RESEARCH PAPER

Event-Driven Valuation & Sensitivity for a Technology Licensing Deal covering of portfolio of products

Use Case: AbbVie/MedinCell licensing deal

Author : Olivier Leherle December 2025

1 Executive Summary

This report presents an independent valuation assessment of a biopharmaceutical licensing agreement, highlighting how **headline "billion-dollar" deal announcements** involving portfolios of very early-stage programs **can obscure the true underlying economics**. For investors and strategic partners, understanding the risk-adjusted value of such deals is essential, as headline figures often misstate the real economic exposure and likelihood of value realization.

A central challenge lies in the absence of product-level disclosure, the approximate nature of the royalty structure, and potentially back-loaded milestone payments, all of which contribute to a **wide dispersion of potential valuation outcomes**. Traditional **deterministic models** rely on single-point assumptions and therefore **understate the uncertainty** inherent in early-stage portfolios. For investors and strategic partners, understanding the risk-adjusted value of such deals is essential.

To address this, we applied a **portfolio event-tree scenario framework** that structures clinical and regulatory gating events and links them to projected commercial revenues for each program. Triangular and other bounded probability distributions were used to **capture uncertainty** in development outcomes, royalty flows, and sales milestones, enabling a more realistic range of potential deal values.

This approach also carries important practical implications. By identifying which **milestones drive the largest swings** in value, the model strengthens risk-mitigation strategies and improves capital-allocation decisions by clarifying how risk-adjusted value evolves across development paths and under different outcome scenarios.

Key findings include:

- **Current value of $280M**: Early-stage, milestone-heavy agreements typically convert only circa 15% of the announced headline value into risk-adjusted present value.
- **High valuation volatility**: Early development risk, binary milestone outcomes, and the presence of up to six programs generate substantial valuation variability, particularly in the initial years.
- **Event-timing uncertainty**: With product identities undisclosed, milestone timing must be inferred from assumed development durations and probability-of-success benchmarks.

In conclusion, beyond establishing a valuation estimate, this analysis highlights the importance of systematically modeling early-stage portfolios to understand how development uncertainty shapes the economics of major licensing transactions.

2 Deal Context and Core Assumptions

The agreement analyzed in this case study is the **AbbVie–MedinCell** licensing deal, signed in April 2024, which grants AbbVie access to **MedinCell's BEPO**, a long-acting subcutaneous injectable formulation technology, for up to six selected products. As is typical for publicly announced transactions, the headline figure of over $2 billion masks substantial uncertainties: the specific products involved and their current market positions are undisclosed, and the economic terms are presented only as broad ranges with likely back-loaded milestones. Although such limited transparency is common and often justified by competitive considerations, it leaves analysts facing considerable uncertainty when attempting to **assess the true value and risks of the agreement**.

2.1 Portfolio Scope and Strategic Rationale

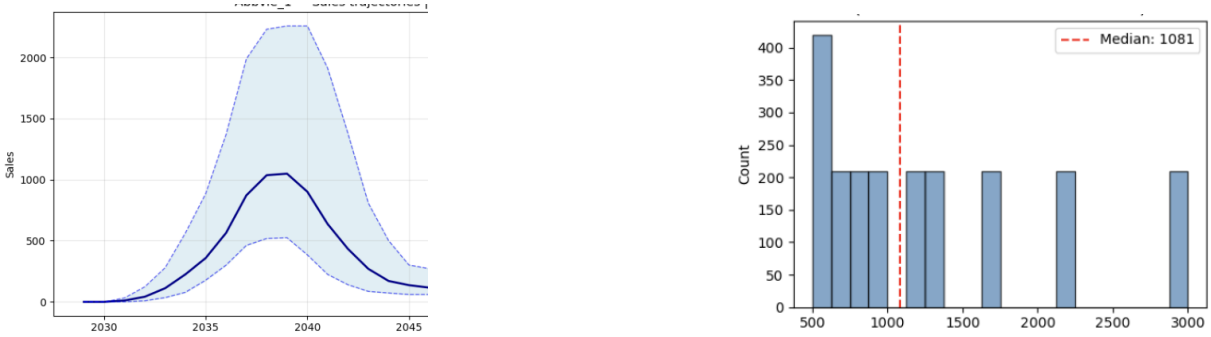
The agreement encompasses up to six AbbVie selected products. AbbVie operates in therapeutic areas that align closely with MedinCell's technology, notably CNS disorders where MedinCell already has two applications: the marketed product *Uzedy* and *TEV-749*, recently submitted for FDA approval. Additional overlap exists in women's health, where MedinCell is developing a long-acting contraceptive. Moreover, AbbVie's Botox franchise represents another area where long-acting injectable technology could potentially offer meaningful relevance.

