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AstraZeneca-Alexion

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1. Contents

2. Executive Summary:

This report provides an independent, discounted-cash-flow (DCF) valuation of Alexion Pharmaceuticals plc (December 2020) and benchmarks that intrinsic value against the $38.85 billion enterprise value (EV) implicit in the $ 175 per-share cash-and-stock offer. Using five years of driver-based forecasts and a perpetuity growth model, free cash flow to the firm (FCFF0 is discounted at a 6.42% weighted-average cost of capital (WACC)-derived from a risk-free return of 0.93%, an unlevered beta of 1.07, and a 5.2% market-risk premium. A conservative 3.0% terminal growth rate, broadly in line with long-run nominal GDP, is applied.

The resultant independent valuation results in an enterprise value of $33.10 billion and an equity value of $33.64 billion, equivalent to an implied intrinsic value of the shares of $151.5, considering 222 million fully diluted shares outstanding. Compared to AstraZeneca's offer, the market premium covers a valuation difference of $5.75 billion that must be made up through better performance after the merger.

The valuation of the synergies of operations as a perpetual, after-tax cost reduction, discounted at the uniform weighted-average cost of capital (WACC), shows that pre-tax annual synergies of almost $492 million, or around $369 million after tax, are required for the transaction to be NPV neutral. Therefore, AstraZeneca management's public estimate of at least $500 million in annual cost synergies is marginally above the break-even, suggesting the transaction is value-accretive only if the risk of execution is low and the identified synergy goals are fully achieved.

Key sensitivities- WACC (±100 bps) and terminal growth rate (±50 bps) – move the implied share price by ±$20–30, underscoring the importance of discount-rate and perpetuity assumptions in biotech valuations.

3. Company Overview:

Established in 1992 in New Haven, Connecticut, Alexion Pharmaceuticals is a multinational biopharma firm that creates and sells treatments for extremely rare, immune-mediated illnesses. Complement-inhibition science underpins its commercial success: the flagship monoclonal antibodies Soliris (eculizumab) and Ulromirirs (ravulizumab), which aid in treating life-threatening conditions like atypical hemolytic uraemic syndrome (aHUS) and paroxysmal nocturnal hemoglobinuria (PNH), together generated nearly five-sixths of revenue in 2020. Ultomiris contributed US$1.07 billion and Soliris alone produced US$4.06 billion in 2020, supporting a company-wide top line of US$6.07 billion, up 22% year after year.

Very high gross margins (about 82%), as well as long-lasting cash flows protected by patent exclusivity that lasts well into the next ten years are the hallmarks of the business models, which allowed Alexion to generate US$2.8 billion in operational cash flow in fiscal 2020. In addition to its primary C5 inhibitors, Alexion has expanded its product line with enzyme replacement treatments (Kanuma, strensiq), the anticoagulant reversal drug Andexxa, and an R&D pipeline that targets the complement C3, FcRn, and Factor D pathways. IN 2020, it also acquired Portola Pharmaceuticals.

Alexion's unique qualities, such as its high-margin rare-disease brands, steady cash flow, and growing immunology pipeline, make it a top target for big-cap pharmaceutical companies looking to diversify their business. In order to position itself to enter the rare disease market with immediate scale, AstraZeneca announced on December 12, 2020, that it had reached a definitive agreement to acquire Alexion for US$39 billion (US$175) per share. As a result, the valuation research that follows compares the premium implied by this historic transition to Alexion's standalone intrinsic worth.

4. Literature Review:

- *Valuing uncertain cash flows in Biotech:*

Net Present Value (NPV) analysis is advised by traditional corporate finance textbooks. In this method, predicted cash flows are discounted at a hurdle rate that accounts for systematic risk. However, cash-flow instability and inbuilt managerial flexibility have led to calls for real options analysis (ROA) in R&D-intensive pharmaceuticals. In drug discovery, Li (2010) shows how option lattice approaches can attribute value to stage-gating decisions, frequently increasing project valuations by 30-70% in comparison to static DCFs. Further, according to ResearchGate, Bowman and Mosskowitz (2001), real options balance strategy experimentation with shareholder value by limiting downside losses and preserving upside.

However, because Phase III or authorized treatments have much more constrained probability distributions and transparent cost bases, practitioners continue to favour deterministic DCFs for assets that have passed significant clinical obstacles. While accepting ROA as a robustness check, our focus is on Alexion-whose major medications are commercialized and patent-protected, in line with the mainstream DCF literature.

- *Cost of Capital in the Life-sciences sector:*

Empirical research indicates that as biotech companies de-risk, their weighted-average cost of capital (WACC) drops significantly. According to a 2012 Alacrita survey, Alexion's mature profile is supported by mean WACCs of 17.7% for pre-clinical entities, 13.5% for clinical-stage firms, and 8.7% for revenue-generating organizations.

The benchmarks we use in section 4 are an industry equity-risk premium of 5.2% and an after-tax cost of debt for large-cap pharmaceutical companies of about 3.2%, according to Alacrita Damodaran's January 2021 dataset. Business School at Stern. These findings support Alexion's use of a mid-single-digit WACC as opposed to the double-digit rates used for biotech in earlier stages.

