



Turning options into decisions

ralph.villiger@avance.ch

IP Valuation in Life Sciences

Budapest, November 27, 2008



Messages

1. Value increases in every stage
2. License contracts are closely related to the risk structure
3. Idea of sublicense terms



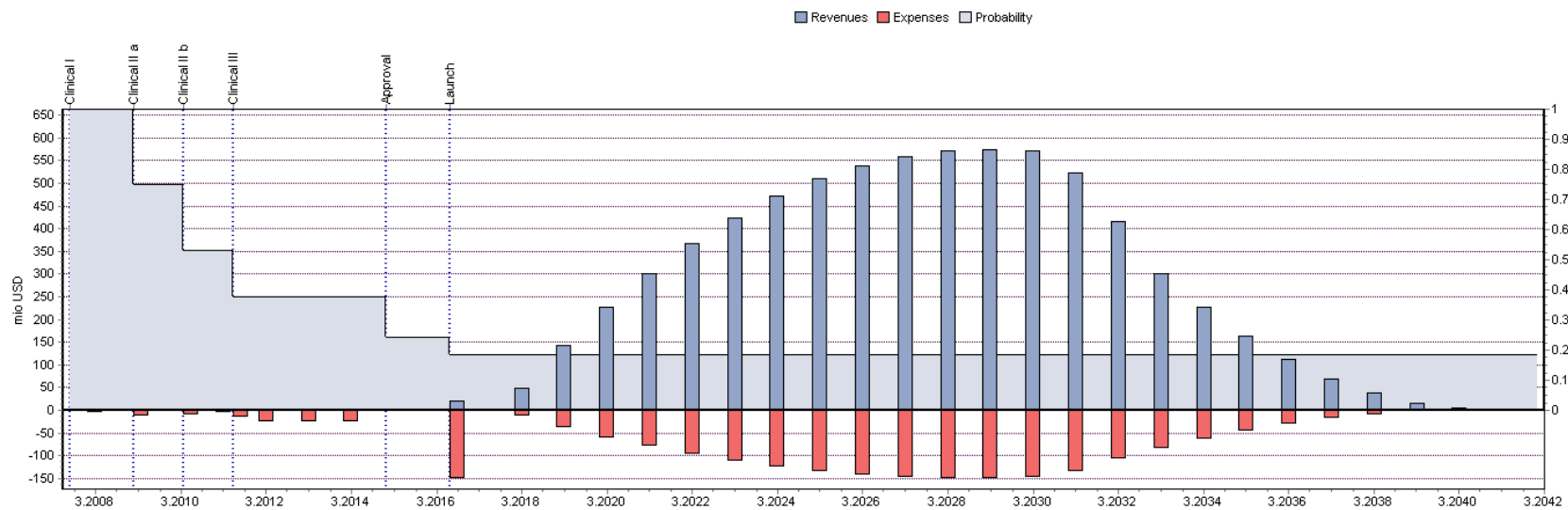
Agenda

- Risk adjusted net present value (rNPV)
- License contracts
- Sublicensing

Value



The value of a project/license is determined by its cash flows.



Cash Flows – Value



Cash flows are defined by

- Size (and sign)
- Time
- Probability
 - Size
 - Event

The value is sensitive to these three properties.

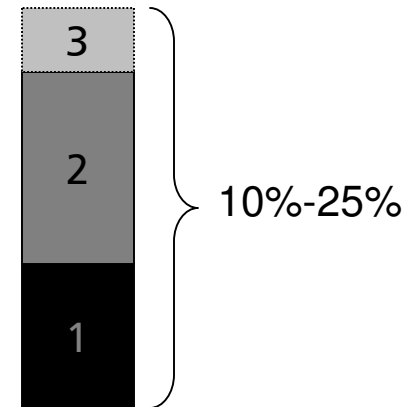
Discount Rate – Cost of Capital



Indicates the rate at which investors want to be rewarded for the risk they take.

