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Valuation – How Do I Approach it?

As alluded to last month I am going to write some notes on valuation, particularly as applied in research. This month I am concentrating on standalone valuations, and in particular DCF modelling. I will look at comparative valuations between peers next month.

Countless volumes have been written on valuation, including methodologies used on resource equities. I will not attempt to provide a detailed description of these methodologies here, but rather discuss my approach, and what I believe are the major pitfalls and other things to watch out for.

When Do I Carry Out a Valuation?

For those that read my notes you will notice that not all include a valuation. Valuations are only carried out at the request of the company commissioning the note, and then they are only usually done on advanced projects that have some chance of proceeding to development. At times, where a company has a published study (be it scoping, pre-feasibility or feasibility), and a valuation has not been commissioned, I may carry out a high level review of the data and comment on the veracity of the inputs and results.

What Methods Do I Use?

The main method I use is Discounted Cash Flow ("DCF") modelling, which results in a Net Present Value ("NPV") and Internal Rate of Return ("IRR"). The NPV gives the discounted value of future cashflows, and is dependent upon the discount rate used; the IRR gives the percentage return from future cashflows on the initial investment, and is not affected by the discount rate. The IRR is that discount rate that if used in the NPV calculation, would result in an NPV of zero.

DCF is a well understood and commonly used method, and is suitable for ongoing or potential new operations, where inputs can be reasonably estimated (or in earlier stage projects "guesstimated"). This is the method I will concentrate on in this column.

In many cases a company has a portfolio of projects, but there is often a key project which can be valued by DCF. The other, lesser important projects need to be ascribed some additional value. Here comparative valuations can be used, but in the case of writing research, they are indicative only, and even in professional valuations (say for an IPO or transaction) are based on the informed and educated opinion of the valuer (as are all valuations). Comparative methods include market value relative to a company that has similar projects, or else a valuation based on recent transactions amongst others.

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DCF Valuations

Rubbish In – Rubbish Out

A typical Excel DCF model takes a series of numbers (the inputs and assumptions), does various things to them, and then spits out an answer or a series of answers (the results).

The mechanics of the modelling are well understood and generally not that much different between analysts – different models may use different methodology for things such as depreciation, and real versus nominal cash flows, however if you give two analysts the same set of inputs they will generally arrive at similar valuations.

Therefore it stands to reason that the result is very much dependent upon what goes in the front end – this is where care needs to be taken – with the wrong inputs (for example which are commonly wildly optimistic), you will end up with a a valuation that is not realistic (and again commonly optimistic). Just a quick aside – research has shown that valuations commonly err on the optimistic side by up to 30%.

What needs to be appreciated is that the level of confidence in the results of a valuation is in the order of +-40% if done to Scoping Study accuracy.

How are Inputs Chosen?

Key inputs include:

1. Mineral resources/reserves
2. Metallurgical factors
3. Mining factors – mining methods, strip ratio for open cut, mining dilution
4. Capital costs
5. Operating costs
6. Taxes and royalties
7. Commodity prices
8. Exchange rates
9. Financing details
10. Discount rate

Resource and Mining Inputs

The first three inputs are deposit specific, and are really the keys to whether a deposit is economically viable.

One vital point here is the difference between resources and reserves. A mineral resource is the in-situ tonnes and grade of a mineral deposit, a reserve has had modifying factors applied, and is what may be economically extracted out of the ground. There are areas of resources that will not convert into reserves as the economics of extracting that ore block may not stand up, with factors including the grade and morphology of mineralisation affecting economics.

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In addition a reserve will include dilution. Where a model is based on resources only (i.e. the company has not done the studies to enable it to publish reserves), estimates may have to be incorporated for the resource to reserve conversion ratio (i.e. what percentage of resources convert to reserves, and hence how much of the material can be extracted), and what amount of dilution and the grade of that dilution is likely. These are estimated on a case by case basis, and there are some general rules of thumb that can be used.

Another key question is that is the resource estimation methodology used applicable to the style of mineralisation?

