RATING METHODOLOGY

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Rating Methodology

Manufacturing

This rating methodology replaces the *Manufacturing* methodology published on 10 September 2021. We have made editorial changes throughout the methodology to enhance readability. These updates do not change our methodological approach.

Scope

This rating methodology applies to companies globally that are primarily engaged in the manufacturing of product components, finished products or capital goods. These companies develop and produce a wide breadth of products, including ball bearings, electrical installation products, vacuum pumps and rail cars, to name only a few examples. Products range from commoditized components to highly engineered parts used in complex industries.

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 revenue, earnings and cash flows.

Manufacturing companies that we rate using this methodology serve a variety of end markets, such as energy, medical, agriculture and construction. They may also provide related services. For example, some companies may provide services to the aerospace and defense or automotive end markets; however, these end markets do not represent the preponderance of business risk for the manufacturing companies that we rate using this methodology.

We rate companies that are primarily engaged in the manufacturing of automobiles or automotive parts, in the manufacturing of consumer durables, and in providing aerospace and defense products and services, using our methodologies for automobile manufacturers, automotive suppliers, consumer durables, and aerospace and defense companies, respectively.[1] We also rate makers of metal, glass and plastic packaging, and medical products and device makers using separate methodologies.

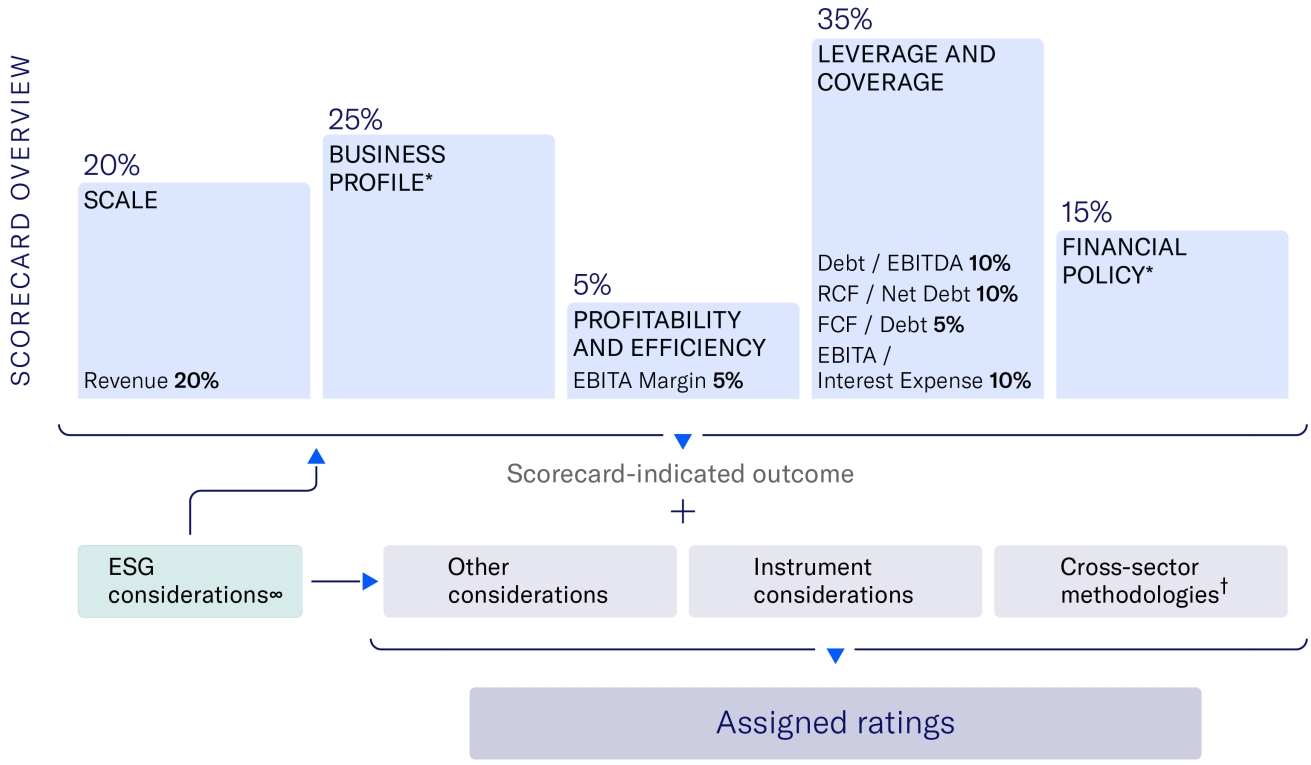
Rating approach

In this methodology, we explain our general approach to assessing credit risks of companies in this sector, including the quantitative and qualitative factors likely to affect rating outcomes.