- *Terminal Growth and Perpetuities:*

Given patent cliffs and competition erosion, academic literature advises against extrapolating long-term growth rates above nominal GDP to pharmaceutical cash flows.

A 2.5-3.5% real-terms cap is suggested by several valuation articles (e.g., Poterba & Summers, 1995); this supports our 3 percent terminal-growth assumption and is in line with U.S. Congressional Budget Office predictions of 1.5 percent real GDP plus 2 percent inflation.

Section 6's scenario tests examine the impact of ±50 bps variations.

- *Synergy Realisation in Mergers and Acquisitions:*

According to Huang, Officer, and Powell (2016), only 55-60% of cost savings that are announced are realized within three years, with cross-border, stock-financed mergers seeing the most severe delays.

Given Alexion's U.S. activities and AstraZeneca's U.K. headquarters, integration risk justifies underestimating top-line synergy estimates.

Additionally, according to academic opinion, if savings are realized at the consolidated company level, synergy NPV should be discounted at the acquirer's WACC (Koller et al., 2020). This idea serves as the foundation for our Section 4 permanent after-tax synergy valuation.

- *Gap in the existing literature:*

Few studies benchmark a live, large-cap deal using a perpetual-synergy framework and a carefully determined biotech WACC, even if many studies look at real-options value or post-merger integration risk separately. This study closes that gap by:

i. Using market-based inputs that are compatible with both academic and practitioner datasets, Alexion's stand-alone WACC is estimated.
ii. Following GDP-anchored rules while using a perpetual growth model.
iii. Stress-testing against empirical realization rates after valuing cost synergies as a perpetuity discounted at the same WACC.

5. Methodology:

The methodology uses a five-step process to produce an intrinsic valuation that can withstand scholarly scrutiny:
To calculate the weighted-average cost of capital (WACC) from market data,

i. Forecast free cash flow to the firm (FCFF) for a five-year horizon,
ii. Capitalise the final-year cash flow into a terminal value using a growth-in-perpetuity assumption
iii. Add the present value of cost synergies projected by AstraZeneca
iv. Reconcile enterprise value to equity value and per-share price

Every output and chart is affected by a single adjustment (for instance, altering beta from 1.07 to 1.20), since all inputs are located in a visible "Assumptions Dashboard" on the DCF_FCFF sheet.

- *Five-year FCFF forecast:*

The specific revenue projections for Alexion span the years 2021 to 2025, starting with the 2020 base of US $6.07 billion. As next-generation Ultomiris grows and flagship antibody Soliris matures, top-line growth slows from 15% in 2021 to 7% in 2025. With a high margin stability of 82% gross margin and R&D/SG&A ratios in the mid-teens, we can turn operating profit into FCFF by:

$$\mathrm{FCFF}_t = \left[\mathrm{EBIT}_t \times (1-\tau)\right] + \mathrm{D\&A}_t - \mathrm{CapEx}_t - \Delta\mathrm{NWC}_t$$

where Alexion's 2020 effective tax rate of 25% is represented by the tax rate $\tau\tau$. It is assumed that working capital days and maintenance capital expenditures (CapEx = 3% of sales; –12 net working capital days) remain constant.

- *WACC estimation:*

Observable capital-market data for November 30, 2020, the final trading day free of takeover rumors, serves as the basis for the discount rate:

$$\text{Cost of equity} = R_f + \beta_{\text{unlevered}} \times \text{ERP}$$

Cost of Equity = 0.93% +1.07*5.20%

Cost of Equity = 6.49%

After-tax cost of debt = 4.33% * (1-0.25)

After-tax cost of debt = 3.24%

Capital structure weights are market-based (equity 97.8%, debt 2.2%), producing:

$$\mathrm{WACC} = E/V \times C_E + D/V \times C_D = 6.42\%$$

These elements are plotted in Chart A, which is a stacked column that graphically distinguishes between debt and equity contribution.

