

## **The Optimal Petroleum Fiscal Regime for Ghana: An Analysis of Available Alternatives**

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**ABSTRACT:** Ghana became an oil producing country in December 2010. This development renewed the expectation of the citizenry as to the revenue that will accrue to the state and its direct effect on standard of living. The purpose of this study was to evaluate the Ghanaian upstream petroleum fiscal regime, including state and investor shares, and to compare it with petroleum fiscal regimes of some six other oil producing African countries. The qualitative assessment compared the regime on general taxation and petroleum taxation in particular. The traditional Discounted Cash Flow (DCF) method was used in the quantitative assessment of the regimes. Out of the seven regimes used in the quantitative analysis, the Ghanaian regime ranks sixth in terms of government take. It also ranks second with 31 months investor payback period based on post-tax discounted cash flow. Though the Ghanaian fiscal regime appears to be progressive; thin capitalisation, royalty rate, and cost recovery limits withholding taxes on interest. Therefore tying of additional oil entitlements to profits are recommended in future reviews of the Ghanaian fiscal regime. It appears from the study that the Ghanaian regime is not optimal and the recommendation provided would help improve upon it.

**Keywords:** Petroleum fiscal regime; oil revenues; taxation

**JEL Classifications:** H29; Q33; Q38

### **1. Introduction**

Exploration for oil in Ghana goes as far back as 1896 with drilling activities around Half-Asini following oil seepage at onshore Tano Basin in the Western Region (Tullow, 2012). Petroleum production started in the mid 1970s when Signal-Amaco Consortium discovered the Saltpong field. Having started production in 1975, Signal-Amaco abandoned the field as non commercial in December 1979. It has since been changing operators; Agripetco (1979-1984), Primary Fuel Inc (1984-1985), Ghana National Petroleum Corporation (GNPC) and Lushann Eternity Energy Limited (2000-date).

Until December 2010, the Saltpong Field was the only producing block in the country. More exploration work resumed in early the 2000s involving International Oil Companies (IOCs) such as Hess Corporation, Tullow, Kosmos Energy, Afren and Norsk Hydro Oil and Gas. Hydrocarbons in commercial quantities were discovered in 2007, which coincided with Ghana's 50<sup>th</sup> independent day celebration; hence the renaming of the field as Jubilee Field. Over thirty more discoveries have since been made.

The discovery in the jubilee year of commemoration of independence made the citizenry believe that it is the blessings of God which the state should exploit to the advantage of the nation; an idea worth pursuing. However, the approach to achieving this worthwhile project is of paramount concern as this can make or mar decisions of investors. This is more so as the state needs to rely on International Oil Companies to develop this strategic natural resource. As the state considers taking so much benefits from the resource, it should bear in mind the French finance minister, Jean-Baptiste

Colbert's assertion that the act of taxation consist of plucking the goose to obtain the largest amount of feathers but with the least possible of hissing (Stiglitz, 1999).

Most economic decisions in an economy are influenced by government fiscal policies. Tax rate can either increase or decrease the level of investment within a country. Taxes are raised in order to encourage or discourage activities in certain areas of the economy. Mineral taxation can be used to attract more investors or discourage them to exploit the natural resources. Economic problems such as the "resource curse" or "Dutch Disease" (Asafu-Adjaye, 2010); where the increased revenue from the mineral resources exported has the effect of raising the price of domestic goods relative to foreign goods (Osei and Domfe, 2008). It is also used to correct balance of payment problems as it raises high income. A caution should however, be given here that petroleum taxation alone cannot be used as a tool for macroeconomic policy, as it forms just a fraction of public sector financing. "Taxation has a very significant effect on the management of resources, including the timing of exploration and development and the sequencing of production" (Cairns, 1985). To ensure purposeful usage of resources, taxes are applied. Petroleum taxation in oil producing countries are set not only for the above purposes but also to discourage waste of the scarce resource as it does happen in some Middle East countries to the extent that Iran could import petrol and petroleum products. This is one of the reasons for which OECD countries have high taxes on petroleum products. Green Taxes, as they are called are used to discourage the use of fossil fuel which produces CO<sub>2</sub> emissions. This in no doubt increases the prices of energy products. Governments are therefore entangled with the difficulty of imposing additional tax which would eventually increase the cost of energy products for especially the poor and vulnerable in society that the government might want to protect. Green taxes have been criticised as being punishment for use of fossil fuels. Those against green taxes believe that energy efficiency should be encouraged rather but one should also not lose sight of the "rebound effect", a tendency in which consumers use an appliance more because it uses less energy thereby eroding benefits gained through efficiency.