Metallurgy is also vital – poor metallurgical performance will decrease revenue (and increase costs per unit of metal produced), and complex metallurgy will increase both capital and operating costs.

Cost Inputs

The next three inputs are generally well understood, and a reasonable estimate can be made as to the respective figures. These inputs can be tightened up depending on the level of advancement of a project, and what studies have been completed by the company.

Confidence in selecting these inputs is backed by a very large database of historic and current operations, including sources such as the cost data and curves published in “The Mining Valuation Handbook” by Victor Rudenno.

Maintenance capital is a number that could be termed a bit of a guesstimate. For a long term operation, it can be viable to use an annual figure equal to initial capex divided by the mine life – i.e. for a twenty year mine life a figure of 5% of initial capex per annum is fine. Other methods include a percentage of revenue – commonly in the order of 3-5%, or a figure per tonne of ore mined.

Another factor at play here are depreciation methods and timing, which will affect the outcome. I will commonly fully depreciate capital over the life of the mine – this can be done on a time basis or unit of production basis. Some valuations will not fully depreciate assets, hence resulting in a residual value.

Revenue Inputs

The key revenue inputs - prices and exchange rates - are where there is a large chance for inaccuracy, and are ones for which models are commonly most sensitive to, particularly where grades are comparatively low. The real question here is “how good is your crystal ball”? The answer to that question is, judging on past forecast performance by a large proportion of forecasters is “not too good at all”.

So what do I generally do? In the absence of reliable forecast price data I tend to use flat prices for the life of mine. Metal prices, particularly base metals, have entered a new paradigm since the end of the GFC and the mining boom. In the case of base metals, until the start of the boom in around 2003, prices were comparatively stable, followed by a period of volatility, driven by the mining boom and the GFC. Prices have again stabilised since the middle of 2011, although at a higher level than pre the volatility. This is shown in the following chart.

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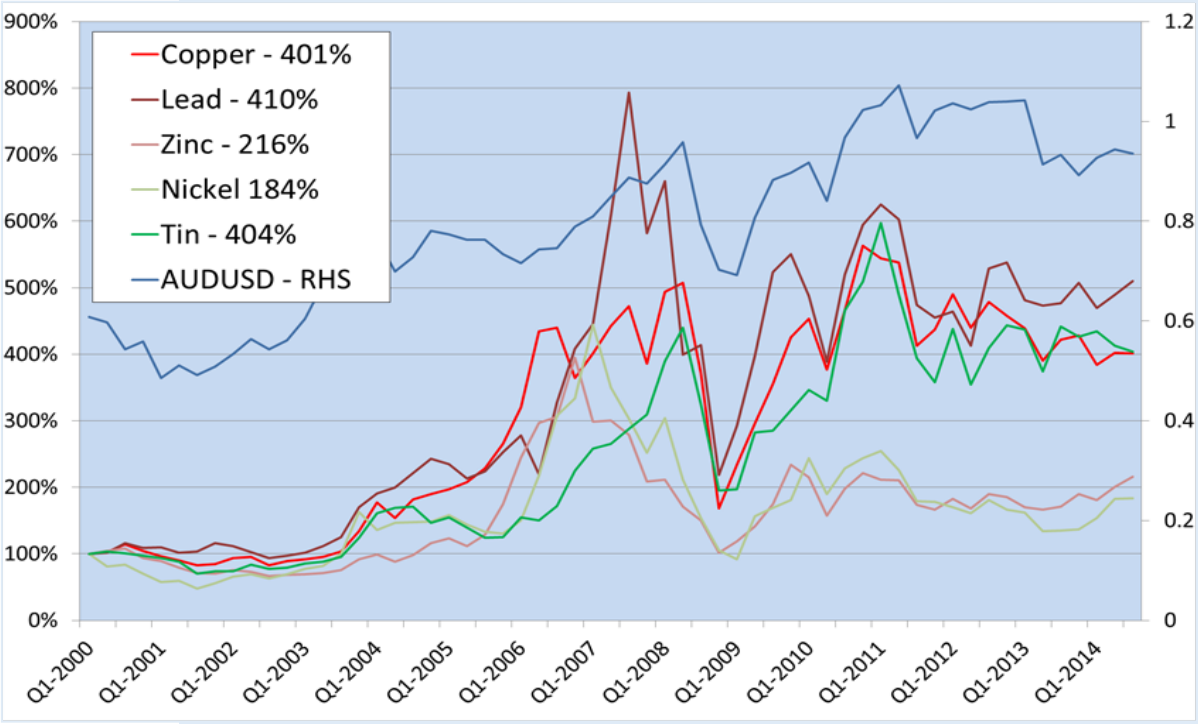
Prices are indexed to 1/1/2000, so the chart shows relative performance instead of actual prices for the metals.



