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DISCOUNTED CASH FLOW MODEL BASED EQUITY VALUATION IN THE PHARMACEUTICAL INDUSTRY: A CASE STUDY OF NOVARTIS AG

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Abstract

Purpose. This paper applies the discounted cash flow (DCF) methodology to estimate the intrinsic equity value of Novartis AG, one of the world's largest research-driven pharmaceutical companies and evaluates whether its shares are fairly priced relative to the market.

Methodology. A two-stage free cash flow to the firm (FCFF) model is constructed with explicit projections spanning 2025–2030, underpinned by a 5% revenue CAGR, a 31% EBIT margin, and a 15% effective tax rate. The WACC is estimated at 8.2% using the CAPM with regionally weighted inputs. Terminal value is derived via a perpetual growth model at 2.5%. Sensitivity analysis tests the responsiveness of the implied share price to variations in WACC and the terminal growth rate.

Findings. The model produces an enterprise value of approximately USD 286.6 billion and an equity value of USD 268.1 billion, implying a share price of USD 126.93. Against the observed market price of USD 148.08 as of 15 May 2026, this suggests that Novartis may be overvalued by roughly 14% on an intrinsic basis. Sensitivity analysis shows that the valuation responds far more strongly to changes in WACC than to the terminal growth rate, with implied prices ranging from USD 91 to USD 181 across plausible scenarios.

Conclusion. The evidence points toward a sell recommendation. The study also demonstrates that the DCF framework, when calculated with industry-specific assumptions, offers a reliable basis for pharmaceutical equity valuation, though the critical sensitivity to discount rate assumptions must be acknowledged.

Keywords: *DCF valuation, equity valuation, pharmaceutical industry, WACC, intrinsic value, Novartis AG, sensitivity analysis, FCFF*

1. Introduction

Equity valuation is a core area of corporate finance, helping investors determine whether a company's shares are fairly priced and guiding capital allocation decisions. Among available methods, the discounted cash flow (DCF) model stands out for its grounding in the time value of money and its ability to reflect company-specific expectations about growth, profitability, and risk (Damodaran, 2012; Berk and DeMarzo, 2020).

Applying DCF to pharmaceutical companies is particularly challenging. Unlike firms in more predictable industries, pharmaceutical businesses face heavy R&D uncertainty, patent expirations that can sharply erode revenues, multi-jurisdictional regulatory hurdles, and pipeline outcomes that are often binary in nature. These factors make cash flow forecasting considerably more complex and demand careful, industry-aware assumption setting (Koller, Goedhart and Wessels, 2015).

Novartis AG offers a well-suited case for this type of analysis. Operating in around 120 countries with a portfolio focused on oncology, immunology, neuroscience, and cardiovascular therapies, the company has recently undergone significant strategic changes—most notably the

divestment of Alcon (2019) and the spin-off of Sandoz (2023)—that have shifted its profile toward higher-margin innovative medicines (Novartis AG, 2024). This paper estimates Novartis's intrinsic equity value through a two-stage FCFF-based DCF model, compares the result with the current market price, and assesses the sensitivity of the valuation to its key inputs.

2. Literature Review

At its core, DCF valuation rests on the idea that any asset is worth the present value of the cash flows it is expected to generate, discounted at a rate that reflects how risky those cash flows are. Damodaran (2012) draws a useful distinction between equity models, which discount cash flows accruing to shareholders, and firm-level models, which work with FCFF and subtract net debt to reach equity value. The FCFF approach tends to be preferred in practice because it keeps operating performance separate from financing choices, giving a cleaner picture of a firm's economic value. The discount rate used in this framework is the WACC, which blends the cost of equity—usually estimated through the CAPM (Berk and DeMarzo, 2020)—with the after-tax cost of debt according to their respective capital structure weights.

Terminal value is another area that deserves close attention. Because explicit forecasts rarely extend beyond five to ten years, the terminal value often makes up 60–80% of total enterprise value (Koller, Goedhart and Wessels, 2015). The perpetual growth model used here assumes that cash flows grow at a constant rate indefinitely—one that should logically stay below long-run GDP growth, since no individual firm can outgrow the economy forever.