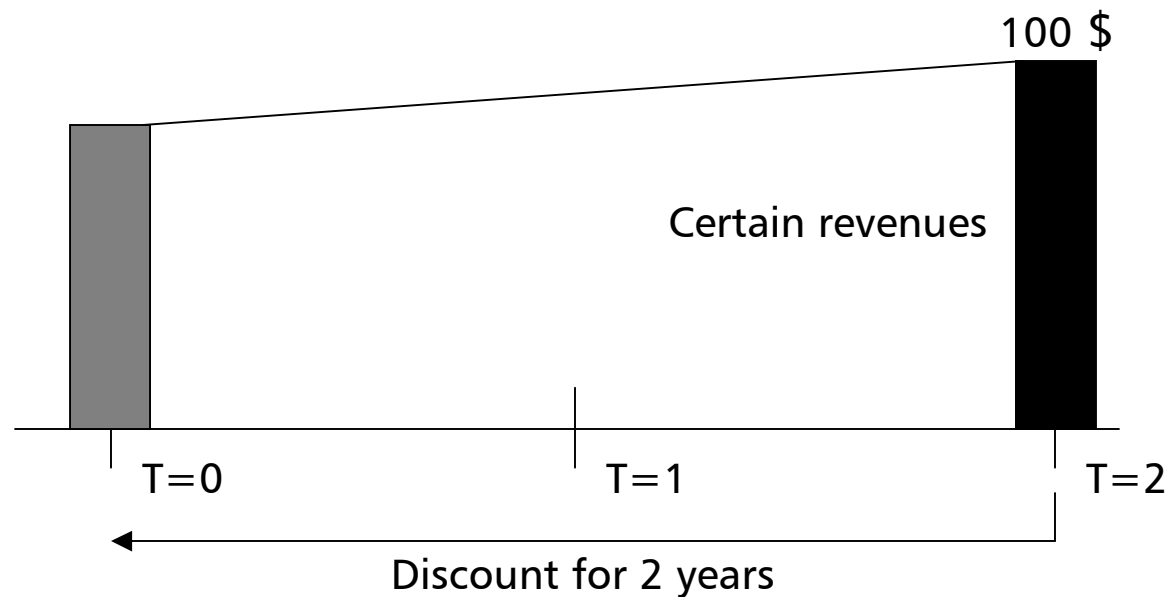
The discount rate contains

1. Time value: interest rate (2%-5%)
2. Risk aversion: risk premium (5%-20%)
3. (Qualitative aspects: premium)



$$V_0 = V_t^* (1 + \text{discount})^{-t}$$

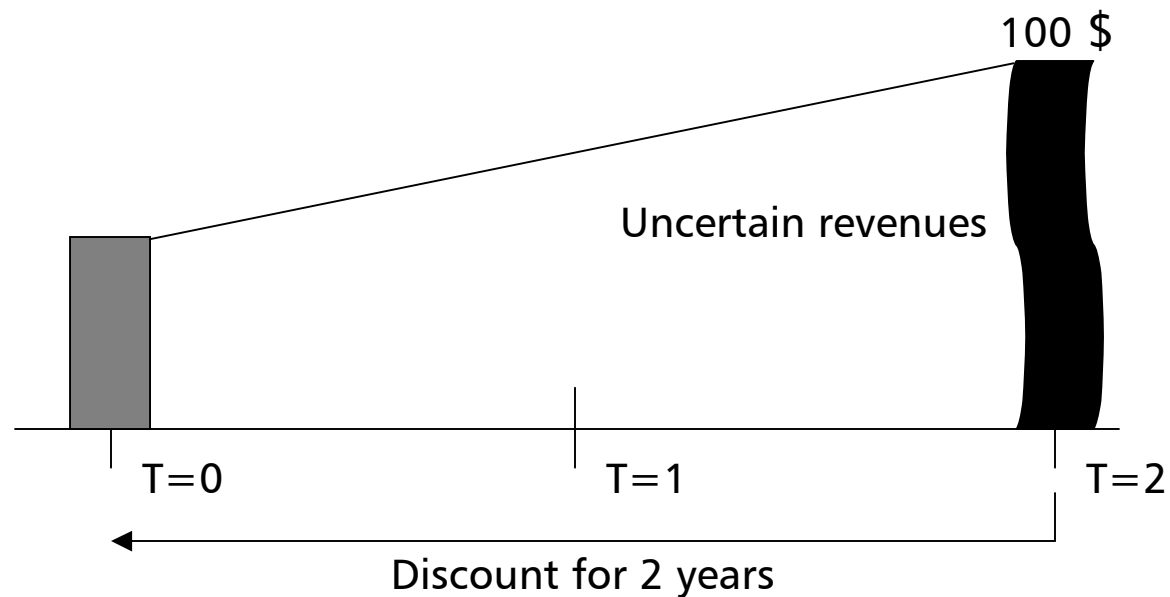
Discount Rate – Mechanism



NPV of 100 \$ at T=2 discounted at 5% p.a.:

$$\text{NPV}(T=0) = 100 * (1 + 5\%)^{-2} = 100 / (1.05)^2 = 90.7 \$$$

Discount Rate – Mechanism



NPV of 100 \$ at T=2 discounted at 11% p.a.:

$$\text{NPV}(T=0) = 100 * (1 + 11\%)^{-2} = 100 / (1.11)^2 = 81.2 \$$$

DCF – Success Rates



- Some cash flows are uncertain
- The probability is given by the success rates

Example:

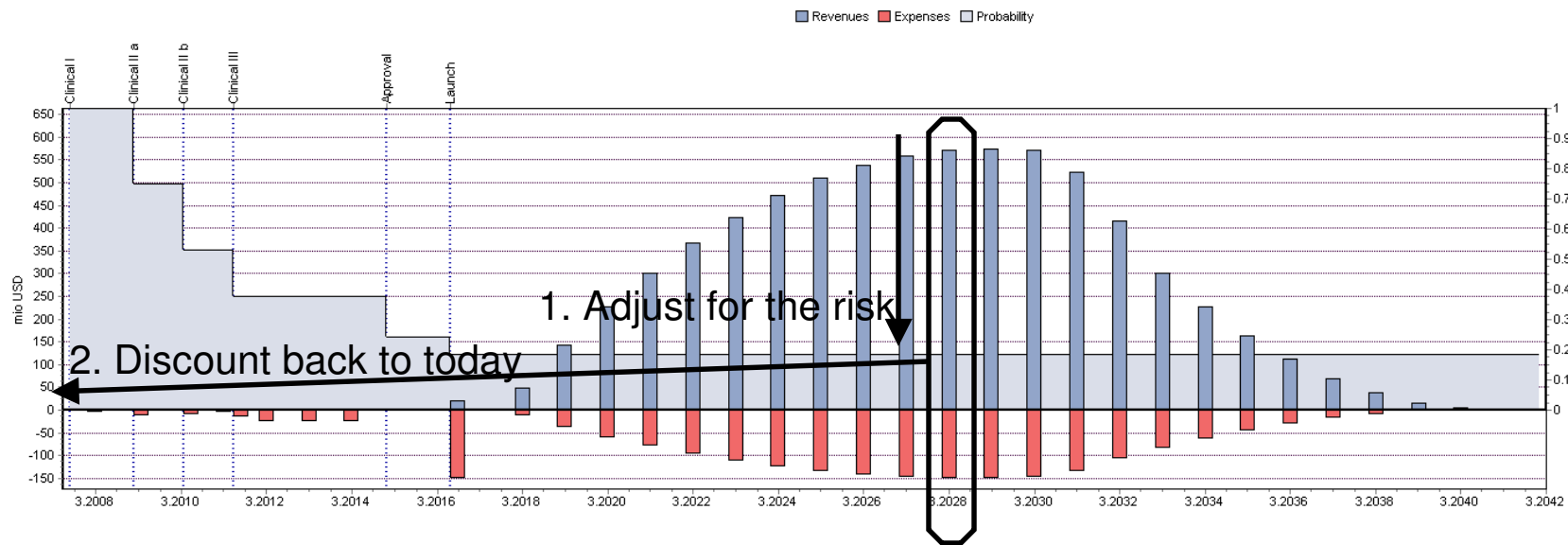
- Head: 2 \$, Tail: 0 \$.
- On average we receive 1 \$.
 - We multiply the results with their probability.
 - Risk aversion is not yet considered, this is done by means of the discount rate.

➔ Multiply all cash flows with their probability

Value of a Drug Development Project



The value is the sum of all risk adjusted discounted cash flows.

