



# THE VALUATION EXPERTS

Workshop Presentation: Deal and Product  
Valuations

Sep 2017 | Boston, RESI

# Agenda

**1. Overview of product valuation**

**2. rNPV product valuation**

**3. Deal structure / Negotiation**

**4. Case Study**

# Company



## Mission

Independent assessment and valuation of technology driven companies / products in growth industries

Biotechgate / Life Sciences Database



## Offices

HQ: Zurich with representative offices in Europe, North America and Asia

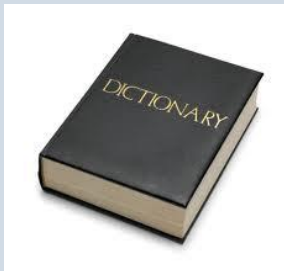
## Employees

30 people in Switzerland / UK / Ireland / Canada / USA  
Singapore / India / China

## Clients

Pharma, Biotech and Investors such as Novartis Venture Fund, GSK, European Investment Bank, 4SC, Arpida/Evolva, Celtic Pharma  
Biotech Associations / Governments like Ausbiotech, Medicon Valley, SwedenBio, BIOTECanada, Maryland

# Value vs. Price



- **Value:** implies the inherent worth of a specific thing
- **Price:** depending on the market (supply / demand); whatever somebody is prepared to pay

“Price is what you pay. Value is what you get.”

By Warren Buffett

=> Provide basis for negotiation, investment decision, licensing deal

# Product Valuation

## Valuation of a product

- Value of an asset
- Licensing deal
- Strategic development decision
- Expenses included are only those relevant to the product



# Introduction



## Input

- Development cost and timelines
- Production / Marketing cost
- Market / expected sales
- Success rate based on historical data

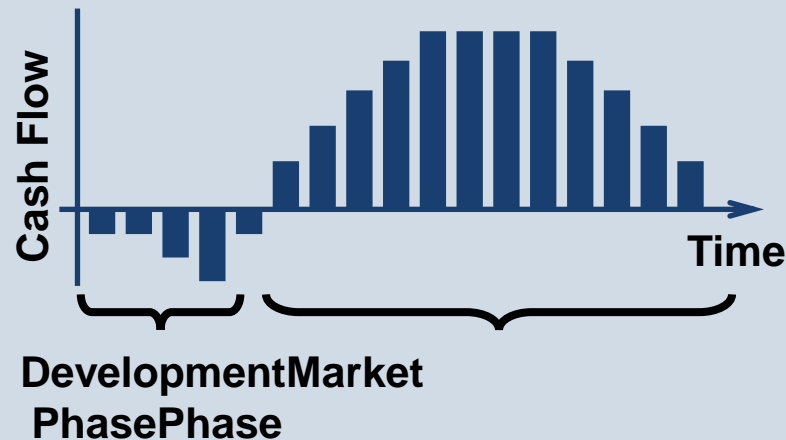
## Output

- Expected annual discounted cash flows

# rNPV Valuation



1. Development phase => investment  
Product Risk ( $r$ ) => success rate or attrition rate
2. Market phase => revenues  
Patent expiry => end of revenues  
(often no terminal value)
3. Discount => non-specific risk (General Risk)



1. Overview of product valuation
- 2. rNPV product valuation**
3. Deal structure / Negotiation
4. Case Study



# Five Step Process



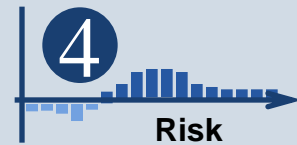
Determine Cash Flows in **Development** Phase



