

Practitioners Section

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Value Levers in the Chemicals Industry

Capital-market-driven unbundling in Germany/Europe versus state-supported scaling and integrated value-chain control in China

Since around 1990, the chemicals industries of Germany/Europe and China have diverged. In Europe, integrated groups were broken up to remove conglomerate discounts and maximise enterprise value. This created shareholder value but sacrificed scale, integration and strategic control. In China, the state built large integrated platforms to control value chains, secure supply and gain market power. This won scale and share, but often at the cost of overcapacity and weak returns on capital. Neither model is sustainable in its pure form. Europe needs capital-market-compatible Verbund economics, and China needs greater capital discipline. The causal links are the authors' interpretation, not proven single causes.

Keywords: Conglomerate discount, Corporate unbundling, Verbund integration, State industrial policy, Capital discipline, Value-chain control.

1. Origins of the Industrial Chemicals Industry up to 1990

The industrial chemicals industry developed particularly dynamically during the nineteenth century in Germany and several other European countries, as well as in the United States. Among the formative companies founded during this period were Bayer (1863), BASF (1865), Hoechst (1863), Solvay (1863), Brunner Mond (1873; later ICI), Dow Chemical (1897), Ciba (1884) and Sandoz (1886). These first industrial, integrated chemicals groups combined a very broad range of activities under one corporate roof. These activities included both different types of chemical products (e.g., basic chemicals and intermediates, plastics and fibers, specialty chemicals, crop protection, pharmaceuticals, consumer products) and support functions such as energy supply, research, logistics and site infrastructure. (BASF, 2026; Bayer, 2026; Novartis, 2026)

The companies were not conceived as collections of homogeneous businesses, but as industrial systems. Raw materials (coal/syngas and, later crude oil/naphtha or natural or shale gas/ethane), energy (particularly steam generated in power plants), intermediates, by-products, logistics, infrastructure and research were physically and organisationally interconnected. The economic rationale was therefore not simply portfolio breadth, but the integrated optimisation of material, energy, supply chain and knowledge flows. This Verbund logic was particularly pronounced in Germany, especially by BASF, and became one of the defining competitive advantages of the German chemicals industry. This Verbund principle was successful for around 130 years. Shareholders were mostly national and not worried about the lack of business transparency.

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2. Vertical, Horizontal and Risk-Based Separations to Maximise Enterprise Value

From around 1990 onwards, however, the integrated business model in the Western world came under growing pressure from increasingly international capital markets. Investors began to value individual businesses according to their specific growth, margin, capital-intensity, cyclicality and risk profiles rather than accepting a single valuation for the conglomerate as a whole. The central capital-market question increasingly became: why should a high-growth, IP-protected pharmaceutical or specialty-chemicals business be valued at the same multiple as a cyclical and capital-intensive commodity-chemicals operation?

The capital market recognised, for example, that plastics – used here as an illustration of basic and petrochemicals – are exposed to high capital intensity, cyclical margins, limited differentiation, high energy dependence, environmental and liability risks. Accordingly, such businesses cannot reasonably be valued at the same enterprise-value multiple (EV/EBITDA = Enterprise Value / Earnings before interest, taxes, depreciation and amortisation) as pharmaceuticals, which typically benefit from patent protection, strong

pricing power, high gross margins, comparatively low production intensity and significant barriers to entry.

Pharmaceutical businesses are therefore commonly valued at two to three times the multiples of plastics businesses. Figure 1 illustrates how the valuation gap widened over time. In 1990, pharmaceuticals commanded an enterprise-value multiple that was double that of basic chemicals. By 2025 the valuation gap has increased to more than three. Capital markets increasingly monetised differences in business quality through differentiated valuation multiples.

These pronounced valuation differences triggered one of the largest structural transformations in the history of Western industry. The era of the integrated chemicals conglomerate came to an end. Businesses were separated vertically into chemicals and life sciences, followed by basic chemicals, specialty chemicals, pharmaceuticals, agrochemicals and other segments; and subsequently into increasingly focused customer, technology and application portfolios. The financial logic was straightforward: if a conglomerate contained businesses with fundamentally different valuation profiles, separation could release the conglomerate discount and allow each business to be valued against its own peer group.

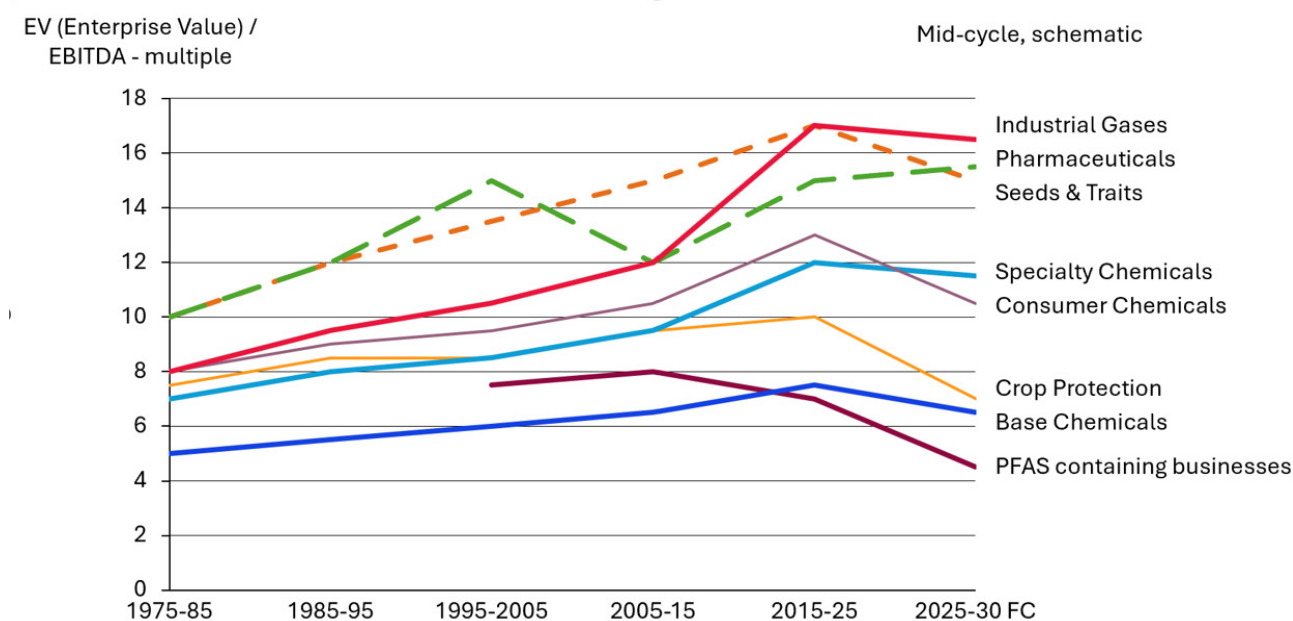


Figure 1. Enterprise values (EV/EBITDA multiples) across chemicals and life sciences, 1975–2025. (source: ELCH 2026); average mid-cycle EV/EBITDA multiples for typical Western transactions.

The spun-off pharmaceutical, agricultural and specialty-chemicals businesses receive their own peer sets and can therefore realise business-specific, generally higher EV/EBITDA valuation multiples. The lower-valued commodity businesses no longer dilute their valuation. In many cases, the sum of the separately valued parts is therefore higher than the market value of the former integrated group (Table 1).

