

Concession (License) and the Production Sharing Agreement: Lessons for the Way Forward in Achieving Balanced Benefits to Host Countries and Investors in the Petroleum Sector

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Abstract: *The paper presents a discourse analysis of the various International Petroleum Agreements. It highlights the main features and clauses of these IPAs. This literature review paper seeks to evaluate and compare different types of IPAs in different countries. It concludes that most developed oil producing countries prefer the concession while less developed oil producing countries favour the Petroleum Sharing Agreement. The study also found that there is no one generally accepted method used to evaluate and compare different types of contracts in different countries. The attractiveness of the fiscal terms in a country does not depend on the fiscal regime or its specific provisions but a combined effect of its fiscal terms. From the evaluation, it was concluded that there is a lacuna between discounted and non-discounted calculations and simulations. This means that the project itself is on the red line and the host country can get more revenue by imposing taxes, bonuses and other fees on the contractor, including where the contractor is almost running into negative figures. To overcome the defect of this indicator to reflect the combination of the fiscal terms realistically based on the evaluation and proportion of the host country's take, front-loading index of the contractor can be used to reflect the effect of the time sequence differences of the host country on the project and the contractor's profit. The study is the first of its kind and the lessons are expected to guide the way forward in achieving balanced benefits to host countries and investors in the petroleum sector.*

Keywords: concessions, host country, license, production sharing agreement, royalty

EL Classifications: K12, K32, Q48

1. Introduction

Since the inception of the oil and gas industry in the 1850s, there has always been a keen interest for investors to explore, develop and produce for the consuming market. As a result, the rights and obligation for the investors (International/ Independent Oil Companies) and the host country (HC) have found their ways into various laws and contractual agreements (Duval *et al.*, 2010; Colen *et al.*, 2016). The main parties involved are the HC, who owns the crude oil insitu (underground), the international oil companies (IOCs), who are the investors, and the final consumers of these petroleum products. There are many investment agreements between HCs and investors aptly found in the international energy industry (Cameron, 2010; Umirdinov, 2015). The first part of this paper provides an introduction to the main features of international petroleum exploration and production agreements, while the subsequent parts deal with the main features of International Petroleum Agreements (IPAs), that is Concessions (license or tax systems) and Production Sharing Agreements (PSAs). In this paper, service agreements, also known as risk service contracts (RSCs), will not be discussed because they remain relatively limited and cover only a small percentage of the global oil production agreements. Finally, a discussion and

evaluation of petroleum fiscal terms with the cash elements in the upstream projects would be simulated.

There are three basic types of IPAs between the HC, domestic investors and the International or Independent Oil Companies (IOCs) and these are: Production Sharing Agreements/Contracts (PSA/Cs), Concessions or Royalty/tax systems and Risk Service Agreements (RSAs). Each of these agreements established a different fiscal regime of governance sanctioned by the HC (Tordo, 2007; Mazeel, 2010; Duval *et al.*, 2010; Hassan *et al.*, 2023). Notwithstanding this, hybrid agreements, which show a mix of features of PSA/Cs and Concessions or Royalty/tax systems, are also common and a combination of some, if not all, of these IPAs in a particular country is not unusual (Gao, 1994; Cameron, 2010; Abraham, 2017). Cameron (2010) adds that one other consideration worth noting in IPAs is that many countries can have more than one kind of contractual agreement in place at one point or the other, so as to reflect policy changes that occur in that particular country over the years. For example, in the 1990s, there was a policy shift in Venezuela and Ecuador that led to investors (IOCs) being offered different contractual agreements. Figure 1 shows the fiscal hierarchy of IPAs.

