MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY
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Rating Methodology

Software

This rating methodology replaces the *Software Industry* methodology published in August 2018. We have reordered and have made editorial updates to various sections of the methodology, and we have changed the presentation of the scorecard. We have removed outdated information. These updates do not change our methodological approach.

Scope

This methodology applies to companies globally that are primarily* engaged in the sale and support of software and software services to consumer or enterprise end-markets. The majority of companies that are rated using this methodology are enterprise-focused software companies with a substantial proportion of recurring revenue, primarily driven by annual maintenance revenue or subscription revenue from well-established customer bases. These companies produce software packages and solutions from internally developed or acquired technologies and physically or virtually deliver these products to end-customers for installation and use at the customer's premises. Software companies are typically compensated in the form of license, support and maintenance or subscription revenue as well as ancillary consulting and other services.

Companies that sell or support software but are primarily engaged in other activities, such as business and consumer services, communications equipment or technology hardware, are rated using separate methodologies.[1]

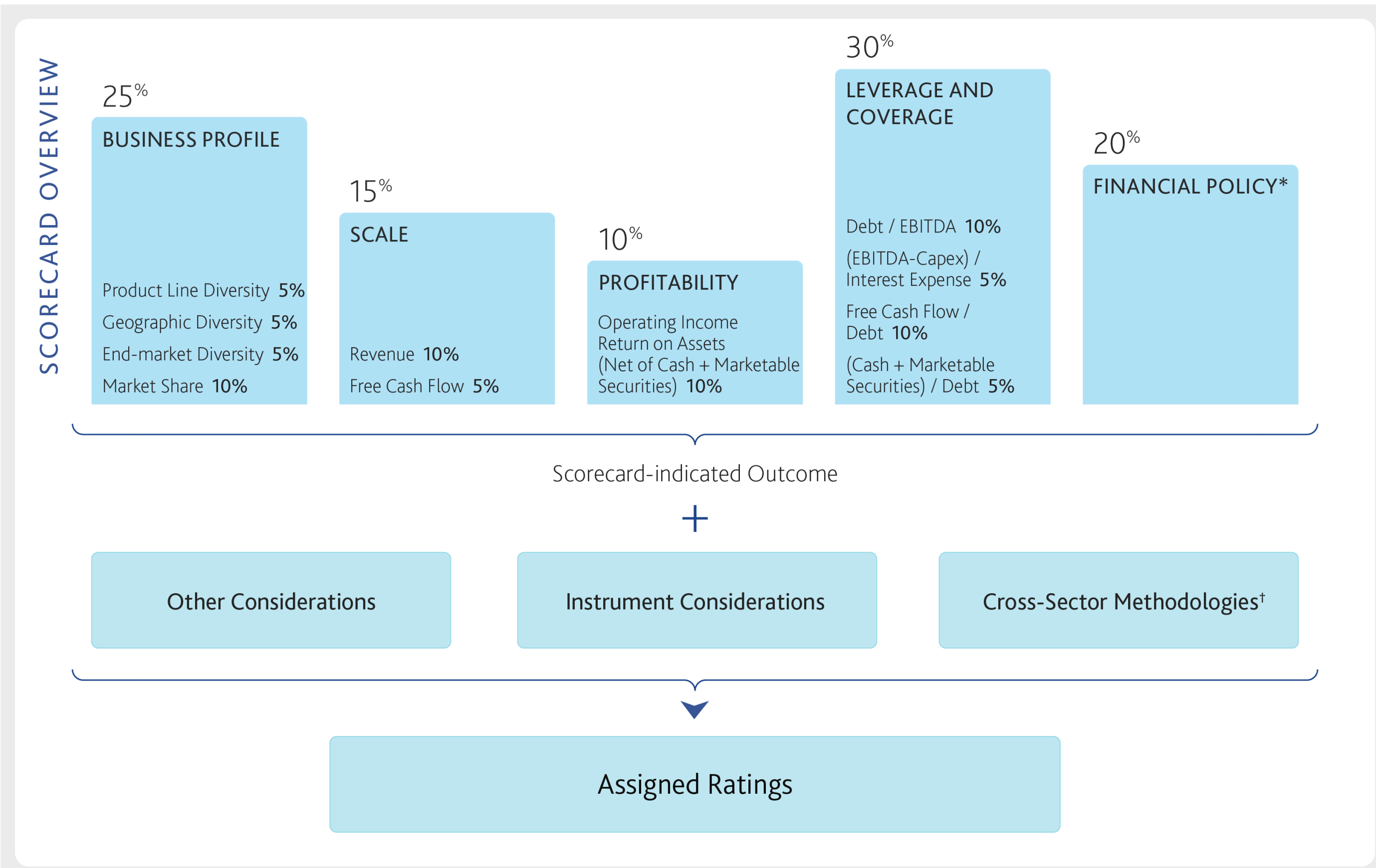
*The determination of a company's primary business is generally based on the preponderance of the company's business risks, which are usually proportionate to the company's revenues, earnings and cash flows.