Determine Cash Flows in **Market** Phase



Discount with **Discount rate**



Adjust for **Risk**



Sum cash flows

# rNPV – Example

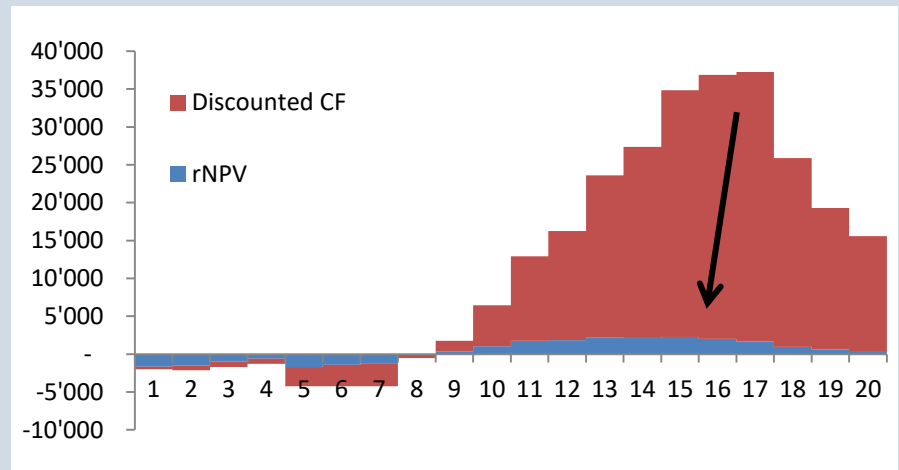
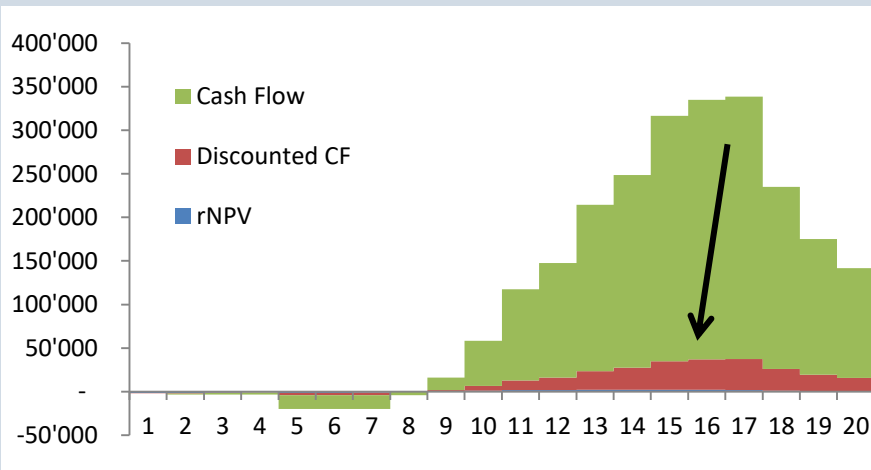


- Phase 1 product
- 20% discount rate
- 11% Probability of success (p1 to market)

⇒ CF: USD 2'269m

⇒ DCF: USD 127m

⇒ rNPV: USD 8m



# Development Phase



- Determine cost and duration of clinical trials
  - Geographic location
  - Number of patients and centres
  - Type of treatment



- Manufacturing
- Regulatory affairs
- Long term animal tox. studies
- Misc. administration



# Example Trial Inputs



In US\$ 000's	Phase I	Phase II	Phase III	Approval
Time (Years)	1	2	3	1
Number of Patients	~10	~200	~3000	
Cost per patient	7	7	7	
Total Patient costs	70	1400	21000	
Total patient costs as percentage of total costs*	30%	30%	30%	
Total non-patient costs	163	3267	49000	
Total costs	233	4667	70000	2500
<b>Total Development Costs (unadjusted)</b>				<b>77400</b>

\* To factor in other cost including animal studies, manufacturing, administration etc.