The following exhibit illustrates our overall rating approach in the analysis of companies in this sector, which includes the use of a scorecard. The scorecard-indicated outcome may not match a company's assigned rating, which is determined by a rating committee. For more information, see the "Other considerations" and "Limitations" sections.

Exhibit 1

Illustration of the manufacturing rating approach



* This factor has no subfactors.
∞ Environmental, social and governance (ESG) considerations, including, where available, our opinions of exposure to them as expressed in Issuer Profile Scores (IPSs), may affect scorecard factors and other considerations outside of the scorecard. For more information, see the "Other considerations" section.
† Some of the methodological considerations described in one or more cross-sector 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 Ratings

Scorecard

The scorecard in this methodology is a relatively simple reference 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. The scorecard may not include or address every consideration a rating committee may assess in assigning ratings to companies in this sector.

Exhibit 2

Manufacturing scorecard

	SCALE (20%)	BUSINESS PROFILE (25%)	PROFITABILITY and EFFICIENCY (5%)	LEVERAGE and COVERAGE (35%)				FINANCIAL POLICY (15%)
	Revenue (USD Billion)[1] (20%)	Business Profile (25%)	EBITA Margin (EBITA / Revenue)[2] (5%)	Debt / EBITDA[3] (10%)	RCF / Net Debt[4] (10%)	FCF / Debt[5] (5%)	EBITA / Interest Expense[6] (10%)	Financial Policy (15%)
Aaa	≥ $50	Unassailable market positions across essentially all of its business segments globally and extremely stable revenue and margins, supported by extremely stable end-markets; a highly diverse portfolio of products in multiple business segments; and entire cost structure is extremely efficient and effective.	≥ 35%	≤ 0.5x	≥ 60%	≥ 25%	≥ 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	$30 - $50	Commanding and defensible market positions across most of its business segments globally and highly stable revenue and margins, supported by highly stable end-markets; a highly diverse portfolio of products in multiple business segments; and a highly efficient and effective cost structure.	25% - 35%	0.5x - 1x	45% - 60%	20% - 25%	15x - 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 - $30	Extremely strong and defensible market positions across its core business segments and stable revenue and margins, supported by mostly stable end-markets; a diverse portfolio of products in multiple business segments; an efficient and effective cost structure.	17% - 25%	1x - 1.75x	35% - 45%	15% - 20%	10x - 15x	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	Strong and defensible market positions in most of its core business segments and moderately stable revenue and margins, supported by end-markets that are characterized by solid long-term demand but subject to short-term volatility; a diverse portfolio of products in only one or two business segments; some volatility in input costs, but cost management that substantially mitigates the margin impact.	12% - 17%	1.75x - 3.25x	25% - 35%	10% - 15%	7x - 10x	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.
Ba	$1.5 - $5	Operates in one or few business segments with leading market positions that are defensible in the near term but are subject to long-term competitive threats and revenue and margin volatility due to end-markets that are characterized by moderate short-term volatility; a somewhat concentrated portfolio of products; input costs that are volatile and cost management that only partially mitigates the margin impact.	7% - 12%	3.25x - 4.75x	15% - 25%	5% - 10%	4x - 7x	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.

