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Valuation—what you need to know

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The basics of determining valuation will help you to understand what criteria matter most for investors.

Valuing a company has always been more art than science. At the best of times, it is a tricky and difficult task, especially for early-stage, biotech companies. The so-called pre-money valuation (which takes place before a company is financed) dictates how equity is divided among a company's investors and entrepreneurs. Those entrepreneurs foolhardy enough to ignore the need for a proper valuation before they begin seeking capital not only may find themselves at a disadvantage in negotiations with investors, but also may have no way of rectifying a situation if the company valuation is suboptimal. In contrast, those who prepare a thorough valuation of their venture often gain a strong negotiating position, even in a buyer's market. Every startup should thus enter financing negotiations with a clear understanding of its value drivers to obtain a fair and full valuation. In this article, we provide a basic outline of how to conduct a proper valuation exercise and present two common methods used to value an early-stage biotech company.

Gauging value

A company's value lies in its potential to generate a stream of profits in the future. All valuation exercises are thus based on envisioning a company's future, relying almost entirely on educated guesses. Value is based on assumptions as to what a company's future may look like, what important milestones will have to be met and strategic decisions taken. These assumptions are grounded in three fundamental factors: first, the state of the market targeted by the company; second, the principle elements of a company's science and technology; and third, the ability of management to deliver on the business plan. An intrinsic part of the envisioning process is thus the ability to question a company's fundamental economic, technological and managerial hypotheses, as well as the likelihood of a company delivering on its promises.

There is no gold standard when it comes to valuation: it is and will remain a subjective task. Consequently, a company can have as many values as there are people doing the valuation. Even so, we would recommend that every valuation start with a systematic and rigorous testing of a company's economic, technological and managerial hypotheses in combination with the following two key approaches:

- primary valuation, which is based on such fundamental information as projected future free cash flow (FCF) and costs of capital;
- secondary valuation, which is based on comparable information, where valuation is done by analogy to other similar companies.

With a good understanding of the above two approaches, an entrepreneur is already well equipped to tackle the negotiations that will ultimately determine the deal valuation.

Fundamental valuation

The most common approaches to primary valuation in the corporate finance literature are generically referred to as the discounted cash flow (DCF) methods, whereby a company is valued at the present value of the future cash flows it will be able to generate. These methods are conceptually robust but can prove difficult to implement in high-uncertainty environments, such as those of early-stage biotech firms. Typical problems include highly uncertain and distant positive cash flows, a business model based on many assumptions and a difficult risk profile. Although the DCF methods commonly applied in such contexts could be construed as

technical overkill (given the variable quality of assumptions made about the future performance of a biotech company and the lack of tangible results on which to base calculations), they can still generate valuable insights into the value drivers of a company (even though the final number generated may be of questionable value).

Corporate finance theory indicates that the value of any asset is equal to the present value of its future cash flows. Therefore, in principle, all that is needed is (i) to estimate the expected future cash flows of the business, and (ii) to discount back to the present all these future cash flows, using a discount rate consistent with the level of risk in the project. In practice though, problems emerge at every step of this process. First, projecting performance for several years into the future is a process seen by many as too speculative to be useful. Second, selecting a forecasting horizon for the future cash flows (5 years, 10 years or 20 years) is purely arbitrary and leaves open the question of the residual value of the business at the end of that horizon. Third, obtaining an appropriate discount rate for an early-stage, privately held company presents difficulties.

Projecting cash flows into the future is never an easy endeavor, especially for smaller, high-growth life science firms. The key data used for valuation is the FCF. According to Copeland, Koller and Murrin[1], "[FCF] is a company's true operating cash flow." In other words, the FCF refers to the cash flows free of (or before) all financing charges related to the corporate debts. These cash flows include all necessary fixed asset investments and working capital needs, as both are normally needed for a viable business. The FCF is estimated through the financial projections of the business plan. Depending on the available information and the time frame needed for a steady revenue flow, a forecast period of 5 or 10 years is most commonly used.

