Options Theory: A New Way Forward for Exploration and Engineering Economics? $

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Abstract

Techniques used in conventional project appraisal are mathematically very simple in comparison to those used in reservoir modelling, and in the geosciences. Clearly it would be possible to value assets in mathematically more sophisticated ways if it were meaningful and worthwhile so to do. The DCF approach in common use has recognised limitations; the inability to select a meaningful discount rate being particularly significant. Financial Theory has advanced enormously over the last few years, along with computational techniques, and methods are beginning to appear which may change the way we do project evaluations in practice.

The starting point for all of this was a paper by Black and Scholes, which asserts that almost all corporate liabilities can be viewed as options of varying degrees of complexity. Although the financial presentation may be unfamiliar to engineers and geoscientists, some of the concepts used will not be. This paper outlines, in plain English, the basis of option pricing theory for assessing the market value of a project. It also attempts to assess the future role of this type of approach in practical Petroleum Exploration and Engineering economics. Reference is made to relevant published Natural Resource literature.

Keywords: real option, capital asset pricing model, option pricing, pricing model, state variable, evaluation, exploration, calculation, upstream oil & gas, simulation

Subjects: Reservoir Characterization, Reserves Evaluation, Asset and Portfolio Management, Risk Management and Decision-Making, Information Management and Systems, Project economics/valuation

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