# Market Phase



**Develop assumptions to predict the future market**

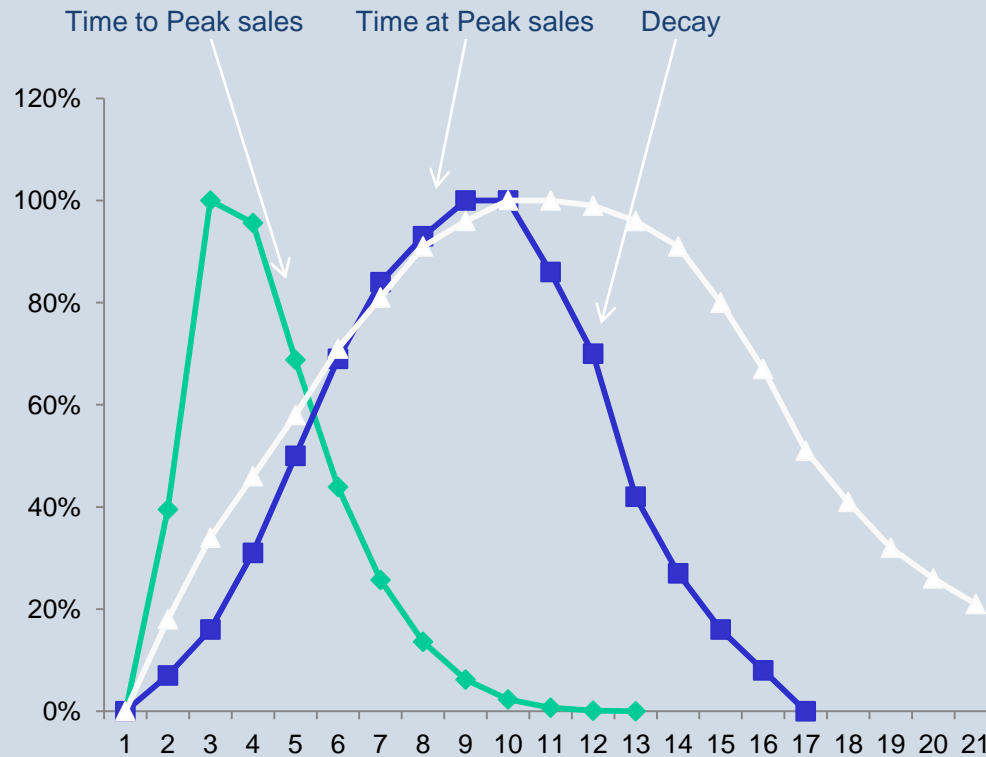


**Methods used:**

- Bottom-up approach
  - Based on primary market data
- Top-down approach
  - based on comparable products



# Product Life Cycle



- A. Define Growth Phase (4-8 years)
- B. Define Mature Phase (1-4 years)
- C. Define Decay Phase (7-10 years)

# Bottom up approach



## Sales Forecast

Western EU		2018	2019
Population (000's)		300'000	306'000
Incidence rate (%)	0.020%	60.000	61.200
Diagnosed population	70%	42.000	42.840
Population treated with drugs	80%	33.600	34.272
Compliance rate	90%	30.240	30.845
Addressable population		30.240	30.845
Market penetration rate (%)		18%	34%
Patient population		5.443	10.487
Market share	12%		
Price (EUR)	2000		
<b>Sales Western EU (EUR 000's)</b>		<b>1'306</b>	<b>2'517</b>
<b>USA Sales</b>		<b>2'540</b>	<b>4'798</b>
<b>Japan Sales</b>		<b>392</b>	<b>755</b>
<b>Rest of the World (RoW) Sales</b>		<b>1'270</b>	<b>2'399</b>
<b>Total sales (EUR 000's)</b>		<b>5'508</b>	<b>10'469</b>

### Peak Sales

USD 1bn =>

### Value

USD 8m

USD 0.7bn =>

USD 3m

USD 2bn =>

USD 25m

# Discount rate



Used discount rate in rNPV:

- Early stage                    12% - 28%
- Mid stage                        10% - 22%
- Late stage                        9% - 20%

