NEWS IN AVANCE
VALUATION IN LIFE SCIENCES
July 2008 - N.4
avance
Corporate Finance in Life Sciences

How not to value biotech

In this article we focus on analyst's reports on public biotech companies that have not yet reached profitability. These companies often have a market capitalisation below US$ 500 Mio and are therefore under the radar screen of most analysts. Nevertheless, some analysts accept the challenge to value unprofitable public biotech companies. Reviewing some of their reports, we have discovered some original valuation models that merit a short discussion. We will review in this article the P/E ratio as a valuation method for non-profitable biotech companies.

P/E ratio

Analysts usually value profitable companies. A good and fast method to see how expensive a share is is the price-earning ratio (P/E ratio). If we assume a company with stable earnings, we assume that its value would be as in the formula below.

$$V = \sum_{t=1}^{\infty} (1+r)^{-t} E = \frac{E}{r}$$ [1],

Formula 1: r = discount rate, E = earnings.

If we assume that the market capitalisation of a company, i.e. its price, is the value the market attributes to this company, then the P/E ratio corresponds more or less to the inverse of the discount rate. If the ratio is high, this means that "the market uses a low discount rate", i.e. the investment is perceived as rather safe. A low P/E ratio points at a high discount rate, i.e. a risky investment. If an investor thinks that the market uses a wrong discount rate, then he can either buy or sell the company's shares.

The P/E ratio is so simple and easy to understand that it is widely popular metric amongst analysts. Nevertheless, the P/E ratio has two dramatic disadvantages. It requires the company to be profitable and stable. Biotech companies are mostly not yet profitable and only at the beginning of their planned life cycle. So, the P/E ratio is a bad metric to use for biotech companies, you might think.

P/E valuation of a biotech company

Have a look at the following valuation of Clinuvel, an Australian company, performed by an analyst at Louis Capital Markets. Clinuvel has one product in phase III trials.

Table 1: Sales Analysis

	Potential Peak Sales (US$ Mio)	Probability	Probability Weighted Sales
Phase III			
PLE	40	50%	20
EPP	25	50%	12.5
Phase II			
SCC/AK	240	30%	72
SU	12	30%	3.6
Other	200	15%	30
TOTAL	**517**		**138.1**

Clinuvel develops the project for various indications. The analyst estimates for each indication the peak sales and the likelihood that Clinuvel receives marketing approval for this indication. The overall probability adjusted peak sales are $ 138.1 Mio. As

[1] If a growth factor is factored in the equation becomes $V = \sum_{t=1}^{\infty} (1+r-g)^{-t} E = \frac{E}{r-g}$.

a next step the analyst calculates the net present value of these probability-adjusted sales, assuming that they only occur in 5 years. In order to get to risk adjusted earnings (=Net in table 2) he must reduce the NPV of sales by cost of goods, sales, general and administrative expenses, and taxes.

Table 2: Calculation

	Parameter	rNPV
Sales	At 15% discount	68.7
COGS	15%	10.3
SG&A	~25%	17.7
EBIT		46.6[2]
Tax	35%	16.3
Net		30.3

The final $ 30.3 Mio represent the risk adjusted net present value of Clinuvel's earnings in 5 years. On a per share basis this corresponds to (risk adjusted and discounted) earnings per share (EPS) of $ 0.1. At a share price of A$ 1.07 this corresponds to a P/E ratio of 9.1 (including the exchange rate A$/US$). The analyst then compares this to the Industry P/E (BBG World Biotech Index) of 45.05 and concludes that the share is a bargain.

Dynamic P/E ratio

1. Determine representative year regarding revenues (5 to 10 years in the future): T.
2. Assess revenues for that year: R_T
3. Discount and probability-adjust earnings: $R_t = p*R_T*(1+r)^{-(T-t)}$
4. Calculate EBIT: $EBIT = R_t*(1\text{-COGS-M\&S})$
5. Calculate earnings: $E_t = EBIT*(1\text{-tax})$
6. Multiply with selected P/E ratio: $P = E_t*P/E$

This method, the so-called dynamic P/E ratio, is much wider spread than one would believe[3]. Some analysts do not even use risk-adjusted sales but simply use a much higher discount rate (35%) and factor in the attrition risk this way. But then they all use an industry P/E ratio. These industry P/E ratios differ quite dramatically.

Another analyst from RRS, also valuing Clinuvel, uses a 25 P/E ratio. He mentions, that profitable biotech companies trade at 25 to 40 times their earnings. Other analysts use a multiple of 30.

P/E ratio in more detail

Established drug development companies typically exhibit a P/E ratio of about 10-15.

Table 3: P/E ratios and corresponding discount rates

Company	P/E ratio	Discount rates
Amgen	9.73	10.3%
BMS	14.28	7.0%
Lilly	13.29	7.5%
Merck	11.96	8.4%
Pfizer	9.29	10.8%

We can assume that these companies have reached a stable stage of their business cycle. Therefore we can apply the P/E idea and deduct their discount rates, with some caution. A 30x multiple (read price = 30 x earnings) would therefore correspond to a discount rate of 3.3%. Of course, this does not correspond at all to biotech companies that usually exhibit much higher discount rates than pharma companies.

[2] It is unclear why this is not 40.7.

[3] cf reference Bähr/Manns

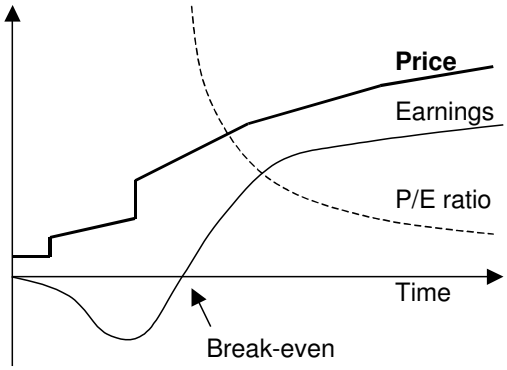

Figure 1: P/E ratio along the business cycle of a company

Figure 1 exhibits first, that unprofitable companies do not have any P/E ratio at all (due to lack of earnings). Second, companies that are only at the beginning of profitability have naturally a high P/E ratio, because the price is calculated using the future and higher earnings, but are divided by the current and lower earnings. A high P/E ratio is therefore not only a sign of an established and diversified business as is the case for pharma companies, but also for a business that is still in growth.

Critique

The described risk-adjusted discounted P/E method has some serious flaws. First, it does not account for all the R&D expenses it takes to get to a profitable stage. Second, it is completely unclear that the selected year represents already a stable state of business. Calculating with the expected P/E ratio in 5 years corresponds to taking the terminal value already after 5 years. This is quite a short period of time in an industry where it takes 15 years to commercialise a product that should then stay on the market for another 10 years. Third, this method is unsuited to correctly account for the tax value of the company (cf. Avance Newsletter May 2008). Fourth and most important of all, it makes no sense to compare with an industry P/E ratio. The P/E ratio depends on the stage of the company and on the discount rate. Both are particular to the company and the selected year.

We can only speculate why analysts use this method. One advantage is that the method is relatively insensitive to the discount rate, one of the most critical parameters. On the other hand the method supposes that the company is comparable to the industry average and uses an at best questionable P/E ratio. It is careless to hope that all the flaws of the method will compensate each other.

With risk-adjusted net present value (rNPV) analysts have a method at hand that accounts for all particularities of the company. Fortunately, most analysts make use of rNPV, although the described dynamic P/E method is widely spread.

References

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