



Mergers & Acquisitions

Novozymes and Chr. Hansen Case Study

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Question 1

Context

On December 12, 2022, Novozymes announced a proposed statutory merger with Chr. Hansen, structured as an all-stock transaction with Novozymes as the surviving entity. The combination is justified by management on the basis of meaningful operational synergies: EUR 200m of incremental revenue (translating into EUR 80-90m of EBIT impact) achievable within four years of closing, and EUR 80-90m of cost synergies achievable within three years. These benefits are partially offset by EUR 250m of integration costs, of which approximately EUR 50m would be capitalised, leaving EUR 200m of P&L impact through 2026.

The relevant question for the acquirer's shareholders is whether the present value of these synergies is sufficient to justify the consideration being paid. This answer derives the NPV of the synergies on a stand-alone basis. The comparison with the premium paid is addressed in Question 2.

Step 1: Run-rate synergies

The case discloses synergies both at the top-line and at the EBIT level. For valuation purposes, only the EBIT-level impact is relevant, since revenue synergies translate into incremental free cash flow only to the extent they fall through to operating profit. Total run-rate EBIT-level synergies amount to €170.0m, comprising €85.0m from cost synergies and €85.0m from the EBIT impact of revenue synergies (Appendix A).

Note on revenue synergies: The case discloses EUR 200m of incremental revenue translating into EUR 80-90m of EBIT, implying an EBIT margin on synergies of approximately 42.5%. This is materially above the standalone EBIT margins of both companies (~26% each) but is defensible, as revenue synergies typically arise from cross-selling on a substantially fixed cost base. We adopt the figure as disclosed without further adjustment.

Step 2: Phasing assumption

The case provides the time horizon over which each synergy stream reaches full run-rate (3 years for cost, 4 years for revenue) but does not disclose the year-by-year build-up curve. A linear ramp is applied (detailed in Appendix B), which is the standard sell-side convention in the absence of management-specific guidance.

Note on phasing: An S-curve build-up (slower in Years 1-2, faster in Year 3) would more accurately reflect the operational reality of integrating 23 manufacturing sites and 38 R&D centres, but would leave the total NPV essentially unchanged, as the terminal value accounts for approximately 90% of the result. The linear assumption is retained for transparency.

Step 3: Integration costs

The case discloses EUR 250m of total integration costs running through 2026, of which approximately EUR 50m would be capitalised. Only the EUR 200m P&L impact is taken into account, spread linearly over three years at €66.7m annually for 2024 through 2026. The capitalised portion is excluded from the operating cash flow build, consistent with standard practice. The 4-year horizon ends with Year 4 (2027) as the first fully normalised year (full run-rate synergies, no remaining integration spend), which is the appropriate starting point for the Gordon Growth perpetuity (Appendix C).

Step 4: Discounting framework

The valuation framework applies a WACC of 8.0%, a marginal tax rate of 20%, and a terminal growth rate of 2.0% based on long-run inflation assumptions, with a valuation date at the end of 2022 (Appendix D).

Note on terminal growth: The 3.8% terminal growth rate used in the Novozymes stand-alone DCF (Exhibit 12) reflects the underlying business growth potential. For synergies, which are incremental cash flows whose steady state should track inflation, a 2% rate is more appropriate. Using 3% instead would lift the NPV by approximately EUR 350m (16%); using 1% would reduce it by approximately EUR 250m.

Step 5: Cash flow build and discounting

After-tax cash flows are computed as $(\text{synergies} - \text{integration costs}) \times (1 - t)$. A full year-by-year cash flow build is available in Appendix E. Year 4 (2027) represents the first normalised cash flow and forms the basis for the terminal value. Discounting to end-2022 (the announcement date), the terminal value is €2,312m (calculated as $136 \times 1.02 / 0.06$, detailed in Appendix F).

NPV of synergies

Component	€m
PV of synergies (Y1-Y4, after-tax)	277
PV of integration costs (Y1-Y3, after tax shield)	(127)
PV of terminal value (discounted 5 periods)	1,573
NPV of deal synergies	1,723

Sensitivity

The two parameters that most materially affect the NPV are WACC and terminal growth rate, which together drive approximately 90% of the result through the terminal value. The sensitivity matrix provided in Appendix G is taken directly from the model and uses a WACC range of 7.8%-8.2% (± 20 bps around the base case of 8.0%) and a terminal growth range of 2.5%-3.5%. Note that the central estimate of 2.0% terminal growth is deliberately conservative relative to the table range; the sensitivity is presented at higher growth rates to stress-test the upside and illustrate the convexity of the result.

