MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY
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Rating Methodology

Aerospace and Defense

This rating methodology replaces the *Aerospace and Defense Methodology* published in July 2020. We have reordered and have made editorial updates to various sections of the methodology, and we have changed the presentation of the scorecard. These updates do not change our methodological approach.

Scope

This methodology applies to companies globally that are primarily* engaged in the development, production, assembly, sale and distribution of parts and services in the aerospace and defense industry. Companies rated under this methodology may produce large commercial airplanes, regional jets and business jets, or supply aircraft systems or components such as engines or flight controls to commercial customers. This methodology also applies to companies that may provide military products such as aircraft, submarines and weapons primarily to governments or to other defense contractors. Companies rated under this methodology may also provide maintenance, repair and overhaul, or other services to both commercial aerospace and defense end markets.

Companies that provide products or services to aerospace and defense end markets, but for which this business does not represent the preponderance of the company's business risk, are rated under other methodologies, such as our manufacturing methodology or business and consumer services methodology.[1]

*The determination of a company's primary business is generally based on the preponderance of the company's business risks, which are usually proportionate to the company's revenues, earnings and cash flows.

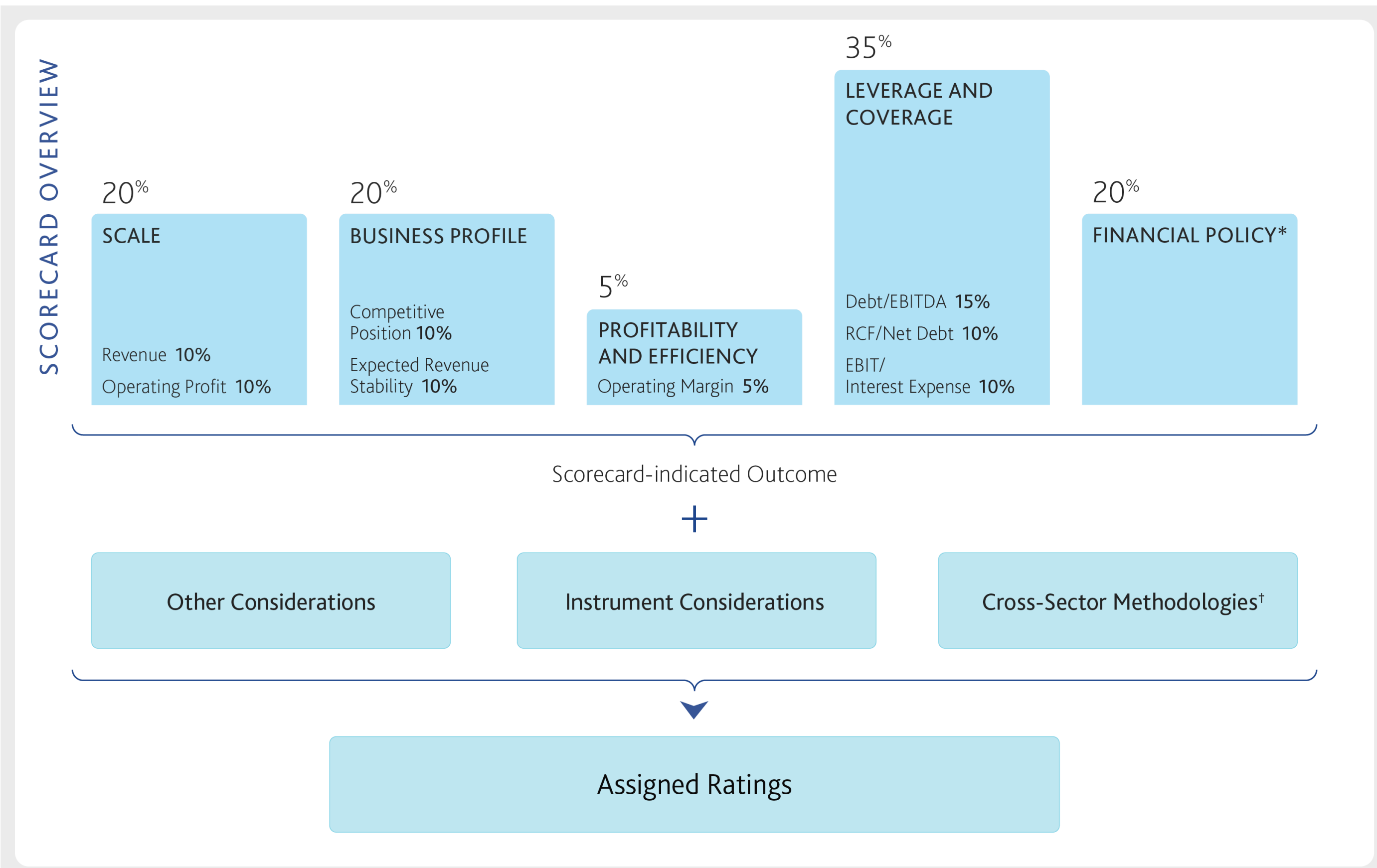
Rating approach

In this rating methodology, we explain our general approach to assessing credit risk of issuers in the aerospace and defense industry globally, including the qualitative and quantitative factors that are likely to affect rating outcomes in this sector. We seek to incorporate all material credit considerations in ratings and to take the most forward-looking perspective that visibility into these risks and mitigants permits.

The following schematic illustrates our general framework for the analysis of aerospace and defense companies, which includes the use of a scorecard.[2] The scorecard-indicated outcome is not expected to match the actual rating for each company. For more information, see the “Other considerations” and “Limitations” sections.

Exhibit 1

Illustration of the aerospace and defense methodology framework



* This factor has no sub-factors.

† Some of the methodological considerations described in one or more cross-sector rating methodologies may be relevant to ratings in this sector. A link to a list of our sector and cross-sector methodologies can be found in the “Moody's related publications” section.

Source: Moody's Investors Service

Aerospace and defense scorecard

For general information about how we use the scorecard and for a discussion of scorecard mechanics, please see the "Using the scorecard to arrive at a scorecard-indicated outcome" section. The scorecard does not include or address every factor that a rating committee may consider in assigning ratings in this sector. Please see the "Other considerations" and "Limitations" sections.