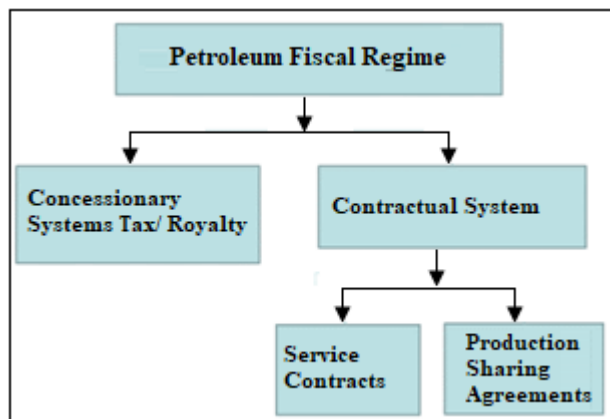


Figure 1: Fiscal hierarchy of IPAs

Source: Johnston (1994)

When the petroleum industry began in the United States in 1857, most of the petroleum deals were the concessionary petroleum agreements which had their origin from contracts in the mining industry. Edwin L. Drake pioneered this system in Titusville, Pennsylvania where crude oil was discovered (Duval *et al.*, 2010; Smith, 2021). According to Mariano, *et al.* (2018), the basic elements contained in petroleum concessions today include:

- The award of a concession by the HC to the concessionaire that gives the concessionaire the exclusive right to explore, develop and produce crude oil at a particular block or area within a specified period of time and there can be a possibility of an extension of the contract rights.
- Payment of royalties either in cash or kind to the HC in accordance with the function share of the production.
- There is also the responsibility of the contractor/investor (IOC) to undertake operations of the assigned area or block without delay or else the contract could be terminated.

IPAs have gone through a series of changes since the time of Edwin Drake. It is worth noting that the type of fiscal regimes and regulatory models used in different oil producing countries have been of great interest to IOCs or investors in the oil and gas industry globally (Smith, 2012; Mariano, *et al.*, 2018; McLean, 2023). Different countries have different forms of HC participating interest paid by the IOCs, including their respective aliquant. Not only that, different countries have adopted different fiscal regimes in a quest to maximize the HC's take of the revenues and efficient appropriation of same.

Some of these HCs adopt a single tax regime or multiple tax regimes (Tordo, 2007; Mazeel, 2010; Mariano *et al.*, 2018). Today, though a lot of fiscal regimes or agreements exist, IPAs can still be narrowed to a few contractual agreements used in the petroleum industry (Duval *et al.*, 2010; Amoako-Tufuor and Owusu-Ayim, 2010; Abraham, 2017). This implies that exploration and production activities and agreements may vary from country to country.

The most common contractual agreements identified by Mariano *et al.* (2018) are: contractual system and the concession system. It is also well documented that PSA represents the most common of the contractual systems. Donkung and Na (2010) add that IPAs are divided into two categories: concessions and contracting and that the IOCs have different rights, duties and obligations under each contract model. It is worthy of note that under both contractual and concessionary systems, the IOC bears the risks of exploration, development and production and will only be compensated for the risks it takes for exploring, developing and producing (Duval *et al.*, 2010; Donkung and Na, 2010).

The other form of IPA, apart from concessions and contractual agreements, is Risk Service Agreements or Risk Service Contracts (RSAs/RSCs) which was first used in Latin America in the 1950s and later in the Middle East in the 1960s. RSCs gained prominence because, some oil producing and exporting countries found it unacceptable to enter into a concession agreement or even a PSA that gives ownership of their natural resources or reserves to an IOC. Yet, these IOCs still want access to these crude reserves in those areas, hence RSCs came into being especially in Bolivia, Argentina, Brazil, Iraq and Iran so that the interest of the HC and that of the IOC can be balanced (Duval *et al.*, 2010).

Figure 2 illustrates the IPAs used in most oil producing and exporting countries. It can be deduced from the map that most developed oil producing countries tend to favour concessionary/royalty/tax system while the less developed oil producing countries relied more on contractual agreements (PSAs). What could be the reason for this preference? Examples of some countries and their preference for any of the three basic IPAs was also looked at. It further indicates the features and clauses which may offer a best deal for a country that is contemplating the establishment of a petroleum regime for the first time.

