

N536: Petroleum Economics, Risking and Decision-Making

Instructor(s): Pete Smith

Format and Duration

Classroom - 2 Days

Virtual - 4 Sessions

Summary

This course introduces the economic evaluation techniques that are used in the oil and gas upstream business. Exploration risk in decision-making will be demonstrated using the concepts of expected monetary value, decision trees, and Bayes Theory. Decisions in E&P ventures are affected by heuristics (mental short-cuts) and biases in the estimation of key variables, due to intrinsic uncertainty associated with alternative interpretations and lack of data. The course will illustrate these heuristics and biases by awareness exercises, E&P examples, mitigation tools, and exercises to practice lessening their impact.

Business impact: Participants on this course will become familiar with the **economic evaluation** techniques used in the oil and gas upstream business to assist **decision-making** throughout the E&P lifecycle. They will learn **exploration risking techniques** to enhance their decision-making capability. By appreciating the **heuristics and biases** that can **affect business decisions**, participants will ultimately **reduce negative impacts** of these in their work.

Learning Outcomes

Participants will learn to:

1. Illustrate how petroleum economics is critical to the project decision-making process.
2. Understand the basic principles of petroleum economic analysis such as the time value of money, discounting, and other project cash flow measures.
3. Calculate the economic indicators, Net Present Value and Rate of Return, along with the Cost of Capital (Weighted Average Cost of Capital).
4. Understand exploration risk and prospect ranking using expected monetary value (EMV).
5. Appreciate Bayes theory and illustrate its pertinence to exploration risking.
6. Deploy decision trees to lay-out the logic and evaluate the robustness of the decision.
7. Recognize the various types of heuristics and biases and be able to distinguish between them.
8. Identify, in various case studies, which heuristics contribute to erroneous decisions and understand how bias is manifested in various assessments.
9. Practice through exercises on range and probability estimation the need to keep ranges as wide as possible.

Training Method

A classroom or virtual classroom course comprising lectures, discussions, exercises, and case studies.

Who Should Attend

Individuals working in geoscience, engineering, management, finance, administrative, or operational roles involved in the E&P process who wish to obtain an understanding of petroleum economics and decision-making.

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Course Content

The following briefly summarises the course content:

Session 1

- Heuristics questionnaire
- Introduction
- Risk and uncertainty
- Decisions with uncertainty
- Exploration risk

Session 2

- Principles of cash flow analysis
- Discounted cash flow
- Calculating the cost of capital
- Incorporating exploration risk
- Exploration ranking using EMV

Session 3

- Heuristics & biases
- Exercise: Range estimation
- Exercise: Probability estimation
- Mitigation techniques

Session 4

- Bayes Theory
- Decision trees
- Case studies
- Wrap-up