Exhibit 2

Aerospace and defense scorecard

	SCALE (20%)		BUSINESS PROFILE (20%)		PROFITABILITY and EFFICIENCY (5%)	LEVERAGE and COVERAGE (35%)			FINANCIAL POLICY (20%)
	Revenue (USD Billion)[1] (10%)	Operating Profit (USD Billion)[2] (10%)	Competitive Position (10%)	Expected Revenue Stability (10%)	Operating Margin (Operating Income / Revenue)[3] (5%)	Debt / EBITDA[4] (15%)	RCF / Net Debt[5] (10%)	EBIT / Interest Expense[6] (10%)	Financial Policy (20%)
Aaa	≥ $75	≥ $10	Sole provider or leading market position in essentially all segments; prime position on essentially all contracts; essentially no alternatives to products or services; essentially all programs are highly strategically important to customer(s); and extremely high barriers to entry in essentially all segments.	Extremely high revenue stability, supported by exceptional, multi-year backlog; essentially all revenue derived from extremely stable end markets with long product cycles; essentially no exposure to budget cuts, deferrals, cancellations or cyclicality; and exceptional track record of execution.	≥ 30%	≤ 0.5x	≥ 70%	≥ 20x	Expected to have extremely conservative financial policies (including risk and liquidity management); very stable metrics; essentially no event risk that would cause a rating transition; and public commitment to a very strong credit profile over the long term.
Aa	$40 - $75	$5 - $10	Leading market position in essentially all segments; prime position on most contracts; few alternatives to products or services; most programs are strategically important to customer(s), and very high barriers to entry in essentially all segments.	Very high revenue stability, supported by extremely strong, multi-year backlog; revenue derived mostly from extremely stable end markets with long product cycles; essentially no exposure to budget cuts, deferrals, cancellations or cyclicality; and extremely strong track record of execution.	20% - 30%	0.5x - 1x	45% - 70%	12x - 20x	Expected to have very conservative financial policies (including risk and liquidity management); stable metrics; minimal event risk that would cause a rating transition; and public commitment to a strong credit profile over the long term.
A	$15 - $40	$2 - $5	Leading or No. 2 market position in most segments; prime or Tier 1 position on most contracts; few alternatives to products or services; most programs are strategically important to customer(s); very high barriers to entry in most segments.	High revenue stability, supported by very strong, multi-year backlog; revenue derived mostly from highly stable end markets with long product cycles; very low exposure to budget cuts, deferrals, cancellations or cyclicality; very strong track record of execution.	15% - 20%	1x - 2x	30% - 45%	7x - 12x	Expected to have predictable financial policies (including risk and liquidity management) that preserve creditor interests; although modest event risk exists, the effect on leverage is likely to be small and temporary; strong commitment to a solid credit profile.
Baa	$5 - $15	$1 - $2	Leading or No. 2 market position in most core segments; Tier 1 position on most contracts; few alternatives to products or services; many programs are important to customer(s); high barriers to entry in most segments.	High revenue stability in most segments, supported by strong, multi-year backlog; revenue derived mostly from stable end markets with long product cycles; low exposure to budget cuts, deferrals, cancellations or cyclicality; strong track record of execution.	10% - 15%	2x - 3x	20% - 30%	4x - 7x	Expected to have financial policies (including risk and liquidity management) that balance the interests of creditors and shareholders; some risk that debt-funded acquisitions or shareholder distributions could lead to a weaker credit profile.

	SCALE (20%)		BUSINESS PROFILE (20%)		PROFITABILITY and EFFICIENCY (5%)	LEVERAGE and COVERAGE (35%)			FINANCIAL POLICY (20%)
	Revenue (USD Billion)[1] (10%)	**Operating Profit (USD Billion)[2] (10%)**	**Competitive Position (10%)**	**Expected Revenue Stability (10%)**	**Operating Margin (Operating Income / Revenue)[3] (5%)**	**Debt / EBITDA[4] (15%)**	**RCF / Net Debt[5] (10%)**	**EBIT / Interest Expense[6] (10%)**	**Financial Policy (20%)**
Ba	$2 - $5	$0.5 - $1	Strong market position in most core segments; Tier 1 or Tier 2 positions on most contracts; alternatives for some products and services; several programs are important to customer(s) and some are being phased out; high barriers to entry in most core segments.	High revenue stability in some segments, supported by fairly strong backlog; some revenue derived from moderately stable end markets with long product cycles; may have some exposure to budget cuts, deferrals, cancellations or cyclicality; fairly strong track record of execution.	6% - 10%	3x - 4x	10% - 20%	2x - 4x	Expected to have financial policies (including risk and liquidity management) that tend to favor shareholders over creditors; above-average financial risk resulting from shareholder distributions, acquisitions or other significant capital structure changes.
B	$0.5 - $2	$0.1 - $0.5	Solid market position in some core segments; mostly Tier 2 positions on contracts; alternatives for most products and services; a few programs are important to customer(s) and some are being phased out; moderately high barriers to entry in some segments.	Moderate volatility of revenue in most segments; moderate backlog; limited revenue derived from stable end markets; some exposure to budget cuts, deferrals, cancellations or cyclicality; moderate track record of execution.	3% - 6%	4x - 6x	5% - 10%	1x - 2x	Expected to have financial policies (including risk and liquidity management) that favor shareholders over creditors; high financial risk resulting from shareholder distributions, acquisitions or other significant capital structure changes.
Caa	$0.25 - $0.5	$0.025 - $0.1	Weak market position in most segments; low-tier position on most contracts; most products and services are easily replicable; most programs lack importance to customer(s) or are being phased out; or low barriers to entry in most segments.	High revenue volatility; limited backlog; very limited revenue from stable end markets; high exposure to budget cuts, deferrals, cancellations or cyclicality; or weak track record of execution.	0% - 3%	6x - 8x	0% - 5%	0x - 1x	Expected to have financial policies (including risk and liquidity management) that create elevated risk of debt restructuring in varied economic environments.
Ca	< $0.25	< $0.025	Low-tier position on essentially all contracts; essentially all products and services are easily replicable; essentially all programs lack importance to customer(s) or are being phased out; or most segments have essentially no barriers to entry.	Extremely volatile revenue; limited or non-existent backlog; essentially no revenue from stable end markets; very high exposure to budget cuts, deferrals, cancellations or cyclicality; or extremely weak track record of execution.	< 0%	> 8x	< 0%	< 0x	Expected to have financial policies (including risk and liquidity management) that create elevated risk of debt restructuring even in healthy economic environments.

