

The Biotech Model

Deal Structure Workbook

User guide, version 1.0

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This workbook values a biotech licensing or co-development structure from both sides of the table. It tells you what the asset is worth in the partner's hands, what the licensor actually receives once development risk and time are counted, what the partner is left with and what return it earns, and where the deal sits between the licensor's walk-away value and the asset's value to the partner. Two structures run side by side so a term sheet and a counter can be compared on one page.

It is a starting point for a conversation, not advice, and it is only as good as the peak-sales number you put in. Brian Hotchkiss, biotechmodel.com.

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1. What the workbook does

Most licensing negotiations are argued in headline numbers: the upfront, the total milestones, the royalty rate. The workbook translates those into what each side can expect to receive, once you account for the probability that the program fails at each stage, the time it takes to reach the market, and the different rates at which a small company and a large one discount the future. The method is risk-adjusted net present value (rNPV), the standard used by pharma business development groups, banks, and the academic literature on drug valuation.

Four numbers matter most and are on the Summary tab. **The ceiling** is what the asset is worth in the partner's hands before any deal payments; a partner will not pay more than that. **The floor** is what the licensor could expect if it kept the program and launched alone, at its own cost of capital; a licensor should not accept less. **Cost to the partner** is the risk-adjusted value of everything the term sheet pays the licensor, at the partner's rate. **Worth to the licensor** is the same payments at the licensor's own, usually higher, rate. A workable deal sits between the floor and the ceiling for both sides. The two sides' gains do not add up to the gap, because they discount differently; that unattributed slice is why deals are announced in cash terms rather than NPV.

The workbook also reports the licensor's share of the asset value, on paper and risk-adjusted; the partner's risk-adjusted return on the deal against the 20% to 30% that partners generally look for; the value the licensor receives before the program depends on Phase 3; the probability of reaching the market and the probability each side loses money; and, on the Sensitivity tab, exactly what each term is worth to each side before you trade it.

2. Five steps

1. Asset Inputs: pick the disease area and the stage at signing. The stage durations, costs, and probabilities of success fill in from the Reference tab; adjust any of them if you have better numbers. Enter peak sales by region, or build them from patients and price.
2. Deal Inputs: enter the term sheet as Structure A. If you have a counter, an alternative, or a what-if, enter it as Structure B. Both are always calculated.
3. Summary: choose A or B in the selector at the top, then read the headline block, the components of the licensor's value, and the negotiating range. The three paragraphs at the bottom are written from the numbers and can be pasted into a note.
4. Sensitivity: before conceding a term, see what it is worth to each side. Every payment term and every stage's probability is valued exactly.
5. Checks: if anything looks odd, this tab shows which identity broke. It should read "All checks pass" and does so on the Summary as well.

Summary

Who gets the value under the term sheet, once development risk and time are counted. Change inputs on the two input tabs; this page updates. The one input on this page is the A/B selector below.

Structure to show in the headline (A or B)

Asset	A	Structure A
Rate used for the value split	All indications	Phase 2a at signing
Checks	Partner	10.0%
	All checks pass	

Both structures are always calculated and shown side by side below

Headline for the selected structure

Metric	Selected	Structure A	Structure B Note
Asset value in the partner's hands, risk-adjusted (ceiling) (\$M)	243.2	243.2	243.2 Product rNPV at the partner's rate, before any deal payments.
Licensor value, risk-adjusted, partner rate (\$M)	108.5	108.5	108.5 What the term sheet costs the partner.
Licensor value at the split rate (\$M)	108.5	108.5	108.5
Licensor share of asset value (at the split rate)	45%	45%	45%
Licensor share on paper (no risk adjustment)	31%	31%	31% Same term sheet with every probability set to 100%.
Licensee value, risk-adjusted (\$M)	134.7	134.7	134.7
Licensee risk-adjusted IRR	19%	19%	19% Partners generally look for 20% to 30% (Torreya).
Worth to the licensor at its own rate (\$M)	73.6	73.6	73.6
Licensor value if it kept the program (floor) (\$M)	41.7	41.7	41.7 Stand-alone rNPV at the licensor's rate, with the stand-alone peak
Licensor gain over going alone (\$M)	31.9	31.9	31.9
Partner's value left after paying the licensor (\$M)	134.7	134.7	134.7 Equals the licensee value before tax leakage.
Headline value (upfront plus milestones, unrisks) (\$M)	175.0	175.0	175.0
Value received before the program depends on Phase 3 (\$M, risk-adjust)	26.8	26.8	26.8
Probability of reaching the market	15%	15%	15%
Probability the licensor loses money (after its costs)	-	-	-
Probability the licensee loses money	85%	85%	85%
Licensee NPV if the program reaches the market (\$M)	1,299.5	1,299.5	1,299.5
Licensee NPV, average across failure outcomes (\$M)	(73.0)	(73.0)	(73.0)
Licensee break-even year (expected cash flows)	11	11	11