	SCALE (20%)	BUSINESS PROFILE (25%)	PROFITABILITY and EFFICIENCY (5%)	LEVERAGE and COVERAGE (35%)				FINANCIAL POLICY (15%)
	Revenue (USD Billion)[1] (20%)	Business Profile (25%)	EBITA Margin (EBITA / Revenue)[2] (5%)	Debt / EBITDA[3] (10%)	RCF / Net Debt[4] (10%)	FCF / Debt[5] (5%)	EBITA / Interest Expense[6] (10%)	Financial Policy (15%)
B	$0.5 - $1.5	Operates in a highly competitive and fragmented market with a moderate ability to defend its position and is subject to high revenue and margin volatility due to end-markets that are characterized by high short-term volatility; a concentrated portfolio of products; input costs that are volatile and the company has little ability to mitigate the margin impact.	2.5% - 7%	4.75x - 6.25x	7.5% - 15%	0% - 5%	1.5x - 4x	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	Operates in a highly competitive and fragmented market characterized by product substitution and is subject to extremely high and unpredictable revenue and margin volatility due to weak and highly volatile end-markets; offers one or few products; input costs are volatile and the company essentially has no ability to mitigate the margin impact.	0% - 2.5%	6.25x - 7.75x	0% - 7.5%	(5)% - 0%	0.75x - 1.5x	Expected to have financial policies (including risk and liquidity management) that create elevated risk of debt restructuring in varied economic environments.
Ca	< $0.25	Operates in an intensely competitive market that is approaching obsolescence.	< 0%	> 7.75x	< 0%	< (5)%	< 0.75x	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 $75 billion. A value of $75 billion or better equates to a numeric score of 0.5. The Ca endpoint value is zero. A value of zero or worse equates to a numeric score of 20.5.
[2] 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.
[3] For the linear scoring scale, the Aaa endpoint value is 0x. A value of 0x 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.
[4] For the linear scoring scale, when net debt is positive, the Aaa endpoint value is 80%. A value of 80% 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.
[5] For the linear scoring scale, the Aaa endpoint value is 35%. A value of 35% or better equates to a numeric score of 0.5. The Ca endpoint value is (10)%. A value of (10)% or worse equates to a numeric score of 20.5.
[6] For the linear scoring scale, the Aaa endpoint value is 30x. A value of 30x or better equates to a numeric score of 0.5. The Ca endpoint value is 0x. A value of 0x or worse equates to a numeric score of 20.5.
Source: Moody's Ratings

Discussion of the scorecard factors

In this section, we explain why each scorecard factor or subfactor is a meaningful credit indicator, and we discuss our analytical approach to scoring each factor or subfactor. When a factor comprises subfactors, we score at the subfactor level. Some factors do not have subfactors, in which case we score at the factor level.

In assessing quantitative subfactors, we use information that we calculate or estimate from a company's financial statements or regulatory filings, or that we derive from other observations. We may incorporate nonpublic information qualitatively in our assessment.

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 in a company's performance, as well as for peer comparisons. We typically calculate or estimate financial metrics, unless otherwise indicated, based on an annual or other 12-month period. However, we may assess the scorecard factors using various periods. For example, we 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 in the scorecard incorporate our standard adjustments to income statement, cash flow statement and balance sheet amounts for items described in our cross-sector methodology on financial statement adjustments for nonfinancial corporations.[2] We may also make nonstandard adjustments that are specific to a particular company.

For a discussion of scorecard mechanics, see the "Scorecard-indicated outcome" section.

Factor: Scale (20% weight)

Why it matters

Scale is an important indicator of the overall strength of a company's business, the size of its market and the company's relevance within an industry and the economy. Scale is also an indicator of a company's importance to its customers and its bargaining strength with suppliers, as well as its ability to invest resources to maintain its competitive position and expand its marketing and geographic reach.

Larger manufacturing companies typically attract a greater breadth of customers and can better withstand cyclicality resulting from economic conditions and product cycles. A larger revenue base also generally leads to significant economies of scale in raw material purchases and corporate functions, which is particularly important for manufacturing companies that seek to control costs through effective global supply chain management. Larger manufacturers also tend to generate higher cash flow for capital reinvestment and debt reduction. In addition, they generally have greater access to the capital markets, which can reduce the cost of capital.

How we assess it for the scorecard

We score this factor based on one quantitative subfactor: Revenue.

Revenue

We use total reported revenue in billions of US dollars to measure scale, or to estimate it in the case of forward-looking expectations.

Factor: Business Profile (25% weight)

Why it matters

The business profile of a company is important because it greatly influences its ability to generate sustainable earnings and operating cash flow.

Core aspects of a manufacturing company's business profile are its market position, the breadth and stability of the end markets it serves, the diversity of its product offerings, as well as the effectiveness of the company's cost structure. These aspects of the business profile typically have a considerable impact on the stability of a manufacturing company's revenue and margins.

A company's market position is a meaningful indicator of its resilience to economic downturns and intensifying competition. A leading market position may indicate that a company's investments in manufacturing capacity, technology and R&D are translating into competitive advantages and may provide insight into the extent of the differentiation of its products and services. Companies with leading market positions are also generally more able to pass on increases in input costs to customers and have stronger negotiating

power, which may allow them to achieve more favorable payment terms from customers. For example, advance payments from customers can reduce working capital needs and bolster liquidity. A leading position may also indicate high barriers to entry, which further reinforces a company's market position.