Hoechst between 1994 and 1999 represents the most radical German example. Under CEO Jürgen Dormann, the group began disposing of large parts of its chemical activities. Specialty chemicals operations were transferred to Clariant, industrial chemicals were sold or separated, and the pharmaceutical and agricultural activities were increasingly placed at the centre of the portfolio. In 1999, Hoechst merged with Rhône-Poulenc to form Aventis; Aventis was subsequently acquired by Sanofi. One of Germany's largest integrated chemicals groups had effectively disappeared within only a few years. Its constituent businesses continued to exist, but under numerous different owners and corporate structures. (Clariant, 2026; Infraserv, 2013; Sanofi, 2014)

Bayer proceeded more gradually. In 2005, major chemicals and rubber activities were spun off into LANXESS. In 2015, Bayer MaterialScience was separated as Covestro. Bayer increasingly concentrated on life sciences – pharmaceuticals, consumer health and

crop science. The subsequent acquisition of Monsanto was intended to create a global leader in agriculture, although it also introduced substantial litigation and liability exposure into the group. (Bayer, 2026; Covestro, 2015)

BASF sold its Knoll pharmaceuticals business to Abbott in 2000 and concentrated on chemicals. Its core operations continue to be organised around an integrated network of material, energy and logistics flows. BASF therefore represents an important counterexample to the more radical break-up strategies pursued by Hoechst and others: the group has repeatedly adjusted its portfolio but has retained the Verbund as the organising principle for much of its production system. Businesses outside the Verbund, e.g. coatings, agro solutions, catalysts, batteries were allowed more degrees of freedom outside the Verbund-structures. (BASF, 2000; BASF, 2026)

A similar development occurred elsewhere in Europe. In Switzerland, the chemicals activities of Ciba-Geigy and Sandoz – both with historical roots in textile chemicals and dyes – were combined. Immediately before the creation of Novartis in 1996, their specialty-chemicals operations were separated as Ciba Specialty Chemicals and Clariant. The higher-valued pharmaceutical activities were combined in Novartis, while the chemicals businesses continued independently. This was another example of the capital market separating

Table 1. Illustration of a conglomerate discount using a fictitious integrated chemicals company. (source: ELCH 2026); average mid-cycle EV/EBITDA multiples for typical Western transactions. Fictitious example for illustration only.

Business	Revenues [Mio. €]	EBITDA [Mio. €]	Multiple [EV/EBITDA]	Enterprise Value [Mio. €]
Integrated Chemicals	100	16	6-8x	110
Base Chemicals	35	4	4-5x	18
Specialty Chemicals	25	4	8-11x	38
Agro	15	2,5	10-13x	29
Pharmaceuticals	25	5,5	12-18x	83
Sum of Businesses	100	16	10x	160
Released and monetised conglomerate discount			3x	50

businesses with very different valuation profiles. (Novartis, 2026; Novartis Deutschland, 2021; Clariant, 2026)

ICI spun off Zeneca in 1993. Zeneca subsequently merged with Sweden's Astra to form AstraZeneca, which in 2026 became the subject of reported merger speculation involving US competitor Bristol-Myers Squibb. The remaining 'old' ICI chemicals business lost the pharmaceutical jewel that had supported the group's valuation and was progressively reshaped and sold; AkzoNobel ultimately acquired ICI in 2008. Again, the higher-multiple life-sciences business survived as a major global company, while the traditional chemicals conglomerate disappeared. (AstraZeneca, 2026; AkzoNobel, 2008)

The most radical European example of this transformation in specialty chemicals is the Dutch company DSM (formerly Dutch State Mines). DSM began as a coal-mining company in 1902, transformed itself into a petrochemicals and materials group, then progressively exited commodity chemicals and moved into specialty materials, nutrition and health. The subsequent combination with Firmenich further shifted the portfolio towards nutrition, fragrances and consumer-oriented life-science businesses. The transformation illustrates how far a former heavy-industry group can migrate towards higher-multiple, less capital-intensive activities. (dsm-firmenich, 2025)

In the United States, the same development took place in parallel, but in many cases even more radically. Wall Street has historically been particularly intolerant of uneven business profiles and conglomerate structures. Activist investors, pension funds, mutual funds and private-equity investors repeatedly pressed management teams to divest lower-return businesses, spin off divisions or break up diversified groups where the market value of the parts appeared to exceed the value of the whole.

Monsanto is perhaps the most extreme example. Until the 1980s it was a classic diversified chemicals group, active in acids, plastics, nylon, industrial chemicals and other basic-chemicals businesses. From the 1990s onwards, the company radically repositioned

itself towards life sciences, seed and agricultural biotechnology. Traditional chemicals activities were separated into Solutia in 1997, while Monsanto increasingly concentrated on agricultural technologies and pharmaceuticals. (SEC, 2004)

Act 1: Severe Crisis and the Pharmacia Deal (1997–2000)

Immediately after the Solutia spin-off, the 'new' life-sciences Monsanto came under severe pressure. The group had spent around US\$8 billion acquiring seed companies and building its biotechnology platform. Its agricultural strategy required substantial investment before the expected returns materialised, while the pharmaceuticals business alone was not sufficient to stabilise the group. In 2000, Monsanto therefore merged with Pharmacia & Upjohn to form Pharmacia Corporation. (SEC, 2002)

Act 2: Breaking Up the 'Marriage of Convenience' (2000–2002)

In the merger, Pharmacia was primarily interested in one particularly attractive Monsanto asset: the pharmaceutical business G.D. Searle. Searle had recently launched the highly successful anti-inflammatory drug Celebrex. The agricultural business, by contrast, had a very different risk, growth and valuation profile. Monsanto's agricultural activities were therefore floated separately again, and by 2002 Monsanto had once more become an independent, pure agricultural biotechnology company. Pfizer subsequently acquired Pharmacia, including Searle.

Act 3: Rise to Global Agricultural Leadership (2002–2018)

Over the following fifteen years, the new pure-play agricultural biotechnology company grew rapidly. It became a dominant global supplier of genetically modified seed in crops such as maize, soybeans and cotton and built a powerful portfolio of seed genetics, traits and crop-protection products, including the herbicide glyphosate (Roundup). Monsanto doubled the global seed market value. At the same time, the company became highly controversial because of patent litigation against farmers, intensive lobbying and the broader public debate surrounding genetically modified crops and glyphosate. In 2016, Monsanto unsuccessfully attempted to acquire Syngenta and subsequently approached Bayer CropScience, both without success.

Act 4: The Bayer–Monsanto Transaction (2018 to the Present)

The final act followed in 2018, when Bayer reversed the roles and acquired Monsanto for US\$63 billion. At US\$128 per share, Monsanto's shareholders and management could hardly refuse Bayer's offer. Bayer CEO Werner Baumann intended the transaction to create the ultimate global market leader in agricultural chemicals and seeds. In an effort to eliminate Monsanto's negative public image, Bayer discontinued the Monsanto corporate name immediately after completion; the underlying businesses continued under the Bayer CropScience umbrella. The acquisition is now regarded as one of the most financially consequential transactions in recent German corporate history because Bayer inherited extensive US litigation relating to alleged cancer risks associated with glyphosate. Bayer's market capitalisation subsequently fell sharply. On 19 December 2024, Bayer shares closed at €18.976, and Bayer reported a year-end 2024 market capitalisation of €19 billion. This was roughly one-third of the approximately €56 billion equivalent that Bayer had spent on the Monsanto acquisition. (Bayer, 2018; Bayer, 2026; Bayer, 2025; Wiener Börse, 2024)

Monsanto was not the only US example of decisive corporate break-up. DuPont, arguably the most tradition-rich chemicals group in the United States, attempted for decades to preserve an integrated model but ultimately succumbed to relentless pressure from Wall Street. Its reverse integration through the acquisition of the oil company Conoco was rejected by the stock market as an unwieldy 'mega-conglomerate' and was

subsequently reversed. Conoco was spun off again. DuPont then disposed of its pharmaceuticals business, DuPont Pharmaceuticals, through a sale to Bristol-Myers Squibb. As specialty chemicals, agricultural chemicals and basic chemicals continued to command very different valuations, DuPont spectacularly merged with its long-standing rival Dow Chemical to create the temporary DowDuPont. The sole objective was then to separate the mega-group into three tailored pure-play companies: Dow for basic chemicals/plastics, DuPont for specialty chemicals and Corteva for agriculture. Agro initially remained an integrated Life Sciences business within Corteva. However, significant differences have since emerged between seeds, genetics, chemical crop protection, biologicals and digital agriculture. The separation of the agro pure-play Corteva into the new Corteva (chemical and biological crop protection) and Vylor (seeds, genetics and traits) marks the latest stage of this unbundling process in 2026. (Corteva, 2026a, 2026b) (DuPont, 2019a, 2019b)

Seeds and traits exhibit many characteristics of an IP- and licensing-based business model while chemical and, to some extent, biological crop protection is more similar to traditional chemical business models, as table 2 demonstrates.