Where the licensor's value sits (risk-adjusted PV, partner rate, \$M)

Component	Structure A	Structure B
Upfront	20.0	20.0
Event milestones	13.4	13.4
Sales milestones	3.4	3.4
Royalties	71.8	71.8
Profit share	-	-
Funding and fees	-	-
Less costs borne by the licensor	-	-
Less licensor tax	-	-
Licensor value, risk-adjusted	108.5	108.5
Licensee value, risk-adjusted	134.7	134.7

The negotiating range (\$M)

Marker	Structure A	Structure B
Licensor alone (floor)	41.7	41.7
Worth to the licensor at its own rate	73.6	73.6
Cost to the partner at its rate	108.5	108.5
Partner in-house (ceiling)	243.2	243.2

A deal should land between the floor and the ceiling for both sides: worth more to the licensor than going alone, and costing the partner less than the asset is worth to it. The two sides' gains do not add up to the gap b

Reading the selected structure

The licensor's risk-adjusted value is \$108M, 45% of the \$243M the asset is worth in the partner's hands at the split rate. Published value-share bands put the licensor at 40% to 60% for a program licensed at this stage; this structure is within that band. Treat the band as a comparison, not a target: the risk it rewards is already in the probabilities and discount rate.

On paper the same term sheet gives the licensor 31% of the value; once development risk and time are counted it is 45%. The headline is \$175M; on a risk-adjusted basis the licensor should expect about \$27M of it before the program depends on Phase 3, and there is a 85% chance the program never reaches the market.

The licensee's risk-adjusted return is 19%, against the 20% to 30% partners generally look for. At the licensor's own rate the deal is worth \$74M to it, \$32M more than going alone; it costs the partner \$108M, leaving it \$135M of a \$243M asset.

Split rate calculation

Licensor share at the partner's rate (selected structure)	44.6%
Rate used for the split	10.0%

Blend: share-weighted average of the two rates, computed from the split at the partner's rate and then applied (Bogdan and Villiger). Both parties must be valued at one rate for licensor plus licensee to equal the asset

Licensor value by component (\$M)

The negotiating range (\$M)

The Summary tab with the default inputs, which reproduce the opening example of the free Deal Structure Calculator on biotechmodel.com.

3. Reading the workbook

Color code

There is one rule: **blue text on a shaded box with a thin border is an input** and nothing else is. Black text is a calculation. Green text is a value linked from another tab. Bold dark blue is a key result. Please do not type over black, green, or bold cells; if you need a different assumption, it has an input somewhere on the two input tabs.

Tabs, left to right

Every tab reads only from tabs to its left, so the workbook can be followed in one pass.

Tab	What it holds
Start	Purpose, the five steps, color code, conventions, and what version 2 adds.
Summary	The dashboard: headline for the selected structure, A and B side by side, components of the licensor's value, the negotiating range, three written paragraphs, three charts.
Asset Inputs	General settings, the development plan by stage, commercial assumptions by region, and the licensor's stand-alone assumptions that set the floor.
Deal Inputs	Upfront, event milestones, sales milestones, royalty tiers, term and regional multipliers, profit share, cost sharing, funding, fees, and an option fee, for Structures A and B.
Timeline	The year grid: when each stage starts and ends, the probability of reaching each one, and the discount factors.
Revenue	Sales by region by year: uptake curve to peak, held to loss of exclusivity, then the tail; pre-launch and launch-phase spend.
Product P&L	The asset on its own, before any deal: unrisks and risk-adjusted P&L and cash flow, and the stand-alone version for the licensor.
Deal Cash Flows	Every payment between the parties, by year, with its probability and exact timing, for both structures.
Licensor P&L	What the licensor receives and bears, its NPV at both rates, and the stand-alone floor.
Licensee P&L	The partner's share of the product less what it pays, its NPV, its risk-adjusted IRR, and its break-even year.
Scenario Tree	Every outcome (fail at each stage, or launch) with its plain NPV and probability; the probability-weighted sum equals the rNPV. Also the value-uptake ladder.
Sensitivity	What one more unit of each term is worth to each side; what ten points of probability at each stage adds.
Checks	The identities the model relies on, with one status cell.
Reference	Probabilities of success by disease area, uptake shapes, value-share bands, and sources.

