa offer exceptional financial security and are judged to be of the highest quality, with minimal risk of requiring assistance
aa	Entities rated aa offer excellent financial security and are judged to be of very high quality, with very low risk of requiring assistance
a	Entities rated a offer good financial security and are judged to be of upper-medium grade and are subject to low risk of requiring assistance
baa	Entities rated baa offer adequate financial security and are judged to be of medium grade and are subject to moderate risk of requiring assistance
ba	Entities rated ba offer questionable financial security and are judged to have speculative elements and are subject to substantial risk of default in the absence of assistance
b	Entities rated b offer poor financial security and are considered speculative and are subject to high risk of default in the absence of assistance
caa	Entities rated caa offer very poor financial security and are subject to very high risk of default in the absence of assistance.
ca	Issuers assessed ca have highly speculative intrinsic, or standalone, financial strength, and are likely to be either in, or very near, default, with some prospect for recovery of principal and interest; or, these issuers have avoided default or are expected to avoid default through the provision of extraordinary support from an affiliate or a government.
c	Issuers assessed c are typically in default, with little prospect for recovery of principal or interest; or, these issuers are benefiting from a government or affiliate support but are likely to be liquidated over time; without support there would be little prospect for recovery of principal or interest.

Note: Moody's appends numerical modifiers 1, 2 and 3 to each generic rating classification from aa through caa. The modifier 1 indicates that the obligation ranks in the higher end of its generic rating category; the modifier 2 indicates a mid-range ranking; and the modifier 3 indicates a ranking at the lower end of that generic rating category.

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[70] Affiliate includes a parent, cooperative groups and significant investors (typically with a greater than 20 percent voting interest). Government includes local, regional and national governments

Indications of failure (known as a "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., collateralised loans to banks from the central bank)

» Unusual direct loans from the support provider

» Assumption of existing debt by the support provider

» 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 programmes 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.

Our **Adjusted BCA** incorporates the probability of support from commercial entities, typically a bank's parent or broader group (collectively, its "affiliates").

Our **various debt and deposit ratings** are a function of both our Loss Given Failure analysis – which assesses the loss severity on each class of debt if a BCA event occurs, in the absence of further support – and our expectation of government support for each class of debt. Combined, these elements produce an expected loss for each rated debt class and, hence, a credit rating.

Bank Deposit Ratings

Bank Deposit Ratings are opinions of a bank's ability to repay punctually its foreign and/or domestic currency deposit obligations and, in the case of long-term deposit ratings, also reflect the expected financial loss of the default. Bank Deposit Ratings do not apply to deposits that are subject to a public or private insurance scheme; rather, the ratings apply to uninsured deposits, but they may in some cases incorporate the possibility that official support might in certain cases extend to uninsured as well as insured deposits. Foreign currency deposit ratings are subject to Moody's country ceilings for foreign currency deposits. This may result in the assignment of a different (and typically lower) rating for the foreign currency deposits relative to the bank's rating for domestic currency deposits.

Where deposits are subject to preference amongst themselves, our deposit ratings reflect the risk on junior deposits, unless otherwise specified.

Rating outlooks

We assign outlooks to long-term issuer ratings and major debt classes. For more information on outlooks, see *Rating Symbols and Definitions*.

Issuer ratings

Issuer Ratings are opinions of the ability of entities to honour senior unsecured financial counterparty obligations and contracts. As such, Issuer Ratings incorporate government support and are usually aligned with Senior Unsecured debt ratings. Issuer Ratings do not incorporate support arrangements, such as guarantees, that apply only to specific (but not to all) senior unsecured financial obligations and contracts.

Treatment of foreign-currency obligations

Foreign-currency ratings are based on the obligation's local-currency rating and our country ceiling policy. Foreign-currency deposit ratings are in all cases constrained by the Country Ceiling for Foreign Currency Bank Deposits. Foreign-currency debt obligations may also be constrained by the Country Ceiling for Foreign Currency Bonds. However, in some cases the ratings on foreign-currency debt obligations may pierce the foreign currency ceiling.

Our methodology for determining whether or not a foreign-currency debt obligation may pierce the foreign currency ceiling is based on an analysis of the following: (1) the local-currency debt rating; (2) the probability that there will be a generalised foreign currency moratorium in the event of default by the government in question; and (3), the probability that, in the event of a foreign-currency payments moratorium, certain classes of debt securities may be exempted from such a moratorium.

The hybrid indicator (hyb) is appended to all bank hybrid and contingent capital securities

The hybrid indicator (hyb) is appended to all bank hybrid and contractual contingent capital securities, which may or may not have coupon-suspension mechanisms as a defining characteristic.[71] Together with the indicator, the security ratings continue to be an expression of the expected loss associated with that particular security. It is based on our best information at the time regarding the various loss scenarios resulting from a structural analysis as well as an assessment of the bank's credit fundamentals. However, the indicator signals the potential for volatility in the rating due to exogenous factors that are less predictable and not always credit-linked, such as regulatory and/or government intervention.

Hybrid and subordinated debt ratings do not capture certain risks

Like other Moody's debt ratings, our hybrid, contingent capital, and subordinated debt ratings do not capture certain risks, such as extension, market, and liquidity risks. Consistent with firm-wide practices, we rate securities to maturity and do not factor in extension risk, which is the risk that a security will not be called at the first call date. Prior to the financial crisis, there was a tacit agreement between an issuer and investors that hybrid and subordinated debt would be called at the first call date. During the crisis, this did not prove to be the case, resulting in significant negative implications for the market value of these securities.

If a bank is in financial distress and is unable to access the market at the call date or if regulators do not approve the call, hybrids, contingent capital securities and subordinated debt will remain outstanding. This may be consistent with the regulatory goal of having capital available to absorb losses in place when needed, but may be inconsistent with investors' expectations. Our hybrid, contingent capital, and subordinated debt ratings do not incorporate extension risk, but it is a risk that nonetheless exists

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[71] Refer to "Introduction of Moody's Hybrid Indicator (hyb) for Financial Institutions", October 18, 2011.

and one that could heighten the risk of coupon skips and/or principal write-downs in perpetual or very long-dated hybrid securities.[72]

Particularly for hybrids and contingent capital securities, coupon suspension and/or the imposition of principal losses could have broad, market-wide reverberations including the loss of liquidity. While recognising that these risks exist, the ratings for hybrids and contingent capital securities speak to credit risk rather than incorporating other risks, such as market or liquidity risks.

Short-term ratings

Our short-term ratings are mapped from our long-term ratings. For more details, see *Rating Symbols and Definitions*. Our more advanced Loss Given Failure framework can lead to deposit ratings being rated higher than senior unsecured debt ratings. This may lead in some instances to different short-term debt and deposit ratings.

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[72]   Refer to "Debt Redemption Extension Risk" dated December 2008.

Appendix 4: Macro Profiles

Initial Estimates of Macro Profiles[73]

EXHIBIT 40

Country	Banking Country Risk	Credit Conditions	Funding Conditions	Industry Structure	Macro Profile
ALBANIA	Ba2 - B1	Weak -	-1	0	Weak -
ANDORRA	na	na	na	na	Moderate +
ANGOLA	B2 - Caa1	Neutral	0	0	Very Weak +
ARGENTINA	B3 - Caa2	Weak	0	0	Very Weak +
ARMENIA	Ba1 - Ba3	Weak +	-2	0	Weak -
AUSTRALIA	Aaa - Aa2	Neutral	-1	1	Very Strong
AUSTRIA	Aaa - Aa2	Neutral	0	-1	Very Strong -
AZERBAIJAN	B1 - B3	Neutral	0	0	Weak -
BAHRAIN	Baa2 - Ba1	Weak	0	0	Moderate -
BELARUS	Caa2 - C	Neutral	0	0	Very Weak -
BELGIUM	Aaa - Aa2	Neutral	0	0	Very Strong
BERMUDA	A1 - A3	Neutral	0	-2	Moderate +
BOLIVIA	Ba3 - B2	Neutral	0	0	Weak
BRAZIL	A2 - Baa1	Weak +	0	-1	Moderate +
BULGARIA	Baa2 - Ba1	Weak -	0	0	Weak +
CANADA	Aaa - Aa2	Weak	0	1	Very Strong -
CHILE	Aa1 - Aa3	Weak	0	0	Strong +
CHINA	A1 - A3	Weak -	0	0	Moderate +
COLOMBIA	Baa2 - Ba1	Neutral	0	0	Moderate
COSTA RICA	Baa2 - Ba1	Weak +	0	-1	Moderate -
CROATIA	Baa1 - Baa3	Weak -	-1	0	Weak +
CYPRUS	Baa2 - Ba1	Very Weak	-3	0	Very Weak -
CZECH REPUBLIC	A2 - Baa1	Neutral	0	0	Strong -
DENMARK	Aaa - Aa2	Weak +	-1	-1	Strong
DOMINICAN REPUBLIC	Ba1 - Ba3	Weak -	0	0	Weak
EGYPT	B2 - Caa1	Very Weak +	-1	0	Very Weak
FINLAND	Aa1 - Aa3	Neutral	0	-1	Strong +
FRANCE	Aaa - Aa2	Neutral	-1	0	Very Strong -
GEORGIA	Baa3 - Ba2	Weak	-1	0	Weak +
GERMANY	Aaa - Aa2	Neutral	0	-1	Very Strong -
GHANA	Ba2 - B1	Weak +	0	-3	Very Weak +
GREECE	B3 - Caa2	Very Weak +	-3	0	Very Weak -
GUATEMALA	Ba2 - B1	Weak +	0	0	Weak +
HONG KONG	Aaa - Aa2	Weak	0	0	Strong +
HUNGARY	Baa2 - Ba1	Weak	-1	-1	Weak
INDIA	Baa1 - Baa3	Neutral	0	-1	Moderate
INDONESIA	Baa2 - Ba1	Neutral	0	0	Moderate
IRELAND	Aa3 - A2	Weak -	-1	-1	Moderate -
ISRAEL	Aa2 - A1	Weak +	0	-1	Strong
ITALY	A1 - A3	Weak	-1	0	Moderate +
JAPAN	Aa1 - Aa3	Weak	0	0	Strong +
JORDAN	Ba1 - Ba3	Neutral	0	0	Weak +
KAZAKHSTAN	Baa3 - Ba2	Neutral	0	-1	Weak +

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[73] As of August 2014.

