

**CREDIT OPINION**

14 June 2024

Update

Send Your Feedback

**RATINGS**

**Deutsche Bank AG**

Domicile	Frankfurt am Main, Germany
Long Term CRR	A1
Type	LT Counterparty Risk Rating - Fgn Curr
Outlook	Not Assigned
Long Term Debt	A1
Type	Senior Unsecured - Fgn Curr
Outlook	Stable
Long Term Deposit	A1
Type	LT Bank Deposits - Fgn Curr
Outlook	Stable

Please see the [ratings section](#) at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

**Contacts**

Olivier Panis +33.1.5330.5987  
Senior Vice President  
olivier.panis@moody.com

Andrea Pasceri +33.1.5330.1021  
Ratings Associate  
andrea.pasceri@moody.com

Carola Schuler +49.69.70730.766  
MD-Banking  
carola.schuler@moody.com

**Deutsche Bank AG**

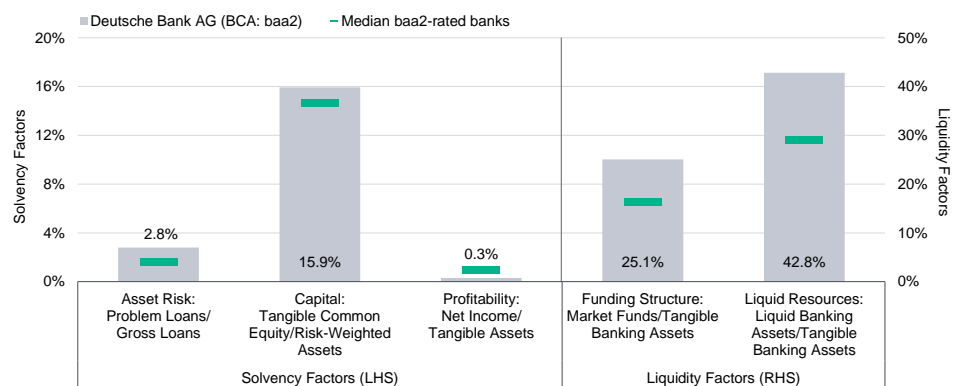
Update following rating affirmation, outlook remains stable

**Summary**

The ratings reflect (1) DB's baa2 BCA and Adjusted BCA; (2) the results of our Advanced Loss-Given-Failure (LGF) analysis, providing three notches of rating uplift for deposits and senior unsecured debt, as well as one notch for its junior senior unsecured debt; and (3) a one-notch additional rating uplift for the bank's deposits and senior unsecured debt ratings, based on our assumption of a moderate level of government support for these debt classes.

The baa2 BCA reflects the bank's continued progress towards meeting its medium-term targets, set in 2022 and revised up in 2023, in particular by being able to sustain improving operating profitability through solid revenue growth and cost efficiency efforts. This trajectory, which has been supported by the rise in interest rates since 2022, should allow the bank to safeguard its net profits against the negative effects of the current subdued economic growth and higher rate environment on cost of risk, which we expect will rise marginally over the next eighteen months. The baa2 BCA also reflects the bank's stabilized capital ratios, albeit with relatively high leverage, the high quality deposit base as well as our assessment of the bank's prudent and well controlled risk appetite that is likely to result in a sound and relatively stable asset quality through the cycle.

Exhibit 1  
**Rating Scorecard - Deutsche Bank AG - Key financial ratios**



Source: Moody's Ratings

**Credit strengths**

» The bank's continued solid capital and liquidity metrics

- » Diversified loan book and strong market position in Germany mitigate the prospects of asset quality deterioration and resulting earnings strain
- » Moderate reliance on confidence-sensitive wholesale market funding and stable deposit base

### Credit challenges

- » To continue executing along its medium-term plan during volatile and uncertain macroeconomic conditions
- » Retain and grow group-wide earnings in a context of volatile markets and slowing global economy
- » Maintain robust capital markets revenues in a less favourable market environment, without increasing risk appetite
- » Keep contained loan loss charges in a weaker operating environment
- » Litigation costs, albeit related to legacy disputes, remain high

### Outlook

- » The stable outlook on the bank's long-term deposit, issuer and senior unsecured debt ratings reflects our expectation that DB will be able to maintain financial stability and, in particular, sustain its improved level of profitability as measured by our net income/tangible assets ratio, even in an uncertain operating environment. The resulting higher capital-generation capacity will allow DB to offset strain on earnings potentially resulting from cyclically lower capital market revenues or higher loan loss charges and provisioning.
- » The stable outlook also reflects our assessment that the bank will maintain generally sound asset quality despite the subdued economic growth and the negative impact that higher interest rates environment has on certain assets, such as commercial real estate.

### Factors that could lead to an upgrade

- » DB's long-term ratings could be upgraded if the bank improved its capital metrics and its leverage ratio to 5% or above.
- » The ratings could also be upgraded if DB makes visible progress towards exceeding its medium-term targets, in particular earning sustainably improved returns well above its 10% return on tangible equity target, while continuing to invest to strengthen its technology platform and control infrastructure, would support an upgrade.
- » Any upgrade remains contingent on the bank maintaining a prudent and well controlled risk appetite resulting in a sound and stable asset quality and associated metrics through the cycle.

### Factors that could lead to a downgrade

- » DB's long-term ratings could be downgraded if DB suffered a strategic setback, particularly with respect to achieving sustainable revenue generation or permanent cost savings supporting a stable operating expense base over time.
- » In addition, the ratings could be downgraded should DB experience a material risk management failure or sustained deterioration in asset quality, liquidity or capital, or its franchise and reputation.
- » The ratings could also be downgraded if additional litigation charges were required well in excess of existing reserves.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the issuer/deal page on <https://ratings.moody's.com> for the most updated credit rating action information and rating history.

- » Although unlikely at present, a downgrade of long-term ratings could also result from a sustained decrease in the volume of bail-in-able debt relative to the bank's tangible banking assets, leading to a higher loss severity of DB's junior senior unsecured debt or other liability classes at failure and potentially resulting in a lower rating uplift as a result of our Advanced Loss Given Failure (LGF) analysis.

## Key indicators

Exhibit 2

### Deutsche Bank AG (Consolidated Financials) [1]

	12-23 <sup>2</sup>	12-22 <sup>2</sup>	12-21 <sup>2</sup>	12-20 <sup>2</sup>	12-19 <sup>2</sup>	CAGR/Avg. <sup>3</sup>
Total Assets (EUR Billion)	1,053.6	1,028.6	1,014.3	968.6	949.9	2.6 <sup>4</sup>
Total Assets (USD Billion)	1,163.9	1,097.8	1,149.4	1,185.2	1,066.2	2.2 <sup>4</sup>
Tangible Common Equity (EUR Billion)	55.8	54.5	51.4	47.8	47.5	4.1 <sup>4</sup>
Tangible Common Equity (USD Billion)	61.6	58.2	58.2	58.4	53.3	3.7 <sup>4</sup>
Problem Loans / Gross Loans (%)	2.8	2.4	2.5	2.7	2.2	2.5 <sup>5</sup>
Tangible Common Equity / Risk Weighted Assets (%)	15.9	15.1	14.6	14.5	14.7	15.0 <sup>6</sup>
Problem Loans / (Tangible Common Equity + Loan Loss Reserve) (%)	22.0	19.7	21.2	22.5	18.8	20.8 <sup>5</sup>
Net Interest Margin (%)	1.4	1.4	1.1	1.2	1.5	1.3 <sup>5</sup>
PPI / Average RWA (%)	2.0	1.6	1.1	0.9	-0.1	1.1 <sup>6</sup>
Net Income / Tangible Assets (%)	0.5	0.2	0.2	0.1	-0.4	0.1 <sup>5</sup>
Cost / Income Ratio (%)	74.9	77.8	85.2	88.1	101.5	85.5 <sup>5</sup>
Market Funds / Tangible Banking Assets (%)	25.1	24.7	26.5	26.5	25.4	25.6 <sup>5</sup>
Liquid Banking Assets / Tangible Banking Assets (%)	42.8	37.8	41.1	42.2	41.9	41.2 <sup>5</sup>
Gross Loans / Due to Customers (%)	77.6	79.0	79.3	76.5	76.9	77.8 <sup>5</sup>

[–] Further to the publication of our revised methodology in July 2021, only ratios from annual 2020 onwards included in this report reflect the change in analytical treatment of the "high-trigger" Additional Tier 1 instruments. [1] All figures and ratios are adjusted using Moody's standard adjustments. [2] Basel III - fully loaded or transitional phase-in; IFRS. [3] May include rounding differences because of the scale of reported amounts. [4] Compound annual growth rate (%) based on the periods for the latest accounting regime. [5] Simple average of periods for the latest accounting regime. [6] Simple average of Basel III periods.