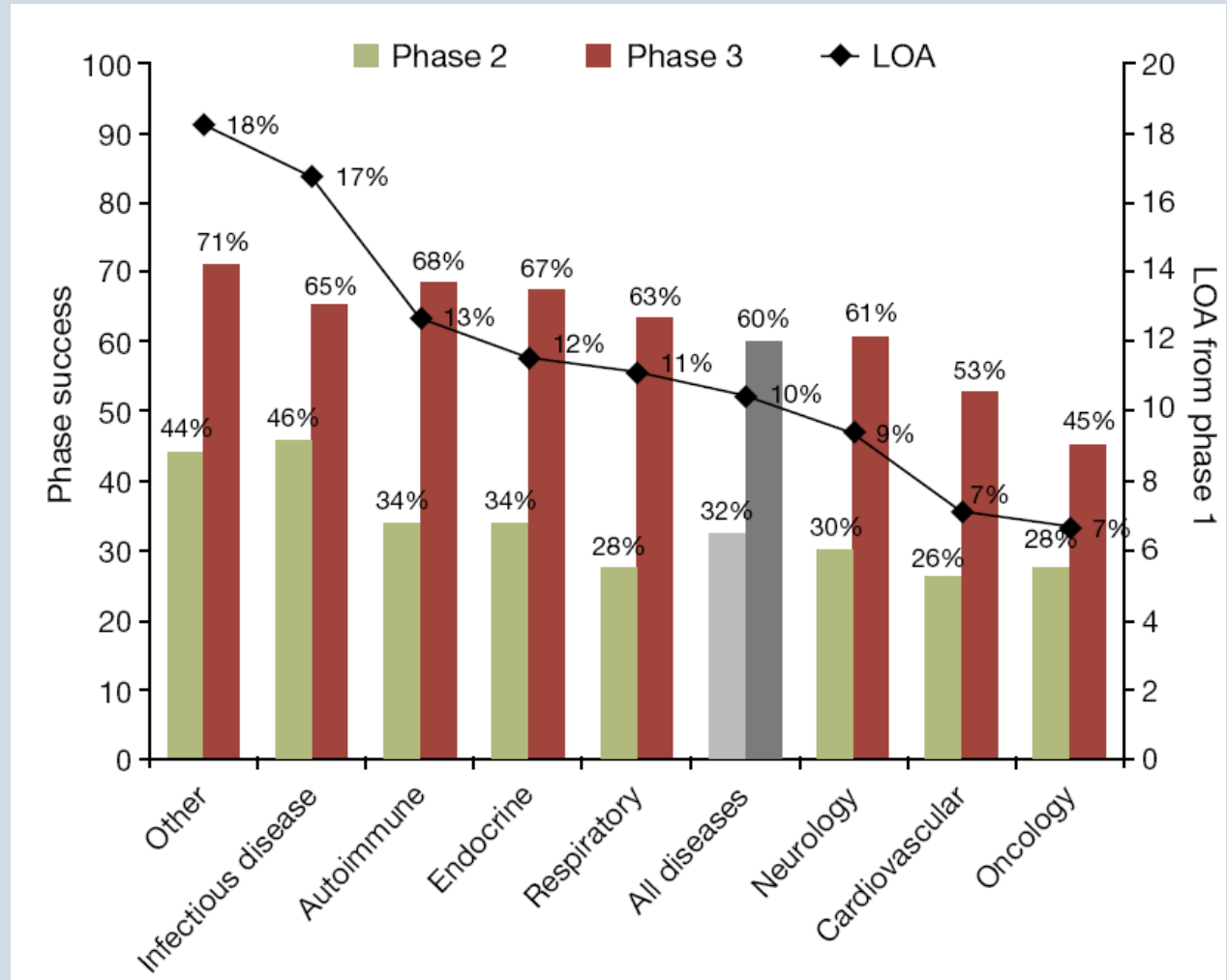
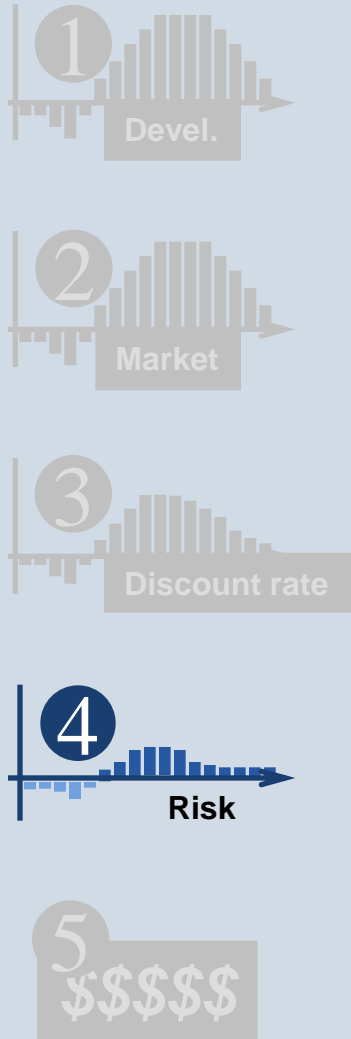
Source. [www.biostrat.dk](http://www.biostrat.dk)

Cost of equity and non-development associated risks.

