Economic Assessment of Deep-Water Fields in the Gulf of Mexico Under the Licensing Scheme
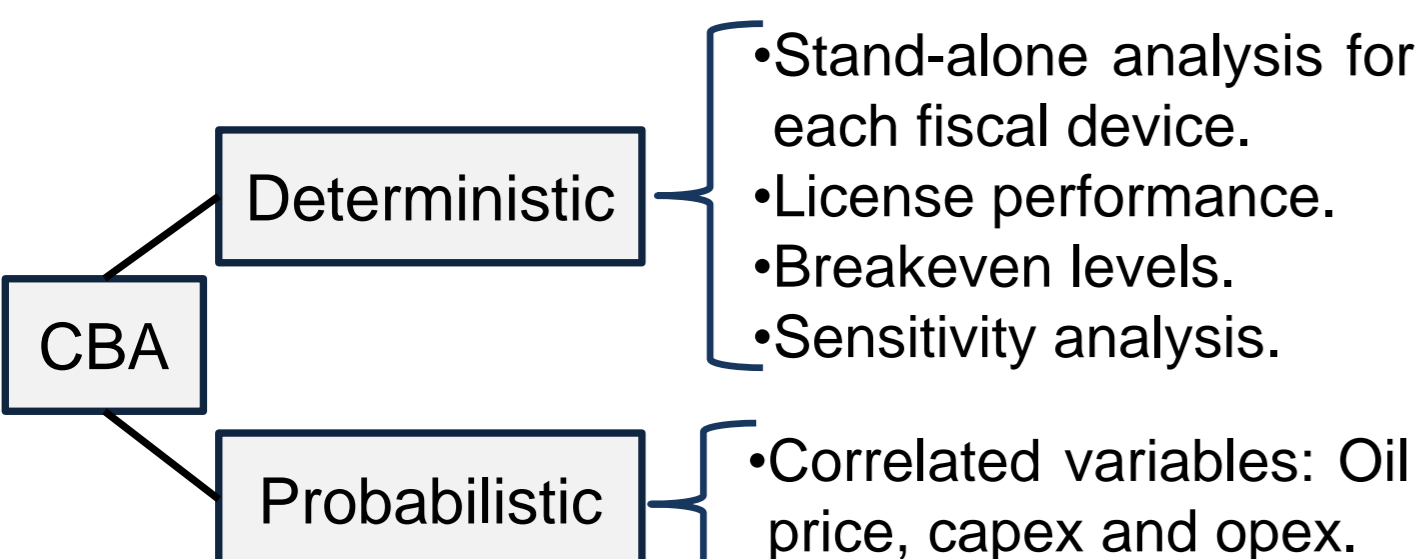
Diego Martinez Diaz

UNIVERSITY OF ABERDEEN

Introduction

✓ Mexico has no production in GOM deep-water fields.
✓ USA holds a diversified portfolio in GOM fields.
✓ Mexican Constitution was amended in 2013 to allow private investors to participate in the local oil industry.
✓ The State maintains the property of hydrocarbons.
✓ Auctions for allocation: 1) ascending, 2) descending and 3) first-price sealed-bid.
✓ 4 Contracts permitted: 1) License, 2) Production Sharing, 3) Profit Sharing and 4) Services.
✓ Licenses: Signature Bonus, Exploration Fee (CFEP) Tax on E&P (EEHAT), Royalty, Over-royalty and IT.

Research Questions

1. Are licenses regressive, proportional or progressive?
2. Are projects profitable under licensing scheme?
3. What are the breakeven levels in terms of price, over-royalty, capex and opex?

Methodology

✓ Cost-benefit analysis based on Net Present Value.
✓ IRR, payback and profitability index are displayed.
✓ 3 scenarios with real data from north GOM.

CBA
- Deterministic
  - Stand-alone analysis for each fiscal device.
  - License performance.
  - Breakeven levels.
  - Sensitivity analysis.
- Probabilistic
  - Correlated variables: Oil price, capex and opex.

