SCOPE | Ratings

Chemicals Rating Methodology

Corporates

30 June 2025

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1. Introduction

This methodology is an update of the 'Chemicals Rating Methodology', and complements the General Corporate Rating Methodology, superseding it in event of conflict, inconsistency or ambiguity. The different issuer-specific and rating-relevant characteristics laid out in this methodology must not be seen as a predetermined ranking or scorecard. We apply the underlying criteria in an opinion-driven way at the issuer level.

The update contains the following changes:

- Merging the rating frameworks for specialty chemicals and commodity-focused chemicals through the development of one framework that can be applied to all chemicals companies;
- Changing the assessment of entry barriers to the sub-industry of commodity-focused chemicals to "Medium" from "High", resulting in a BB assessment for the Industry Risk Profile, thereby reflecting the differences between commodity-focused and specialty chemicals companies and the higher vulnerabilities of commodity-focused chemicals companies which face stronger competition than specialty chemicals companies;
- Extending the assessment of size in the market position also to specialty chemicals and introducing recurring EBITDA as a proxy for assessing size in the market position for both specialty and commodity-focused chemicals companies, replacing revenues for the latter;
- Enhancing the assessment of diversification through the provision of more granular assessment points covering i) geographical diversification, ii) asset diversification, iii) product diversification, iv) supplier and customer diversification as well as v) a chemicals company's end-market diversification overall and vi) its contribution to highly cyclical end-markets in particular;
- Enhancing the assessment of operating profitability through the introduction of assessing a chemicals company's margin volatility;
- Enhancing the assessment of operating profitability through the introduction of return on capital employed (ROCE);
- Aligning the phrasing of the qualitative assessment of a chemical company's market position and R&D activities with the definition from Scope's Credit Rating Definitions;
- Providing typical information and data sources used in the analytical process;
- Minor editorial changes.

The updated methodology might have a positive impact of up to one notch on the outstanding rating for one issuer.

2. Scope of application

We define chemical corporates as corporates which generate most of their revenue and operating profit (EBITDA) from the manufacturing of chemicals or products which have similar characteristics and are used in various industries. Corporates acting in the refining business are not covered by this methodology, as these corporates are subject to global energy market drivers, especially oil and gas.

The rating methodology can be applied to chemical corporates operating globally.

3. The chemicals industry

The chemical industry is a broad sector which consists of various subsectors. These subsectors have different drivers and can develop differently to the general chemical market. We reflect these different dynamics in our rating assessments by splitting the chemical industry into commodity-focused chemical corporates and specialty chemicals corporates. In this regard, we differentiate between base/commodity products (typically upstream products) and specialty products (typically downstream products) by looking at factors including operating profitability and its volatility, the transparency of product markets and their prices, as well as R&D intensity. Typically, upstream products are categorised as commodities due to their lower added value, while downstream products are considered specialty items owing to higher production costs. However, in some cases, this alignment does not hold, as downstream products initially deemed specialty may become commoditised as the market begins to replicate them.

Figure 1: Selected chemical products: Upstream vs. downstream

Upstream products	Downstream products
Petrochemicals: including ethylene, propylene, butadiene, benzene	Sealants, adhesives, derivatives
Base products: including polyolefins, monomers, solvents	High performance plastics and technical polymers
Titanium dioxide and other metal oxides	Coatings and decorative paints
Carbon fibres	Industrial gases
Resins and inorganic materials	Agrochemicals and seeds
Precious and nonprecious metals	Food and feed ingredients
Elastomers	Flavours and fragrances
Potash, fertilisers	Battery materials
Pigments	Composite materials

Source: Scope

Commodity-focused chemical corporates

Commodity-focused chemical corporates typically generate most of their revenue and earnings from the manufacturing of base chemicals and basic materials. Under the term basic materials, we group firms that generate most of their revenues through the extraction of materials which are used in high quantities in the chemical industry with limited to no pricing power. The product pricing process is transparent with a well-functioning market, resulting in producers being price takers. Therefore, the respective cost structure is a critical success factor. Economies of scale are achieved through high levels of capacity utilisation, often in conjunction with backward-integration, supporting a favourable cost position. Product innovation and R&D (research and development) intensity are of lower Importance given the commoditised nature of products, with a vast majority being in later stages of their life cycle. Consequently, the commodity-focused chemical industry is dominated by large-sized corporates. The portfolios of these large-sized corporates often include a substantial proportion of specialty chemicals operations, improving diversification and mitigating cyclicality of earnings.

With regard to industry-specific factors, we believe that producers face high revenue and earnings cyclicality because chemicals products are used as raw materials in many different industries. As economic scenarios change, demand for base chemicals tends to react promptly. There are also considerable entry barriers. Beyond the large capital expenditures typically required to build large-scale production facilities, further capital expenditures result from working capital and the obligations to meet safety and environmental protection requirements. Lengthy building permit approval times for new production facilities can also represent a substantial entry barrier.