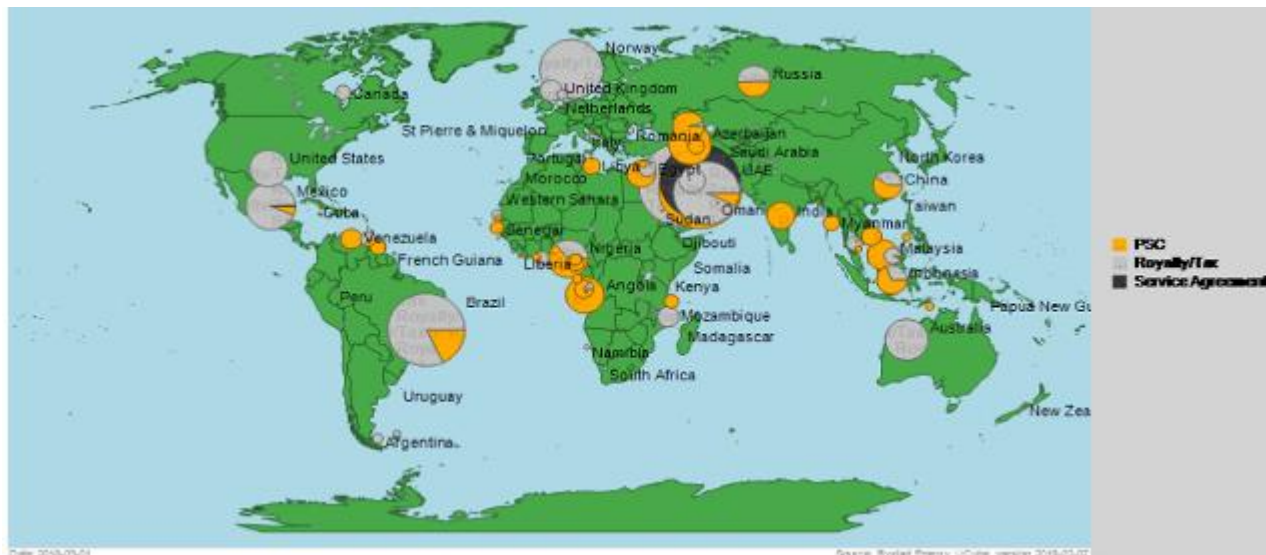


Figure 2: Geographical Preference for Petroleum Fiscal Source: Rytad Energy, 2018 and Mariano, de Sousa and Filho, 2018 Source: Duval et al. (2009)

2. Concessions (Licence) Agreements

Concession/tax or royalty system, according to Duval et al.(2010),entails the various forms of contracts, permits and licences or instruments depending on the applicable petroleum code and its regulations. Licensing/taxation regimes have become increasingly varied from country to country. Historical and regional preferences (Tordo, 2009)for instance, have influenced the nature and content of concessions agreement. Petroleum exploration and production permits or licences may both be contained in one contract document or separate contracts.

Common law countries and countries that apply the 1810 French Napoleonic mining code tend to put both exploration and exploitation contractsin a single document (Duval *et al.*, 2010). Duval *et al.* (2010) further opined that petroleum exploration permit is sometimes called exploration right, and production right is called a concession or a production lease. Countries like Norway and UK mining rights cover both exploration and exploitation in case a commercial discovery is made. On the contrary, Nigeria’s petroleum industry issues two different distinct titles for their exploration and exploitation: oil exploration licence and oil mining lease which authorizes extraction of crude oil (Duval *et al.*, 2010; Amana and Amana, 2013; Osa, 2016).

Concession agreements represent one of the three fundamental petroleum agreements for the exploration for and production of petroleum in the oil and gas industry (Duval *et al.*, 2010; Abraham, 2017; La Macchia et al., 2017; Paterson, 2019). Concessions are also called licence, permit or royalty mineral tax system (Donkung and Na, 2010). The other two, apart from concession, also known as concession agreements or license agreements, are PSA/Cs and SRA/Cs (Duval, *et al.*, 2010). Under the concession agreement, the HC gives the concessionaire (IOC) a specified area to explore for and produce.The crude then belongs to the IOC, subject to possible reservation of a royalty which becomes the share of productionpayable to the HC (Mullins and Burns, 2018; Duval *et al.*, 2010). The HC grants the IOC or the national Oil Company (NOC)the right

to explore and produce the crude oil at its own risk. The extracted crude belongs to the IOC once it is brought to the wellhead. However, the raw crude in situ (underground) belongs to the HC. According to Donkung and Na (2010), under some modern concessions, the HC government, through its NOC, can establish a joint venture with the IOC.Compared with the self-exploration of the IOC, the IOC still bears the exploration costs and after a commercial discovery is made, the HC government then bears a percentage of the development and exploration costs and then also recovers a certain cost of percentage from the total revenue after deducting royalties. However, Adeyemi (2015) is of the view that that most crude oil producing nationscontributed nothing but concession rights, for meagre returns in the nature of royalties.