Manufacturers that provide diverse products and services to a broad range of end markets can typically achieve more stable revenue and margins and therefore more stable cash flow, because different end markets and products may follow different economic and product cycles. Companies with a high proportion of recurring revenue relative to total revenue, for example from long-term contracts, also typically benefit from lower volatility and greater predictability of cash flow. Revenue that is spread across a mix of more stable, predictable end- markets as well as more volatile end markets allows a company to benefit from growth in more volatile businesses while mitigating fluctuations in cash flow if revenue from that business declines. For example, rising sales to the longer-cycle medical industry can offset declining sales in shorter-cycle industries such as the oil and gas sector when oil prices fall. Diversity across product and service offerings and end markets also typically goes hand in hand with customer diversity, limiting a company's vulnerability to the potential loss of any one customer or set of customers. Geographic diversity also supports stability because economic trends can affect regions differently; a manufacturer with sales in different countries and regions can typically withstand weakness in one region better than a company with a more limited geographic presence.

A manufacturer's cost structure and its ability to control costs are also important indicators of its ability to withstand the cyclicality inherent in the manufacturing sector. A company with more effective cost controls has greater flexibility to quickly adjust its expense base, resulting in more stable margins through varied economic conditions than a company with little ability to mitigate the impact of higher costs on margins. Manufacturers with strong supply chain management and a broad geographic footprint can typically cushion the impact of fluctuations in input costs, including labor and raw materials, by sourcing lower-cost materials and shifting production to lower-cost locations, which may lead to more stable margins. Given the typically global sales and production of the manufacturing sector, a company with a broad geographic footprint of manufacturing plants can typically control costs better than a company with more limited options.

How we assess it for the scorecard

We score this factor based on our qualitative assessment of the durability of demand and a company's ability to meet that demand.

We generally do not expect a given company to match each attribute listed for a given scoring category for this factor. We typically assign a factor score based on the alpha category for which a 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 factor score. For example, a concentration in volatile end markets, such as truck or railcar manufacturing, may limit a company's Business Profile score to Ba or lower, even if the company has a strong market position and good cost control.

We assess qualitatively a manufacturer's market position across segments, the stability of its end markets, and its cost control. We also consider historical and projected trends in revenue and margin, typically indicated by EBIT, operating and EBITA margins.

We generally assess a company's market position relative to its competitors and the overall competitiveness of the market. We may consider market share, which we generally estimate based on information provided by third parties and company financial disclosures, and we may also use nonpublic information. We may also consider whether barriers to entry are meaningful and reduce potential competition from new entrants. We assess market position across a company's business segments, typically where a segment comprises a suite of products and services generally oriented to serving a set of customers. Core segments are those that represent key competencies of the company and a material portion of the company's revenue and cash flow.

In our qualitative assessment of end-market stability, we typically consider the different industries or sectors of the manufacturer's customer base. For example, a manufacturer with a significant concentration of sales to a single volatile sector (such as oil and gas or automotive) would typically score lower on this factor than a company with customers diversified across multiple industries that are likely to be affected by different business or economic trends. We also assess diversity of the manufacturer's offering by considering the breadth of products and services across its segments, and we may also consider the contribution of revenue from each key segment, as well as geographic diversity (typically based on revenue from different regions or countries). We may also assess whether the company benefits from long-term agreements, which provide revenue visibility and stability.

We typically assess cost control based on historical and projected margin trends and may also consider the portion of fixed costs relative to variable costs and margins of a company's key business segments. We typically consider the effectiveness of a company's supply chain management, including its geographic footprint of plants, its access to suppliers and its ability to source key inputs at stable prices. Delayed deliveries, revenue shortfalls relative to forecasts, and margin deterioration may be indicators of poor supply chain management and volatile costs for key inputs. We may also consider plant utilization.

Factor: Profitability and Efficiency (5% weight)

Why it matters

A company's profitability matters because it supports the generation of sustainable cash flow and reflects the strength of the company's competitive position. Profitability also provides insights into a company's ability to manage key costs and pass them on to customers, which is an important indicator of the long-term viability of its business model. Strong profitability and operating efficiency can help a company to withstand economic and cyclical downturns that affect its competitive position and credit metrics.

How we assess it for the scorecard

We score this factor based on one quantitative subfactor: EBITA Margin.[3]

EBITA Margin

We use the ratio of earnings before interest, taxes and amortization (EBITA) to revenue.

Factor: Leverage and Coverage (35% weight)

Why it matters

Leverage and debt service coverage provide insight into the level of risk a company is willing to undertake. The degree of leverage is an important indicator of a company's financial flexibility, its ability to invest in growth opportunities and its capacity to pay debt service.