Conventions

- Units are \$ millions. Year 0 is signing; Year 1 is the first full year after it. The horizon is 25 years.
- Annual flows are discounted mid-year. Upfronts and milestones are discounted from their exact timing, so a milestone at the start of Phase 3 is valued at that date, not at the middle of a year.
- Costs carry a negative sign, so every column adds and the P&L totals are sums.
- Each stage's cost is weighted by the probability of reaching that stage; revenue and royalties by the probability of launch; pre-launch commercial spend by the probability of reaching Registration.
- Tax is a flat rate per party applied to positive and negative income alike, with no loss carry-forward. Set both rates to 0% for a pre-tax view.
- The value split is computed at one rate for both parties, the partner's by default, so that licensor plus licensee equals the asset. The licensor's own rate is reported alongside.

4. The inputs

Asset Inputs

Section A sets the discount rates (10% for a large pharma partner and 15% for a small public biotech are the usual conventions), the tax rates, and working capital. Section B is the development plan: six stages from Preclinical to Registration, each with a duration, a cost after signing, and a probability of success. The default probabilities come from the BIO, QLS Advisors, and Informa study of clinical success rates for 2011 to 2020, by disease area, and can be scaled with one factor or overridden stage by stage. Phase 2b is a placeholder with zero duration and 100% probability; give it a duration, a cost, and a share of the Phase 2 probability if the program has a real interim gate. Registration runs from filing to approval, so the filing milestone is paid at its start and the approval milestone at its completion.

Section C holds the commercial assumptions for four regions. Peak sales can be entered directly, gross or net, or built from treated patients, price, and compliance; the gross-to-net row converts either way. The uptake curve reaches peak in the years you set, with a linear, fast, or slow shape, holds at peak until loss of exclusivity, then decays at the retention rate for the tail years. Costs are cost of goods, sales and marketing, and G&A as percentages of sales, plus two launch items: an additional launch-phase spend as a percentage of sales that fades to zero by the peak year, and a pre-launch spend in dollars per year for the years before first sale. Section D sets what the licensor could do alone, which determines the floor: a lower peak, a slower ramp, and its own discount rate.

Asset inputs

Blue cells on a shaded box are inputs. Everything else on this tab is a lookup or a check. Units are \$ millions unless stated.

A. General		
First year of the model (calendar year of signing)	2026	Year 0 is the signing date; Year 1 is the first full year after signing.
Model horizon	25	Fixed at 25 years in this version; the grid runs Year 0 to Year 24.
Partner (licensee) discount rate	10.0%	Convention: 10% large pharma. Used for the asset value.
Licensor discount rate	15.0%	Convention: 15% small public biotech, higher if VC-backed.
Rate used for the value split	Partner	Partner (usual convention), Licensor, or Blend (share-weighted).
Partner tax rate	-	Set to 0% to reproduce the free calculator, which is pre-tax.
Licensor tax rate	-	
Working capital, % of the change in net sales	-	Convention 10-15% of incremental sales; 0% reproduce

B. Development plan		
Disease area (sets default probabilities from the Reference tab)	All indications	
Stage at signing (the stage that begins at Year 0)	Phase 2a	Stages before this one are complete; their costs, probabilities, and PoS are set on Deal Inputs.
Adjust all default probabilities by a factor (1.00 = as published)	1.00	Atacrit: biologics and biomarker-selected programs run

Stage	Duration (yrs)	Cost after signing	Default PoS	Override PoS	PoS used
Preclinical	2.00	10	65.0%		65.0%
Phase 1	1.50	15	52.0%		52.0%
Phase 2a	2.50	40	28.9%		28.9%
Phase 2b	0.00	-	100.0%		100.0%
Phase 3	3.00	120	57.8%		57.8%
Registration	1.00	10	90.6%		90.6%

Durations may be fractional. Phase 2b has zero duration and 100% probability by default; give it a duration, a cost, and split the Phase 2 probability between 2a and 2b if the program has a real interim gate. Registration completion is approx. Costs are what will be spent after signing on each stage, whoever pays; who pays is set on Deal Inputs.

