Investment decision methodology

By Phillip Crowson

General comments

Rio Tinto-Zinc (RTZ) has a luxury, perhaps denied to state-owned companies, in that it does not have to develop uneconomic deposits. In this context it is wishful thinking to argue that any deposit can be economic if only the exchange rate is "correct" (eg, the Indian case of copper mining needing 1.5-2 USD/lb at 1981 prices).

We are in business to make profits for our shareholders and not to massage anyone's ego, support home industries, maintain or expand market share, protect an investment upstream or downstream, ensure supplies, etc. etc.

Each project should stand on its own two feet and be looked at in vacuo on its merits.

The basic criteria for evaluating projects should not differ substantially. That affects the desirability of projects for a particular investor, however, rather than the criteria used.

Mining projects often have up to ten years' gestation period and 20-40 year lives. For most investors such time scales would be regarded as very long run indeed.

Administrative arrangements

All project analyses are prepared to a common format with common assumptions, methodology, etc. They are checked by a small central department to clarify details and raise questions. The group has a decentralised management system with responsibility devolved down the line. Although the centre is the source of finance for projects, it does not attempt to "second guess" line management. Each stratum of management has a budgetary limit for capital expenditure, but it is such that no part of the Group should be able to build plants by stealth.

Projects are discussed and approved by a Committee of the Board which is prepared and able to act very quickly. This is especially important when acquisitions are involved.

Criteria for new investment

In essence a DCF approach is used with the requirement that projects meet the company's pass mark which is expressed in real terms after tax. The net present value has to exceed zero when discounted over the project's life at that pass-mark.

This is based on extensive academic studies into the long period rates of return to private individuals in the UK. It is assumed that the company must achieve rate of return such that it achieves that requisite rate — ie, meets its cost of capital. This is taken as about 7% per annum. The difference between this and the higher pass-mark is to allow for marginal projects, all central costs not borne by any project, and the inevitable mistakes.

The calculations are made both on the assumption that the project is entirely equity-financed, and on the expected methods of financing.

The analysis is made throughout in money terms in order to incorporate adequately the effect of taxation and debt service (both of which are expressed in money terms).

The final cash flows are deflated to real terms to check whether projects achieve the criterion.

For large and significant projects the main sensitive variables will be subjected to some form of sensitivity analysis. This might (preferably) take the form of a full Monte Carlo analysis of all relevant aspects of a project to calculate the expected variance of the rate of return around the mean. More usually there will be a far simpler analysis.

We do *not* use different pass-marks for different industries or different geographical areas. Any risks of these types will probably be assessed subjectively.

Typically, however, the objective would be to reduce the financial risks to

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the parent company by watever strategems are available — eg, long or medium term sales contracts to reduce the marketing risk and obtain as much security as possible for the financing. The assumption is that funds are always available for balance sheet, and to the requirements and perceptions of lenders. Off-balance sheet finance of all types might be used, perhaps linked to sales contracts. These can usually be negotiated without giving away too many concessions. Certainly major ventures would be project financed, with the minimum necessary amount of equity injected by the parent company. It is salutary for the banks to discover that nonrecource finance means just that (eg, East Kemptville).

So much for the basic approach. There are several major problem areas, even assuming that the various technical evaluations (eg, of ore reserves) are straightforward (which they are not!) and that costs can be estimated accurately. Some can, but many important costs are other people's prices — eg, energy, etc. Due allowance has to be made for their variability.

Prices

A problem for the mineral industries generally has long been the "straw hats in winter syndrome". One of the more crucial assumptions in any project is the expected price of the output (and by extension of some inputs).

Our approach has been to require all those putting up projects to use pre-defined prices. If nothing else, it enables people throughout the company to practise the voodoo arts of sticking pins in dolls! Here incidentally we do not have the luxury of public sector monopoly pricing.

The pre-defined prices have been the best estimates of long-run equilibrium prices, based on analysis of supply and demand, with the emphasis laid on long-run marginal costs but these shade into short-run costs. (It is interesting to hear comments about tin prices returning to normal. They are reminiscent of the copper industry several years ago. The only normality is what the market will bear, and that changes. The drop in tin prices has permanently changed the dynamics of the tin market.) We are not looking at short-run prices in the near term, but at the expected averages over a project's life.

Historically, this has meant prices which have been judged conservative by the industry's normal yardsticks. Hindsight shows we were not only right but not conservative enough. Fine, but the situation has arisen in recent years that our expected long-run prices were in many instances above prevailing price levels. The latter were held back by a variety of influences loosely embraced under the heading of excess capacity.

Now the problem comes. Projects may meet the pass-mark at the assumed prices, but look unattractive at recent levels. What is to be done — invest and be damned? Often that is what will happen through the adverse responses of the financial community. Move the goal post? Why if the analysis has been done thoroughly and honestly?

The answer appears to be to introduce other criteria. There are several candidates of which two are:

(a) *Comparative costs.*
These mean something in a reasonably free market, but not a lot in the short-run in a regulated market (although even OPEC has been unable to defy gravity indefinitely).

In any discussion of costs, it is very important to recognise that they are not static. A mine that was low cost in the early 1980s would now be relatively high cost unless it had taken steps to improve its efficiency in line with the rest of the industry. This dynamism of costs qive a perspective to statements about the need for high cost producers to close down. An alternative has been to reduce costs, which is what many have done. There has been a massine game of leapfrog which has benefited consumers but prolonged oversupply.

Even where costs are relevant what costs should we talk about? New projects need to cover their capital as well as operating costs at least prospectively. Once a project is completed, only its operating costs matter — ie, it is necessary to compare the full costs of a project with the cash costs of the industry. Perhaps this in an onerous yardstick which negates any project. Is that necessarily bad in a period of excess capacity?

(b) *Estimation of project cash flows in early years on "conservative" prices related to the industry's cash cost.*
Average long-run prices do by definition disguise variable prices in the short term. Not all projects can get their timing right.

Exchange rates

The second major problem, apart from prices, is the treatment of exchange rates. A UK-based company has this problem with almost any project in the natural resources area, but it affects all companies which have revenues in one currency and costs in another.

Given the variability of exchange rates, not only on a daily basis but also over extended periods, what is the right treatment of exchange rates both theoretically and in practice? A view of some sort has to be taken. There is a wide variety of possible approaches.

Use today's rate whatever that might be. At least it is definite and objective. Use of such a rate satisfies those who believe that foreign exchange markets are efficient.

Also the economists' record in forecasting is not very good.

The track record of most models over long periods is fairly poor, and the forecasts tend to change substantially even several years ahead. That suggests they

are heavily influenced by today's rates or at least by recent experience.

Use a real term average rate based on the historical experience. Again it is objective, but is it fully valid? It also does not reduce the need for forecasts in that it implicitly assumes some purchasing power parity theory.

Should the rate adopted be adjusted in money terms analyses by projected relative inflation rates? How good are forecasts of such rates? Our own comparisons of the main international econometric models show considerable differences between them and also marked changes in such model's predictions over time. There is often a fluctuation rather than a trend. In practice, the variability of exchange rates can make a mockery of sophisticated evaluations.

Conclusion

Project appraisal itself is relatively straightforward. Sophisticated computer programmes can do most of the work, and some form of computing facility is now essential. The more difficult issues concern neither calculations nor the criteria but the assumptions underlying and project's cash flows.

We presently look carefully at the revenue side and may place too little emphasis on the costs. Perhaps that is because costs can to a large extent be controlled but revenues are in the lap of the Gods. What price chicken's entrails?