Time is the least considered driver of asset valuations in life sciences – and may be a factor behind the low level of M&A deals so far this year. ICON’s Andy Smith provides some advice to the C-suite and business development managers on strategies to clarify the duration aspect in risk-sensitive transaction negotiations.

As the chase for great assets in biopharma gets tighter, the decision to proceed with a merger, acquisition or strategic transaction usually comes down to price. It’s also likely that both parties to the deal will rely on the standard discounted cash flow (DCF) methodology as the basic criteria to set the value of the asset, reinforced by estimates of future sales growth and market share. Yet while time or duration aspects of value – how long the asset will deliver an optimal return to investors – have significant influence on the ultimate price paid, they are rarely discussed. And why not?

This article aims to bring the role of duration in pharmaceutical valuations into the light, so that the next time an investment banker mentions the large terminal value component of a transaction, the acquiring management team will be better placed to ask the pertinent questions. In cases where capital is at risk, one might assume the components of a DCF model will be carefully evaluated. But only rarely does the role of time figure in the process. That’s unfortunate, because sidestepping an accurate assessment of time and duration in fixing asset value can have larger implications for the health and productivity of the entire biopharma business.
Growing Concerns About Long-Term Risk

It’s also a factor that may explain why investors have been disappointed by the lower than expected number of biotech company acquisitions so far in 2017. Potential acquirers may not be able to justify acquisitions that are based on a value generated far into the future and whose dynamics have little visibility – and are impossible to predict with certainty. In the past, this sort of impasse has been met by also deferring part of the price to the future, as Sanofi did with its use of a contingent value right in its acquisition of Genzyme Corp. Market conditions show that new approaches are going to be expected by investors.

Determination of value by a DCF calculation, typically the net present value (NPV) of a product, a portfolio of products or even a company, is probably easiest for firms with relatively simple asset structures. Despite this, DCF valuations of biopharmaceutical assets are today used by venture capitalists at the earliest stages of company formation, by pharmaceutical business development (BD) directors to assess a potential licensing transaction, and even by CEOs to justify M&A. The power of the DCF lies in its flexibility, not just in the number of products that, for an asset-rich big drug company, can be valued together, but also that key assumptions can be altered for every year across the valuation horizon. This allows the analyst to take into account changes in market share or generic competition.

The calculus around time and duration begins with the consideration of how valuation of a particular asset relates to time. In standard DCF approaches to valuation, there are two specific time components: the horizon period, over which we can forecast the sales growth and marketing spend in detail, and what happens after the horizon period ends. The value of this post-horizon period is termed the terminal value and its duration is opaque.

Exhibit 1 illustrates a hypothetical drug launch with annual sales on the y-axis and the time (in years) on the x-axis. Two Gompertz curves have been used to model the periods before and after the loss of exclusivity. The NPV of the product’s sales includes a two-year investment period but excludes continuing sales and marketing costs. This results in an NPV of just under $2 billion. There will almost certainly be some sales after year 30, but as they decline in the face of established generic competition and a higher discount factor, they become minimal. The length of the first component of a pharmaceutical product’s valuation duration – the horizon period – is still not that easy to define for early-stage assets. Although loss of exclusivity may be known, its impact on valuation will differ depending on the priority dates of the patents filed in different markets, the prescribing preference of physicians, legal proceedings and even the manufacturing-related shortages at generic drug manufacturers.

Exhibit 1

Net Present Value Over A Drug’s Life
Typically for biopharmaceutical products in early-stage development, where the timing of approval and launch (and therefore the remaining market exclusivity) can only be approximated, we use a 10-year horizon period. Valuing just this period for the launch profile in Exhibit 1 results in an NPV of just over $1 billion. The $1 billion gap between the modeled value over the total life of a product, and an arbitrary 10-year horizon, is one of the reasons why DCF valuations also include a value for the product after the horizon period – the terminal value.

Exhibit 2 demonstrates the combination of the present values of the horizon and terminal periods at each year for a different theoretical pharmaceutical asset that is forecasted to launch in 2020. Apart from the first year, the sum of the horizon and terminal values give a similar valuation over the next 11 years. This might suggest that long horizon periods are not required and a two- or three-year horizon added to a terminal value would be an adequate valuation method.

Exhibit 2

Long Horizons Unnecessary?
In a similar way, constant growth valuation methods like the dividend discount model base all of the value of the company on a similar perpetuity-type terminal value calculation but miss the latitude to model (to change key valuation variables and observe the effect) over a foreseeable (horizon) period. About a 10-year horizon period gives the analyst the scope to model changes that could include a different sales growth rate each year and even a different risk profile of the company from a year; say three years after launch, when competition is expected. This ability to model the product over a horizon period results in more flexibility for DCF valuations than for constant growth models.

The terminal value has other reasons to exist. These include the potential for a company to discover or license, develop and commercialize new products or expanded indications, or formulations of existing products that are unknown at the time of the model’s construction. Terminal values also represent the sticky branded preferences of prescribers and other commercial dynamics at a company, from a position 10 years hence. The key point? It is this distant and opaque future valuation component that often becomes a barrier to an acquisition that not even cost savings and synergies can bridge.

