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A Real Options Valuation Analysis for Enhanced Oil Recovery

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ABSTRACT

Using Real Options models are of great value for the economic viability analysis of projects. The valuation captures the flexibility of a decision - maker to possible changes in fundamental variables involving a project. Enhanced oil recovery projects have several types of uncertainties. In this paper the objective is to apply a model for the study of effects on the evaluation of economic uncertainties, impacting on revenues and costs of a project using natural gas injection to boost the production. We apply a traditional Real Option Model to a simulation of an oil production project. The model's main idea is the definitions of a trigger investment decision point which the potential returns have optimal value. The fact in Real Options is the existence of stochastic(s) variable(s). This project considers two uncertainties: oil prices and operational costs. Uncertainties are represented by one stochastic variable, a benefit - cost ratio, where historical oil and natural gas prices data are used to construct a historical series for this indicator. The variable's oscillation is simulated by a stochastic process. Comparing model's results, with traditional NPV Method, we observe different investment decision rules. Oil prices levels where traditional NPV economic analysis, have a "no investing" decision, Real Options rules defines a "waiting" decision. Applying Real Options Models in enhanced oil recovery projects is important, since the main variables defining a project's economic viability are constantly under intense market variability, resulting in impact on the moment for investing.

KEYWORDS Investment Decision; Real Options; Uncertainty; Oil Industry

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