Even at the most conservative parameter combination in the table (WACC 8.2%, g 2.5%), the NPV remains above €1.8bn. The result is more sensitive to WACC than to growth: moving WACC from 7.8% to 8.2% at g = 3.0% reduces the NPV by approximately €190m, while moving g from 2.5% to 3.5% at WACC 8.0% adds approximately €400m. This asymmetry reflects the fact that WACC affects both the discount rate on explicit cash flows and the terminal value capitalisation multiple, while g affects only the latter.

The central estimate of €1,723m (WACC 8.0%, g 2.0%) sits below the entire table, consistent with the conservative terminal growth assumption adopted. A reasonable communication range, incorporating both parameter uncertainty and the conservative growth assumption, is €1.7bn to €2.1bn.

Conclusion

The deal synergies announced by Novozymes have a central-case NPV of approximately EUR 1.7 billion, implying a multiple of approximately 12.7x on after-tax run-rate synergies. This figure is broadly consistent with how recent comparable consumer-ingredient transactions were priced (Exhibit 8 shows DSM-Firmenich and IFF-DuPont N&B post-synergy EV/EBITDA multiples in the 14-16x range), suggesting the result sits within a reasonable economic envelope. Whether this value is sufficient to justify the consideration paid to Chr. Hansen shareholders, and therefore whether the deal creates or destroys value for Novozymes' shareholders, is the subject of Question 2.

Question 2

Context

The Novozymes share price fell 15% on the day of the merger announcement, from EUR 57.93 (DKK 431) to EUR 49.2 (DKK 366). The transaction was structured as an all-stock merger where Novozymes offered Chr. Hansen's free float shareholders a 49% premium to the unaffected share price. The analysis below examines whether the market reaction is consistent with rational pricing across four compounding factors: the relationship between the premium paid and the present value of the announced synergies, the earnings per share (EPS) dilution implied by the all-stock structure, the governance dynamics introduced by a controlling shareholder with a conflicted dual position, and the strategic execution risk associated with a horizontal merger between two operationally distinct businesses.

Overpayment Relative to Expected Synergy Value

Based on the Q1 analysis, the NPV of the expected synergies between the two businesses is EUR 1,723m. To fund the acquisition, Novozymes issued shares worth EUR 10,850m for a business with a standalone equity value of EUR 7,872m, implying a total premium of EUR 2,978m. Since the premium paid exceeds the NPV of expected synergies by approximately EUR 1,255m, the transaction is value-destructive for Novozymes shareholders even under the assumption of full synergy delivery.

To fund the acquisition, Novozymes issued 187.3m new B-shares, increasing the total share count from 281m to 468.3m. As shown in the deal value bridge below, adding the NPV of synergies to the two standalone market capitalisations and dividing by the post-merger share count yields a theoretical post-merger share price of EUR 55.25, compared to Novozymes' pre-merger price of EUR 57.93. The implied decline of 4.6% represents the minimum expected market reaction under the assumption that all announced synergies are fully delivered.

Component	EUR m	% of Novozymes Market Cap
Novozymes standalone market capitalisation	16,278	—
Chr. Hansen standalone market capitalisation	7,872	—
NPV of synergies	1,723	—
Combined enterprise value	25,873	—
Pre-merger Novozymes share price (EUR)	57.93	—
Theoretical post-merger share price (EUR)	55.25	—
Theoretical share price decline	(2.68)	(4.6%)
Actual share price decline (announcement day)	—	(15.0%)
Residual implied discount	—	(10.4%)

The actual share price decline of 15% exceeds this floor by 10.4%. Working backwards from the observed post-announcement share price implies a market-implied NPV of synergies of approximately negative EUR 1,091m, as detailed in Appendix H. The 15% decline therefore implies not just a synergy discount, but also net value destruction. The EUR 2,814m gap between the modelled and market-implied NPV of synergies represents the execution risk and credibility discount embedded in the share price reaction.