Once again, the same principle applies separation promises to free the more highly valued seeds and traits business from the lower valuation multiple attached to crop protection. The separated businesses become smaller, but the expected combined valuation multiple of Vylor and the new Corteva is, driven by

Table 2. Comparison of Agrochemicals Business Models. (source: ELCH 2026/MCC)

Dimension	Seeds Business	Chemical Crop Protection
Customer Retention	High	Lower (pricing pressure, generics)
Key Assets	Patented genetic traits	Manufacturing assets
Key Cost Driver	Development costs	Raw materials costs
Manufacturing Intensity	Low	Higher
Revenues	Recurring	More volatile (competition)
Entry Barriers	Patents, proprietary germplasms	Regulatory approval, testing

Vylor, higher than the valuation multiple of the original integrated Corteva. Here too, the underlying assumption is that the conglomerate discount exceeds the value of the synergies arising from seed treatment, digital applications and integrated offerings.

Another prominent US example is American Cyanamid. Originally founded in 1907 as a traditional chemicals and fertilisers producer, the company built a highly profitable pharmaceuticals division, Lederle Laboratories, during the twentieth century. In the early 1990s, when pure pharmaceutical companies traded at exceptionally high earnings multiples, American Home Products (later Wyeth and now part of Pfizer) acquired American Cyanamid in a hostile US\$9.7 billion transaction. The buyer was principally interested in the pharmaceuticals business; the long-established chemicals operations were rapidly spun off as Cytec Industries and left to operate independently. (C&EN, 1994; FTC, 1995)

While banks and founding families in Europe often continued to shield the old chemical conglomerates, institutional investors – pension funds and Wall Street analysts – increasingly prevailed in the United States. They established the doctrine of the “pure play”: an investor seeking high risk and high returns in pharmaceuticals or biotechnology did not want, within the same equity investment, to finance cyclical polyethylene plants. Investors buying chemical stocks expected to acquire them cheaply (P/E multiples of 8–12x) and to receive a high dividend yield. This uncompromising logic meant that, by the turn of the millennium, the historically evolved integration of pharmaceuticals and basic chemicals had been dismantled even more thoroughly in the United States than in continental Europe.

3. Impact of the Break-up on Market and Competitive Dynamics

According to the authors' estimates, the major integrated Western chemical groups accounted for approximately 25% of global chemical sales in 1990; by 2025, their corresponding share had fallen to only around 12%. BASF illustrates this relative shift particularly well: Group sales amounted to approximately EUR 24 billion in 1990 and just under EUR 60 billion in 2025. Although BASF's sales increased approximately 2.5-fold over

these 35 years (CAGR: 2.7%), the global chemical market expanded sixfold (CAGR: 5.3%). In the 2025 ICIS ranking, Sinopec took first place for the first time, ahead of BASF. (authors' estimate; CEFIC, 2025; BASF, 1994, 2026; ICIS, 2025)

The decline in the global market share of the major Western integrated groups coincided with their capital-market-driven break-up, but cannot be attributed to it alone. Slower demand growth in a maturing European market, comparatively high European energy and feedstock costs, currency effects, and above all the scale of Chinese capacity build-out under state industrial policy have all contributed materially to this shift. The remainder of this article discusses these factors – in particular corporate focus/diversification and vertical (dis-)integration on the Western side, and state industrial policy and industrial resilience on the Chinese and European sides – in more detail.

The deconsolidation of the Western chemicals industry was already being described in the German trade press more than a decade before this article; Haug (2013) provided a comparable overview of market and industry perspectives for the German chemicals sector through 2030. The present article extends that earlier account by tracing how Western deconsolidation and Chinese consolidation diverged further over the subsequent decade, and by drawing out the resulting implications for a capital-market-compatible Verbund model.

4. Separation to Reduce Business and Liability Risks

A relatively recent development, but one that is becoming increasingly visible, particularly in Europe, is the separation of businesses according to their business and sustainability risk profiles – including natural capital consumption, environmental and societal costs, litigation risk, product liability and reputational risk.

This changes the rationale for business separation from the offensive pursuit of a higher corporate valuation towards the defensive mitigation of business and liability risks. Businesses associated with high natural capital consumption, environmental and societal risks, insolvency risk and broader business risks are separated at lower valuations in order to protect the core business. While the principal concerns in chemicals are often

natural capital, environmental and regulatory risks, in pharmaceuticals they are more frequently affordability, product liability, reputation and other societal issues.

Although enthusiasm for sustainability has declined significantly in Europe following the bureaucratic and restrictive requirements of the European Union's Green Deal, these considerations have not disappeared. The relief provided by the Omnibus package, the later introduction of reporting obligations for larger companies and the shortening of the supply chain subject to due-diligence requirements should not obscure the fact that financial and capital markets continue to regard sustainability as a high-priority issue and incorporate it into corporate and business valuations.

A useful practical indicator is the increasing difficulty – or, at the very least, sharply rising cost – of obtaining insurance for manufacturing sites. Insurers, and particularly reinsurers, scrutinise very carefully what is manufactured, where and how it is produced, and where the relevant raw materials and feedstocks originate. Obvious factors lowering valuations have an impact not only on operating costs but also on a number of other aspects, as shown below.

This creates a new valuation discount that cannot be eliminated simply through further corporate separation. It is also becoming increasingly apparent that

sustainability risks do not stop at the legal boundaries of a corporate entity – nor can they be resolved through greenwashing.

5. PFAS as a Typical Example of Sustainability-Related Liability Risk

PFAS (per- and polyfluoroalkyl substances, sometimes referred to as 'forever chemicals') are an example of sustainability-related liability risk. The substance group comprises a wide range of fluorinated substances which, because of their high persistence, are often described as forever chemicals. Some PFAS present significant toxicological or ecological risks. Others perform important technical functions in semiconductors, medical devices, batteries, seals, coatings and high-performance materials. (ECHA, 2025a, 2026a, 2026b)

There is currently no general labelling obligation for PFAS-containing products. Restrictions on PFHxA, its salts and related substances start in the EU/EEA in April 2026. Separately, the EU restriction on PFAS in firefighting foams starts to apply in October 2026, beginning with a ban on PFAS in portable fire extinguishers and additional requirements for continued use of PFAS-containing foams. The broader EU-wide PFAS restriction proposed by five European countries remains under evaluation, with ECHA's scientific committees having issued their 2026 scientific and socio-economic opinions. Given the

examples, schematic			
Value Lever	Time	Chemistry	Life Sciences
Starting point: Integration	Before 1990	Integrated Chemicals	
1. Vertical Separation - Sector separation - Value chain separation	1990 – 2015	Chemistry Base & Specialty Chemicals, Fertilisers, Industrial Gases, Fine & Petrochemicals, Polymers, Industrial Chemicals	Life Sciences Pharma & Agro, Food & Feed, Crop Protection, Pharmaceuticals & Generics
2. Horizontal Separation - Market- & Customer- segmentation - Technology- & Pro- ductsegmentation	2010 – 2030	Construction, Transport, Elektro & Elektronics, Mining, Process Industries, Substrates & Applications, Ingredients & Process Chemicals	Human & Animal Health, Care & Cosmetics, Food & Feed, Crop Protection & Seed/Traits, Natural vs. Synthetic
3. Future: Business & Liability Risk Separation	After 2020	Insolvency, Use of Nature Capital, Environmental & Societal Risks	Human- & Eco-toxicity, Biodi- versity, Land-use, Water

Figure 2. Value Drivers in Chemicals and Life Sciences, examples, schematics. (source: ELCH 2026)

essential importance of these substances to industry and medicine, numerous exemptions and transition periods are expected. For investors, the decisive issue is not merely whether a particular substance is prohibited today. (ECHA, 2026a, 2026b)

Value-relevant considerations include those related to legal aspects (possible future regulation, product liability), costs related to customers (e.g., reputational risk, changing customer requirements) as well as costs related to increased insurance premiums and the cost of exploring substitutes.

