

Valuing mining projects under uncertainty

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Commodity prices in the world markets are always suspect to uncertainty. This tends to manifest itself in price volatility which significantly affects the profitability and balance sheets of companies engaged in commodities. This is particularly true for mining companies which engage in the exploration and mining operations to extract and sell commodities like base metals, coal and iron ore to world markets. Mining companies make significant investments and expenses in setting up and operating mines. It is imperative that mining companies make such investment decisions under uncertainty in the most effective way such that the value is maximized.

Currently, companies value mining projects using discounted cash flow techniques to estimate value as a present value of expected future cash flows. However, this assumes that the investment policy is independent of price fluctuations. In reality management responds to fluctuating commodity prices by altering investment policy, such that production expands in the high price scenario and reduces in response to low prices. Management's ability to exercise these options to alter investment policy is very valuable. It is estimated that approximately 30% of the value of high growth, high volatility mining firms can be attributed to the value of the embedded options that management can exercise. There is sufficient empirical data to suggest that market prices of mining firms can exceed traditional valuation techniques and this difference can be attributed to option value.

Managers who ignore option value are likely to arrive at mining valuations substantially different from those typically observed in the market. Rather than increase uncertainty over estimated value, options based mechanisms apply rigorous finance theory to estimate value. The options based valuation techniques includes the value of management's options to change the size or scope of the project and unlike traditional methods, derive the project value as the expectation of values associated with all possible cash flows. Management's options while estimating the value of a project in a mining project can consist of categories to include expansion, contraction, abandonment, extension, deferral or other compound derivatives. In a dynamic investment policy management can increase the shareholder value by altering investment policy which spans the spectrum from growth to abandonment.

Consideration of options based valuation is especially important for the high volatility mining sector. The volatility associated with value drivers such as commodity prices, exchange rates and costs dictates that management require the ability to alter investment plans in response to these drivers. Hence on one extreme, the value of firms' abandonment option is likely to be greater than average. Similarly, a heightened volatility of revenue streams and margin growth means that their growth options also have above average value.

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It is envisioned that options based valuation mechanisms lend themselves to a wide variety of environmental contexts – especially for corporations considering when, whether and how to develop a given resource. Policy makers concerned with the social impacts in cyclical industries can also take advantage of policy formulations in line with the best interest of the mining industry. Ultimately, option based valuation techniques are one of the most important decision making techniques in the commodity sector. It captures the present value of flexibility of managerial decisions at a future date in response to the arrival of new information. Traditional methodologies, like discounted cash flows, implicitly assumes precommitment – that is no flexibility. Yet most applications of options based approach are more realistic and are therefore more appropriate models of reality.