A new approach to green taxes is carbon trading; an administrative approach of using "cap and trade" to control GHG by offering economic incentives to firms for engaging in reduction of emissions. The citizenry demands government accountability when an oil producing country imposes too rigid and complex tax regime on the people. This usually results in wide spread unrest and protest across the nation as occurred in March 2012 in the Peoples' Republic of Nigeria. When people show general discontent it may worsen the tax system of the country. On the other hand, if the government of an oil producing country focuses too much on the oil revenue, it may not tax the ordinary activities of the citizenry.

It is in the light of the foregoing that this paper is being developed to assess the impact of state take on investment in the upstream sector and in particular whether the taxation regime is optimal for the economic development of Ghana. Evaluate the existing petroleum taxation (both theoretically and practically); calculate how much the state obtains from the production of oil and compare it with the investor take. It will also be used to determine the investor payback period. Apply (Study) petroleum fiscal regimes of other countries to ascertain how the Ghanaian regime compares with other regimes as far as sharing the petroleum wealth between the investor and the state is concerned. Assess the possibility of the state changing the existing regime and the impact of such a decision. This research is coming at a time when production at the Jubilee Field is still in its early years and more and more discoveries are being made. This study is important for several reasons. It will enable the state and the investor to evaluate the current regime at the Jubilee Field. It will suggest areas for consideration for fiscal policy design and formulation for the new discoveries and the investors to assess investment implications with regards to cost and profit. Oil as a strategic commodity, has special features such as exhaustibility, high exploration risk and price volatility; these characteristics should be factored into any fiscal system. In most oil producing economies, oil contributes significantly to the economy and so if properly managed, can help develop the Ghanaian economy.

This study seeks to evaluate the existing petroleum taxation (both theoretically and practically) and calculate how much the state obtains from the production of oil and compare it with the investor take. The study further aims to assess the petroleum fiscal regimes of other countries to ascertain how the Ghanaian regime compares with other regimes as far as sharing the petroleum wealth between the investor and the state is concerned. Assess the possibility of the state changing the

existing regime and the impact of such a decision and provide recommendations on the way forward based on the aforementioned.

## **2. The Ghana Upstream Petroleum Fiscal Regime**

The first law, PNDC Law 84 (1984), establishes the upstream fiscal regime comprising royalty, rent and income tax. It, however, gives GNPC, the national oil company, the mandate to determine the nature of the fiscal regime. In the case of the Jubilee Field, the GNPC adopted the Royalty/Tax System which is also a hybrid in disguise. The regime has a typical element of a concessionary system as it is made up of royalties and taxes with state participation and so profit sharing. The Ghanaian regime is assessed based on the general principles of taxation and petroleum taxation in particular. The table 1 itemises the main strengths and weaknesses in use Jubilee field fiscal regime as assessed. This assessment is based on the regime's effectiveness in sharing the economic rent accrued from the resource between the state and the investor. It should however be noted that the strengths and weaknesses might not necessarily be advantage or disadvantage to either party (That is, the state or the investor).

### **a) Royalty**

Royalty is on gross production of crude oil and does vary on each block depending on depths of water; ranging from 5% - 12.5% oil extracted. However, the royalty for gas is 3% regardless of the water depths.

### **a) Carried Interest**

The state is entitled to 10% interest in each block should a find be made without any payment to the investor by the state. The state is 'carried' during exploration and development stages.

### **b) Additional Interest**

The state can opt for additional interest in each block if a commercial discovery is made but is charged with the cost of development and production prorated. The state through GNPC waves its right to additional interest if GNPC fails to notify the contractor of its intention to acquire additional interest within sixty (60) days of commercial discovery. Additional Interest varies from one block to the other and in the Jubilee Field, the state has 3.75%.

### **c) Income Tax on Petroleum**

The Petroleum Income Tax Law provides a maximum of 50%. Nonetheless, it can be altered by the contract. The Jubilee Field has the rate of 35%.

### **d) Additional Oil Entitlements (AOE)**

This entitles the state to additional payment if the post tax rate of return exceeds a specified level. AOE is on the basis of after royalty, after tax inflation adjusted Rate of Return (RoR) which a contractor has achieved thereby achieving some level of progressivity. The following rates were set; 12.5%, 17.5%, 22.5% and 27.5%.