**The Goodwill Factor**

The terminal value also reflects a concept that academic writers on company valuation call “unrealized goodwill.” Goodwill is an accounting term that describes the difference between the price paid for an asset and
its book value, and can only be incorporated into a company’s balance sheet as a result of an acquisition. When one company buys another the goodwill takes the place of the cash paid in the acquirer’s balance sheet. Goodwill also includes the control or acquisition premium that is required to compensate the vendor for the transfer of full control over the asset.

If goodwill didn’t exist, then the only acquisitions that would occur would be those close to book value, because making an acquisition in cash without being able to recognize goodwill would destroy value at the acquiring entity. Hence the question arises – what are CEOs paying for when they buy a company for more than its book value?

The answer is they are paying for future growth. This is the same growth in assets or sales that we attempt to calculate both in a defined horizon period, and then with much less visibility beyond that period, in the terminal value. (Also see "Distortion And Inflation In Measuring Pharma M&A" - In Vivo, 16 Jan, 2017.)

**Impact On M&A**

Indeed, if there is a single factor that is holding back M&A in the biotech sector, then it could be the inability to justify large terminal valuations by pharmaceutical BD managers and their CEOs. Even if a public company is not being acquired, we can get a sense of the value of that goodwill or duration of growth at the company by subtracting its reported full-year 2016 book value from its March 2017 market capitalization to obtain what is termed the unrecognized goodwill. A selection of unrecognized goodwill values from selected S&P 500 life science companies are shown in Exhibit 3. For comparison, the unrealized goodwill value of a number of non-life science S&P 500 constituents where significant future growth is obviously not anticipated by the market are also shown. Whether it is a company or an asset acquisition, it is this unrecognized goodwill that needs to be justified. Drilling down further, the duration of the horizon and terminal values are key components of this value.

Exhibit 3

**Unrecognized Goodwill**
When DCF analyses are set the framework for subsequent valuation refinements such as economic value added or shareholder value analyses, the use of a perpetuity calculation for the terminal valuation did not appear to be a contentious issue. In biopharmaceutical product valuations the terminal value is typically calculated by dividing the last horizon year's cash flow (at year 10) by the discount rate and then discounting back to a present value using a factor calculated from one plus the cost of capital, raised to the 11th power (10 plus one time period). This brings up two important questions: is a perpetuity calculation valid, and why use the 11th power to construct the discount factor when the cash flows are presumed to continue for many more than one year after the horizon period?

Companies or patents on biopharmaceutical products don't last forever. Most of the cash flows that derive today from the sale of, for example, Aspirin (salicylic acid), no longer accrue to the holder of the original patent (Bayer AG). In a study by the Financial Times in 2014, the original constituents of the Dow Jones 30 index were compared against those index components 100 years on. Only one company (General Electric Co.) remained, and bearing this in mind I have always found it difficult to recommend, but very easy to calculate, a terminal value based upon a perpetuity calculation. Not only do investment bank analysts use this terminal value calculation, they often inflate the terminal value by including a growth rate in perpetuity (which gives me visions of the sales exceeding the number of molecules in the universe).

In attempting to avoid a perpetuity calculation in the calculation of terminal value, alternative methods have been proposed that include a simple multiple of the year-10 cash flows (I have used two or three) or the price to
earnings (PE) or price to book ratio for the company. I have typically found the latter two give inflated terminal values as in the case of a perpetuity calculation.

**A Patchwork Solution**

One answer to this duration conundrum is to retain the perpetuity calculation, but increase the power in the discounting formula from (year) 11 to something more reflective of the effective life span of the company or product. A higher power in the discounting of the terminal value would imply more years required to generate the terminal value, in the same way as the PE ratio implies the number of years of earnings needed to recoup the stock price. I have run a regression analysis on over 200 public life science companies using the market capitalization of the company as the dependant variable, along with an independent variable based on an adapted academic model consisting of a constant growth valuation that also incorporates book value. The discounting power was solved for, to have as small a difference as possible between the market capitalizations and the forecasted values of the companies.

Over three years, that discounting power ranged from about five to 15 (years) depending on whether the NASDAQ Biotech Index was trading at an all-time high in the summer of 2015, or a recent low in late 2012, respectively. This back-testing for a duration that investors are tacitly using to discount the terminal value of life science companies is akin to the Shiller PE or CAPE ratio in being a snapshot of investors’ appetite for risk in life science assets compared with historical values. In 2017, it could be suggested that a lower than expected level of M&A in biopharmaceutical companies could have resulted from valuations that are too high and are being derived from short durations in the terminal value discount – factors that acquiring CEOs and BD managers don’t believe.

The objective of valuation models for life science assets or companies should be to give comfort to an investor – from a VC to a CEO – that a reliable and representative per share valuation has been generated. In other words, the model should be something more than just an aspirational stock price target.

**The End Game: Timing Risk To The Market Cycle**

So how close are we to finding that sweet spot? The DCF methodology enables an initial period of product sales to be modeled in detail, whereas the time after the horizon period is much less defined. The problem is it often ends up representing an uncomfortably large part of that valuation, which in times of uncertainty like today can be problematic for any acquirer of assets. The level of investor comfort with a large terminal value will vary depending on stock market cycles and investors’ attitudes to risk. After all, some investors bought tulip bulbs just before the plunge in values in the late 1630s. Perhaps if they had determined the duration in the discount factor used to calculate the present value of the terminal value that was implied by those inflated prices, they would have been able to make more rational investment decisions.

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