Given the varied nature of concessions over years, Waelde (1995) suggests that each concession agreement/licence should be analysed depending on its substantive content instead of their type or formal design. In other words, substantive factors regulating the agreement, including risk assignment, management and control, and revenue sharing should be pivotal in determining concession agreement type.

Table 1: Countries preferring the traditional concession agreements

Example of Countries adopting concession model	
United States of America (USA)	Canada
United Kingdom (UK)	Norway
France	Pakistan
United Arab Emirates (UAE)	Papua New Guinea
Australia	Denmark

Source: *Donkung and Na (2010)*

During the time of exploring and producing crude by the IOC at the assigned block, the IOC is expected to adhere to all the rules of the contract terms and all the applicable taxation mechanisms and at the same time the assignment of the block or blocks is/are subject to bidding processes or it may be executed through a direct negotiation or analysis of the IOC proposals or other forms (Mariano *et al.*, 2018).

According to Duval *et al.* (2010), petroleum codes define, among other things, the system that has to be used by the appropriate authorities in awarding licenses and other IPAs to explore for crude and in an event of a commercial discovery to extract it. The two methods of awarding IPAs are: First, licensing phase where interested and qualified IOCs are invited to submit their proposals for a particular block or area within a period of time following the bidding procedure of the HC's petroleum code. Second, the HC can also have a direct negotiation with the interested parties. These direct negotiations are mostly conducted under open door policy after an official notice is issued by the HC indicating blocks which are open and requesting potential bidders to apply (Duval *et al.*, 2010; Cameron, 2010; Agalliu *et al.*, 2018).

Considering the strategic management of oil and gas, the HC may have a clause in the contract that mandates the IOC to supply the crude to the local or the domestic market. Under the concession system, royalties are levied on the gross revenues. After royalty deductions, the concessionaire's operating expenses (OPEX), depreciation and amortization deductions are also made to help recoup the concessionaire's cost of investment. The amount corresponding to the net income minus the deductions forms the calculation basis for the income tax. The remaining amount, after tax payments, is the company's profit (Mariano *et al.*, 2018). Depending on the legal system of the country, a grant of an exclusive right for exploration and exploitation licence can be issued to the concessionaire (Abraham, 2017; Stănescu *et al.*, 2020). For example, Norway petroleum licence contains about nine articles while that of Denmark consists of forty articles. Brazil has a long document of about thirty-five clauses and annexes usually signed by the authorities in charge. Table 2 shows an example of concession/tax royalty computation.

Table 2: Example of concession/tax royalty computation

Item	Bbl (\$)	Tax or Royalty Cost
Wellhead price	\$40.00	
Royalty	\$7.50	Royalty of 18.75%
CAPEX	-\$14.46	
DD&A	-\$10.30	
Before Income Tax	\$7.72	
State Income Tax	\$0.62	8% State tax
Federal Income Tax	\$2.40	34% Federal Tax
After Tax Income	\$4.70	

Source: Authors' construction (2023)

3. The main Features of a Concession (Licence) Agreements

According to Duval *et al.*, (2010) and Cameron (2010), the main features of concession agreements are almost the same irrespective of the kind of instrument concerned.

- 1) The concessionaire or the licensee (IOC) has the exclusive right to explore for and to produce crude at its own risks and expense;
- 2) The concessionaire also owns the entirety of the production and can dispose of it subject to any obligations to supply the domestic market and payment of royalty to the HC either in kind or cash;
- 3) During exploration and production, the IOC makes surface rental payments to the HC;

- 4) The IOC also pays income tax on the profit it derives from its extraction, operations and any other taxes;
- 5) The equipment and the installations belong to the IOC during the lifetime of the project and may be subject to transfer to the HC at no cost when the concession expires; and lastly
- 6) The concessionaire is responsible for the decommissioning or abandonment of the installations and equipment in due course.