The discount may therefore also affect businesses that are not formally subject to a general or imminent PFAS ban. This applies, for example, to agrochemical or pharmaceutical active ingredients, which very often contain fluorinated molecular structures or whose manufacturing processes use fluorinated auxiliaries and intermediates. Many of these applications may

be exempted from regulation or treated differently. This does however not change the fact that agro and pharmaceutical ingredients often contain PFAS and that small, water soluble PFAS, like TFA (trifluoroacetic acid) are released into ground waters. Nevertheless, mere proximity to the PFAS issue can already result in higher due-diligence costs, longer approval processes, lower investor demand and lower valuation multiples. (ECHA, 2025a, 2026a, 2026b) This demonstrates that even a highly focused pharmaceutical, agrochemical or specialty-chemicals pure-play is not automatically protected from business risks and sustainability discounts.

What does this PFAS discussion have to do with valuation? The previous unbundling process between highly valued, IP-driven and lower valued, asset-driven businesses was primarily based on the respective business model, as shown in figure 3.

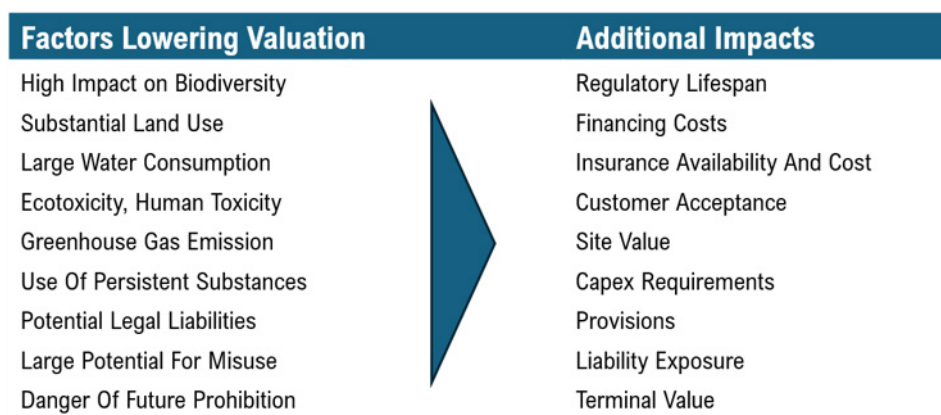


Figure 3. Factors Lowering Business Valuations. (source: ELCH 2026/MCC)

Table 3. Comparison of Chemical Models (Asset-driven versus IP-driven). (source: ELCH 2026/MCC)

Dimension	Asset-driven	IP-driven
Capital Intensity	High	Low
Cyclicality	High	Low
Product Type	Commodity	Specialty
Customer Group	Industrial customers	Consumer
Key Value Creation	Via Production	Via Intellectual Property
EV/EBITDA	Lower	Higher

In future, a second valuation dimension will become increasingly important: the physical and societal impact of the business. Two companies may appear economically similar but be valued very differently if one causes critical emissions, produces persistent chemicals, impairs biodiversity or carries substantial remediation risks, while the other does not.

The traditional break-up logic is therefore supplemented by a new question. It is no longer only: How focused is the company? (Pure Play Question). It is also: Which substances, impacts and obligations are embedded in the business? (Sustainability Question)

6. Sustainability Carve-outs Do Not Necessarily Solve the Problem

Separating burdened businesses can improve the parent company's valuation multiple. Examples such as Chemours, Solutia and Tronox show, however, that this does not make the underlying problem disappear.

A company with high debt, limited or no diversification and substantial legacy liabilities may actually be more vulnerable after the spin-off than it was within a larger group. In addition, courts, authorities, lenders and investors increasingly examine whether risks have been allocated in an economically viable and fair manner. Liabilities may subsequently revert to former parent companies or be reallocated among several successor companies. The financial value lever of a separation can therefore quickly be outweighed by environmental and liability risks.

7. Integration Along Value Chains, Technology Platforms and for Import Substitution

China, by contrast, acted strategically and from around 1990 pursued almost the opposite approach. Instead of capital-market-driven break-ups, China focused on consolidation and scale. After the Second World War, China's chemicals industry was only at an early stage of development. Under central direction, production capacities and state-owned structures were gradually combined into larger units. An important milestone was the creation of large state petrochemical platforms,

whose reorganisations gave rise, among others, to today's Sinopec Group. (MIIT et al., 2022; Sinopec, 2025)

While Europe created an increasing number of smaller pure-plays, China built massive new capacity between 2000 and 2010 and systematically integrated companies. In a petrochemicals group such as Sinopec, one important objective is to capture synergies along the physical value chain from fossil feedstock to applied product. But this is only one dimension of integration. Between 2010 and 2020, China embarked on a technological catch-up process, supported by global acquisitions. Wanhua illustrates how a world-leading position was first built around MDI (methylene diphenyl diisocyanate, a key raw material for polyurethane), after which the company expanded backwards, forwards and laterally into adjacent stages of the value chain. At the same time, comparable Verbund structures in Germany were being separated and sold, as illustrated by the sequence Bayer → Covestro → Covestro/Plixxent. (MIIT et al., 2022; Sinopec, 2025; Covestro, 2015)

A third integration route arose from the need to reduce dependence on imported chemicals. Sinochem evolved from a trading company into an increasingly integrated chemicals group and in 2021 was combined with ChemChina to form the state-controlled Sinochem Holdings. (Sinochem Holdings, 2025, 2026)

8. Assessment of the Western Enterprise-Value Model and the Chinese Integration Model

Which model has prevailed? The answer depends on the perspective chosen. From the standpoint of an investor focused on TSR (Total Shareholder Return), ROIC (Return on Invested Capital) and EV/EBITDA (Enterprise Value / Earnings before interest, taxes, depreciation and amortisation), the last 30 years of the EV-maximising model have worked well. Compared with the Chinese model, capital-market pressure tends to reduce empire-building, cross-subsidisation of permanently unattractive businesses, inefficient capital commitment and politically motivated investment. It also forces management to address a highly valuable question: 'Why should this business belong to us in particular?' Integrated groups often lack this discipline.

From the perspective of industrial scale, control of value chains, and industrial and geopolitical power, however, the Chinese model has so far been considerably more successful. The outcome of this industrial policy development is striking. The latest Cefic figures available at the time of revision put China at 48% of global chemical sales and Europe at 12% (Figure 4).

Europe maximised capital productivity and minimised industrial redundancy. From an operational and financial perspective, this was efficient. Particularly during the first 20 years of decoupling, the model delivered strong results. Geopolitically and industrially, however, it was risky, because the question gradually changed from: 'Why should we produce this intermediate ourselves if China offers it at substantially lower cost?' to: 'We can no longer manufacture the final product at all without Chinese intermediates.' As industrial and geopolitical risks have risen globally, the advantages of the Chinese model have become particularly apparent over roughly the last ten years of decoupling. This is precisely the difference between efficiency and resilience. (CEFIC, 2025)

Europe is increasingly recognising this problem. The European Commission launched the Critical Chemicals Alliance (CCA) in 2025; its first General Assembly took place on 13 January 2026 with the objective of making strategically relevant chemicals capacity more resilient and protecting it from closure. This is late, but nevertheless remarkable: Europe is effectively reintroducing a strategic value for chemicals production capacity that goes beyond the individual ROIC of an asset. (CEFIC, 2025; European Commission, 2026a, 2026b)

In summary, the two systems pursue fundamentally different models and objectives: one optimises enterprise and financial value, while the other creates geopolitical dominance and market power.