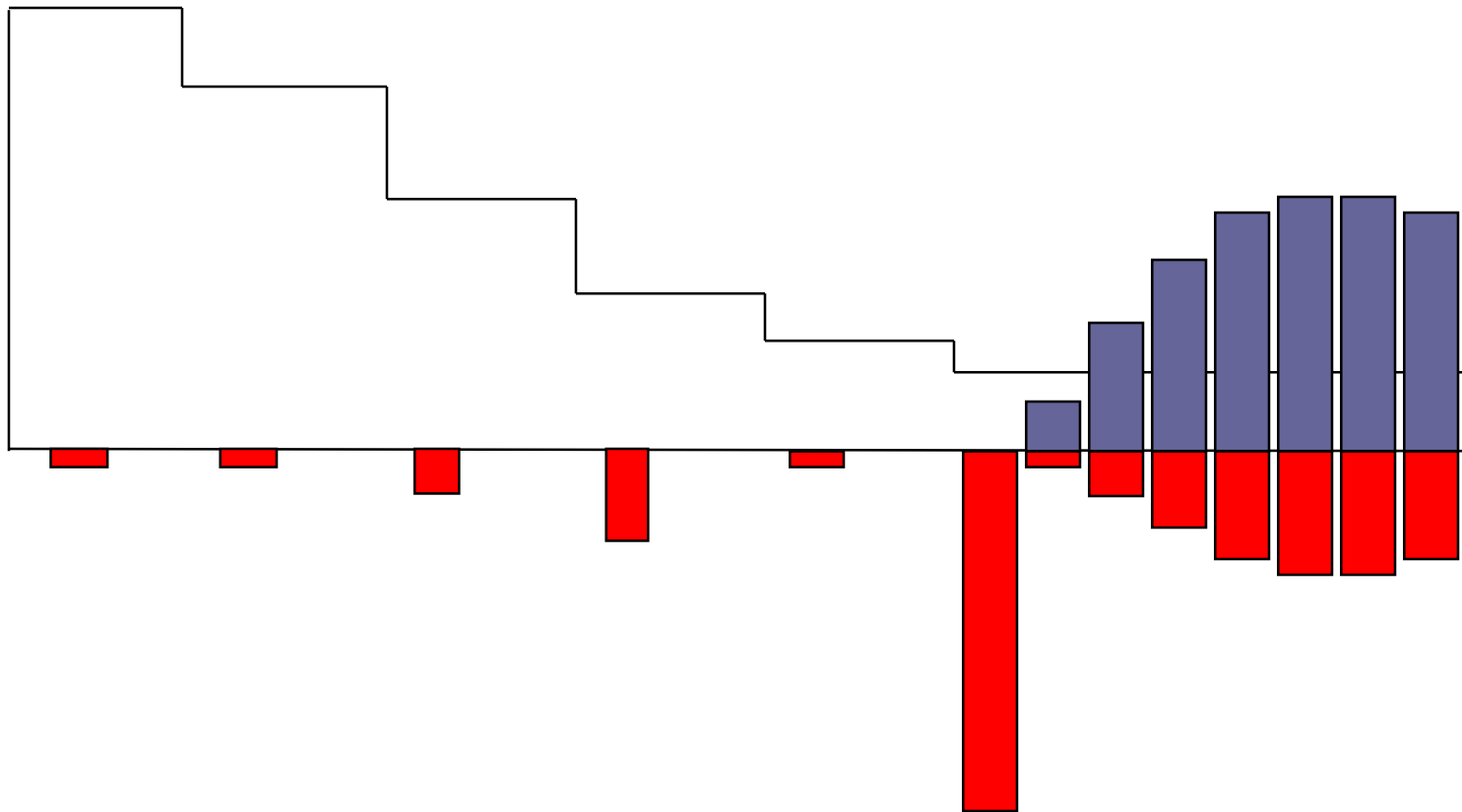


3. Sum all adjusted cash flows

Value of a Drug Development Project



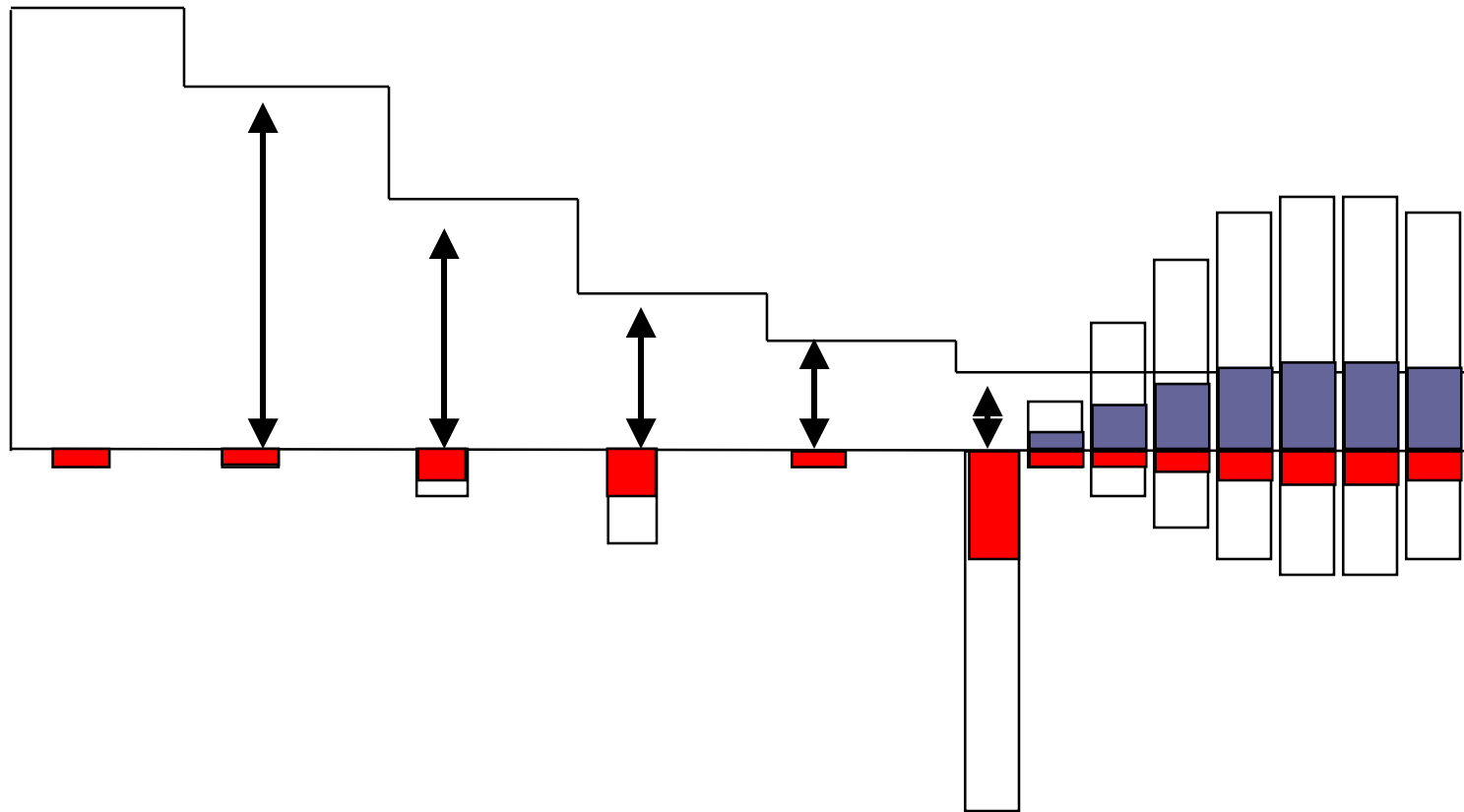
Sum of all risk adjusted discounted **cash flows**.



Value of a Drug Development Project



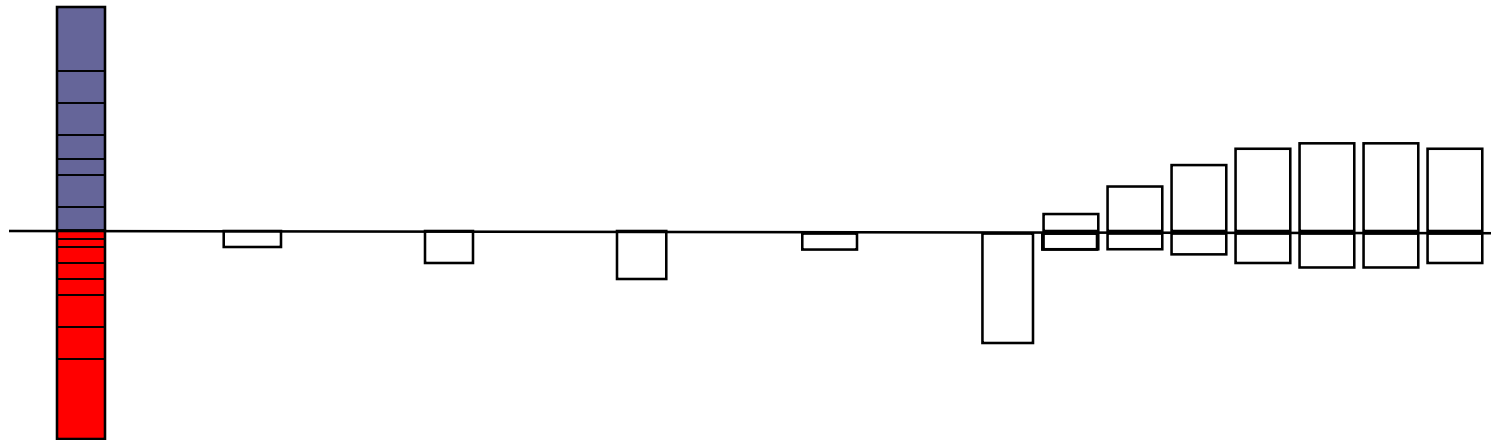
Sum of all **risk adjusted** discounted cash flows.