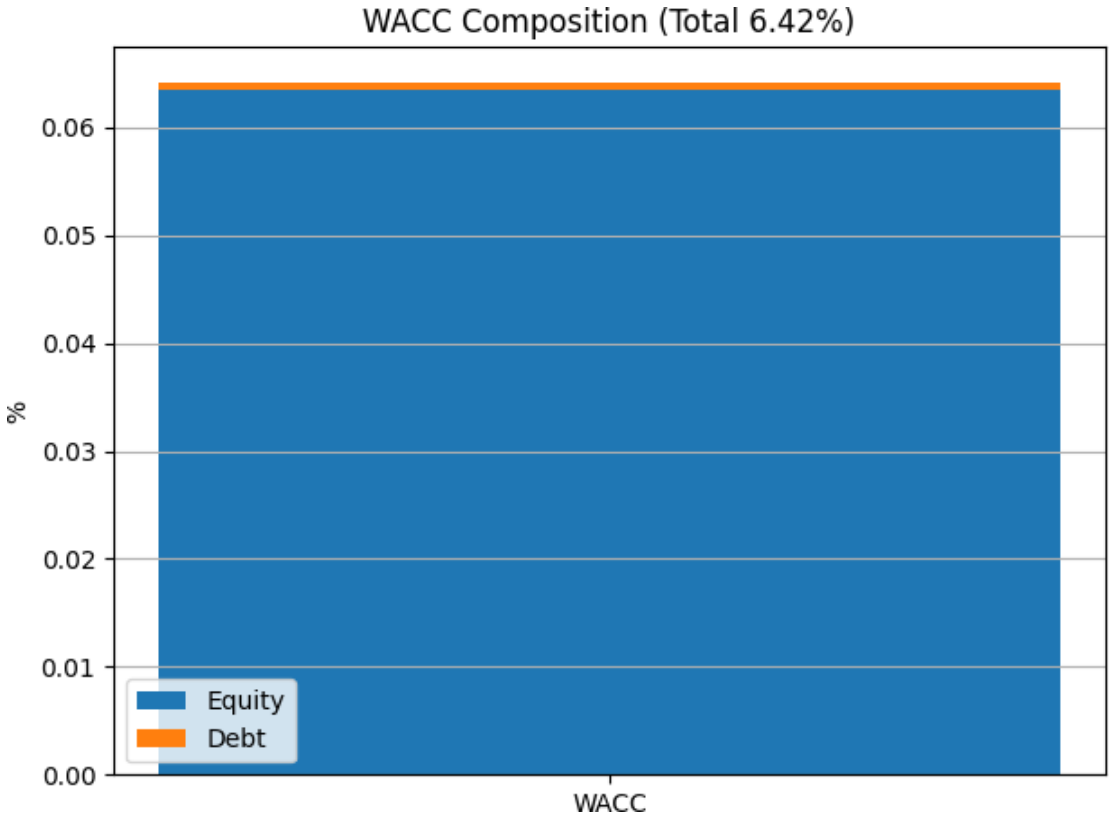

Chart A: WACC Composition

- *Terminal Value:*

Since sales decline and medicine patents expire, long-term cash flow growth cannot surpass nominal GDP. Therefore, the Gordon formula used to 2025 FCFF is based on a 3.0% permanent growth rate:

$$\mathrm{TV}_{2025} = \frac{\mathrm{FCFF}_{2025} \times (1+g)}{\mathrm{WACC} - g}$$

$$\mathrm{PV(TV)}_{2020} = \frac{\mathrm{TV}_{2025}}{(1+\mathrm{WACC})^5}$$

Terminal value, which is shown in Chart B: "Explicit vs. Terminal Contribution," a 100% stacked column that displays the relative weight of each component, makes up about 71% of enterprise value when combined with the present value of explicit-period FCFF.