The Chinese model is not merely an SOE (state-owned enterprise) model. Large private groups such as Hengli, Rongsheng and Shenghong have likewise built highly integrated refining–petrochemicals–polymer/fibre chains. The state, however, provides financing, infrastructure, industrial policy and, in some cases, market protection that enable this strategy. (Sinochem Holdings, 2025, 2026) (MIIT et al., 2022; Sinochem Holdings, 2025, 2026)

A further, increasingly relevant development is the emergence of direct joint ventures between Western and Chinese chemical groups, which combine elements of both models within a single asset. BASF, for example, has operated the integrated BASF-YPC Verbund site in Nanjing together with Sinopec for 25 years (BASF, 2025), while INEOS and Sinopec have more recently agreed a series of joint ventures for a large petrochemicals complex in Tianjin (INEOS, 2025). Such structures allow Western companies to participate in Chinese scale and cost positions and Chinese partners to access Western technology and operating know-how; they may point towards a hybrid organisational form alongside pure Western deconsolidation and pure Chinese state-led integration.

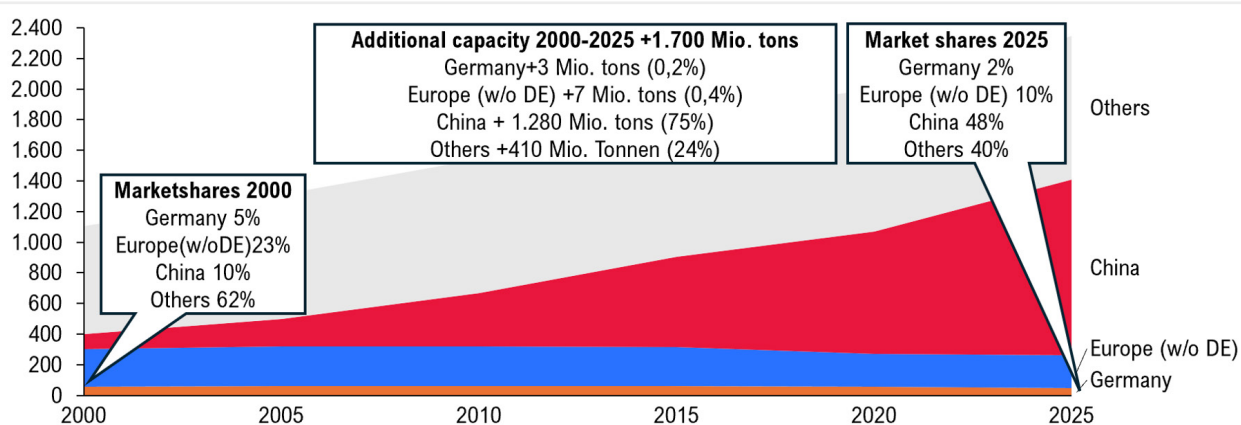


Figure 4. Global chemicals production (excluding pharmaceuticals), million metric tons. (sources: EEA/UNEP; Eurostat; Cefic; VCI; ACC based on ICIS Supply & Demand Database; ELCH 2026)

Table 4. Comparison of Integrated and Enterprise-value Maximizing Business Models in Chemicals. (source: ELCH 2026)

	Enterprise-value maximization	Integrated national chemicals groups
Primary objective	ROIC, multiple, shareholder value	Scale, market share, security of supply, industrial dominance
Organisational principle	Extract homogeneous business models	Control value chains
Capital allocation	Each business must earn its own cost of capital	Capital can be cross-subsidised for strategic purposes
Time horizon	typically 3–7 years	typically 10–20+ years
Commodity business	frequently spun off / sold	strategic component
Specialties / pharmaceuticals	high multiple → valued separately	may remain integrated downstream in the chain
Overcapacity	close / sell	partly accepted deliberately
Pricing power	through differentiation	through cost, volume and market position
Crisis resilience	lower in the event of supply-chain disruption	higher with vertical integration
Capital-market valuation	high priority	secondary
Geopolitical power	rather weak	very strong

9. Neither the Western nor the Chinese Model Is Sustainable in Its Current Form

Both models are increasingly showing cracks and are unlikely to be sustainable in their present form. Germany and Europe have taken the capital-market-oriented model too far: the marginal benefit of further separation is declining and, in some cases, turning negative. Excessive fragmentation creates units that are too small to compete successfully over the long term. China seeks to control entire industrial value chains and has moved too far in the opposite direction.

Under such a logic, individual stages of a value chain may even earn a 0% ROIC if they secure supply, reduce downstream costs, displace competitors, generate economies of scale, reduce import dependence or

support exports at other stages. From a financial and Western portfolio perspective, this represents poor capital allocation. From an industrial and geopolitical perspective, however, it may be entirely rational. Yet China's overinvestment in massive excess capacity and weak capital discipline, combined with slower domestic demand growth, are producing unsustainable business models and an intense struggle for survival. (CEFIC, 2025; Reuters, 2025a, 2025b)

10. A Capital-Market-Compatible Verbund Model

What should be done? Instead of 'continuing to separate different business models', the principle should be that 'the Verbund value of groups of assets must earn its cost of capital'. Reviewing chemical value-chain trees together with utility supply and logistics can help protect integration where it creates value. The economic Verbund

value of material, energy, infrastructure, supply-chain, know-how and resilience synergies should be quantified and considered alongside the stand-alone value of individual assets in investment and portfolio assessments. Germany and Europe should not re-integrate companies. They should integrate production.

Critical chemicals value chains as the ones shown in table 5 should therefore be defined.

The next question should be: which two to four production stages must Europe under no circumstances lose simultaneously? This is fundamentally different from saying, 'this plant has a poor 2027 EBITDA margin, so close it'. Analogous to energy or defence infrastructure, Germany and the EU should maintain a list of perhaps 50–100 key chemicals plants or production capabilities. Not every ammonia, PE or TiO₂ plant is strategic. But if the last European plant producing a critical intermediate disappears, the economic damage is of a fundamentally different order.

Stand-alone ROIC should therefore be supplemented by a 'systemic Verbund ROIC'. A plant earning a 3% ROIC may enable value creation of 10% or more elsewhere in the chain. Companies should not automatically spin off such assets. The consideration should also include aspects such as securing feedstock or utilizing by-products. The question should therefore not be: 'Asset

A does not earn its WACC → sell it.' It should be: 'What happens to the EBITDA, risk profile and strategic value of B–F if A disappears?'

A particularly relevant issue in Germany is the role of independent chemicals parks. Where financial investors own the park infrastructure, interests can diverge quite easily. Chemicals companies require energy, logistics and infrastructure services at the lowest possible competitive cost. Chemicals-park owners, by contrast, seek a stable, competitive return on their investment. This is particularly important for mandatory services that cannot readily be sourced externally. The scope for profit maximisation is naturally constrained by the fact that, under uneconomic conditions, chemicals companies themselves can no longer survive at the site.

Infraserv Höchst, which operates the Höchst Industrial Park in Frankfurt, illustrates one way of managing this tension: rather than being owned by a purely financial investor, it is held jointly by several of the chemicals and pharmaceuticals companies operating on the site (Wikipedia, 2026). Ownership structures of this kind, in which tenant companies hold a stake in the site operator, can help align infrastructure investment with the operating companies' own interests and may preserve some of the economic benefits of Verbund production even where full corporate integration is neither possible nor desirable.

