

High Finance in Biotech?

It is well known that several hedge funds look into biotech companies, and sometimes use some sort of insider knowledge to speculate on trial outcomes and the subsequent move of the share price. These finance experts even use instruments that look rather complex to the layman such as combination of options with different strikes and even expiry dates (so-called straddles). Whether these speculative activities have a significant effect on the share prices is still subject to academic research, even though at least the German government seems to have made up its mind on that.

But sometimes also biotech companies themselves try to excel in the field of quantitative finance. We cite two examples: Cephalon bought in 1997 call options on its own stock, and Cytos raised 2007 CHF 70 mn with a convertible bond. By coincidence, both transactions have been facilitated by what is today UBS Investment Banking.

The case of Cephalon

In May 1997 an FDA panel gathered to decide upon market approval of Myotrophin, an ALS treatment from Cephalon. If Myotrophin gets approved, Cephalon's share price is expected to raise from USD 20 to USD 30-40. A negative decision would probably lead to a drop below USD 15. If Myotrophin gets approved, then Cephalon must pay a milestone to Cephalon Clinical Partners (CCP), to which it previously sold the rights. Actually, Cephalon wanted to purchase CCP in that case, but did not have enough cash at hand. The then-called SBC Warburg proposed Cephalon to exchange 490,000 shares for 2,500,000 capped call options. The

call options had a maturity of 6 months, a strike of USD 21.5 and a cap of USD 39.5. This way Cephalon would earn up to USD 18 per option, or USD 45 mn in total, providing them with necessary cash for the purchase of CCP.

The whole transaction has been discussed in detail in a very interesting article by Chacko, Tufano, and Verter¹. The main reason for the transaction is allegedly risk management; the options provide Cephalon with cash when it needs it most. Of course, the options also correspond to a bet on the approval of Myotrophin. With the options Cephalon leverages the value of Myotrophin.

The day after the execution of the transaction, on May 8, 1997, the FDA decided with 6 to 3 votes, that there was not substantial evidence of the efficacy of Myotrophin in the treatment of ALS. The share price fell to USD 13 and did not recover until the expiry of the options, so they became worthless. Pervious to the panel probabilities of 70% to 80% were mentioned for an approval. While the management of Cephalon would have been complimented for this deal in case of success, they have simply diluted its shareholders by an additional USD 9.8 mn this way. But there was also a winner in this transaction; SBC Warburg hardly did it for free.

¹ Chacko, George and Tufano, Peter and Verter, Geoffrey (2002), "Raising Contingent Capital: The Case of Cephalon.". *Journal of Applied Corporate Finance*, 15 (1). pp. 95-101.

The case of Cytos

Our second case shows, that even in a conservative country like Switzerland, risky transactions are executed. Back in 2007 Cytos, a Swiss biotech company, raised CHF 70 mn with a convertible bond. This means that they have not issued shares to the new investors, but have entered the obligation to pay back the money in 5 years (with annual interest payments of 2.875%) or transform the bond into shares at a predefined rate in case of the share price's rising above a trigger value of CHF 175. The share price at issue of the convertible bond was at CHF 134.30. For investors a convertible bond is attractive, because – usually – the investment is relatively safe (even if the share price drops they get back the nominal value like with a normal bond), but they keep an upside value (in case of good share price development their investment becomes more valuable). For a company a convertible bond is attractive because it is cheaper capital than equity (the cost of equity is significantly higher than the cost of a convertible bond). The debt part has a coupon of 2.875% and the equity part is obviously cheaper, because the conversion price is at CHF 175, which corresponds to a premium of 30% (this is as if the company valuation would be 30% higher).

Previous to Cytos already Actelion and Speedel (meanwhile acquired by Novartis) have issued convertible bonds on the Swiss market. However, there was one major difference. Actelion had certain revenues from Tracleer, and Speedel received royalties on sales of Rasilez/Tekturna from Novartis. Cytos was in a different position. Its most advanced drug was in phase 2b, and all projects rely on

the same unproven technology. But this, apparently, did not bother the investors too much, as is shown by the high conversion premium and the low coupon. No doubt that they expected Cytos' shares to surge once project moves into phase 3.