C. Commercial assumptions by region				
Region	US	EU	Japan	Rest of world
Include region in the model? (1 = yes, 0 = no)	1	0	0	0
Launch lag after approval	0.00	1.00	2.00	2.00
Peak annual sales (\$M), if not built from patients	1,500	-	-	-
Build peak sales from patients and price? (1 = yes)	0	0	0	0
Treated patients at peak	-	-	-	-
Price per patient per year (\$), before gross-to-net deductions	-	-	-	-
Compliance (share of a full year of therapy)	100%	100%	100%	100%
Gross-to-net deduction, % of the sales figure above	-	-	-	-
Peak net sales used (\$M)	1,500	-	-	-
Years to reach peak after launch	5	5	5	5
Uptake shape (Linear, Fast, Slow)	Linear	Linear	Linear	Linear
Years of exclusivity from launch (sales held at peak until then)	14	14	14	14
Sales after loss of exclusivity, % of the prior year	25%	25%	25%	25%
Years of sales after loss of exclusivity	3	3	3	3
Cost of goods, % of net sales	10%	10%	10%	10%
Sales and marketing, % of net sales, steady state	35%	35%	35%	35%
Product G&A, % of net sales	10%	10%	10%	10%
Additional launch-phase spend, % of sales in the launch year, fading to zero by the	30%	30%	30%	30%
Pre-launch commercial spend (\$M per year, in the years before first sale)	-	-	-	-
Years of pre-launch spend before first sale	2	2	2	2

D. If the licensor kept the program (sets the floor of the negotiating range)	
Licensor stand-alone peak sales, % of the partner's peak, all regions	70%
Licensor stand-alone years to peak	7
Licensor stand-alone uptake shape	Linear

Development costs, probabilities, and commercial cost ratios are the same as above; the licensor bears all of them and discounts at its own rate.

Deal Inputs

Structures A and B sit side by side. Event milestones are entered per stage, paid either at the start of the stage or on its completion. Sales milestones are paid once, the first year annual or cumulative worldwide sales reach the threshold. Royalties use up to five tiers on worldwide annual net sales, either incremental (the higher rate applies only to sales above the threshold) or on all sales once a threshold is reached, with a regional multiplier, a step-down after loss of exclusivity, and an optional term in years from first sale. Leave unused thresholds blank.

Section D covers everything else: a profit share as a percentage of operating profit, switchable by region so a US profit share can sit alongside ex-US royalties; the share of each cost the licensee bears after signing, which is how co-development and co-promotion are entered; R&D funding or FTE reimbursement; an annual license fee; and an other fixed payment such as an option exercise fee, paid at the time you enter if the program is still active then.

Deal inputs

Two structures side by side. Structure A is the term sheet in hand; Structure B is a counter or an alternative. Both are always computed; the Summary shows the one you select.

Name of Structure A
Name of Structure B

Structure A
Structure B

A. Upfront and event milestones (\$M)

	Structure A	Structure B
Upfront payment at signing	20	20
Event milestone	A: at start A: on completion	B: at start B: on completion
Preclinical	-	-
Phase 1	-	-
Phase 2a	-	-
Phase 2b	-	-
Phase 3	30	30
Registration	25	50

A milestone at the start of a stage is paid when the stage begins; on completion, when it succeeds. Registration start is the filing milestone; Registration completion is the approval milestone. Milestones for stages completed before signing are ignored.