### **e) Other Taxes**

These include surface rent, training fees and withholding taxes.

### **f) Cost recovery, Deduction and Containment**

- Unlimited carried forward of losses under the Petroleum Income Tax Law (PITL)
- The law prohibits depreciation but grants Capital Allowance (CA) over 5 year period covering cost of petroleum exploration and production and other capital expenditure
- The Internal Revenue Act (IRA) Act 592 has provision to prevent transfer pricing, though the PITL contains no such provisions
- The PITL places no limits on the extent to which interest expense is deductible and neither does it charges Withholding Taxes (WHTs) on interest and dividend payments
- Closely related to the above is the waiver of WHTs on subcontractor companies that are affiliate for the main contractor though it allows for deduction of WHTs on both resident and non resident subcontractors
- The PITL excludes capital gains tax
- Both the PITL and the IRA has provisions for ring fencing
- None of the two has provision for decommissioning expense

### **g) The Petroleum Agreement for the Jubilee Field has a stability clause to protect the tax system**

Table 1. highlights the strength and weaknesses of Ghana's fiscal regime.

**Table 1. The strengths and weaknesses of the Ghanaian Fiscal Regime.**

Strengths	Weaknesses
<p>a. Up-front payment: The regime does not require up-front payments in the form of bonuses and major stock takes. Therefore the state share arrived at from streams of payment. Surface rental and training cost are too insignificant to be described as such. Osmundsen (2008) holds that ‘The major challenge in attracting petroleum investments is the high level of front end loading of investments’.</p> <p>b. Royalty: a rate of between 5% - 12.5% is provided depending on the water depths. The Jubilee Field has a rate of 5%. The royalty enables the state to also get early cashflow.</p> <p>c. State Participation: participation through Carried and participating interest makes the state part owners though it does not share in exploration risk and development risk (in case of the CI) but does share in both production and commercial risk with investor. State interest ranges from 12.5% to 30%. Jubilee field has 13.75%.</p> <p>d. Unlimited carry forward of Losses and non-capping of the exploration and development cost recovery: This element of the regime makes it more investor friendly allowing for Corporate Income tax only after deduction of allowable expenses.</p> <p>e. Additional Oil Entitlements (AOE): AOE enables the state capture more of the economic rent as it focuses on additional profit over and above the investor’s RoR. It enhances neutrality and progressivity of the regime.</p> <p>f. Standardisation Clause: The standard clause is set to protect investor’s investments. It is used to prevent legislative intervention in a negotiated contract (Faruque, 2006). Hence, the Ghanaian system insulates the investor and makes the regime more stable at least for signed contract.</p>	<p>a. Thin Capitalisation and Non-Capping of interest expense: The failure of the PITL to cap interest expense would lead to thin capitalisation. By this investors can siphon funds away under the cover of interest thereby reducing chargeable profit. Though the IRA has a clause to stripe companies, Amoako-Tuffour &amp; Owusu-Ayim (2010) asserts that that clause is not applicable to petroleum and again it has not been enforced in the mining sector.</p> <p>b. Withholding Taxes (WHTs): The problem of thin capitalisation above is made worst by the fact that interest expense and dividends are not subject to final WHT. The PITL puts the state in a double jeopardy by the waiving of WHTs on work or services rendered by affiliate companies. In as much as the IRA can reset the price of work done to prevailing market values; it can scarcely do so for management services rendered by an affiliate company. The most contentious of the WHTs issue according to Amoako-Tuffour &amp; Owusu-Ayim (2010), is that WHT on individual income tax is subject to the individuals contract especially as expatriates will earn high incomes if employed.</p> <p>c. Transfer Pricing: This involves the pricing of goods or services supplied by a subsidiary company too low or too high in order to move profit from higher tax bracket into a lower tax bracket. But in petroleum IOCs uses this ploy to move profit from one tax jurisdiction to another usually across borders which denies the host country its revenue in terms taxes. The PNDC law (PNCL 84) which seem to deal with this is weak and might not be able to deal with the issue objectively.</p> <p>d. Ring Fencing: The ring fencing being applied in the PITL will delay cash flow to the state as it allows cost from other fields being explored by the same company to be deducted from a producing field by the same company. On the other hand, this would encourage more exploration and development which could yield more future cash flow.</p>

### 3. Method

This section sets out the analytical structure to determine quantitatively the state and investor take in the Jubilee Field having gone through the details of the Ghanaian regime in the preceding chapter. It provides quantitative evaluation using the Ghanaian fiscal regime. It then tests how the share of each of the partners (state and investor) would be by applying other regimes from other Sub Saharan countries. The chapter begins by describing the life cycle of petroleum field. This is to enable the reader appreciate the problems associated with oil taxation and the complications involve in sharing the wealth the natural resource creates. It then deals with the methodology in employed in the analysis; the traditional Discounted Cash flow (DCF) method.