Rating approach

In this rating methodology, we explain our general approach to assessing credit risk of issuers in the software 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 software 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 software 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

Software 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

Software scorecard

	BUSINESS PROFILE (25%)				SCALE (15%)		PROFITABILITY (10%)	LEVERAGE and COVERAGE (30%)				FINANCIAL POLICY (20%)
	Product Line Diversity (5%)	**Geographic Diversity (5%)**	**End-Market Diversity (5%)**	**Market Share (10%)**	**Revenue (USD Billion) (10%)**	**Free Cash Flow (USD Billion) (5%)**	**Operating Income ROA (Net of Cash + Marketable Securities) (10%)**	**Debt / EBITDA[1] (10%)**	**(EBITDA - CapEx) / Interest Expense (5%)**	**FCF / Debt (10%)**	**(Cash + Marketable Securities) / Debt (5%)**	
Aaa	Operates in all 3 Primary industry segments with a broad portfolio in each	Globally extremely well-diversified with significant presence in all regions and minimal concentration in any one region; no single region expected to account for more than 30% of revenues	Extremely well-diversified with largest market expected to be no more than 5% of sales	Expected to be #1 in all key market segments with greater than 50% market share in majority of segments	≥ $60	≥ $12.5	≥ 30%	< 0.5x	≥ 22x	≥ 75%	≥ 175%	Expected to have extremely conservative financial policies; very stable metrics; public commitment to very strong credit profile over the long term
Aa	Operates in all 3 Primary segments, with a broad portfolio in 2 and a limited portfolio in 1	Globally well-diversified; no single region expected to account for more than 35% of revenue; no two regions expected to be more than 65% of revenue	Very well-diversified end markets with very limited concentration expected in any end market	Expected to have #1 or #2 market share in all key markets	$30 - $60	$7.5 - $12.5	25 - 30%	0.5 - 1x	16 - 22x	50 - 75%	125 - 175%	Expected to have very stable and conservative financial policies; stable metrics; minimal event risk that would cause a rating transition; public commitment to strong credit profile over the long term
A	Operates in all 3 Primary segments, with 1 broad and 2 limited or, Operates in 2 Primary segments with a broad portfolio in each	Globally diversified; no single region expected to account for more than 45% of revenue; no two regions expected to be more than 65% of revenue	Well-diversified end markets with minimal concentration expected in any end market	Expected to be #1 or 2 in majority of key markets	$15 - $30	$3.75 - $7.5	20 - 25%	1 - 1.5x	9 - 16x	35 - 50%	75 - 125%	Expected to have predictable financial policies 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	Operates in 2 Primary segments with a broad portfolio in 1 and limited in the other	Main region expected to account for approximately 45 - 55% of revenue or less than 45% but the two largest regions account for no more than 75% of revenue	Diversified end markets but with modest concentration expected in one or more end markets	Expected to be among top 3 in majority of key markets	$3 - $15	$0.75 - $3.75	15 - 20%	1.5 - 2.5x	4.5 - 9x	20 - 35%	35 - 75%	Expected to have financial policies that balance the interest of creditors and shareholders; some risk that debt funded acquisitions or shareholder distributions could lead to a weaker credit profile