3.1 Advantages and disadvantages of Concession (Licence) Agreements

From the economics point of view, the calculation of royalties is simple and can easily ensure an early and predictable cash flow for the HC. The concessionaire also has security of rights to the resources or reserves in situ (underground). Because of its simple nature, countries such as UK, Norway, Thailand, and Australia, among others, use these types of agreements. This kind of system is also compatible with countries with a strong NOC with various domestic companies participating in the oil and gas industry. Besides, it offers technology transfer to the HC as well as training programmes to fulfil local content obligations (Smith *et al.*, 2000; Cameron, 2010). Cameron (2010) further opines that this type of agreement has also been used in so many countries including Norway without any disadvantages arising from the agreement.

In contrast, concession agreements have always suffered from nomenclature challenges. The demerits associated with this type of agreement cannot be over emphasized. For countries who are very sensitive about their natural resources, there is that negative feeling that a foreign company can have control over their national patrimony and that can be an affront to the sovereignty of a new independent state or even sometimes unconstitutional for such an agreement just as in the case of Iran. The disadvantages of this type of agreement may also stem from the fiscal and operational point of view. For example, a concession agreement can be inflexible as a rent-sharing instrument (Cameron, 2010) and that could lead to low income or profit tax. Under the concession agreements, the concessionaire appears to have more or greater freedom compared with the PSA.

In some instances, negotiations surrounding oil concessionary agreements lack the expected level of transparency. Abraham (2017) blames corrupt practices and lack of skilled negotiators representing HCs as the root cause of this phenomenon in the developing world. To reverse this trend, leaders in less-developed countries must endeavour to train staff that can match their skilled professional counterparts representing the contractors in all negotiations. This is expected to minimize the disadvantaged position developing economies often find themselves.

4. Production Sharing Agreements or Contracts (PSA/Cs)

PSA, as the name suggests, is a type of petroleum agreement that stipulates that the output of the oil and gas project be shared between the HC and the contractor (IOC) in a

predetermined percentage proportion between the parties (Cameron, 2010; Purba, 2021; Hassan, 2023)). PSA/Cs were first used in Bolivia in the 1950s. Relatively, PSAs are new legal agreements compared to concession agreements in defining the relationship between the HC and the IOC (Duval *et al.*, 2010; Abraham, 2017; Paterson, 2019; Moran, 2021). PSAs became popular in Indonesia in the 1960s from the contracts used in the agricultural sector and the IOCs were reluctant to accept or adopt it because they preferred the traditional concession agreements (Tordo, *et al.*, 2011; Baudoin *et al.*, 2017). Despite the slow growth of PSA, it has now become one of the common contractual agreements in so many developing countries. PSA is now used in over fifty-five countries across the globe (Cameron, 2010; Abraham, 2017; Paterson, 2019; Lingard, 2020). Its wide acceptance can be attributed to its simple nature with respect to taxation. The fundamental difference between PSA and RSA is whether the IOC gets paid in kind or cash of the oil output. Under the PSA, the contractor also bears all the risks, just like in the traditional concession agreements, if there is no commercial discovery of hydrocarbons. The contract can also be terminated when it expires or when the contractor decides to give up. However, when there is commercial discovery, the contractor (IOC) will continue to develop and produce the crude oil. After extraction of the crude, the output is then divided into two parts: one part being the cost recovery oil and the other profit oil which is shared between the contractor (IOC) and the HC based on a predetermined formula (agreement) even before exploration, development and production. The contractor, IOC, is also required to pay taxes on its profit oil (Bindemann, 1999; Daniel *et al.*, 2010; Dongkun and Na, 2010; Hassan; 2023).