Table 5. Examples of Chemical Value Chains For Which Integration May Be Critical. (source: ELCH 2026)

Chain	What strategically belongs together
Chlor-alkali	Electricity → chlorine/NaOH → PVC, isocyanates, epoxides, pharmaceutical/agrochemical intermediates
C2/C3	Naphtha/LPG → cracker → ethylene/propylene → EO/PO, PE/PP, oxo chemicals, acrylates
Aromatics	Refinery → benzene/toluene/xylenes → PU, PA, PET, coatings, pharmaceuticals
Sulphur	Refineries → sulphur/H ₂ S → H ₂ SO ₄ /sulphides → fertilisers, metals, specialty chemicals
Fluorine / phosphorus	Raw material → basic chemicals → electronics, batteries, pharmaceuticals, crop protection
Pharma / agro	Basic chemicals → key intermediates → active ingredients → formulation

More important, however, is often the failure to make the investments required for a future competitive energy, material and logistics Verbund under such ownership and incentive structures. This can progressively undermine the economics of the companies located at the site. Even today, decentralised steam-generation solutions are often more economical than steam generated centrally in chemicals-park power plants and distributed across the site. Similar considerations apply to other services. Industrial parks therefore need to be closely integrated economically with the chemical companies operating on them, without necessarily merging the companies themselves. This is probably the most important practical point – but also the one that is most difficult to implement.

Even then, energy policy must be treated as chemicals policy. Germany cannot strategically retain energy-intensive basic chemicals while permanently providing electricity and gas at structurally higher costs than in the United States, the Middle East or China. Subsidy programmes alone cannot compensate for this. Strategically necessary basic chemicals production in Europe requires long-term, predictable costs for inputs such as electricity, hydrogen/ gas as well as for infrastructure/ grid costs and emission fees (carbon tax).

The EU action plan for the chemicals industry is already moving more strongly towards protecting critical production capacities and strengthening resilience. This logic, however, needs to be applied more consistently to value chains rather than to individual companies. (European Commission, 2026a, 2026b)

When responding to Chinese dumping, Europe should not react plant by plant. China plays value chains; Europe often plays individual customs tariff numbers (HS codes). If, for example, an integrated Chinese producer accepts upstream losses in order to build global downstream market share, an anti-dumping duty on product X alone may not be sufficient. Europe should examine the economics of the Chinese chain as a whole and, where appropriate, take greater account of value-chain effects, state financing, energy prices, capital costs and cross-subsidization. European competition law has traditionally focused very strongly on competition within Europe. For globally traded chemicals, the question should more often be: 'Is the relevant competition BASF versus

Evonik – or Europe versus Chinese platforms with five to ten times the scale?' In some areas, European champions or shared platforms may make more sense than five companies that are each too small.

11. What Should China Do?

For China, the task is almost the mirror image. China has now taken some of the advantages of integration too far. The central challenge is no longer: 'How do we build complete value chains?' This has largely been achieved. China does not need to disintegrate production, but it does need to reduce overcapacity in basic chemicals, focus more strongly on specialty chemicals, impose greater discipline on capital allocation, support a broader ownership base and permit domestic consolidation. (European Commission, 2026a, 2026b; Reuters, 2025a, 2025b)

Four measures could help China avoid systematically building excess capacity and destroying capital and margins:

1. From 'maximum capacity' to 'maximum ROIC'

Not every province needs a refinery, a cracker, a PTA, polyester, methanol and chlor-alkali plant. China should accelerate the closure of older and less efficient capacity in particular. (Reuters, 2025a, 2025b) The country has already begun to address the overcapacity problem more actively. (Reuters, 2025a, 2025b)

2. Preserve integration – but consolidate commodity capacity

China should not destroy value chains. Instead, it could, for example, replace ten mediocre plants with four very large integrated plants. This would preserve economies of scale, security of supply, infrastructure and market power while improving ROIC.

3. Make state financing more selective

As long as capital is available almost irrespective of returns, overinvestment is inevitable. The decisive reform would therefore be: strategic importance must not mean automatic financing of every project. Strategic industrial policy should secure the value chain, not every individual producer.

4. From cost leadership to value leadership

China has now achieved scale advantages in many areas of chemicals. The next stage of value creation is: Commodity → Specialty → Formulation → Application Know-how → IP – precisely the progression that Europe spent decades perfecting.

12. What Does a 'Capital-Market-Compatible Verbund Model' Mean?

Germany does not need to re-integrate companies. It needs to integrate production. China does not need to disintegrate production. It needs to discipline capital allocation.

Germany: „Integrated value chains without integrated ownership.“

China: „Integrated value chains with disciplined capital allocation.“

This could indeed give rise to a new and potentially superior long-term model for the chemicals industry:

a capital-market-compatible Verbund model. It combines the capital discipline of the Western model with the industrial advantages of integrated value chains – in Germany and Europe with a stronger emphasis on ROIC and resilience, and in China with a stronger emphasis on ROIC and strategic market power.

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Table 6. Key Issues and Solutions for German/European and Chinese Chemical Companies. (source: ELCH 2026)

	Germany / EU	China
Key Issue	Excessive fragmentation	Excessive capacity expansion
Solution by Aspect		
Companies	Fewer further spin-offs	Fewer additional capacities
Integration	Increase physical integration again	Preserve physical integration
Ownership	May remain separate	Consolidate more strongly
Capital discipline	Relax somewhat for strategic assets	Increase significantly
State	Secure value chains	Limit overinvestment
Competition policy	Take global scale into account	Permit domestic consolidation
Commodity	Retain strategic minimum capacity	Reduce overcapacity
Specialty	Continue to focus	Expand substantially
Objective	Resilience + ROIC	ROIC + market power

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Statement of AI Usage

In preparing this revised manuscript, the authors used AI-based writing assistants (Claude, Anthropic and ChatGPT, OpenAI) to support the reformatting of in-text citations and the reference list in line with the Journal's submission guidelines, to help incorporate the reviewers' comments into the text, and for language editing. All analysis, arguments, data interpretation and conclusions are the authors' own; the authors reviewed, edited and take full responsibility for the entire content of the article, including any text drafted with AI assistance.

References

Note: In-text citations follow the format (author, year); full references are listed alphabetically below. The authors' own assessments and recommendations, ELCH (2026) figures, and statements explicitly identified as the authors' estimates reflect the authors' professional judgement and are not externally substantiated factual claims; they are distinguished in the text from documented, individually sourced facts.

AkzoNobel (2008): Annual Report 2008, available at <https://www.akzonobel.com/content/dam/akzonobel-corporate/global/en/investor-relations-images/result-center/archive-annual-reports/2009-2000/AkzoNobel-annual-report-2008.pdf>, accessed 24 September 2026.

AstraZeneca (2026): A timeline of our company history, available at <https://www.astrazeneca.com/our-company/history.html>, accessed 24 September 2026; see also Reuters (2026) for reported merger speculation involving Bristol-Myers Squibb.

BASF (1994): Annual Report 1994, Ten-Year Summary, BASF SE, Ludwigshafen, available at https://www.basf.com/dam/jcr%3A31ee7b47-08f4-3dc0-b980-51223989000d/1994_BASF_Annual_Report.pdf, accessed 16 September 2026.

BASF (2000): Annual Report 2000, including announcement of the sale of the worldwide pharmaceuticals business to Abbott, available at https://www.basf.com/dam/jcr%3A463d07df-49e2-34e5-8819-39390e7fbefa/BASF_Annual_Report_2000.pdf, accessed 24 September 2026.

BASF (2025): BASF-YPC Celebrates 25th Anniversary, available at <https://www.basf.com/cn/en/media/news-releases/cn/2025/11/cn-25-152>, accessed 16 September 2026.

BASF (2026): BASF Report 2025, Results of Operations, available at <https://report.basf.com/2025/en/combined-managements-report/basf-groups-business-year/results-of-operations.html>, accessed 16 September 2026.

Bayer (2025): Annual Report 2024, Investor Information, available at <https://www.bayer.com/sites/default/files/2025-03/bayer-annual-report-2024.pdf>, accessed 24 September 2026.

Bayer (2026): A Journey through the History of Bayer, available at <https://www.bayer.com/en/history>, accessed 16 September 2026.