	BUSINESS PROFILE (25%)				SCALE (15%)		PROFITABILITY (10%)	LEVERAGE and COVERAGE (30%)				FINANCIAL POLICY (20%)
	Product Line Diversity (5%)	**Geographic Diversity (5%)**	**End-Market Diversity (5%)**	**Market Share (10%)**	**Revenue (USD Billion) (10%)**	**Free Cash Flow (USD Billion) (5%)**	**Operating Income ROA (Net of Cash + Marketable Securities) (10%)**	**Debt / EBITDA[1] (10%)**	**(EBITDA - CapEx) / Interest Expense (5%)**	**FCF / Debt (10%)**	**(Cash + Marketable Securities) / Debt (5%)**	
Ba	Operates in 2 Primary segments with a limited portfolio in each or Operates in 1 Primary segment with a broad portfolio in that segment	Main region expected to account for approximately 55 - 65% of revenue	Concentration in one or more end markets but no single market expected to generate half of sales	Expected to be a strong niche player in majority of markets	$0.75 - $3	$0.1875 - $0.75	10 - 15%	2.5 - 4x	2.5 - 4.5x	12.5 - 20%	20 - 35%	Expected to have financial policies that tend to favor shareholders over creditors; above average financial risk resulting from shareholder distributions, acquisitions or other significant capital structure changes
B	Operates in 1 Primary segment with a limited portfolio within that segment	Main region expected to account for approximately 65 - 80% of revenue	Limited diversification with largest end market expected to generate more than half of sales	Expected to be strong local or strong but small niche player in majority of markets	$0.25 - $0.75	$0.0625 - $0.1875	5 - 10%	4 - 6.5x	1.25 - 2.5x	5 - 12.5%	7.5 - 20%	Expected to have financial policies that favor shareholders over creditors; high financial risk resulting from shareholder distributions, acquisitions or other significant capital structure changes
Caa	Very limited portfolio of products	Main region expected to account for 80% or greater of revenue	Very limited diversification with largest end market expected to generate more than two thirds of sales	Expected to be small local player or very small niche player	$0.1 - $0.25	$0 - $0.0625	0 - 5%	6.5 - 9x	0.25 - 1.25x	0 - 5%	2.5 - 7.5%	Expected to have financial policies that create elevated risk of debt restructuring in varied economic environments;
Ca	One product company	One small region or country expected to account for over 80% of revenue	Expected to have one narrow end market only	Not expected to have niche of any significance	< $0.1	< $0	< 0%	≥ 9x	< 0.25x	< 0%	< 2.5%	Expected to have financial policies that create elevated risk of debt restructuring even in healthy economic environments

[1] When debt is zero, the score is Aaa. When debt is positive and EBITDA is negative, the score is Ca.
Source: Moody's Investors Service

Sector overview

The software industry is relatively young in comparison to long-standing industries such as automotive, homebuilding and healthcare. The sector has grown tremendously since the 1980s, both for consumer and enterprise users. Although the industry has since shown some signs of maturing, it continues to evolve as new products are developed, new architectures take hold and new delivery methods gain traction.

The great expansion of debt financing within the software industry was propelled in part by recognition from private equity groups and leveraged lenders of the stability of maintenance revenue streams generated by established enterprise software firms and the benefits of consolidating what was a fairly fragmented industry. Leveraged buyouts and strategic acquisitions have subsequently driven the vast majority of newer software entrants into the debt markets. Post consolidation, software companies can often provide a broader suite of interoperable products to customers while benefitting from cost savings achieved through combining companies.

The software industry includes a very large, diverse universe of companies with software technologies and applications that serve numerous functions and industry verticals. The more successful companies have typically achieved a meaningful market position within a specific end-market or product market that is defensible in the near-to-midterm. This product positioning is sometimes defined by a technological capability (such as for database, middleware, or operating system segments of the infrastructure market) or the ease-of-use and customizable aspects of an application product for a specific industry vertical (such as ERP systems designed for the education end-market). The industry is continuously evolving with some segments growing faster than others. Demand for hosted versions of software or Software as a Service (SaaS) has grown significantly, creating opportunities for new entrants and forcing legacy players to quickly adapt or acquire their own hosted offerings.

For technology-driven software firms, the growth of the firm can be driven by the underlying characteristics of the technical landscape with which it is aligned. For example, data management software for the mainframe industry is dependent on the ongoing success of mainframe technology. In other cases, the ability to deliver superior or more reliable performance is a driving factor, such as a faster database or a more efficient operating system. Stability of firms competing in these markets is driven over the near to medium term by the ongoing maintenance and support requirements of the software as well as high switching costs (complexity and time commitment) which deter replacement.

Over the long term, the stability of firms is driven by their ability to innovate, acquire or develop desirable next-generation software technology. While companies in this sector spend considerable amounts on research and development, they also rely on acquisitions to supplement their R&D spending. Companies may rely on acquisitions to broaden their product line-up as customers increasingly look to a smaller group of vendors to provide broader, more integrated software products and systems.

For application-driven software firms, the company's product position is often achieved by catering to a specific industry vertical ahead of the competition and then nurturing the end-market relationship through continued product development and strong customer support. These firms often possess a first-mover advantage and a deep end-market knowledge base that yields high customer retention. This also means that it can be very difficult to acquire new customers through competitive displacement and in most cases they are reliant upon selling new products and functionality into their existing customer base to achieve organic growth.