[1] For the linear scoring scale, the Aaa endpoint value is $125 billion. A value of $125 billion or better equates to a numeric score of 0.5. The Ca endpoint value is zero. A value of zero equates to a numeric score of 20.5.
[2] For the linear scoring scale, the Aaa endpoint value is $20 billion. A value of $20 billion or better equates to a numeric score of 0.5. The Ca endpoint value is ($0.15) billion. A value of ($0.15) billion or worse equates to a numeric score of 20.5.
[3] For the linear scoring scale, the Aaa endpoint value is 50%. A value of 50% or better equates to a numeric score of 0.5. The Ca endpoint value is (5)%. A value of (5)% or worse equates to a numeric score of 20.5.
[4] For the linear scoring scale, the Aaa endpoint value is zero. A value of zero or better equates to a numeric score of 0.5. The Ca endpoint value is 12x. A value of 12x or worse equates to a numeric score of 20.5, as does a negative Debt/EBITDA value.
[5] For the linear scoring scale, when net debt is positive, the Aaa endpoint value is 100%. A value of 100% or better equates to a numeric score of 0.5. The Ca endpoint value is (5)%. A value of (5)% or worse equates to a numeric score of 20.5. When net debt is negative and RCF is positive, the numeric score is 0.5. When net debt is negative and RCF is negative or zero, the numeric score is 19.5.
[6] For the linear scoring scale, the Aaa endpoint value is 40x. A value of 40x or better equates to a numeric score of 0.5. The Ca endpoint value is (1)x. A value of (1)x or worse equates to a numeric score of 20.5.
Source: Moody's Investors Service

Discussion of the scorecard factors

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

Factor: Scale (20% weight)

Why it matters

Scale is an important indicator of the overall depth of a company's business, its success in attracting a variety of customers, as well as its resilience to shocks, such as sudden shifts in demand or rapid cost increases.

A company with greater scale typically has a broader platform of products and services and the ability to offer them to a wider range of customers, as well as more flexibility to invest in research and development.

How we assess it for the scorecard

Scoring for this factor is based on two quantitative sub-factors: Revenue; and Operating Profit.

REVENUE:

Revenue is measured (or estimated in the case of forward-looking expectations) using total reported revenue in billions of US dollars.

OPERATING PROFIT:

Operating profit is measured (or estimated in the case of forward-looking expectations) using total reported operating profit in billions of US dollars.

Factor: Business Profile (20% weight)

Why it matters

The business profile of an aerospace and defense company is important because it greatly influences its ability to generate sustainable earnings and operating cash flows. Core aspects of an aerospace and defense company's business profile are its competitive position and expected revenue stability, which can reduce volatility through economic and industry cycles.

This factor comprises two qualitative sub-factors:

Competitive Position

Competitive position is an important indicator of a company's resilience to downturns and ability to maintain a strong business profile over time. Core aspects of an aerospace and defense company's competitive position include the strength of its market position across business segments, the importance of its programs to its customers and barriers to entry.

A leading market position may indicate that a company's investments in research and development are translating into competitive advantages and that its products and services are meaningfully differentiated from competitors.

An aerospace and defense provider with a prime[3] or Tier 1 position on a contract is typically difficult to replace and has staying power, whereas a lower-tier company that sells undifferentiated components is generally more easily replaced by the customer and may face greater pricing pressure.

An aerospace and defense company generally provides products and services as part of an overall spending program by its end customer, and the program's relevance to the customer is an important indicator of the company's prospects with that customer. An aerospace and defense company that derives sales from programs that are strategically important to the customer is typically more likely to have sustained revenue from that customer over time, whereas sales from programs that are less critical or ones that are being phased out typically indicate lower future revenue opportunity.

Barriers to entry provide important indications of the likelihood of competition developing among aerospace and defense companies and of customers switching providers or remaining loyal. Companies that offer products and services with a higher level of intellectual property and sophisticated engineering, for example, typically benefit from greater pricing power. Gaining regulatory approval for products or special clearance for employees is another barrier to entry because it is generally costly and time-consuming and creates inherent limitations on the number of providers of these products or employees. Companies that offer products and services that have cleared regulatory hurdles are therefore typically at an advantage. In some defense contracts, the customer (e.g., a government) shares highly classified information and may be less likely to switch providers. Barriers to entry may be particularly important in cases where the company pays an upfront program participation fee for a contract and anticipates future revenue over the contract term to recoup this fee and achieve profitability.

Expected Revenue Stability

Expected revenue stability is an important indicator of the extent that a company is insulated from short-term economic or industry disruptions as well as its potential future earnings if it can execute on its orders. Core aspects of a company's revenue stability include its backlog, the stability of its end markets and its track record of execution.

Backlog, which represents committed orders from customers, indicative orders, or expected revenue based on long term programs, typically indicates a minimum level of revenue a company is likely to generate. A company with a strong, multi-year backlog can typically expect more revenue stability than one with a limited backlog that may be subject to greater uncertainty. Backlog may be a less important consideration for some suppliers with products that are less capital-intensive and require less time to develop.

Exposure to multiple end markets across and within the broad categories of aerospace and defense typically lends a company stability, because it derives revenue streams from end markets and products that are subject to different economic and industry cycles and trends. For example, steadier sales of passenger airplanes can help offset the generally greater volatility in the sale of business jets. Companies in the defense business are typically more insulated from downturns because defense contracts follow cycles linked to government budgets rather than economic cycles.

Products with longer life cycles can also help an aerospace and defense company's expected revenue stability. For example, large airplanes used for long commercial flights are typically flown for over 10 years and also require a lengthy manufacturing process, so orders are placed well in advance.

Exposure to business in different regions may also help a company mitigate economic or other weakness in one region with more favorable trends in another. For example, governments typically commit to defense budgets over multiple years, so a company that sells to multiple regions may be able to offset weakening revenue from one country's declining defense budget with business in a country that is increasing defense spending.

