Valuation at Cost

In this series of articles we mostly discuss forecast based valuation methods and in particular rNPV. Pretty much all forecast based methods use discounting, be it the Venture Capital method, Fisher Black's method, or Discounted Cash Flows in all its varieties, including rNPV. But there are also other valuation methods that do not rely on a discount rate. Typically, we then talk about comparables.

Another valuation method, which we – quite frankly – never really regarded as a true valuation method is valuation at cost. Valuation at cost is particularly popular amongst accountants and has some big advantages. You do not have to make any assumptions about the future, it is purely based on historical data. So you do not really have to have a clue about the industry and the product you are valuing. That comes very handy for many. Being a bit less sarcastic, we also admit that it is objective, as no subjective opinion about future sales or success rates apply (even though the issue with the success rates is not really true as we are going to see).

Idea

The basic idea of valuation at cost is that all money spent on a project adds value. This interesting claim is actually supported to some degree by a discounted cash flows method.

$$V_0=CF_0+p_0*V_1/(1+r)$$

The value at time t=0 equals the discounted value at time t=1 plus the cash flows in the period t=0. During development CF_0 is usually negative. p_0 denotes the probability that the project survives period 0. Of course, if we isolate V_1 then the equation explains the valuation at cost:

$$V_1= (V_0- CF_0)*(1+r)/p_0$$

Let us assume two scenarios as laid out in table 1, for simplicity even without probabilities.

Table 1: Two business plans.

Scenario	A	B
V_1	11	11
CF_0	-5	-3
r	10%	10%

From time t=1 onwards both business plans assume the same cash flows, therefore the value V_1, which represents the value composed by all cash flows later than t=1, is the same. However, business plan A assumes a first investment CF_0 of -5, while in business plan B CF_0 is only -3 (e.g., it assumes a cheaper CRO). So in scenario A the value V_0 is 5, while in scenario B the value is 8.

Conversely, in scenario A after spending the initial investment of -5 the value increases by 5 (plus some value increase due to capitalisation or inverse discounting), while in scenario B the investment increases the value by only 3. So this might make us want to spend more, because we can increase the value that way as much as we want. This, of course, is not true. In scenario A we start with a lower value and after the first period at time t=1. The idea that the money spent is all value contributing is therefore based on the hypothesis that the initial value is fair. If we cal-

culate the value V_0 under the assumption of business plan B but then spend nevertheless 5, V_1 will still only be 11.

So, valuation at cost means that all money spent adds the equivalent value to an initial fair value. This initial fair value can be 0 if we assume the costs from the beginning, or it can be an arm's length transaction value, if we have bought or licensed the project.

As the above formula displays we also have to take in account capitalisation if we assume that the money is spent in a value adding way. However, the EVCA guidelines (European Venture Capital and Private Equity Association) recommend using valuation at costs at most for one year and only if no material event has happened. Within that period capitalisation barely matters. And obviously also no probabilities matter, because the termination of a trial, good or bad, would qualify as material event.

Fair Value as Starting Point

Valuation at cost relies therefore on at least two very strong assumptions. The first is that we start from a fair value (either 0 if we start from the beginning or the transaction value if we start from the moment of acquisition).

Both of these scenarios are questionable. First, a project does not necessarily have a value of 0 at the beginning. It is probably unlikely that it has a large positive value before any work has been done. Usually value must be created. But it easily conceivable that an idea at least represents *some* value, even though not very much. On the other hand we claim that most projects have a negative value and that is why they are not pursued. Otherwise you could, e.g., start a project to fly to Jupiter. With an at-cost-valuation the value would always be positive.

The other possibility is to start with a fair value, typically starting with the acquisition value of the project. The underlying idea states that you pay what you get; it's a zero sum game. But the assumption that the closed transaction is a fair deal is quite presumptuous. Usually a closed deal is believed to represent the market and that the market is always right. This, of course, makes anyone who has closed a deal a market maker, which is not realistic. Whether the deal is really fair can be confirmed by comparing it to other deals. If you say that a deal is naturally fair and therefore the subsequent at-cost-valuation would be justified, you also say that the market already predicts all your negotiation skills. Ultimately, it means that you believe in fate, that your actions are predetermined. Even if you negotiate badly, the deal would still be fair. So why negotiate at all, you cannot beat the market anyway? This is of course exaggerated. In general it is not possible to beat the market consistently, but you might very well beat it with the one or other deal. On the other hand, if you believe that any deal is fair by definition and therefore neglect negotiation, you are sure to underperform. Keeping up with the market requires all your efforts.