Although most rated firms have robust product development capability, many rated software companies use acquisitions to supplement internal capabilities and add new features and products, or to expand into new areas. These acquisitions serve the purpose of building out product portfolios as well as bringing in new customers to cross-sell the pre-acquisition portfolio. Additionally, as software providers become more pervasive within their customers' IT systems, the ability to displace becomes that much more difficult.

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: Business Profile (25% weight)

Why it matters

A software company's business profile provides important indications of its qualitative strength, based on several measures of diversification and our assessment of market share. A company's business profile provides an indication of the likely stability and sustainability of its cash flow. A strong position in one of these areas with weakness in the others can limit long-term stability of cash flows.

This factor has four qualitative sub-factors:

Product Line Diversity

Product line diversity helps to offset constantly evolving trends within the software industry. New product categories are continually emerging and reliance on any one line can carry significant risks. Product line diversification is important as customers look to reduce the number of software suppliers they rely on and improve integration and interoperability of different software platforms within the customer organization. Building a broad suite of products has been a major driver of consolidation in the enterprise software industry. While niche specialist firms can operate profitably, customers often look to an integrated software solution with a broad range of products.

Geographic Diversity

Geographic diversity is viewed positively because it reduces reliance on any region to generate profitability. While software often requires some modification to adapt to local languages, financial reporting, cultural or regulatory issues, there are often beneficial economies of scale if a product can be adapted for global use.

End-market Diversity

End-market diversity is also viewed positively because it mitigates the risk that a change in any individual industry or vertical market will significantly impair profitability and cash flow.

Market Share

Market share is important for credit assessment as it can indicate the level of competitive success, the strength of customer relationships and likely prospects for future performance. Particularly in the enterprise software sector, software tends to be “sticky” and customers do not change vendors often. When a customer’s employees are well versed in software that is critical to a customer’s operations, the incumbent software vendor tends to have a significant advantage at renewing or upgrading aging systems or expanding the number of employees or geographic locations that use a software system.

How we assess it for the scorecard

Scoring is assessed qualitatively, based on four sub-factors: Product Line Diversity, Geographic Diversity, End-market Diversity and Market Share.

PRODUCT LINE DIVERSITY:

In scoring this sub-factor, we consider the number of primary industry segments the company operates in and the breadth of product lines within those primary industry segments. For a company to have a broad portfolio within a primary industry segment, the company would have substantial product offerings within several sub-segments within the primary product category. For instance, a company that has only a broad lineup of engineering applications would typically be considered to have a limited portfolio within the applications industry segment and would typically receive a score of B for this sub-factor. In assessing this sub-factor, examples of the primary industry categories and secondary categories we typically consider are generally based on IDC’s software taxonomy and are shown in the table below:

Exhibit 3

Software Industry Segments*

Primary Industry Segment	Example Key Sub-Segment
System Infrastructure	
	Operating Systems
	Security Software
	Systems Management
	Network Software
	Storage Software
Application Development and Deployment	
	Data Management
	Database Administration and Tools
	Application Development and Quality Assurance
	Application Deployment
	Analytics and Business Intelligence
Applications	
	Collaboration Applications
	Enterprise Resource Management
	Customer Relationship Management
	Supply Chain Management
	Engineering Applications

* This is not an exhaustive list of all available industry sub-segments but rather a few examples of product segments that fit within the methodology's criteria of a software sub-segment. Many other meaningful-size industry sub-segments exist and new sub-segments may emerge over time due to the high rate of change in the software industry. The breakdown is generally based on IDC's software segmentation taxonomy.
Sources: IDC and Moody's Investors Service

GEOGRAPHIC DIVERSITY:

In scoring this sub-factor, we consider trends for annual revenue for major geographic regions or countries. Our assessment of geographic diversity is an estimation, and we consider information from other sources, particularly in estimating the underlying regional components of sales made to multinational customers.

Generally, we view a region as being a major portion of a global market, but the size of regional markets differs by product, which is a consideration in how we view regional importance.

END-MARKET DIVERSITY:

Our scoring of this sub-factor uses data from various sources, including financial reports. In estimating the relative proportion of each company's revenues in different end-markets or vertical markets, we generally look at fairly broad industry categories rather than very specific industry categories. As an example, within the financial sector, we would consider the insurance market as distinct from the banking market for software but would likely not treat community banking as separate from credit unions.