Azerbaijan has over thirty IOCs in their oil and gas industry (Rasizade, 1999). The historical petroleum legal regime of petroleum exploration, development and production in Azerbaijan is based on PSA (Ciarreta and Nasirov, 2012). The NOC of Azerbaijan (SOCAR) has in the past signed over thirty PSAs with the IOCs for the exploration, development and extraction of their petroleum resources which has subsequently transformed their oil industry into the backbone of their economy. Azerbaijan however, has two petroleum fiscal regimes in operation, i.e., licensing regimes which are domestically based and the PSA contract between the HC, represented by SOCAR, and the IOCs (Mustafayev, 2015). While other countries like the UK, Canada, Australia, Norway and France prefer the traditional concession agreements, others like Azerbaijan, Nigeria, Angola, Equatorial Guinea, and Congo prefer the PSA/C (Mustafayev, 2015). Most developing countries prefer the PSA but it has its own critics (Cameron, 2010). What could be the reason(s) for their preference? The paper highlights the main features of both traditional concessions and the PSA/Cs. What would make a country contemplating establishing a petroleum regime opt for one instead of the other?

Table 3: Countries preferring the production sharing agreements

<i>Example of Countries Favouring Production-Sharing Agreements/Contracts</i>			
Indonesia	Egypt	Algeria	Libya
Oman	Qatar	Iraq	The Philippines
Malaysia	China	Trinidad and Tobago	Angola
Congo	Ivory Coast	Equatorial Guinea	Gabon
Nigeria	Azerbaijan	Kazakhstan	The Russian Federation
<i>Caspian Area (Southeastern Europe and Asia)</i>			

Source: Donkung and Na (2010)

4.1 Main Features of PSA/C

According to Duval *et al.* (2010), PSA has evolved to keep pace with changing trends in the international energy industry between the contractors (IOCs) and the Host Country (HC). Duval *et al.* (2010) identified the following as the main features of PSA:

- 1) The contractor (IOC) is appointed by the HC through its NOC to undertake petroleum exploration in a certain area over a specified period of time;
- 2) The contractor (IOC) undertakes the petroleum exploratory activities at its own risk under the control and supervision of the HC;
- 3) When the contractor brings the crude to the wellhead (produces), the crude oil belongs to the HC, with the exception of the share of the output (cost oil) that would be taken out for the contractor (IOC) to recover its cost of exploration, development, production and operation. Afterwards, the profit oil is shared between the HC and the contractor (IOC) on a predetermined percentage contained in the contract. The sharing of the profit oil between the HC and the IOC is a sharp distinction between PSA and traditional concession agreement;
- 4) The IOC is entitled to a recovery of its costs out of the production from the contractual area;
- 5) The net income of the IOC is liable to taxation unless the PSA provides otherwise; and lastly
- 6) The HC owns the equipment and installations.

4.2 Advantages and Disadvantages of PSA/C

As indicated by Jafar (2008) and Cameron (2010), though originally, IOCs were reluctant to use PSA, it however offers a lot of advantages: it creates its own legal regime, especially in countries where international legal regimes for international energy investment are not robust or unsettled. This, according to the authors (Klein, 1999; Wolf 2008; Tordo, 2011), was axiomatic in the 1990s of nations who were transitioning from communist states to market oriented economies in Eastern Europe and Central Asia. Besides, under the PSA, the HC retains the ownership of the petroleum which can defuse passions that may arise in some HCs, allowing for a relationship of cooperation between the HC and the IOC. The IOC can also book the crude reserves in its books, thereby enhancing its share values. Lastly, PSA has in the past demonstrated flexibility in the event of oil price volatility.

However, PSA has its own critics. If it is not properly supervised, cost recovery provisions may result in 'gold-plating', which refers to the incorporation of costly and unnecessary features or refinements into a product or

structure. For instance, the claims made by the Russian government about the performance of a contract in the Sakhalin-II oilfield operated by Shell. Besides, calibrated volumetric sliding machines can fail to account for the high cost of an oilfield. It is also prudent to involve an IOC in areas where the crude reserves have known chances of probable low risk. Issues of decommissioning or abandonment may also arise and lastly an assessment of

PSA can sometimes be difficult because of the impure character or nature of it (Jafar, 2008; Cameron, 2010).