20% => USD 8m  
25% => USD 2m  
15% => USD 21m

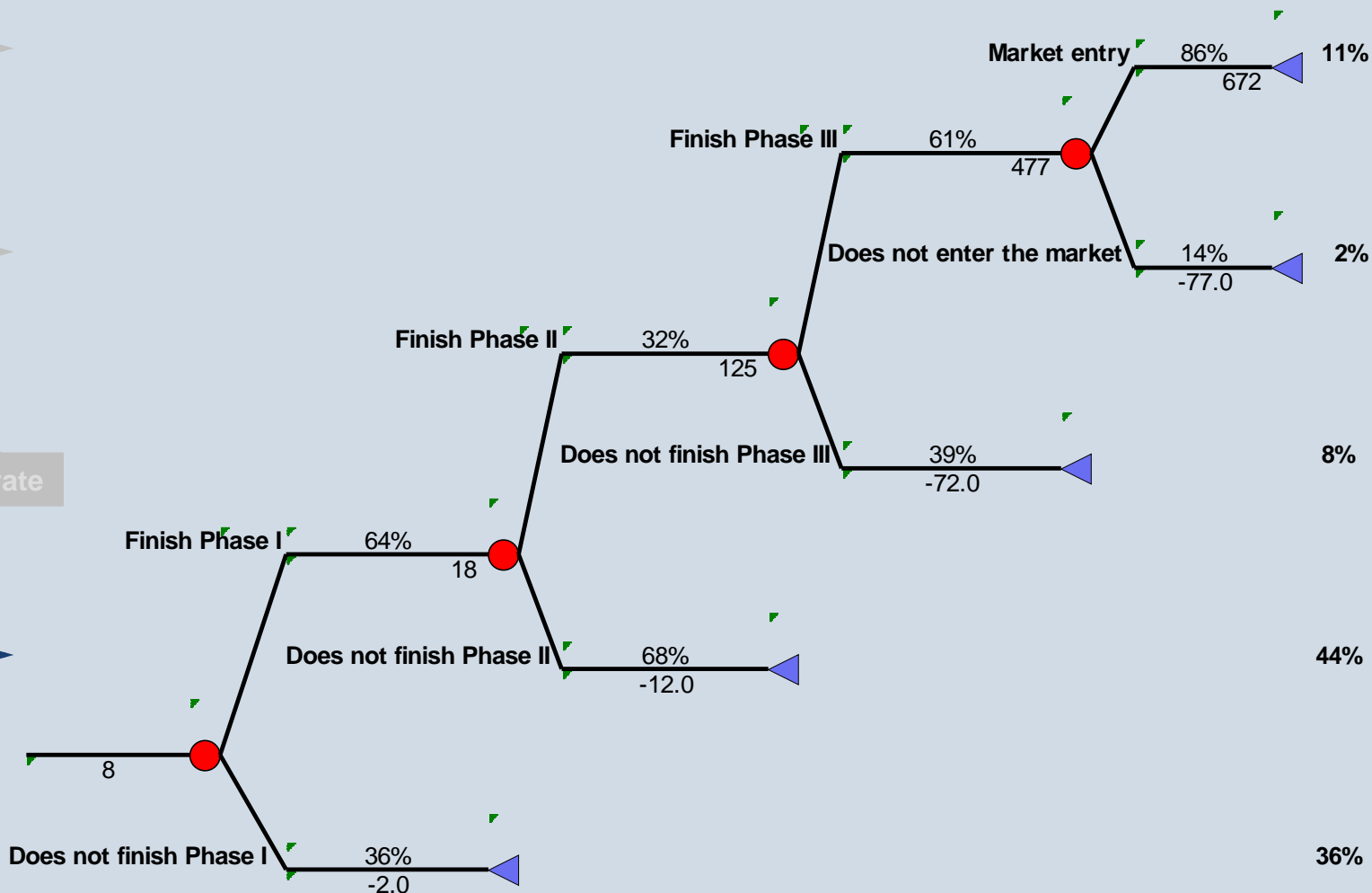
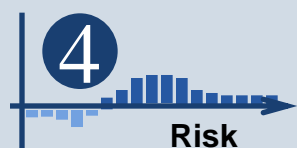