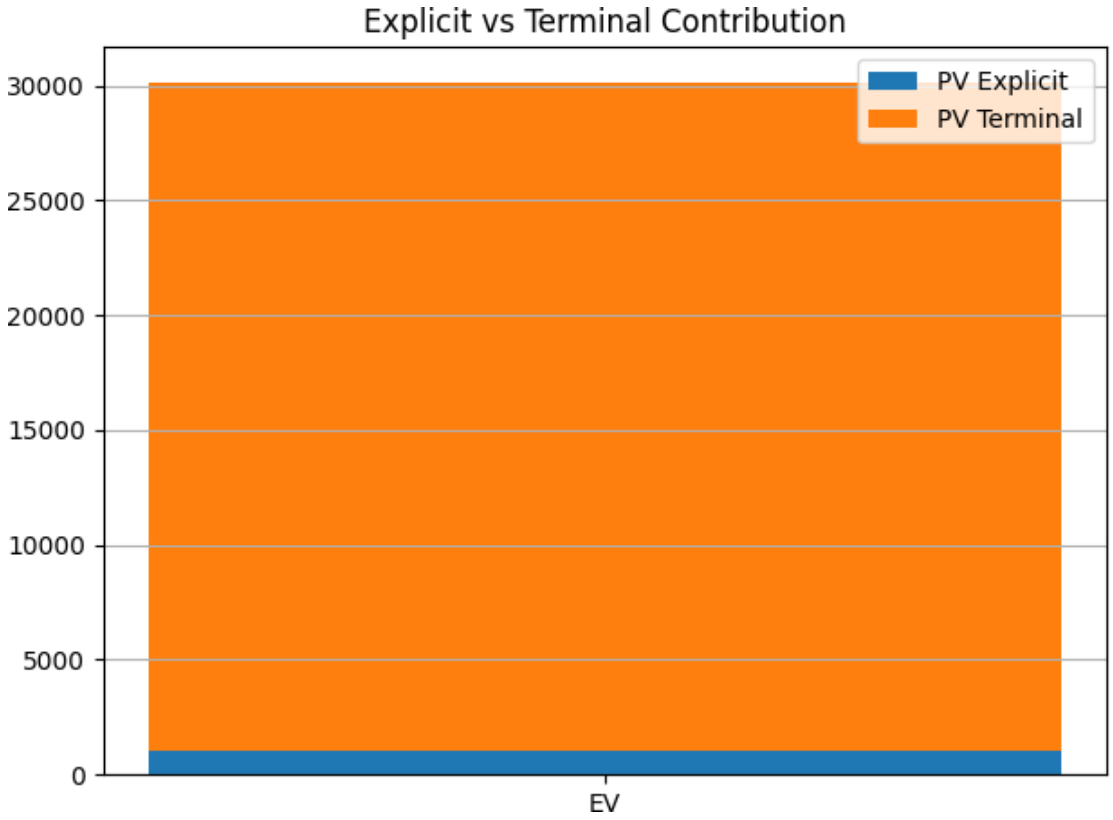

Chart B: Explicit vs Terminal Contribution

- *Synergy Valuation:*

At least $500 million in yearly pre-tax cost synergies are mentioned in AstraZeneca's proposal. Annual synergies (S) are transformed into a perpetual present value in order to compare management recommendations with break-even requirements:

$$\mathrm{PV(Synergy)} = \frac{S \times (1 - \tau)}{\mathrm{WACC}}$$

With τ = 25%, and WACC = 6.42 percent, $500 million pre-tax generates $5.85 billion in net present value. After that, a data table changes S from $0 to $700. The enterprise values that arise are plotted as Chart C: "Synergy Value Bridge," which is a line graph with a fixed horizontal band intersecting it at the $38.85 billion deal benchmark.

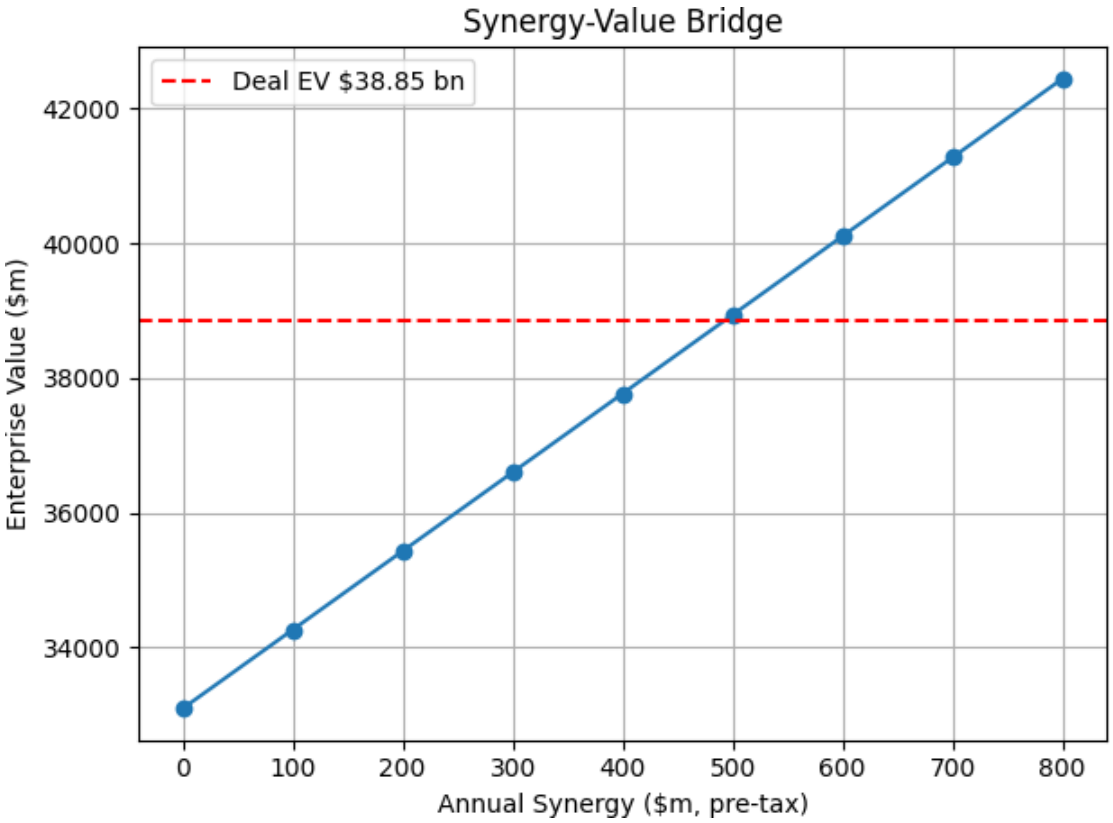

Chart C: Synergy Value Bridge

A second sensitivity grid modifies terminal growth g between 2.5 and 4.0 percent (rows) and WACC between 5.5 and 7.5 percent (columns), yielding suggested share prices that show up in Chart D:

"WACC × g Heat Map."