product	ind_date	probability	payment
abbvie_1	2026	90%	35
abbvie_2	2028	75%	35
abbvie_3	2029	50%	35
abbvie_4	2030	33%	35
abbvie_5	2031	25%	35
abbvie_6	2032	10%	35

Table 1: AbbVie products assigned selection by date and probabilities

Despite these strategic alignments, decreasing entry probabilities were assigned across the portfolio, from 90% for the first asset to 10% for the last. This approach was chosen instead of imposing a gating constraint (e.g., limiting progression to two or three products) because of the very early stage of the deal and the absence of sufficient disclosure to model AbbVie's internal selection process and to reflect major pharma assets strategic attrition decision.

2.2 Commercial Forecasting Approach



(a) Sales Forecast curves

(b) Peak Sales Scenarios distribution

Figure. 1: Sales Assumptions applied accross the products

In the absence of product-specific disclosures, a standard sales distribution was applied uniformly across all projects, assuming a median peak sales level of **$1 billion**. For each asset, a lognormal peak-sales curve was used, spanning values from **$500** million to **$3 billion**. The lognormal distribution reflects the asymmetric nature of commercial outcomes, where upside potential can be large but downside is constrained.

2.3 Royalty and Milestone Economics

Because the royalty schedule was disclosed only as *"mid–single-digit to low–double-digit,"* we translated this broad range into a **two-tier royalty model** to avoid overstating value at the upper end where rates typically apply only at later, less certain revenue levels. Sales up to $1 billion and sales above that threshold were each assigned a triangular distribution, capturing the full spectrum of plausible outcomes while maintaining valuation discipline.

2.4 Modeling Milestone Triggers Under Probabilistic Ranges

All products in the agreement remain at the pre-IND stage. However, because BEPO technology is already clinically validated through Uzedy and AbbVie's target compounds are likely marketed molecules, we applied historical development success rates for long-acting reformulations, adjusting probabilities by phase to reflect expected attrition.

Event	Sales_min	Sales_max	Proba	IC	Payment
IND					35
Start_P3			75%	15%	35
End_P3			80%	10%	35
Approval			80%	5%	35
Sales_Milestone $M	1000	2000			210

Table 2: Probability and Sales Level assumptions

Sales milestones are one-time payments tied to annual revenue thresholds. Because the trigger level was not disclosed, we applied a sales window approach: each product was assigned a probabilistic milestone trigger drawn from a uniform distribution between $1 billion and $2 billion. This captures reasonable uncertainty around the activation point while remaining consistent with typical milestone structures.

3 Valuation Outcomes and Sensitivity Insights

3.1 Single-Asset Event-Tree Valuation

The Event Tree chart provides an intuitive view of how the valuation one product evolves as the product progresses through key development and regulatory milestones. By structuring outcomes as success or failure at each stage, **it captures the inherently binary nature** of pharmaceutical development. The event tree should be read from left to right: each node represents the average valuation across all simulated scenarios at that point in the pathway, illustrating how milestone achievements increase expected value while setbacks reduce or eliminate the commercial component of the deal. For each transition, the chart displays:

- The upcoming events and date
- the valuation at each steps in case of success (blue boxes) or failure (pink boxes) and the final valuation (green box) if all milestones are achieved.
- the modal probability of success for each steps as well as the overall cumulative probability.