Over the last decade, the manufacturing of upstream products has become more competitive, mainly driven by commodity-focused oil and gas corporates expanding their base chemical businesses. Consequently, few commodity-focused chemical corporates are purely focused on the production of commodity products. Commodity-focused corporates tend to have substantial downstream operations, hedging their earnings cyclicality and increasing the number of higher yielding products in their product portfolio. Additionally, due to the market entrance of new producers and expanded production, several products previously classified as specialty chemicals have increasingly become commoditised over the past few years or are likely to become a commodity product, e.g. pigments and several types of additives. Producers located in the Middle East and emerging countries entering markets for downstream products have also contributed to this development. Lastly, corporates from the Western hemisphere have been increasing their production capacities in Asia and emerging markets in order to promptly service fast growing local demand for chemical products.

Specialty chemicals corporates

Going down the chemical value chain, specialty chemicals are typically produced in smaller quantities. Markets are medium-size and are often relatively concentrated. Product innovation and the amount of intellectual property owned allow for a favourable pricing position. Here, the number of new product launches is key. For instance, various corporates pursue a 'spill-over strategy' introducing existing products to new applications and end-markets. The production of specialty chemicals typically requires limited quantities of raw materials which results in lower sensitivity to input price changes. In addition, higher feedstock prices (input prices) for several specialty chemicals are commonly automatically passed on to customers. Compared with commodity-

focused chemicals corporates, economies of scale are less important for specialty chemicals corporates, given their greater pricing power (they are not 'price takers'). However, as product prices usually decline when economic growth stalls, a specialty chemicals corporate's cost position is also of considerable importance in the event of an economic downturn.

In our view, specialty chemicals corporates face medium cyclicality. Specialty materials often account for a small share of production costs, where those specialty chemicals are used (such as in automotive coatings). The production of these end-products typically continues at lower volumes even in periods of weaker economic demand. We see high barriers to entry for the specialty chemicals sector owing to the high investment in R&D, special knowledge and long-standing customer relationships of existing players in the industry. Substitution risks for the specialty chemicals industry are low. Specialty chemicals are used in a myriad of different products with specific technical requirements that are barely met by other technological solutions.

As shown in Figure 1, specialty chemicals corporates can be grouped into various product types. Due to the wide range of products and higher levels of intellectual property involved, the specialty chemicals industry is less transparent than the commodity-focused chemicals industry. Specialty chemicals are used in a broad range of end-markets, including automotive, construction, and consumer products. Smaller-sized corporates often operate successfully in the specialty chemicals industry. Segments such as industrial gases or agrochemicals, after years of strong M&A activity, have become significantly concentrated. Beyond expanding market shares, M&A has been driven by the aim of improving end-market diversification and offsetting the decline in earnings caused by the commoditisation of former specialty materials products. Lastly, commodity-focused players have strengthened their product offering through the acquisition of downstream assets.

Investment grade rated chemical corporates typically have large scale with strong market share and pricing power. This often goes hand in hand with a strong cost position, indicated by high utilisation rates and/or gross margin. Furthermore, investment-grade rated chemicals corporates usually display a diversified portfolio with no major concentration on certain industries, products or geographies. Ample and robust free operating cash flow generation is coupled with solid credit metrics and a solid ability for deleveraging.

The credit quality of chemical corporates having a non-investment grade rating is often characterised by a moderate or weak market position in rather fragmented markets. This is typically associated with limited ability to exert pricing power and weak and volatile EBITDA margin as well as a relatively concentrated portfolio in terms of industries where corporate's products are applied. Such comparatively high business risks are often coupled with weaker cash flow generation which translates into moderate free operating cash flow and weaker credit metrics.

4. Information/Data sources

In the analytical process Scope typically takes into account the following sources of information. Not all of the listed information will be considered for every rated entity. Moreover, Scope may consider additional sources of information if necessary.