EEHAT: Exploration and Extraction Hydrocarbon Activities Tax.
CFEP: Contractual Fee for Exploration Phase.
MCA. Monte Carlo Analysis.
MOD. Money of the Day.
NPV. Net Present Value

Analysis Undertaken

Variable (US dollars)	Low	Base	High
Price 2016		$44	
Production (milion barrels)	70	150	250
Opex (per barrel)	$8	$11	$11
Capex (per barrel)	$17	$16	$17
Decommissioning (per barrel)	$1	$1	$1
Total Costs (per barrel)	$26	$28	$29

WACC=11%

Apache   devon   noble energy   bp
Anadarko   Chevron   Shell

Deterministic Analysis

1) Signature bonus, CFEP and EEHAT: **Regressive**.
2) Royalty: **Progressive** to oil price.
3) Over-royalty: **Progressive** to profit determinants.
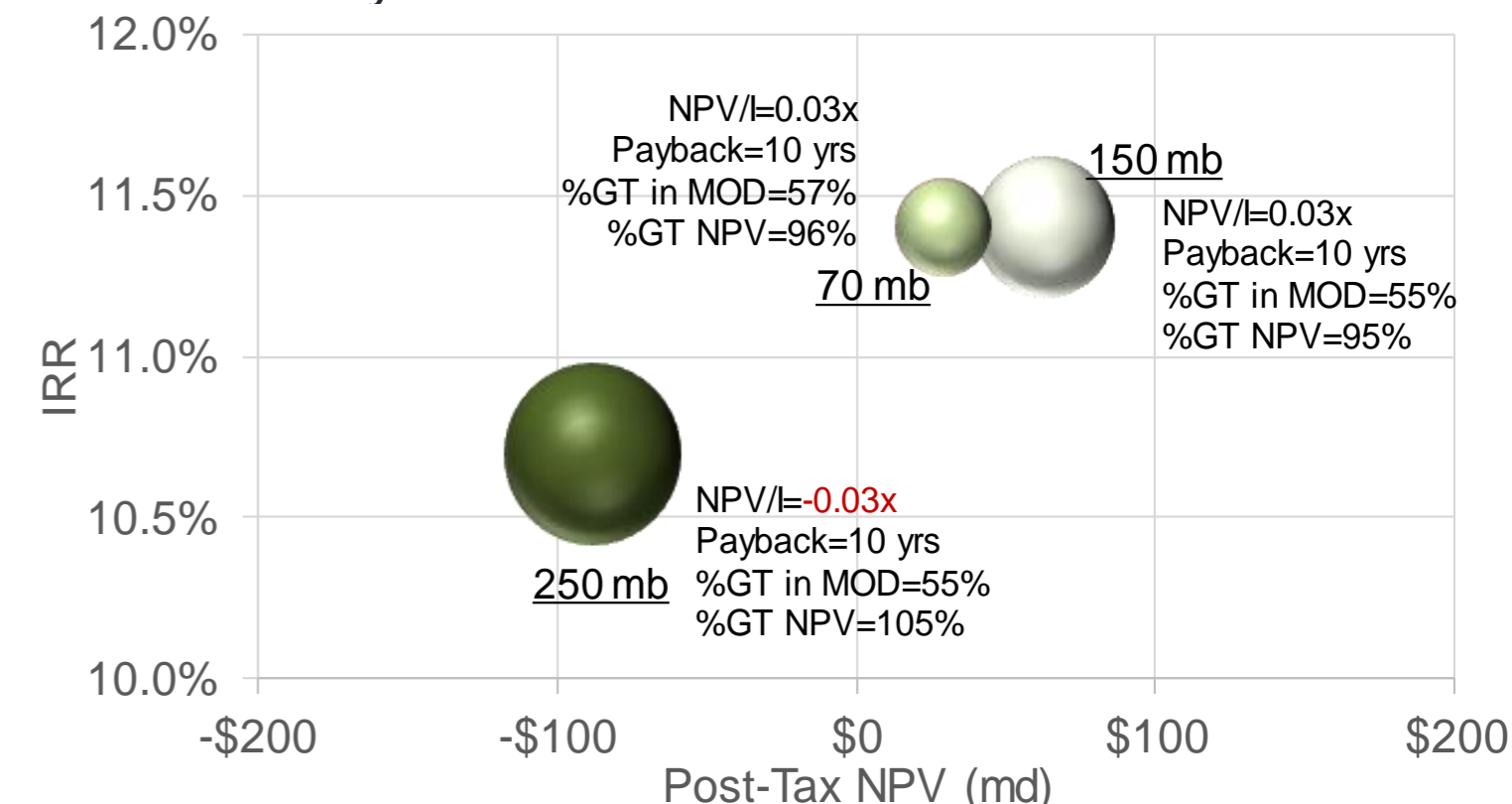4) IT: **Proportional** in MOD.