The easiest approach to determining the most appropriate discount rate in a DCF exercise is one that would use the stage of development of the company, which can be determined by the drug development stage of products in the pipeline as proxies for risk (see Table 1). For example, a company that is generating leads without further developed products would be considered a seed stage company and a discount rate of between 70%–100% would be used. Although conceptually a bit loose, the method is surprisingly reliable. Several factors typically influence the risk profile of a biotech company (Table 2). Once identified, the risk factors can then be used to determine the discount rate within the ranges provided in Table 1. The discount rate to be used in a DCF calculation depends on the degree to which a company fulfils each of the criteria. As the discount rate is critical in determining value, it is appropriate to spend time in meticulously assessing each criterion and to investigate the sensitivity of the results to the various parameters. The full DCF approach is illustrated in Box 1.

Table 1: Discount rates to be used depending on stage of product development[a]

Company stage	Discount rate (%)	Drug development stage
Seed stage	70–100	Generating leads
Startup stage	50–70	Optimizing leads/preclinical
First stage	40–60	Phase 1 clinical trial
Second stage	35–50	Phase 2 clinical trial
Later stage	25–40	Phase 3 clinical trial

[a]The discount rate presented incorporates the overall 'risk profile' of the company investigated, a profile driven jointly by technological, market and business (management/organization) risks.Source: reference 2.

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Comparable valuation

The comparable method is also known as a 'secondary' valuation method because it uses the market value of comparable companies or transactions as reference points. The method relies on available key figures, such as earnings, sales, number of employees, number of PhDs or R&D expenditures, to estimate value.

In a sense, secondary valuation makes the assumption that these comparable companies have been properly valued, and can serve as benchmarks when assessing a company. For example, if a comparable public company is valued at $1,000 with R&D expenditures of $500, for a

price/R&D ratio of 2, then the private company to be valued with R&D costs of $200 would, by analogy, be worth an estimated $400. An example of comparable valuation is provided in Box 2.

Cautionary remarks

Humility and realism are the two key attributes of the prospective company valuator. Humility is needed to recognize that the exercise is primarily about envisioning the future, and that the exercise is fraught with uncertainty. Realism will help to understand that the inherent uncertainties do not constitute an excuse for sloppy estimates of the valuation components. Whether the valuation is done explicitly (as in the DCF methods) or implicitly (as in the comparable methods), either method will give an accurate valuation if carried out by experienced valuators.

Although the valuation methods described here are routinely used by investors, we offer three important cautionary remarks to help the newcomer to watch for typical pitfalls.

First, investors often refer to pre- and post-money valuations: pre-money is the value before the investment is included; post-money is the value including the new investment. Thus, pre-money value + investment = post-money value. Investors routinely play with different figures and company data. Numbers are their daily business and they may try to use them to their advantage.

Second, don't enter into negotiations without having completed your homework. Management needs to master the figures and numbers and have clearly laid out its expectations about pre- and post-money value and the corresponding value of its shares. Only with preparation and a good understanding of valuation drivers can management establish itself as a credible partner in front of investors.

And third, valuation is not everything. The investment contracts that accompany investments can easily take away everything that was given in a rich valuation, by imposing drastic restrictions on the future conduct and wealth of the founders. Similarly, a company must feel comfortable with its investors because they will share the same bed, figuratively, for a long time to come. It would thus be foolish to maximize the short-term share price if it is at the cost of the long-term value creation potential of the company. Never lose track of the fact that a financing round is just a means to an end, not the end itself!

Table 2: Reduce the risk profile: what are the driving factors that influence the value of a biotech company?

Management	Market	Technology
Management team	**Product**	**Intellectual property**
˙Historical track record/experience	˙Revolutionary rather than just evolutionary	˙Strong patent protection
˙Varied skill sets	˙High consumer demand	˙Freedom to operate
˙Financial incentives to keep them in place	˙Ease of scalability	**Stage of technology**
Individual members	**Business model**	˙Ready to commercialize
˙Much experience	˙Makes sense	**Technological partnerships & alliances**
˙Entrepreneurial attitudes	˙Broad customer base	˙High probability of partnering
˙Good business judgment	˙Ease of distribution	˙Diverse collaboration
˙Great motivation/commitment	**Industry structure**	**Management of future innovation**
Directors/scientific board	˙Few substitutes	˙Robust pipeline
˙Highly respected in community	˙Little rivalry among existing competitors	˙High chance of second generation product development
˙Independent thinkers	˙Low barriers of entry	
˙Proactive involvement	˙Low bargaining power of suppliers	
	˙Low bargaining power of buyers	