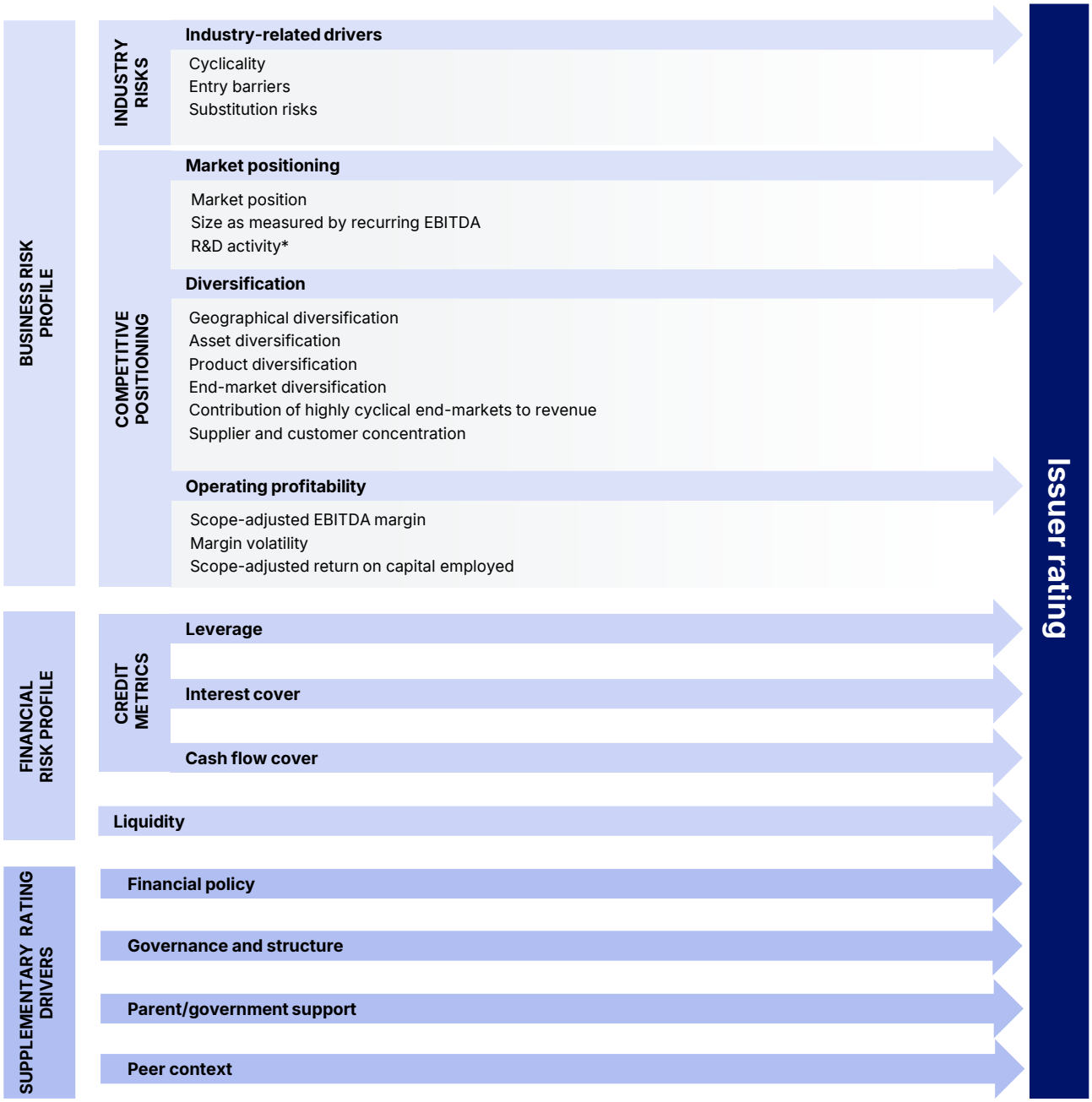
- Audited financial statements
- Unaudited interim financials
- Press releases
- Presentations and information from conference calls/Capital Market Days
- Financial forecasts/budgeting of the rated entity, if available/accessible
- Research on the industry, rated entity and relevant jurisdictions
- Data from external data providers, e.g. consensus estimates, debt placements
- Management meeting (in case of issuer participation)
- Loan documentation, e.g. debt prospectuses, bank loan agreements
- Valuation reports from external assessors
- Scope internal data, e.g. spreading of historical financials and detailed forecasts for the next few years, peer group data.

5. Key components

We apply our rating methodology as outlined in Figure 2. The rating analysis takes into account credit risk factors specific to Chemical Corporates as specified in this sector methodology as well as factors common to all industries such as management, liquidity, legal structure, governance and country risks which are explained in more detail in the General Corporate Rating Methodology.

The following business risk and financial risk indicators are non-exhaustive and may overlap; some may not apply to certain corporates. We may add issuer-specific rating factors, and a company's business model is decisive for the applicable indicators. No rating driver has a fixed weight in the assessment. Please refer to the General Corporate Rating Methodology for more detail.

Figure 2: Scope's rating approach for chemical corporates



* only applicable to Specialty chemicals companies

5.1 Business risk profile

We adopt a forward-looking approach when analysing an issuer's business risk profile, taking into account the issuer's market and sector dynamics, as well as business drivers. The business risk profile is divided into an analysis of the industry risk profile and of the company's competitive positioning.

5.1.1 Industry–related drivers

Industry-related drivers aim to capture the general drivers for the underlying industry and consist of three sub-categories:

- Cyclicality: risk of volatility in revenue and operating profits for the foreseeable future compared with past industry performance.
- Entry barriers: level of protection for a company operating in an industry. These comprise high capital requirements, regulation, technological requirements, customer relationships, R&D requirements or distribution channels.
- Substitution risks: the risk and vulnerability of an industry to technological obsolescence/maturity. Here, we consider megatrends or transition risks (i.e. technological, ecological, or demographic) as well as structural shifts that can influence the industry's trajectory and increase risk and vulnerability.