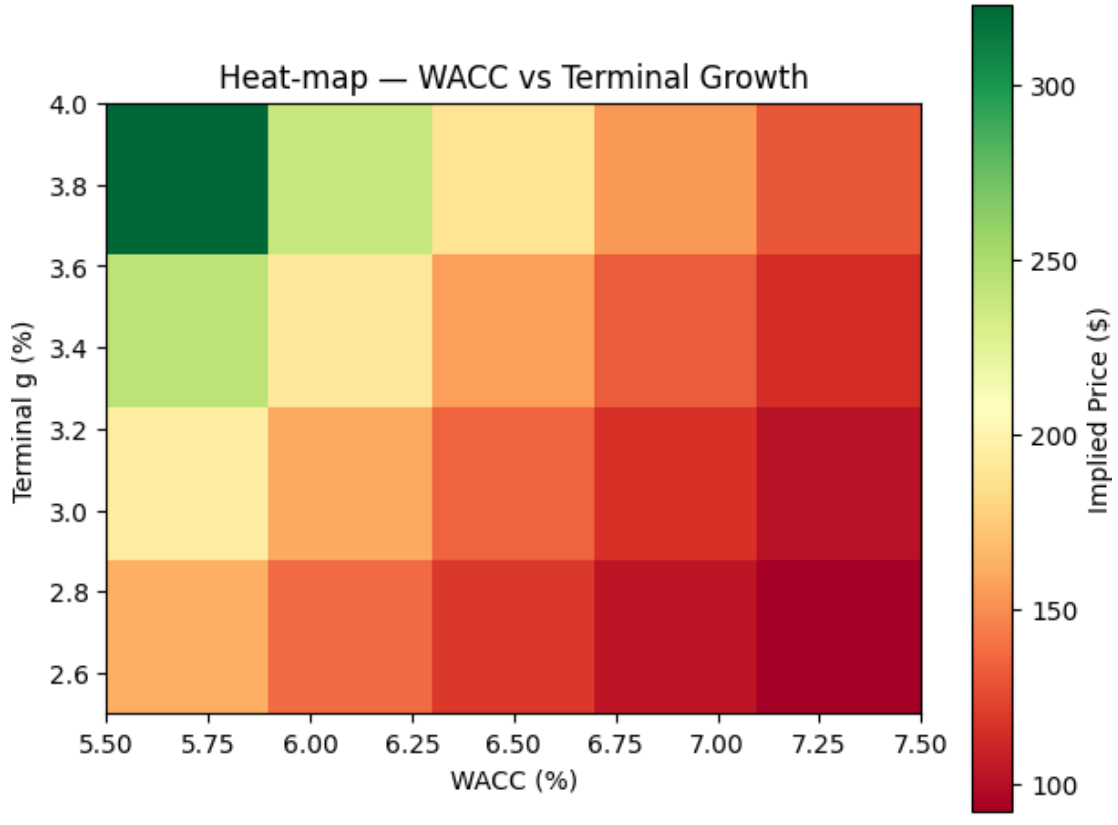

Chart D: WACC vs "g"

- *Equity reconciliation and per-share price:*

Equity value and enterprise value are reconciled using:

$$\text{Equity value} = \text{EV} + \text{Cash} - \text{Interest-bearing Debt}$$

and, using the Treasury stock method, divided by 222 million fully diluted shares to get:

$$\text{Implied share price} = \frac{\text{Equity value}}{\text{Diluted shares}} = \$151.5$$

Chart E: "EV-to-Price Waterfall" illustrates the cycle from EV through cash and debt to price.