5. Comparison of the main Clauses in Concessions (or License) Agreements and PSAs

Table 4: Comparison of the main clauses in concessions (or license) and Production Sharing Agreements (PSAs)

Concession Agreement	Production Sharing Agreement
Definitions	
The definitions between these two types of agreements are almost the same except:	
The International Oil Company (IOC) is called Concessionaire or Licensee.	The International Oil Company (IOC) is called contractor.
The International Oil Company (IOC) holds the petroleum rights.	The International Oil Company (IOC) does not hold the petroleum rights, but has the exclusive right to perform exploration and production.
Object of the contract	
An exclusive licence is granted to the concessionaire.	The contractor is appointed to carry out exploratory activities within a contract area or block. An exclusive authorization is granted the contractor but not a petroleum title over the area.
Under both agreements, the International Oil Company bears all the financial risks and obliged to provide the equipment, capital, technology, technical assistance and manpower for the project.	
There are also some similar provisions among the two types of contracts	
i. Terms of the agreements are same. ii. Exploration and extension periods including time periods for relinquishments iii. Exploration minimum work and expenditure obligations. iv. Commercial discovery and extraction periods including appraisal and development plans, production levels, and decommissioning and abandonment plans. v. Natural Gas: appraisal and commercial discovery of gas, retention periods and the use or utilization of the gas. vi. Annual work programs and budgets: the IOC is supposed to submit its program schedules and budgets on annual basis to the HC. vii. Rights and obligations of the IOC: the IOC is obligated to adhere to all general standards of conduct, best oilfield practices, abide by all environmental and socioeconomic clauses contained in the agreement. viii. Confidentiality of data and information regarding their operations and dealings with the HC. ix. Project inspections, records, quarterly, half year and annual reports to the HC.	

Source: Duval et al. (2010) and Cameron (2010)

6. Discussion and evaluation of Petroleum Fiscal Terms

Contract terms vary from country to country and as aptly stated by Johnston (1994, Page5), “there are more petroleum fiscal systems in the world than there are countries”. But the fundamental difference between these contract terms is whether the resource (crude oil) ownership should be transferred to the IOCs and how this transfer should be done (Dongkun and Na, 2010; Kyari,2020). Considering the nature of risks in international energy investment, who bears the risks of geological, commercial, market and political uncertainties? Viewing the various petroleum agreements or contracts from a fiscal point of view, there exists no essential differences between these petroleum agreements or contracts. Dongkun and Na (2010) further add that all petroleum contracts are executed and performed based on five fundamental guiding principles:

- 1) Investment to produce or extract the crude oil.
- 2) Allocation of royalties and other fees or bonuses payable to the HC.
- 3) Cost recovery by the IOC.
- 4) Tax deductions and compensations for the IOC.
- 5) Profit oil sharing (the split between the HC and the IOC).

All these issues can be attributed to who provided funds or money for the investment and therefore how to allocate

revenue or share the profits thereof. Based on this, the differences in contract terms can be ignored when evaluating the attractiveness of particular fiscal terms (Dongkun and Na, 2010).

No empirical studies have proven that there is one generally accepted method used to evaluate and compare different types of contracts in different countries. The attractiveness of the fiscal terms in a country does not depend on the fiscal regime or its specific provisions but a combined effect of its fiscal terms. To evaluate the effectiveness of fiscal terms and compare different contracts, it is important to choose an indicator to reflect all the fiscal terms.

- 1) The indicator should reflect the revenue allocation of all the parties (between the HC and the IOC) under the combined effect of the fiscal terms;
- 2) A composite score (CS) indicator to evaluate the fiscal terms;
- 3) For the HC’s take, Government Take (GT), there should be an indicator to reflect the proportion of the HC’s share to the total income share of the total revenue of the project;
- 4) There should also be a front-loading index as an indicator to reflect royalties; and lastly
- 5) Cost sharing ratio and profit sharing ratio should adopt a progressive sliding scale.

6.1 Host Government Take (GT)

GT is the common and mostly used indicator to reflect how attractive a contract is. GT reflects the attractiveness of the contract terms. It also indicates the total income of the HCs income of the total revenue of the project (DR) within the contract period. The two streams of income to the HC include: the HC’s income take (GTG) and its NOC take (GTC). Royalties, profit oil sharing, taxation and carried and participating interest are put into one indicator. Considering the time value of money and at a particular output and price of oil, cash inflows and outflows are stimulated and all the appropriate allocations and deductions of the contract is made in accordance with the terms of contract and the proportion of the HC’s revenue within the contract period. This implies that the more the GT, the less attractive the contract is to the concessionaire or the contractor (IOC). The formula for GT calculation can be illustrated below:

$$GT = \frac{\sum_{t=1}^n (GTG_t + GTC_t)}{\sum_{t=1}^n DR_t} \times 100\% \dots \dots (a)$$