That said, the DCF approach has well-known weaknesses. Even small changes in the WACC or terminal growth rate can shift the output considerably, and this problem is amplified in pharmaceuticals, where patent cliffs, clinical trial failures, and shifting regulatory environments add layers of forecasting uncertainty. For this reason, relative valuation using market multiples can serve as a useful reality check. Liu, Nissim and Thomas (2002) show that forward earnings multiples produce reasonably accurate value estimates, though the results depend heavily on how comparable the chosen peer group actually is.

3. Methodology

The valuation uses a two-stage FCFF-based DCF model. The first stage projects Novartis's free cash flows explicitly for 2025–2030; the second stage captures the value of all subsequent cash flows through a terminal value. Discounting both components and summing them gives the enterprise value, from which net debt is deducted to arrive at equity value.

3.1 Free Cash Flow to the Firm

FCFF is calculated as:

$$FCFF = EBIT \times (1 - t) + D\&A - CapEx - \Delta NWC$$

This formulation, following Damodaran (2012), captures the cash generated by operations that is available to all providers of capital—both debt and equity holders.

3.2 Weighted Average Cost of Capital

The WACC is given by:

$$WACC = (E/V) \times Re + (D/V) \times Rd \times (1 - t)$$

with the cost of equity estimated through the CAPM:

$Re = Rf + \beta \times ERP$

Both the risk-free rate (4.4%) and the equity risk premium (5.6%) are regionally weighted averages based on Novartis's 2024 revenue distribution across geographies, which better reflects where the company actually earns its money. The equity beta of 0.769 comes from Bloomberg and is based on a five-year monthly regression against the MSCI ACWI. This produces a cost of equity of 8.7%. The after-tax cost of debt works out to 4.2%, using the risk-free rate plus a 50 basis-point AA-rated spread, adjusted for the 15% tax rate. With a target structure of 89% equity and 11% debt, the resulting WACC is 8.2%.

3.3 Forecast Assumptions

Revenue growth is set at 5% per year for 2025–2030. This sits at the conservative end of Novartis's own guidance (+5–6% CAGR), aligns with the historical CAGR of 5.56% over 2021–2024 (excluding Sandoz), and is consistent with IQVIA's (2024) industry forecast of 5–8% global medicine spending growth. The EBIT margin is held at 31%—well below management's 40%+ target for 2027, but reasonable given execution risks. The tax rate is set at 15%, slightly above the historical average of 13.7% and in line with the OECD global minimum. CapEx rises gradually from 7.0% to 9.5% of sales, reflecting Novartis's announced USD 23 billion US investment programme. Depreciation converges toward the same 9.5% level by 2030 to ensure the model is internally consistent in the terminal year. Net working capital changes are pegged at 5.5% of incremental sales.

3.4 Terminal Value

The terminal value uses the perpetual growth model:

$TV = FCFF_{2030} \times (1 + g) / (WACC - g)$

A 2.5% terminal growth rate is applied—below the roughly 2.8% historical world GDP growth (World Bank, 2025)—as a conservative assumption reflecting competitive intensity and trade frictions in the pharmaceutical sector.

4. Empirical Findings

4.1 Company Context

In 2024, Novartis reported USD 50.3 billion in net sales. Oncology accounted for 29% of revenue, followed by established brands (26%), immunology (19%), and cardiovascular, renal and metabolic therapies (17%). Geographically, the United States contributed 42%, Europe 31%, and Asia/Africa/Australasia 20%. The Sandoz spin-off temporarily depressed revenues in 2023, but EBIT margins improved from around 20% to 28.9% by 2024, and free cash flow hit a record USD 14 billion—clear evidence that the strategic refocusing is paying off.

4.2 DCF Valuation Output

Projected FCFF grows from roughly USD 14.7 billion in 2025 to USD 18.3 billion by 2030. The terminal value at end-2030 is estimated at USD 326.8 billion, which discounts back to USD 220.0 billion and accounts for 77% of total enterprise value. This heavy weighting toward terminal value is typical for mature firms in stable industries (Koller, Goedhart and Wessels, 2015) and is worth keeping in mind when interpreting the results.