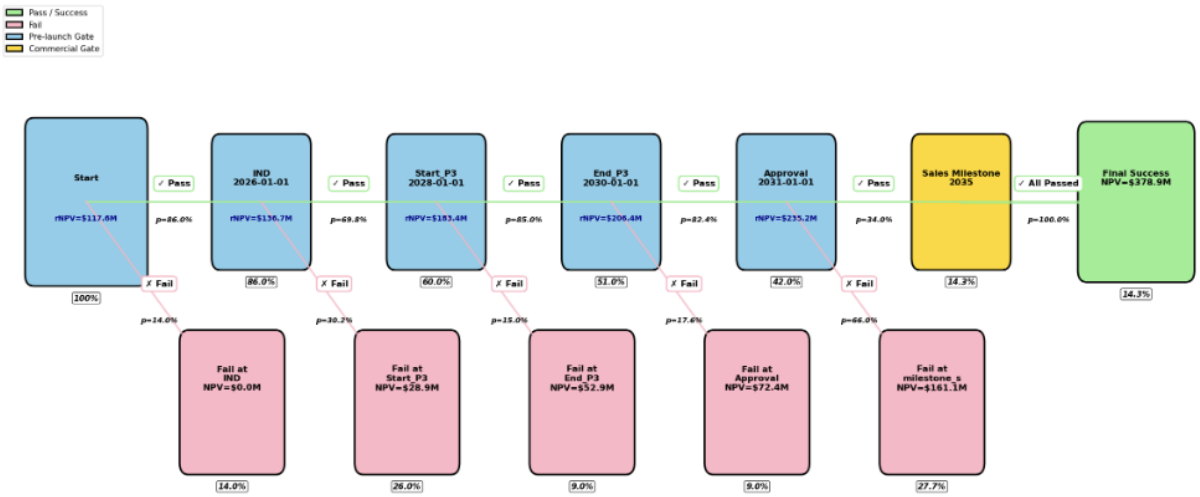


Figure. 2: Event Tree Valuation for Abbvie 1 Product

Note: The Event Tree refers to valuation of ONE product based on the scenario at different milestone.

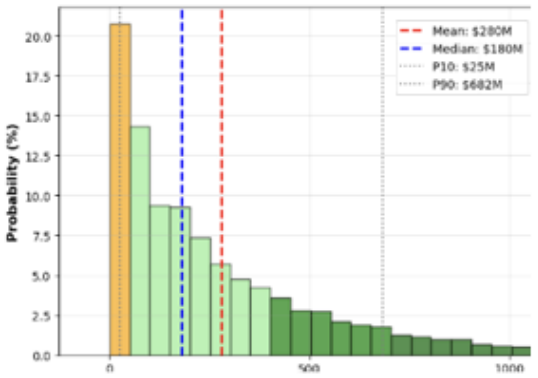
At date of approval the valuation strongly remains related to the estimated sales milestone approval in the scenarios. Further valuation sensitivity were run, considering that this topic has already been covered in our previous paper about TEV-749 heatmap and Tornado charts are not disclosed in this paper.

3.2 Portfolio-Level Valuation and Sensitivity Analysis

Portfolio valuation was performed using a Monte Carlo simulation with a Gaussian copula structure, assuming a 50% inter-project correlation to account for technology-driven dependencies among the assets. The deal's total risk-adjusted value comes out to approximately **$280 M**.

product	p_10	p_50	p_90	mean
abbvie_1	0	68	311	118
abbvie_2	0	30	180	66
abbvie_3	0	0	136	46
abbvie_4	0	0	86	25
abbvie_5	0	0	78	20
abbvie_6	0	0	14	7
Portfolio	**25**	**180**	**700**	**280**

Risk-adjusted value per product (in $M)



Portfolio rNPV distribution (in $M)

Applying the valuation framework to the full portfolio of assets provides a **year-by-year view of the deal's sensitivity**, driven by the sequence of upcoming product events. To avoid double counting and reduce visual complexity, the sensitivity of each event, whether success or failure, is measured against a constant current **rNPV baseline of $280 million**. Consequently, the larger upside and downside observed in the initial years of the chart reflect the disproportionate influence of early binary development decisions (go/no-go outcomes) and the associated probability adjustments applied to the initial valuation.