We assess the industry fundamentals of chemical corporates as follows:

Cyclicality

Commodity-focused chemicals corporates face "High" cyclicality because of their heightened sensitivity to fluctuations in raw material prices. The transparent price setting in these markets leads to reduced prices in an economic downturn scenario. Base chemicals are a key leading indicator for potential slowdowns in economic activity, as they are used in virtually all end-markets and base chemical product sales volumes are highly sensitive to demand changes.

In contrast, we believe that the specialty chemicals sector has "Medium" cyclicality. This is because aftermarkets require lower quantities of specialty chemicals in their product processes and prices tend to be negotiated individually.

Entry barriers

Entry barriers are a function of capital investments, product differentiation and easiness of an off-taker to substitute the supplier, adherence to safety and environmental protection requirements as well as technological advantages which ensure innovation and product differentiation.

We consider entry barriers to be higher for specialty chemicals companies than for commodity-focused chemical companies. While it requires extensive amounts of initial capex for building up production facilities and working capital, as well for the compliance with safety and environmental requirements, it does not require similar technological USPs (unique selling points), patents or technical customisation to the special needs of individual customers as compared to the specialty chemicals industry. As such, key entry barriers for specialty chemicals companies are primarily technological differentiators and the development, maintenance and extension of chemical products which can hardly be provided in a commoditised manner by a large number of other producers which can be substituted without major hurdles.

In addition to investments in R&D, further barriers to entry for the specialty chemicals sector come in the form of bespoke solutions and applications with long-term customer relationships which new entrants find difficult to destabilise. Specialty chemicals account for only a small proportion of the final product costs. Therefore, switching costs for customers in the specialty chemicals industry are high, resulting in reluctance to switch to realise only slight gains (customer 'stickiness'). In general, specialty chemicals markets are characterised by medium market sizes, high concentration and corporates offering niche products. Thus, the specialty chemicals industry is more fragmented than the purely commodity-focused chemical industry.

Overall, we assess market entry barriers for specialty chemicals companies as 'High', whereas entry barriers for commodity-focused chemicals companies are deemed 'Medium'.

Substitution risks

Chemical products play an important role in various products in different end-markets and have few alternative materials or products. We therefore believe that the risk of substitution is limited. However, different factors drive substitution risk for commodity-focused and specialty chemicals producers.

Risk of substitution is primarily caused by the broad application of innovative manufacturing processes in end-markets, lowering the overall demand for commoditised chemical products.

For specialty chemicals, we believe that for most no substitute products are generally available, or that the number of substitute products is very low. High technical production requirements and a lack of alternative production methods also lower substitution risk. Market sizes for specialty chemicals are often small to medium. We consider the absolute size of many specialty materials markets to make the large investments required to develop new products less attractive for bigger chemical players.

The industry risk matrix (Figure 3) shows how we derive the industry risk rating from our combined assessment of cyclicality, entry barriers and substitution risk for the chemicals sector.

Commodity-focused chemicals corporates: industry risk assessed at **BB** based on medium entry barriers, high cyclicality and medium substitution risk

Specialty chemicals corporates: industry risk assessed at **A** based on high entry barriers, medium cyclicality and low substitution risk

Figure 3: Scope's industry risk matrix for commodity-focused and specialty chemicals corporates

Entry barriers / Cyclicality	Low	Medium	High
High	CCC/B	B/BB	BB/BBB
Medium	B/BB	BB/BBB	BBB/A
Low	BB/BBB	BBB/A	A/AA

Commodity-focused chemicals corporates

Specialty chemicals corporates

5.1.2 Competitive positioning

The analysis of competitive positioning aims to capture the individual drivers for the rated company. These are discussed below for the chemical corporates.

Market positioning

The market positioning of chemical corporates is mainly driven by our overall assessment of the market position and/or market share over all upstream and downstream activities, but we complement the overall assessment by considering absolute scale and level of technological advancement.

Figure 4: Market positioning by rating category

	AA and above	A	BBB	BB	B	CCC and below
Market position*	Very strong market position and/or market share	Strong market position and/or market share	Good market position and/or market share	Moderate market position and/or market share	Weak market position and/or market share	Very weak market position and/or market share
Recurring EBITDA (EUR)	>10bn	1bn to 10bn	250m to 1bn	50m to 250m	5m to 50m	<5m
R&D activity**	Very strong R&D ratio and intellectual property portfolio	Strong R&D ratio and intellectual property portfolio	Good R&D ratio and intellectual property portfolio	Moderate R&D ratio and intellectual property portfolio	Weak R&D ratio and intellectual property portfolio	Very modest R&D ratio and intellectual property portfolio

* Strength of the issuer's market position is driven by the above stated factors, depending on the scope of business and relevance of information, among others. For example, strong market position is indicated by a substantial share in global production capacities, together with a favourable cost position and continuously high capacity-utilisation rates.
** Only applicable to chemicals companies with significant exposure to specialty chemicals products.