How we assess it for the scorecard

We score this factor based on four quantitative subfactors: Debt/EBITDA; RCF/Net Debt; FCF/Debt; and EBITA/Interest Expense.[4]

Debt / EBITDA

We use the ratio of total debt to earnings before interest, taxes, depreciation and amortization (EBITDA).

RCF / Net Debt

We use the ratio of retained cash flow (RCF) to net debt.

FCF / Debt

We use the ratio of free cash flow (FCF) to total debt.

EBITA / Interest Expense

We use the ratio of earnings before interest, taxes and amortization (EBITA) to interest expense.

Factor: Financial Policy (15% weight)

Why it matters

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

Financial risk tolerance serves as a guidepost for investment and capital allocation. Liquidity management is an important aspect of financial policy and can provide insight into risk tolerance. Liquidity management is distinct from the level of liquidity, which we discuss in the "Other considerations" section.

Many companies in this sector have historically used acquisitions to spur revenue growth, expand business lines, consolidate market positions, advance cost synergies or seek access to new technology. Companies have also undertaken significant divestitures of business units as an important component of their portfolio balancing strategies, with a goal of shedding lower-performing businesses

or those that no longer align with evolving strategic objectives. In such cases, we typically weigh the loss of earnings and cash flow from divested assets against the potential for improved margins and streamlining of the company's remaining portfolio of businesses.

How we assess it for the scorecard

We assess qualitatively a company's targeted credit profile or desired capital structure, and its ability to achieve its targets. We also consider a company's complexity and transparency, its track record of risk and liquidity management, and its public commitments and history of adhering to its commitments in these areas. We also consider management's operating performance and use of cash flow through different phases of economic and industry cycles, as well as how management responds to key events, such as changes in the credit markets and liquidity environment, legal actions, competitive challenges and regulatory pressures.

When considering event risks in the context of scoring financial policy, we assess the likelihood and potential effect of M&A or other types of balance-sheet-transforming events. We assess management's appetite for M&A activity, with a focus on the type of transactions (i.e., core competency or new business) and funding decisions. We also evaluate the frequency and materiality of acquisitions and previous financing choices. A history of debt-financed or credit-transforming acquisitions generally results in a lower score for this factor. We may also consider a company's willingness to sell itself and the negative repercussions that could result, such as through a leveraged buyout transaction.

We also consider a company's and its owners' past record of balancing shareholder returns and debtholders' interests. We are likely to take a negative view in scoring this factor when a company has a track record of favoring shareholder returns at the expense of debtholders.

Other considerations

Ratings may reflect other considerations that are not in the scorecard, usually because the credit importance of these considerations varies widely among companies in this sector or because they may be important only under certain circumstances or for a subset of companies. Such considerations can 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 can also be considerations that affect ratings.

The following are examples of other considerations that may be reflected in our ratings and may cause ratings to be different from scorecard-indicated outcomes.

Environmental, social and governance considerations

Where environmental, social and governance (ESG) issues are meaningful for credit profiles, we incorporate them into our ratings analysis in a variety of ways in the application of our sector-specific methodologies. As one part of our overall credit analysis, we consider how ESG considerations could affect the qualitative and quantitative factors and subfactors in the scorecard.

Even where ESG considerations do not affect the measures in the scorecard, or where they cannot be quantified, we incorporate them into our overall analysis of credit drivers that are meaningful to the rating. As a result, we may incorporate these ESG risks qualitatively outside of the scorecard. As part of our ratings analysis, we may establish Issuer Profile Scores (IPSs), which indicate our opinion of the extent to which a given company is exposed to E, S and G risks (incorporating ESG-specific mitigants) or benefits from its exposure to E, S or G. The IPSs are inputs to credit ratings. For more information, see our methodology that describes our general principles for assessing ESG risks.[5]

Manufacturing is a broad sector, and the credit impact of environmental risks, including air, soil and water pollution, as well as the resulting costs of cleanup, may be higher in certain subsectors than in others. However, in most developed markets, clear regulation and compliance by companies may reduce the risk of unexpected costs. Manufacturers with operations in countries with less rigorous standards may face lower regulatory costs but possibly higher clean-up risks. The impact of these risks typically varies based on a manufacturer's business mix. Some manufacturers with asbestos exposure face cash payment requirements related to lawsuits or regulatory requirements.

Companies that sell primarily high-value-add products and services, such as medical devices, communications equipment, and aerospace and defense 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. Manufacturers with exposure to the auto manufacturing end market may face greater environmental risk because of the challenge of meeting regional emissions requirements. Demand trends for renewable products and innovations in energy technology may affect the competitive landscape, which in turn may advantage some companies and disadvantage others.