Given the above my view is that it is reasonable, at least in the case of base metals, to use a flat price for the foreseeable future, with a price that approximates the average from Q3, 2011 to now. If need be the forecast can be conservative, and be set at say 10% lower than the average.

For the bulks and precious metals things currently are a lot different, given their volatility. There are widely differing views on future pricing, so sensitivity analysis (see below) is vital in any modelling to reflect the differing views.

Exchange rates are another critical factor, and in the case of the Australian vs US dollar, hard to forecast – there again has been a paradigm shift in this rate. Again this should be included in sensitivity analysis.

Financing Details

Depending on the stage of the project, financing details can be included in a model. The main difference to the NPV will be in the after tax cost of servicing debt. In addition, a financed model will have an unrealistic IRR (or no IRR) – the funding drawdown at the start negates the negative capex figure, and an IRR requires a negative cashflow at the start for calculation.

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Discount Rate and Discounting

The discount rate is a parameter that can be set to reflect risk in the project – the higher the discount rate used the higher risk of the project. There is another way, which I use, to risk a valuation, which is explained below.

The starting point for a discount rate can be amongst others the weighted average cost of capital ("WACC"), or the stakeholders "hurdle rate", which is the required return on investment.

My starting point, given the low interest rate environment, is generally 10% real (which equates to around 12% nominal at current CPI increases). I generally do not use the discount rate as a risking tool – I discount the resulting NPV using multiplicative discount factors based on the stage of the project as given below.

Project Stage	Multiplication Factor
Inferred Resource	5 to 20%
Probable Reserve/Indicated Resource	20 to 50%
Measured Resource	50 to 80%
Proven Reserve (or an operating mine)	100%

Again, there is a range of multipliers which can be used – which to use will come down to additional risks (e.g. sovereign, marketing) inherent in a project.

Sensitivity Analysis

I feel it is vital to include sensitivity analysis in any valuation, particularly where there may be widely divergent viewpoints on inputs – this particularly relates to future commodities pricing. This calculates changes in NPV and IRR (or any other output that is relevant) with changes in inputs. This measures the robustness of the project (I like to see a project being able to weather at least 20% adverse changes in key inputs), and also allows potential investors, if they have a different view on any input, to readily ascertain what they may think the project/company may be worth.

All key inputs, both on the revenue and cost sides, are included in this analysis, with the result either being a spider graph or sensitivity table. I generally vary inputs from a -20% change to +20% change using 5% increments.

The Final Word

My view is that the key comment from the above is "Rubbish In, Rubbish Out". On my side, being an analyst, care has to be taken on the selection of inputs into a model so as I give potential investors a reasonable idea of what the value may be. However, investors do need to be aware that the accuracy of most modelling is in the order of +-40%.

On the investor's side, caution needs to be taken when looking at valuations, particularly in company releases. These are generally associated with completed studies (scoping, feasibility and pre-feasibility), with increasing confidence with the later stage studies.

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These also generally give an un-risked project NPV, and will be used for decisions by the Company on whether to proceed or not.

In the past I have seen some shockers of so called “valuations” released by companies, with inappropriately optimistic inputs (particularly commodity prices) being used particularly when the study has been internally prepared. However, with the advent of JORC 2012, rules regarding the public release of valuations have been tightened up, and also companies are now tending more to use independent consultants to prepare relevant studies, which should give a higher measure of comfort in the inputs used.

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