Box 1: Example of DCF model for determining valuation

Table 3 shows the expected FCFs in the next 5 years for a fictitious biotech company. The analysis of the management shows some weaknesses in business development but the overall experience level of the team is excellent, coupled with strong boards of directors and advisors. The market targeted shows high growth rates but also high competitiveness. The science and technology of the company is sound and solid, with strong intellectual property protection and a filled pipeline for the future. The most advanced product in the company's pipeline is in phase 1 clinical trials. This assessment and referring to Table 1 for the stage of the company, a discount rate of about 42% seems appropriate, at the low end of the range for the first stage due to the favorable factors above.

Table 3: Calculation of pre-money value of a fictional biotech

	FCF ($ millions)	Present value (FCF/(1 + Discount rate)^[years from present]) ($ millions)
2004	−1,400	$-1,400/(1.42)^1 = -986$
2005	−600	$-600/(1.42)^2 = -298$
2006	2,100	$2,100/(1.42)^3 = 733$
2007	5,500	$5,500/(1.42)^4 = 1,353$
2008	11,000	$11,000/(1.42)^5 = 1,905$
Continuing value (CV = FCF for 2009/[discount rate − perpetual growth rate])	41,667	$41,667/(1.42)^5 = 7,217$
Pre-money valuation	58,267	9,925

The continuing value (CV) of the company (that is, the value in 2008 of all cash flows in 2009 and beyond) is calculated with a normalized FCF of $12,500 for 2009, estimated by extrapolating from the 2008 FCF of $11,000 (FCF for 2008 is calculated based on the projections in the business plan) on the basis of the established growth trend and a perpetual growth rate of the cash flows beyond 2009 of 12%. The growth rate is estimated based on the long-term industry growth rate of the market in which the company is active. On the basis of the equation shown in Table 3 (present value = FCF/[discount rate – perpetual growth rate]), the CV in 2008 in this example is $41,667 (that is, $12,500/[(42% – 12%]).

Readers should note that even though the assumption of a 12% perpetual growth may sound a little optimistic, the large discount rate of 42% applied (because of the early stage of product development) essentially guarantees that very distant cash flows have very little impact on the value of the company today. The pre-money value of the fictitious biotech company is the present value of the first five years of cash flows plus the present value of the continuing value, which is equal to $9,924 (see Table 3). PV = $FCF_t/(1 + \text{discount rate})^t$ + CV (with t = years from present).

Box 2: Simplified example of comparable valuation

A comparable valuation for a fictitious biotech company is based upon a financial investment into a comparable company that took place, for the example, two months before the present. Table 4 shows the input data for the comparable company and the fictitious company to be valued.

Table 4: Parameters of a company and fictitious biotech company deemed comparable for a secondary valuation

Parameter	Comparable company	Company to be valuated
Past 12 months' revenues	$3 million	$4 million
Employees	15	17
Past 12 months' R&D	$5 million	$8 million
Value	$10 million	?

Based on the information in Table 4, ratios (including price/revenue, price/employee and price/R&D) can be calculated (see Table 5) and used to estimate the value of the company of interest. These ratios are used because they have a direct or indirect impact on the valuation. It would seem to make more sense to use earnings or cash flows as the ultimate basis of comparisons across firms. Unfortunately, most early-stage companies, as development entities, tend to burn more cash than they generate, and usually have negative earnings as well. Comparing losses or cash burns would obviously lead to nonsensical valuations (would a comparable company burning twice as much cash as the company being valued deserve double or half the valuation?). The amount spent on R&D, the number of people working for a company and the level of revenues that can be generated already are seen as better indicators of future performance.

Table 5: Calculation of a comparable valuation for a company

	Calculation		Ratio		Company to be valuated ($ million)		Value ($ million)
Value/revenues	3-Oct	=	3.3	×	4	=	13.2
Value/employees	15-Oct	=	0.66[a]	×	17	=	11.3
Value/R&D	5-Oct	=	2	×	8	=	16
Average value							13.5

[a]0.66 represents a value of $660,000 per employee, or $0.66 million

With all three ratios weighted equally, the resulting (mean) value of the company is $13.5 million, with a spread between $11.3 million and $16 million.

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