How Biotech Stocks Behave

Example: the Swiss public biotech scene

Typically, many biotech companies end up as failures. This is even true for companies that have reached the public market. A company can usually float with a phase 2 project, but even then many obstacles await the companies on their path to the releasing drug revenues. The Swiss public biotech scene went through particularly hard times. Two years ago Swiss biotechs seemed unable to fail, no company suffered a major loss. But then bad news followed each other, either failures in phase 2 or phase 3 trials, or FDA disapproval. Today, even the European star company Actelion trades 40% below its all-time high because of, amongst other reasons, a disappointing phase 3 trial.

Table 1: Swiss biotech performance (only companies with more than 2 years track record included)

Company	All-time high	May-10	Performance
Actelion	74	43	-42%
Addex	75	12	-84%
Arpida[1]	45	1	-98%
Basilea	283	73	-74%
Bioxell[2]	64	7	-89%
Cosmo	33	20	-39%
Cytos	179	12	-93%
Newron	80	19	-76%
Santhera	135	26	-81%

Looking at this poor track record (of course, compared to the all-time high it always looks bad, and the crisis also helped worsening the situation, but only Actelion and Cosmo are still more or less on track) many might ask whether it is actually worthwhile investing in biotech; is it possible to make money with biotech?

What valuation tells us

Any valuation model using success rates takes care of these negative events, and on average you should be able to make money as long as first, the value is positive when you invest, and second, your assumptions are not completely off. But that's the theory, what does the reality look like?

First, in reality Actelion is a company worth CHF 5.5 Bn and should definitely be counted as a success. Actelion probably already compensates for the other companies when invested early enough. Second, we have to define success and failure more clearly. Naturally, one or two companies out of ten become a success if invested from the start (let's say IPO to be generous) to the end (either with products on the market or failed). But we don't need to hold the shares to the end. In reality many more events happen that can be called success or failure. Table 2 shows that based on biotech success rates[3] we get out of 100 phase 1 projects 167 positive events and 87 negative events, although only 13 projects actually get approved. If we look only at phase 2 projects or later then we get a ratio of 82:72 positive and negative events, almost 50:50.

When then looking at the value development of a normal drug development project as indicated by rNPV we get the value jumps as in figure 1.

[1] Arpida has been taken over by Evolva after FDA disapproval.
[2] Bioxell has been taken over by Cosmo after phase 2b failure.

[3] From the report „Biotech Success Rates – Going the Wrong Way" by Avance.

Table 2: Success and Failure Events for 100 Phase 1 Projects

	Success Rates	100 projects	
		Success	Failure
Phase 1	85%	85	15
Phase 2	58%	49	35
Phase 3	40%	20	30
Review	65%	13	7
Overall	13%	167	87
Overall (≥P2)	13%	82	72

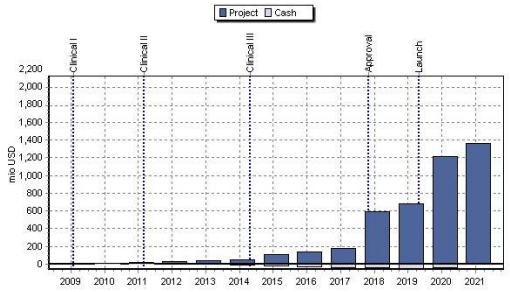

Figure 1: Value development of a one-compound company (calculated with ri:val).

Of course, in case of negative trial results the company value falls to the value of the remaining assets of the company, or in the case of a one-compound company pretty much to zero.

The real picture

We have collected all clinical news of public companies from a group of biotech newsletters and looked at their impact on the share price of the corresponding companies. The following list gives an impression of the reactions of the share prices to the news flow. The list is, however, far from being complete.

Table 3 : Share price reactions to trial results.

Company	Date	Phase	Result	Reaction
Neuropharm	Feb 09	P3	failure	-90%
Synta	May 09	P3	failure	-27%
Poniard	Nov 09	P3	failure	-78%
Spherix	Nov 09	P3	success	+77%
Addex	Dec 09	P3	failure	-65%
Achillion	Dec 09	P1	success	+48%
Ark	Dec 09	Approval	failure	-50%
Medivation	Mar 10	P3	failure	-68%
Antisoma	Mar 10	P3	failure	-72%
Arqule	Mar 10	P2	success	+63%
Ardea	Apr 10	P2b	success	+23%
Omeros	Apr 10	P2	success	+28%
Intermune	Apr 10	P2	success	+65%
Dynavax	Apr 10	P2	success	+35%
Vertex	Apr 10	P2	success	--
Cadence	Apr 10	Filing	success	+10%
Gilead	Apr 10	P2	failure	-9%
BioCryst	Apr 10	P2	success	+15%
Dendreon	Apr 10	Approval	success	+15%
Raptor	May 10	P2	success	+29%
Pozen	May 10	Approval	success	+21%
Pharmasset	May 10	P2b	success	--
InterMune	May 10	Approval	failure	-81%
Newron	May 10	P2	failure	-55%

The vast majority of share price reactions obey the model, i.e. a failure leads to a drop and a success to a steep increase of the share price. The amount of the value change depends, of course, on the rest of the company. The loss of a phase 2 project affected Gilead just with a 9% value drop, while a negative FDA decision took 81% of InterMune's value.

Other events

There are also other events that can have a significant impact on the value. Table 4 lists a few examples:

Table 4 : Share price reactions to trial results.

Company	Date	Event	Reaction
Ligand	Apr 07	Dividend Payment	-24%
Javelin	Apr 10	Merger announcement	+63%
CSL	Apr 10	Collateral effects	-4%
Array	Apr 10	Deal with Novartis	+33%
Transgene	Mar 10	Deal with Novartis	-19%
Glenmark	May 10	Deal with Sanofi Aventis	+3%

Also this list confirms that the value follows the lines that are proposed in the valuation framework. It is, however, a little more complex. A dividend payment

results automatically in a 1:1 value reduction, there is no secret about that. A merger announcement is already more interesting. As soon as the merger price is communicated, the stock surges to that price (with a slight reduction for the time value until the transaction). This could be observed in several occasions like in the cases of Serono and Merck or Genentech and Roche. The CSL example shows, that even once a treatment is on the market, it is not free of uncertainty. The reported collateral effects of Fluvax have led to an adjustment of the sales estimates and consequently to a value reduction. Finally, the announcement of a partnership can also increase the value. First, such a partnership confirms the potential of a drug, or in the case of Transgene it disappoints the shareholders and leads to an adjustment of the valuation assumptions. Second, a license deal leads to a changed risk-profile of the company, as usually no significant expenses are linked to that project anymore and the cash position improves. This should typically lead to a lower cost of capital. This effect is quite opaque and cannot be separated from an adjustment of the assumptions; but we recognise it in several stock charts.

Conclusion

We can observe an excellent correlation between share price reactions and valuation. Of course, all the above-mentioned share price reactions were observed and explained after the event. But it should give us confidence that we can also predict what is going to happen to the share price in various R&D and corporate scenarios.