MARKET SHARE:

We estimate market share based on the market segments that the company participates in, using information from various sources, including financial reports. We generally estimate market share within significant industry market segments (which generally correspond to the key sub-segments that were previously specified). Typically, this implies markets in excess of $2.5 billion in revenue.

Factor: Scale (15% weight)

Why it matters

Scale is an important indicator of the overall depth of a company's business and its success in attracting customers. It also typically confers economies of scale in research, engineering and development, and corporate overhead. Larger companies with strong cash flows also typically have greater access to capital markets and greater options in making acquisitions. Software companies often rely on acquisitions to obtain critical technology or promising product lines.

This factor has two sub-factors: Revenue and Free Cash Flow. While gross revenue is a useful direct indicator of scale, free cash flow provides an indication of financial flexibility and the ability to make acquisitions.

How we assess it for the scorecard

Scoring for this factor is based on two sub-factors: Revenue and Free Cash Flow.

REVENUE:

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

FREE CASH FLOW:

Free cash flow is measured (or estimated in the case of forward-looking expectations) using free cash flow in billions of US dollars.

Companies that operate in larger and more substantial markets tend to receive higher scores for these sub-factors.

Factor: Profitability (10% weight)

Why it matters

Profits matter because they are needed to generate sustainable cash flow and maintain a competitive position.

Return on assets is an indicator of a software company's profitability on an unleveraged basis and is useful in comparing companies separate from our evaluation of capital structure. While we view acquisitions as often critical to a company's long-term success, we consider companies that are able to generate successful new products in-house as generally having an advantage over firms that have to rely heavily on acquisitions. Most softwarecompanies use a combination of internally developed technology and products as well as acquired technology and products.

How we assess it for the scorecard

RETURN ON ASSETS:

In calculating or estimating return on assets, we use the trailing four quarters of operating income divided by average assets (net of cash and marketable securities) over the period. Average assets is calculated or estimated by taking the average of total assets less the average of cash, cash equivalents and short-term investments over the past two years.

Factor: Leverage and Coverage (30% weight)

Why it matters

Leverage and coverage measures are important indicators of a company's financial flexibility and long-term viability. Financial flexibility is critical to software companies to adapt to evolving technology and trends. Software companies need resources to invest in research and development as well as to make strategic acquisitions both to acquire critical technology and to expand product suites to meet shifting customer demands.

Established enterprise software companies tend to have a substantial base of recurring maintenance or subscription revenue which can facilitate higher amounts of leverage, but enterprise software companies are still subject to economic downturns as new license and service sales tend to decline significantly during such periods. Enterprise software customers also look to the long-term viability of their software suppliers, as customers rely on the software vendor to provide continuous support over the life of a software system. Software systems tend to remain in place for many years and are often critical to the operations of the customer.

This factor comprises four 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.

(EBITDA-Capex) / Interest Expense

The ratio of EBITDA minus capital expenditures to interest expense ((EBITDA – Capex)/Interest Expense) indicates a company's ability to meet its interest obligations and invest in fixed assets with EBITDA.

FCF / Debt

The ratio of free cash flow to debt (FCF/Debt) provides a different view of a company's ability to repay its debt compared with Debt/EBITDA, because it compares cash flow generation after working capital movements, capital expenditures and dividends to total debt. For software companies, free cash flow captures the upfront nature of software maintenance revenue and subscription payments, which are often paid annually in advance.

(Cash + Marketable Securities) / Debt

The ratio of cash plus marketable securities to debt ((Cash + Marketable Securities)/Debt) provides an indication of a company's financial flexibility and ability to absorb fluctuations in working capital needs or unforeseen events. It also provides an indication of the amount of cash, relative to debt, that would be available in periods of stress or when faced with an inability to access the capital markets.

How we assess it for the scorecard

Scoring for this factor is based on four sub-factors: Debt/EBITDA; (EBITDA-Capex)/Interest Expense; FCF/Debt; and (Cash + Marketable Securities)/Debt.

DEBT / EBITDA:

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

(EBITDA-CAPEX) / INTEREST EXPENSE:

The numerator is EBITDA minus capital expenditures, and the denominator is interest expense.

FCF / DEBT:

The numerator is free cash flow, and the denominator is total debt.

(CASH + MARKETABLE SECURITIES) / DEBT:

The numerator is the sum of cash, cash equivalents and marketable securities and short-term investments, and the denominator is total debt.

Factor: Financial Policy (20% weight)

Why it matters

Management and board tolerance for financial risk is a rating determinant as it directly affects debt levels, credit quality, and the risk of adverse changes in financing and capital structure.

