Economic Evaluation of Trinidad and Tobago's Fiscal Regime for the Development of Marginal Gas Fields

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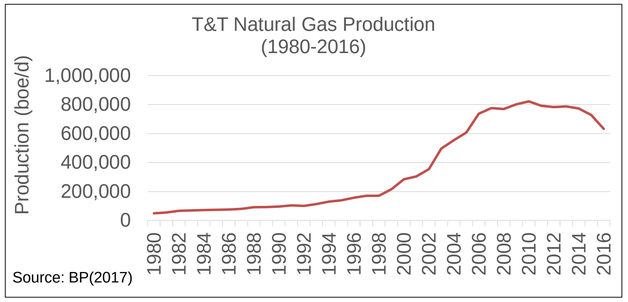
Motivation

- Natural gas production in T&T has been declining since 2010 due to diminishing gas reserves and supply disruptions by upstream suppliers for major maintenance works.



- Located offshore T&T are **30 undeveloped marginal gas fields.**

Working Definition for a Marginal Gas field in T&T is one with a reservoir size between 60 and 500 Bcf

- Production from marginal gas fields would help to alleviate the current decline in production.

Research Questions

1. Do Trinidad and Tobago's PSCs incentivise the development of marginal gas fields under the current environment?
2. Are the current PSC economic terms regressive, progressive or proportional?
3. How can the terms of the PSC be changed to incentivise marginal gas field development?

Methodology

- 3 Model Gas Fields: Small 100 Bcf, Medium 250 Bcf, Large 500 Bcf

DCF Analysis: To calculate NPV, IRR, NPV/I, GT% → Sensitivity Analysis → Probabilistic Analysis (Monte Carlo Simulations)

Key Model Assumptions		Small	Medium	Large
Deterministic	Reserves (Bcf)	100	250	500
	Development Costs ($/boe)	12	10	8
	Operating Costs(% of devex)	7.75	7	6.25
	Abandonment Costs (% of devex)	10	10	10
	Gas Price ($/mmbtu)	5		
	Discount Rate (%)	10		
Fiscal	Cost Recovery Limit (fixed)	50%		
	Government's share of Profit Gas (biddable)	52% - 68%, increasing with production		

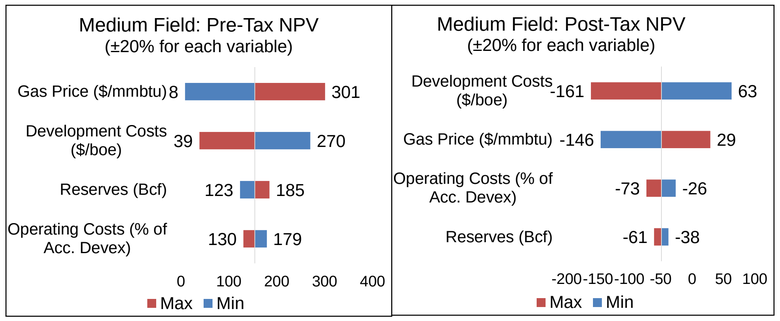
Results

DCF Analysis

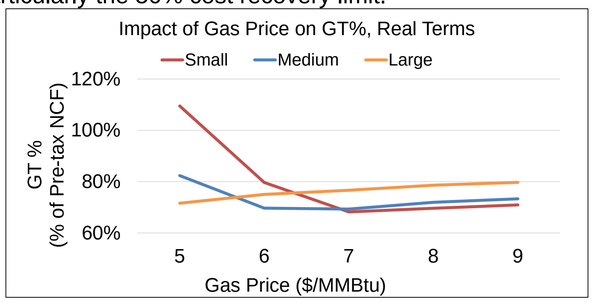
Financial Criteria	Small (100 Bcf)		Medium (250 Bcf)		Large (500 Bcf)	
	Pre-tax	Post-tax	Pre-tax	Post-tax	Pre-tax	Post-tax
Real NPV @ 10% ($/Million)	39	-47	154	-49	478	42
Real IRR (%)	18%	-2%	22%	5%	32%	12%
Real NPV/I @ 10%	0.20	-0.24	0.39	-0.13	0.80	0.07

- Pre-tax, all fields are profitable.
- Post-tax, only the large field is profitable based on positive NPV and IRR>10%, but has low NPV/I.
- Huge difference between pre-tax and post-tax returns; major shift of the burden of the project risks towards the investor.

Sensitivity Analysis



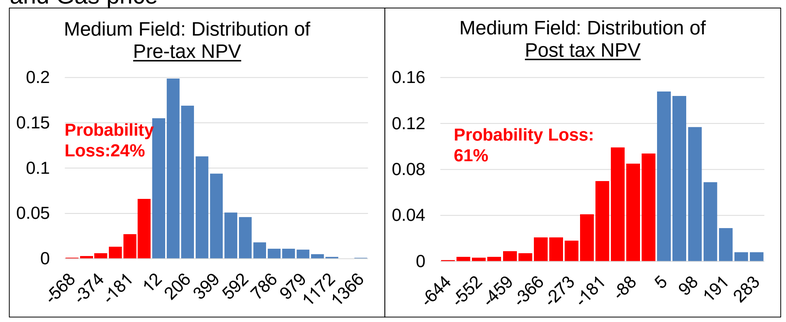
- Development costs and Gas price have the **most** influence on pre-tax and post-tax NPV.
- Rank changes on a post-tax basis due to the impact of the PSC terms, particularly the 50% cost recovery limit.



- PSC terms are initially **regressive** in relation to price changes, but proportional or even progressive at higher prices.

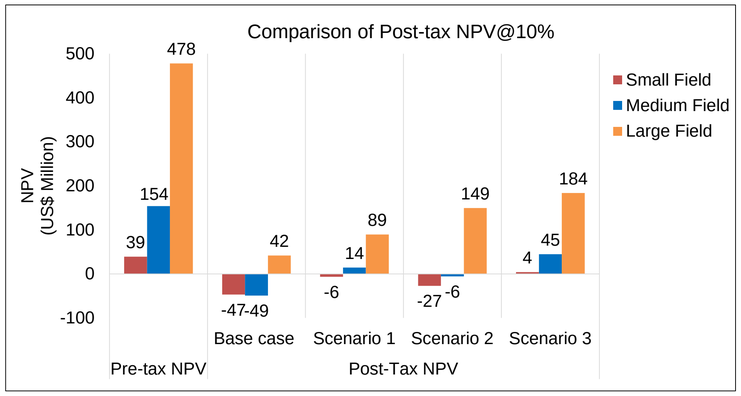
Probabilistic Analysis

- 4 Stochastic variables: Reserves, Development costs, Operating costs and Gas price



Modifications to PSC Terms

- Scenario 1: Increase cost recovery limit to 80%
- Scenario 2: Reduce Government's share of Profit Gas (40%-50%)
- Scenario 3: Combination of Scenarios 1 & 2



- Scenario 3 generated the most profitable investments.
- **Increased cost recovery ceiling** and **reduced GT** provides the contractor with a greater share of PSC revenues and hence, faster cost recovery.

Conclusion

- T&T's PSCs discourage the development of marginal gas fields under the current environment; they are economically inefficient and not directly targeted on economic rents.
- Fiscal terms are very regressive; 50% cost recovery prevents the contractor from achieving payback from the investment.
- A change to the fiscal system is necessary to encourage investors and increase production from marginal fields
- Higher cost recovery ceiling and reduced GT are highly recommended.

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