#### 3.1 The life cycle of a Petroleum Field

Tordo (2007) describes a typical petroleum field life cycle as follows: Licensing: This is the first stage of the life cycle of a petroleum field. Usually license or a lease of the area to be explored for

oil and gas is granted or where the state enters into a contractual agreement with an investor (could be group of companies) for exploration and production of oil.

1. **Exploration:** An oil company proceeds with geological and geophysical survey after acquisition of license to operate a field. This may involve the use of seismic or core boiling survey. Exploratory drilling are then embarked upon should the results from the survey proved promising.
2. **Appraisal:** A successful exploration is followed by appraisal of the field to determine the size, structure and quality of oil. This reduces the risk of technical uncertainty. The decision to produce the oil discovered is usually taken here taken at this stage when other factors are taken into consideration especially the estimated future oil price that the oil from field would be produced.
3. **Development:** When commercial viability of a field is ascertained the through the appraisal, the next step is to determine the strategy and techniques to employ in production. The petroleum act in Ghana provides that the investor submits a detail production plan to the minister of energy on how the field is to be produced. It also involves obtaining approval for their environmental impact assessment plan from the appropriate agency of state, development drilling and building of transport facilities. Cost to this stage is usually capitalised and expense over a period of time when production commences.
4. **Production:** Project is said to have come ‘on stream’ when the first production well is drilled and facilities commissioned. More production wells are drilled to increase production in the projected level.
5. **Abandonment:** This stage comes in when the project reaches its ‘economic limit’ (Tordo, 2007). A project is said to have come to its useful life when cost of production is equal to its revenue and so a decision is made to abandon the field thereby ushering in decommissioning.

The understanding of the project life is the first step to the formulation of policies governing petroleum production and investments. By their nature, petroleum projects have long lead times from exploration to production and production also take long years. It is capital intensive with more initial investments that can only be recouping when commercial discovery is made. Besides, the uniqueness of this industry is in its high risk and uncertainties which includes exploration risk which could be non commercial discovery or a dry hole, political risk, commercial risk and price uncertainties. To enhance international competitiveness of a field, a fiscal regime should be tailored to take into account these features to provide incentives at the various stages of a project.

A model to evaluate the Ghanaian regime and six other Sub-Saharan African countries namely, Nigeria, Cote d’Ivoire, Congo, Cameroon, Equatorial Guinea, and Uganda is discussed below in Table 2.

**Table 2. Details of fiscal regime for oil producing countries in Africa**

	Nigeria	Cote D’ivorire	Congo	Cameroon	Guinea	Uganda
Sign Bonus	\$25m	\$12	-	-	\$1.5m	\$0.5
Prod Bonus	0.1%	<200mdbl \$12m	-	-	\$5m	-
Royalties	8%	-	15%	12.5%	13%	12.5%
State Participation	Varies	10% initial + 10% AI interest @ LIBOR + 1%	-	Carried Interest 50%	-	20% initial + 15% + interest @ LIBOR
Cost recovery and other invest incentives	Exploration & Dev. Cost 20% uplift on CAPEX in year of acquisition	Cost Recovery cap 80% of gross production	70% cap on cost recover	No limits on cost recovery	No limits on cost recovery	60% limit on cost recovery
Tax Allowance	50% on capex	-	-	-	-	-
Income Tax	65.75%, 85% petroleum profit tax	27%	35%	57.5% / 48.65%	35%	30%
Split of	Split of Profit	20%	>20,000	Split of Profit	Split of Profit	Split of Profit

Profit Oil with State	Oil with State		bpd 30%	Oil with State 50%	Oil with State	Oil with State
Additional Oil Entitlement (AOE)	35%	46%	50%	-	<30% RoR @ 0%	-
Others: Rentals	-	-	-	-		

Source: Data taken from Amoako-Tuffour & Owusu-Ayim (2010) with adjustments to reflect the characteristics of the Jubilee Field. Ernst & Young (2011), Global Oil & Gas Tax Guide, EYG no. DW0092.