Value of a Drug Development Project



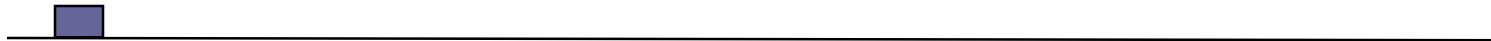
Sum of all risk adjusted **discounted** cash flows.



Value of a Drug Development Project



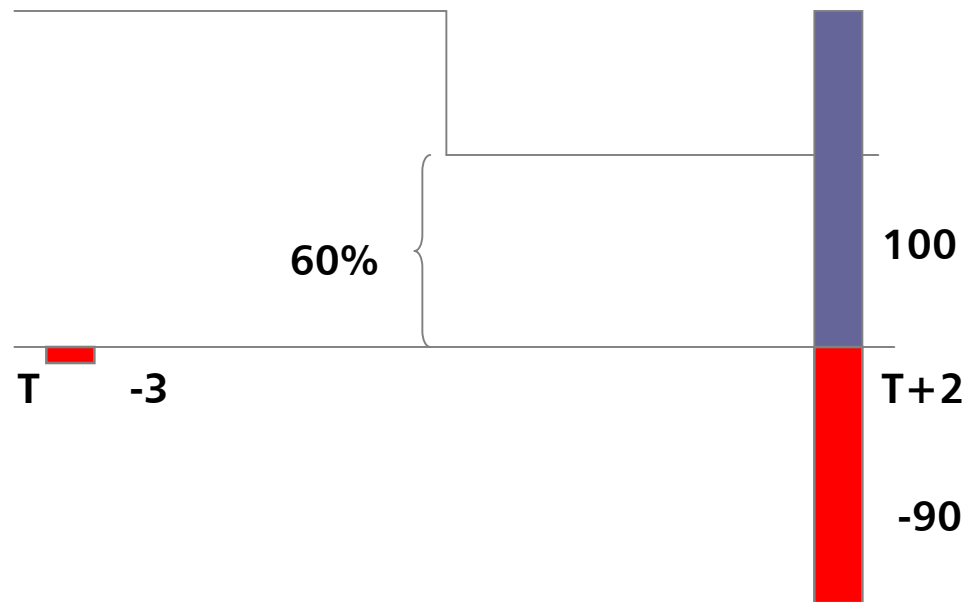
Sum of all risk adjusted discounted cash flows.



DCF - Example



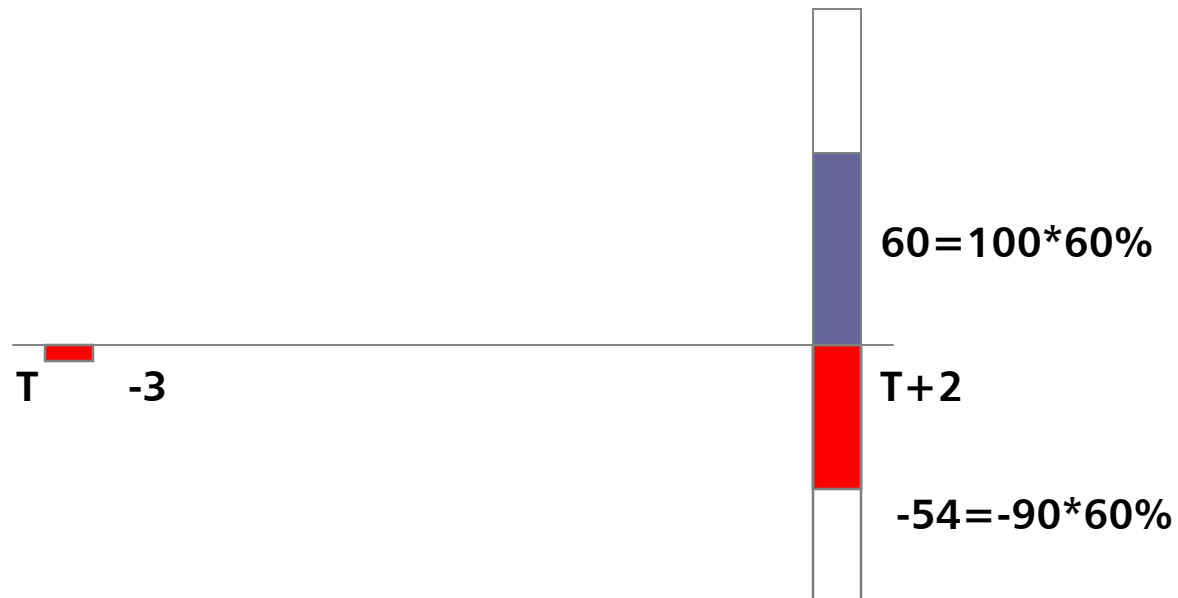
risk-adjusted net present value:



DCF - Example



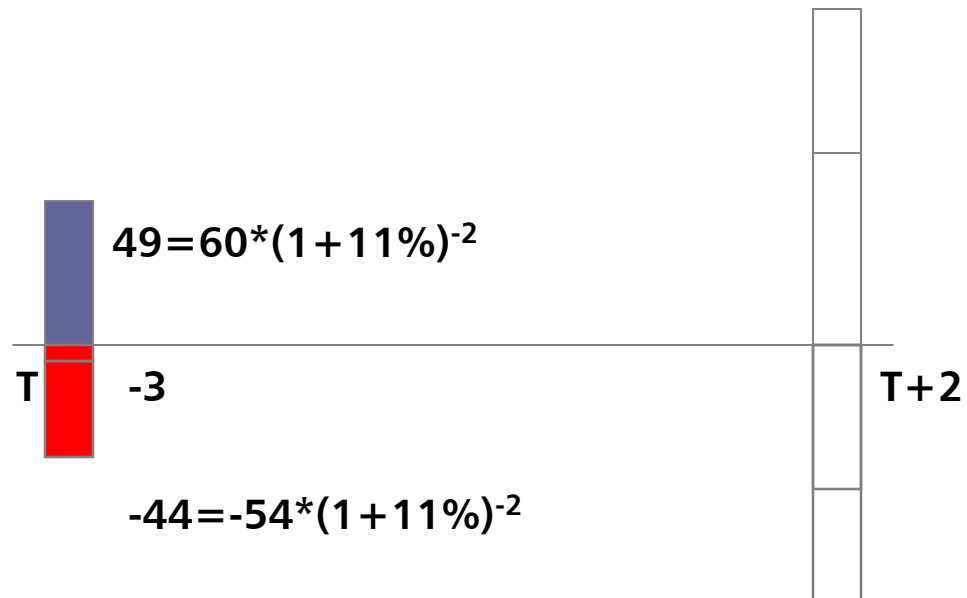
risk adjusted net present value:



