The economics of the Australian gold industry depends on a range of questions which need to be addressed by analysts in evaluating companies and projects. This paper focuses on valuation issues associated with capital structure, gold price hedging and taxes.

Debt financing

It is commonly accepted that for a taxpaying entity, debt financing creates value insofar as interest is a tax deduction but dividends are not — the value of debt financing being equal to the present value of the tax deductions associated with the interest rate shield.

The Australian gold industry is, however, tax-exempt. Together with dividend imputation, how does this influence a company's optimum capital structure?

The industry's financing requirements are essentially to fund development and exploration. Since the early 1980s the industry has grown from 17 tonnes per annum to around 85 tonnes per annum; in other words, more than two million ounces of annual capacity has been brought on-stream during the period.

Gold-mining capacity costs somewhere in the range of $300 to $500 per annual ounce, so we can conclude that something like $1 billion has been invested in development in the 1980s. Given the perceived importance of the gold industry this is a modest amount (this level of investment would be insufficient to develop a new iron mine in Pilbara), highlighting the point that the gold industry is not capital-intensive. This fact, together with the availability of finance, has facilitated the emergence of numerous "junior" mining companies. It would appear to us that about two-thirds of development finance has been sourced by debt.

Based on work done last year for the Australian Goldmining Industry Council, we estimate that a further $1 billion has been invested in exploration in the period. Clearly, exploration funding can be attributed to equity, be it retained earnings or new equity. This means that debt/equity ratio for direct expenditure by the gold industry is around 0.33 — less than the average for other sectors of the mining industry. It would be fair to say that before the production surge which started in 1983, the gold industry was essentially financed by equity.

In considering whether debt financing confers value, in the absence of corporate taxes and under the current dividend imputation regime, we should look at debt bearing market rates of interest (it is obvious that debt at less than market rates, such as was available to the gold industry in the past through preference shares, adds value).

It is generally accepted that the value of a leveraged firm or project equals...
the value of an unleveraged firm plus an adjustment for the benefits of debt finance so that:

\[
V_l = V_u + \left(1 - \frac{\text{Tc}}{(1 - \text{Tc})(1 - \text{Tpe})}\right)D
\]

where:
- \(V_l\) = value of a leveraged company
- \(V_u\) = value of an unleveraged company
- \(\text{Tc}\) = corporate tax rate
- \(\text{Tpe}\) = personal tax rate on equity
- \(\text{Tpi}\) = personal tax rate on debt
- \(D\) = amount of debt

In the past, it has been most unlikely that \(\text{Tpe} = \text{Tpi}\), with personal tax rates on interest being higher than personal tax rates on equity. Where \(\text{Tc}\) equals zero, we can conclude that debt finance under these circumstances would have reduced the value of a gold project.

Circumstances have however changed, and after the introduction of dividend imputation and a capital gains tax, personal taxes on equity are now likely to approximate personal taxes on debt, at least for the domestic investor. For the gold industry, where \(\text{Tc}\) equals zero, we show that under the current tax regime the value of the leveraged firm/project is identical to the value of the unleveraged firm, meaning that debt financing confers no value. (Of course, the value of the equity in the leveraged firm still equals the value of the unleveraged firm minus the level of debt.)

It is true, however, that share prices for many emerging gold producers have increased after an announcement that debt financing has been arranged. It is contended that this has more to do with the information content of the announcement (i.e., development is proceeding and viability has been confirmed by a risk-averse third party) than with the issue of whether debt financing confers value.

If debt financing does not confer value, then why use it? Since debt costs as much as equity (allowing for differences in risk), a preference for debt probably is related to qualitative issues such as dilution of control and flexibility.

**Gold loans**

The previous section dealt with debt carrying market rates of interest. A number of gold financings — in particular, gold loans, but also gold bonds and other convertible instruments — carry coupon rates significantly lower than market rates of interest. It is tempting to conclude, therefore, that value has been created for the gold company/project with the benefit equal to the present value of the apparent interest saving (discounted at market rates of interest).

There are no free lunches given by the financial community, so why should the gold industry be treated differently? The following suggests that gold-loan financing carries a cost similar to those of other sources.

In a gold loan, a bullion bank advances gold which, when converted at current spot prices, gives the project sponsor his development finance. The number of ounces borrowed is repaid by the same number of ounces from subsequent production (irrespective of future gold prices) plus an annual interest rate of up to 4 per cent.

To show why, at the time of drawdown, this is no cheaper than a conventional cash loan bearing market rates of interest, it is necessary to focus on what represents an unbiased estimate of future gold prices.

Gold is a financial asset which defies fundamental supply/demand analysis for predicting future prices. Given that the gold market is both sophisticated and efficient, we can conclude that at any time gold is priced to yield a return comparable with assets of a similar risk, such as government bonds. In fact, gold is analogous to a zero-coupon bond, where the future expected price is today's spot price plus market rates of interest. If this were not the case, an arbitrage opportunity would arise and we know that arbitrage opportunities don't last long in an efficient market.

A model of gold prices increasing in line with interest rates is confirmed by the gold futures market, where the forward price is always at a premium to the spot price — the premium, or contango, being equal to the market rates of interest.

A gold loan with its repayment in gold means, however, that the gold producer cannot avail itself of the contango, which is the expected increase in gold price. That is the opportunity cost of going the gold-loan route.