B. Sales milestones (\$M, paid once, the first year the threshold is reached)

Sales basis (Annual or Cumulative net sales, worldwide)	Annual	Annual		
Tier	A: threshold	A: amount	B: threshold	B: amount
Sales milestone 1	500	50	500	50
Sales milestone 2	-	-	-	-
Sales milestone 3	-	-	-	-
Sales milestone 4	-	-	-	-

C. Royalties on net sales

	Structure A	Structure B
Tier basis (Incremental: higher rate only on sales above the threshold. All sales: the tier rate)	Incremental	Incremental
Threshold 1: annual worldwide net sales above which tier 2 applies (\$M)	500	500
Threshold 2: annual worldwide net sales above which tier 3 applies (\$M)		
Threshold 3: annual worldwide net sales above which tier 4 applies (\$M)		
Threshold 4: annual worldwide net sales above which tier 5 applies (\$M)		
Royalty rate, tier 1	8.0%	8.0%
Royalty rate, tier 2	11.0%	11.0%
Royalty rate, tier 3	11.0%	11.0%
Royalty rate, tier 4	11.0%	11.0%
Royalty rate, tier 5	11.0%	11.0%
Royalty after loss of exclusivity, % of the pre-LOE rate (0% ends royalties at LOE)	50%	50%
Royalty term, years from first sale in each region (blank = no fixed term)		
Royalty multiplier by region (100% = the tier rate applies; 50% = half rate; 0% = no royalty in that region)		
US	100%	100%
EU	100%	100%
Japan	100%	100%
Rest of world	100%	100%

Royalties stop after this many years in each region, whichever is

D. Co-development, profit share, funding, and fees

	Structure A	Structure B
Profit share paid to the licensor, % of operating profit before R&D (0% for a royalty-only deal)	-	-
Profit share applies in region (1 = yes, 0 = royalty only in that region)		
US	1	1
EU	1	1
Japan	1	1
Rest of world	1	1
Share of each cost borne by the licensee after signing (the licensor bears the rest)		
R&D: Preclinical	100%	100%
R&D: Phase 1	100%	100%
R&D: Phase 2a	100%	100%
R&D: Phase 2b	100%	100%
R&D: Phase 3	100%	100%
R&D: Registration	100%	100%
Cost of goods	100%	100%
Sales and marketing (including launch-phase spend)	100%	100%
Product G&A	100%	100%
R&D funding or FTE reimbursement paid to the licensor (\$M per year while the program is active)	-	-
Number of years of funding, from signing	0	0
Annual license fee (\$M per year while the program is active, until launch)	-	-
Other fixed payment, for example an option exercise fee (\$M)	-	-
Paid at (years from signing); paid only if the program is still active at that time	0.00	0.00

For an option exercised on Phase 2 data, use the end of Phase 2

Funding and fees are transfers between the parties; they do not change the product P&L. Costs shared with the licensor reduce what the licensee spends and what the licensor keeps.

5. A worked example

The defaults describe a Phase 2 program in an unspecified indication with \$1.5 billion of peak sales reached five years after launch, 14 years of exclusivity, a 45% operating margin at peak (15% in the launch year), and a partner discounting at 10% against a licensor at 15%. Structure A is \$20 million upfront, \$30 million at the start of Phase 3, \$25 million at filing, \$50 million at approval, a \$50 million sales milestone at \$500 million of annual sales, and a royalty of 8% rising to 11% above \$500 million.

The headline is \$175 million in upfront and milestones. Risk-adjusted, the licensor's value is \$108 million, 45% of the \$243 million the asset is worth in the partner's hands. On paper, with every probability set to 100%, the same term sheet gives the licensor 31%; its share rises when risk is counted because the partner carries the failure cases. The partner's risk-adjusted return is 19%, a little under the 20% to 30% partners generally look for, so expect some resistance. Only \$27 million of the licensor's value arrives before the program depends on Phase 3, and there is an 85% chance the program never reaches the market. At the licensor's own 15% rate the deal is worth \$74 million, \$32 million more than the \$42 million it could expect by going alone, and it costs the partner \$108 million of a \$243 million asset.

Now enter the same terms as Structure B but move the \$20 million upfront to the approval milestone, making it \$70 million. The licensor's value falls to \$90 million, the value received before Phase 3 falls to \$7 million, and the partner's return rises to 22%. The Sensitivity tab shows why: a dollar at approval is worth eight cents to the licensor today, against a full dollar upfront. That trade, and its price, is the negotiation.