Our assessment of financial policies includes the perceived tolerance of a company's governing board and management for financial risk and the future direction for the company's capital structure. Considerations include a company's public commitments in this area, its track record for adhering to commitments, and our views on the ability for the company to achieve its targets.

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 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.

How we assess it for the scorecard

We assess the issuer's desired capital structure or targeted credit profile, history of prior actions, and adherence to its commitments. Attention is paid to management's operating performance and use of cash flow through different phases of economic 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, and regulatory pressures.

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 also consider a company and its owners' past record of balancing shareholder returns and debtholders' interests. A track record of favoring shareholder returns at the expense of debt holders 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.

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.

Environmental, Social and Governance Considerations

Environmental, social and governance (ESG) considerations may affect the ratings of issuers in the software industry. For information about our approach to assessing ESG issues, please see our methodology that describes our general principles for assessing these risks.[3]

Among the areas of focus in corporate governance, for example, are audit committee financial expertise, the incentives created by executive compensation packages, related party transactions, interactions with outside auditors, and ownership structure.

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.

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 Debt/EBITDA and FCF/Debt ratios with gross debt rather than net debt, we do consider excess cash holdings in our rating analysis, including 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.

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 software 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 with limited operating and financial flexibility, 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.[4]

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 — can overwhelm even a stable, well-capitalized firm. Some other types of event risks include M&A, asset sales, spin-offs, capital restructuring programs, litigation, pandemics, geopolitical conflict, significant cyber-crime events and shareholder distributions.

Parental Support

Ownership can provide ratings lift for a particular software company 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.[5] For example, price controls, onerous taxation and high distributions can have a negative effect on an issuer's underlying credit profile.

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,[6] 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 metrics,[7] unless otherwise indicated, are typically calculated based on an annual or 12-month period and, in certain cases, on a pro forma basis for recent or pending acquisitions and divestitures, or capital structure changes. 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[8] 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. For example, we may re-class to expense amounts capitalized as software development costs for customer-facing software where the information is available. This levels the playing field for companies that chose to capitalize certain capital expenditures rather than expense them in the income statement.

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

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 5
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	x ≥ 19.5

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.[9]

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.[10]

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.[11]

Key rating assumptions

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

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 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 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.[13] 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 rating 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.

Appendix: Some considerations for the pro forma assessment of acquisitive software companies

Many software companies are acquisitive, have gone through a merger or leveraged buyout, or all of the above. The companies that issue debt are often formed through consolidation of two or more software companies, a roll-up of several companies, a spin-off from another even larger company or a leveraged buy-out. Historical financial statements of these companies often do not reflect the ongoing credit profile of the business. As part of developing the go-forward view of the business, it can be helpful to assemble a run-rate perspective of historical results, which reflects the impact of recent or pending acquisitions and resulting changes to the business(es).

Creating a run-rate view of the business

Our ratings are based on a forward-looking view of an issuer. To assist in building a forward view of an acquisitive software company, we may develop a pro forma run-rate picture of the business and capital structure reflecting the impact of an acquisition(s) or of financial structure changes on historical results. Leveraged buyouts are typically a driver of large changes to the financial structure of a company.

Some key issues in developing forward views of software companies

Purchase accounting write-downs – Upon acquisition of a software company, accounting standards may require a significant portion of deferred revenue to be written off. Deferred revenue typically arises when a software company receives one year's (for example) worth of maintenance, support or subscription revenue but can only recognize the revenue as it is "earned" over the year (or multiple years in certain cases). As a large portion of a software company's revenues are booked as deferred revenue and recognized over time, the write-down at close of an acquisition can dramatically reduce post-closing revenues and EBITDA and thus give an incomplete picture of the business. It often makes sense to look at results as if deferred revenue had not been written off but amortized in the traditional manner. The amount of written off revenues is not typically part of GAAP statements post-closing, although it is often included in loan agreement covenant compliance reports. Public filers may present non-GAAP financials which break out the written off revenue or present a run rate view of revenues.

Results of acquired companies pre-closing – We often consider results (i.e., revenue, EBITDA and free cash flow) of acquired companies for the pre-closing period to get a run-rate picture of the combined businesses. Acquired companies may themselves have been acquisitive, which we may also incorporate into our run-rate view.

Transaction and restructuring costs – Transaction-related expenses can muddy the view of the ongoing underlying economics of the business. Consequently, the costs related to making an acquisition (typically legal, accounting, debt issuance and M&A fees as well as severance costs) may be evaluated where developing a run-rate picture of the business. For certain companies that we view as serial acquirers, we may view those costs as ongoing expenses of their strategy.

