

# COMPARATIVE ECONOMICS OF PROPOSED NIGERIAN FISCAL INSTRUMENTS ON DEEPWATER INVESTMENTS

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## Overview

The Gulf of Guinea deepwater region is unique for its high exploration success rates, favorable geology, crude quality, and a relatively close proximity to key oil markets. The concerns to investors, however, are the inherent economic risks associated with petroleum resource development in deep offshore due to uncertainty in fiscal instruments and contractual terms, security of assets- human and capital, and public policy issues. It is therefore important to note that success rate, favourable geology and closeness to the market, although are necessary conditions, attractive incentives for new investments in exploration in the face of fiscal policy uncertainty, are equally important to grow reserves.

This paper evaluates comparative economics in offshore E&P projects under two seemingly related fiscal regimes in the Gulf of Guinea petroleum basin. Due consideration is given to the very controversial provisions in both bills with the aim of providing policy makers empirical facts devoid of subjective undertone.

## Methods

Discounted economic models are developed for the two proposed petroleum sharing contracts in Nigeria- the 2012 PIB and the IAT redraft of the 2008 Petroleum Industry Bill (PIB). Taking a holistic perspective, due consideration is given to the three Arps' production decline profiles. Different tangible CAPEX depreciation methods are imposed on the models and the take statistics are estimated. Monte Carlo simulation analysis is applied to resolve the stochastic nature of some model input variables.

Other model framework adopted include:

$$NPV(r, t) = \sum_{t=1}^N \left( \frac{NCF(t)}{(1+r)^t} \right) \text{-----} (1)$$

Where NCF (t) is estimated net cash flow and r is the rate of discount at the end of time t.

For the Internal Rate of Returns (IRR), the NPV = 0;

$$\sum_{t=1}^N \left( \frac{NCF(t)}{(1+r)^t} \right) = 0 \text{-----} (2)$$

Where r = IRR.

The test of terms & conditions of a fiscal regime is provided by the Front-end Loading Index (FLI). This throws more light on the spread in the discounted and undiscounted takes. FLI of zero indicates an ideal condition in which a fiscal system presents no front-end loading at all. The higher the FLI, the more front-end loaded the fiscal regime becomes. The fiscal conditions that present very high FLI becomes less attractive to the contractor. FLI is given by equation 3

$$FLI = \frac{\text{Discounted Government take}}{\text{Undiscounted Government take}} - 1 \text{-----} (3)$$

A typical hypothetical Niger Delta field data are applied in developing a spreadsheet modeling and simulation tool. A comparative analysis is performed to evaluate the stochastic performance profile and attractiveness of exploration

and production (E&P) investments governed by IAT 2008 and PIB 2012 regimes respectively. The paper adopts different cost treatment methods and provides for straight line depreciation (SLD), sum of years' digits depreciation (SOY), decline balance depreciation (DBD) and the unit of production (UOP) depreciation. The empirical outcomes of this study are presented and used to compare project performance and government/contractor take statistics and compared with other existing petroleum sharing contract terms in Nigeria.

## Results

From the empirical results, the government has surrendered just 3 to 5% of her take from IAT 2009 to 2012 PIB. It is observed that the 10% PHCF when applied to the net revenue makes the contractor take to decrease drastically as compared to when it is applied to gross revenue. The contention has been whether government can pay tax to government.

In terms of NPV, given exponential decline patterns, both proposed fiscal regimes present viable investment options. It is observed that cost treatment varied the take statistics. Other things being equal, Unit of Production (UOP) CAPEX depreciation presents the most viable scenario for IAT 2009 as sliding scale royalty and profit oil split are tied to production. Given the uncertainty in the treatment of royalties in 2012 draft, similar results are obtained when 2009 conditions are imposed. However, Straight Line depreciation (SLD) presents better metrics when neither royalty nor profit split is tied to production but to R-factor as in the case of 2005 PSC

The FLI indicates that the 2012 PIB can switch from being low to being very high, hence regressive, depending on the base for calculating the 10% PHCF in PIB 2012.

## Conclusions

Discounted cash flow models have been successfully developed for IAT 2009 and PIB 2012 fiscal systems. Production decline patterns and tangible CAPEX depreciation are successfully integrated into the models. These have tremendous impact on rewards of investment.

The fiscal attractiveness of a fiscal system is a basis for influx of investment in Nigeria. The success rate, favourable geology and proximity to the market are secondary investment motivations. Therefore, Nigeria will be better off passing the PIB 2012, legislating the royalty rates just like it was proposed in the IAT 2008 submission.

## References

1. Arps J.J. "Analysis of Decline Curves". TRANS AIME Vol. 160, 228 – 247, 1945
2. Iledare O. O., "Evaluating the Impact of Fiscal Provisions in the Draft Petroleum Industry Bill on offshore E&P Economics and Take Statistics in Nigeria". SPE 136972, 2010.
3. Lima G.A.C., Ravagnani A.T.F.S.G., Schiozer D.J., "Proposed Brazilian Fiscal System for Pre-Salt Production Projects: A Comparative Study of Gain and Loss of Government and Companies", SPE PAPER 139311, 2010.
4. Iledare O. O., "Analyzing the Impact of Petroleum Fiscal Arrangements and Contract Terms on Petroleum E&P Economics and the Host Government Take", SPE 88969, 2004.
5. Inter- Agency Team, 2008 Nigerian Petroleum Industry Bill (PIB) redraft.
6. Onwuka E. I., Iledare O. O., Echendu J. C., "Evaluating the Impact of Depreciation Methods and Production Decline Patterns on Deepwater Economics: A Case Study of Nigeria", SPE 163007, 2012.