Country	Banking Country Risk	Credit Conditions	Funding Conditions	Industry Structure	Macro Profile
KOREA	Aa1 - Aa3	Weak +	-1	0	Strong +
KUWAIT	A2 - Baa1	Weak +	0	0	Strong -
LATVIA	A2 - Baa1	Neutral	0	-1	Moderate +
LEBANON	Ba2 - B1	Weak -	0	0	Weak
LIECHENSTEIN	na	na	na	na	Strong +
LUXEMBOURG	Aa2 - A1	Neutral	0	0	Very Strong -
MACAO	Aa2 - A1	Weak	0	0	Strong
MALAYSIA	Aa3 - A2	Weak +	0	0	Strong
MAURITIUS	A1 - A3	Weak -	0	-1	Moderate
MEXICO	A1 - A3	Neutral	0	0	Strong
MONGOLIA	B3 - Caa2	Weak -	0	0	Very Weak +
MOROCCO	Baa1 - Baa3	Weak -	0	0	Moderate -
NETHERLANDS	Aaa - Aa2	Weak +	-1	0	Strong +
NEW ZEALAND	Aaa - Aa2	Neutral	-1	0	Very Strong -
NORWAY	Aaa - Aa2	Weak +	0	0	Very Strong -
OMAN	A2 - Baa1	Neutral	0	0	Strong -
PAKISTAN	Caa1 - Caa3	Very Weak +	0	0	Very Weak
PANAMA	A3 - Baa2	Weak	0	-1	Moderate -
PARAGUAY	Ba2 - B1	Neutral	0	0	Weak +
PERU	Baa1 - Baa3	Neutral	0	0	Moderate +
PHILIPPINES	Baa1 - Baa3	Neutral	0	0	Moderate +
POLAND	Aa3 - A2	Weak +	-1	0	Strong -
PORTUGAL	A2 - Baa1	Weak -	-1	0	Moderate -
QATAR	Aa2 - A1	Weak -	0	0	Strong -
ROMANIA	Baa2 - Ba1	Weak	-1	0	Weak +
RUSSIA	Baa3 - Ba2	Neutral	0	0	Moderate -
SAUDI ARABIA	Aa3 - A2	Weak +	0	0	Strong
SINGAPORE	Aaa - Aa2	Weak +	0	1	Very Strong
SLOVAKIA	A2 - Baa1	Neutral	0	0	Strong -
SLOVENIA	Baa1 - Baa3	Weak	-2	-2	Weak -
SOUTH AFRICA	A2 - Baa1	Weak +	-1	0	Moderate +
SPAIN	A1 - A3	Weak	-1	0	Moderate +
SRI LANKA	Baa3 - Ba2	Weak +	0	0	Moderate -
SWEDEN	Aaa - Aa2	Neutral	0	0	Very Strong
SWITZERLAND	Aaa - Aa2	Weak	0	0	Strong +
TAIWAN	Aa1 - Aa3	Weak	0	-1	Strong
TAJIKISTAN	na	Neutral	-1	-1	Very Weak -
THAILAND	Baa1 - Baa3	Weak	0	0	Moderate
TRINIDAD and TOBAGO	Baa3 - Ba2	Neutral	0	0	Moderate -
TUNISIA	Ba3 - B2	Weak	0	0	Weak
TURKEY	A3 - Baa2	Weak	0	0	Moderate
UKRAINE	Caa2 - C	Weak +	0	0	Very Weak -
UNITED ARAB EMIRATES	Aa1 - A3	Weak -	0	0	Strong -
UNITED KINGDOM	Aaa - Aa2	Neutral	0	-1	Very Strong -
UNITED STATES	Aaa - Aa2	Weak +	1	-1	Very Strong -
URUGUAY	A2 - Baa1	Neutral	-1	-1	Moderate
UZBEKISTAN	na	Neutral	0	-1	Very Weak +
VIETNAM	Ba3 - B2	Very Weak	0	0	Very Weak +

Appendix 5: Scorecard Ratios: Scoring Thresholds, Weights and Definitions

	VS+	VS	VS-	S+	S	S-	M+	M	M-	W+	W	W-	VW+	VW	VW
Asset Quality (25%)	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	>
Problem Loans / Gross Loans	0.5%	0.75%	1.0%	1.5%	2%	3%	4%	5%	6%	8%	10%	15%	20%	25%	25%
Capital (25%)	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	<
Tangible Common Equity / RWAs (Basel I)	23.8%	21.4%	19.0%	17.1%	15.7%	14.3%	12.9%	11.4%	10.0%	8.6%	7.1%	5.7%	4.3%	2.9%	2.9%
Tangible Common Equity / RWAs (Basel II)	25.0%	22.5%	20.0%	18.0%	16.5%	15.0%	13.5%	12.0%	10.5%	9.0%	7.5%	6.0%	4.5%	3.0%	3.0%
Tangible Common Equity / RWAs (Basel III)	25.0%	22.5%	20.0%	18.0%	16.5%	15.0%	13.5%	12.0%	10.5%	9.0%	7.5%	6.0%	4.5%	3.0%	3.0%
Profitability (15%)	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	<
Net income / tangible assets	2.5%	2.25%	2.0%	1.75%	1.5%	1.25%	1.0%	0.75%	0.5%	0.375%	0.25%	0.125%	0.0%	-1.0%	-1.0
Funding Structure (20%)	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	>
Market funds / tangible banking assets	2.5%	3.75%	5.0%	7.5%	10%	15%	20%	25%	30%	35%	40%	50%	60%	70%	70%
Liquid resources (15%)	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	<
Liquid Assets / tangible banking assets	70%	60%	50%	40%	35%	30%	25%	20%	15%	10%	7.5%	5.0%	3.75%	2.5%	2.5%

All our ratios are on a fully-adjusted basis, in accordance with our cross-sector rating methodology, *Financial Statement Adjustments in the Analysis of Financial Institutions*, published December 19, 2013. In addition to this, please note the following modifications to our existing ratio definitions.

Tangible Common Equity (TCE)

TCE is the sum of common equity, less goodwill and other intangibles, plus equity credit for "high trigger" contingent capital instruments. Deferred tax assets are capped at 10% of the total.

Tangible Assets

Tangible assets are total assets, less derivatives, less goodwill and other intangibles.

Tangible Banking Assets

Tangible banking assets are total tangible assets (see above) less insurance assets.

Market Funds

Market funds are funds due to other financial institutions, short term borrowings, trading liabilities, other financial liabilities at fair value though profit and loss, senior bonds, notes and other long-term borrowings, less trading derivatives, less 50% of covered bonds.

Liquid Assets

Liquid assets are cash and balances with central banks, funds due from other financial institutions, trading securities, available-for-sale securities, other securities, government investment securities (held to maturity) , unearned income from securities, less trading derivatives.

Appendix 6: Forward-Looking Analysis of Asset-Quality

Our ratings are forward-looking views of credit quality, based on assessments of qualitative and quantitative data. For banks, an important component of any judgment about credit quality will be the performance of the loan portfolio, and the 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 'expected loss' rates over coming years. This approach focuses 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 employ leading indicators to 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, key growth drivers, 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.[74] However, in all instances we select indicators according to 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 considers a variety of factors including the macroeconomic outlook articulated via our Global Macro Outlook,[75] secular trends in asset quality, and structured finance data on delinquencies and loss rates. In addition, local delinquency laws and regulations, accounting practices, and other relevant quantitative indicators and qualitative information are also considered. Individual banks' asset quality is also 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) rates are based on academic literature and local experience and knowledge. Where data limitations impede full analysis, we adopt conservative assumptions about exposures and loss rates, consistent with our other methodologies.

Using these outlooks and associated loss rates, and forward-looking views on how banks' income and securities portfolios will evolve, we assess the likely evolution of banks' balance sheets. Key outputs are the three ratios that inform the Solvency component of the BCA Scorecard, although this may be expanded over time.

Moving from central case to stress tests

These granular assessments of future credit 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 on 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. Given the global nature of our main rating scales, the consistency of these tests is a key concern.