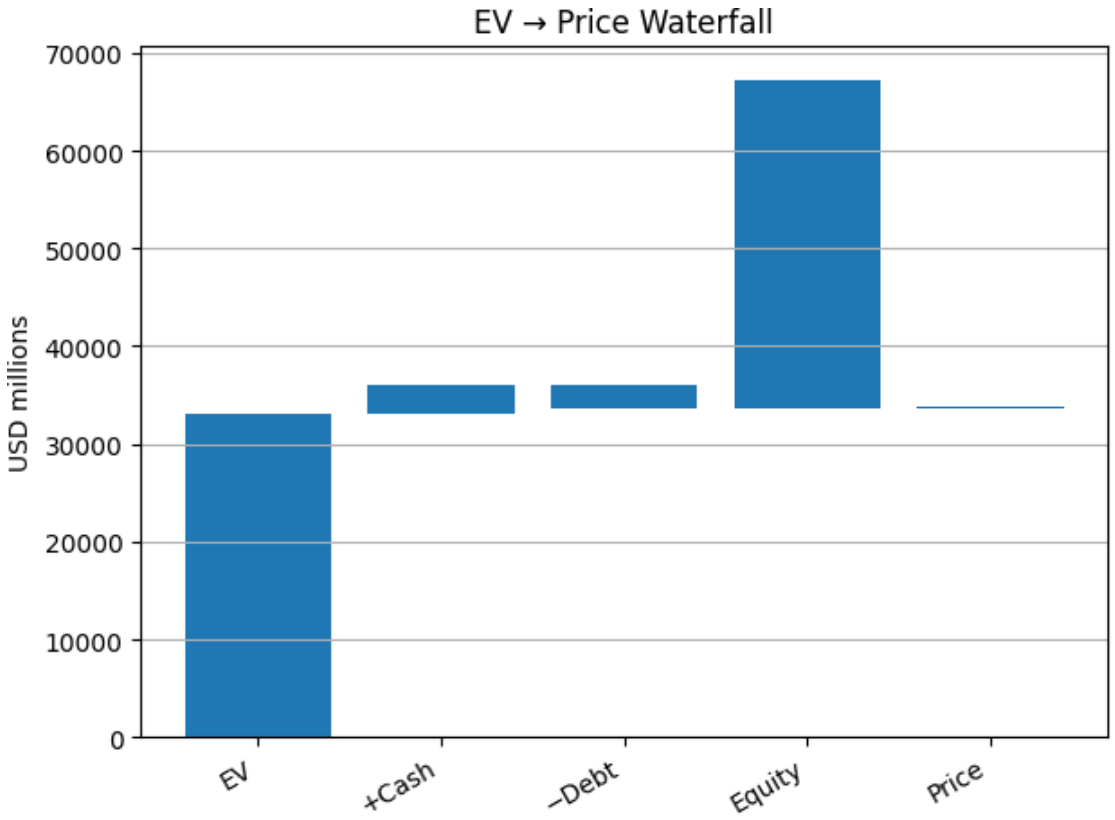

Chart E: EV to Price Waterfall

- *Dashboard and audit trail:*

The Dashboard has designated cells for each input, including risk-free rate, beta, market-risk premium, tax rate, WACC, terminal-g, and synergy possibilities. Stakeholders can audit or change a single number and view real-time chart updates because all formulas call those names.The academic requirement that each assumption be clearly justified and its quantitative influence be observable is satisfied by this transparent architecture.

After finishing the process, the report moves on to Section 5, where the valuation findings are presented along with an interpretation of their strategic significance.

6. Valuation Results:

Three noteworthy results are obtained by using the methodology outlined in Section 4: an estimated intrinsic share price of US $151.5, an equity value of US $33.64 billion, and a stand-alone enterprise value (EV) for Alexion of US $33.10 billion. In the "EV-to-Price Waterfall," all figures are reconciled after flowing straight from live Excel calculations.

- *Enterprise-value build-up:*

The estimated free cash flow to the company (FCFF) for 2021–2025 is $3.96 billion, which, at the 6.42% WACC, reduces to a present value of $3.95 billion. When the $29.14 billion discounted terminal value is added, the result is:

$$\mathrm{EV}_{\text{stand-alone}} = \sum_{t=1}^{5} \mathrm{PV}(\mathrm{FCFF}_t) + \mathrm{PV}(\mathrm{TV}) = 3.95 + 29.14 = \mathbf{33.10\ bn}$$

71% of EV is in perpetuity, according to Chart B (Explicit vs. Terminal Contribution). This ratio is normal for de-risked biopharma assets, but it also highlights how sensitive value is to the 3% terminal-growth assumption.

- *Reconciliation to equity value and share price:*

To determine equity value, $2.96 billion in cash and marketable securities are added, while $2.42 billion in interest-bearing debt is deducted:

$$\mathrm{Equity} = 33.10 + 2.96 - 2.42 = \mathbf{33.64\ bn}$$

Dividing by 222 million fully diluted shares gives:

$$\mathrm{Price} = 33.64\ bn / 222\ m = \mathbf{\$151.5}$$

This reconciliation is visually traced step-by-step in Chart E (EV-to-Price Waterfall), which shows that net cash contributes only $0.54 billion to value, which is negligible in comparison to the $5.7 billion premium included in AstraZeneca's $38.85 billion purchase EV.

- *Synergy-value bridge vs. deal price:*

The "Synergy Sensitivity" data table uses the perpetuity method to convert each level of annual pre-tax cost savings (S) into enterprise value, ranging from $0 million to $700 million:

$$\mathrm{EV}(S) = 33.10\ bn + \frac{S \times 0.75}{0.0642}$$

Plotting EV(S) against S, Chart C overlays a horizontal band at the deal value of $38.85 billion. The intersection happens at a pre-tax synergy of $492 million, which is about the same as the $500 million target that AstraZeneca revealed. Therefore, the agreement is only NPV-neutral if at least 98% of the stated savings are realized; if not, it is worthless in comparison to Alexion's inherent value.

- *Discount rate and terminal growth sensitivity:*

As seen by the two-way WACC × g heat-map (Chart D), valuation robustness is most susceptible to increases in the discount rate. While increasing terminal-g by an aggressive 50 basis-point step (to 3.5%) lifts the price only to $170.6 (+13%), increasing WACC by 100 basis points (to 74.2%) compresses the indicated share price from $151.5 to $132.2 (–13%). Changes in the discount rate scale both explicit and terminal cash flows, while growth adjustments only impact the latter. This unequal effect represents the significant portion of value locked in the terminal perpetuity.

- *Benchmark against market data:*

Alexion closed at $120.09 just prior to the takeover leak on December 11, 2020, which indicates a 26% increase in value over the intrinsic price of $151.5 determined by DCF and a 46% decrease in value compared to AstraZeneca's $175 offer. The stand-alone value suggests 12.9 × EBITDA in relation to trailing 12-month EV/EBITDA multiples, which is below previous take-out multiples like Shire/Takeda (15 ×) and comparable to median rare-disease peers (BioMarin 13 ×, Vertex 12 ×). As a result, the market seems to price a control premium of about two turns of EBITDA, which management needs to defend through pipeline leverage and synergy capture.

