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Private Asset Management Ltd

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EVERYTHING IS A DCF MODEL

This week's story looks at a paper which was a bit of a hit on Twitter a few months back: "Everything is a DCF Model" by Michael Mauboussin and Dan Callahan of Morgan Stanley. The authors make the point, obvious to many in the financial world but maybe less so to people with proper jobs, that "whenever investors value a stake in a cash generating asset, they should recognise that they are using a discounted cash flow (DCF) model".

They also emphasise that, whilst assets that produce cash flow like shares, bonds, residential and commercial property have an intrinsic value (although we can disagree as to what the value of the inputs to calculate it are) some valuable financial assets do not generate cash flows. Therefore not quite everything is a DCF model: the authors list cryptocurrencies, art, wine and gold as examples of the latter.

But first a brief primer on DCF: the DCF methodology was apparently formulated by a German forester to solve the problem of valuing a forest whereby an investment was made in year one but income and cash flows were typically delayed for 50 years or more. The issue was that people knew you couldn't compare a dollar received in 50 years time with a dollar invested today but how to measure that properly?

The theory is that a share price or the price of anything producing cashflow in the future represents the present value of future cash flows. In other words the share price of a company is simply the sum of all future cash flows of that company discounted at an appropriate discount rate. DCF thus acknowledges that $1.00 today is worth more than $1.00 in a year's time although the period of negative interest rates recently gave everyone a bit of a scare. For a risk-free asset like a government bond the discount rate might be the one-year government stock yield but for risky assets with cash flows far into the future the discount rate is typically the weighted average cost of capital which is a function of the ten-year risk-free rate plus an adjustment for risk. Whilst the risk-free rate is observable the adjustment for risk is as much an art as a science. DCF is one of the most widely used models in finance and is used to value bonds, companies, property, indeed any asset that produces cash flow. Below is an illustration of how a DCF model works:

$$\text{DCF value} = \frac{cashflow\ year\ 1}{(discount\ rate)^1} + \frac{cashflow\ year\ 2}{(discount\ rate)^2} + \frac{cashflow\ year\ 3}{(discount\ rate)^3} + \text{etc} + \text{etc}$$

From the formula we see that there are two factors determining the value of a company and the market as a whole - future free cashflows and the rate at which those cashflows are discounted to take into account the time value of money and risk.

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Let's use a practical example to illustrate exactly how the DCF formula works: Mrs Smith bought $10,000 of a 10 year bond about seven years ago which paid an interest rate then of 5% per year. Today she needs to get her house painted so she rings her financial advisor to sell the bond. We use the DCF formula to see what Mrs Smith's bond is worth now – we know it will be worth more than $10,000 because it is paying 5% and interest rates are much lower today. If the bond has a face value of $10,000 the cash flows in the last three years are $500 in years one and two and then in year three $10,500 reflecting the fact that the money is paid back at that point. The 5% was the interest rate when the bond was originally issued but today interest rates for a three year bond are only about 2% so the discount rate in year one is 1.02, in year two is 1.02^2 and in year three it is 1.02^3. We then put those numbers into the equation as follows:

$$\text{Value of Mrs Smith's bond} = \underset{\text{Year 1}}{\frac{500}{(1.02)^1}} + \underset{\text{Year 2}}{\frac{500}{(1.02)^2}} + \underset{\text{Year 3}}{\frac{10500}{(1.02)^3}}$$

$$= 490 + 481 + 9894$$

$$= \$10{,}865$$

So that's it for a bond – not exactly rocket science but it can get quite complicated – particularly determining what the appropriate discount rate is and of course forecasting cash flows so far into the future. The authors make the point that one of the attractions of the DCF model is that it forces you to make the assumptions and then debate those assumptions with your superiors who review the model. Back in the 80s I spent most of my time writing DCF models analysing the viability of Tasman Pulp and Paper's proposed fourth paper machine, geothermal power stations and other stuff. The fourth paper machine model incorporated Monte Carlo analysis and got so big that we had to run the model at night because it slowed the paper machines down during the day! Today with the advances in computer power you could run a model like that on a laptop at home.

The key takeaways of a DCF model are that the lower the discount rate the higher the DCF value and the further away the cash flow the lower the DCF value. In a stock market context value stocks typically have cash flows which occur reasonably evenly over the investment horizon whereas growth stocks are frequently characterised by their tendency to produce cash flows further out into the future. This partly explains the reason why, when interest rates fall, growth stocks tend to rise more than value stocks – the net present value of their cash flows is more sensitive to a change in the discount rate. A stock market example of DCF's utility is that, all other things being equal, if investors think that interest rates are going to rise they should be overweight value versus growth.

Brent Sheather is a Financial Advice Provider. A disclosure statement is available upon request. Brent Sheather may have an interest in the companies discussed.

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