Sources: Moody's Ratings and company filings

## Profile

Deutsche Bank AG (DB) is the largest German-domiciled private bank, operating through a European as well as a global network servicing retail and wealthy individuals as well as corporate and institutional clients. As of March 2024, the bank reported total assets of €1.3 trillion and €941 billion of assets under management<sup>1</sup>.

DB offers a wide range of investment, financial and related products and services to its clientele, served by 90,323 employees as of end-March 2024 in about 60 countries globally. The bank focuses on four main businesses: (1) The Corporate Bank (CB) offers cash management, trade finance and lending, as well as foreign exchange in support of corporates' needs for working capital and liquidity management, CB also serves financial institutions, SMEs and entrepreneurs; (2) the Private Bank (PB) offers retail banking and wealth management services in Germany and abroad, (3) the Investment Bank (IB) caters to the needs of corporate and institutional clients, including the trading and hedging of financial products; and (4) Asset Management (AM) has a broad range of product offerings surrounding investment funds and related products and services to both retail and institutional clients.

### DB's BCA is supported by its Weighted Macro Profile of Strong (+)

DB's Strong (+) Weighted Macro Profile is mainly driven by its exposure to [Germany](#) (Aaa stable) the [US](#) (Aaa negative) or the [UK](#) (Aa3 stable), and also incorporates exposures to other EU countries, such as [Spain](#) (Baa1 positive) and [Italy](#) (Baa3 stable).

As the largest private-sector bank in Germany, DB benefits from an environment with very high economic, institutional and government financial strength and a low susceptibility to event risk. However, operating conditions for the German banking system are constrained by overly high cost bases; high fragmentation in an oversaturated market; still relatively low margins despite higher rates; modest fee income generation; and strong competition for domestic business.

## Detailed credit considerations

### Continued execution remains key to solidifying DB's improved credit profile and higher ratings

Since DB announced its strategic overhaul in summer 2019, it has regained earnings strength; reduced capital and leverage exposure consumption; significantly lowered operating costs; maintained strong liquidity; and reduced dependence on confidence-sensitive market funding. All these items have allowed it to self-finance its strategic overhaul without a significant impact on its key capital ratios.

The achievement of DB's strategic revamp which concluded at the end of 2022 has placed DB on firmer ground than previous, less fundamental restructurings. At the same time, and even if DB reaches its 2025 RoE targets, its performance – although materially improved – will continue to lag that of its global investment bank (GIB) peers. Therefore, to sustain its improved credit strength, DB will need to keep a steady pace in reaching its key milestones and repositioning its business model as announced through its extended 2022-25 business plan.

Under this revised three-year plan, DB aims to grow revenues by a CAGR of 5.5-6.5% between 2021 and 2025<sup>2</sup> while keeping cost broadly flat from 2022 level in order to achieve a cost-to-income ratio of below 62.5%. Together with loan loss charges retreating to around 20 basis points of gross loans by 2025 (25bps in 2022, 31 bps in 2023 and a target of the upper end of the 25-30 bps range for 2024), DB aims to achieve a net return on tangible equity (ROTE) of 10% or higher at that point. The bank ultimately aims to achieve a 50% total payout ratio through a combination of dividends and more flexible share buybacks while maintaining its Common Equity Tier 1 (CET1) capital ratio around 13% or 200 basis points above the maximum distributable amount.

The updated medium-term targets represent a bondholder-friendly evolution of DB's strategic revamp, although success in execution increasingly relies on less predictable revenue growth rather than cost reductions. We nevertheless believe the outlined measures to be prudent and realistic assuming a gradually normalizing market environment until 2025. We would also expect DB to remain disciplined on total costs despite inflationary pressures continuing in 2024.

DB's 5.5-6.5% updated revenue CAGR target between 2021-2025 is expected to be generated through further volume growth in lower risk, stable businesses; additional strategic initiatives; and the continued positive effect of higher interest rates on net interest income, albeit declining in 2024 from 2023's peak. DB's 2025 revenue guidance builds on enhancing DB's strengths in its Corporate Bank (cash management, trust and agency services, lending), its Private Bank (retail and wealth management) and capital-light investment banking services such as Origination & Advisory (O&A).

During the 2022-25 planning period, DB envisages a change in composition of underlying growth drivers, with franchise and efficiency improvements in the CB and PB segments targeted to bring in the bulk of the planned growth. Indeed, recent interest-rate hikes have improved the prospects for higher returns within the bank's core lending businesses conducted in its PB, CB and O&A segments, despite expectations of at least a normalization in the cost of risk.

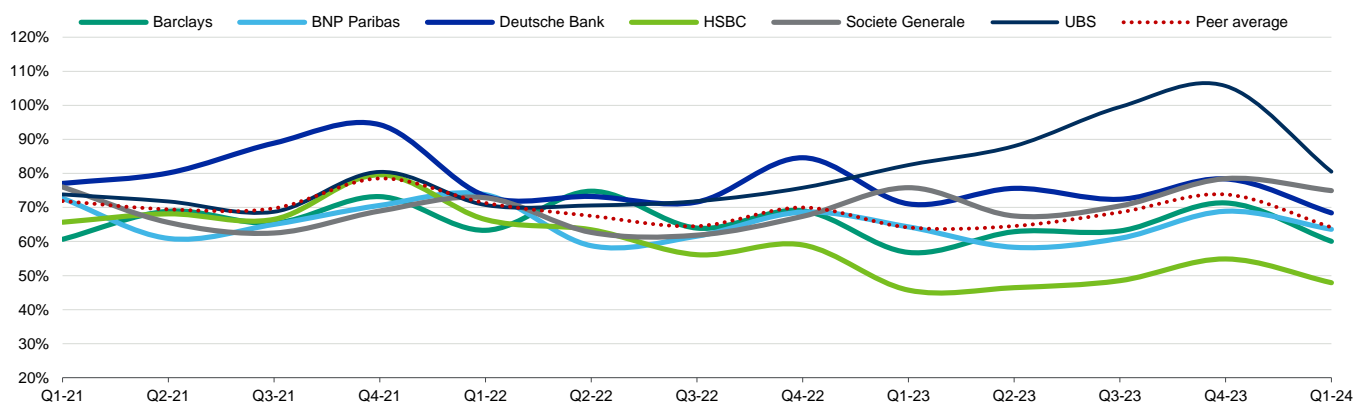
DB's capital markets earnings streams in its Investment Bank (IB) and Asset Management (AM) segments remain vulnerable to market setbacks and tighter liquidity conditions, although the market volatility has supported some of DB's core IB franchises in fixed income and related client flow in recent years. But their contribution to overall revenue growth will diminish following strong outperformance of the latter against earlier projections in prior years and the challenging context of slowing economies and market uncertainty for the origination and advisory activities. The strong 32% IB contribution to group revenues in 2023 might not be sustained, and is already showing a declining trend from the 37% contribution in 2022. However based on DB's recent market share gains and select growth investments into regions, products and technology, we believe the bank will be able to safeguard revenues and earnings, even in a less favourable market environment.

### Profitability visibly improved, and DB is on track to reach its medium-term goals

We assign a ba2 Profitability score to DB, taking account of DB trajectory towards meeting its medium-term targets, in particular by being able to sustain adequate, yet still relatively modest, profitability. The assigned score further reflects our anticipation of a net income/tangible asset ratio (our measure of return on assets) of around 0.3% over the next 12-18 months, considering the uncertainties regarding the sustainability of the IB's performance and growth ambition in the PB, CB and O&A segments in a challenging operating environment, the expected normalization of deposit costs and reduction in interest margins from 2023 peak (DB's initial expectation for NII to decline by €600 million in 2024, should be better by more than €100 million under latest

projections, and then recover in 2025), as well as higher risk charges than in previous years. Furthermore, DB has announced that in Q2 2024 it will book a €1.3 billion provision for all claims and related cumulative interests on its 2010 Postbank acquisition, which roughly zeros its Q1 profits<sup>3</sup>. Sustainably improving its profitability and efficiency metrics (see Exhibit 4) according to its revised strategic plan will support overcoming a key relative weakness for DB within its peer group.