For this reason, we link our systematic stress tests explicitly to the forward-looking expected loss rates that inform the 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 then impact on banks' balance sheets in the normal manner.

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[74] See for instance 'Leading indicators of Asset-Quality for Banks in Eastern Europe and the Middle East', 11 November 2013, and 'Leading Indicators of Asset Quality for Banks in Asia Pacific', 27 January 2014.

[75] See for instance 'Global Macro Outlook 2014-15: Summer lull: Subdued, but less risky global growth likely', 11 August 2014.

These 'multipliers' are broadly based on the Basel II 'internal ratings based' (IRB) approach to risk measurement; but the precise calibrations in this framework have been adjusted in light of the recent 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 41.[76] We use multipliers based on the 96th percentile of the implied loss distribution, roughly corresponding to a '1 in 25' year event.

EXHIBIT 41
Illustrative Multiplier Curve
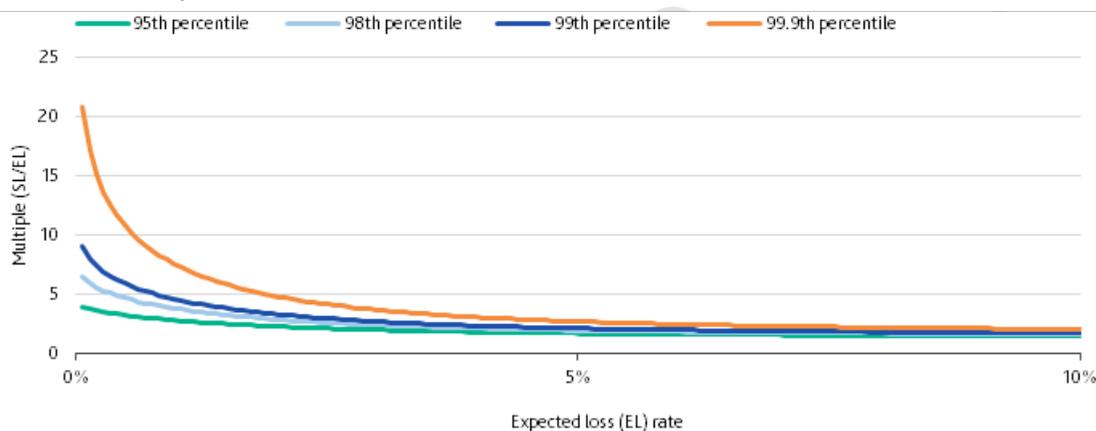
Source: Moody's

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 idealised 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 suffer 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 component 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 favoured by regulators, based on our proprietary models or banks' own internal processes[77]. The results of these analyses can play a significant role in determining Asset Quality, Capital and Profitability scores. However, our Rating Committees will still be able to adjust and change any of the assumptions in these analyses, or the systematic stress testing process.

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[76] For more information on these multipliers, see 'Expected and unexpected bank losses: revisiting the Basel approach', 11 April 2014.

[77] See our Special Comment, Modelling links between economic factor and bank losses, published June 9, 2014.

Appendix 7: Loss Given Failure: Underlying Assumptions

In determining our Loss Given Failure framework for Operational Resolution Regimes we employed a modelling approach which we describe in more detail below. Technically speaking it is closely based upon the model approach used by our Corporate Finance Group[78].

Framework for deriving expected Loss Given Failure

A bank's obligation-specific expected loss given failure rates are derived from a probability distribution of its firm-wide recovery rates at resolution and the expected security and priority of claim in bankruptcy of its expected liabilities at default.

The probability distribution of its firm-wide recovery rates at default resolution assigns a specific probability to each conceivable firm-wide recovery rate scenario. That is, it specifies the likelihood that the bank's overall recovery rate will be 0% or 1% or 2%, etc., all the way to 100% (representing full recovery for all debts) and beyond, in recognition of the possibility that firm value will be large enough at resolution that preferred and even common shareholders may receive some proceeds.

The expected liability structure at default includes both debt and non-debt obligations. Expected priority of claim is generally determined by the prevailing resolution regime, but may be modified where we believe that, in practice, a different sequence is more likely to be followed that that prescribed in the current regime[79].

This information is generally sufficient to estimate each obligation's likely expected loss given failure rate. For each possible enterprise value at resolution, the payouts for each obligation are determined by the priority of claim "waterfall." Each obligation's expected loss given failure rate is then generally determined by the probability-weighted average of its loss given failure rates across these scenarios. The resultant probability-weighted expected losses are then mapped to ratings according to the relative loss rates detailed in Exhibit 47 in Appendix 8.

A number of assumptions are employed in the model as follows.

Assumptions

Average family loss given failure rates

As detailed above, the average family loss given failure rates are determined by our judgment regarding the inherent volatility of assets and the form of resolution. These are ultimately determined on a bank-by-bank basis.

Determination of loss given failure distribution

Our initial assumptions for the mean loss given failure rate and its distribution around the mean are based upon an analysis of several sources of data. One such source is the US FDIC, which provides a long and rich time series of loss data covering over 2,500 failed banks since 1986.

While this source is necessarily restricted to a single country, we believe it provides useful information regarding loss rates. The mean loss rate as a proportion of total assets is 25%, with a median of 21%. There is considerable dispersion around the mean, with a standard deviation of 30%, and a material

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[78] See the Cross-Sector methodology, Loss Given Default for Speculative-Grade Non-Financial Companies in the U.S. , Canada and EMEA, published June 2009.

[79] For example, a number of governments, faced with failing institutions, have enacted emergency legislation in order to modify the priority of claim. We believe that, in particular, deposits may be de facto preferred in some systems even when this is may not be the case under bankruptcy law.

proportion (14%) with losses of zero or less (i.e., more than full recoveries for the FDIC). The distribution closely resembles a truncated normal distribution.

EXHIBIT 42
Probability Distribution of FDIC Reported Loss Rates
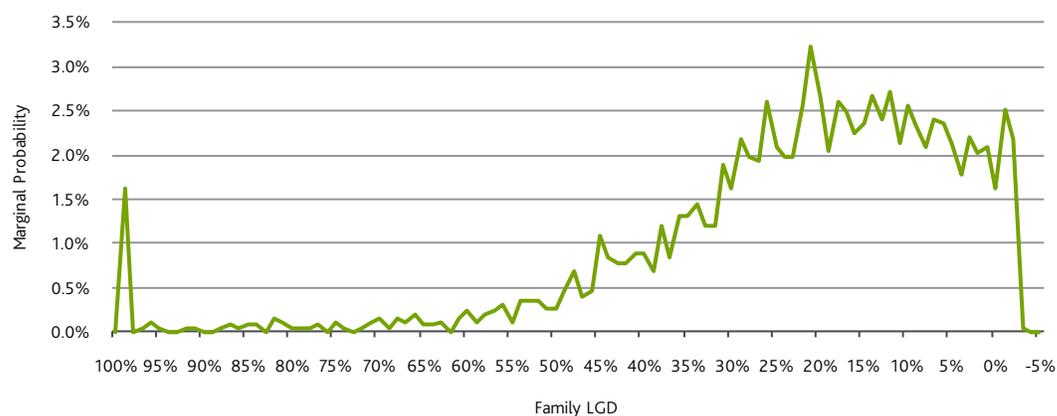
Source: Federal Deposit Insurance Corporation, Moody's

It is noteworthy, however, that the vast majority of these observations relate to very small banks. The median total assets of failed banks resolved by the FDIC since 1986 was just $73 million, whilst we rate banks globally with median total assets of $29 billion. Distinguishing between banks by size shows that the larger banks within the FDIC's sample (those with over $1 billion in assets prior to failure) show a mean loss given failure rate of less than half the broad mean, at around 10%.

Meanwhile we have conducted our own study of about 200 rated banks we consider would most likely have failed in the absence of support. As very few of these banks actually defaulted, we sum the losses on distressed exchanges – mostly of hybrid capital instruments – and capital injections as a proxy for the loss given failure; a guide to the total losses that would have been suffered by bondholders had these banks not been supported. This shows a much lower average loss rate of around 3% of total liabilities.

Neither data set offers a fully reliable guide to future losses: the US data is limited to one system, and our own data is distorted by the very government support which resolution regimes are intended to reduce or eliminate. We also believe that a "going concern" resolution itself reduces losses relative to a bankruptcy, by preserving customers, franchise value, funding and, hence, overall enterprise value.[80]

Taking into account these limitations, we use the following judgments to determine two initial loss rates:

» **5% of liabilities.** We apply this rate to banks with lower asset volatility and subject to going concern resolution techniques likely to preserve enterprise value. This may include receivership of a holding company but not the bank itself.

» **10% of liabilities.** We apply this rate to banks with higher asset volatility or those banks subject to a resolution process involving the bankruptcy, receivership or liquidation of the whole bank, which is less likely to preserve franchise value.

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[80] See, for example, our Special Comment on the conclusion of the review of US systemically important banks.

We assume a standard rate of tangible equity capitalisation at failure equivalent to 3% of total liabilities. This is very similar to the minimum leverage ratio under Basel III and, hence, a reasonable estimate of the residual book equity when a resolution is activated. This means that the 5% and 10% loss rates above are equivalent to 8% and 13% of total assets.