### 3.2 The Discounted Cash Flow Model (DCF)

This method is employed to determine the Net Present Value (NPV) of the field's profitability. The author has taken into account criticisms against the use of NPV particularly that of Dixit & Pindyck (1994) by providing for the opportunity cost of the investment. Nakhle (2008) states that a study by Siew in 2001 indicates that the method is widely used for evaluation of projects by 99% of oil Companies.

This model was chosen against models such as Modern Asset Pricing (MAP), Geometric Brownian Motion (GBM), Geometric Mean Reversion (GMR) models because it is fast, simple and relatively easy to use. It also takes into consideration the time value of money. Nakhle (2008) states that a study by Siew in 2001 indicates that the method is widely used for evaluation of projects by 99% of oil Companies.

However, the DCF model has the following limitations; First, it does not take into account relative riskiness of projects. In addition, the value of waiting<sup>1</sup> and the need to use different discount rates with costs and revenues.

The Net Cash Flow (NCF)

The post tax cash flow under the Ghanaian regime

$$NCF_t = R_t - ROY_t - C_t - TC_t - SR_t - CT_t$$

$$R_t = Q_t P_t$$

$$Roy_t = Roy_r R_t$$

Post-royalty revenue is:

$$R_t - Roy_r R_t$$

$$C_t = CA_t + OE_t + CL_{t-1}$$

Assessable Profit

$$\Pi_t = R_t - ROY_t - C_t - TC_t - SR_t$$

$$CT_t = CT_r \Pi_t$$

Profit Oil (Profit after tax)

$$\Pi_t - CT_r \Pi_t$$

Total State Take

$$ST_t = Roy_t + TC_t + SR_t + CT_t + AOE_t + \text{Share of Profit} + C_t \text{ (State share)}$$

Total Investor Take

$$IT_t = \text{Share of Profit} + C_t \text{ (less State share)}$$

Investor Payback Period K

$$\sum_{t=1}^k (R_t - ST_t - OE_t) < \sum_{t=1}^k CE_t$$

The DCF or NPV is determined by;

$$NPV = \sum_{t=1}^n (NCF_t * DF)$$

The Discount Factor (DF)

$$DF = \frac{1}{(1+r)^t}$$

Discounted State Take

Total State take \* DF

Where  $Q_t$  quantity of oil produced in year t

$P_t$  oil price in year t

$R_t$  Oil revenue in year t ( $R_t = Q_t P_t$ )

DC Exploration & Development Cost

$CE_t$	Capital Expenditure (CAPEX) in year t
$OE_t$	Operational Expenses (OPEX) in year t
OC	Opportunity Cost
$OC_r$	Opportunity Cost Rate
$CA_t$	Capital Allowance for year t
$C_t$	Total Cost in year t ( $C_t$ = the allowed portion of CAPEX and the OPEX)
$CL_t$	Carried Over Losses from previous year
SB	Signature Bonus
$SR_t$	Surface rent in year t
$PB_t$	Production Bonus in year t
$Roy_t$	Royalty for year t
$Roy_r$	Royalty rate
$AOE_t$	Additional Oil Entitlements in year t
$CT_t$	Corporate Income tax in year t
$CT_r$	Income Tax rate
$TC_t$	Training Cost
SR	Surface Rent
$\Pi_t$	Assessable Profit for year t
AT $\Pi_t$	After Tax Profit
$ST_t$	Total State Take
$IT_t$	Total Investor Take

### 3.3 Assumptions

This section deals with some important assumptions made that are critical to the study. It is assumed that the six other countries selected have similar circumstances as Ghana such as social-cultural, political, level of economic development among others. The nearness of the Jubilee Field to Cote d'Ivoire and the fact that Uganda is just emerging as oil producer make their selection in addition to the other four who have already been established as producers make the study all involving and informative. In addition to the above the following assumptions were made in applying the model;

1. It is assumed that a single company is operating the field this eliminates complications in both Capex and Opex recovery and determining the rate of return.
2. That all the fiscal regimes are applicable to the Jubilee Field under the same cost and field technicalities.
3. It is also assumed that the Jubilee is ring fenced.
4. The discount factor is assumed to be 19%
5. Finally, cash flow is calculated annually on cumulative basis.