Proposed cost savings – Cost savings from combining software companies or taking a public company private can materially impact the future profile of the business. We often look at a range of proposed cost savings in evaluating a run-rate and forward view of a software company. We assess the cost savings to determine how much or what range, if any, of the savings makes sense on a go-forward basis. Costs that can be eliminated at closing (or a reasonable period thereafter) typically have a higher likelihood of being considered in our evaluation. We also form a view on how permanent the reductions are likely to be and whether they will have a detrimental impact on our forward view of the business.

Completed cost cuts – Once cost cuts have been made, we often evaluate the run rate as if the cost reductions had been completed at the beginning of the period. In our forward view, we consider whether we expect the costs to continue or if they will have a negative impact on the business.

Capital structure changes – In building a forward view of the business, we may evaluate historical results as if capital structure changes had occurred at the beginning of the LTM period. In cases of a proposed transaction, we may evaluate debt levels pro forma for the transaction, including interest expense as if the transaction had taken place one year prior.

We highlight several of the above considerations in the theoretical example below, which illustrates how we might look at GAAP versus run-rate measures for a company that went through a leveraged buyout, was required to write down a substantial proportion of deferred revenue at closing, and eliminated approximately $40 million of expenses at closing. The presentation shown is a simplified general example. In practice, our analysis considers many issuer-specific considerations, including but not limited to the materiality (for credit assessment) of adjustments that could be made to estimate future performance, and our level of confidence in information that could be used to inform estimates for pro forma analysis.

XYZ Software Corp. – Estimating pro forma performance from reported results under GAAP or IFRS

XYZ Software Corp. was acquired in a leveraged buyout. Post-closing second half (2H) financials include all transaction and restructuring costs and have been impacted by the write-down of deferred revenue at closing. In this theoretical example, the company provided supporting detail on the purchase accounting adjustments, headcount reductions and transaction expenses but not detail on the actual cash outlay and timing of the restructuring actions.

Exhibit 6

XYZ Software Corp .	
Purchase Price	3,600
Total Debt	**2,500**
Closing Costs - Expensed at closing	126
Restructuring Costs	**25**
Run Rate Full Year Cost Savings achieved in month 1	40
Estimated Full Year Pro Forma Interest Expense	**175**

Source: Moody's Investors Service

The last two columns, GAAP and Pro Forma, highlight the significant impact of purchase accounting adjustments and transaction expenses on the calculation of LTM 12/31 results.

Exhibit 7

Summary GAAP vs Estimated Pro Forma View	1H GAAP	Adjustments	1H Pro Forma	2H GAAP	Adjustments	2H Pro Forma	GAAP	Pro Forma
Revenue	650.0	0.0	650.0	392.6	257.4	650.0	1042.6	1300.0
EBITDA	**180.0**	**17.5**	**197.5**	**(210.9)**	**408.4**	**197.5**	**(30.9)**	**395.0**
FCF	155.0	(87.5)	67.5	(71.0)	136.0	65.0	84.0	132.5
Interest	**0.0**	**(87.5)**	**(87.5)**	**(87.5)**	**0.0**	**(87.5)**	**(87.5)**	**(175.0)**

Source: Moody's Investors Service

Revenue Considerations - GAAP revenue is particularly impacted post-closing by the write-down of deferred revenues at closing. In this example, GAAP revenues were $650 in the 1H but only $393 in the 2H. If the written off deferred revenue ($257) had been recognized in 2H, pro forma revenue would have been $650 in 2H, the same as GAAP 1H (for illustrative purposes, 2H revenue is equal to 1H revenue).

Exhibit 8

Example: Estimate of Run Rate Revenue	
1H GAAP Revenue	650.0
2H GAAP Revenue	392.6
Purchase Acctg Write-down (Def'd Rev not recognized)	257.4
Estimated Pro Forma 2H Revenue	**650.0**
Total GAAP Revenue	1,042.6
Purchase Acctg Write-down (Def'd Rev not recognized)	257.4
Estimated Pro Forma Revenue	**1,300.0**

Source: Moody's Investors Service

EBITDA Considerations - In this illustrative example, both 2H GAAP free cash flow and EBITDA are also dramatically impacted by the acquisition. To better reflect the run-rate EBITDA of the business (and assist in projecting future performance), we look at transaction expenses and restructuring charges that flowed through the income statement and purchase accounting adjustments (deferred revenue that would have been recognized in 2H) to estimate a pro forma 2H EBITDA.