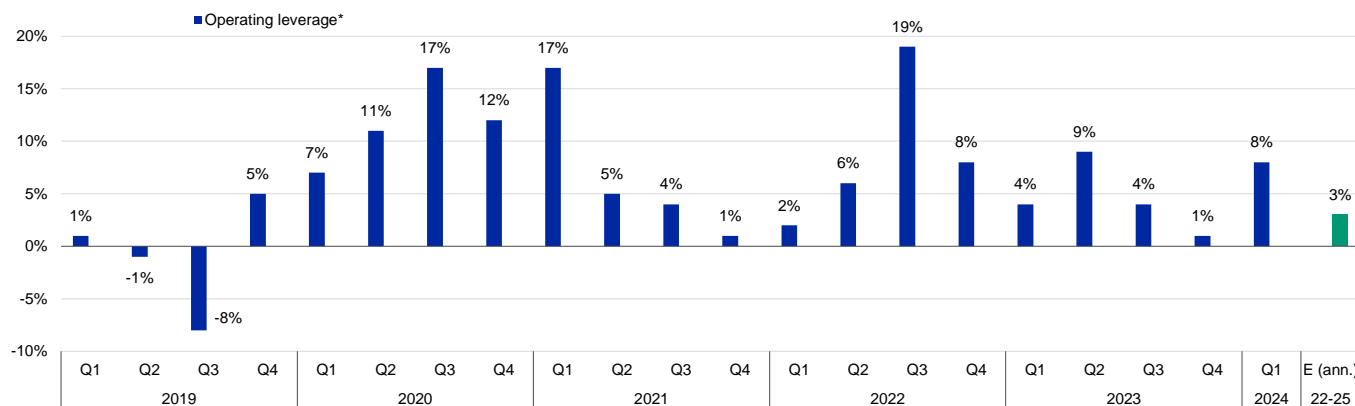
Exhibit 3  
**DB's restructuring success moved it close to its European GIB peers' efficiency ratios**  
 Cost-to-income ratio (Moody's adjusted), Q1 2021 - Q1 2024



Data for UBS fully include Credit Suisse from Q3 2023 (one month only in Q2 2023).  
 Source: Company reports, Moody's Ratings

The swift rundown in the bank's operating cost base, as transformation plan generated around €3 billion of run-rate savings from year-end 2018 until the end of 2022, helped restore DB's operating leverage, making it more resilient to setbacks in its revenue performance. This was a major leap forward from DB's previous restructurings, in which it suffered greater revenue attrition and did not generate any additional operating leverage.

Exhibit 4  
**DB has regained operating leverage**  
 Revenue over cost growth, year-over-year, Q1 2019 - Q1 2024 and forecast



\*Revenue excluding specific items as reported by DB and annualised. ^Costs adjusted in accordance with DB definition and excluding transformation charges. Also annualised. 25F is annual according to DB guidance.  
 Source: Company reports, Moody's Ratings

In 2023, DB's cost base was impacted by inflationary pressure on wages, business growth and investments in controls, technology and processes, which led to a 3% growth in adjusted costs.

Despite this recent trend, DB confirmed its cost-to-income target of below 62.5% by 2025 which would allow for a continuation of operating leverage to build (Exhibit 5). We expect the bank's operating leverage should partly benefit from continued efficiency

measures, but mostly rely on achieving the bank's revenue goals. In 2023, the bank reported a cost-to-income ratio of 75%, broadly stable from 2022, which was lowered to 68% in Q1 2024 (290 bps decrease with respect to the same quarter the previous year), mainly due to a significant decrease in contribution to the Single Resolution Fund from previous years.

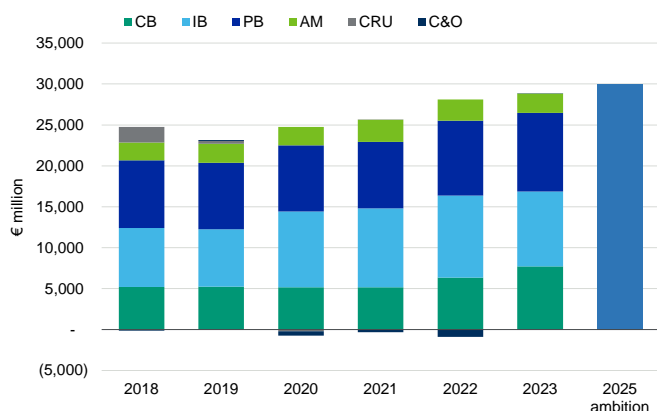
To support its goal of a stable underlying operating cost base, DB has identified around €2.5 billion of additional cost saving opportunities that it aims to reinvest partially into the businesses. Key items include the optimization of the Germany platform through the full integration of former Postbank's IT platform onto the DB architecture; increased usage of cloud technology reducing server cost and maintenance; better lending processes and infrastructure; and ongoing rationalisation of real-estate footprints. As of end-March 2024, the bank has already completed a material portion of those measures.

In addition, DB's 2025 costs should be freed of material business transformation-related adjustments and continue to benefit from a reduction in the bank's contribution to the Single Resolution Fund (SRF<sup>4</sup>; 'banking levy'), already recorded in Q1 2024.

Nevertheless, achieving the new target of maintaining operating expenses flat between 2022 and 2025 remains an ambitious target in a context of remaining inflationary pressures on wages, and the extraordinary litigation costs faced in 2024.

Exhibit 5

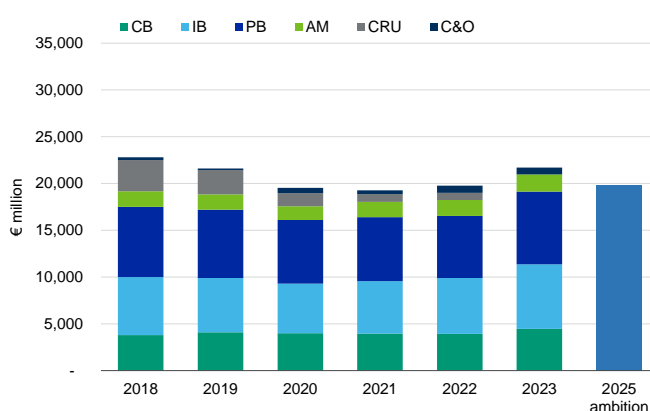
**DB's revenue plan looks more ambitious...**  
Group revenue, € million



Notes: 2025 ambition reflects DB group-level target (including the CRU and the Corporate Center or 'C&O') as implied by current guidance.  
Source: Company reports, Moody's Ratings

Exhibit 6

**...and the bank's cost base is expected to return to 2022 levels**  
Group adjusted costs, € million



Notes: 2025 ambition reflects DB group-level target (including the CRU and the Corporate Center or 'C&O') as implied by current guidance.  
Source: Company reports, Moody's Ratings

In fact, we believe DB has little room to cut further on compensation given the recently conducted staff reduction program as well as the outperformance of its capital markets unit, the latter already displaying one of the lowest compensation ratios in the industry. As a result, staying competitive and retaining or attracting key talent remains vital for achieving the projected ambitious revenue goals. If sustained and strongly executed, the announced ambitions and measures will continue putting DB on track to improve key underlying performance metrics and – according to our estimates – move closer to achieving its ambition of a 10% post-tax ROTE by 2025. This would put the bank at par with the lower-end of the return levels of several of its higher-rated peers – provided it can put through larger parts of the targeted revenue growth.

**Solid revenues since 2021 support DB's trajectory to 2025 target**

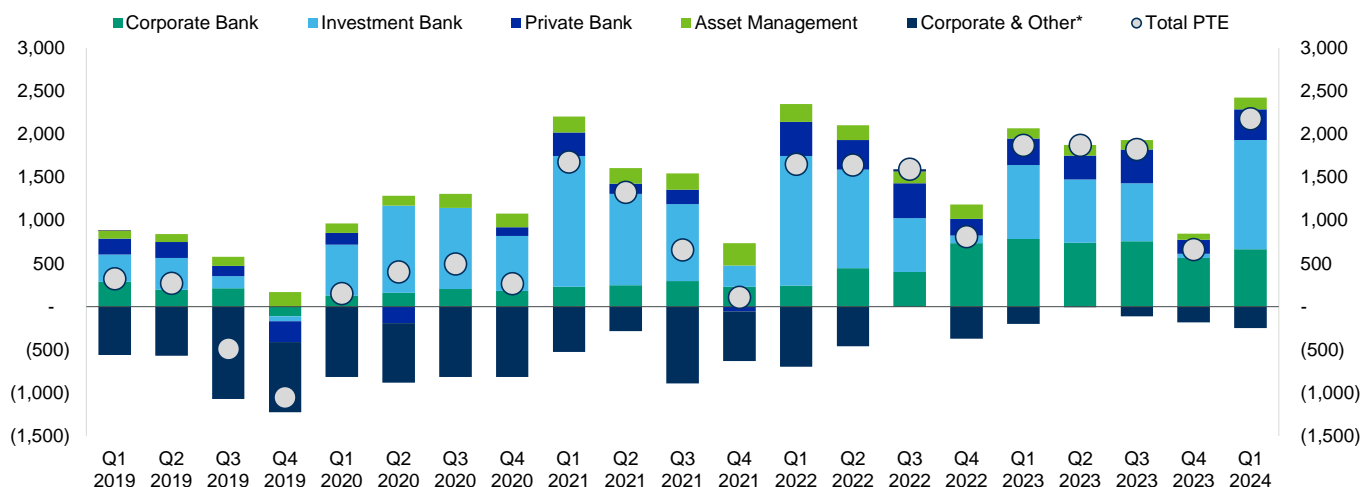
DB reported pre-tax income of €5.7 billion in 2023, up 2% from 2022, and 68% compared with 2021. The year-on-year growth in 2023 was supported by 6% of revenue growth, partially offset by a 6% increase in costs. In 2023 revenue growth was mainly supported by the Corporate bank division, benefiting from rising interest rates leading to a 22% revenue growth and 64% increase in profit before tax at the division. This was accompanied by a 5% increase in Private Banking revenues (10% when adjusted by DB), although more than offset by higher costs related to investments in Postbank service remediation and inflationary pressures, and resulting in a 41% decrease in profit before taxes. In contrast the Investment Bank and Asset Management revenues both decreased by 9% due to lower Fixed Income, Currency (FIC), Sales & trading income and lower management fees respectively.