Market position. We evaluate the company's market share and position across its entire product portfolio. Generally, a high market share or being one of the leading players in a significant market result in a favourable assessment of the company's market position. Investment grade companies typically hold leading market shares (at least top five) or a substantial share in production capacities in large global markets. The size of the market is also considered a determinant of market position: a dominant player in a niche or regional market may still have competitive advantages against its peers (e.g., pricing power), but it may also be exposed to risks from larger chemical players entering such niches.

Our analytical approach encompasses an assessment of market concentration and intensity of competition. Many chemical markets exhibit fragmentation. We regard consolidated markets as more favourable: companies operating within them typically possess greater pricing power, and the risks associated with a fluctuating competitive landscape are minimised. Conversely, we hold a negative perspective on markets characterised by limited consolidation and adverse growth projections.

Our evaluation of market positioning takes into account also several other detailed factors. These include cost position and capacity utilisation rates, which are influenced, among others, by the level of vertical and/or horizontal integration, production flexibility (such as the ability to switch between different feedstocks), advantageous exposure to feedstocks, energy prices, connections to pipeline networks, proximity to key markets. These factors are particularly relevant for commodity-focused chemicals. With regard to maintaining or improving market position, we also form an opinion about a corporate's capacity expansion plans and spending on maintenance capex. The corporate's track record, timing and strategy for expanding its production capacity are of particular interest.

Additionally, in case of large chemical companies operating multiple divisions, we examine the size of each division in relation to the overall corporation as well as on its own. This allows us to determine if a division may be less competitive due to not achieving the critical size needed to be significant in the market. For commodity players, we analyse the market position or shares over all upstream and downstream activities.

We ideally rely on transparent and current information. However, when such data are not fully accessible, often due to smaller companies not publicly disclosing these metrics, we utilise the available information to form an approximate understanding of the market positioning.

Recurring EBITDA. It is our position that chemical corporations require a minimum critical size to achieve market relevance. This is particularly significant for commodity chemicals, where this factor is frequently correlated with the company's share in global production capacities. Larger corporations are better positioned to establish favorable cost structures and benefit from economies of scale, and for commodity-focused chemical is a way to overcome their general limited ability to pass on higher raw material costs.

In this methodology update, the assessment of size is extended also to specialty chemicals and not only applied to commodity-focused chemicals. Because of this, we also decided to change the reference to EBITDA instead of revenues as the main size indicator. Because profitability margins are generally higher for specialty chemicals, whilst commodity producers are more oriented towards quantities, we consider the EBITDA indicator to work better as an indicator of relative size. Overall, we consider the EBITDA level throughout the economic cycle and this factor will have higher weight in the overall market positioning assessment of commodity-focused chemicals compared to specialty chemicals.

R&D activity. We believe innovation is important to maintaining market position, with key factors including continuous investment in R&D and stable intellectual property portfolios. This criteria is especially important for specialty chemicals, while it will not be applied to companies only exposed to commodity businesses. Companies which make use of patent-protected technologies tend to benefit from less competitive pressures and more stable margins. In addition, a corporate with meaningful revenue growth stemming from new products is credit-positive as it indicates the ability to innovate consistently. Expiring trademarks and patents should be replaced with new trademarks and patents for a corporate to maintain its competitive position. Therefore, we assess favourably the ability of companies to maintain a sustained level of intellectual properties over time.

For sub-segments directly catering to consumers such as decorative paints, construction chemicals or adhesives, a corporate's market positioning is strongly influenced by the strength of its corporate brand portfolio. As these subsectors tend to generate a considerable share of their revenue in the consumer sector, the scope and value of a corporate's brand portfolio is also determined by its market position.

Diversification

We assess the diversification of chemical companies based on the following factors:

(i) Geographical diversification. We evaluate how widely a company's revenue base is distributed, typically measured by sales or profits across regions. Significant concentration may expose the issuer to region-specific risks influencing product demand.

(ii) Asset diversification. We assess how concentrated or dispersed a corporate's production capacity is. We capture its exposure to potential disruptions at a local or regional scale, and its ability to continue operations by shifting production to other sites.

(iii) Product diversification. We form an opinion about the breadth and depth of a company's product portfolio. Breadth refers to the number of distinct product verticals or segments with critical size, while depth considers how comprehensive the portfolio is within those key segments.

(iv) End-market diversification. We assess its revenue or profit distribution across customer industries, identify concentration risk, and evaluate the exposure to potential industry-specific downturns.

(v) Contribution of highly cyclical end-markets to revenue[1]. We evaluate the extent to which a company's revenue relies on industries with highly volatile demand.