Social considerations relevant to manufacturers 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 a manufacturer's supply chain. Most manufacturers sell to other businesses, rather than to consumers, but companies with a significant presence in auto manufacturing may have exposure to changing consumer preferences, given increasing awareness of the potential environmental damage from emissions, as well as a trend toward ride-sharing and autonomous vehicles.

Liquidity

Liquidity is an important rating consideration for all companies, and extremely weak liquidity can heavily affect ratings in many cases. Our liquidity assessment can be particularly important where there are significant short-term demands on a company's liquidity, for example, in highly seasonal operating environments where working capital needs must be considered. We form an opinion on likely short-term liquidity requirements from the perspective of both sources and uses of cash. For more information, see our liquidity cross-sector methodology.[6]

Captive finance subsidiaries

Some manufacturers have captive finance subsidiaries that provide inventory financing for customers. Ownership of a captive finance subsidiary can be helpful during economic downturns because the captive finance subsidiary can be used to provide subsidies to customers that might otherwise curtail equipment purchases, which in turn helps the manufacturer maintain revenue.

Captive finance subsidiaries can also constrain a manufacturer's financial flexibility. This stress can result from the finance operation's need for supplementary equity capital and liquidity, which may be formalized in a support agreement. Where present, formal support agreements are typically granted by the manufacturer for the benefit of the finance company and its creditors. In some cases, we may expect that support will be provided in the absence of a formal agreement.

We typically consider the likelihood and cost of the support that the company may extend to its captive finance subsidiary. For more on how we assess the credit impact of a captive finance subsidiary on a manufacturing company, see our methodology on captive finance subsidiaries of nonfinancial corporations.[7]

Advance payments in working capital

Manufacturing companies that require custom-made machinery or turn-key plants to produce goods for specific customers tend to receive advance payments from those customers to contribute to the funding of working capital and mitigate some of the contract risk (e.g., cancellation or nonpayment). Advance and progress payments often exceed a manufacturer's working capital requirements for a project, resulting in excess cash, although this typically reverses to positive net working capital. The cash balance sourced from prepayments may result in stronger net leverage ratios and a stronger liquidity position, even though the cash is dedicated to contract completion and therefore not available either to pay back the manufacturer's debt or to meet other liquidity needs.

We typically consider advance and progress payments part of working capital and not as explicit financial obligations because business partners provide the payments, or customer credits, to fund working capital. However, a sharp fall-off in new orders may precipitate a fast runoff of advance payments, exceeding cash releases from project completion and effectively creating new funding needs, for which most companies hold extra cash. An analysis of cash requirements and sources through the various stages of a cycle is an important consideration.

Guarantees, letters of credit and bonding lines

Manufacturers that supply equipment to construction projects typically provide letters of credit or bank guarantees for many kinds of commitments, such as firm bids and completion and performance guarantees, and warranty obligations. Access to sufficient

committed credit or bonding lines for this purpose may therefore be an important consideration for some companies. The aggregate amount that would be sufficient would reflect the company's business growth, order cycle times, and the possibility that some bank guarantees may not be returned by the customer immediately upon fulfillment.

We do not normally add unfunded letters of credit, bank guarantees or performance bonds (typically reported in the notes to financial statements) to a manufacturing company's total debt because the underlying commitment will only become an obligation contingent upon triggering events, such as nonperformance. The timing, likelihood and amount of any such obligations is often difficult to predict. As long as the manufacturer maintains a track record of reasonably on-time and on-budget delivery and incurs only modest warranty payments, we generally expect that drawings under letters of credit, bank guarantees or performance bonds will remain limited or unlikely.

Regulatory considerations

Companies in this 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 a particular company.

Our view of future regulatory requirements is important because it is the basis for our expectations of future financial metrics and of a company's ability to generate sufficient cash flow relative to its debt burden over the medium and longer term.

In this sector, regulatory considerations also play a role in our assessment of a company's business profile to the extent these considerations affect the company's cost structure or market position. However, we may assess certain aspects of regulatory considerations outside of the scorecard, for instance when considering the effects on a company's credit quality if regulatory change is swift.

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 that 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 far exceed their operating needs. This excess cash can be an important credit consideration.