EPS Dilution Analysis

Because the merger is settled entirely in shares, Novozymes issues 187.3m new B-shares, increasing the total share count by 66.7% from 281m to 468.3m. This generates an immediate reduction in earnings per share, independent of any assumption about synergy delivery.

On a standalone basis, Novozymes generated EUR 1.76 of EPS in 2022. Based on the combined trailing financials of both entities (Exhibit 10), and before any synergy benefits or integration costs, the pro-forma EPS of the combined group is EUR 1.54, a reduction of 12.8%. This reduction follows from issuing 187.3m new shares against a combined earnings base that increases by less than the share count. When integration costs of approximately EUR 83m per year through 2026 are considered, the near-term EPS impact is more pronounced. The case states that EPS is expected to reach mid-single digit percentage accretion only in the third year after completion, implying a two-to-three-year period of lower EPS before the transaction turns accretive. A full breakdown of the EPS dilution analysis is provided in Appendix I.

Since the merger is paid entirely in shares, a higher premium directly requires a larger share issuance and therefore a greater dilutive effect on EPS.

Governance and Principal-Principal Conflict

The governance structure of the transaction is a key driver of the market reaction. Prior to the announcement, Novo Holdings controlled 72.7% of Novozymes' voting rights, giving it unilateral authority to approve the merger. At the same time, it held 21.98% economic interest in Chr. Hansen. This dual position created a principal-principal conflict, where the interests of the controlling shareholder and those of the minority do not align.

The exchange ratio differential is informative in this regard. Chr. Hansen's free float received a 49% acquisition premium, while Novo Holdings accepted a discount of approximately 0.8% on its own Chr. Hansen shares. Novo Holdings effectively accepted less favourable terms on the seller side to limit dilution of its Novozymes stake and preserve post-merger voting control. The cost of the acquisition was therefore borne by Novozymes' minority shareholders. Post-completion, Novo Holdings retains 61% of voting rights on 22% of capital (vote-to-capital ratio of 2.77x), while the combined free float holds 78% of capital but controls only 38% of votes (Appendix J).

The value split reflects the theoretical distributional outcome under the model: Novozymes's public shareholders lose EUR 727m (-6.0%) in equity value, while Chr. Hansen's public shareholders capture EUR 2,657m (+43.3%) through the 49% acquisition premium. Novo Holdings accepts a theoretical loss of EUR 207m (-3.5%). See Appendix K for a full breakdown. One interpretation is that this reflects the price of converting a passive Chr. Hansen stake into consolidated governance control over the combined entity.

Strategic Risk and Synergy Credibility

Beyond valuation and governance, the market reaction also captures uncertainty around the delivery of synergies. The transaction is best characterized as a horizontal merger between two complementary but operationally distinct bioscience businesses, Novozymes multi-industry enzyme platform and Chr. Hansen's concentrated microbial and food cultures franchise. Revenue synergies of EUR 200m over four years depend on cross-selling across different customer bases and commercial models, which is the category of M&A synergies most prone to execution risk. At announcement, Novozymes was delivering 9% organic growth and a 26% EBIT margin on a standalone basis, and the integration introduces meaningful execution risk to that trajectory. The deal was priced at 20x pre-synergy and 18.5x post-synergy EV/EBITDA, above the 14-16x post-synergy range observed in comparable transactions in Exhibit 8 (Appendix L).

Conclusion

Overall, the 15% share price decline reflects four compounding factors. The premium paid exceeds the NPV of synergies by EUR 1,255m, thus transferring value from Novozymes shareholders to Chr. Hansen's free float. The all-stock structure produces immediate EPS dilution of 12.8%, with full accretion not expected until the third year after completion. The governance structure allowed a controlling shareholder to approve a value-destructive transaction without minority input. The above-precedent valuation and execution risk of integrating two distinct businesses likely account for the residual 10.4% discount.