The above model has been applied under three scenarios and results presented in table 4. Table 4 presents State Take while table 5 is for investor take.

1. Scenario I is the main forecast, scenario I and II are for the lower band (That is, scenario I less the Standard Error) and upper band (That is, scenario I plus the Standard Error) respectively. Oil prices for 20 years (Bolton, 2012), starting 1991 were used to forecast for the next 20years. However, actual prices were used for 2010 & 2011. Capital expenditure (PIAC, 2012) was the budgeted 2012 less the cost of the FPSO which is a one off item. This was used to estimate for 10 years by giving 5% inflation every 3 years. The result was then used to forecast for 20 years. Similar exercise was done for operational expense (PIAC, 2012). All the forecast were ran on stamp software by providing for a one year lag.
2. The value of waiting or the option value considers the benefits that will accrue should the decision to explore today or leave the oil in the ground as the Saudi King Abdullah once ordered that new oil finds be left for their children in the future.
3. A document on Tullow on licensing of block 3A of Uganda indicates a rate of return of 14%. The agreement on the Jubilee field allows 5% for inflation. This brings the DF to 19%. The state take of the different countries is discussed in table 3 whilst investor take is discussed in table 4.

**Table 3. State Take under each scenario**

		Ghana \$M	Nigeria \$M	Cote d'Ivoire \$M	Congo \$M	Camero on \$M	Equatorial Guinea \$M	Uganda \$M
StateTake (ST <sub>scenario I</sub> )	NCF	40,531 40.03%	58,192 57.47%	52,118 51.47%	55,565 54.88%	68,210 67.37%	45,204 44.64%	39,298 38.81%
	NPV	8,128 35.72%	11,201 49.04%	10,558 46.24%	11,272 49.35%	13,939 61.03%	9,316 40.79%	8,183 35.49%
(ST <sub>scenario II</sub> )	NCF	35,583 38.86%	50,766 55.44%	48,369 52.64%	48,169 52.60%	60,834 66.43%	40,052 43.74%	34,793 37.99%
	NPV	7,141 38.86%	9,922 47.40%	9,780 46.73%	9,790 46.77%	12,477 59.61%	8,292 39.61%	7,296 34.46%
(ST <sub>scenario III</sub> )	NCF	45,475 40.99%	65,617 59.15%	56,113 50.58%	62,963 56.76%	75,587 68.14%	50,356 45.39%	43,802 39.48%
	NPV	9,1115 36.95%	12,481 50.43%	11,347 45.86%	12,755 51.51%	15,401 62.23%	10,341 41.78%	9,079 36.37%

**Table 4. Investor Take under each scenario**

		Ghana \$M	Nigeria \$M	Cote d'Ivoire \$M	Congo \$M	Cameroo n \$M	Equatori al Guinea \$M	Uganda \$M
Investor Take (IT <sub>scenario I</sub> )	NCF	60,723 59.97%	43,063 42.53%	49,136 48.53%	45,689 45.12%	33,044 32.63%	56,050 55.36%	61,957 61.19%
	NPV	14,629 64.28%	11,640 50.96%	12,277 53.76%	11,569 50.65%	8,902 38.97%	13,525 59.21%	14,873 64.51%
Investor Take (IT <sub>scenario II</sub> )	NCF	55,991 61.14%	40,807 44.56%	43,369 47.36%	43,404 47.40%	30,740 33.57%	51,522 56.26%	56,781 62.01%
	NPV	13,707 65.75%	11,010 52.60%	11,147 53.27%	11,142 53.23%	8,455 40.39%	12,640 60.39%	13,874 65.54%
Investor Take (IT <sub>scenario III</sub> )	NCF	65,460 59.01%	45,318 40.85%	54,821 49.42%	47,972 43.24%	35,348 31.86%	60,579 54.61%	67,132 60.52%
	NPV	15,552 63.05%	12,269 49.57%	13,397 54.14%	11,994 48.46%	9,349 37.77%	14,409 58.22%	15,885 63.63%

In this section we dealt with the stages of project life cycle in petroleum production, NCF and DCF model. The model was applied to six other regimes in addition to Ghana on the Jubilee Field and the results presented. The next chapter will discuss the results and present the findings of the study. It will provide analysis of the seven regimes tested on the Jubilee field. Policy makers and investors will find that chapter very useful.