Because aerospace and defense contracts often involve complex products and services, a company's track record of delivery of such products and services is generally an important indication of its ability to convert its backlog into a consistent revenue stream over time. A company's track record of execution may also provide important indications of its ability to adapt to a customer's changing requirements and manage its cost structure. A company with a poor track record for execution is typically less likely to maintain its current contracts or win new orders from existing customers.

How we assess it for the scorecard

Scoring for this factor is based on two sub-factors: Competitive Position; and Expected Revenue Stability.

COMPETITIVE POSITION:

We assess core aspects of an aerospace and defense company's competitive position, including the strength of its market position across business segments, the importance of its programs to its customers and barriers to entry.

In our assessment of a company's market position, we consider whether a company has a prime, Tier 1, or lower tier position across its key contracts, as well as whether competitors offer similar products and services. We may consider market share, which we generally estimate based on information provided by third parties and a company's financial disclosures, and we may also use non-public information. Companies with mostly lower-tier positions on key contracts typically score lower for this sub-factor, although a company that is the sole source of a key product to another provider that has a Prime or Tier 1 position may have a strong competitive position. A company that primarily offers commodity products and services that can be easily substituted typically scores lower for this sub-factor than one that offers more sophisticated products and services.

Our assessment of the importance of an aerospace and defense company's program to customers involves qualitative considerations of key contracts and customers. We consider whether a program is critical to the end customer's long-term strategy or whether the customer is phasing out the product or service. We may consider the customer's public commitments to particular programs, such as a government's statements about its budget priorities. For example, an aerospace and defense company that manufactures energy-efficient airplanes is likely to be more competitive because airlines typically replace older planes with more energy-efficient ones over time. For a defense contractor, a program targeted at modernizing a government's information technology equipment or supporting a critical national security program is more likely to be a strategic priority for the customer than one related to older equipment.

Exhibit 3 summarizes common barriers to entry for aerospace and defense companies. We also typically assess whether the company is investing to maintain its unique offering, because barriers may erode without continued investment.

Exhibit 3
Typical Barriers to Entry

Barrier	Description
Investment Intensity	Substantial, ongoing investment in physical assets for complex sub-assemblies, and the intellectual capacity needed to create and maintain systems or electronics/surveillance operations. Could include the need for personnel with advanced degrees, unique skills or high clearances.
Unique Technologies	Patented, or difficult to replicate, products or services that provide a clear differentiated advantage in the market and are identifiable and recognized. These products, services or systems may be protected by law or be difficult to replicate by a competitor because of the time or cost involved.
Classified Programs	Large, sustainable and highly classified or secret programs (e.g., intelligence-gathering) where a defense customer is unlikely to switch providers based on costs alone.
Incumbency and Relevance	Important to suppliers as well as lead program managers or contractors. Over the life of a program, it is not possible to substitute products in many cases or only at a very high cost. Programs in civil aerospace or defense are highly consistent with the long-term direction of civilian or defense priorities.

Source: Moody's Investors Service

EXPECTED REVENUE STABILITY:

In assessing expected revenue stability, we consider a company's historical and expected revenue trends. We assess the core aspects of a company's revenue stability, including its backlog, the stability of its end markets and its track record of execution.

We generally estimate the backlog-to-sales ratio as a company's total reported backlog over its last 12 months of revenue. A high ratio typically indicates that a company has good visibility into its expected revenue. We typically use a company's reported backlog where available,[4] or our own estimates based on market conditions and the characteristics of a company's business compared with other companies. The backlog-to-sales ratio may be less relevant in assessing the expected revenue of suppliers, which tend to require a shorter lead time to deliver their products than companies that offer a more complex suite of products and services.

We also assess the stability of end markets for a company's major contracts, including exposure to a customer's budget cuts, deferrals, cancellations or cyclicality. The defense market is typically more stable than the commercial market, and it also generally follows government budget cycles rather than economic cycles. As such, a mix of defense and commercial business may result in stronger overall revenue stability, depending upon the type of commercial business. Within the commercial business, we consider the mix of end customers and products, which may affect revenue stability. For example, sales of business jets are typically more cyclical than commercial jets, which tend to benefit from a more predictable, multi-year cycle. We may also consider geographic diversity as part of our revenue stability assessment.

We assess a company's track record of contract execution over time, and we may consider its ability to manage its supply chain. We may consider the relative mix of development-phase and in-production contracts, given the potential for execution challenges as contracts ramp up. A company that primarily offers commodity products and services is unlikely to have a strong track record of contract execution, because the lack of complexity in its products and services does not afford it with the opportunity to develop one. We may also consider a company's governance culture and practices in our assessment of contract execution.

For the Competitive Position and Expected Revenue Stability sub-factors, we generally do not expect a given company's business profile to exactly match each of the attributes listed for a given scoring category. We typically assign the sub-factor score based on the alpha category for which the company has the greatest number of characteristics. However, there may be cases in which one characteristic is sufficiently important to a particular company's credit profile that it has a large influence on the sub-factor score.

Factor: Profitability and Efficiency (5% weight)

Why it matters

Profits matter because they are needed to generate sustainable cash flow and maintain a competitive position. An aerospace and defense company's operating margin may indicate the importance of its product to customers, its ability to avoid cost overruns, its success in pricing contracts and managing its supply chain, and its overall contract execution capabilities.

How we assess it for the scorecard

OPERATING MARGIN:

We use the ratio of operating income to revenue (Operating Margin).

Factor: Leverage and Coverage (35% weight)

Why it matters

Leverage and cash flow coverage measures provide important indications of a company's financial flexibility, long-term sustainability and resilience through business and economic cycles. Aerospace and defense companies typically need to adapt to new programs and to invest in research and development, making financial flexibility critical for long-term sustainability.

This factor comprises three quantitative sub-factors:

Debt / EBITDA

The ratio of total debt to earnings before interest, taxes, depreciation and amortization (Debt/EBITDA) is an indicator of debt serviceability and financial leverage. The ratio is commonly used in this sector as a proxy for comparative financial strength.

RCF / Net Debt

The ratio of retained cash flow to net debt (RCF/Net Debt) is an indicator of a company's cash generation (before working capital movements and capital expenditures, and after dividend payments) relative to its net debt (total debt minus cash and cash equivalents).