DB's cost-to-income ratio was stable year-on-year at 75%, after the material improvement compared to the 85% recorded in 2021. Loan loss charges stood at €1.5 billion or 31 basis points (bps) of gross loans (2022: €1.2 billion, or 25 bps), reflecting more challenging macro economic environment and the impact of higher interest rates mainly on the Commercial Real Estate (CRE) portfolio in 2023. At group level, DB reported a net income of €4.9 billion, down 14% year-on-year due to the positive impact in 2022 of €1.4 billion deferred tax valuation adjustment.

In the first quarter of 2024, DB reported total group revenues of €7.8 billion, up 1.3% year-over-year, and adjusted costs decreased by 2.8%, representing around 4.1 percentage point positive operating leverage. The solid performance benefited from rising fees more than offsetting declining net interest income rates, primarily in IB (revenue up 13%) and AM (revenue up 5%). This performance more than offset the weaker results recorded in the division more affected by the lower NII performance, namely CB and PB, whose revenues were down 5% and 2% respectively. Group operating costs, excluding all extraordinary items,<sup>5</sup> were down 6% to €5 billion in the quarter, in line with the bank's quarterly run rate target in 2024, mainly due to lower bank levies, which offset higher compensation and benefits. The bank continues to deploy its plan to achieve incremental €2.5 billion operational efficiencies by 2025, and to invest in its business growth, technologies and controls.

Exhibit 7

**DB's profitability benefits from strong revenue performance by IB in Q1**  
**Adjusted quarterly pretax profits by business line (excluding litigation, impairments, DVA and one-offs), € million**



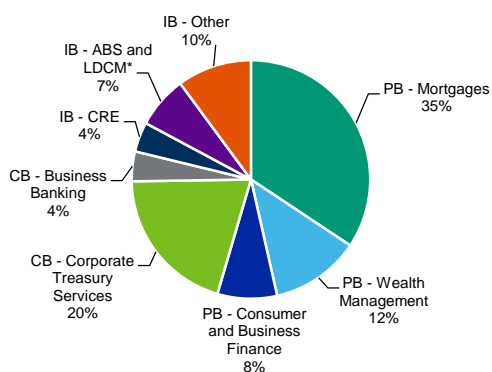
\* CRU discontinued from 2023 and restated in 2022 (moved to C&O). Quarterly 2019-2021 figure for C&O reflects combined CRU and C&O.  
 Source: Company reports, Moody's Ratings

**Diversified loan book will help mitigate undue earnings strain from loan loss charges**

Our baa2 Asset Risk score reflects DB's well diversified loan book by asset class and segment, displaying manageable exposures to sectors most affected by effects of the economic slowdown as well as certain risk pockets, particularly sensitive to the rising interest rates environment, such as commercial real estate (CRE) and leveraged debt capital markets (LDCM). The assigned score also incorporates the market, credit and operational risks and periodic concentration risks inherent to DB's capital markets activities.

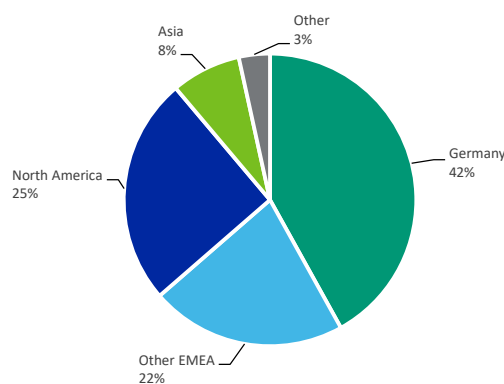
DB's €480 billion loan book remains well diversified by region, asset class and segment (Exhibits 9 and 10). The bank holds collateral of €260<sup>6</sup> billion against performing exposures and €5.4 billion of loan loss reserves in addition to various hedges that will help significantly reduce the bank's overall exposure to potential more major loan losses. About half of the bank's lending is directed to German corporate and retail customers, with very low exposure to unsecured consumer lending and a clear focus on highly collateralised Germany-focused residential mortgages that are typically fixed long-term, display loan-to-value (LTV) ratios of below 50% for 65% of the book and very low delinquency ratios, supported by strong employment levels in Germany. More than half of the loans are to retail and wealth customers, the remaining part of the loan book is exposed to corporate and investment banking: about 30% of the loan portfolio sits in the Corporate Bank (CB) – about half of which is in lower-risk transaction banking balances – and the Investment Bank (IB) holds about 20% of the bank's loan balances, mainly in asset-backed loans and CRE.

Exhibit 8  
**DB's loan book remains well diversified, despite some higher-risk pockets**  
 Gross loans by segment and loan type, as of Q1 2024\*



\*Moody's grouping. PB = Private Bank; CB = Corporate Bank; IB = Investment Bank; ABS = Asset-backed securities; LDCM = Leveraged debt capital markets.  
 Sources: Company reports, Moody's Ratings estimates

Exhibit 9  
**Focus on German home market will help contain loan losses**  
 Gross loans by region, as of YE 2023



Sources: Company reports and presentations, Moody's Ratings

According to our estimates, DB's concentrations in utilities, chemicals, manufacturing, automotive and transportation totaled approximately €48 billion, or about 10% of the bank's loan book, as of YE 2023. These are the sectors likely to be hit hardest by the macroeconomic slowdown, as well as those most vulnerable to commodity price hikes whenever they occur.

However, in Germany, the government extended in 2022 and 2023 support measures to mitigate the economic impact on households and businesses of high energy prices. Together with low levels of corporate and household debt in Germany of 49% and 53% of GDP, respectively, as of September 2023<sup>7</sup>, the bank's corporate and retail customers should be able to contend with continued inflationary pressures or more severe macroeconomic slowdown without quickly becoming over-indebted.

Larger risk exposures to commercial real estate (CRE) and leveraged debt capital markets that are particularly vulnerable to interest rate hikes, market volatility as well as the impact of post-Covid trends, account together for about 8% of DB's total gross loans. Although CRE portfolio of €38 billion as of the end of March 2024 (broadly stable from YE 2023), represents large absolute risk concentrations, they are mitigated by diversification across geographies and assets, tight lending criteria, low LTVs (66% in the investment bank and 54% in the corporate bank), exposure to strong sponsors, good underlying collateral mostly in prime locations and hedges. Around 24% of the CRE exposure was classified as stage 2 loans as of end-March 2024 (up from 20% at year-end 2023 and 14% at year-end 2022) and 8% as stage 3 (impaired, stable quarter-on-quarter but up from 4% at year-end 2022). As of March 2024, the group booked



€485 million out of the €10 billion CRE loans that they modified or restructured in the past 21 months, and the current interest rate environment continues to pose refinancing risk, which we expect will lead to further provisions in 2024.

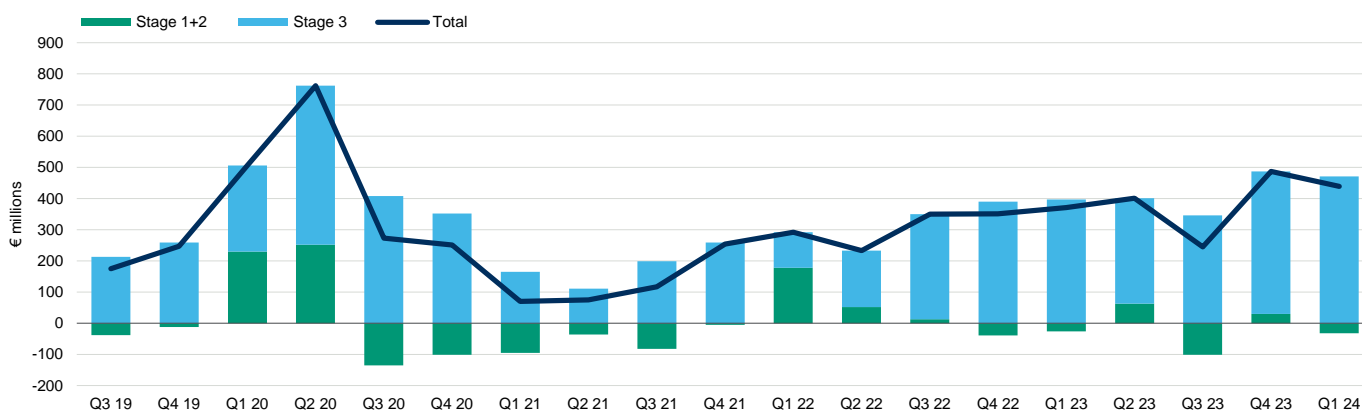
The leveraged lending portfolio of around €4 billion as of end-March 2024, representing 1% of the loan book, is also well diversified across sectors, with limited borrower concentrations and a large majority of the exposure in the form of first lien secured credit facilities, mostly of revolving nature, the remaining being asset-based lending with low loss history. DB has actively de-risked its underwriting pipeline in 2022.