(vi) Supplier and customer concentration. We examine the reliance on key third parties for sales or feedstock procurement. We expect investment grade corporates to exhibit no customer or supplier concentration. At the higher end of the scale, we expect an extensive customer and supplier base, often coupled with a strong international presence in both sales and asset footprint. For non-investment grade corporates, we would assess concentration risk in the context of contractual protections (i.e. take or pay contracts), reciprocal commercial dependency, or other potential mitigating factors.
    i. If customer concentration exists, we analyse the ability to replace key customers without significant pricing concessions or operational disruptions.
    ii. If supplier concentration exists, we consider the ability to source feedstock from alternative suppliers quickly, at comparable costs, and without major switching barriers.

[1] Using the industry-related driver cyclicality the various end-markets are classified as following:
High risk (highly cyclical): Automotive, metals and mining, commodity chemicals, oil and gas, construction, transportation
Medium risk (medium cyclical): capital goods, durable consumer products
Low risk (low cyclical): Pharmaceutical and healthcare, nondurable consumer products

Figure 5: Diversification by rating category

	AA and above	A	BBB	BB	B	CCC and below
Geographical diversification	Global presence	Strong international presence; major player in different continents	Good international presence; operating in many countries, regions and locations	Moderate diversification by country, region and location	Weak diversification by country, region and location	Single country; weak diversification by region or location
Asset diversification	Global presence	Strong international asset presence; major producer in different continents	Good international asset presence; producing in many countries, regions and locations	Moderate asset diversification by country, region and location	Weak asset diversification by country, region and location	Single asset; weak diversification by region or location
Product diversification	Very strong product diversity. E.g. a wide range of product categories, each offering a comprehensive selection of solutions or products	Strong product diversity. E.g. multiple product categories, each offering a comprehensive range of solutions or products	Good product diversity. E.g. multiple product categories, each offering a moderate range of solutions or products; or several product verticals, each offering a comprehensive range of solutions or products	Moderate product diversity. E.g. several product categories, each offering a limited range of solutions or products; or a small number of product verticals, each offering a moderate range of solutions or products	Weak product diversity. E.g. small number of products or categories, with sales relatively spread across them	Very weak product diversity. E.g. limited product diversity and/or sales concentrated in one or a few related products
End-market diversification	Very strong end-market diversification (balanced exposure to more than 5 industries)	Strong end-market diversification (4-5 industry exposures with some concentrations)	Good end-market diversification (three significant industry exposure)	Moderate end-market diversification (two significant industries exposures)	Weak end-market diversification (one core industry exposure)	Very weak end-market diversification (single industry)
Contribution of highly cyclical end-markets to revenue	<10%	10% to 20%	20% to 40%	40% to 70%	70% to 90%	>90%
Supplier and customer concentration	Very strong supplier and customer diversification	Strong supplier and customer diversification	Good supplier and customer diversification	Moderate customer or supplier concentration	Significant customer or supplier concentration	Major customer or supplier concentration

Operating profitability

We regard the EBITDA margin as the most important measure of operating profitability and ability for debt service for both commodity-focused and specialty chemicals corporates. We base our assessment on the margin level that we deem as being recurring and representative for the rated entity. This aims to capture the respective cyclicality, stability and visibility of corporate's operations, and likewise, avoiding an assessment based on EBITDA margins at the top or trough of the economic cycle. Furthermore, this approach captures changes in the corporate's setup which may have significant influence on a corporate's operating profile over time.

EBITDA margin is a sound indicator of a corporate's sustainable pricing power and cost position, among other things. We do not adjust reported EBITDA for expenses of a non-recurring or one-off nature. However, on rare occasions, we do adjust EBITDA e.g. for restructuring expenses, losses/gains from asset disposals or costs for repairing damage caused by natural disasters, if deemed to be material and one-off.

We view the operating profitability of commodity-focused issuers as the outcome of their market positioning, number and type of specialty material units in the portfolio, pricing power and the current stage in the economic cycle. A commodity-focused chemical corporate's relative cost position is reflected in its operating profitability. Usually, base or commodity chemical prices soar when the economic cycle peaks. In addition to these factors, geographical focus, long-term industry trends, regulatory frameworks, local prices and the availability of raw materials may also affect profitability.

Similar to commodity-focused chemical corporates, the operating profitability of a specialty chemicals corporate is primarily driven by its market positioning, types of specialty materials, pricing power and the current stage in the economic cycle. In contrast to upstream-oriented competitors, we believe the cost position plays a less important role, as specialty chemicals corporates are able to exercise significant pricing power. The production of specialty materials usually consumes limited amounts of feedstock, so producers are less sensitive to commodity price development. However, as product prices usually decline as economic growth stalls, the cost position is of considerable importance during economic downturns.