EBIT / Interest Expense

The ratio of earnings before interest and taxes to interest expense (EBIT/Interest Expense) is an indicator of a company's ability to meet its interest obligations.

How we assess it for the scorecard

Scoring for this factor is based on three sub-factors: Debt/EBITDA; RCF/Net Debt; and EBIT/Interest Expense.

DEBT / EBITDA:

The numerator is total debt, and the denominator is EBITDA.

RCF / NET DEBT:

The numerator is retained cash flow, and the denominator is net debt (total debt minus cash and cash equivalents).

EBIT / INTEREST EXPENSE:

The numerator is EBIT, and the denominator is interest expense.

Factor: Financial Policy (20% weight)

Why it matters

Financial policy encompasses management and board tolerance for financial risk and commitment to a strong credit profile. It is an important rating determinant, because it directly affects debt levels, credit quality, the future direction for the company and the risk of adverse changes in financing and capital structure.

Financial risk tolerance serves as a guidepost to investment and capital allocation. An expectation that management will be committed to sustaining an improved credit profile is often necessary to support an upgrade. For example, we may not upgrade the ratings of a company that has built flexibility within its rating category if we believe the company will use that flexibility to fund a strategic acquisition, cash distribution to shareholders, spin-off or other leveraging transaction. Conversely, a company's credit rating may be better able to withstand a moderate leveraging event if management places a high priority on returning credit metrics to pre-transaction levels and has consistently demonstrated the commitment to do so through prior actions. Liquidity management[5] is an important aspect of overall risk management and can provide insight into risk tolerance.

Companies may use acquisitions to spur revenue growth, expand business lines, consolidate market positions, advance cost synergies or seek access to new technology.

How we assess it for the scorecard

We assess the issuer's desired capital structure or targeted credit profile, its history of prior actions, including its track record of risk and liquidity management, and its adherence to its commitments. Attention is paid to management's operating performance and use of cash flow through different phases of economic and industry cycles. Also of interest is the way in which management responds to key events, such as changes in the credit markets and liquidity environment, legal actions, competitive challenges or regulatory pressures. Considerations include a company's public commitments in this area, its track record for adhering to commitments and our views on the ability of the company to achieve its targets.

When considering event risks in the context of scoring financial policy, we assess the likelihood and potential negative impact of M&A or other types of balance-sheet-transforming events. Management's appetite for M&A activity is assessed, with a focus on the type of transactions (i.e., core competency or new business) and funding decisions. Frequency and materiality of acquisitions and previous financing choices are evaluated. A history of debt-financed or credit-transforming acquisitions will generally result in a lower score for this factor. We may also consider negative repercussions caused by shareholders' willingness to sell the company.

We also consider a company's and its owners' past record of balancing shareholder returns and debtholders' interests. A track record of favoring shareholder returns at the expense of debtholders is likely to be viewed negatively in scoring this factor.

Other considerations

Ratings may reflect consideration of additional factors that are not in the scorecard, usually because the factor's credit importance varies widely among the issuers in the sector or because the factor may be important only under certain circumstances or for a subset of issuers. Such factors include financial controls and the quality of financial reporting; corporate legal structure; the quality and experience of management; assessments of corporate governance as well as environmental and social considerations; exposure to uncertain licensing regimes; and possible government interference in some countries. Regulatory, litigation, liquidity, technology and reputational risk as well as changes to consumer and business spending patterns, competitor strategies and macroeconomic trends also affect ratings.

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

Regulatory Considerations

Companies in the aerospace and defense sector are subject to varying degrees of regulatory oversight. Effects of these regulations may entail limitations on operations, higher costs, and higher potential for technology disruptions and demand substitution. Regional differences in regulation, implementation or enforcement may advantage or disadvantage particular issuers.

Our view of future regulations plays an important role in our expectations of future financial metrics as well as our confidence level in the ability of an issuer to generate sufficient cash flows relative to its debt burden over the medium and longer term. For example, changes in regulations or regulatory oversight could place additional cost burdens on companies or result in the erosion of market position for companies that fail to maintain compliance with updated regulations. Regulatory considerations may also play a role in our assessment of an issuer's Competitive Position and Expected Revenue Stability sub-factors. In some circumstances, regulatory considerations may also be a rating factor outside the scorecard, for instance when regulatory change is swift or when a material breach of regulations is disclosed by the company, alleged by a regulator or is the subject of litigation.

Environmental, Social and Governance Considerations

Environmental, social and governance (ESG) considerations may affect the ratings of issuers in the aerospace and defense sector. For information about our approach to assessing ESG issues, please see our methodology that describes our general principles for assessing these risks.[6]

Aerospace and defense companies may face environmental risks related to air, soil and water pollution created during manufacturing, as well as the resulting costs of cleanup. Some companies sell to airlines, an end market sector that faces pressure to reduce its carbon emissions. Airline requirements to reduce carbon emissions drive demand for more fuel-efficient aircraft, which may create advantages for aerospace and defense companies that can deliver equipment with higher fuel efficiency and disadvantages for those that cannot keep up with requirements. In most developed markets, clear regulation and compliance by companies may reduce the risk of unexpected costs. Companies with operations in countries with less rigorous standards may face lower regulatory costs but possibly higher cleanup risks. The impact of these risks typically varies based on a company's business mix. For example, companies that sell primarily high-value-added products and services can generally pass on to customers cost increases related to regulations, whereas companies that sell more commoditized products typically have to absorb cost increases.

Social considerations relevant to aerospace and defense companies relate primarily to labor and product safety. A shrinking pool of more highly skilled workers, such as engineers, may pose a risk for some companies as they seek to keep pace with technological change. Workers in certain hazardous industries may face potential health and safety risks. Product recalls or redesigns may affect companies' supply chains. Most aerospace and defense companies sell to other businesses rather than to consumers, but the airline sector is a key end market for companies that produce airplanes or supply related systems, components, or services. Aerospace and defense companies with a concentration of sales to airlines may have exposure to changing consumer preferences if increasing awareness of the potential environmental damage from emissions reduces demand for air travel.

Governance considerations relevant to aerospace and defense companies may include management's oversight over contracts.