Scenario tree

Every outcome the probabilities allow, with its plain NPV and its probability. The probability-weighted sum equals the risk-adjusted NPV on the P&L tabs (proved on Checks). Values are after tax, partner rate for the product and licensee, licensor rate for the licensor.

Structure A									
Scenario	Probability	Product NPV	Licensor NPV (licensor rate)	Licensee NPV	Licensor NPV (partner rate)	Prob x product	Prob x licensor	Prob x licensee	Prob x licensor (partner rate)
Program fails in Preclinical	-	-	20.0	(20.0)	20.0	-	-	-	-
Program fails in Phase 1	-	-	20.0	(20.0)	20.0	-	-	-	-
Program fails in Phase 2a	71.1%	(35.4)	20.0	(55.4)	20.0	(25.2)	14.2	(39.4)	14.2
Program fails in Phase 2b	-	(35.4)	20.0	(55.4)	20.0	-	-	-	-
Program fails in Phase 3	12.2%	(117.7)	41.2	(161.4)	43.6	(14.4)	5.0	(19.7)	5.3
Program fails in Registration	1.6%	(123.4)	52.7	(181.8)	58.4	(1.9)	0.8	(2.9)	0.9
Program reaches the market	15.1%	1,881.2	353.7	1,299.5	581.7	284.7	53.5	196.7	88.0
Expected value (probability-weighted)	100.0%					243.2	73.6	134.7	108.5
Probability of a loss (NPV below zero)		84.9%	-	84.9%					
Success-case NPV (program reaches the market)		1,881.2	353.7	1,299.5					
Failure-case NPV (probability-weighted average across the failure scenarios)		(48.9)	23.6	(73.0)					

Value-uptake ladder: risk-adjusted value as the program reaches each gate (conditional on getting there, valued at that date)			
Gate	P(reach)	Product value at gate (partner rate)	Licensor value at gate (licensor rate)
Start of Preclinical	100.0%	n/a	n/a
Start of Phase 1	100.0%	n/a	n/a
Start of Phase 2a	100.0%	243.2	73.6
Start of Phase 2b	28.9%	1,223.6	263.0
Start of Phase 3	28.9%	1,223.6	263.0
Start of Registration	16.7%	3,058.1	613.1
At approval (start of commercial life)	15.1%	3,724.6	696.4

The ladder excludes funding and fees paid before the gate and milestones already received; it is what the remaining program is worth to each side standing at that gate. Fill in the stage at signing to see today's value.

The Sensitivity tab for the default structure: each term valued to each side, and the value that depends on passing each stage.

6. How the numbers are produced

The Product P&L computes the asset once, as if all stages succeed, and then a second time with each line weighted by the probability that it is actually incurred or earned. Because each stage's cost is weighted by the probability of reaching that stage rather than by the probability of launch, the risk-adjusted P&L is the exact expected value across every outcome. The Scenario Tree tab makes that explicit: one row per outcome, fail at each stage or launch, with its plain NPV and its probability; the probability-weighted sums equal the rNPVs on the P&L tabs, and the Checks tab proves it. The tree

also gives the probability of a loss, the success-case and failure-case NPVs, and the value-uptake ladder, which is what the remaining program is worth to each side standing at each gate.

The three-party construction is what lets one workbook handle a plain license, a co-development, a co-promotion, or a profit share without separate models. The Licensor and Licensee P&Ls each take the product lines multiplied by that party's share of each cost, and add the transfers between them with opposite signs. Licensor plus licensee plus the tax leakage that arises when the two parties have different tax rates therefore equals the product P&L by construction, in every year.

Sensitivity: what each term is worth

Exact values for the selected structure. The licensor's risk-adjusted value is linear in every payment term and in each stage's probability, so these are derivatives, not approximations; peak sales are not.