DCF - Example



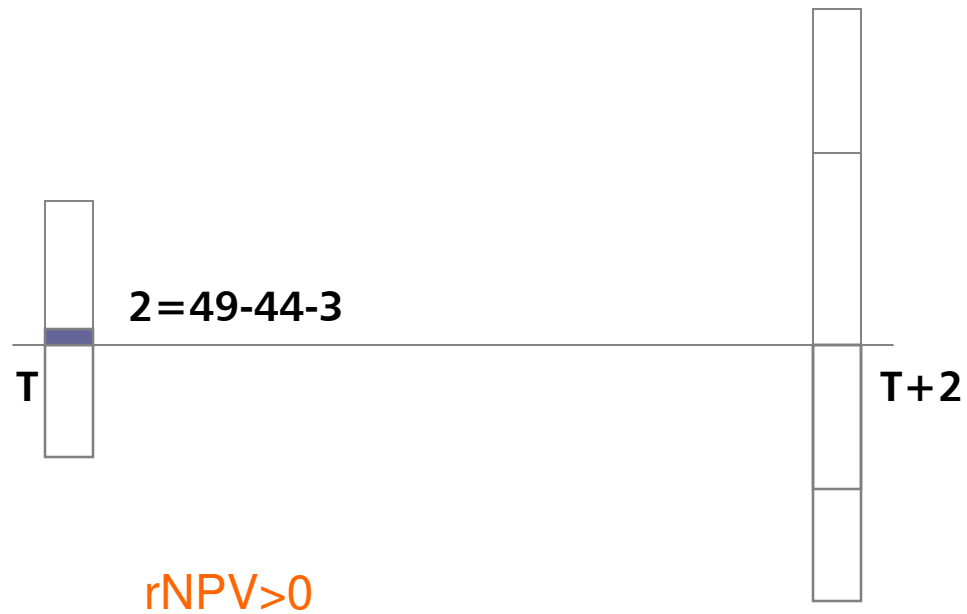
risk adjusted net present value:



DCF - Example



risk adjusted **net** present value:





NPV (net present value)=DCF (discounted cash flows)

With success rates:

- rNPV (risk adjusted net present value)
- eNPV (expected net present value)

rNPV/eNPV is a simple decision tree, but it is not a real option.

Valuation Methods



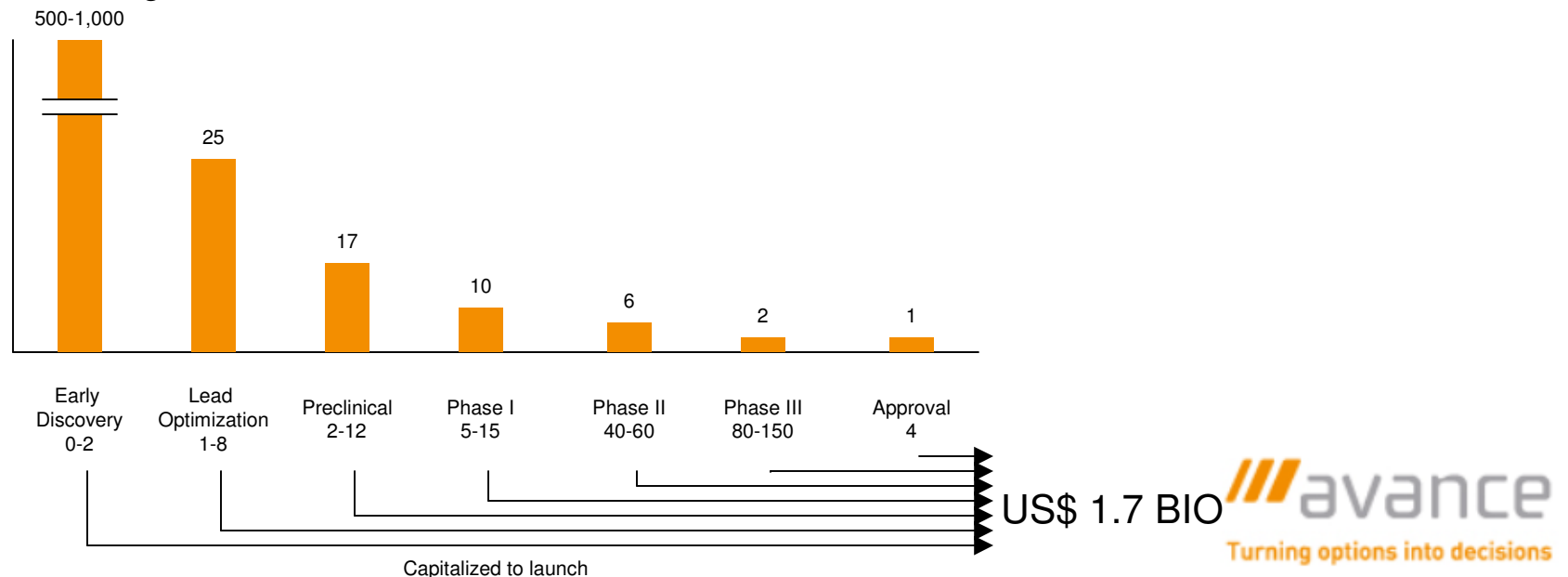
- rNPV
- Decision Tree
- IRR
- Payback Method
- Comparables
- Real Options

Input Parameters – Costs



Who can afford to spend US\$ 1.7 BIO? Certainly no private biotech company. So, how is this number composed?

- It is assumed that for one marketed project you have to start about 1,000 discovery projects: With US\$ 1.7 BIO you can therefore be sure to launch one project.
- Costs are assumed very high, including several indications.
- Costs of all projects are capitalized to launch date: Increase of costs instead of discounting.