Figure 1: Share price of Cytos.

Unfortunately, the share price developed in the opposite direction. In August 2011 Cytos announced that it restructures the company in order to preserve value for the upcoming maturity of the convertible bond. One could read that in the following way: "We do not have sufficient cash and even by firing most of our staff we face the danger of bankruptcy". On October 5, 2011, Cytos' market capitalisation is CHF 11 mn, which can be interpreted as pure option value, i.e. value of the scenario where Cytos is actually able to survive the maturity of the convertible bond.



Figure 2: Price development of the convertible bond.

This impression is further accentuated by the fact that the value of the outstanding convertible bond is traded at around CHF 35 mn. This

plus the CHF 11 mn equity equals a company value of CHF 46 mn; much less than the principal of the bond.

With hindsight, of course, it is easy to judge. But let's put ourselves in Cytos' situation of 2007. If the company had taken any of their projects into phase 3, then the share price most probably would have risen above the conversion price and the debt would have been converted to equity. If, on the other side, they had not managed to develop a project into phase 3, this would probably mean that the company would be out of business anyway by 2012, this is even more true considering that the company had already projects in phase 2 back in 2003. So, Cytos basically just raises equity, but to a 30% higher valuation. Well done.

However, each transaction needs a counterparty. And in this case this is the bondholders. For some reason that might remain forever in the dark the bondholders were not worried too much by the more than 50% probability² that the projects will not pass phase 2. This might mainly be due to the fact that, in general, convertible bonds are issued by companies that otherwise could also issue a straight corporate bond. But the companies are in general not yet at a mature state and would face a relatively high cost of debt. Including the option to convert the bond into more valuable equity they manage to reduce the premium. And for that kind of companies a failure is in general not very likely, certainly not in as much as 50% of the scenarios.

² If we assume that all projects are dependent on the well-functioning of Cytos' particular technology, then we can simply take the success rate for phase 2 as the probability, that one project makes it to phase 3.

Convertible bonds belong to the most complicated instruments to value, because it is a hybrid instrument, something between equity and debt. The common valuation models suppose that a share is about equally likely to raise or to fall. This assumption might be reasonable as long as the value only depends on the accuracy of the estimated cash flows. The estimation might be too optimistic or not enough. In the case of a biotech company the value primarily depends on the results of a study, and this is not necessarily 50%-50%. Actually, in the case of a critical phase 2 study it is more biased to the downside.

One very common reaction to uncommon features is simply ignoring them (this is also why so many still use NPV instead of rNPV in R&D industries). And this is what seemed to have happened in the case of Cytos' convertible bond. It is difficult to understand how a more than 50% chance of bankruptcy could be accepted in view of a 30% overpaid equity-like upside. Maybe the fact that the prestigious UBS was the lead manager of this transaction made investors believe that the investment can't be that bad (didn't we see something similar with Lehman Brothers, Goldman Sachs, and other prestigious names in the recent past?).

Conclusion

Biotech investments challenge investors already without the presence of sophisticated financial instruments. If management embarks on financial adventures like the ones described it is essential that all involved parties have a clear understanding of the possible outcomes, and how likely these are. Otherwise the industry

might even appear to be more unpredictable than it actually is, and this only damages its reputation. Cephalon has meanwhile become an important player in the biotech scene; not because of its financial adventures, but because of compelling results. Cytos is most probably playing its own end game right now. The transaction back in 2007 was a good move vis-à-vis its shareholders (30% less dilution). But the bondholders meanwhile have become the more important stakeholders and they are probably something between frustrated and angry because they have not understood, or have not been told about the bet-like business model of Cytos. Learning is a painful process.