DB's loan-loss charges rose sharply in 2022 and 2023 as the decade-long benign credit cycle began to turn. During 2023, DB's loan loss charges totaled €1.5 billion (31 bps), up significantly from €1.2 billion (25 bps) in 2022 and €515 million (12 bps) in 2021. The increase was driven by significantly higher Stage 3 provisions (€1,538 million versus €1,022 million in 2022 and €734 million in 2021), reflecting weakening macroeconomic conditions. In Q1 2024, risk provisioning continued to increase to 37 bps of gross loans (€439 million), due to US CRE risks and some related to the operational backlog in PB that could be reversed in future.

DB expects a high level of provision also in Q2, followed by a reduction in the second half of the year (due to a gradual improvement in the CRE sector and the partial reversal of the operational backlog provisions), and confirmed its expectation of risk charge at the high end of the 25-30 bps range in 2024. We believe these assumptions are realistic in light of the bank's diversified and highly collateralised Germany-focused loan book, and €5.4 allowances for potential loan losses which would help stave off a sudden deterioration in DB's asset quality and a sharp and unexpected rise in loan loss charges.

Exhibit 10

#### Loan loss charges (LLC) are likely to further gradually increase (€ million)



Source: Company reports, Moody's Ratings

#### Qualitative adjustment captures remaining reliance on capital markets activities

Despite the proposed downsizing and its progress in recalibrating the bank's business model, DB will retain a significant reliance on capital markets activities for income generation: capital markets-related revenue will still account for around one-third of DB's total revenue in 2024 (Moody's estimate). We generally consider capital markets activities to be both opaque and potentially volatile, posing significant challenges for the management of such activities, in particular because these businesses carry significant risk management and risk governance challenges; opaque risk taking; and intrinsic market, counterparty and operational risks; and display a high confidence sensitivity of the customer and funding franchises. The diversity of businesses across many operating environments, legislations and regulatory systems can also add complexity to the control framework and increase risks of litigations.

These structural challenges continue to result in a one-notch negative qualitative adjustment to DB's BCA in respect of remaining 'Opacity and Complexity', an adjustment currently shared with all large GIBs.

#### Sound capital and strong liquidity continue protecting bondholders

DB's pro-forma Common Equity Tier 1 (CET1) capital ratio<sup>8</sup> of 13.25% as of end-March 2024 is lower with respect to the 13.7% as of year-end 2023 mainly because of a €1.3 billion extraordinary litigation provision, with a 20 bps impact on the ratio after being

already netted by the zeroing of the profits allocated to payout in Q1 (the net effect on CET1 capital amounted to around €650 million, while the rest of the provision was absorbed by the share of the Q1 profits that were to be distributed through dividends). This was accompanied by a €5 billion RWA inflation stemming from business growth (12 bps), the deduction for the €675 million share buyback started in March 2024 (around 20 bps) and other smaller deductions. DB's pro-forma CET1 ratio is around 210 bps above minimum regulatory requirement of 11.1% in 2024, which includes a 0.75% countercyclical buffer in Germany and a sectoral systemic risk buffer of 2% for German residential real estate exposures.

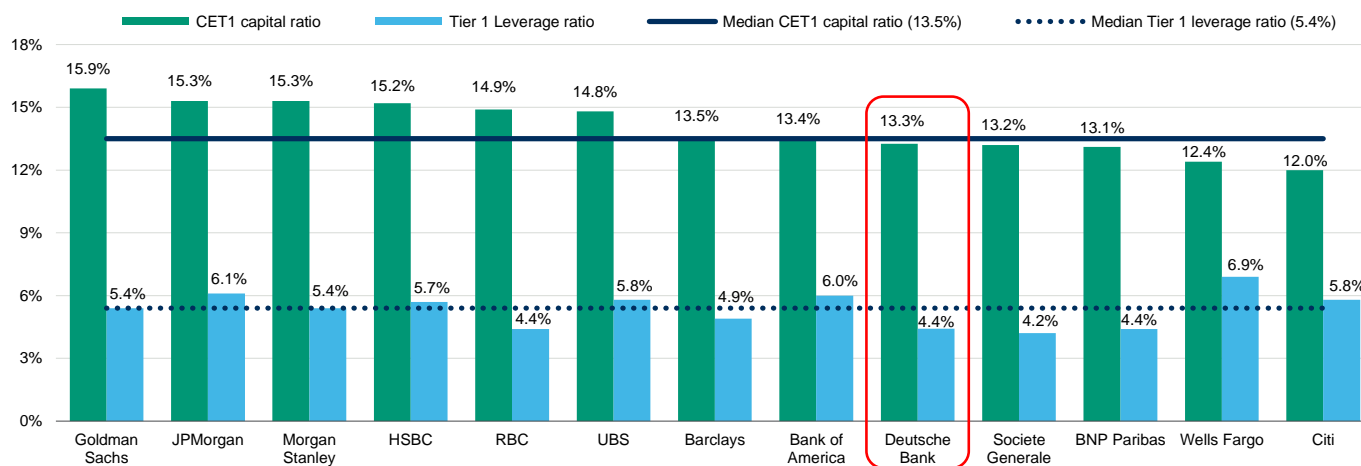
The bank has already achieved as of end-March 2024, €15 billion of its revised €25-30 billion RWA reduction target. This ambition will continue being achieved mainly from lower-yielding portfolios, with limited revenue impact. In addition, the bank reduced its expected impact on RWA of the finalisation of Basel III requirements by €10-15 billion, which will provide an improved capacity (€3 billion additional capital compared to initial plan) to grow the business, distribute earnings and shield the operations against unexpected risk deterioration.

The bank announced at the beginning of the 2022-2025 strategic plan that the intended total payout ratio will gradually increase to 50% by 2025 and the management board authorized in 2023 share buybacks of up to 10% of the share capital before the end of April 2028. In respect of the 2021-2025 reference period, DB is confident they will increase total capital distributions well above the €8 billion initially announced<sup>2</sup>. During the 2021-2024 period, DB expects to grow dividends by around 50% per year, achieving a total of €3.3 billion with the remainder expected to be executed via share buybacks. The bank resumed its share buybacks completing in December 2023 with a first €450 million program and is now progressing a second program of €675 million to be completed by July 2024.

DB reported a pro-forma Tier 1 leverage ratio of 4.42% at the end of March 2024, 13 bps lower than year-end 2023, mainly owing to the impact of the extraordinary litigation provision (around 5 bps) and to an increase in leverage exposure to €1,254 billion (Q4 2023: €1,240 billion). We expect the bank to manage towards a leverage ratio of 4.5% or higher going forward in an effort to close the gap to its peer group.

Exhibit 11

**Common Equity Tier 1 (CET1) ratio and Tier 1 Leverage Ratio for Global Investment Banks, as of end-March 2024**



Notes: 1) Q1 2024 for all banks 2) The Tier 1 leverage ratios of UK and European banks are calculated as per the Capital Requirement Regulations, and they exclude certain central bank balances as temporarily allowed; for US banks we show the supplemental leverage ratio (SLR). 3) The CET1 ratio for US banks is calculated under the advanced approach 4) DB's ratios are pro-forma including the €1.3 billion extraordinary litigation to be booked in Q2 2024

Source: Company reports, Moody's Ratings

This capital distribution policy helps balance shareholders' and bondholders' interests and allows for sufficient flexibility by limiting the anticipated total dividends to half of the target payout, a credit positive considering the uncertain market environment. In the challenging macroeconomic context, we expect loan growth to remain subdued in 2024, but risk-weighted assets, which have been actively managed down and optimized, could be adversely impacted by negative risk migration, elevated market and counterparty risks and regulatory model reviews, which could create some volatility around the bank's CET1 ratio target of around 13%.