Input Parameters – Costs

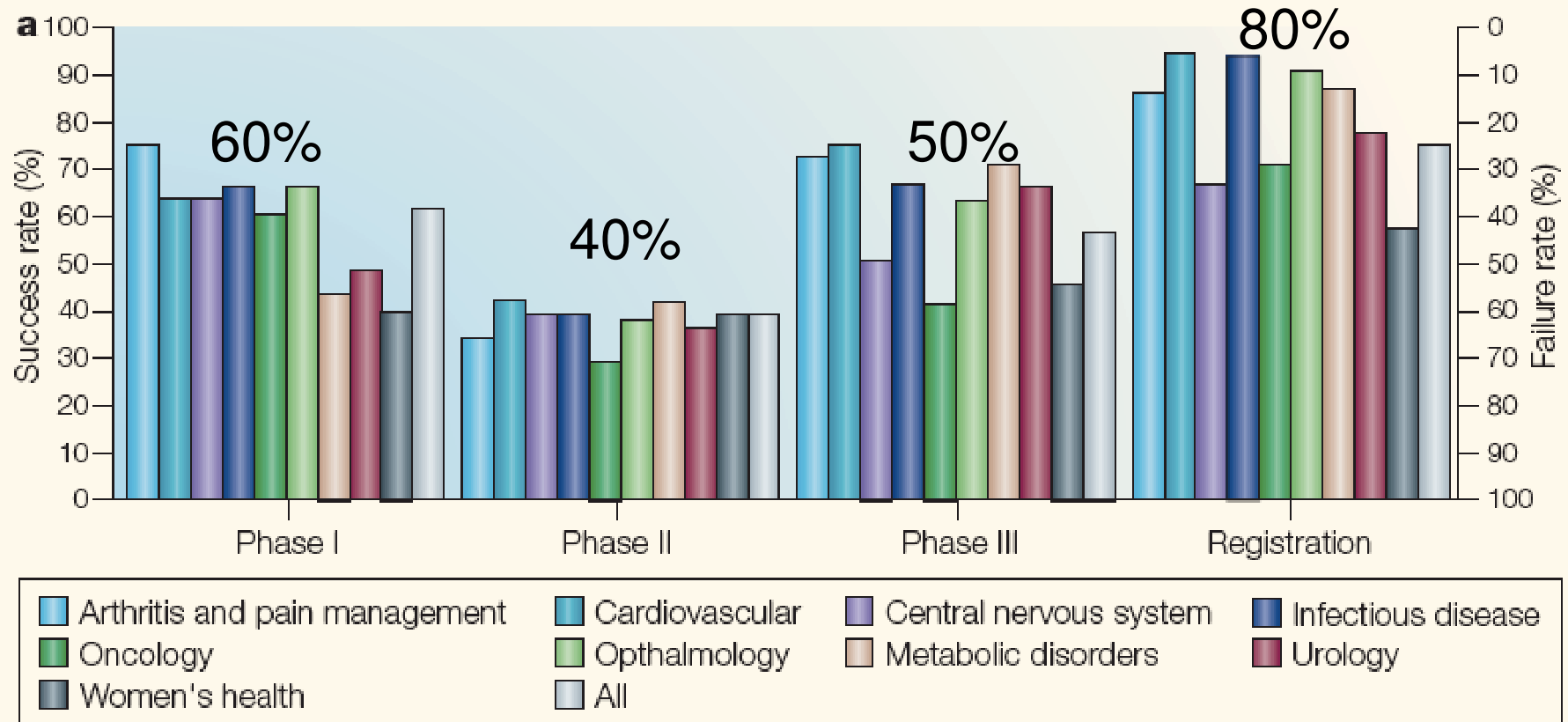


The figures below can be used as guidelines for drug development costs:

Phase	Cost
Lead Optimisation	US\$ 2-3 mn
Preclinical Phase	US\$ 2-3 mn
Clinical Phase 1	US\$ 1-5 mn
Clinical Phase 2	US\$ 3-11 mn
Clinical Phase 3	US\$ 10-60 mn
Approval	US\$ 2-4 mn

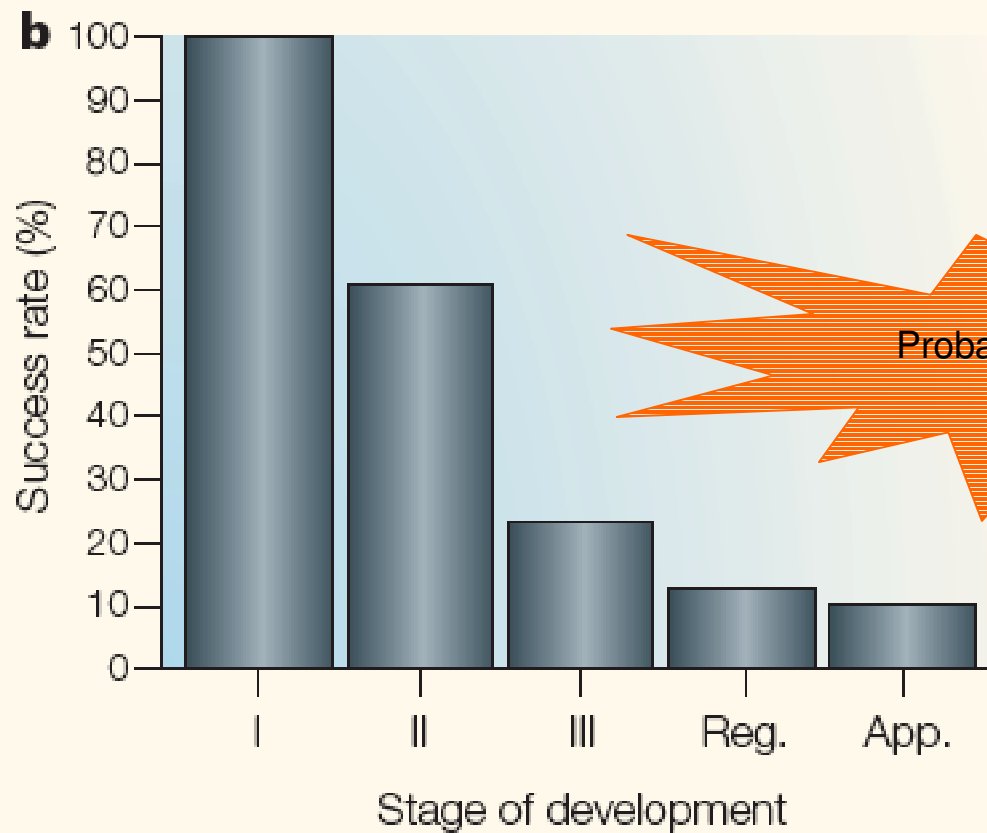
Pharma drug development 3-5x more expensive.

Input Parameters – Success Rates



NCE: Kola, Landis (nat rew drug dis, 2004), DiMasi (TUFTS)
 NBE: Janice Reichert (TUFTS)