We also assume in our modelling that losses are distributed around these means according to a truncated normal distribution, with standard deviations of 6% and 10% respectively. This means that we incorporate into our assumptions the expectation that a minority of banks will not generate losses for creditors in the event of their resolution, and their failure will either be resolved through the provision of emergency liquidity, rather than capital, and / or that any losses will be fully absorbed by shareholders.

Numerous factors may determine the choice between the two initial loss rates employed. In the first instance, we deem banks with Macro Profiles of Very Strong, Strong or Moderate to have lower asset volatility, while those with Macro Profiles of Weak and Very Weak to have higher asset volatility. We also consider banks under the BRRD in the EU or Title II of the Dodd-Frank Act in the US to be subject to a going concern resolution, and banks under Title I of the Dodd-Frank Act to be subject to a resolution process more akin to liquidation

We may choose to apply other loss rates according to our consideration of other factors including but not limited to the following:

» Loss experience on an asset-specific, bank-specific or system-specific basis

» Our judgment of the likely preservation of enterprise value offered by different resolution techniques

» Likely levels of equity capitalisation at failure.

EXHIBIT 43
Assumed Probability Distributions of family Loss Given Failure Rates
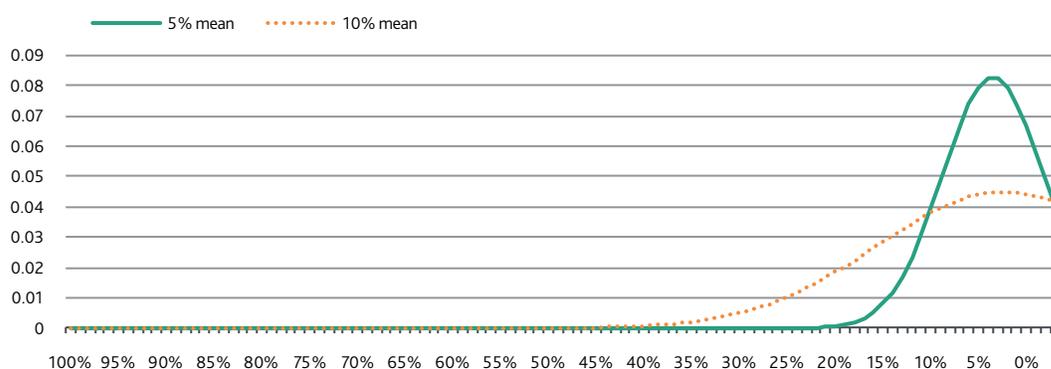
Source: Moody's

Why we do not use a model in our methodology

Our approach is based on model technology, but we do not directly use a model in our analysis. This is because (1) we believe that the inherent uncertainties around resolution makes a modelling approach spuriously precise; and (2) the underlying data on losses and deposit breakdown, while reasonable to form generalised conclusions, is not sufficiently robust in our view to enable us to draw precise individual rating judgments. It is possible, however, that we may in time move to a fully model-based approach, allowing us to integrate a number of other variables, should we be satisfied that the data required is sufficiently reliable.

Appendix 8: Use Of Joint Default Analysis In Support

Our support estimates are determined by our Joint-Default Analysis framework. This approach is also used in many non-financial ratings, for example, corporates and public sector entities.[81]

JDA operates on the principle that the risk of default (and, therefore, loss) for certain obligations depends upon the performance of both the primary obligor and another entity (or entities) that may provide support to the primary obligor. The chief benefit offered by JDA is a consistent, transparent approach to the incorporation of (typically uncertain) non-contractual external support. That said, our bank deposit ratings will continue to be determined through judgment, not through models. Our intention is to be transparent about the judgments we are making and to be consistent in their impact on rating outcomes. Our JDA framework for banks evaluates potential support in a sequential process, or "building block" approach. The intention of the Sequential Support Model 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 BCA or notional BCA, in the case of an Affiliate, and the local-currency rating in the case of a Public sector entity. The second is based on our opinion of the probability that support will be forthcoming when needed. The probability that two parties will jointly default depends on a) the probability that one of them defaults, and b) the probability that the second will default, given that the first has already defaulted. Expressed algebraically, one can write this for events A and B as:

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

Or equivalently,

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

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(•) represents the probability that event "•" will occur and P(• | *) is defined as the conditional probability of event "•" occurring, given that event "*" has occurred. Our ratings can be used to infer directly the probability that a particular issuer will default (P(A) and P(B)). But in order 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 in theory, one can tackle this problem directly by estimating either one of the conditional default probabilities described in equations (1) and (2), it may be more intuitive to focus on the product of the conditional probability of default for the lower-rated, or supported, firm and the unconditional probability of default for the higher-rated, or supporting, firm. Using L to denote the event "lower-rated obligor L defaults on its obligations" and H to denote "higher-rated obligor H defaults on its obligations," we can rewrite equation (1) as:

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

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[81] For an explanation of the principles of JDA, please see Moody's Special Comment The Incorporation of Joint-Default Analysis into Moody's Corporate, Financial and Government Rating Methodologies, February 2005

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

• P(L | H) = 1. Suppose that the financial health of an issuer is crucially linked to the operations of another, higher-rated entity. For example, the default risk of a distributor in a competitive distribution market dominated by a single supplier may be highly dependent on the financial health of that supplier. In other words, the conditional probability of the distributor's default given a default by the higher-rated supplier, P(L | H), is equal to one. In this case, events L and H are maximally correlated. 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 uncorrelated and independent of one another. 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, maximum correlation (i.e., where P(L | H) = 1) and independence, (i.e., where P(L | H) = P(L))

Intermediate Levels Of Correlation

We propose here a simple tool for modelling intermediate cases of default risk linkage. Let us denote the variable W as a correlation weighting factor, where W = 1 corresponds to a maximum theoretical correlation between the default of the lower-rated entity and that of the higher-rated entity; and W = 0 corresponds to a complete independence (i.e., zero correlation) between default events. Fractional values of W indicate intermediate levels of correlation 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 44

Support Probability Assumptions by Category

Support levels	Lower	Upper
Government-backed	95%	100%
Very High	70%	94%
High	50%	69%
Moderate	30%	49%
Low	0%	29%

EXHIBIT 45

Dependence (correlation) Assumptions by Category

Dependence	
Very High	90%
High	70%
Moderate	50%

Default probabilities, expected loss rates and ratings

We map default probabilities to ratings according to a "normalized" range of relative default probabilities and expected loss rates. These do not correspond to any actual default or loss experience, but merely express the relative difference between the risk of each rating level. This differential is, however, closely based on our idealised loss experience over a four-year time horizon, which we have adapted to produce what we term a "horizon-free vector", which does not correspond to any particular time horizon or experience. Formally speaking, the risk multiple separating successive ratings is 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 38%. This relationship holds across the rating scale, with the exception of Aaa. As Aaa ratings are only assigned to obligations which we consider to be of the highest quality, subject to the lowest level of credit risk, the risk multiple between Aaa and 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 a Aa1 rated support provider.

This is a small but technical change from our previous methodology, where we employed the 4-year idealised default rates in applying JDA. The difference can be seen in Exhibit 46 below.

EXHIBIT 46

Relative Default and Expected Loss Rates, Horizon-Free Vector Versus 4-year Idealised Curve
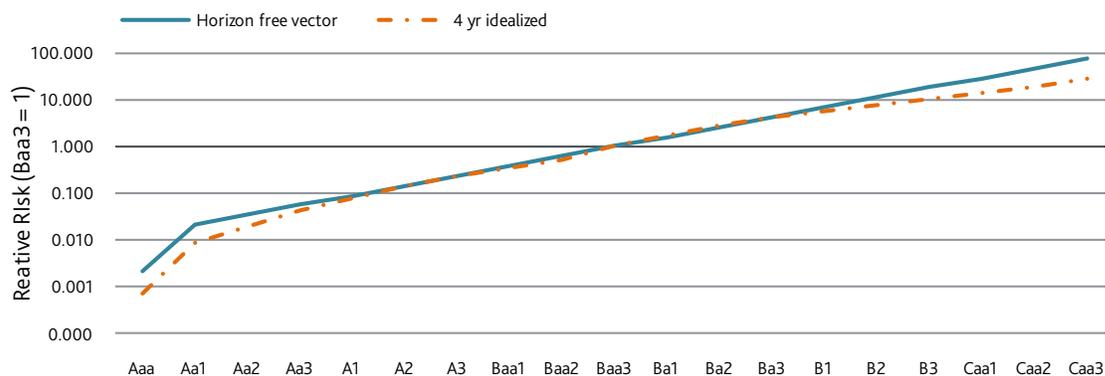
Source: Moody's. Note: Baa3 is normalized to 1.

The revised relative default rates and thresholds for JDA uplift are reproduced in Exhibit 47 below. The same relativities apply to the mapping from expected losses to ratings and vice versa used in LGF.

EXHIBIT 47

Default rate lookup		Reverse rating lookup	
BCA	**Relative default rate (baa3 = 1)**	**Lower bound threshold**	**Local-currency deposit rating**
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	56.76	Caa2
caa3	76.01		

Appendix 9: Calibration and Backtesting

Introduction

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. Would it have been possible to predict ex ante which banks were more likely to default or receive support from a parent, local or national government? This short note describes a model of the 1 year probability of experiencing a BCA event for the universe of banks we rate, conditional on bank financial data and macro variables.