Environmental, social and governance considerations may play a role in our assessment of a company's business profile due to the potential impact of these issues on a company's competitive position as well its revenue stability and ability to execute on contracts.

Financial Controls

We rely on the accuracy of audited financial statements to assign and monitor ratings in this sector. The quality of financial statements may be influenced by internal controls, including the proper tone at the top, centralized operations, and consistency in accounting policies and procedures. Auditors' reports on the effectiveness of internal controls, auditors' comments in financial reports and unusual restatements of financial statements or delays in regulatory filings may indicate weaknesses in internal controls.

Management Strategy

The quality of management is an important factor supporting a company's credit strength. Assessing the execution of business plans over time can be helpful in assessing management's business strategies, policies and philosophies and in evaluating management performance relative to performance of competitors and our projections. Management's track record of adhering to stated plans, commitments and guidelines provides insight into management's likely future performance, including in stressed situations.

Excess Cash Balances

Some companies in this sector may maintain cash balances (meaning liquid short-term investments as well as cash) that are far in excess of their operating needs. This excess cash can be an important credit consideration; however, the underlying policy and motivations of the issuer in holding high cash balances are often as or more important in our analysis than the level of cash held. We have observed significant variation in company behavior based on differences in financial philosophy, investment opportunities, availability of committed revolving credit facilities and shareholder pressures.

Most issuers need to retain some level of cash in their business for operational purposes. The level of cash required to run a business can vary based on the region(s) of operation and the specific sub-sectors in which the issuer operates. Some issuers have very predictable cash needs and others have much broader intra-period swings, for instance related to mark-to-market collateral requirements under hedging instruments. Some companies may hold large levels of cash at times because they operate without committed, long-term bank borrowing facilities. Some companies may hold cash on the balance sheet to meet long-term contractual liabilities, whereas other companies with the same types of liabilities have deposited cash into trust accounts that are off balance sheet.

The level of cash that issuers are willing to hold can also vary over time based on the cost of borrowing and macroeconomic conditions. The same issuer may place a high value on cash holdings in a major recession or financial crisis but seek to pare cash when inflation is high. As a result, cash on the balance sheet is most often considered qualitatively, by assessing the issuer's track record and financial and liquidity policies rather than by measuring how a point-in-time cash balance would affect a specific metric.

Across all corporate sectors, an important shareholder-focused motivation for cash holdings, sometimes over very long periods, is cash for acquisitions. In these cases, we do not typically consider that netting cash against the issuer's current level of debt is analytically meaningful; however, the cash may be a material mitigant in our scenario analyses of potential acquisitions, share buybacks or special dividends. Tax minimization strategies have at times been another primary motivation for holding large cash balances. Given shareholder pressures to return excess cash holdings, when these motivations for holding excess cash are eliminated, we generally expect that a large portion of excess cash will be used for dividends and share repurchases.

By contrast, some companies maintain large cash holdings for long periods of time in excess of their operating and liquidity needs solely due to conservative financial policies, which provides a stronger indication of an enduring approach that will benefit creditors. For instance, some companies have a policy to routinely pre-fund upcoming required debt payments well in advance of the stated maturity. Such companies may also have clearly stated financial targets based on net debt metrics and a track record of maintaining their financial profile within those targets.

While the scorecard in this methodology uses certain leverage and coverage ratios with total (or gross) debt (Debt/EBITDA) we do consider excess cash holdings in our rating analysis, including in the scorecard with the RCF / Net Debt ratio and in our assessment of the financial and liquidity policy. For issuers where we have clarity into the extent to which cash will remain on the balance sheet and/or be used for creditor-friendly purposes, excess cash may be considered in a more quantitative manner. While we consider excess cash in our credit assessment for ratings, we do not typically adjust the balance sheet debt for any specific amount because this implies greater precision than we think is appropriate for the uncertain future uses of cash. However, when cash holdings are unusually large relative to debt, we may refer to debt net of cash, or net of a portion of cash, in our credit analysis and press releases in order to provide additional insight into our qualitative assessment of the credit benefit. Alternatively, creditor-friendly use of cash may be factored into our forward view of metrics, for instance when the cash is expected to be used for debt-repayment. We may also cite rating threshold levels for certain issuers based on net debt ratios, particularly when these issuers have publicly stated financial targets based on net debt metrics. In cases where we believe that cash on the balance sheet does not confer meaningful credit support, we are more likely to cite gross debt ratios in our credit analysis, press releases and rating threshold levels.

Even when the eventual use for excess cash is likely to be for purposes that do not benefit debtholders, large holdings provide some beneficial cushion against credit deterioration, and cash balances are often considered in our analysis of near-term liquidity sources and uses. Such downside protection is usually more important for low rated companies than for highly rated companies due to differences in credit stability and the typically shorter distance from potential default for issuers at the lower end of the ratings spectrum.

Liquidity

Liquidity is an important rating consideration for all aerospace and defense companies, although it may not have a substantial impact in discriminating between two issuers with a similar credit profile. Liquidity can be particularly important for companies in highly seasonal operating environments where working capital needs must be considered, and ratings can be heavily affected by extremely weak liquidity. We form an opinion on likely near-term liquidity requirements from the perspective of both sources and uses of cash. For more details on our approach, please see our liquidity cross-sector methodology.[7]

Additional Metrics

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

For example, free cash flow is not always an important differentiator of credit profiles. Strong companies with excellent investment opportunities may demonstrate multiyear periods of negative free cash flow while retaining solid access to capital and credit, because these investments will yield stable cash flows in future years. Weaker companies with limited access to credit may have positive free cash flow for a period of time because they have curtailed the investments necessary to maintain their assets and future cashgenerating prospects. However, in some cases, free cash flow can be an important driver of the future liquidity profile of an issuer, which, as noted above, can have a meaningful impact on ratings.