Input Parameters – Success Rates



Probability of success 11%



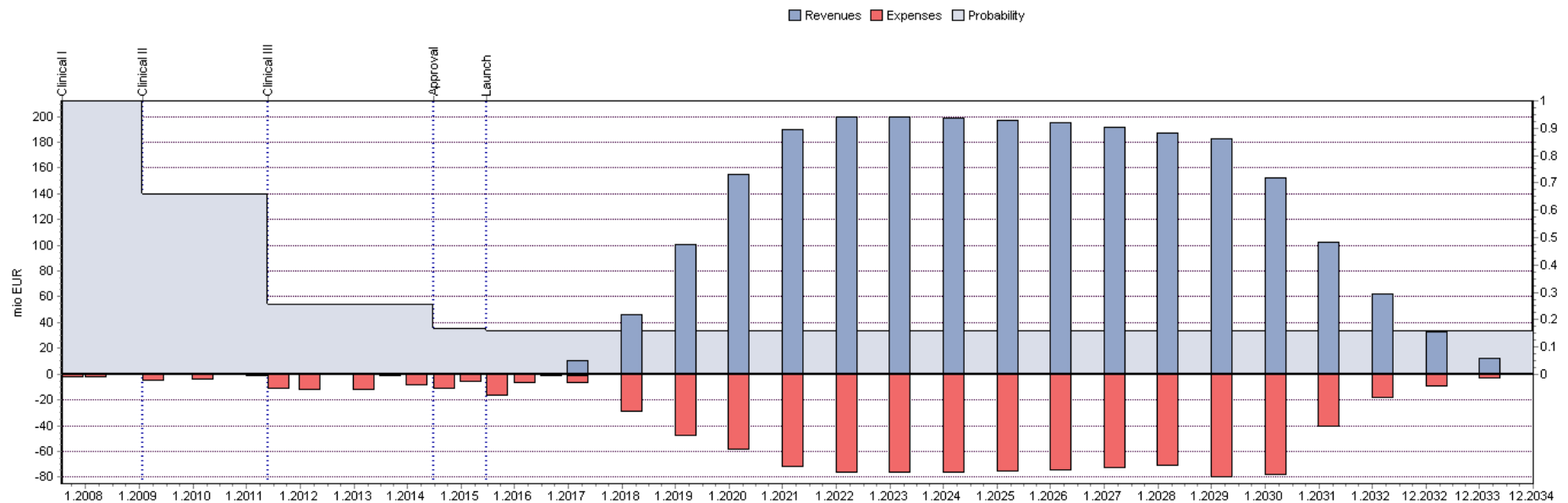
Agenda

- rNPV
- License contracts
- Sublicense terms

Licence Contracts - Valuation



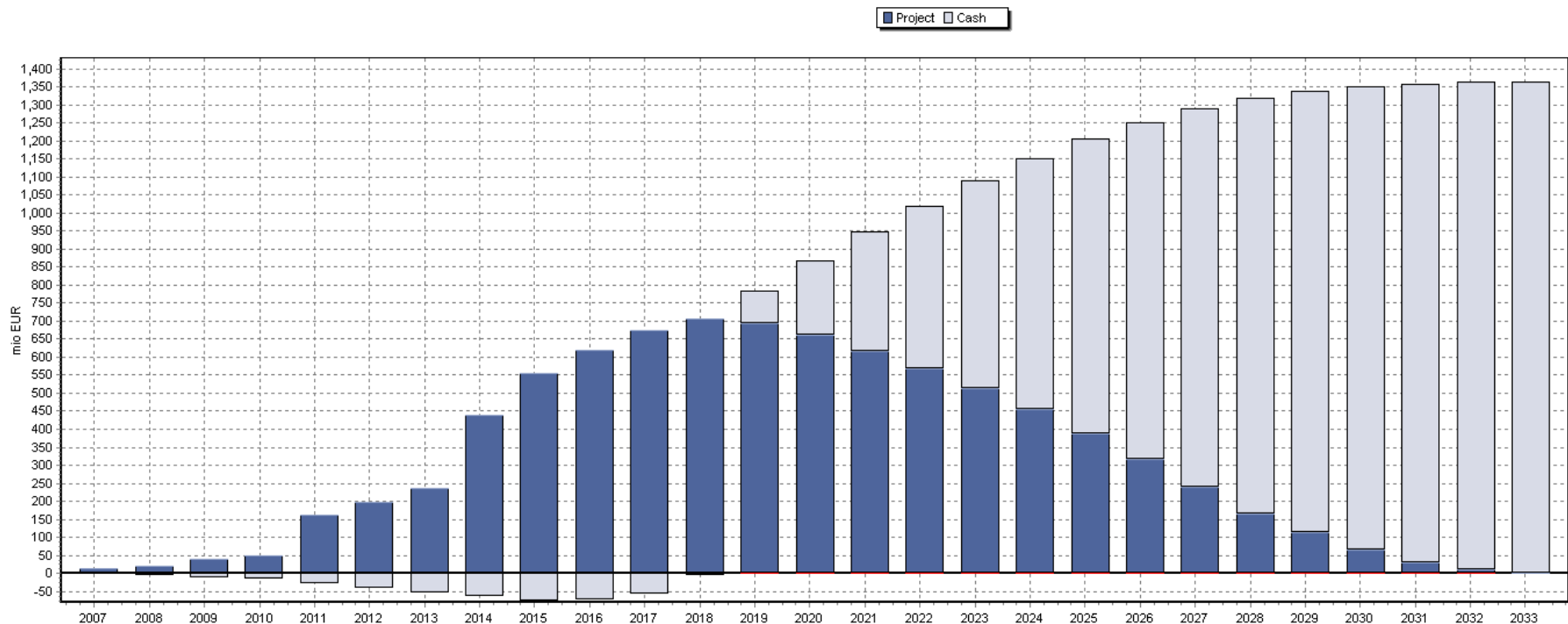
If the project is self-conducted or in-licensed, then we have large costs in the beginning.



Licence Contracts - Valuation



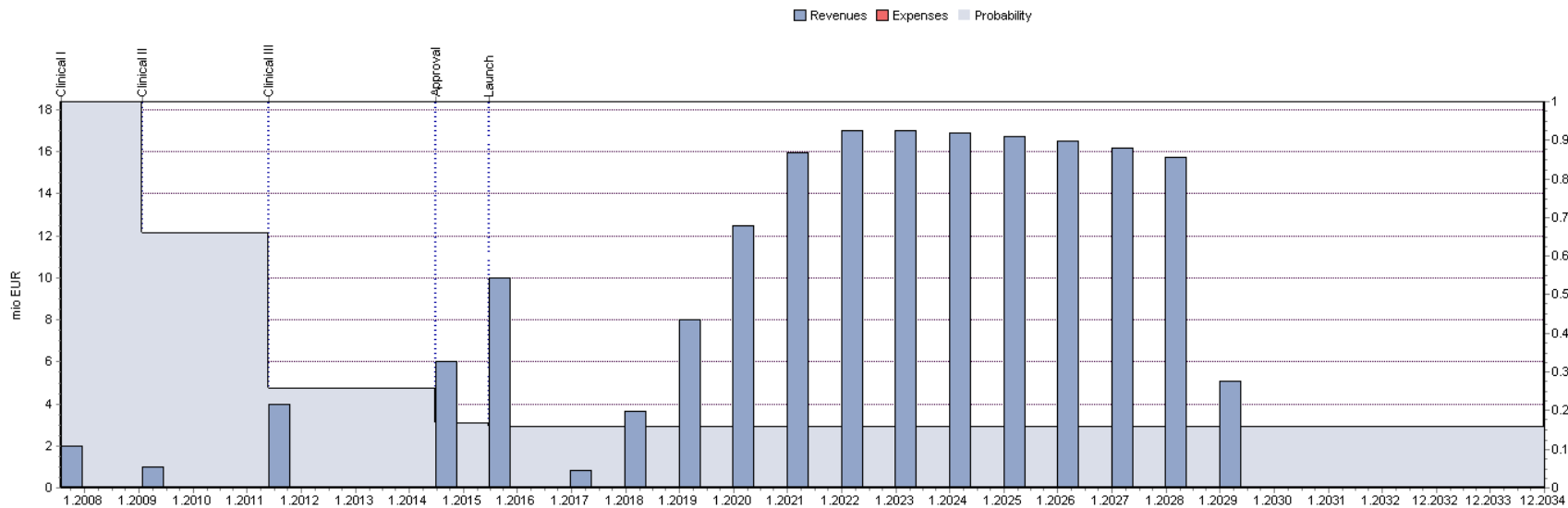
The company has to invest before revenues arrive.