Table 1. Summary of DCF Valuation Outputs

Parameter	Value
Enterprise Value	USD 286,595 million
Less: Net Debt	USD 20,400 million
Equity Value	USD 268,130 million
Shares Outstanding	2,112.4 million
Implied Share Price	USD 126.93
Market Price (15 May 2026)	USD 148.08
Premium / (Discount)	−14%

After subtracting net debt of USD 20.4 billion, the equity value comes to USD 268.1 billion, or USD 126.93 per share. Compared with the market price of USD 148.08 as of 15 May 2026, the DCF model suggests that Novartis is trading at a premium of roughly 14% to its estimated intrinsic value. This gap indicates that, based on the assumptions used here, the market may be pricing in growth or margin expectations that go beyond what the fundamentals support.

4.3 Sensitivity Analysis

To test how robust the base case is, the WACC and terminal growth rate are varied across a 5×5 matrix of scenarios. Table 2 presents the results. The key takeaway is that the share price estimate moves far more in response to changes in WACC than to shifts in the growth rate—because the discount rate affects every single year of projected cash flows plus the terminal value, whereas the growth rate only feeds into the terminal component.

Table 2. Implied Share Price Sensitivity (USD) — WACC vs. Terminal Growth Rate

WACC →	7.2%	7.7%	8.2%	8.7%	9.2%
g = 1.5%	118.80	110.61	103.33	96.86	91.07
g = 2.0%	130.05	120.36	112.00	104.67	98.17
g = 2.5%	143.55	132.01	122.14	113.61	106.17

g = 3.0%	160.18	146.17	134.38	124.28	115.45
g = 3.5%	181.30	163.74	149.56	137.46	126.67

In the most pessimistic scenario (WACC 9.2%, g 1.5%), the implied price drops to about USD 91—roughly 39% below the current market price. Even in the base case, the model output sits well below where the stock is trading. It takes a combination of a lower WACC (7.7% or below) and a growth rate of 2.5% or higher just to bring the estimated value in line with the market. The most optimistic scenario (WACC 7.2%, g 3.5%) does produce an estimate of USD 181, but this requires assumptions that are difficult to justify under current conditions. On balance, the sensitivity analysis reinforces the view that the stock appears overvalued at prevailing prices.

4.4 Relative Valuation Cross-Check

A brief comparison with peers—Sanofi, Pfizer, Merck, Roche, Novo Nordisk, and AstraZeneca—based on forward P/E, EV/EBITDA, and EV/Sales multiples shows that Novartis trades at a consistent premium across all metrics for both 2025 and 2026. This market-based evidence is broadly consistent with the DCF finding: investors appear to be paying a higher price for Novartis than what its underlying cash flows would justify, possibly reflecting elevated expectations around pipeline performance and margin expansion.

5. Practical Implications

Several practical takeaways emerge from this analysis. For investors, the roughly 14% gap between the model's implied price and the market price suggests limited upside at current levels, particularly given the sensitivity of the valuation to the discount rate. Any deterioration in macro conditions or a rise in required returns could widen this gap further.

For valuation practitioners, the dominance of terminal value (77% of enterprise value) is a reminder that the long-term growth assumption carries outsized influence. In pharmaceuticals, where patent cliffs can abruptly change the revenue picture, pegging the terminal growth rate to macroeconomic benchmarks rather than extrapolating near-term momentum is the safer approach. The Novartis case also shows how strategic portfolio changes—like divesting lower-margin units—feed directly into DCF outputs through improved margins and stronger cash generation. Analysts should update their models promptly when such restructuring events occur.

6. Conclusion

This paper has estimated the intrinsic equity value of Novartis AG using a two-stage FCFF-based DCF model. The implied share price of USD 126.93 falls roughly 14% below the observed market price of USD 148.08 as of 15 May 2026, suggesting that the stock is overvalued on a fundamental basis. This conclusion holds across most of the sensitivity scenarios tested and is corroborated by relative valuation, which shows Novartis trading at a premium to its pharmaceutical peers. Accordingly, the analysis supports a sell recommendation.

At the same time, the study highlights both the strengths and the limits of the DCF approach. The framework captures the impact of strategic decisions—such as the Sandoz spin-off—on cash flow generation and margins, but its outputs are heavily shaped by assumptions around the discount rate and long-term growth. Terminal value alone accounts for 77% of enterprise value, and the

implied share price swings from USD 91 to USD 181 depending on the scenario. These figures should be read as a range of plausible outcomes, not as a single definitive number. Future work could refine this analysis by incorporating Monte Carlo simulation or explicitly modelling the timing and revenue impact of patent expiries across Novartis's product portfolio.

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