The amount of cash required to run a business can vary materially based on the regions of operation and the specific subsectors in which a company operates. As a result, we typically assess cash on the balance sheet qualitatively, taking into account a company's track record and its financial and liquidity policies. Cash holdings may be a material mitigant in our scenario analyses of potential acquisitions, share buybacks or special dividends. We assess possible uses of cash, especially for companies that may be acquisitive or under pressure to return cash to shareholders. By contrast, some companies maintain large cash holdings for long periods in excess of their operating and liquidity needs solely because of conservative financial policies, which provides a stronger indication of an enduring approach that will benefit creditors. Large cash holdings provide some buffers against credit deterioration, and we typically consider cash balances in our analysis of near-term liquidity sources and uses. See the "Liquidity" section for more information.

In accordance with our view of how a company will use its cash, we may use total debt or net debt in our forward-looking view of credit metrics for the Leverage and Coverage factor. We may also cite rating thresholds based on these metrics.

Additional metrics

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

Non-wholly owned subsidiaries

Some companies in this sector choose to dilute their equity stake in certain material subsidiaries, such as through an initial public offering or a sale to a private investor, which may, in some cases, negatively affect future financial flexibility. While such transactions may improve cash holdings on a one-off basis, selling minority interests in subsidiaries may have a negative effect on cash flow available to the parent company that consolidated financial statements may not fully reflect. For example, in the case of an equity stake reduction in a subsidiary down to 75%, in the parent's financial statements, the subsidiary's revenue and EBITDA would typically still be consolidated at the group level.

The presence of minority stakes can increase structural subordination and reduce the parent's share of dividend flows from a non-wholly owned subsidiary. While less frequent, the sale of a minority stake may have provisions 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. For example, we may find that an additional view of financial results, such as analyzing cash flow on a proportional consolidation basis, may be useful to inform our analysis. When equity dilution or structural subordination from non-wholly owned subsidiaries is material and negative, the credit impact is captured in our ratings.

For companies that hold material minority interest stakes (investor companies), consolidated funds from operations typically includes the dividends received from the equity-accounted entity, while none of its debt is consolidated. The investor company's cash flow may be subject to interruption if it is required for the equity-accounted entity's debt service, capital expenditures or other cash needs. The debt of the equity-accounted entity is structurally senior to the investor company's debt. When an equity-accounted entity has a material level of debt, we may estimate one or more of the investor company's financial metrics using proportional consolidation or another approach to inform our analysis of consolidated financials and capture the credit impact of these considerations in our ratings.

Event risk

We also recognize the possibility that an unexpected event could cause a sudden and sharp decline in a company's fundamental creditworthiness, which may cause the assigned rating to be lower than the scorecard-indicated outcome. Event risks — which vary and can range from leveraged recapitalizations to sudden regulatory changes or liabilities from an accident — can overwhelm even a stable, well-capitalized company. Other types of event risks may include M&A, asset sales, spinoffs, shareholder distributions, litigation, natural disasters, pandemics, significant cybercrime events and geopolitical conflicts.

Parental support

Ownership can provide ratings lift for a particular company if it is owned by a highly rated owner or owners who view it to be of strategic importance. In our analysis of parental support, we consider whether the parent has the financial capacity and strategic incentives to provide support to the company in times of stress or financial need (e.g., a major capital investment or advantaged operating agreement), or if it has done so in the past. Conversely, if the parent puts a high dividend burden on the company, which in turn reduces its flexibility, the ratings will reflect this risk. For more information, see our cross-sector methodology on assessing the impact of financial support from a parent, subsidiary or affiliate in the absence of a guarantee.[8]

Government-related issuers may receive ratings uplift from expected government support. However, for certain companies, government ownership can have a negative effect on the underlying Baseline Credit Assessment (BCA). For example, price controls, onerous taxation and high distributions can have a negative effect on a company's underlying credit profile. For more information on the BCA, see *Rating Symbols and Definitions* and our cross-sector methodology for government-related issuers.[9]

Other institutional support

In some countries, large companies have received government or banking support in the event of financial difficulties because of their overall importance to the functioning of the economy. We consider whether group and banking relationships may provide support when systemically important companies encounter significant financial stress.

As a notable example, some of our corporate ratings in Japan incorporate the government or banking support we expect to be provided, based on historical experience, to large and systemically important companies. Over the years, this support has resulted in lower levels of default for Japanese companies than might otherwise have occurred.

Seasonality

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

Cyclical sectors

In a cyclical sector, the scorecard-indicated outcome may be higher than the assigned rating at the top of the economic cycle and lower than the assigned rating at the bottom of the cycle. While using annual or other 12-month-period financials in the scorecard typically provides useful insights into recent or near-term financial results, ratings may also reflect our expectations for the progression of financial results over a longer period that may include a full economic cycle. However, cyclicality itself poses many different types of risks to companies, and cycles do not reverse themselves with predictable regularity. A secular decline or expansion may also affect a cyclical sector. Ratings may incorporate these considerations qualitatively.