Data

Data are comprise annual financial statement 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 48 summarises the number of banks and BCA events per country in the sample.

EXHIBIT 48
Number of Banks and BCA Events in Sample, by Country

Domain	# 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

The data source on banks' balance sheets and ratios is Moody's Banking FM. The dataset covers the majority of rated banks although coverage can be limited in the earlier years when the database was first being populated. Macroeconomic data are sourced from the IMF and the World Bank.

The Model

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. Similar to previous studies attempting to predict bank failure, the model 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 non linear 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).[82] 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 (and ratios) and macro variables, the estimated parameters of the preferred model can be found in Exhibit 49.

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 is 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 is higher. This indicator variable largely captures the high number of events in Ukraine early in the crisis and euro area periphery later in the crisis. Moreover, if the sovereign has been downgraded by two notches or more over the past year, a bank in that country is more likely to default.

Bank characteristics

A number of bank characteristics are found significant predicting BCA events in the preferred specification. The following characterises banks that had a high probability of a BCA event: large banks measured by total assets, banks with more market funds (long and short-term debt including amounts due to other banks) to total assets, banks with less liquid assets to total assets, banks with

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[82] If no variables can help explain why a bank had a BCA event we would simply get a probability equal to the unconditional average:

$$P(I_{BCA,t+1} = 1) = \Psi(\hat{\alpha}) = \frac{165}{5182} = 3.18\%$$

more problem loans relative to total loans, banks with lower TCE relative to RWAs, banks with lower return on equity and lower net income to total assets.

The finding that larger banks are more likely to have a BCA event may be counterintuitive, but is simply a reflection of the recent crisis where the majority of BCA events were support events rather than direct default/bankruptcy events; larger banks were more likely to receive support as they are considered more systemically important.

Notice the importance of accounting for negative earnings. While a lower return on equity predicts a higher chance of a BCA event, the probability increases materially if return on equity is negative; if in addition net income to total assets is 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 are 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 is to experience more BCA events.[83]

» Short-term (one-year) country-specific real GDP growth: Once real GDP slows materially, the country is 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.

It is worthwhile emphasising 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 where the US unemployment rate is expected to increase by 2 percentage points over the following year. Bank B has a capital ratio of 8% in a year where the US unemployment rate is expected to remain unchanged over the following year. Everything else 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 as 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 any other year.

Model fit

The model has a very good in sample fit[84]. 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 less than 3.18%. Overall, the model correctly classified 82.8% of the observations relative to the unconditional average probability of a BCA event.

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[83] 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.

[84] 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.

It is possible that the latest 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 RWA 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 49
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 RWA	-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.

Appendix 10: How Risky Are Banks?

Calibrating BCAs

Our calibration of BCAs has been informed by an analysis of historical bank failures. This analysis has led us to conclude that the median BCA should be in the low investment-grade to high non-investment-grade range, i.e., the 'typical' bank in a 'typical' system should have a BCA of ba1/baa3. This is in fact broadly consistent with our current BCA median, and is one reason why we do not anticipate major rating changes as a consequence of this revised methodology. This would place many banks in either of the following categories, according to our BCA definitions:

Issuers assessed baa are judged to have medium-grade intrinsic, or standalone, financial strength, and thus subject to moderate credit risk and, as such, may possess certain speculative credit elements absent any possibility of extraordinary support from an affiliate or a government.[85]

Issuers assessed ba are judged to have speculative intrinsic, or standalone, financial strength, and are subject to substantial credit risk absent any possibility of extraordinary support from an affiliate or a government.[86]

Banks with superior fundamentals are likely to have BCAs in the "a" category:

Issuers assessed a are judged to have upper-medium-grade intrinsic, or standalone, financial strength, and thus subject to low credit risk absent any possibility of extraordinary support from an affiliate or a government.[87]

This means that we consider the "aa" category to be available to only a very limited number of exceptionally strong institutions:

Issuers assessed aa are judged to have high intrinsic, or standalone, financial strength, and thus subject to very low credit risk absent any possibility of extraordinary support from an affiliate or a government.[88]

While theoretically available, we cannot currently envisage a situation in which a bank would be assigned a BCA of aaa. This reflects historical default and support data, coupled with our view that the high transition risk exhibited by banks is inconsistent with the definition for the highest category of BCAs.

What is the standalone riskiness of banks?

Inherent within any methodology is a view regarding the inherent riskiness of a given industry. Some industries, such as airlines, are relatively cyclical and, hence, regarded as risky, while others, such as food retail, are less prone to shocks due to a stability of demand and are, hence, considered less risky.

Addressing the question of the inherent riskiness of banks involves a number of challenges not commonly found in other industries, however:

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[85] See *Rating Symbols and Definitions*, August 2014

[86] Ibid

[87] Ibid

[88] Ibid

» As banks frequently receive support from central banks and governments, in recognition of their importance to the proper functioning of an economy, the incidence of extraordinary support cannot reliably be observed.

» Moreover, in many cases it is impossible to be certain whether or not such extraordinary support prevented a default.

» Bank failures tend to occur in "clusters", i.e., they are typically concentrated in short periods of time. This makes any analysis of their failure rate highly sensitive to the time period selected.

» Over time, the population of banks shifts constantly and, hence, it is hard to establish a constant cohort of banks within which to monitor the incidence of support.

Our analysis draws on three different sources of data:

» The incidence of bank support to prevent default since the introduction of our current methodology in 2007;

» The incidence of bank defaults since the introduction of bank ratings in 1983; and

» The incidence of bank support by the FDIC in the US since its introduction in 1934.

Many of the banks we rate received support to prevent default

As noted above, we identified 165 banks globally that we believe would have defaulted in the absence of support provided, either by group affiliates or most often by governments or central banks. Given our total universe of just over 1,000 rated banks globally, this suggests a failure rate over the 2006-12 period of 16%. On an annualised basis this is equivalent to just over 2%, or an approximate default rate consistent with that displayed by Ba3 rated issuers over the long run.

It is important to note that these failure rates vary considerably by region. During this crisis, bank failures have been concentrated in Europe and North America, while failure rates in the rest of the world have been much lower.

We do not necessarily read this, however, as an indication that European and North American banks are inherently more vulnerable than those elsewhere: after all, Latin American and Asian regions have regularly seen banking crises over prolonged periods. However, in the recent past, thanks in part to more favourable growth dynamics, banking crises have been more muted here. Nor do we interpret this data as an indication that banks are necessarily non-investment grade: as noted above, the study is heavily skewed to a period of crisis in many regions, and, hence, it is likely to over-estimate the level of risk over the long run.

Bank default rates

We have rated banks since 1983 and have about 30 years of default history for the rated universe of banks. This reveals a mean annual default rate of around 0.6%, equivalent to the default rate demonstrated by issuers rated Baa3.

EXHIBIT 50
Default Rate of Moody's-Rated Global Bank Debt
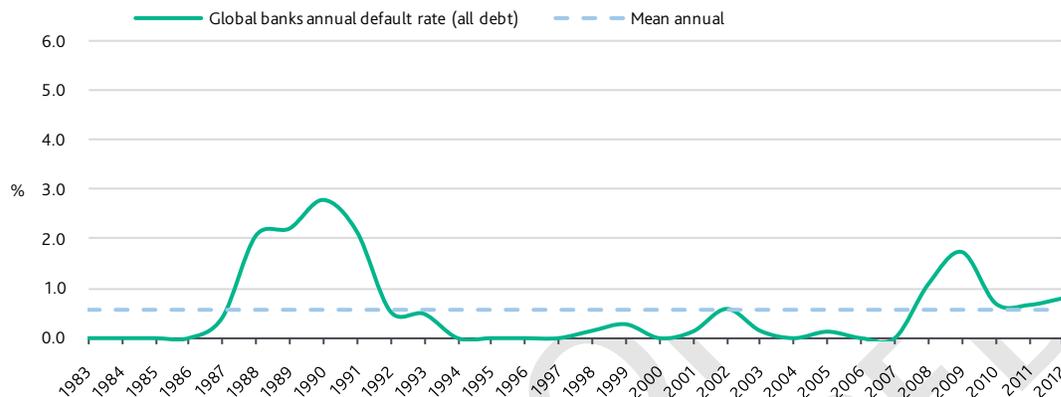
Source: Moody's

However, as noted above, this data is distorted by several factors:

» Default rates do not tell us how many institutions avoided default through the provision of support.

» Over time, the rated population has shifted progressively and significantly away from the US towards Europe, Latin American and Asia, so the population is not constant and the default rate in the late 1980s, for example, is not directly comparable to that in the late 2000s.

It is useful, therefore, to isolate a single country and measure default rates over time. Taking the US offers the best long-run time series, incorporating two distinct crisis phases, those of the late 1980s and early 1990s. This shows an annual default rate of 0.8% – about the default rates demonstrated by issuers rated Ba1.

While once again there is some distortion in the denominator due to the shifting nature of the banks we rate, this is logically much less the case than in global statistics. Moreover, we believe that support considerations do not materially change the outcome. This is because the US has a long history of allowing all but the largest banks to fail, and, therefore, while the *volume* of debt that has been supported is likely large, the *number* of banks supported (as shown in our statistics) is low.