C&EN (1994): American Home Products, Cyanamid to merge, Chemical & Engineering News, 22 August 1994, available at <https://pubs.acs.org/doi/10.1021/cen-v072n034.p007>, accessed 24 September 2026.

CEFIC (2025): Facts & Figures of the European Chemical Industry 2025, available at <https://cefic.org/facts-and-figures-of-the-european-chemical-industry/>, accessed 16 September 2026.

Clariant (2026): History, available at <https://www.clariant.com/en/Company/Clariant-at-a-glance/History>, accessed 24 September 2026.

Corteva (2026a): Vylor Announced as the Future Advanced Seed and Genetics Company, available at <https://www.corteva.com/de/media-center/Vylor-vorgestellt-Corteva-Spinoff-treibt-die-Landwirtschaft-weiter-voran.html>, accessed 16 September 2026.

Corteva (2026b): Corteva Announces Headquarters for Two Future Companies, available at <https://www.corteva.com/resources/media-center/corteva-announces-headquarters-for-two-future-companies.html>, accessed 16 September 2026.

Covestro (2015): Covestro up and running / Covestro debuts on the stock market, available at <https://www.covestro.com/investors/news/covestro-up-and-running> and <https://www.covestro.com/investors/news/covestro-debuts-on-the-stock-market/>, accessed 24 September 2026.

Damodaran (2026): Enterprise Value Multiples by Sector, data as of January 2026, available at https://pages.stern.nyu.edu/adamodar/New_Home_Page/datafile/vebitda.html, accessed 24 September 2026.

dsm-firmenich (2025): Our history, Integrated Annual Report 2025, available at <https://annualreport.dsm-firmenich.com/2025/our-company/about-us/our-history.html>, accessed 24 September 2026.

dsm-firmenich (2026a): dsm-firmenich Announces Agreement to Divest Animal Nutrition & Health to CVC Capital Partners, available at <https://www.dsm-firmenich.com/anh/news/press-releases/2026/2026-02-09-dsm-firmenich-announces-agreement-to-divest-animal-nutrition-and-health-to-cvc-capital-partners.html>, accessed 16 September 2026.

dsm-firmenich (2026b): dsm-firmenich Reports Full-Year 2025 Results, available at <https://our-company.dsm-firmenich.com/en/our-company/news/press-releases/2026/dsm-firmenich-reports-full-year-2025-results.html>, accessed 16 September 2026.

DuPont (2019a): DowDuPont Board of Directors Approves Separation of Materials Science Division, Creating the New Dow, available at <https://www.investors.dupont.com/news-and-media/press-release-details/2019/DowDuPont-Board-of-Directors-Approves-Separation-of-Materials-Science-Division-Creating-the-New-Dow/default.aspx>, accessed 16 September 2026.

DuPont (2019b): DowDuPont Board of Directors Approves Corteva Distribution, available at <https://www.investors.dupont.com/news-and-media/press-release-details/2019/DowDuPont-Board-of-Directors-Approves-Corteva-Distribution-and-Announces-Effectiveness-of-Form-10-Registration-Statement-for-Corteva/default.aspx>, accessed 16 September 2026.

ECHA (2025a): ECHA Publishes Updated PFAS Restriction Proposal, available at <https://echa.europa.eu/de/-/echa-publishes-updated-pfas-restriction-proposal>, accessed 16 September 2026.

ECHA (2026a): Perfluoroalkyl Chemicals (PFAS), available at <https://echa.europa.eu/hot-topics/perfluoroalkyl-chemicals-pfas>, accessed 16 September 2026.

ECHA (2026b): ECHA supports PFAS restriction with targeted derogations, 26 March 2026, available at <https://echa.europa.eu/en-GB/-/echa-supports-pfas-restriction-with-targeted-derogations>, accessed 24 September 2026.

ELCH (2026): Sustainable Business Value (SBV) Database – EV/EBITDA Multiples, Value-Driver and Risk-Discount Analysis for Chemicals and Life Sciences, ELCH GmbH, Frankfurt (proprietary internal analysis, unpublished).

European Commission (2026a): Critical Chemicals Alliance – First General Assembly, available at https://single-market-economy.ec.europa.eu/news/executive-vice-president-sejourne-convenes-first-general-assembly-critical-chemicals-alliance-2026-01-13_en, accessed 16 September 2026.

European Commission (2026b): Chemicals Industry / Competitiveness Coordination Tool, available at https://commission.europa.eu/topics/competitiveness/competitiveness-coordination-tool-projects/chemicals-industry_en, accessed 16 September 2026.

FTC (1995): Federal Trade Commission Decision, American Home Products / American Cyanamid acquisition, available at https://www.ftc.gov/sites/default/files/documents/commission_decision_volumes/volume-119/ftc_volume_decision_119_january_-_june_1995pages_217-315.pdf, accessed 24 September 2026.

Haug (2013): Märkte und Industrie 2030, Nachrichten aus der Chemie, 61, available at https://www.gdch.de/fileadmin/downloads/Netzwerk_und_Strukturen/Fachgruppen/Vereinigung_fuer_Chemie_und_Wirtschaft/2013_chemiewirtschaft_persp.pdf, accessed 16 September 2026.

ICIS (2025): ICIS Top 100 Chemical Companies 2025, available at <https://www.icis.com/explore/press-releases/icis-top-100-chemical-companies-2025/>, accessed 16 September 2026.

INEOS (2025): INEOS and SINOPEC Sign Joint Venture Agreement for a Brand New Petrochemicals Complex in Tianjin, China, available at <https://www.ineos.com/news/ineos-group/ineos-and-sinopec-sign-joint-venture-agreement-for-a-brand-new-petrochemicals-complex-in-tianjin-china/>, accessed 16 September 2026.

Infraserv (2013): Geschichte des Industrieparks Höchst / Von Hoechst zu Aventis, available at <https://www.infraserv.com/includes/upload/inter/brochures/pdf/150plus-Geschichte-Industriestandort-H%C3%B6chst.pdf>, accessed 24 September 2026.

MIIT et al. (2022): Guiding Opinions on Promoting High-quality Development of the Petrochemical and Chemical Industry during the 14th Five-Year Plan, Ministry of Industry and Information Technology et al., available at https://www.miit.gov.cn/zwgk/zcwj/wjfb/yj/art/2022/art_4ef438217a4548cb98c2d7f4f091d72e.html, accessed 24 September 2026.

Novartis (2026): Company History, available at <https://www.novartis.com/uk-en/about/who-we-are/company-history>, accessed 16 September 2026.

Novartis Deutschland (2021): Novartis: Ein Vierteljahrhundert Innovation, available at <https://www.novartis.com/de-de/geschichten/novartis-ein-vierteljahrhundert-innovation>, accessed 16 September 2026.

Reuters (2025a): China Moves to Tackle Overcapacity in PTA and PET, available at <https://www.reuters.com/world/asia-pacific/china-aims-tackle-over-capacity-some-plastic-fibre-petrochemicals-2025-10-28/>, accessed 16 September 2026.

Reuters (2025b): PetroChina Plans to Phase Out 19 Old Refining and Chemical Units, available at <https://www.reuters.com/sustainability/climate-energy/petrochina-phase-out-19-old-refining-chemical-units-curb-sector-glut-2025-11-06/>, accessed 16 September 2026.

Reuters (2026): No discussions over AstraZeneca-Bristol Myers deal, senior source says, 5 August 2026, available at <https://www.reuters.com/world/no-discussions-over-astra-zeneca-bristol-myers-deal-senior-source-says-2026-08-05/>, accessed 24 September 2026.

Sanofi (2014): Form 20-F 2014, History and Development of the Company, available at <https://www.sanofi.com/assets/dotcom/content-app/publications/annual-report-on-form-20-f/2014-01-01-form-20-f-2014-en.pdf>, accessed 24 September 2026.