Scorecard-indicated outcome

We arrive at a scorecard-indicated outcome by first mapping the outcome for each factor or subfactor to a numeric score, and then by producing an aggregate numeric score and the equivalent alphanumeric outcome.

Mapping scorecard factors to a numeric score

We map the outcome of each factor or subfactor in the scorecard to a broad Moody's rating category and to a corresponding numeric score. We score qualitative factors and subfactors based on the description by broad rating category in the scorecard. The following exhibit shows the numeric score that corresponds to each broad rating category.

Exhibit 3

Numeric scores for qualitative factors and subfactors

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

Source: Moody's Ratings

We score quantitative factors and subfactors on a linear continuum. For each metric, the scorecard shows the range by broad rating category. We use the scale in the following exhibit and linear interpolation to convert the metric, based on its placement within the scorecard range, into a numeric score, which may be a fraction. As an illustrative example, if the Baa range for the ratio of revenue to interest is 50x to 100x, the numeric score for a company with a ratio of 99x – relatively strong within this range – would be closer to 7.5, while the numeric score for a company with a ratio of 51x – relatively weak within this range – would be closer to 10.5. In the scorecard footnotes, we define the endpoints of the line (i.e., the metric values that equate to the highest possible numeric score and the lowest possible numeric score).

Exhibit 4

Ranges of numeric scores for quantitative factors and subfactors

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 Ratings

Determining the overall scorecard-indicated outcome

We multiply the numeric score for each subfactor (or each factor, when the factor has no subfactors) by the weight of that subfactor (or factor) and sum the results to produce an aggregate numeric score. We map the aggregate numeric score back to a scorecard-indicated outcome using the ranges in the following exhibit.

Exhibit 5

Scorecard-indicated outcome

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

Source: Moody's Ratings

For example, a company 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 senior unsecured rating for investment-grade companies and the corporate family rating (CFR) for speculative-grade companies. For companies that benefit from rating uplift from parental support, government ownership or other institutional support, we consider the underlying credit strength or BCA for comparison to the scorecard-indicated outcome. For more information on the BCA, see *Rating Symbols and Definitions* and our cross-sector methodology for government-related issuers.[10]

Assigning issuer-level and instrument-level ratings

After considering the scorecard-indicated outcome, other considerations and relevant cross-sector methodologies, we typically assign a senior unsecured rating for investment-grade companies and a CFR for speculative-grade companies. For government-related issuers, we assign a BCA.

We may notch individual debt instrument ratings upward or downward from the senior unsecured rating or the CFR to reflect our assessment of differences in expected loss related to an instrument's seniority level and collateral. For more information, see our cross-sector methodologies on loss given default for speculative-grade nonfinancial companies, notching corporate instrument ratings based on differences in security and priority of claim, and assigning short-term ratings.[11]

Key rating assumptions

For information about key rating assumptions that apply to methodologies generally, see *Rating Symbols and Definitions*.[12]

Limitations

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

Limitations of the scorecard

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

For example, the scorecard may not fully capture credit loss and recovery considerations, which typically become more important as a company gets closer to default. The scorecard is also limited by its upper and lower bounds, causing scorecard-indicated outcomes to be less likely to align with ratings for companies at the upper and lower ends of the rating scale.

The weights of each scorecard factor and subfactor approximate their importance for rating decisions across the sector, but the importance of a particular factor may vary substantially based on an individual company's circumstances.

Factors outside the scorecard, including those discussed 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 methodologies may be relevant to ratings in this sector.[13] These considerations include how sovereign credit quality affects nonsovereign 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 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 does not include an exhaustive description of all the factors we may consider in assigning ratings in this sector. Companies in this 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 our ratings and to take the most forward-looking perspective that visibility into these risks and mitigants permits.

Ratings reflect our expectations for a company'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 methodologies. Certain broad methodological considerations (described in one or more cross-sector methodologies) may also be relevant to the determination of credit ratings of issuers and instruments. A list of sector and cross-sector methodologies can be found here.

Data summarizing the historical robustness and predictive power of credit ratings can be found here.

For more information, see *Rating Symbols and Definitions*, which is available here.

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

3 For definitions of our most common metrics, see our cross-sector methodology that describes our financial statement adjustments for nonfinancial corporations. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's related publications" section.

4 For definitions of our most common metrics, see our cross-sector methodology that describes our financial statement adjustments for nonfinancial corporations. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's related publications" section.

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

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

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

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

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

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

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

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