### Strong liquidity position and sound funding profile

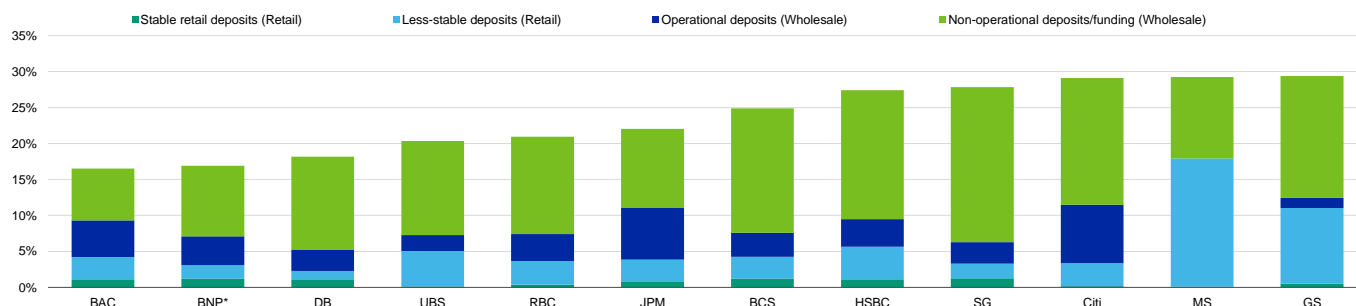
We assign an a3 Funding Structure score to DB, two notches above the bank's initial score. The positive adjustment reflects DB's extended and now more stable tenure for a larger part of its confidence-sensitive wholesale funding and further captures our expectation that DB will remain less dependent on such funding sources, adding flexibility to managing refinancing costs and executing on the announced plans over the next 12-18 months. The adjustment also takes account of the benefits provided by the bank's stable and diversified deposit base generated from its sizable domestic corporate and retail banking franchise. Deposits constitute 62% of DB's net liabilities (including equity) and are raised mostly in Germany (around 69% as of March 2024). About 50% of total deposits were sourced from retail clients and 33% of total deposits sourced from SMEs and corporates' operational or term deposits, which counterbalances the wholesale funding needs of the bank's remaining capital markets activities. As a result, DB displays one of the strongest deposit stability among global investment bank peers, based on a limited proportion of non-operational overnight deposits (15% as of Q1 2024).

Following a context of very volatile markets in Q1 2023, and the confidence crisis that followed the failure of several US regional banks and the measures taken by the Swiss National bank to ensure stability for Credit Suisse's customers, DB confirmed that the change in deposit balances experienced in the first quarter of 2023 (to €592 billion at end of March 2023 from €621 billion at the end of December 2022) reflected a normalization from very high levels posted in 2022. Deposits have bounced back since then to €635 billion at the end of March 2024.

Exhibit 12

#### Deposits are also significantly more stable than in the past

Weighted outflow of deposits as a proportion of total deposits (in %, from LCR disclosures)

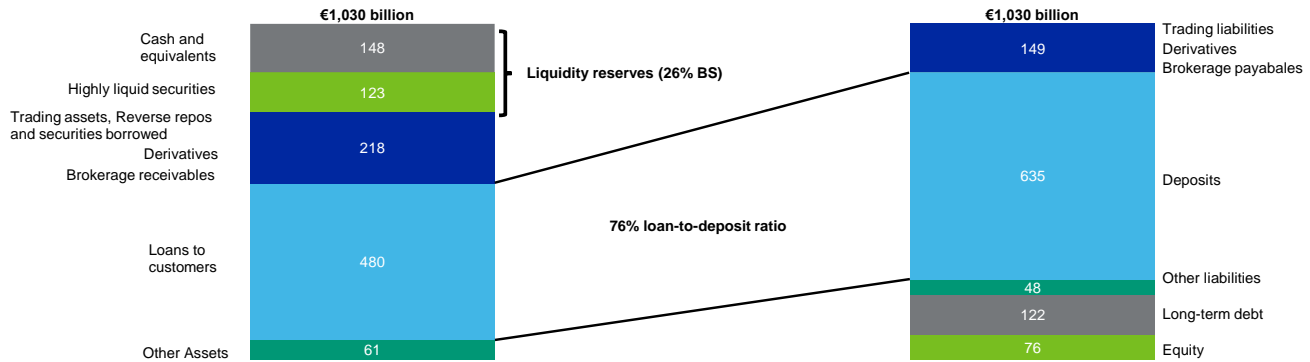


\*BNP outflows exclude a proportion of short-term wholesale funding the bank immediately places in central bank cash as part of its 'sterilization' strategy.

Source: Company reports, Moody's Ratings

DB's stock of loss-absorbing debt is likely to remain above the minimum stipulated under the EU's minimum requirement for own funds and eligible liabilities (MREL; Q1 2024 excess was €16 billion). However, DB will continue replacing partially some maturing junior senior unsecured debt with less costly preferred senior unsecured debt. Further, the group's total loss-absorbing capacity (available TLAC) amounting to €123 billion as of the end of Q1 2024 was well in excess of DB's €85 billion requirement<sup>10</sup>. Long-term debt (capital market) funds outstanding totaled €126 billion, equal to around 13% of net liabilities (Exhibit 14). As of end-April 2024 4 DB has already issued €7 billion including three senior non-preferred bonds amounting to €5 billion and a €2 billion senior preferred bond. The bank has also fully repaid ahead of schedule the last €15 billion of TLTRO tranches.

Exhibit 13  
**DB's balance sheet remains highly liquid, a credit positive (Balance sheet as of end-March 2024)**



Trading and related assets along with similar liabilities, include debt and equity securities (excluding highly liquid securities); derivatives; repos; securities borrowed and lent; brokerage receivables and payables and; loans measured at fair value.

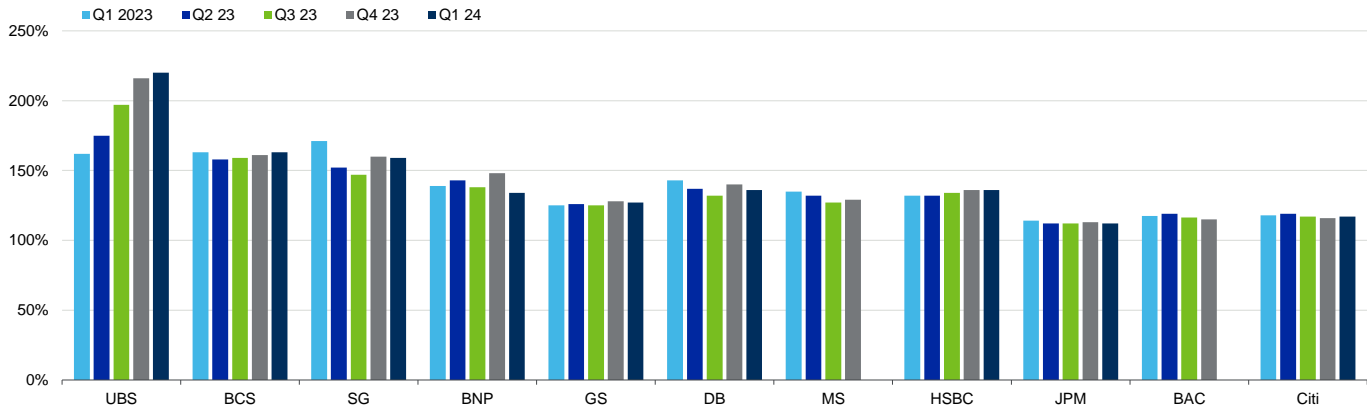
Source: DB's Fixed Income Investor Presentation Q1 2024, Moody's Ratings

**Liquidity remains a credit strength**

Liquidity remains a comparative and credit-positive strength of DB and has significantly reduced the bank's refinancing risk. This is reflected in our a1 Liquid Resources score, one notch below DB's initial score. The assigned score contains a two-notches downward adjustment to the initial score to reflect asset encumbrance on a sizeable portion of assets that are designated as liquid in our initial ratio and score. At the same time, we make an offsetting one-notch upward adjustment based on our consideration of the group's conservative management of liquidity across its various branches and subsidiaries, as well as its high stock of high-quality liquid assets which we expect to remain virtually unchanged from here.

The bank's reported liquidity reserves largely comprised central bank cash (71% of LCR's stock of High Quality Liquid Assets - HQLA) and other highly liquid securities (non-cash Level 1 assets represented 26% of HQLA as of Q4 2023, last data available), substantially mitigating the refinancing risks associated with its more confidence-sensitive wholesale market funding (€76 billion MREL-eligible debt outstanding as of end-March 2024<sup>11</sup>). The bank's strong €261 billion liquidity reserve as of December 2023 (last available) also continued to stand well above regulatory requirements as stipulated by the Liquidity Coverage Ratio (LCR), the latter standing at 136% as of end-March 2024. Some of DB's excess liquidity is likely to be consumed by planned business growth, reducing the liquidity buffer (and LCR, see Exhibit 15). In Q1 2024, the bank has repaid the remaining €15 billion of the TLTRO tranches, which contributed to the 4 percentage points decrease in the LCR ratio from the 140% recorded as of December 2023.