Royalty
Base royalty rate: 7.5% up to $48dpb

Over-royalty

Adjustment Factor   Over-royalty rate
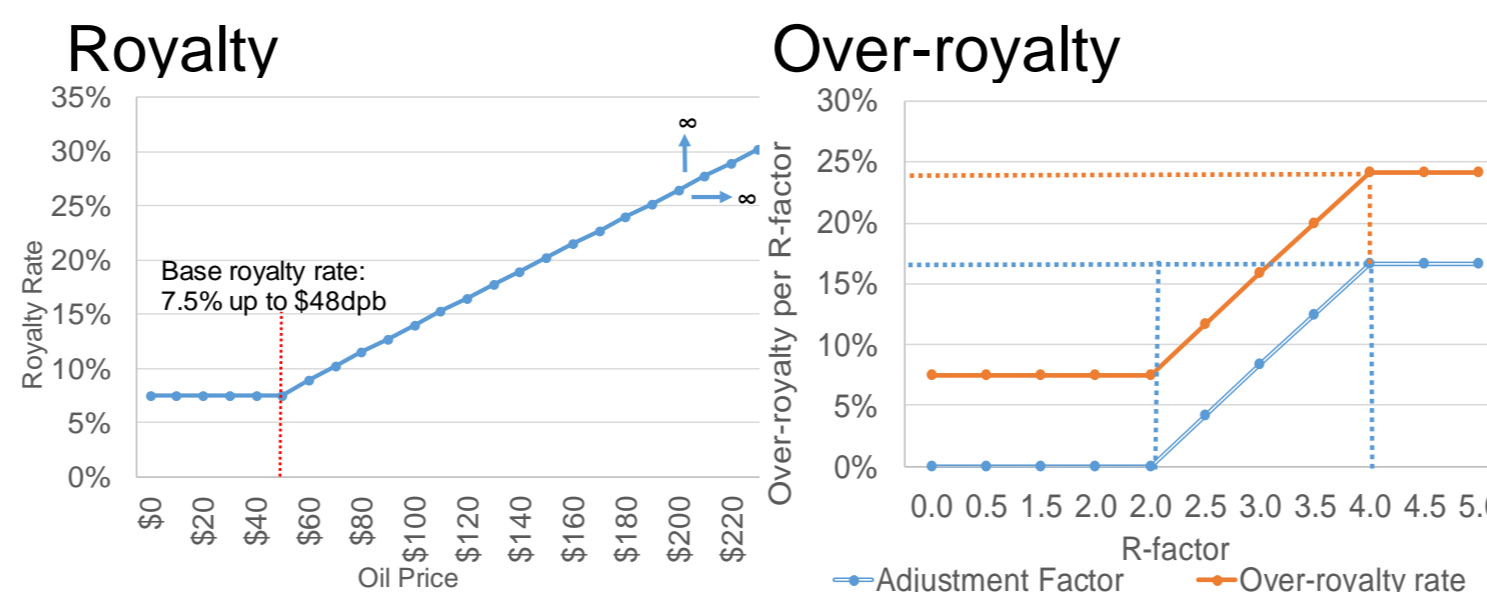
Probabilistic Analysis (MCA)

Variable	Distribution	Minimum	Maximum	
Oil Price (α=3.8 and β=1.7)	Beta	$22	$125	
Capex (per barrel)	Triangular	$12	$20	Correlated
Opex (per barrel)	Triangular	$8	$14	
Reserves	Triangular	70	250	

Results

Reserves by NPV and IRR.

NPV/I=0.03x
Payback=10 yrs
%GT in MOD=57%
%GT NPV=96%
70 mb

150 mb
NPV/I=0.03x
Payback=10 yrs
%GT in MOD=55%
%GT NPV=95%

250 mb
NPV/I=-0.03x
Payback=10 yrs
%GT in MOD=55%
%GT NPV=105%

✓ Oil price, Capex, Production, Discount rate and Over-royalties resulted the most sensitive variables.
✓ MCA showed more room for investors' profitability.
✓ **Progressive** system in MOD and **regressive** in NPV.

Breakeven levels.

Scenario	Oil Price	Opex	Capex	Over-royalty
Low	$65.1	$9.6	$17.3	12.3%
Base	$65.1	$12.6	$16.6	12.3%
High	$69.1	$9.7	$16.8	8.1%

Conclusions

✓ Tough fiscal scheme for deep-water fields.
✓ Mandatory payments create distortions in NPV terms. Lower base rates might provide additional incentives.
✓ Minimum oil price of $65 per barrel.
✓ Marginal profitability, but changes in key variables might increase it.
✓ Huge challenge for investors to decrease costs that allow them to increase profitability.

Diego Martinez Diaz   d.martinezdiaz.15@aberdeen.ac.uk   +44 (0)7939-943053   www.abdn.ac.uk

University of Aberdeen, King's College, Aberdeen, AB24 3FX