#### 4. Results and Discussion

The previous chapter showed the methodology and applied the model to the Jubilee Field based on the fiscal regimes of the seven countries including Ghana. Assumptions made in the calculations were also given. In this chapter we do a detail analysis of the results, to show how benefits from the oil are shared by various regimes. Among others, the regimes are ranked to see which provides more to whom and they are also ranked according to investor payback period under three scenarios (ie business as usual (BSA), lower band-BSA less standard error and upper band-BSA plus standard error discussed in chapter four foot notes). The results for which the analysis is made are based on scenarios selected and as such may change should the scenarios change.

##### 4.1 Sharing the Wealth – State verses Investor

This model shows (Table 5) that for four out of the seven countries, the state takes above 50% of the oil revenue while the remaining three had around 40% on all scenarios. It is worthy to note that Ghana and Uganda that are new producers have shares that are below 40% of the revenue. The question is ‘is it a deliberate attempt by Ghana and Uganda to attract investors or a mere lack of good bargaining power on the side of state?’ The Ghanaian regime ranks 6<sup>th</sup> out of seven in terms of



percentage state take. Ghana comes 2<sup>nd</sup> in terms of investor take with 60.04% following Uganda with 61.24%. Cameroon comes last providing 32.69% this is the reverse of table 5.

**Table 5. State Take**

Country	Scenario I (%) (Business as usual – BSA)	Scenario II (%) (Lower Band –BSA less Standard Error)	Scenario III (%) (Lower Band – BSA plus Standard Error)	Average (%)
Cameroon	67.37	66.43	68.14	67.31
Nigeria	57.47	55.44	59.15	57.35
Congo	54.88	52.60	56.76	54.75
Cote D’Ivoire	51.47	52.64	50.58	51.56
Guinea	44.64	43.74	45.39	44.59
Ghana	40.03	38.86	40.99	39.96
Uganda	38.81	37.99	39.48	38.76

#### 4.2 Field Profitability

Field profitability can be measured by the payback period. Investor payback period is the period it takes for the investor to recoup its initial investments after production starts. It takes a minimum of 24 and maximum of 31 months for an investor to recoup its initial investment when post-tax cash flow is not discounted. When time value of money is considered (discounted cash flow) it takes 29 to 45 months for the investor to get his money. It makes the Jubilee Field very profitable as its finding cost of US\$6.92 is about a third of the world average of US\$18.31 (PIAC, 2012). Tables 7 and 8 provide the post-tax payback period of the Jubilee Field as per the selected regimes.

The Ghanaian regime comes first together with Uganda by providing the shortest payback period of 24 months for undiscounted Cash flow and 2<sup>nd</sup> with 31 months when cash flow is discounted. Cameroon comes last with 31 months and 45 months for post-tax undiscounted and discounted cash flow respectively.

As a result of its profitability the tax system can be adjusted to increase the state share and yet remain attractive to investors. Table 6 discusses the undiscounted cash flow whilst table 7. Discusses the discounted cash flow.

**Table 6. Undiscounted Cash flow Payback Period**

Country	Scenario I (Business as usual – BSA) (Months)	Scenario II (Lower Band – BSA less Standard Error) (Months)	Scenario III (Lower Band – BSA plus Standard Error) (Months)	Average (Months)
Uganda	24	24	23	24
Ghana	24	25	24	24
Guinea	25	26	24	25
Cote D’Ivoire	25	27	24	25
Congo	26	27	26	26
Nigeria	25	27	25	26
Cameroon	31	30	31	31

#### 4.3 The Fiscal Regime

The regime seems progressive. Its progressiveness is in its back-end loaded taxes<sup>1</sup>. The 5% royalty rate is low compared to the world average of 7% without signature and production bonuses. The Additional Oil Entitlements (AOE) helps the state take more of the economic rent. Nigeria and Guinea’s oil tax regimes are more progressive. However, Cote D’Ivoire’s regime is regressive. Flexibility of the Ghanaian regime is in the AOE. It enables government to take more of the rent when prices go up and reduces when prices fall. The AOE comes in only when a project attains cumulative cash flow. Flexibility is very vital in oil industry.