EXHIBIT 51
Default Rate of Moody's-Rated US Bank Debt
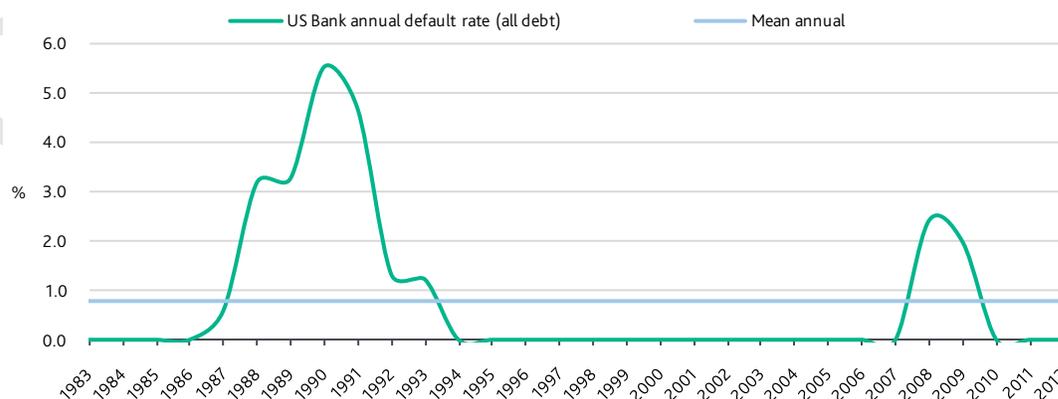
Source: Moody's

FDIC support rates

It is instructive to compare this with the incidence of bank failures recorded by the FDIC since it began to insure deposits in 1934. This data offers the advantage of a long and consistent database for a large population of banks (7,083 institutions at end-2012). Over this 80-year period, the average annual failure rate (defined as the number of banks requiring FDIC assistance, or experiencing outright failure) is 0.44%. This is close to the default rate shown by issuers rated Baa2. As already noted, these failures occur in distinct phases: the 1930s (although the very high failure rates observed during the Great Depression and which triggered the creation of the FDIC itself precede this period); the late 1980s and early 1990s, and the last six years.

EXHIBIT 52
Proportion of FDIC Registered Institutions Failing or Requiring Assistance Requiring Assistance
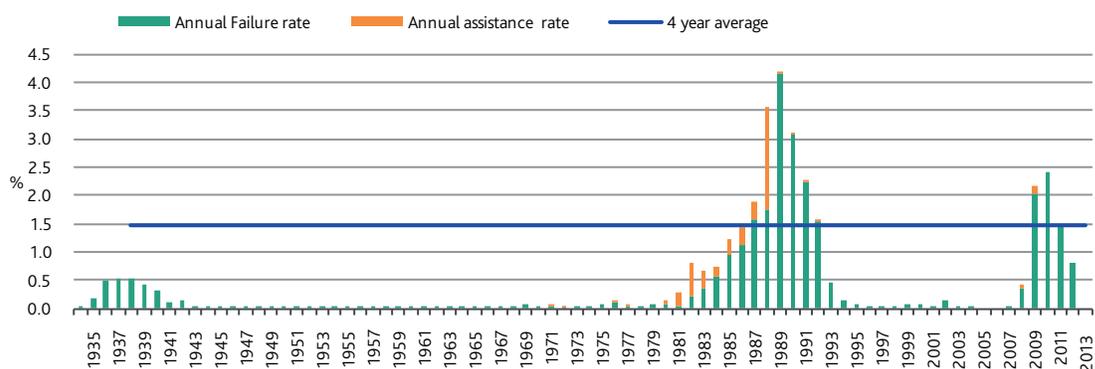
Source: Federal Deposit Insurance Corporation, Moody's

In order to compare with our own dataset, the failure rate since 1983 (aligned with our bank default history) is 0.98% -- slightly superior to the 0.8% noted above. This is around the one-year default rate recorded by issuers rated Ba2.

This analysis suggests that for a system such as the US, a failure rate of between 0.5% and 1% is likely, albeit with significant volatility around this mean. This suggests that a median BCA of between ba2 and baa3.

Appendix 11: Impact Assessment[89]

EXHIBIT 53

Summary of Estimated Impact – Baseline Credit Assessments

Region	Number in sample	Impact (notches)						Balance up / down	Weighted average notch change	Average BCA
		-2	-1	0	1	2	3			
North America	79	0%	0%	100%	0%	0%	0%	0%	0.0	a3
EU and Other Western Europe	292	0%	2%	94%	2%	1%	0%	1%	0.0	ba1
Asia Pacific	186	0%	1%	91%	5%	2%	0%	6%	0.1	baa3
CIS and Western Asia	144	0%	0%	97%	3%	0%	0%	3%	0.0	b2
Latin America	120	1%	1%	98%	0%	0%	0%	-2%	0.0	ba2
MEA	107	0%	1%	96%	3%	0%	0%	2%	0.0	ba2
WORLD	**928**	**0%**	**1%**	**95%**	**3%**	**1%**	**0%**	**2%**	**0.0**	**ba2**

Source: Moody's

EXHIBIT 54

Summary of Estimated Ratings Impact – Deposits (local currency)

Region	Number in sample	Impact (notches)						Balance up / down	Weighted average notch change	Average rating
		-2	-1	0	1	2	3			
North America	75	0%	0%	12%	8%	75%	5%	88%	1.7	A1
EU and Other Western Europe	275	0%	4%	16%	24%	49%	5%	75%	1.4	Baa1
Asia Pacific	173	3%	5%	88%	3%	1%	0%	-3%	-0.1	A3
CIS and Western Asia	143	0%	2%	95%	3%	0%	0%	1%	0.0	B2
Latin America	112	0%	13%	84%	2%	1%	0%	-11%	-0.1	Ba2
MEA	102	0%	19%	79%	2%	0%	0%	-17%	-0.2	Baa3
WORLD	**880**	**1%**	**6%**	**59%**	**10%**	**22%**	**2%**	**27%**	**0.5**	**Baa2**

Source: Moody's

EXHIBIT 55

Summary of Estimated Ratings Impact – Deposits (foreign currency)

Region	Number in sample	Impact (notches)						Balance up / down	Weighted average notch change	Average rating
		-2	-1	0	1	2	3			
North America	13	0%	0%	85%	15%	0%	0%	15%	0.2	A1
EU and Other Western Europe	261	0%	4%	16%	23%	50%	5%	75%	1.4	Baa1
Asia Pacific	179	0%	2%	94%	3%	1%	0%	2%	0.0	A3
CIS and Western Asia	141	0%	2%	95%	3%	0%	0%	1%	0.0	B2
Latin America	117	0%	6%	92%	1%	1%	0%	-4%	0.0	Ba2
MEA	102	0%	4%	94%	2%	0%	0%	-2%	0.0	Baa3
WORLD	**813**	**0%**	**3%**	**69%**	**9%**	**16%**	**2%**	**24%**	**0.4**	**Baa2**

Source: Moody's

EXHIBIT 56

Summary of Estimated Ratings Impact – Senior Unsecured Debt (local currency)

Region	Number in sample	Impact (notches)						Balance up / down	Weighted average notch change	Average rating
		-2	-1	0	1	2	3			
North America	72	1%	61%	29%	6%	1%	1%	-54%	-0.5	A3
EU and Other Western Europe	143	0%	14%	24%	36%	21%	3%	48%	0.8	Baa1
Asia Pacific	31	3%	0%	97%	0%	0%	0%	-3%	-0.1	A1
CIS and Western Asia	48	0%	2%	94%	4%	0%	0%	2%	0.0	B1
Latin America	22	0%	9%	86%	5%	0%	0%	-5%	0.0	Ba2
MEA	8	0%	0%	100%	0%	0%	0%	0%	0.0	Ba1
WORLD	**324**	**1%**	**21%**	**49%**	**18%**	**10%**	**2%**	**9%**	**0.2**	**Baa2**

Source: Moody's

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[89] Sample comprises principal banks with a standalone BCA.