Value Creation by Definition

The second strong assumption is that all money is spent in a value creating

way. If it were that easy! Money only adds value if it increases a project's chances to perform on the market or takes it closer to the market. Otherwise you could just concentrate on spending money, which is considerably easier than crating value. If in doubt, ask a boat or vintage car owner.

What price can I ask for my project?

Joseph DiMasi's number that a drug development project costs USD 1.242 mn is a typical at-cost-valuation. Let's have a closer look at these numbers.

Table 2: DiMasi's parameters for clinical phases.

2007	Phase I	Phase II	Phase III	NDA	TOTAL
costs (US$ Mio)	32.3	37.7	96.1	0.0	**166.1**
success rates	84%	56%	64%	100%	**30%**
duration (months)	19.5	29.3	32.9	16.0	**97.7**

DiMasi also mentioned that for one product on the market it takes USD 200 mn preclinical spendings. He uses 11.5% as cost of capital for capitalisation. Capitalising these USD 200 mn roughly over ten years we receive USD 613 mn of preclinical costs for one project at launch. Of course, this means that these preclinical costs also include the costs for projects that did not make it to the market. In fact, these costs are risk-augmented (instead of risk-adjusted). So, preclinical costs for one IND amount therefore to 30% of USD 200 mn, i.e. USD 60 mn. The costs of phase 1 have to be spent for 1/30% or 3.3 projects to get one to the market. The costs of USD 32.3 mn (which seem fairly high) therefore need to be risk-augmented by 30% and then capitalised from the middle of the phase to launch, i.e. for 88 months. This leads to phase 1 costs of 32.3/30%*(1+11.5%)^(88/12) = USD 238.9 mn. Phase 2 costs lead to USD 187.2 mn and phase 3 to 202.5 mn – if DiMasi's numbers are right. In total we therefore get the USD 1,242 mn.

But what does that mean? Is an approved project worth USD 1,242 mn? Well, no. It means, that if you want to reach a long-term return of 11.5%, then your approved projects should be worth USD 1,242 mn – and you should reach the costs and success rates as indicated.

Sanofi's former CEO Jean-François Dehecq once made a similar back-of-the-envelope calculation. If the company spends EUR 4 mn on R&D every year and gets two approvals, so an approved project must be worth EUR 2 mn. This is of course assuming that the company achieves the revenue targets.

How high do my peak sales need to be?

But let us assume a different set of R&D assumptions, one that looks more familiar.

Table 3: Parameters for clinical phases in oncology.

Oncology	Phase I	Phase II	Phase III	NDA	TOTAL
costs (US$ Mio)	15	30	90	5	**140**
success rates	77%	44%	62%	85%	**18%**
duration (months)	19.5	29.3	32.9	16.0	**97.7**

Assuming the same preclinical costs a cancer project therefore costs USD 1,682 mn at approval. Assuming furthermore a 10 year sales curve and a

55% profit margin, this means that the average cancer project should have peak sales of USD 738 mn – such a project is worth exactly USD 1,682 at launch.

If a company requires a different rate of return, then – of course – the value is different. For a higher rate of return – or cost of capital – the capitalised costs add up to a higher at-cost-valuation, which in return requires higher peak sales.

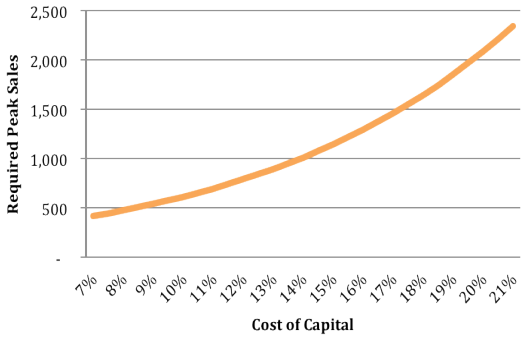

Figure 1: Required peak sales depending on the cost of capital.

The at-cost-valuation only tells you what it should be, not what it is. A project might very well be worth more or less than the money spent. And a potential licensee or acquirer won't judge you on how much you have spent, but only what earnings can one derive from the product. The valuation will be forecast based. The assumptions of the at-cost-valuation are simply not trustworthy and far from reality.