**Table 7. Discounted Cash flow Payback Period**

Country	Scenario I (Business as usual – BSA)  (Months)	Scenario II (Lower Band – BSA less Standard Error) (Months)	Scenario III (Lower Band – BSA plus Standard Error) (Months)	Average  (Months)
Uganda	29	30	28	29
Ghana	31	32	30	31
Guinea	32	34	31	32
Cote D'Ivoire	34	36	32	34
Congo	35	36	35	35
Nigeria	34	36	32	34
Cameroon	45	47	43	45

In terms of sharing of risk, the state takes more of the risk. Although the government is carried through the exploration and development phases, it allows the investor to recoup all accumulated cost with no cost recovery ceiling when production starts. The investor therefore receives early cash flow thereby shifting most of the risk unto the state which can be done through thin capitalisation, transfer pricing and cost manipulation hence Amoako-Tuffour and Owusu-Ayim's (2010) assertion that "Purely back-end loaded taxes may not be ideal as they transfer too much of the risk to the government".

## 5. Conclusion and Policy Implications

This study was conducted in order to evaluate the Ghanaian upstream petroleum fiscal regime; determine the state take and that of the investor; and compare the regime with regimes of Uganda, Nigeria, Cote d'Ivoire, Cameroon, Equatorial Guinea and Congo. The following are the main findings from the study;

First, the state obtains 39.96% on the average when cash flow is not discounted. However, the State share falls to 37.18% when cash flow is discounted which means that early cash flow from the project flow to the investor whose undiscounted cash flow of 60.04% increases to 62.82% when cash flow is discounted on the average. The investor obtains a post-tax undiscounted cash flow payback period of 24 months and 31 months when discounted cash flow is applied.

Secondly, it was found that the Ghanaian regime ranks sixth in terms of state take when compared with the six other regimes which also mean that the Ghanaian regime gives more to the investor placing second on table of investor take.

Finally, it can be seen that the investor share in the current regime is higher than the state share it is however, unwise for the state to unilaterally change the existing regime to increase the state share due to the stability clause. Such an action (if taken) will lead to litigation between the state and the investor and might also affect investor confidence not only in the hydrocarbon business but the economy at large.

The aforementioned make it appear that Ghana is not optimising her benefits under the current regime in terms of sharing the economic rent from the oil. However, it should be noted that this is not as a result of the type of regime being used; rather it might be the combination of tax instruments being employed under the regime. Recommendation to enhance this is provided in the next section.

Ghana share in the oil wealth is low as compared to its peers in the region. This might have evolved partly because it was a risky endeavour for the early investors and so the state opted for a lower share to attract investors. However, the discovery of more oil makes Ghana no longer risky and therefore Ghana can aim at taking more of the economic rent vis-à-vis being investor friendly.

The current regime for the Jubilee Field though can be altered by the state to increase the state share, it must be noted that any unilateral action by the state might not be a wise decision as it might breach the existing agreement based on the stability clause. The flexibility clause also gives the discretion for change majorly to the investor thereby making it more difficult for the state to increase

its share. Nevertheless, the state can increase its share of the economic rent by adopting some of the following measures in any new contract;

**Royalty Rate:** Ghana's royalty rate is the lowest among the sample regimes. Though royalties are regressive, increasing the rate into a range of 8%-10% will ensure early cash flow to the state and ensure equitable sharing of the risk. This range will let it compare well with its peers in the sub region.

**The Additional Oil Entitlements:** This should naturally make the tax system progressive. But that of Ghana is not progressive enough as it is based on RoR alone. The AOE should tie to profitability if it is to help make the tax system progressive and ideal.

**Cost Recovery:** Cost recovery limits should be set to control early cash flow. Thin Capitalisation and Withholding Taxes (WHTs) on interest income: Thin capitalisation should be avoided by specifying the required level of capitalisation in the agreement to prevent payment of excessive interest. Again, deduction of WHTs should be allowed on interest income. A range can also be set for interest rate on debt capital.

**Transfer Pricing:** The current law leaves room for its manipulation. Steps should therefore be taken to state clearly the rules on transfer pricing. Regrettably payments to overseas subsidiary are not subject to WHTs tax under the existing regime. The agreements should provide for deduction of WHTs on any such payments.

**Stability clauses:** These should be set based on external environmental factors such as price and should not be left in hands of a single party's discretion. Further research in future should use other methods such as Modern Asset Pricing (MAP), Geometric Brownian Motion (GBM), Geometric Mean Reversion (GMR) models among others are recommended alternative methods for assessing the fiscal regime. These methods will provide a holistic view of the regime in the mix of risk and uncertainty. Also, regimes for specific fields from the countries selected should be taken for the application of the model just as the regime for Ghana is for the Jubilee Field. This will enhance the comparison and make the analysis more interesting.

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