EXHIBIT 57

Summary of Estimated Ratings Impact – Senior Unsecured Debt (foreign currency)

	Number in sample	Impact (notches)						Balance up / down	Weighted average notch change	Average rating
Region		-2	-1	0	1	2	3			
North America	11	0%	0%	91%	9%	0%	0%	9%	0.1	A3
EU and Other Western Europe	100	0%	7%	22%	42%	23%	5%	64%	1.0	Baa1
Asia Pacific	70	0%	10%	89%	1%	0%	0%	-9%	-0.1	A1
CIS and Western Asia	25	0%	0%	96%	4%	0%	0%	4%	0.0	B1
Latin America	31	0%	10%	84%	3%	3%	0%	-3%	0.0	Ba2
MEA	37	0%	11%	84%	5%	0%	0%	-5%	-0.1	Ba1
WORLD	**274**	**0%**	**8%**	**64%**	**18%**	**9%**	**2%**	**21%**	**0.3**	**Baa2**

EXHIBIT 58

Estimated Impact on European Bank Ratings Under Different Support Scenarios – Deposits (local currency)

	Number in sample	Impact (notches)							Balance up / down	Weighted average notch change	Average rating
Support Scenario		<=-3	-2	-1	0	1	2	>=3			
Current	275	0%	0%	4%	16%	24%	49%	6%	75%	1.4	Baa1
Reduced	275	1%	2%	8%	26%	36%	26%	2%	52%	0.8	Baa1
Eliminated	275	5%	6%	22%	29%	21%	16%	1%	4%	0.0	Baa2

Source: Moody's

EXHIBIT 59

Estimated Impact on European Bank Ratings Under Different Support Scenarios – Deposits (foreign currency)

	Number in sample	Impact (notches)							Balance up / down	Weighted average notch change	Average rating
Support Scenario		<=-3	-2	-1	0	1	2	>=3			
Current	261	0%	0%	4%	16%	23%	50%	6%	75%	1.4	Baa1
Reduced	261	1%	2%	8%	26%	36%	26%	2%	53%	0.8	Baa1
Eliminated	261	5%	7%	21%	31%	20%	16%	1%	4%	0.0	Baa2

Source: Moody's

EXHIBIT 60

Estimated Impact on European Bank Ratings Under Different Support Scenarios – Senior Unsecured Debt (local currency)

	Number in sample	Impact (notches)							Balance up / down	Weighted average notch change	Average rating
Support Scenario		<=-3	-2	-1	0	1	2	>=3			
Current	143	0%	0%	14%	24%	36%	21%	4%	48%	0.8	Baa1
Reduced	143	2%	10%	24%	29%	23%	10%	1%	-2%	0.0	Baa2
Eliminated	143	19%	22%	24%	22%	9%	3%	0%	-52%	-1.2	Baa3

Source: Moody's

EXHIBIT 61

Estimated Impact on European Bank Ratings Under Different Support Scenarios – Senior Unsecured Debt (foreign currency)

	Number in sample	Impact (notches)							Balance up / down	Weighted average notch change	Average rating
Support Scenario		<=-3	-2	-1	0	1	2	>=3			
Current	100	0%	0%	7%	22%	42%	23%	6%	64%	1.0	Baa1
Reduced	100	1%	6%	22%	30%	28%	12%	1%	12%	0.2	Baa2
Eliminated	100	13%	24%	19%	29%	10%	4%	1%	-41%	-1.0	Baa3

Source: Moody's

Support scenarios

» **Current.** Current support assumptions are maintained and applied using JDA.

» **Reduced.** Banks considered global systemically important financial institutions are assigned two notches of government support. Other banks for which we currently assume a "Moderate" or higher probability of systemic support are assigned one notch of government support uplift. Other banks for which we assume a probability of systemic support below "Moderate" are assigned no government support. However we maintain the current level of support for banks which currently receive four or more notches of systemic support, as this may indicate exceptional idiosyncratic factors.

» **Eliminated.** No government support is assigned and instrument ratings are aligned with their PRAs, subject to any applicable currency or sovereign ceilings.

» Sample includes banks in the EU, Liechtenstein, Norway and Switzerland.

Appendix 12: Step-by-Step Guide for Rating "high trigger" Securities

As discussed, the credit risk of a "high trigger" security consists of losses being imposed not just at the point of non-viability, but also earlier, following some deterioration in financial strength ahead of failure. To assess both these risks, our model captures both **the probability of a bank's failure** and **the probability of a trigger breach**, as well as loss severity should either or both of these events occur. Our framework also captures the risk of coupon suspension, for Additional Tier 1 securities, in the notching for the related non-viability security rating and, for "high trigger" securities, we rate to the lower of the model-implied rating and the non-viability security rating.

Here is the step-by-step guide for rating "high trigger" securities.

Step 1: Determining the probability of a high-trigger breach

For a "high trigger" security issued by specific bank, we assume in this example a trigger breach event occurs if the bank's CET1 ratio falls below 7%. To estimate this probability, we also assume that the distribution of a bank's future CET1 ratios follows a normal distribution[90], which can be derived from two bank-specific data inputs:

» **The bank's last-reported CET1 ratio**, possibly adjusted for our forward view of capital, is the mean of the distribution of forward CET1 ratios. On the curve, this is represented by the dark blue line (CET1 of 10% in Exhibit 62). Since we assume a normal distribution, a bank's CET1 ratio has a 50% of 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 I 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%[91] 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, 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 62, this is area A).

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[90] Before deciding to use a normal distribution in the forward capital model, we considered a number of alternatives, each of which have their own limitations. The model is just one input into our approach for rating "high trigger" securities and, while 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 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.

[91] 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%.

EXHIBIT 62
Modeling Contingent Bank Capital Securities
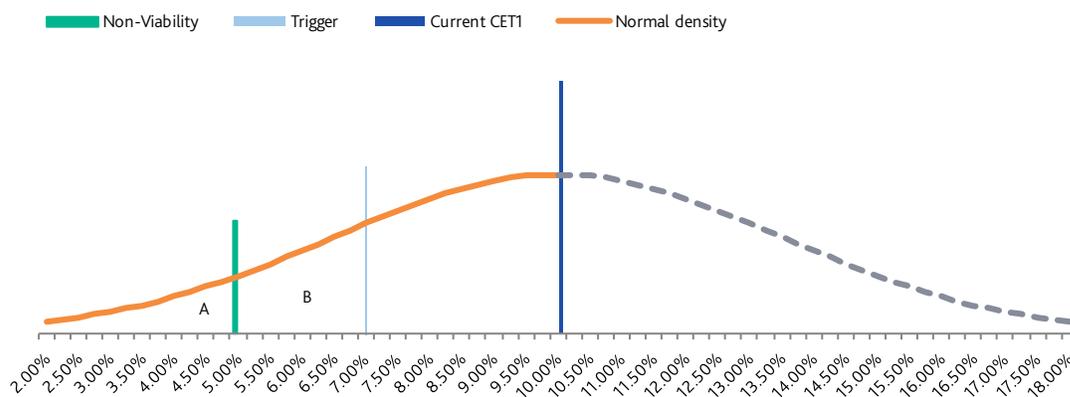
Source: Moody's

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 CET 1 ratio moving to any level, including the probability of landing in the area at or below the 7% threshold of interest to us in this case – light blue line in Exhibit 62. The area under the curve to the left of that line, represented by the sum of area A and area 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-implied rating

Once we have determined the probability of a trigger breach, we can map to a rating using the four-year idealized default table. The model-implied rating 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 would add an additional 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 the next section.

Accessing the model

The model can be accessed by sending an e-mail to figmodels@moodys.com or a fax to +1.212.658.9475 requesting it. The model does not reflect all additional factors that may be taken into consideration by Moody's Investors Service in determining the actual inputs to our rating analysis, or the ratings we would assign to any particular securities.

Step 2: Capping "high trigger" Security Ratings at the Level of the Non-Viability Security Rating

We will cap the "high trigger" security rating at the level of the non-viability security rating if the model-implied rating outcome points to a "high trigger" security rating that is above the bank's non-viability security rating[92]. That is because a "high trigger" security rating is comprised of the credit risk of its non-viability component **_and_** that associated with the distance to trigger breach, which means the "high trigger" rating could never be above the non-viability security rating.

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[92] This is possible because, although the "high trigger" security rating outcome could never be higher than the bank's BCA, our ratings for non-viability ratings are notched from the bank's Adjusted BCA, typically two to three notches below this anchor point, depending on whether the security is a Tier 2 or Additional Tier 1 security.

In some cases, a bank may not have a non-viability security with the same host as the "high trigger" security. To determine the non-viability security rating cap in this situation, we would assume that the bank issued a non-viability security consistent with the form or 'host' of the "high trigger" security being issued – either Tier 2 or Additional Tier 1. We would then notch accordingly from the bank's Adjusted BCA to determine the cap.

Of note, the model-implied rating outcome only considers 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, this risk is already captured in the notching for the related non-viability security rating and, for "high trigger" securities, we rate to the lower of the model-implied rating and the non-viability security rating.

By positioning a non-viability Additional Tier 1 security at the bank's Adjusted BCA minus three notches, 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)[93]. Effectively, in assigning ratings to "high trigger" securities, we are rating to the greatest credit risk among a trigger breach, bank-wide failure, and impairment associated with coupon suspension, in the case of an Additional Tier 1 "high trigger" security.

Step 3: Final Positioning of 'High Trigger' Security Ratings Involves Rating Committee Judgment

The model-implied rating that we have developed is only the starting point in positioning the final rating and would not necessarily be the final rating outcome. Consistent with the way we assign bank ratings generally, Rating Committees have the flexibility to use their judgment if they believe a model-based approach (or scorecard, as the case may be) fails to adequately capture the security's credit risk.

Other factors that we may consider in positioning the "high trigger" security rating include:

» **Specific security features that may prompt certain bank 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 not have any qualms allowing the trigger breach to occur, which would make it a relatively riskier security compared to one with equity conversion.

» **Bank-related circumstances.** 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, such as deleveraging or selling off business units, to address a capital problem and avoid a trigger breach. We may also consider how close a bank is to breaching its capital buffers, which would result in coupon suspension. While these factors will also influence a bank's BCA, they could potentially have a greater impact on the positioning of the rating for a "high trigger" security.

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[93] Assuming that the risk of coupon suspension has normal loss severity (55% loss severity compared to 100% for a bank-wide failure), the positioning of non-viability ratings 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 rate the 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.