Commoditisation of specific products may be responsible for a sustained decline in operating profitability. This may be driven by the entry of new players attracted by high growth in the market, or significant capacity expansions. In the past, several downturns in the chemical industry were caused by significant oversupply in the aftermath of large capacity coming online. In addition to the relative level of operating profitability, we take individual characteristics into consideration such as the ability to pass on higher commodity prices, take or pay clauses and the length of supply contracts (longer contracts being viewed positively).

Our analysis also considers the volatility of operating margins. High margin volatility is typically associated with limited pricing power, i.e. a limited ability to pass on higher costs, a limited ability to adjust the cost base in the event of significant changes in demand (volumes) or a strong dependence on non-controllable external factors. Chemicals companies with high margin volatility could also be affected by a similarly high volatility in their operating cash flow, which could limit their access to external financing. In contrast, chemicals companies with high pricing power, more variable cost structures, the ability to reduce operating costs in a timely manner through productivity and efficiency measures, and the ability to adapt to market conditions during downturns tend to have low margin volatility. Specialty chemicals companies tend to display significantly lower margin volatility compared to commodity-focused chemicals companies.

We would base our assessment on margin fluctuations over an extended period of time, including (a) stress period(s) and our forecast horizon. For example, we would classify the volatility of operating profitability as high, medium or low based on statistical measures such as the EBITDA margin range, a standard deviation of a chemicals company's EBITDA margin or the coefficient of variation of the EBITDA margin.

Moreover, Scope assesses a chemical company's operating profitability taking into account a Scope-adjusted Return on Capital Employed (SaROCE) as defined in the Appendix. This takes into consideration the capital intensity of different chemical segment that is needed to generate the operating cash flow. As such, the metric facilities a comparison of companies with different asset-/investment intensity across the entire industry. A sustainable ROCE above the cost of capital (WACC) signals value creation, while a low and/or declining ROCE suggests inefficiencies or poor capital allocation. Scope observes that the ROCE can strongly vary across different chemicals segments and companies depending on achievable operating profits, asset and investment intensity, and the state of a company's production facilities. As such, the ROCE which fluctuates from negative or very low single-digit levels to more than 30% across companies is deemed a reliable assessment point for a chemical company's operating profitability.

We place less emphasis on an elevated ROCE driven by a comparatively lower asset base, i.e. either due to impairments or depreciations indicating an outdated asset base.

Figure 6: Operating profitability by rating category

	AA and above	A	BBB	BB	B	CCC and below
Scope-adjusted EBITDA margin	>30%	20% to 30%	15% to 20%	10% to 15%	5% to 10%	Scope-adjusted EBITDA insufficient to cover maintenance capex and interest expense
Margin volatility	Low		Medium		High	
Scope-adjusted return on capital employed	>30%	20% to 30%	10% to 20%	5% to 10%	0% to 5%	Negative

5.2 Financial risk profile

Our assessment of a chemical corporate's financial risk profile follows the general guidance in our General Corporate Rating Methodology. As part of our forward-looking analysis of the financial risk profile, we assess the issuer's financial leverage, cash flow generation, and ability to cover interest and principal payments (debt service).

We focus on cash-flow-based ratios such as leverage ratios, interest coverage and cash flow coverage. These are good indicators of credit risk as they tend to be less distorted by accounting policy than ratios based on P&L or balance sheet items. Liquidity considerations supplement our assessment of the financial risk profile.

The financial risk profile indicates a corporate's financial flexibility and viability in the short to medium term. A corporate with a strong financial risk profile is more likely to be resilient to economic downturns, adverse industry dynamics, unfavourable regulation or an unexpected loss of a revenue source. The ability to retain financial flexibility during an economic downturn is a rating driver for chemical corporates as it indicates an ability to invest during all phases of the economic cycle.

5.2.1 Credit metrics

Our general assessment of credit metrics (e.g. leverage, interest cover and cash flow cover) is outlined in the General Corporate Rating Methodology.

Scope's analysis typically adjusts the debt by various factors, including off-balance sheet debt from the leasing of long-term assets (if not reflected by IFRS 16), debt-like provisions such as unfunded pension provisions and unfunded asset retirement provisions for site remediation[2].

5.2.2 Liquidity

There is no sector-specific assessment of a chemical corporates liquidity. Our general liquidity assessment is outlined in our General Corporate Rating Methodology.

[2] Provisions made for asset retirement obligations reflect commitments for the disposal, dismantling or decommissioning of assets during their operation and/or at the end of their lifetime in sectors such as power generation, mining or commodity exploration. Likewise, we would take into account provisions for environmental remediation, if material. Scope highlights that the characteristics of asset retirement obligations are different to conventional debt regarding timing, measurement of the estimated obligation including potential asset-salvage values, tax effects or funding mechanisms among others. Particularly, the payment schedule may often extend over a very long time horizon, with obligations arising more than 20 years after the cessation of assets. As with pension provisions, Scope-adjusted debt would consider the unfunded part of such obligations. Dedicated retirement fund assets are likely to cover required payments in times of economic distress. Scope's debt adjustments for asset retirement obligations aim at capturing the nature of the expected payments on an individual basis which Scope deems appropriate for the corresponding assets/activities (i.e. power plants, exploration sites, waste disposal). When assessing the debt burden from asset retirement obligations, Scope takes into account the likely funding requirement for the next 25 years only. The reasoning behind this approach is twofold: On the one hand, Scope views potential funding needs for very-long-term obligations as not overly representative of the creditworthiness of a corporate and of the full coverage of interest-bearing debt instruments, which are likely to mature in less than 25 years. On the other hand, Scope points to the strong impact of current discount rates on very-long-term provisions. As such discount rates may fluctuate strongly over a long time horizon, a full approach on the theoretical funding requirements may be misleading.