Licence Contracts - Valuation



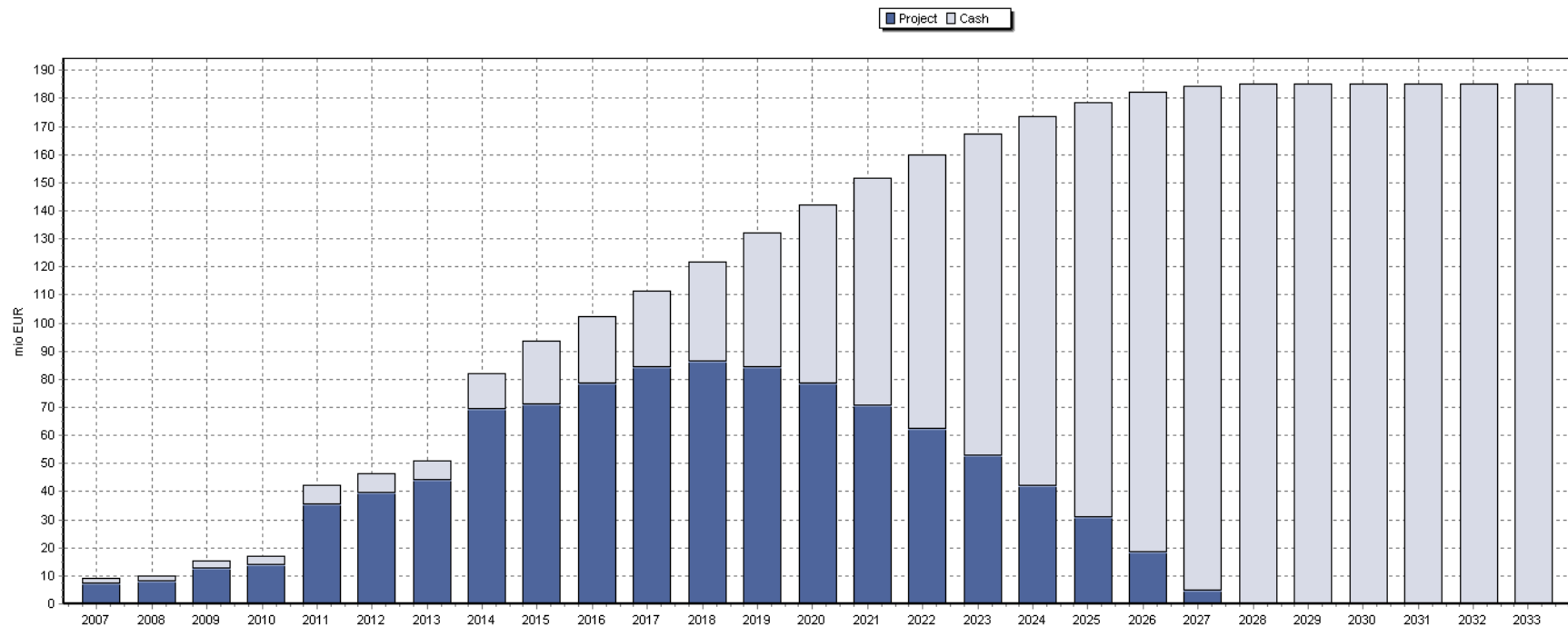
With a license contract, the licensor starts making revenues.



Licence Contracts - Valuation



Part of the value is securitised before commercialisation.





Licensor: Access to resources

- Non-dilutive capital
- Marketing
- Production
- Know-how

Licensee: Access to innovative products

Risk management

- Diversification
- Securitisation



Payments

- Upfront payment risk free
- Milestone payments attrition risk
- Royalties attrition risk and market risk

Development/Commercialisation

- Co-development
- R&D Funding
- Co-marketing/Co-promotion

Why to Value License Contracts?



- Define your negotiation leeway.
- Find out your partners negotiation leeway.
- Optimise your deals in terms of value, return, and risk profile.
- Benchmark your deals.
- Prepare rational arguments for the negotiation.



Agenda

- rNPV
- License contracts
- **Sublicense terms**

Early-Stage Contracts (Sublicensing)



Licensee licenses the product again (sublicense)

In US\$ Mio	preclinical	IND	POC	Launch
Original terms	0.3	0.5	1	2 and 3%
Sublicense in prec		40%		
Sublicense at IND	0.3		30%	
Sublicense at POC	0.3	0.5		20%
Sublicense at Launch	0.3	0.5	1	15%

If product exhibits better potential:

- Licensor wants to participate

Of products exhibits worse potential:

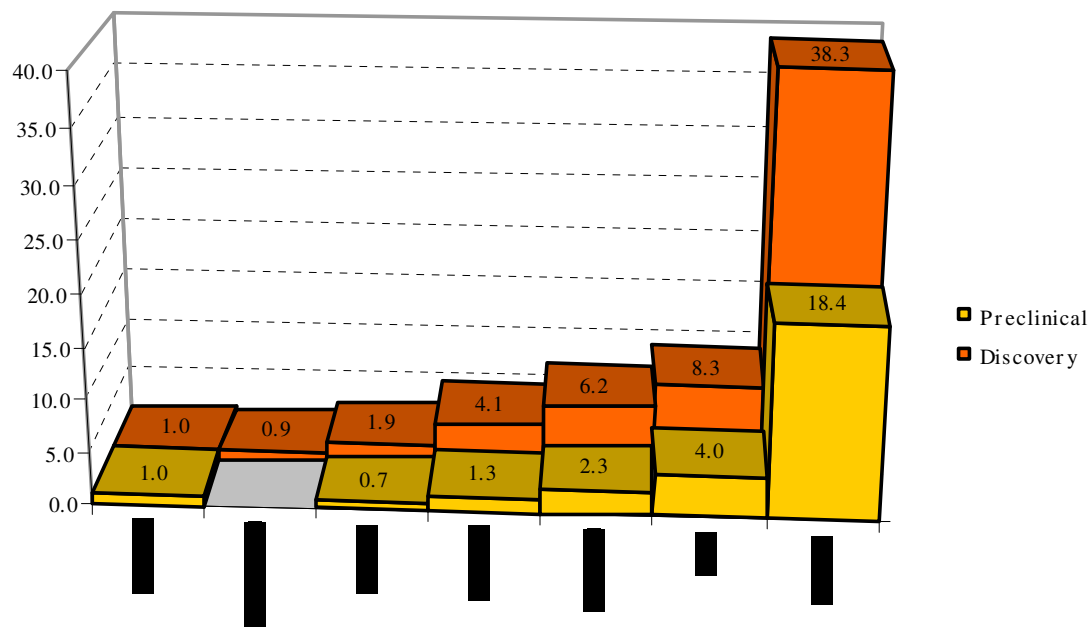
- Original terms should not prevent a deal

Early-Stage Contracts



- University of Queensland (AUS) licenses vaccine in early stage to CSL (AUS)
- CSL continues development
- Large potential recognised
- Sublicense to Merck (USA)

Licence Contracts - Weights



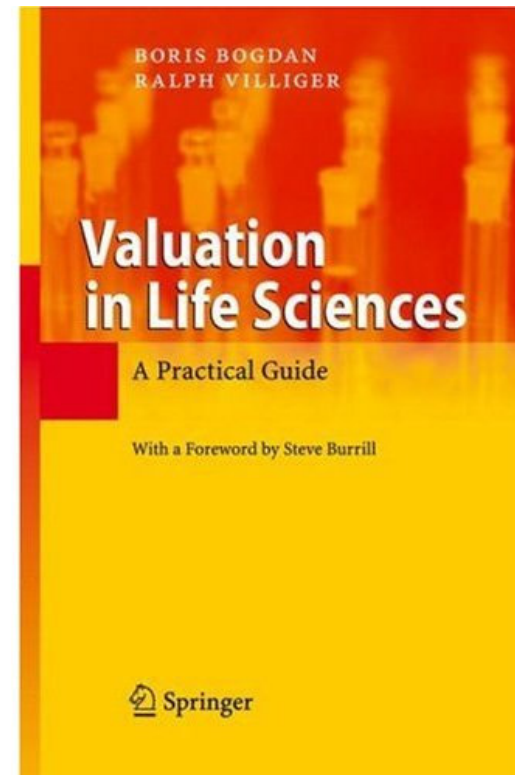
Book



Valuation in Life Sciences

Springer Verlag, 2007

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 **avance**

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