Non-wholly Owned Subsidiaries

Some companies in the aerospace and defense sector choose to dilute their equity stake in certain material subsidiaries, for example through an initial public offering, which may in some cases negatively impact future financial flexibility. While improving cash holdings on a one-off basis, selling minority interests in subsidiaries may have a negative impact on cash flows available to the parent company that may not be fully reflected in consolidated financial statements.[8] The parent's share of dividend flows from a non-wholly owned subsidiary is reduced, and minority stakes can increase structural subordination, since dividend flows to minority interest holders are made before the cash flows are available to service debt at the parent company. While less frequent, sale of a minority stake may be accompanied by policies protective of the subsidiary that further limit the parent's financial flexibility, for instance restrictions on cash pooling with other members of the corporate family, limitations on dividends and distributions, or arms-length business requirements. Minority stakeholders may have seats on the board of the subsidiary. In many cases, we consider the impact of non-wholly owned subsidiaries qualitatively. However, in some cases we may find that an additional view of financial results, such as analyzing cash flows on a proportional consolidation basis, may be very useful to augment our analysis based on consolidated financial statements. When equity dilution or structural subordination arising from non-wholly owned subsidiaries is material and negative, the credit impact is captured in ratings but may not be fully reflected in scorecard-indicated outcomes.

For companies that hold material minority interest stakes, consolidated funds from operations typically includes the dividends received from the minority subsidiary, while none of its debt is consolidated. When such dividends are material to the company's cash flows, these cash flows may be subject to interruption if they are required for the minority subsidiary's debt service, capital expenditures or other cash needs. When minority interest dividends are material, we may also find that proportional consolidation or another additional view of financial results is useful to augment our analysis of consolidated financials. We would generally also consider structural subordination in these cases.[9] When these credit considerations are material, their impact is captured in ratings but may not be fully reflected in scorecard-indicated outcomes.

Event Risk

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

Parental Support

Ownership can provide ratings lift for a particular company in the aerospace and defense sector if it is owned by a highly rated owner(s) and is viewed to be of strategic importance to those owners. In our analysis of parental support, we consider whether the parent has the financial capacity and strategic incentives to provide support to the issuer in times of stress or financial need (e.g., a major capital investment or advantaged operating agreement), or has already done so in the past. Conversely, if the parent puts a high dividend burden on the issuer, which in turn reduces its flexibility, the ratings would reflect this risk.

Government-related issuers may receive ratings uplift due to expected government support. However, for certain issuers, government ownership can have a negative impact on the underlying Baseline Credit Assessment.[10] For example, price controls, onerous taxation and high distributions can have a negative effect on an issuer's underlying credit profile.

Other Institutional Support

In some countries, large aerospace and defense issuers may receive government support in the event of financial difficulties because of the strategic importance of their products or operations to maintain defense capabilities and to the functioning of the economy.

Seasonality

Seasonality is an important driver of customer demand and can cause swings in cash balances and working capital positions for issuers. Higher volatility creates less room for errors in meeting customer demand or operational execution.

Cyclical Sectors

Scorecard-indicated outcomes in cyclical sectors such as the aerospace sector may be higher than the rating at the top of the economic cycle and lower than the rating at the bottom of the cycle. While using annual financials in the scorecard typically provides very useful insights into recent or near-term results, ratings may also reflect our expectations for the progression of yearly results over a longer period that may include a full economic or industry cycle. However, cyclicality itself poses many different types of risks to companies, and cycles do not reverse themselves with predictable regularity. A cyclical sector may also be affected by a secular decline or expansion. These considerations may be incorporated qualitatively in ratings.

Using the scorecard to arrive at a scorecard-indicated outcome

1. Measurement or estimation of factors in the scorecard

In the "Discussion of the scorecard factors" section, we explain our analytical approach for scoring each scorecard factor or sub-factor,[11] and we describe why they are meaningful as credit indicators.

The information used in assessing the sub-factors is generally found in or calculated from information in the company's financial statements or regulatory filings, derived from other observations or estimated by Moody's analysts. We may also incorporate non-public information.

Our ratings are forward-looking and reflect our expectations for future financial and operating performance. However, historical results are helpful in understanding patterns and trends of a company's performance as well as for peer comparisons. Financial ratios,[12] unless otherwise indicated, are typically calculated based on an annual or 12-month period. However, the factors in the scorecard can be assessed using various time periods. For example, rating committees may find it analytically useful to examine both historical and expected future performance for periods of several years or more.

All of the quantitative credit metrics incorporate our standard adjustments[13] to income statement, cash flow statement and balance sheet amounts for items such as underfunded pension obligations and operating leases. We may also make other analytical adjustments that are specific to a particular company.

2. Mapping scorecard factors to a numeric score

After estimating or calculating each factor or sub-factor, each outcome is mapped to a broad Moody's rating category (Aaa, Aa, A, Baa, Ba, B, Caa or Ca, also called alpha categories) and to a numeric score.

Qualitative factors are scored based on the description by broad rating category in the scorecard. The numeric value of each alpha score is based on the scale below.

Exhibit 4

Aaa	Aa	A	Baa	Ba	B	Caa	Ca
1	3	6	9	12	15	18	20

Source: Moody's Investors Service

Quantitative factors are scored on a linear continuum. For each metric, the scorecard shows the range by alpha category. We use the scale below and linear interpolation to convert the metric, based on its placement within the scorecard range, to a numeric score, which may be a fraction. As a purely theoretical example, if there were a ratio of revenue to interest for which the Baa range was 50x to 100x, then the numeric score for an issuer with revenue/interest of 99x, relatively strong within this range, would score closer to 7.5, and an issuer with revenue/interest of 51x, relatively weak within this range, would score closer to 10.5. In the text or table footnotes, we define the endpoints of the line (i.e., the value of the metric that constitutes the lowest possible numeric score, and the value that constitutes the highest possible numeric score).

Exhibit 5

Aaa	Aa	A	Baa	Ba	B	Caa	Ca
0.5-1.5	1.5-4.5	4.5-7.5	7.5-10.5	10.5-13.5	13.5-16.5	16.5-19.5	19.5-20.5

Source: Moody's Investors Service

3. Determining the overall scorecard-indicated outcome

The numeric score for each sub-factor (or each factor, when the factor has no sub-factors) is multiplied by the weight for that sub-factor (or factor), with the results then summed to produce an aggregate numeric score. The aggregate numeric score is then mapped back to a scorecard-indicated outcome based on the ranges in the table below.