Appendix

Appendix A

Run-rate synergies

Synergy stream	Run rate (€m)
Cost synergies (mid-point of EUR 80-90m)	85.0
Revenue synergies EBIT impact (mid-point of EUR 80-90m)	85.0
Total run-rate EBIT-level synergies	170.0

Appendix B

Phasing assumption (% of run-rate)

% of run-rate	Y1 (2024)	Y2 (2025)	Y3 (2026)	Y4 (2027)
Cost synergies (3-year ramp)	33.3%	66.7%	100.0%	100.0%
Revenue synergies (4-year ramp)	25.0%	50.0%	75.0%	100.0%

Appendix C

Integration costs (Annual P&L impact)

Integration costs	Y1	Y2	Y3	Y4
Annual P&L impact (€m)	66.7	66.7	66.7	-

Appendix D

Discounting framework parameters

Parameter	Value	Rationale
WACC	8.0%	Exhibit 12. Novozymes example DCF model
Marginal tax rate	20%	Exhibit 12. Effective tax rate applied in the DCF
Terminal growth (g)	2.0%	Long-run inflation assumption
Valuation date	End-2022	Aligned with the deal announcement (12 December 2022)

Appendix E

Cash flow build and discounting

€m	Y1 (2024)	Y2 (2025)	Y3 (2026)	Y4 (2027)
Cost synergies	28.3	56.7	85.0	85.0
Revenue synergies (EBIT)	21.3	42.5	63.8	85.0
EBIT synergies (pre-tax)	49.6	99.2	148.8	170.0
Taxes at 20%	(9.9)	(19.8)	(29.8)	(34.0)
After-tax synergies	39.7	79.3	119.0	136.0
Integration costs (pre-tax)	(66.7)	(66.7)	(66.7)	-
Tax shield at 20%	13.3	13.3	13.3	-
Net integration cost	(53.3)	(53.3)	(53.3)	-

Appendix F

Terminal value calculation

Terminal value calculation	€m
Normalised after-tax synergies (Y4)	136.0
Terminal growth (g)	2.0%
WACC	8.0%
TV = CF × (1+g) / (WACC – g) = 136 × 1.02 / 0.06	2,312

Appendix G

Sensitivity matrix (WACC vs. Terminal growth)

NPV (€m)	WACC 7.8%	WACC 7.9%	WACC 8.0%	WACC 8.1%	WACC 8.2%
g = 2.00%	1,794	1,758	1,723	1,690	1,657
g = 2.25%	1,872	1,833	1,796	1,759	1,724
g = 2.50%	1,958	1,915	1,875	1,835	1,798
g = 2.75%	2,052	2,006	1,961	1,919	1,877
g = 3.00%	2,156	2,105	2,056	2,010	1,965
g = 3.25%	2,271	2,215	2,162	2,110	2,061
g = 3.50%	2,400	2,338	2,279	2,222	2,168

Appendix H

Market-implied NPV of synergies

Component	EUR m	% of Novozymes Market cap
Combined enterprise value (observed post-announcement price)	23,059	—
Less: Novozymes standalone market cap	(16,278)	—
Less: Chr. Hansen standalone market cap	(7,872)	—
Market-implied NPV of synergies	(1,091)	—
NPV of synergies (Q1)	1,723	—
Gap (credibility and execution discount)	2,814	17.3%

Appendix I

EPS dilution analysis (pro-forma, before synergies and integration costs)

Metric	Novozymes standalone	Combined pro-forma
Standalone net profit 2022 (EUR m)	495	—
Combined EBIT (EUR m)	—	900
Combined net profit after tax (EUR m)	—	720
Shares outstanding (m)	281.0	468.3
EPS (EUR / share)	1.76	1.54
EPS dilution	—	(12.8%)

Appendix J

Post-deal governance structure

Shareholder group	Share capital	Voting rights	Vote / capital ratio
Novozymes free float	44%	21%	0.48x
Chr. Hansen free float	34%	17%	0.50x
Novo Holdings	22%	61%	2.77x
Combined free float	78%	38%	0.49x

Appendix K

Value distribution across shareholder groups

Shareholder group	Pre-deal value (EUR m)	Post-deal value (EUR m)	Delta (EUR m)	Delta %
Novozymes free float	12,111	11,384	(727)	(6.0%)
Chr. Hansen free float	6,140	8,797	2657	43.3%
Novo Holdings (combined)	5,899	5,692	(207)	(3.5%)
Total	24,150	25,873	1,723	—

Appendix L

Deal precedents: EV/EBITDA multiples

Transaction	Pre-synergy EV/EBITDA	Post-synergy EV/EBITDA
IFF-DuPont Nutrition & Bioscience	~18x	~15x
IFF-Frutarom	~20x	~14x
DSM-Firmenich	~22x	~15x
Novozymes / Chr. Hansen	20x	18.5x