# Adjust for risk (I)

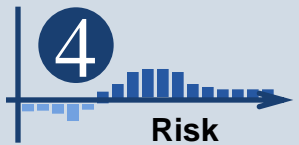


Source: Nature Biotechnology; Clinical development success rates for investigational drugs; January 2014  
 LOA: Likelihood of approval

# Adjust for risk (III)

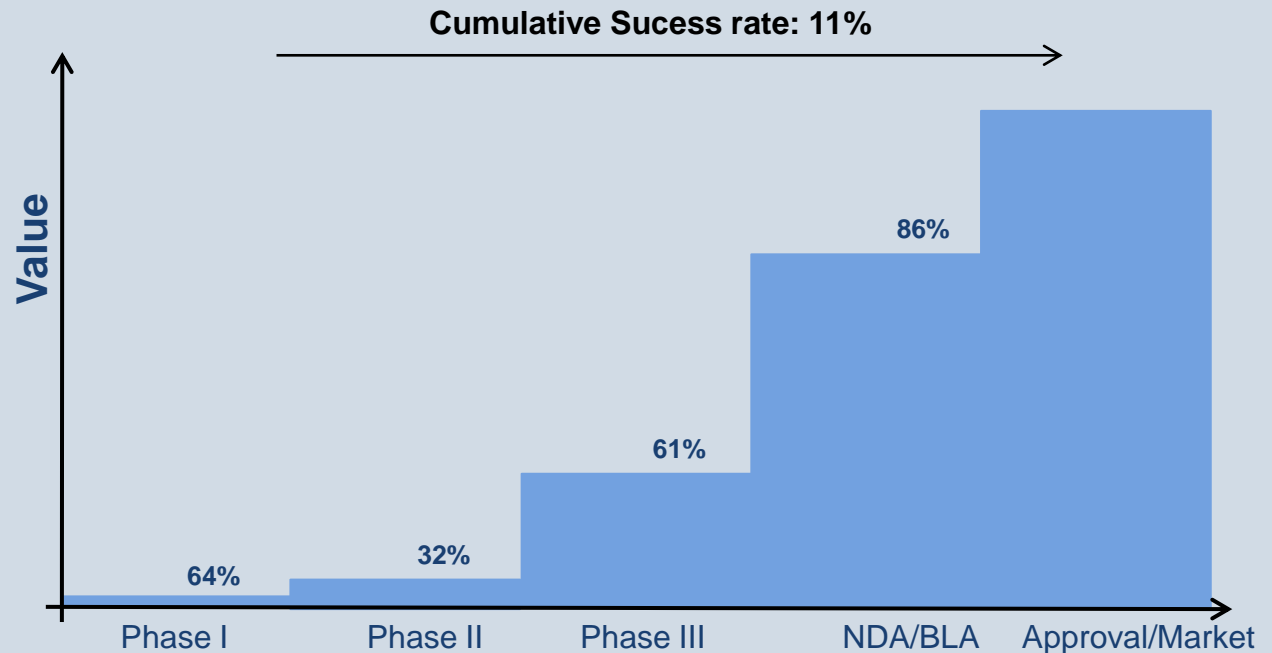


# Adjust for Risk (III)



## The relation between Risk and Value

- Completion of a phase → Direct value increase



1. Overview of product valuation
2. rNPV product valuation
- 3. Deal structure / Negotiation**
4. Case Study

# Structuring the deal



## AIM: to develop a **fair** deal structure

rNPV



■ Pharma  
■ Biotech

- Product value has to be shared
- The licensee (Pharma) is compensated for taking on risk
- The licensor (Biotech) receives payments and shares some of the risk and rewards
- The model inputs and assumptions are simple, understandable, and transparent

**The rNPV valuation can help to understand the deal terms**

# Timing of payments



- Front/ back-loading a deal can heavily influence deal structure
- Deal terms dependent on needs of both parties

In USD m	Payment of	rNPV* (or up-front)
<b>Up-front</b>	1 m	1 m
<b>Finish Pre-clinical</b>	1 m	0.44 m
<b>Finish Phase I</b>	1 m	70'000
<b>Finish Phase II</b>	1 m	17'000
<b>Finish Phase III</b>	1 m	8'000
<b>Approval / Enter market</b>	1 m	5'000
<b>Royalties</b>	1%	0.70 m