Exhibit 14  
**DB's LCR is well in-line with its peer group**  
**GIBs' LCR, Q1 2023 - Q1 2024**



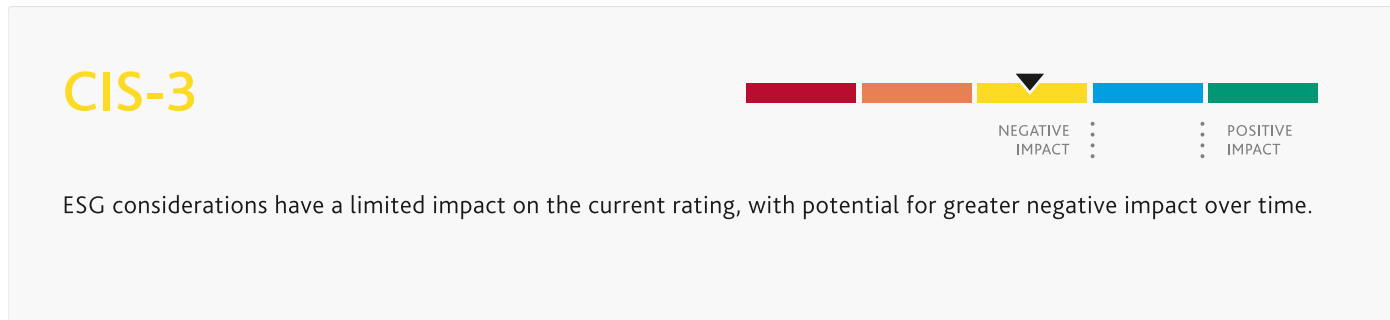
Q1 2023 LCR for UBS does not include Credit Suisse.  
 Source: Company reports, Moody's Ratings

## ESG considerations

### Deutsche Bank AG's ESG credit impact score is CIS-3

Exhibit 15

#### ESG credit impact score



Source: Moody's Ratings

DB's **CIS-3** indicates no impact of ESG considerations on the rating to date with potential greater negative impact over time. However, like its closest peers, DB's score reflects our industry view of the opacity, complexity and tail risks associated with running a global capital markets business, which are captured under our governance assessment. The bank's significantly improved track record in managing these risks and executing on its strategic overhaul are important mitigating factors, supported by the bank's improved financial fundamentals, even if some legacy litigations have recently resulted in material provision charges.

Exhibit 16

#### ESG issuer profile scores



Source: Moody's Ratings

### Environmental

DB faces moderate exposure to environmental risks mainly because of its portfolio exposure to carbon transition risk as a diversified, universal banking group, consistent with its global peers. DB is facing mounting business risks and stakeholder pressure to meet broader carbon transition goals. In response, the bank recently set clearly articulated targets for sustainable finance for its corporate and asset management businesses and is actively engaging in further developing its comprehensive risk management and climate risk reporting frameworks.

### Social

DB faces high industry-wide social risks related to regulatory risk, litigation exposure, reputational risk and high compliance standards. These risks are largely mitigated by well-developed policies and procedures. However, the design of complex, opaque or speculative financial products for institutional clients increases the bank's exposure to the potential for reputational risk and litigation. High cybersecurity and personal data risks are increasingly mitigated by the bank's improved IT framework, which includes sharing information with regulators and government cybersecurity entities.

### Governance

DB has improved its management track record since the announcement of its strategic overhaul in summer 2019. It has embedded more conservative, risk-focused and risk-aware financial policies, and has much stronger overall corporate governance practices.

However, the opacity and complexity of capital market activities, which account for around 30% of group revenue, exposes the group to tail risks. If litigation, regulatory and restructuring costs have materially declined in the past decade, some material additional provisions booked in 2024 indicate that impacts from legacy litigations are not over yet.

ESG Issuer Profile Scores and Credit Impact Scores for the rated entity/transaction are available on Moodys.com. In order to view the latest scores, please click [here](#) to go to the landing page for the entity/transaction on MDC and view the ESG Scores section.

## Support and structural considerations

### Loss Given Failure (LGF) analysis

DB is subject to the Bank Recovery and Resolution Directive, which we consider an operational resolution regime. Therefore, we apply our Advanced LGF analysis, where we consider the risks faced by the different debt and deposit classes across the liability structure should the bank enter resolution. In line with our standard assumptions, we assume a residual tangible common equity of 3%, as well as asset losses of 8% of tangible banking assets in a failure scenario. We also assume a 25% runoff of junior wholesale deposits and a 5% runoff of preferred deposits. Moreover, we assign a 25% probability to junior deposits being preferred to senior unsecured debt. We apply a standard assumption for European banks that 26% of deposits are junior.

The results of our Advanced LGF analysis are as follows:

- » For deposits and senior unsecured debt, our LGF analysis indicates an extremely low loss given failure, leading to three notches of rating uplift from the bank's baa2 Adjusted BCA.
- » For junior senior unsecured debt, our LGF analysis indicates a low loss given failure, leading to one notch of rating uplift from the bank's baa2 Adjusted BCA.
- » For subordinated debt and junior securities issued by DB, our LGF analysis indicates a high loss given failure, given the small volume of debt and limited protection from more subordinated instruments and residual equity, leading to a one-notch deduction from the bank's baa2 Adjusted BCA. We also incorporate additional notching from the Adjusted BCA for junior subordinated and preference share instruments, reflecting the coupon suspension risk ahead of potential failure.

### Government support considerations

We assume a moderate probability of government support for both deposits and senior unsecured debt of DB, which we consider a domestic systemically important financial institution, resulting in a one-notch additional rating uplift. For junior senior unsecured debt<sup>12</sup>, subordinated debt and hybrid instruments, we believe the potential for government support is low, and these ratings, therefore, do not benefit from any government support uplift.

## Methodology and scorecard

### Methodology

The principal methodology we use in rating Deutsche Bank AG is the [Banks Methodology](#), published in March 2024.

### About Moody's Bank Scorecard

Our bank scorecard is designed to capture, express and explain in summary form our Rating Committee's judgement. When read in conjunction with our research, a fulsome presentation of our judgement 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). The scorecard output and the individual scores are discussed in rating committees and may be adjusted up or down to reflect conditions specific to each rated entity.

## Rating methodology and scorecard factors

Exhibit 17

### Deutsche Bank AG

<b>Macro Factors</b>							
<b>Weighted Macro Profile</b>		<b>Strong +</b>	<b>100%</b>				
<b>Factor</b>	<b>Historic Ratio</b>	<b>Initial Score</b>	<b>Expected Trend</b>	<b>Assigned Score</b>	<b>Key driver #1</b>	<b>Key driver #2</b>	
Solvency							
Asset Risk							
Problem Loans / Gross Loans	2.8%	a2	↓	baa2	Expected trend	Market risk	
Capital							
Tangible Common Equity / Risk Weighted Assets (Basel III - transitional phase-in)	15.9%	aa3	↔	a3	Nominal leverage	Expected trend	
Profitability							
Net Income / Tangible Assets	0.3%	ba2	↔	ba2	Return on assets	Expected trend	
Combined Solvency Score		a3		baa2			
Liquidity							
Funding Structure							
Market Funds / Tangible Banking Assets	25.1%	baa2	↔	a3	Deposit quality	Extent of market funding reliance	
Liquid Resources							
Liquid Banking Assets / Tangible Banking Assets	42.8%	aa3	↔	a1	Stock of liquid assets	Expected trend	
Combined Liquidity Score		a3		a2			
Financial Profile				baa1			
Qualitative Adjustments				Adjustment			
Business Diversification				0			
Opacity and Complexity				-1			
Corporate Behavior				0			
Total Qualitative Adjustments				-1			
Sovereign or Affiliate constraint				Aaa			
BCA Scorecard-indicated Outcome - Range				baa1 - baa3			
Assigned BCA				baa2			
Affiliate Support notching				0			
Adjusted BCA				baa2			
<b>Balance Sheet</b>		<b>in-scope (EUR Million)</b>	<b>% in-scope</b>	<b>at-failure (EUR Million)</b>	<b>% at-failure</b>		
Other liabilities		366,958	35.9%	420,075	41.1%		
Deposits		520,750	51.0%	467,633	45.8%		
Preferred deposits		385,355	37.7%	366,087	35.9%		
Junior deposits		135,395	13.3%	101,546	9.9%		
Senior unsecured bank debt		29,393	2.9%	29,393	2.9%		
Junior senior unsecured bank debt		52,889	5.2%	52,889	5.2%		
Dated subordinated bank debt		11,500	1.1%	11,500	1.1%		
Preference shares (bank)		8,871	0.9%	8,871	0.9%		
Equity		30,630	3.0%	30,630	3.0%		
Total Tangible Banking Assets		1,020,991	100.0%	1,020,991	100.0%		