5.3 Supplementary rating drivers

Supplementary rating drivers complement our analysis of the factors and drivers of business and financial risks. Our supplementary analytical aspects cover:

5.3.1 Financial policy

Our assessment of supplementary rating drivers is described in the General Corporate Rating Methodology.

5.3.2 Governance and structure

Our assessment of governance and structure as part of the supplementary rating drivers is described in the General Corporate Rating Methodology.

5.3.3 Parent/government support

Our assessment of parent support is described in the General Corporate Rating Methodology.

5.3.4 Peer context

Our assessment of peer context as part of the supplementary rating drivers is described in the General Corporate Rating Methodology.

5.4 Environmental, social and governance assessment

We implicitly capture general environmental, social and governance factors during the rating process with the sole criteria of their material impact on the credit quality of a rated entity. We only consider an ESG factor relevant to our credit rating process if it has a ubiquitously discernible and material impact on key rating factors (e.g. the rated entity's cash flow profile) and, by extension, its overall credit quality. If material, we explicitly highlight any such factor. Credit-relevant ESG drivers are mostly of a qualitative nature. Hence, identified ESG rating factors are based on an opinion in a relative context (factors are ordinal rather than cardinal).

ESG-related factors can be credit-positive, credit-negative or credit-neutral. Such factors need be assessed through either qualitative judgement or through quantitative measures.

ESG-related rating factors can directly or indirectly affect all key rating factors that make up our assessment of an issuer's business risk profile, financial risk profile and supplementary rating drivers. The importance/relevance of certain ESG factors is specific to each rated entity, industry and region, except for governance, which is universally applicable across all industries.

We conduct an explicit corporate governance assessment during the corporate rating process, under the supplementary rating drivers (see 5.3.2). For environmental factors, we review factors such as resource management, product innovation, physical risks or efficiencies in production processes. For social factors, we review factors such as labour management, health and safety, client relationships and supply chains, and regulatory/reputational risks.

The General Corporate Rating Methodology provides further detail on how ESG factors and supplementary rating drivers are incorporated in the credit analysis.

6. Issuer rating

The final issuer rating is based on our analysis of the business risk profile, financial risk profile and supplementary rating drivers. The rating committee decides on the relative importance of each rating driver. The business risk profile and financial risk profile are generally weighted equally for companies perceived as crossovers between investment grade and non-investment grade. The business risk profile is typically emphasised for investment-grade companies, while the financial risk profile is mostly the focus of ratings assigned to companies that are perceived as having high yield credit profiles. However, the latter also depends on the financial risk profile. Less focus is granted to strong financial risk profiles of companies showing a weak/vulnerable business risk profile (in the B or low BB category) since for such companies, the financial risk profile is subject to higher volatility. This takes into account that the credit rating of companies with business risks that reflect weak or moderate credit quality should not be bolstered by a temporary strong financial risk profile. Hence, the weighting between the business risk and financial risk profiles is adapted to each issuer's business model and market(s).

7. Additional methodology factors

For more details on our rating Outlooks for issuer ratings, long-term and short-term debt ratings, specific considerations for small and medium-sized enterprises, and the recovery analysis see the General Corporate Rating Methodology.

8. Appendix

8.1 Definition of financial items and key performance indicators applicable only to the chemicals industry

The General Corporate Rating Methodology defines in detail the indicators used in our financial risk profile assessments.

The following additional key performance indicators are used for the assessment of chemicals corporates.

Scope-adjusted return on capital employed (%)	
Profitability and efficiency	
$\frac{\text{Scope-adjusted EBITDA}}{\text{Average capital employed}}$ (average property, plant and equipment + average intangible assets + average current assets – average short-term liabilities)	This ratio measures how efficient a company is at generating earnings from its assets. It allows a comparison between companies with varying business mixes and capital intensities (e.g. upstream versus downstream). Balance sheet values are typically used as reported, while EBITDA is adjusted for significant, exceptional or non-recurring items. Scope takes into account the average exposure of capital employed taking the average of the balance sheet values for periods t and t-1.

8.2 Related documents

For more information, please refer to the following documents:

- General Corporate Rating Methodology
- Government Related Entities Rating Methodology
- Credit Rating Definitions

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