Deal terms: value of one more unit (risk-adjusted PV, \$M)

Term	To the licensor, partner rate	To the licensor, own rate	Cost to the licensee (after its tax)
\$1M more upfront	1.0	1.0	(1.0)
\$1M more at Preclinical start	-	-	-
\$1M more at Preclinical completion	-	-	-
\$1M more at Phase 1 start	-	-	-
\$1M more at Phase 1 completion	-	-	-
\$1M more at Phase 2a start	1.0	1.0	(1.0)
\$1M more at Phase 2a completion	0.2	0.2	(0.2)
\$1M more at Phase 2b start	0.2	0.2	(0.2)
\$1M more at Phase 2b completion	0.2	0.2	(0.2)
\$1M more at Phase 3 start	0.2	0.2	(0.2)
\$1M more at Phase 3 completion	0.1	0.1	(0.1)
\$1M more at Registration start	0.1	0.1	(0.1)
\$1M more at Registration completion	0.1	0.1	(0.1)
\$1M more as the other fixed payment (option fee), at its entered timing	-	-	-
One percentage point of royalty, all tiers (on royalty-bearing sales)	7.4	4.1	(7.4)
One percentage point of profit share (of operating profit before R&D)	3.0	1.7	(3.0)

Probabilities: change in licensor value for ten points more probability at each stage (\$M)

Stage	PoS used	Licensor value that depends on passing it (partner rate)	Ten points more PoS adds (partner rate)	Ten points more PoS adds (licensor rate)
Preclinical	100.0%	-	-	-
Phase 1	100.0%	-	-	-
Phase 2a	28.9%	88.5	30.6	18.5
Phase 2b	100.0%	88.5	8.8	5.4
Phase 3	57.8%	81.7	14.1	8.2
Registration	90.6%	79.2	8.7	5.0

Value that depends on passing a stage: every payment and cost that comes after it. Ten points more probability scales all of it by 0.10 / PoS. Funding and fees are excluded (they depend on sales).

Peak sales: approximate effect of 10% higher peak in every region

Licensor value, partner rate (royalties and profit share scale with sales; sales multiplier)	7.2
Asset value in the partner's hands (all commercial lines scale)	30.3

For anything non-linear (tier thresholds, sales milestones, the licensee's IRR), change the input and read the Summary; both structures recompute instantly.

The Scenario Tree for the default structure.

7. Simplifications to keep in mind

- Tax is linear: a loss produces a tax benefit in the year it occurs rather than a carry-forward, which slightly flattens early-stage economics. Version 2 adds loss carry-forward.
- The partner's risk-adjusted IRR is computed on the annual grid and is within a few tenths of a point of an exact-timing figure.
- Sales milestones and royalty tiers are evaluated on worldwide annual sales, not by region; regional differences are handled by the royalty multipliers and the profit-share switches.
- Probabilities are per compound. A second indication needs a conditional probability and is a version 2 item, as are a target-share solver, licensee abandonment (real options), sublicensing participation, equity as consideration, and Monte Carlo on peak sales.
- There is no terminal value, by design, and no working-capital release at the end of the horizon.

- The 25-year horizon is fixed. The Checks tab warns if launch plus exclusivity plus the tail runs past it.

8. Sources

- BIO, QLS Advisors, and Informa, Clinical Development Success Rates and Contributing Factors 2011-2020, February 2021 (probabilities of success by disease area).
- Bogdan, B. and Villiger, R., Valuation in Life Sciences: A Practical Guide, Springer (value-share bands, the negotiating range, the blended discount rate, and the caution that phase-based value shares double-count risk).
- Torrey Partners, Valuation Analysis in Pharmaceutical Licensing and M&A Transactions: A Tutorial, January 2014 (the partner's 20% to 30% risk-adjusted return band).
- Dillon, J., Valuation and Deal Structuring: Concepts and Trends, BIO Advanced Business Development Course, June 2015 (milestone placement).
- Locust Walk, Biopharma Valuation Analysis, September 2017, and Alacrita, Pharmaceutical Probability of Success, 2018 (discount-rate and cost conventions; sensitivity to probability assumptions).

The free Deal Structure Calculator at biotechmodel.com/model uses the same method with fixed probabilities and a single region; the workbook's defaults reproduce its opening example so the two can be reconciled.

9. License, updates, and support

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Every tab is protected without a password so that a calculation cannot be overwritten by accident. Inputs are unlocked and edit normally. If you want to adapt the model, use Review, Unprotect Sheet, and rerun the Checks tab afterwards.

Corrections and minor updates to version 1.x are free and are sent to the email used at purchase. If the workbook is not right for you, email brian@biotechmodel.com within seven days of purchase for a full refund, no questions asked; the license then ends and you delete your copies. Questions and error reports are welcome at the same address; I read every one.