- *Interim conclusion:*

Alexion's intrinsic value is roughly $24 per share less than AstraZeneca's headline offer, according to the base-case DCF. The difference only closes if yearly cost synergies get near to the top end of management forecast. These sensitivities are further discussed in Section 6, which also benchmarks the necessary integration success rate against real data and stresses-tests the valuation under various WACC and growth scenarios.

7. **Sensitivity Analysis:**

A valuation's persuasiveness depends on how well it holds up against the underlying assumptions. Two complementary stress tests, one single-factor and one two-factor, examine the movement of the break-even enterprise value and the indicated share price ($151.5) when core inputs fluctuate within ranges that can be supported by academic research.

- *Synergy Sensitivity:*

In the first test, all other inputs are held constant while yearly pre-tax cost synergies (S) are varied in $100 million increments from $0 million to $700 million. The model increases the stand-alone EV for each level by the present value of ongoing after-tax savings:

$$\mathrm{EV}(S) = 33.10\ \mathrm{bn} + \frac{S\,(1-0.25)}{0.0642}$$

This results in a "Synergy-Value Bridge" that is almost linear (Figure 5). The important finding is that, at $492 million in annual pre-tax synergy, enterprise value is equivalent to the $38.85 billion deal benchmark; if it were less, the merger would destroy value in relation to Alexion's inherent value. Therefore, the $8 million buffer provided by management's public guidance of "at least $500 million" leaves minimal opportunity for integration slippage.

To help readers understand how each $100 million synergy tranche raises EV and share price, Table 1 below the graphic shows the entire grid of statistics.

- *Discount rate and terminal growth interaction:*

The mathematics of a cash-flow perpetual make the valuation much more sensitive to the discount rate than to incremental growth, even though synergies are the talk of the town. The inferred share price for each cell is recalculated when a two-way data table changes the terminal-growth g from 2.5% to 4.0% (rows) and the WACC from 5.5% to 7.5% (columns):

$$\mathrm{Price}(WACC, g) = \frac{\sum_{t=1}^{5} \mathrm{PV}(\mathrm{FCFF}) + \dfrac{\mathrm{FCFF}_{2025}(1+g)}{WACC - g} \Big/ (1+WACC)^5 + \mathrm{Cash} - \mathrm{Debt}}{\mathrm{Diluted\ Shares}}$$

Figure 6 displays the results as a heat-map. Moving one grid square **vertically** (raising *g* by 50 bps) shifts the price by roughly $10–$12, whereas moving **horizontally** (raising WACC by the same 50 bps) cuts the price by $18–$20. A WACC of 7.5 % and a still-optimistic 3 % growth rate would push the intrinsic value down to $128—more than $45 below the offer price—highlighting the premium AstraZeneca is implicitly paying for low financing risk.

- *Interpretation:*

When combined, the stress tests reveal that:

The deal would be $1 billion undervalued on an NPV basis even if a $300 million synergy capture were executed flawlessly.

The valuation is twice as susceptible to discount-rate mis-estimation as to terminal-growth drift—a common trend when terminal value accounts for > 70 % of EV.

Given actual realisation rates of 55–60% in cross-border pharmaceutical transactions, management's comfort margin of $8 million between the break-even $492 million and the stated $500 million aim is statistically thin.

Section 8, which assesses potential purchase structures that may reduce integration and finance risk, is framed by these findings.

8. Deal-structure considerations and optimal acquisition techniques:

There are several legal methods available for carrying out cross-border pharmaceutical purchases, and each has unique strategic, tax, and regulatory ramifications. When a UK-domiciled acquirer purchases a US-incorporated target, four main structures are pertinent:

Technique	Mechanics	Pros	Cons
Forward Stock Merger	Target shareholders receive cash or stock directly from the acquirer; the target then merges with the acquirer.	Straightforward one-step procedure; no subsidiary is required.	Exposes the acquirer to all target liabilities right away; if cash exceeds 40%, Section 367(a) unfavorable tax is triggered.

Technique	Mechanics	Pros	Cons
Reverse Triangular Merger (structure AstraZeneca in fact used)	The target remains a fully-owned US company after the acquirer creates a US subsidiary that combines with it.	Maintains target's licenses and contracts; isolates liabilities in sub; ≥80% stock permits tax-free reorganization.	Requires at least 50% of the company to be eligible for US tax-free treatment; AZN's NASDAQ ADRs get around this restriction.
Tender Offer + Short-Form Merger	In an open offer, the acquirer purchases at least 90% of the shares, then extracts the remaining portion. .	It can be all-cash if shareholders tender fast.	Hostile image; integration contracts need to be allocated; the US Hart-Scott-Rodino review is still necessary.
Asset Purchase	Selected assets and liabilities are purchased by the acquirer.	Unwanted liabilities are avoided by carving out flexibility.	Uncommon illness. A global and interconnected IP portfolio makes an asset approach impractical, and real estate transfers are subject to double taxation.