Glossary of Terms

Moody's Bank Methodology Terminology

Adjusted Baseline Credit Assessment (BCA) (see *Affiliate Support* and *Baseline Credit Assessment*) – The Adjusted BCA is the output of the first step of our Support and Structural Analysis, and measures the probability that a bank will require support beyond that which we deem probable to be provided by its affiliates in order to avoid default.

Affiliate Support (see *Adjusted Baseline Credit Assessment and Support*) – The first consideration in our Support and Structural analysis, 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) 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 bonds issuer; or (2) the Support Provider.

Asset Quality (see *Financial Factors* and *Scorecard*) – one of five Financial Factors considered in the BCA Scorecard, Asset Quality (25% weighting) is measured primarily by the Problem Loans / Gross Loans ratio, which signals potential problems, credit losses and pressure on solvency that disadvantage bondholders. Most bank failures stem from credit risk, since even a small deterioration in the value of an institution's assets can have a large effect on its solvency given the banks' typically high balance sheet leverage. Other considerations include loan growth, large and/or high-risk credit concentrations, as well as the bank's market risk and operational risk.

Baseline Credit Assessment (BCA) (see *Macro Profile, Financial Factors, Qualitative Factors* and *Scorecard*) – Our forward-looking assessment of the standalone credit strength of a bank, based on its Macro Profile, Financial Factors and Qualitative Factors, and capturing the probability of a bank defaulting, or requiring support to avoid such a default.

Capital (see *Financial Factors, Asset Quality, Scorecard*) – one of five Financial Factors considered in the BCA Scorecard, Capital (25% weighting) is measured by Tangible Common Equity / Risk-Weighted Assets. Capital goes hand-in-hand with a bank's Asset Quality, since the greater the risk of unexpected losses, the more capital a bank needs to hold to protect bondholders and maintain the creditor confidence necessary to fund itself. Other considerations include nominal leverage (TCE/Total Assets) for an un-weighted metric of capital outside of regulatory measures, capital quality, access to additional capital and problem loan coverage.

Financial Factors (see *Baseline Credit Assessment, Asset Quality, Qualitative Factors* and *Scorecard*) – Five fundamental credit factors considered in our assessment of a bank's financial strength and incorporated into the BCA Scorecard. Three factors, the bank's Asset Quality, Capital and Profitability, determine its solvency. Two factors, the bank's Funding Structure and Liquid Resources, determine its Liquidity.

Funding Structure (see *Financial Factors, Scorecard*) – one of five Financial Factors considered in the BCA Scorecard, Funding Structure (20% weighting), as measured by Market Funds / Tangible Banking Assets, has a strong bearing on the bank's potential to need assistance. If a bank makes significant use of unreliable funding sources (short-term or from risk-sensitive counterparties), it is more likely to suffer difficulties refinancing its debt. Since a single ratio cannot capture all the subtleties of a banks funding structure, we also consider the quality of market funding and deposit funding, as well as the bank's market access.

Government Support (see *Support*) – Support from local, regional, national or supranational authorities that may reduce the risk of losses on some or all of a bank's debt instruments. Under our Support and Structural Analysis, government support is the last step (after affiliate support and Loss Given Failure analysis) before arriving at a final debt and deposit rating.

Gross Risk (see *Solvency* and *Liquidity*) – For Solvency, 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 Liquidity, 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 (see *Financial Factors, Scorecard*) – one of five Financial Factors considered in the BCA Scorecard, Liquid Resources (15% weighting), as measured by Liquid Assets / Tangible Banking Assets, is an indicator of a bank's ability to attain funding from credit-sensitive investors. If a bank has a stock of high-quality liquid instruments that it can sell or repo for cash, it will be better able to respond to the changing behavior of its funding counterparties.

Liquidity (see *Gross Risk* and *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.

Loss Given Failure (see *Support and Structural Analysis*) – the second step in our Support and Structural Analysis, Loss Given Failure 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. Our approach assesses the potential loss to different rated instruments of banks subject to an Operational Resolution Regime, taking into account the resolution method (e.g., a "going concern" bail-in would likely result in lower losses than receivership), the subordination of the debt class (which helps determine priority of claims and protection from loss), and the volume of the debt class (the greater the volume and number of creditors, the lower the loss severity).

Macro Profile – an assessment of the system-wide factors that Moody's believes are predictive of the propensity of banks to fail. The Macro Profile draws heavily on the work of our Sovereign Rating Group, with the Sovereign Rating Scorecard as a starting point, considering the Sovereign's 1) Economic Strength, 2) Institutional Strength, 3) Susceptibility to Event Risk. We then combine this with our assessment of Credit Conditions, resulting in an Unadjusted Macro Profile (from Neutral to Very Weak) which may be adjusted up or down to reflect Funding Conditions or Industry Structure issues to arrive at the final Macro Profile.

Operational Resolution Regime (see *Loss Given Failure*) – We define a system with an Operational Resolution Regime as one which 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 the 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 therefore incorporates our Baseline Credit Assessment, Affiliate Support, our Loss Given Failure analysis and other notching considerations.

Profitability (see *Financial Factors, Scorecard*) – one of five Financial Factors considered in the BCA Scorecard, Profitability (15% weighting), as measured by Net Income / Total Assets, 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 also considers earnings stability, which in practice favors retail and commercial institutions with a stock of income-generating assets over wholesale banks subject to more volatile flows of business.

Qualitative Factors (see *Baseline Credit Assessment, Financial Factors* and *Scorecard*) – Important qualitative contributors to the soundness of a financial institution, incorporated into our BCA Scorecard, that are either non-financial or cannot be easily represented by a common standard ratio. They include the institution's 1) business diversification, 2) opacity and complexity and 3) corporate behavior.

Scorecard – an analytic tool focused on the core ratios describing the five main credit factors: Asset Quality, Capital, Profitability, Funding Structure and Liquid Resources. These simple but effective financial ratios are combined with forward-looking judgments and Qualitative Factors in arriving at a Baseline Credit Assessment. Different from our historical practice, any adjustments to these ratios based on Moody's forward-looking judgments are incorporated *within* the Scorecard itself rather than being applied after the Scorecard outcome.

Solvency (see *Gross Risk* and *Liquidity*) – The combination of the extent of a bank's credit, market and operational risks and its capacity to absorb any losses resulting from them through capital, provisions and profit generation.

Support (see *Affiliate Support, Government Support*) – resources external to a bank's standalone credit strength – as measured by Baseline Credit Assessment (BCA) – that reduce the probability that it will default on some or all of its debt instruments. Under our Support and Structural Analysis, support from the bank's affiliated entities is considered first, resulting in an Adjusted BCA. Then, following a Loss-Given Failure analysis, potential government support is incorporated to arrive at the final debt and deposit ratings for the bank.

Support and Structural Analysis (see *Loss Given Failure* and *Support*) – A step-by-step assessment of the likely effect of a bank's failure on the various debt instruments it has issued. The analysis covers three separate stages in the sequence we expect them to occur: 1) Affiliate Support, which may reduce the probability of default, 2) Loss Given Failure, a liability-side analysis of potential loss-severity for the bank's rated debt instruments, absent external support and 3) government support, which may be forthcoming from local, regional, national or supranational authorities, reducing the risk of some or all of the bank's debt instruments.

Support Provider – in respect of a Special Covered Bond Issuer (SCBI), a rated member of the SCBI's group which is expected to provide parental support to the SCBI.

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» [Rating Obligations with Variable Promises, April 2014 (166780)](#)

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Index

Moody's Global Banking Management Team

Global

Michael Foley
Managing Director – Global Financial Institutions
New York: 212-553-2835
michael.foley@moodys.com

Gregory Bauer
Managing Director – Global Banking
New York: 212-553-1498
gregory.bauer@moodys.com

Frederic Drevon
Managing Director – Global Banking
London: 44-207-772-5356
frederic.drevon@moodys.com

Nick Hill
Managing Director – Financial Institutions Analytics
Paris: 33-1-5330-1029
nick.hill@moodys.com

Americas

Robert Young
Managing Director – North America and Global Investment Banks
New York: 212-553-4122
robert.young@moodys.com

Celina Vansetti-Hutchins
Managing Director – Latin America
New York: 212-553-4845
celina.vansetti-hutchins@moodys.com

EMEA

Carola Schuler
Managing Director – Austria, Benelux, France, Germany, Switzerland
Frankfurt: 49-69-7073-0766
carola.schuler@moodys.com

Simon Harris
Managing Director – Nordics
London: 44-20-7772-1576
simon.harris@moodys.com

Yves Lemay
Managing Director – CIS, Eastern Europe and MEA
London: 44-20-7772-5512
yves.lemay@moodys.com

Johannes Wassenberg
Managing Director – Ireland, United Kingdom, Italy, Portugal and Spain
London: 44-20-7772-1543
johannes.wassenberg@moodys.com

Asia Pacific

Stephen Long
Managing Director – Asia Pacific
Hong Kong: 852-3758-1306
stephen.long@moodys.com

Report Number: 171718

Authors
Nick Hill
Roland Auquier

Editor
Greg Davies

Production Specialists
Cassina Brooks
Shubhra Bhatnagar

Moody's
INVESTORS SERVICE