\* Time value of money and Risk adjusted

# Timing of payments (II)



- Two very different deal structures can look identical

Cash Flow



- Non-discounted, non-risk adjusted

1

rNPV



- 25 million upfront
- 300 million milestones
- 5% royalties

2

rNPV



- 5 million upfront
- 50 million milestones
- 12% royalties



1. Overview of product valuation
2. rNPV product valuation
3. Deal structure / Negotiation
- 4. Case Study**



# Case Study

- Mid-size Pharma to in-license from a Biotech
- Phase I finished pancreatic cancer product
- Prevalence: 14/100'000
- Patents expiring in Q1 2036

## **Proposal from Biotech:**

- EUR 20m up-front
- EUR 90m milestone at market entry
- 10% royalties on net revenues

# Case Study - Market



- 1 competitor product on the market since 2004 (Patent expiry in 2014), had 60% market share

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
150	370	550	760	980	1000	1200	1400	1600	1500	1200	900
9%	23%	34%	48%	61%	63%	75%	88%	100%	94%	75%	56%

In EUR 000

- Competing products in development:
  - 7 pre-clinical
  - 3 in phase I

# Case Study - Sales



## Sales Forecast

Western EU		2024	2025	2026	2027	2028	2029	2030	2031	2032
Population (000's)		400'000	408'000	416'160	424'483	432'973	441'632	450'465	459'474	468'664
Prevalence rate (%)	0.014%	56	57	58	59	61	62	63	64	66
Diagnosed population	90%	50	51	52	53	55	56	57	58	59
Population treated w. drugs	80%	40	41	42	43	44	45	45	46	47
Compliance rate	90%	36	37	38	39	39	40	41	42	43
Market penetration rate (%)		10%	26%	38%	50%	62%	73%	83%	90%	100%
Max patient potential		4	10	14	19	24	29	34	38	43
Market share	60%									
Price (EUR)	40'000									
<b>Sales (EUR m)</b>		65	173	258	347	438	526	611	675	765
<b>USA</b>										
<b>Sales (EUR m)</b>		56	149	223	299	378	454	527	582	660
<b>Total sales (WEU &amp; USA)</b>		122	323	481	646	816	981	1137	1258	1425

# Case Study – Costs



Phase II: EUR 18m 2 years

Phase III: 4'200 patients @ EUR 9'000  
patient costs = 1/3 of total costs  
Total costs: EUR 113m 3 years  
(3 \* EUR 38m)

Approval: US and EU: EUR 3 m 1 year

# Case Study – Cost



- Discounts to wholesalers: 8%
- Sales & marketing costs: 25% of net revenues
- G&A costs: 5% of net revenues
- Cost of goods sold (COGS): 11% of net revenues
- Capital expenditures: 2% of net revenues

# Case Study – Developm.

<i>In m EUR</i>		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
		P II	P II	P III	P III	P III	Approval	Market	Market	Market	Market
<b>Cash Flows Development stage</b>											
<b>DEVELOPMENT COSTS</b>		-9	-9	-38	-38	-38	-3		-	-	-
<b>Cash Flows in Market Stage</b>											
<b>TOTAL SALES</b>								122	323	481	646
<i>Discounts, Returns</i>	8%	-	-	-	-	-	-	-10	-26	-38	-52
<b>NET REVENUES</b>		-	-	-	-	-	-	112	297	442	594
<b>Product Costs</b>											
	<i>% of Net Sales</i>										
Sales and Marketing	25%	-	-	-	-	-	-	-30	-81	-120	-161
COGS	11%	-	-	-	-	-	-	-13	-35	-53	-71
Capital Expenditure	2%	-	-	-	-	-	-	-2	-6	-10	-13
G&A	5%	-	-	-	-	-	-	-6	-16	-24	-32
<b>TOTAL PRODUCT COSTS</b>		-	-	-	-	-	-	-52	-139	-207	-278
<b>EBIT / FREE CASH FLOW</b>		-9	-9	-38	-38	-38	-3	60	158	236	316