Exhibit 6

Scorecard-indicated outcome

Scorecard-indicated outcome	Aggregate numeric score
Aaa	x ≤ 1.5
Aa1	1.5 < x ≤ 2.5
Aa2	2.5 < x ≤ 3.5
Aa3	3.5 < x ≤ 4.5
A1	4.5 < x ≤ 5.5
A2	5.5 < x ≤ 6.5
A3	6.5 < x ≤ 7.5
Baa1	7.5 < x ≤ 8.5
Baa2	8.5 < x ≤ 9.5
Baa3	9.5 < x ≤ 10.5
Ba1	10.5 < x ≤ 11.5
Ba2	11.5 < x ≤ 12.5
Ba3	12.5 < x ≤ 13.5
B1	13.5 < x ≤ 14.5
B2	14.5 < x ≤ 15.5
B3	15.5 < x ≤ 16.5
Caa1	16.5 < x ≤ 17.5
Caa2	17.5 < x ≤ 18.5
Caa3	18.5 < x ≤ 19.5
Ca	19.5 < x ≤ 20.5
C	x > 20.5

Source: Moody's Investors Service

For example, an issuer with an aggregate numeric score of 11.7 would have a Ba2 scorecard-indicated outcome.

In general, the scorecard-indicated outcome is oriented to the corporate family rating (CFR) for speculative-grade issuers and to the senior unsecured rating for investment-grade issuers. For issuers that benefit from rating uplift from parental support, government ownership or other institutional support, we consider the underlying credit strength or Baseline Credit Assessment for comparison to the scorecard-indicated outcome. For an explanation of the Baseline Credit Assessment, please refer to *Rating Symbols and Definitions* and to our cross-sector methodology for government-related issuers.[14]

Assigning issuer-level and instrument-level ratings

After considering the scorecard-indicated outcome, other considerations and relevant cross-sector methodologies, we typically assign a CFR to speculative-grade issuers or a senior unsecured rating for investment-grade issuers. For issuers that benefit from rating uplift from government ownership, we may assign a Baseline Credit Assessment.[15]

Individual debt instrument ratings may be notched up or down from the CFR or the senior unsecured rating to reflect our assessment of differences in expected loss related to an instrument's seniority level and collateral. The documents that provide broad guidance for such notching decisions are the rating methodology on loss given default for speculative-grade non-financial companies, the methodology for notching corporate instrument ratings based on differences in security and priority of claim, and the methodology for assigning short-term ratings.[16]

Key rating assumptions

For information about key rating assumptions that apply to methodologies generally, please see *Rating Symbols and Definitions*.[17]

Limitations

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

Limitations of the scorecard

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

The scorecard in this rating methodology is a relatively simple tool that can be used in most cases to approximate credit profiles of companies in this sector and to explain, in summary form, many of the factors that are generally most important in assigning ratings to these companies. Credit loss and recovery considerations, which are typically more important as an issuer gets closer to default, may not be fully captured in the scorecard. The scorecard is also limited by its upper and lower bounds, causing scorecard-indicated outcomes to be less likely to align with ratings for issuers at the upper and lower ends of the rating scale.

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

Factors that are outside the scorecard, including those discussed above in the "Other considerations" section, may be important for ratings, and their relative importance may also vary from company to company. In addition, certain broad methodological considerations described in one or more cross-sector rating methodologies may be relevant to ratings in this sector.[18] Examples of such considerations include the following: how sovereign credit quality affects non-sovereign issuers, the assessment of credit support from other entities, the relative ranking of different classes of debt and hybrid securities, and the assignment of short-term ratings.

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

General limitations of the methodology

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

Ratings reflect our expectations for an issuer's future performance; however, as the forward horizon lengthens, uncertainty increases and the utility of precise estimates, as scorecard inputs or in other considerations, typically diminishes. Our forward-looking opinions are based on assumptions that may prove, in hindsight, to have been incorrect. Reasons for this could include unanticipated changes in any of the following: the macroeconomic environment, general financial market conditions, industry competition, disruptive technology, or regulatory and legal actions. In any case, predicting the future is subject to substantial uncertainty.

Moody's related publications

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

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

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

Moody's Basic Definitions for Credit Statistics (User's Guide) can be found here.

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Endnotes

1 A link to a list of our sector and cross-sector methodologies can be found in the "Moody's related publications" section.

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

3 Prime typically indicates an aerospace and defense company that supplies products or services directly to the end customer. For example, a company that sells planes directly to an airline or provides services directly to a government has a prime position. A company that sells products to the prime airplane manufacturer may have a Tier 1 position, and suppliers to the Tier 1 provider are generally considered to be lower-tier companies. Lower tiers typically indicate greater distance from the end customer.

4 Companies typically do not follow identical standards for reporting backlog, which may reduce comparability across issuers. We consider this qualitatively in our assessment.

5 Liquidity management is distinct from the level of liquidity, which is discussed in the "Other considerations" section.

6 A link to a list of our sector and cross-sector methodologies can be found in the "Moody's related publications" section.

7 A link to a list of our cross-sector methodologies can be found in the "Moody's related publications" section.

8 For example, in the case of an equity stake reduction in a subsidiary down to 75%, in the parent's financial statements, all revenue and EBITDA of the subsidiary would typically still be consolidated at the group level.

9 Proportional consolidation brings a portion of the minority subsidiary's debt onto the balance sheet, but this debt is structurally senior to debt at the parent company, because it is closer to the assets and cash flows of the minority subsidiary.

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

11 When a factor comprises sub-factors, we score at the sub-factor level. Some factors do not have sub-factors, in which case we score at the factor level.

12 For definitions of our most common ratio terms, please see *Moody's Basic Definitions for Credit Statistics (User's Guide)*. A link can be found in the "Moody's related publications" section.

13 For an explanation of our standard adjustments, please see the cross-sector methodology that describes our financial statement adjustments in the analysis of non-financial corporations.

14 A link to a list of our sector and cross-sector methodologies and a link to *Rating Symbols and Definitions* can be found in the "Moody's related publications" section.

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

16 A link to a list of our sector and cross-sector rating methodologies can be found in the "Moody's related publications" section.

17 A link to *Rating Symbols and Definitions* can be found in the "Moody's related publications" section.

18 A link to a list of our sector and cross-sector methodologies can be found in the "Moody's related publications" section.

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

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