SEC (2002): Monsanto Company, Equity Roadshow / corporate history and strategic transformation, available at <https://www.sec.gov/Archives/edgar/data/1110783/000095013802000157/equityroadshow.htm>, accessed 24 September 2026.

SEC (2004): Monsanto Company, Form 10-K, chronology of Monsanto, Pharmacia and Solutia, available at <https://www.sec.gov/Archives/edgar/data/1110783/000095013704009377/c89126e10vk.htm>, accessed 24 September 2026.

Sinochem Holdings (2025): Corporate Profile, available at <https://www.sinochem.com/sinochemen/index.html>, accessed 16 September 2026.

Sinochem Holdings (2026): History, available at <https://www.sinochem.com/sinochemen/About/Profile/History/A046001001002Gone1.html>, accessed 16 September 2026.

Sinopec (2025): Corporate history and organisation, available at <https://www.sinopec.com/listco/en/000/000/041/41662.shtml>, accessed 24 September 2026.

Wiener Börse (2024): BAYER AG historical data, December 2024, available at <https://www.wienerborse.at/en/stock-global-market/bayer-ag-DE000BAY0017/historical-data.pdf?date-end=01%2F12%2F2025&date-start=12%2F12%2F2024>, accessed 24 September 2026.

Wikipedia (2026): Infraserb Höchst, available at https://de.wikipedia.org/wiki/Infraserb_H%C3%B6chst, accessed 16 September 2026.

Appendix

Table A1. Typical 2025 EV/EBITDA Multiples, Business Models and Sources of Pricing Power. (source: ELCH 2026), proprietary analysis based on company and transaction data; indicative ranges, cross-checked against Damodaran (2026) where comparable sector classifications exist.

Business Segment	Business-model logic	Sources of pricing power	Limits to pricing power	Typical EBITDA margin	Typical EV/ EBITDA
1. Petro-chemicals	Large continuously operated plants converting oil, gas or naphtha into olefins, aromatics, polymers and intermediates. Economics driven by scale, feedstock integration, utilisation and site costs.	Cost leadership, favourable feedstocks, Verbund sites, logistics position, regional supply shortages.	Largely interchangeable products; world-market and import parity; high fixed costs drive aggressive volume competition during overcapacity.	8–18%, highly cyclical	5–8×
2. Fertilisers	Production of ammonia, urea, nitrate, phosphate and potash fertilisers. Value is primarily created through access to gas, phosphate or potash resources.	Resource and gas advantages, trade barriers, regional logistics, temporary supply shortages.	Commodity character; farmers respond to crop prices; supply from China, Russia and the Middle East; high cyclicity.	15–35%, highly cyclical	4–7× mid-cycle
3. Industrial gases	Local supply networks, on-site plants, pipelines and long-term take-or-pay contracts. The gas itself is simple; infrastructure and supply reliability are decisive.	Very high switching costs, customer-specific plants, long-term contracts, local oligopolies, safety-critical supply.	Regulatory control, large customers with bargaining power; electricity costs may only partly be passed through.	25–40%	12–17×
4. Industrial chemicals	Chlor-alkali, acids, alkalis, silicates, technical salts and other industrial basic chemicals. Markets are often regional because of high transport costs.	Local plant position, by-product integration, transport costs, security of supply.	Low product differentiation; energy and raw-material costs; overcapacity; large industrial buyers.	10–20%	6–9×

Business Segment	Business-model logic	Sources of pricing power	Limits to pricing power	Typical EBITDA margin	Typical EV/ EBITDA
5. Fine chemicals / custom manufacturing	Multi-step synthesis of smaller volumes, often customer-specific. Model based on process know-how, quality, plant flexibility and regulatory documentation.	Qualification effort, confidential processes, long customer relationships, low material cost in final product, high cost of failure.	Project concentration, customer insourcing, Asian competition, volatile utilisation.	15–25%	8–12×
6. Renewable feedstock chemicals	Conversion of vegetable oils, sugar, starch, cellulose or fermentation products into oleochemicals, surfactants, polymers and functional ingredients.	Sustainability credentials, certified supply chains, specific functionality, customer CO ₂ targets.	Many products compete directly with petrochemical alternatives; feedstock prices and green premiums are volatile.	10–22%	7–11×
7. Specialty chemicals	Selling a function or performance improvement rather than a molecule: additives, coating raw materials, electronic chemicals, catalysts, water treatment etc.	Small cost item for customer, high impact on product/process, formulation know-how, technical approval, high switching risk.	Pseudo-specialties may commoditise; customer consolidation; Chinese imitators; portfolio heterogeneity.	18–30%	9–14×
8a. Paints and coatings	Formulation and brand model combining raw materials, colour systems, distribution and application technology across OEM, refinish and decorative markets.	Specifications, colour consistency, OEM approvals, workshop/dealer networks, brands, low coating cost relative to coated product.	Raw-material costs, private labels, powerful OEMs and DIY retailers, local competitors.	15–25%	9–13×

Business Segment	Business-model logic	Sources of pricing power	Limits to pricing power	Typical EBITDA margin	Typical EV/ EBITDA
8b. Adhesives and sealants	Highly application-specific formulations that bond components or enable processes. Often low material share but high importance to product quality.	Customer design-in, certifications, automated application processes, high requalification or failure costs.	Standard products and construction adhesives are less differentiated; exposure to automotive, construction and electronics cycles.	18–30%	10–15×
8c. Home care	Formulation, branding, marketing and distribution of laundry, cleaning and household products. Production itself is relatively simple.	Brand, shelf space, consumer habits, product innovation, distribution and advertising budgets.	Private labels, strong grocery-retail bargaining power, low consumer switching barriers.	15–25%	9–14×
9. Cosmetics and personal care	Brand-, innovation- and distribution-led business; product cost is often only a small share of selling price. Premiumisation and high marketing intensity.	Brand, trust, emotional differentiation, influencers and distribution, formulation and claims innovation.	Fashion trends, high customer-acquisition costs, weak loyalty for weaker brands, regulatory claims.	15–30%	11–18×
10. Crop protection	Development, registration, production and marketing of patented active ingredients, formulations and increasingly integrated seed/digital offerings.	Patents, regulatory approvals, field trials, efficacy, distribution channel, development costs, long market-entry times.	Patent expiry, generics, resistance, weather, channel inventories, political bans and liability risks.	18–30%	7–11×
11. Biotechnology	Use of living systems for therapeutics, enzymes, ingredients or industrial processes. Value derives primarily from IP, platforms and clinical/technical probability of success.	Patents, proprietary organisms/ platforms, data, regulatory exclusivity, potentially unique efficacy.	Very high development and scale-up risks; binary trial outcomes; often no positive EBITDA.	Often negative; commercial businesses 20–50%	Profitable platforms c. 12–25×

Business Segment	Business-model logic	Sources of pricing power	Limits to pricing power	Typical EBITDA margin	Typical EV/ EBITDA
12. Generics	Rapid, cost-efficient manufacture and approval of off-patent medicines; scale through global product portfolios and distribution.	Regulatory know-how, security of supply, complex generics, sterile products, biosimilars, vertical API integration.	Tenders, steep post-patent price declines, US pricing pressure, many competitors, quality and FDA risks.	15–25%	6–10×
13. Research-based pharmaceuticals	Investment in research, clinical development and approval; after success, time-limited monopoly rents from patent and regulatory protection.	Patents, clinically superior products, regulatory exclusivity, physician/payer access, high barriers to entry.	Patent cliffs, reimbursement pressure, clinical risk, regulatory intervention, concentration on individual blockbusters.	25–45% for established companies	9–15×
14. Chemical distributors	Purchasing, storage, financing, bundling, technical advice and small-lot delivery of chemicals. Value derives from network and working-capital management.	Exclusive supplier mandates, local warehouses and licences, broad customer base, technical advice, small order sizes.	Suppliers can sell direct; low differentiation in standard chemicals; working-capital and price risk.	7–13%	7–11×