# Case Study – Successrate

Indication	Success rates (lead indication)				
	P I	P II	P III	Approval	Cumulative
Infectious disease	67%	46%	70%	90%	19%
Respiratory	64%	32%	85%	95%	16%
Autoimmune	68%	37%	81%	76%	15%
Endocrine	61%	38%	69%	90%	15%
Oncology	69%	42%	55%	83%	13%
Neurology	63%	34%	67%	85%	12%
Cardiovascular	63%	27%	57%	90%	9%
<b>Total</b>	<b>67%</b>	<b>40%</b>	<b>68%</b>	<b>86%</b>	<b>15%</b>

Phase II ready oncology product: 42% \* 55% \* 83%

Cumulative: 19%

# Case Study – Summary



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>FREE CASH FLOW</b>	-9	-9	-38	-38	-38	-3	60	158	236	316

## Discounted Free Cash Flows

*Discount rate* 21%

<b>DISCOUNTED CASH FLOWS</b>	-7	-6	-21	-18	-15	-1	16	34	42	47
------------------------------	----	----	-----	-----	-----	----	----	----	----	----

## Risk Adjusted Discounted Free Cash Flows

Annual Success Rate Used 100% 100% 42% 42% 42% 23% 19% 19% 19% 19%

<b>RISK ADJUSTED CASH FLOWS</b>	-7	-6	-9	-7	-6	-0	3	7	8	9
---------------------------------	----	----	----	----	----	----	---	---	---	---

## Sum Risk Adjusted Discounted Cash Flows

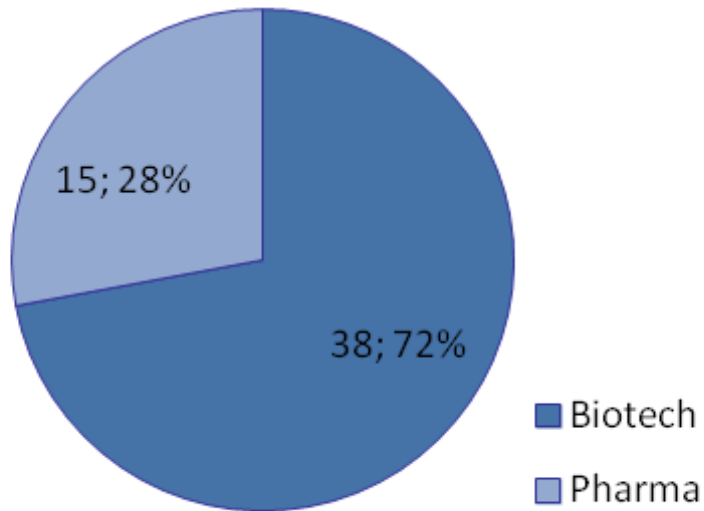
**TOTAL PRODUCT VALUE 53**

Stage	Phase I	Phase II	Phase III	Approval	Market
<i>Probability of success</i>	100%	42%	55%	83%	n/a
<i>Cumulative Success Rate</i>	100%	42%	23%	19%	19%



# Case Study – Deal

## Risk Adjusted Cash Flows Pharma Biotech Split



### Deal Proposal:

EUR 20m up-front

EUR 90m milestones

10% royalties

### Fair Deal:

EUR 6m up-front

EUR 90m milestones

10% royalties

Alternative: EUR 20m up-front & 6% royalties

# Conclusion



- Valuation is key in development of biotechs / LS
- Value = future risk & potential
- Valuation is not an exact science
- Its all about the assumptions



# THE VALUATION EXPERTS

Thank you for listening!

Tel : +41 43 321 86 60

[www.venturevaluation.com](http://www.venturevaluation.com)  
[p.frei@venturevaluation.com](mailto:p.frei@venturevaluation.com)

Venture Valuation AG  
Kasernenstrasse 11  
8004 Zürich



45'000 company profiles in over 70 countries,  
65'000 products, 19'000 licensing opportunities



1) Company Directory



2) Deals Database with financial information



3) Investors database



Partial information can be found free on:



[www.swisslifesciences.com](http://www.swisslifesciences.com) / [www.ukbiotech.com](http://www.ukbiotech.com) /  
[www.frenchbiotech.com](http://www.frenchbiotech.com) / [www.nordic-lifesciences.com/](http://www.nordic-lifesciences.com/)  
[www.germanbiotech.com](http://www.germanbiotech.com) / [www.usalifesciences.com](http://www.usalifesciences.com)