Debt Class	De Jure waterfall		De Facto waterfall		Notching		LGF Notching Guidance vs. Adjusted BCA	Assigned LGF notching	Additional Notching	Preliminary Rating Assessment
	Instrument volume + subordination	Sub-ordination	Instrument volume + subordination	Sub-ordination	De Jure	De Facto				
Counterparty Risk Rating	23.0%	23.0%	23.0%	23.0%	3	3	3	3	0	a2
Counterparty Risk Assessment	23.0%	23.0%	23.0%	23.0%	3	3	3	3	0	a2 (cr)
Deposits	23.0%	10.2%	23.0%	13.1%	3	3	3	3	0	a2
Senior unsecured bank debt	23.0%	10.2%	13.1%	10.2%	3	2	3	3	0	a2
Junior senior unsecured bank debt	10.2%	5.0%	10.2%	5.0%	1	1	1	1	0	baa1
Dated subordinated bank debt	5.0%	3.9%	5.0%	3.9%	-1	-1	-1	-1	0	baa3
Non-cumulative bank preference shares	3.9%	3.0%	3.9%	3.0%	-1	-1	-1	-1	-2	ba2

Instrument Class	Loss Given Failure notching	Additional notching	Preliminary Rating Assessment	Government Support notching	Local Currency Rating	Foreign Currency Rating
Counterparty Risk Rating	3	0	a2	1	A1	A1
Counterparty Risk Assessment	3	0	a2 (cr)	1	A1(cr)	
Deposits	3	0	a2	1	A1	A1
Senior unsecured bank debt	3	0	a2	1	A1	A1
Junior senior unsecured bank debt	1	0	baa1	0	Baa1	Baa1
Dated subordinated bank debt	-1	0	baa3	0	Baa3	Baa3
Non-cumulative bank preference shares	-1	-2	ba2	0	Ba2 (hyb)	Ba2 (hyb)

[1] Where dashes are shown for a particular factor (or sub-factor), the score is based on non-public information.

Source: Moody's Ratings

## Ratings

Exhibit 18

Category	Moody's Rating
<b>DEUTSCHE BANK AG</b>	
Outlook	Stable
Counterparty Risk Rating	A1/P-1
Bank Deposits	A1/P-1
Baseline Credit Assessment	baa2
Adjusted Baseline Credit Assessment	baa2
Counterparty Risk Assessment	A1(cr)/P-1(cr)
Issuer Rating	A1
Senior Unsecured	A1
Junior Senior Unsecured	Baa1
Junior Senior Unsecured MTN	(P)Baa1
Subordinate	Baa3
Pref. Stock Non-cumulative	Ba2 (hyb)
Commercial Paper -Dom Curr	P-1
Other Short Term -Dom Curr	(P)P-1
<b>DEUTSCHE BANK TRUST COMPANY AMERICAS</b>	
Outlook	Stable
Counterparty Risk Rating	A1/P-1
Bank Deposits	A1/P-1
Baseline Credit Assessment	baa1
Adjusted Baseline Credit Assessment	baa1
Counterparty Risk Assessment	A1(cr)/P-1(cr)
Issuer Rating	A1

Source: Moody's Ratings

## Endnotes

- [1](#) Assets under management shown in Asset Management segment. The Private Bank further holds €606 billion of assets under management as of the same date.
- [2](#) Up from the initial target set at 3.5-4.5% for the period
- [3](#) [Deutsche Bank's €1.3 billion provision for Postbank litigation will reduce Q2 profit](#), 29 April 2024
- [4](#) The SRF has been built up over a period of eight years (2016-2023) and, reached its target level of at least 1% of the amount of covered deposits of credit institutions in all twenty-one Banking Union countries at the end of 2023.
- [5](#) Adjustment reflects mainly litigation, restructuring and severance charges that were €172 million higher than in Q1 2023.
- [6](#) Data as of December 2023, last available.
- [7](#) Data source is the Banque de France report on [Indebtedness levels of non-financial entities - international comparisons Q3 2023](#).
- [8](#) the ratio pro-forma includes the €1.3 billion provisions for Postbank litigation, as disclosed by the bank.
- [9](#) including dividends paid in 2026 in respect of 2025
- [10](#) DB's TLAC requirement is equivalent to 6.75% of its leverage exposures as of the end of Q1 2024.
- [11](#) This includes senior preferred and senior non-preferred issuances, as well as AT1 and Tier 2 instruments.
- [12](#) In particular, for junior senior unsecured debt, the 2018 legal changes to Germany's bank insolvency rank order has lowered the likelihood of government support being available for these instruments, because they legally rank pari passu with most of the outstanding (statutorily subordinated) senior unsecured debt instruments issued up until 20 July 2018. This pari passu ranking of junior senior unsecured debt with legacy (statutorily subordinated) senior unsecured instruments makes it less likely that German authorities would selectively support the legacy instruments (which we reclassified into junior senior unsecured debt), following clarification that the German authorities expect these liabilities to bear losses in a resolution. As a result, our government support assumption for these instruments is 'Low'.

© 2024 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved. CREDIT RATINGS ISSUED BY MOODY'S CREDIT RATINGS AFFILIATES ARE THEIR CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MATERIALS, PRODUCTS, SERVICES AND INFORMATION PUBLISHED OR OTHERWISE MADE AVAILABLE BY MOODY'S (COLLECTIVELY, "MATERIALS") MAY INCLUDE SUCH CURRENT OPINIONS. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT OR IMPAIRMENT. SEE APPLICABLE MOODY'S RATING SYMBOLS AND DEFINITIONS PUBLICATION FOR INFORMATION ON THE TYPES OF CONTRACTUAL FINANCIAL OBLIGATIONS ADDRESSED BY MOODY'S CREDIT RATINGS. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS, NON-CREDIT ASSESSMENTS ("ASSESSMENTS"), AND OTHER OPINIONS INCLUDED IN MOODY'S MATERIALS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S MATERIALS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. AND/OR ITS AFFILIATES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND MATERIALS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND MATERIALS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND MATERIALS DO NOT COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS, ASSESSMENTS AND OTHER OPINIONS AND PUBLISHES OR OTHERWISE MAKES AVAILABLE ITS MATERIALS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

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

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT. FOR CLARITY, NO INFORMATION CONTAINED HEREIN MAY BE USED TO DEVELOP, IMPROVE, TRAIN OR RETRAIN ANY SOFTWARE PROGRAM OR DATABASE, INCLUDING, BUT NOT LIMITED TO, FOR ANY ARTIFICIAL INTELLIGENCE, MACHINE LEARNING OR NATURAL LANGUAGE PROCESSING SOFTWARE, ALGORITHM, METHODOLOGY AND/OR MODEL.

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

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

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

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

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

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

Moody's SF Japan K.K., Moody's Local AR Agente de Calificación de Riesgo S.A., Moody's Local BR Agência de Classificação de Risco LTDA, Moody's Local MX S.A. de C.V., I.C.V., Moody's Local PE Clasificadora de Riesgo S.A., and Moody's Local PA Calificadora de Riesgo S.A. (collectively, the "Moody's Non-NRSRO CRAs") are all indirectly wholly-owned credit rating agency subsidiaries of MCO. None of the Moody's Non-NRSRO CRAs is a Nationally Recognized Statistical Rating Organization.

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

Additional terms for India only: Moody's credit ratings, Assessments, other opinions and Materials are not intended to be and shall not be relied upon or used by any users located in India in relation to securities listed or proposed to be listed on Indian stock exchanges.

Additional terms with respect to Second Party Opinions (as defined in Moody's Investors Service Rating Symbols and Definitions): Please note that a Second Party Opinion ("SPO") is not a "credit rating". The issuance of SPOs is not a regulated activity in many jurisdictions, including Singapore. JAPAN: In Japan, development and provision of SPOs fall under the category of "Ancillary Businesses", not "Credit Rating Business", and are not subject to the regulations applicable to "Credit Rating Business" under the Financial Instruments and Exchange Act of Japan and its relevant regulation. PRC: Any SPO: (1) does not constitute a PRC Green Bond Assessment as defined under any relevant PRC laws or regulations; (2) cannot be included in any registration statement, offering circular, prospectus or any other documents submitted to the PRC regulatory authorities or otherwise used to satisfy any PRC regulatory disclosure requirement; and (3) cannot be used within the PRC for any regulatory purpose or for any other purpose which is not permitted under relevant PRC laws or regulations. For the purposes of this disclaimer, "PRC" refers to the mainland of the People's Republic of China, excluding Hong Kong, Macau and Taiwan.