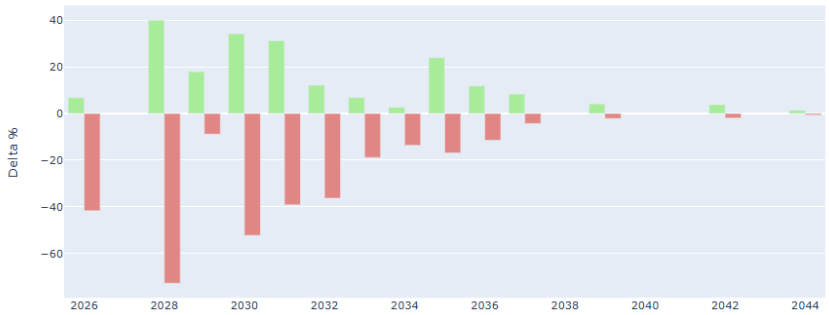


Figure. 3: Yearly valuation sensibility to products event

3.3 Event-Level Impact Details

In greater detail, the event impacts summarized in the table below present the **expected timing of each milestone, the nature of the event, and its potential effect on the initial mean rNPV of $280M**. The associated probabilities of success reflect the Monte Carlo–based gating framework, incorporating the underlying assumptions outlined in Tables 1 and 2.

YEAR	PRODUCT	EVENT	PoS	$\Delta\_\$M\_if+$	$\Delta\_\$M\_if-$	$\Delta\_\%\_if+$	$\Delta\_\%\_if-$
2026	Abbvie_1	IND	86%	19	-118	6.8	-41.7
2028	Abbvie_1	Start_P3	70%	40	-93	14.2	-32.9
2028	Abbvie_2	IND	73%	24	-66	8.7	-23.4
2028	Abbvie_3	IND	49%	48	-46	17.1	-16.4
2029	Abbvie_4	IND	33%	51	-25	17.9	-8.8
2030	Abbvie_1	End_P3	85%	14	-78	4.9	-27.8
2030	Abbvie_2	Start_P3	68%	23	-49	8.0	-17.4
2030	Abbvie_5	IND	25%	60	-20	21.3	-7.1
2031	Abbvie_1	Approval	82%	15	-68	5.2	-24.2
2031	Abbvie_3	Start_P3	69%	15	-35	5.5	-12.4
2031	Abbvie_6	IND	11%	58	-7	20.5	-2.5
2032	Abbvie_2	End_P3	78%	11	-40	4.0	-14.1
2032	Abbvie_4	Start_P3	73%	7	-18	2.4	-6.4
2032	Abbvie_3	End_P3	76%	9	-29	3.2	-10.4
2032	Abbvie_5	Start_P3	68%	7	-15	2.6	-5.4
2033	Abbvie_2	Approval	77%	10	-34	3.6	-11.9
2033	Abbvie_4	End_P3	67%	7	-14	2.5	-5.1
2033	Abbvie_6	Start_P3	73%	2	-5	0.7	-1.9
2034	Abbvie_3	Approval	85%	5	-26	1.7	-9.1
2034	Abbvie_5	End_P3	82%	3	-13	1.0	-4.6
2035	Abbvie_1	milestone_s	34%	60	-31	21.4	-11.0
2035	Abbvie_4	Approval	81%	3	-12	1.0	-4.4
2035	Abbvie_6	End_P3	50%	4	-4	1.5	-1.5
2036	Abbvie_2	milestone_s	34%	31	-16	11.2	-5.8
2036	Abbvie_5	Approval	86%	2	-11	0.6	-3.8
2036	Abbvie_6	Approval	100%	0	-5	0.0	-1.9
2037	Abbvie_3	milestone_s	34%	24	-12	8.4	-4.3
2039	Abbvie_4	milestone_s	34%	12	-6	4.1	-2.1
2042	Abbvie_5	milestone_s	34%	11	-5	3.8	-1.9
2044	Abbvie_6	milestone_s	34%	4	-2	1.3	-0.7