**Ex ante**, gold loans therefore confer no economic benefit on the project sponsor and hence they should not play a part in project evaluation. **Ex post**, the situation could be different and for this reason the analyst needs to keep on his toes. Notwithstanding our contention about what represents an unbiased and neutral price model, observation tells us that gold prices follow a fairly random walk. Should prices rise more than expected, then the gold loan (through the opportunity-cost notion) will have reduced company value compared with what would have been the case had the...
Gold bonds and other securities convertible into gold include an option element. Options have value and the cost of granting options to debt financers needs to be recognised by both the borrower and the broker. We are normally concerned with the cost to the company of granting a call option to the financer; that is to say, allowing the financer the right to demand delivery of gold at a predetermined price. We must be aware that the value of an option alters with changes in spot prices, volatility, time to maturity and interest rates.

**Gold price volatility**

While we can state with certainty that reduction in gold price volatility through a gold price management program will enhance company and project debt capacity, it is not obvious that, ex ante, value has been created for the company’s shareholders. First, debt financing does not add value; second, it is not clear that shareholders with a reasonably diversified portfolio are unduly concerned about the volatility of gold prices.

Numerous studies have been made of whether gold actually acts as a hedge, reducing the overall risk of a portfolio. (A “perfect” hedge is one with a beta factor of minus 1; that is, the returns on this asset are equal, but opposite, to the returns from holding the stock market index. Combining this perfect hedge with the market portfolio, having a beta of plus 1, results in a riskless portfolio.)

These studies indicate that gold has a negative or low-positive beta, which tends to confirm that the addition of gold to a portfolio, while not a perfect hedge, is likely to reduce the portfolio’s overall riskiness. In a recent study by Resource Finance Associates, we observed that the beta of gold bullion against the all ordinaries index over the 10 years to 1987 was 0.26.

Putting in place a gold price management program has the effect of breaking the nexus between gold price movements and movements in share prices, meaning that gold prices under such a program would have a beta of zero. But since gold already has a low beta, little has been achieved in an economic sense.

**Gold price management programs**

It is important for the analyst attempting to assess company/project value to understand the type of gold price management program in place. Our guess is that one-third of current production would be subject to some form of hedging. It is also important for analysts focusing on near-term earnings to recognise that normally the programs cover only part of annual production and that they are in place for a limited time — two to three years.

In projecting profit figures it may be tempting to deduct gold loan repayment ounces from the estimated revenue stream or, worse, the profit line. This tends to distort expected profit performance. With a gold loan the company has effectively borrowed cash and forward-sold part of the production at the spot price prevailing on drawdown. For comparative purposes, the projected revenue stream must include all production at the actual price received; and actual price received for the production dedicated to the gold loan repayment is the price at which the loan was drawn down.

We believe that profit-and-loss projections should allow for gold prices increasing with interest rates (or real interest rates, which remain at historically high levels should inflation be excluded from the projections) for the unhedged portion of production. This will help partly to explain why gold stocks deserve relatively high p/e ratios on near-term earnings. Another popular form of comparative analysis — market capitalisation per annual ounce of production — requires judicious interpretation to allow for different gold price management programs (and capital structure, among other things).

We have mentioned that options have value. A company writing call options over its future production will receive a benefit at the time of writing the option, at the expense of transferring value to the option-holder at a later time. Presumably the cost/benefit analysis at the time of making the decision was in balance, but with the passage of time the benefit is often consumed while the cost remains. In our experience few studies by industry practitioners allow for this aspect.

**Taxation on gold**

It has long been our view that some allowance must be made in company valuation and project evaluation for the possible introduction of a corporate tax on gold. We would undertake an expected value analysis by assigning probabilities to both full-tax and no-tax cases; the assigned probabilities would depend on the then status of the gold-tax debate.

While the Australian gold industry is exempt from corporate taxes, the Australian taxation system has undergone considerable change with the introduction of dividend imputation, a capital gains tax, a lift in company taxes to 49 per cent and a reduction in the top marginal personal tax rate to 49 per cent. The general effect of these changes has been positive. With the removal of one layer of tax — either the company pays or the ultimate shareholder pays, but not both — a general adjustment is required to the standard valuation/evaluation criteria employed in previous years.

Various classes of investors are affected differently by the changes to the taxation system and it can be shown that the gold industry has lost some of its relative attractiveness. Indeed, for the tax-paying investor, his effective tax rate is the same be it an industrial or gold investment.

This analysis does not go far enough because capital gains tax, which in our view is a form of double tax, tends to have a greater impact on growth industries, such as the gold industry, than on established industrials. Nor have we raised the issue of who is the marginal investor most likely to determine asset values. In our view, the gap in effective tax rates between the gold industry and other industries is not as great as many imagine.

We have examined some financial issues that intrigue experienced gold analysts and can summarise as follows:

- Debt financing is unlikely to increase the value of a gold company or project.
- While gold-linked financings ex ante have no impact on company or project value, ex poste their impact will depend on gold price movements.
- Action to avoid gold price volatility is unlikely to result in an immediate change in asset values. Future gold prices will determine the economic wisdom of hedging production today.
- Tax is omnipresent; despite the apparent tax-exempt nature of the industry, economic studies should make some provision for tax.

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