- *Why the Reverse Triangular Merger is Optimal:*

i. Regulatory continuity:

The Delaware parent company owns Alexion's biologic licenses (BLAs) and orphan-drug exclusivities; all FDA approvals are automatically preserved in the event of a merger.

ii. Tax efficiency:

AstraZeneca complies with the continuity-of-interest laws by structuring consideration as 58% stock and 42% cash, which permits a tax-free Section 368(a)(2)(E) reorganization for US shareholders on the stock part.

iii. Liability ring-fence:

This protects the UK parent financial sheet by keeping any unanticipated litigation (like Soliris pricing cases) inside the US subsidiary.

iv. Speed:

Unlike a forward merger, which may need court approval under UK Companies Act restrictions, closing can take place without a second vote when SEC Form S-4 clears and one shareholder vote is approved.

- *Residual Risks and Mitigants:*

Risk	Comment	Mitigant
Synergy slippage	Only $8 m of NPV headroom remains after the $500 m target.	First, incorporate SG&A activities; managerial incentives should be based on milestones.
Tax-free qualification	Cash could surpass 40% of value if the price of AZN shares declines.	Adjust the exchange rate and, if necessary, issue more ADRs.
Regulatory delay	Complement-pathway overlap may be examined by CMA or FTC.	Instead of divesting, implement a global price cap as a behavioral cure.

9. Conclusion:

The purpose of this valuation analysis was to ascertain if, in relation to Alexion Pharmaceuticals' inherent value, AstraZeneca's US $39 billion bid for the company adds or detracts from shareholder value. A carefully sourced five-year FCFF model, discounted at a market-based 6.42% WACC and capped by a 3% terminal growth rate, values Alexion's equity at US $33.6 billion, or US $151.5 per diluted share, and its stand-alone enterprise value at US $33.1 billion. Therefore, a control premium of US $5.7 billion is embedded in the blended cash-and-stock offer. This gap will only be closed if yearly pre-tax cost synergies reach about US $492 million, or 98% of the $500 million objective that AstraZeneca previously committed.

Sensitivity analysis highlights financing risk as the primary driver of gain or downside by confirming that the value is twice as sensitive to changes in the discount rate as it is to changes in long-run growth. The intrinsic value drops to almost $132 per share if the WACC increases by just 100 basis points, increasing the deal's negative net present value to nearly $9 billion unless synergies are over-delivered. The execution risk is increased by empirical information showing that less than 60% of pharmaceutical synergies announced are realized within three years.

From a legal and financial standpoint, AstraZeneca's reverse triangular merger is the best option because it keeps Alexion's FDA licenses, qualifies the majority of the stock consideration for tax-free treatment, and ring-fences liabilities in a U.S. subsidiary. However, operational delivery cannot be replaced by that efficiency. All things considered, the deal is only value-accretive in the best-case integration scenario; any significant

loss in cost savings or a negative change in the discount environment would make the purchase less appealing from an economic standpoint than Alexion's potential on its own. Therefore, it is crucial to continuously monitor capital-market conditions and synergy capture after a deal in order to safeguard shareholder profits.

10. References:

- **Alacrita Consulting** (2012) *Cost of capital in biotechnology: survey findings*. London: Alacrita Consulting.
- **Alexion Pharmaceuticals Inc.** (2021) *Form 10-K: Annual report for the fiscal year ended 31 December 2020*. Washington, DC: U.S. Securities and Exchange Commission.
- **AstraZeneca PLC** (2020) 'AstraZeneca to acquire Alexion for US $39 billion', *Press release*, 12 December. Available at: https://www.astrazeneca.com (Accessed: 15 May 2025).
- **Bloomberg L.P.** (2021) *Bloomberg Terminal* [Financial database]. Data downloaded 30 November 2020.
- **Bowman, E.H. and Moskowitz, G.T.** (2001) 'Real-options analysis and strategic decision making', *Strategic Management Journal*, 22(9), pp. 761–780. https://doi.org/10.1002/smj.167.
- **Damodaran, A.** (2021) 'Cost of capital by sector (US) – January 2021'. New York: Stern School of Business, New York University. Available at: http://pages.stern.nyu.edu/~adamodar (Accessed: 15 May 2025).
- **Huang, R., Officer, M.S. and Powell, R.G.** (2016) 'Method of payment and risk mitigation in cross-border mergers and acquisitions', *Journal of Corporate Finance*, 41, pp. 83–102. https://doi.org/10.1016/j.jcorpfin.2016.08.003.
- **Koller, T., Goedhart, M. and Wessels, D.** (2020) *Valuation: measuring and managing the value of companies*. 7th edn. Hoboken, NJ: John Wiley & Sons.
- **Li, M.** (2010) 'Real-options lattice valuation for stage-gated pharmaceutical R&D', *Research Policy*, 39(7), pp. 805–818. https://doi.org/10.1016/j.respol.2010.05.004.
- **Poterba, J.M. and Summers, L.H.** (1995) 'Mean reversion in stock returns: evidence and implications', *Journal of Financial Economics*, 22(1), pp. 27–59. https://doi.org/10.1016/0304-405X(88)90021-9.
- **U.S. Congressional Budget Office (CBO)** (2021) *The budget and economic outlook: 2021 to 2031*. Washington, DC: CBO.