Table 3: Event impact on valuation, Percent changes are relative to the initial rNPV baseline

Multiple scenarios reflecting the full matrix of success and failure combinations were also generated, although they are not presented in this paper. In addition, the analysis is systematically rerun at each milestone outcome, success or failure, to recalibrate the portfolio's rNPV based on updated development paths.

Given the early-stage nature of the portfolio, only the expected year of each event is reported in the table, reflecting the most likely timing assumptions. Potential schedule slippages are already incorporated into the valuation model but not detailed at the event level.

4 Methodology and Framework

A detailed description of the full methodology and valuation framework is provided in the previous paper; the key elements of the approach are summarized below:

- Development risk is modeled using Monte Carlo simulation with a gated progression system, applying probabilistic success rates and timing delays that propagate across milestones.
- Milestone achievements trigger the corresponding contractual cash payments, ensuring alignment between development uncertainty and financial flows.
- Commercial valuation relies on simulated long-term revenue forecasts incorporating launch timing, peak sales, loss of exclusivity, and sales-curve dynamics, using multimodal distributions where appropriate.
- Royalty rates and sales-based milestone triggers are modeled probabilistically to reflect limited public disclosure and threshold uncertainty.
- The license value is determined by discounting simulated cash flows using a 12% WACC, with risk captured through simulation inputs rather than the discount rate.
- Sensitivity analysis—through tornado charts, heatmaps, and event-tree mapping—quantifies how uncertainty in key inputs influences valuation outcomes.

4.1 Analytical Framework

A Python-based analytical framework was used to operationalize the valuation and scenario-modeling workflow. The platform enables systematic analysis of licensing transactions and ensures rigorous version control of all inputs, configurations, and outputs. For this engagement, the tool was improved from its existing form rather than developed de novo. (*Analysis conducted using Framework Version 1.2.3.*)

Compared with prior framework iterations, several methodological enhancements were used or incorporated:

1. **Royalty rates**: A tiered royalty rate was applied considering the "mid to low double-digit".
2. **Portfolio Event Tree analysis**: A portfolio-level event-tree module was integrated to represent milestone pathways and their cumulative effect on portfolio rNPV.
3. **Portfolio Valuation:** Portfolio total value was estimated using a Monte Carlo simulation with a Gaussian copula structure to model inter-project correlation arising from shared technology across products.

This systematic framework can also be extended to value an entire company portfolio, a topic that will be addressed in an upcoming research paper.

Limitations & Disclaimers

This analysis is based solely on information available as of January 2025. Future clinical, regulatory, competitive, or commercial developments may materially alter the outcomes presented in this report.

All assumptions, estimates, and projections used in this valuation are derived exclusively from publicly available information, which has not been independently verified. As a result, the conclusions herein are subject to the accuracy and completeness of the underlying data.

This report does not constitute an audit opinion, investment recommendation, or fairness opinion. All valuations are expressed in nominal USD and discounted to January 1st 2025 to incorporate the 2025 upcoming milestone events, unless otherwise specified.

Given the inherent uncertainties associated with early and mid stage pharmaceutical assets including clinical success rates, regulatory outcomes, competitive dynamics, and pricing—actual results may differ materially from the modeled scenarios.

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Author

Olivier LEHERLE

Lend-Rx SAS
Phone: + 33 6 50 89 90 73
Mail: olivier.leherle@lend-rx.com