1H was not impacted by these charges. However, the company did eliminate $40 in annual costs (headcount reductions and elimination of certain public company costs) immediately after closing, offset by the introduction of an annual $5 million management fee by the private equity sponsor. Thus, 1H EBITDA would have been $17.5 higher had the transaction taken place at the beginning of the year ($20 million half year expense reduction net of $2.5 half year sponsor management fee). Evaluation of these annual savings is highly subjective, and we may choose to include all the savings, partial or none depending on our level of comfort with the cost reductions and their impact on the business.

Exhibit 9

Example: Estimate of Run Rate EBITDA	
Pre Closing 1H GAAP EBITDA	180.0
Pro Forma Cost Savings 1H	20.0
Pro Forma 1H PE Mgmt Fees	(2.5)
Estimated Pro Forma 1H EBITDA	**197.5**
2H GAAP EBITDA	(210.9)
GAAP Transaction Expenses (Expensed)	126.0
GAAP Restructuring Charges (Expensed)	25.0
Purchase Acctg Write-down (Def'd Rev not recognized)	257.4
Estimated Pro forma 2H EBITDA	**197.5**
GAAP based EBITDA	(30.9)
Total Adjustments to EBITDA	425.9
Estimated Pro Forma EBITDA	**395.0**

Source: Moody's Investors Service

Free Cash Flow Considerations - Free cash flow is dramatically impacted in this example by transaction expenses at closing and shortly thereafter, expenses that are not representative of how the company will perform going forward. Estimating the impact of these expenses can be challenging, however, as there is typically limited information available on the timing of cash outlays and how they impact free cash flow.

Run-rate pro forma free cash flow can be estimated by looking at the closing expenses and restructuring payments that flowed through the cash from operations line. However, the breakdown of the actual cash payments is not often provided (GAAP charges often do not reflect when the cash was paid). In cases where we do not have sufficient information, we often look at a range of cash costs for the period and evaluate a range of pro forma free cash flow. We reduced pre-closing 1H free cash flow in this example to reflect interest expense as if the transaction had taken place at the beginning of the year (while this interest may have provided a tax shield and reduced tax payments during the period, this level of detail is not often available).

Exhibit 10

Example: Estimated Run Rate FCF	
Pre Closing 1H FCF	155.0
Run Rate Cash Cost Savings (2)	0.0
Pro Forma 1H PE Mgmt Fees	(2.5)
Pro Forma Interest 1H	(87.5)
Estimated Pro Forma 1H FCF	**65.0**
2H actual FCF	(71.0)
Cash Transaction Costs	126.0
Cash Restructuring Costs (1)	10.0
Estimated Pro forma 2H FCF	**65.0**
GAAP Full Year FCF	84.0
Total Adjustments to FCF	46.0
Estimated Pro Forma Full Year FCF	**130.0**

(1) Only $10 million of restructuring charges were paid in cash in 2H, the remainder paid in the following year.
(2) While head count was significantly reduced, insufficient data was available on actual cash amounts.
Source: Moody's Investors Service

GAAP vs Pro Forma Metrics - As detailed below, pro forma metrics can vary significantly from GAAP-based results.

Exhibit 11

GAAP Based Measures		Estimated Pro Forma Measures	
Revenue	1042.6	Pro Forma Revenue	1300.0
FCF	84.0	Pro Forma FCF	130.0
Debt/LTM EBITDA	(80.9x)	Pro Forma Debt/EBITDA	6.3x
EBITDA-Capex/Interest	(0.7x)	Pro Forma EBITDA-Capex/Interest	2.1x
FCF/Debt	3.4%	Pro Forma FCF/Debt	5.2%
Cash/Debt	2.8%	Pro Forma Cash/Debt	2.8%
ROA (Op Inc/Avg Assets net of cash)	1.6%	Pro Forma ROA (Op Inc/Avg Assets net of cash)	2.7%

Source: Moody's Investors Service

In this example, leverage (debt to LTM EBITDA) is 6.3x on a pro forma basis, which is much more reflective of the run-rate profile of the company than the GAAP-based result. Likewise, free cash flow to debt is approximately 5.2% and also more reflective of the run rate of the business than the GAAP-based result.

The write-down of deferred revenues typically affects GAAP results for the first full year after the transaction closes and in some cases the impact can last two or more years, although typically at much diminished levels. As a result, LTM pro forma adjustments often continue well into the second year after a transaction closes.

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

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

5 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.

6 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.

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

8 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.

9 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.

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 A link to a list of our sector and cross-sector rating 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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