Title The economic perspectives of the mature oil fields remaining to be developed in the UKCS and the role of tax arrangements.

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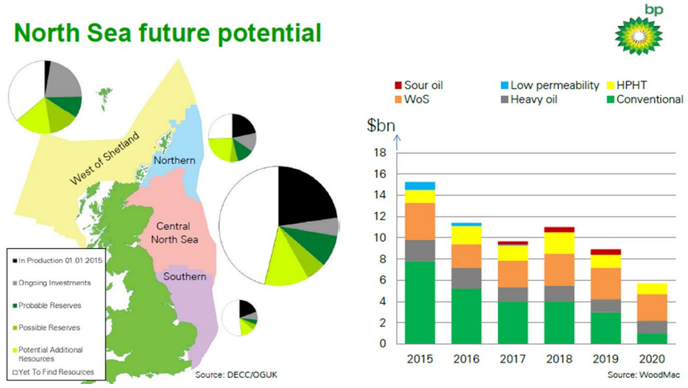
Motivation

- UKCS main characteristics: Production decline, low production efficiency rate, exploration decrease, over 300 fields many of which are small marginal and inter dependent, high investment and operating costs per barrel
- Oil price Collapse WTI crude oil less than $45 boe, Brent crude oil less than $50 boe.
- It is estimated that 12-24 billion boe further could be produced from UKCS boosting employment and achieving security of supply for the next decades while the UK economy is being decarbonised
- The implementation of Wood Review recommendations could result in 3-4 additional barrels of oil equivalent over 20 years worth over $200bn (MER UK)



Source: Smith Tim, North Sea Review 2015

Research Question:

- The analysis is targeted on the effect of taxation on the development of three mature oil fields of different average size lying in the UKCS

Methodology

- A spreadsheet model of three oil fields was employed for the calculation of NPV using the method of DCF

- Model assumptions:10% discount rate, 2.5% inflation rate, oil price $60 per barrel, base year 2015, 30% CT, 20% SC, 62.5% IA subject to 100% first year allowance for CT and SC (it is assumed that investor retains other taxable income in UKCS)

Table of input data

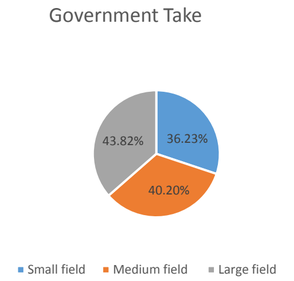
Inputs	Small field	Medium field	Large field
Acc Reserves mmbbls	10	20	50
An Production decline rate	32%	28%	25%
Devex ($/boe)	25	22.5	17.5
Opex % of acc Devex boe	9.50%	8.50%	7.50%

- A Sensitivity Analysis was undertaken to evaluate the effect of production, oil price and capex on the Post-Tax NPV

- Monte Carlo Simulation was used to forecast NPV based on normal distributions of oil price, opex, capex and production.

Results

Profitability Indicators	Small Field	Medium Field	Large Field
Pre-Tax NPV($mm)	142	364	1.141
Post-TaxNPV($mm)	86	203	599
NPV/CAPEX ratio	0.38	0.5	0.81
Tax Take % with IA	36.23	40.2	43.82
Tax Take % without IA	50	50	50



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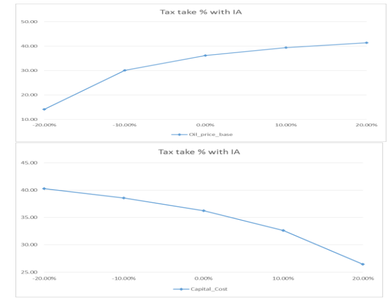

Impact on taxation

Monte Carlo results

Statistics	small field		medium field		large field	
	Pre-Tax NPV	Post-Tax NPV	Pre-Tax NPV	Post-Tax NPV	Pre-Tax NPV	Post-Tax NPV
Mean ($mm)	134	86	350	199	1,151	600
St Dev ($mm)	155	69	297	137	801	357
Min ($mm)	-400	-143	-621	-232	-1,369	-774
Max ($mm)	-628	306	-1.33	677	4.096	1.7
oil price	$60		$60		$60	

Conclusions

- Production and oil price largely affect the Post-Tax NPV
- The current UK fiscal system is progressive with respect to oil price and capex
- Investment in new fields in UKCS is encouraged with IA However, the marginal field (10mmbbls) has the higher investment risk (20% probability) to get a negative NPV and therefore make the investment uneconomical and lead to the rejection of the project.

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