Where n = contract period, a; GTGt = HC’s take for the year, t, \$; GTCt = revenue of the HC NOCs in the year t, \$; DRt = total revenue in the year t, \$

The discounted cash flow rate is also calculated based on the HC’s take on a discount rate. At a certain output and price of crude oil, the cash inflow of the HC within the contract period is simulated and presents the revenue of the HC during the petroleum project lifecycle per a certain discount rate. The ratio of the Present Value (PV) of the HC’s revenue to that of the petroleum project cash flow is GTias illustrated below:

$$GT_i = \frac{\sum_{t=1}^n (GTG_t + GTC_t)(1 + i)^{-t}}{\sum_{t=1}^n DR_t(1 + i)^{-t}} \times 100\% \dots \dots (b)$$

Where i represents the discount rate.

It is therefore important to mention that forecast of cash flow needs a lot of data, complex and multidisciplinary calculations and simulations and these can be sometimes difficult to achieve within a short period of time. Dongkun and Na (2010) came out with a fast and an intuitive calculation method. Under the formula, the project revenue (I) is assumed to be 100% and the calculations are made in accordance with the proportion of the project contract.

So, let’s assume the allocation order and ratio of a PSA/C is:

- 1) HC royalty (R) equivalent to (R=10%).
- 2) IOC cost recovery (R_r) not exceeding 35% (upper limit) with total income of revenue deducted.
- 3) Allocation of profit oil after the (a) and (b) deductions, the remainder becomes the profit oil for sharing, between the HC takes 55% (E_r) and IOC takes 45%.
- 4) The IOC is liable to pay income tax (T) to the HC, then the tax rate (T_r) equals 25%. The taxable income is the income the IOC gets from the profit oil. Now the HC has three income streams: R, E and T. The GT can now be calculated as follows:

GT =R +E + T

Where R = IR_t I = 100%
 E =CI – R (I - R_r)E_r
 T = (I – R) (I – R_r) (I – E_r) Tr

The GT is calculated by fast and intuitive method as:
 GT_r =10% + (100% – 10%) × 100% – 35% × 55% + [(100% – 10%) × (100% – 35%) × 45%] × 25% = 48.77%

By using this method, it is easy to calculate the amount of the HC’s income to the total revenue of the oil project. The evaluation of the calculation also reflects the attractiveness of the contract to a certain extent, especially for the HC. This also has its own flaws when compared to different fiscal terms. It only shows how much revenue or income the HC receives without taking into account the financial implications of the contract on the contractor (IOC). From the above calculation, it can be deduced that there is a lacuna between discounted and non-discounted calculations. With the non-discounted formula, the take home of the HC is 1 but when calculated with discount rate, the take home of the HOC could exceed 1. This means that the project itself is on the red line and the HC can get more revenue by imposing taxes, bonuses and other fees on the contractor (IOC) whiles the contractor is almost running into negative figures.

This means that the time sequence of differences of revenue gained by the HC will not only affect the contractor and the project viability but also on the attractiveness of the sequence of the fiscal terms of the parties involved in the project. To overcome the defect of this indicator to reflect the combination of the fiscal terms realistically based on the evaluation and proportion of the HC’s take, front-loading index of the contractor can be used to reflect the effect of the time sequence differences of the HC on the project and the contractor’s profit (adopted from Dongkun and Na, 2010).

7. Conclusion

The paper looked at the various International Petroleum Agreements(IPAs) and further highlighted the main features and clauses of these IPAs. The study revealed that most developed oil producing countries prefer the concession/tax or royalty system whilst less developed oil producing countries favour the PSA. There was no one generally accepted method used to evaluate and compare different types of contracts in different countries. The attractiveness of the fiscal terms in a country does not depend on the fiscal regime or its specific provisions but a combined effect of its fiscal terms. An evaluation and calculation of the fiscal terms reflect the attractiveness of the contract to a certain extent especially for the HC. This also has its own weaknesses when compared to different fiscal terms. It only shows how much revenue the HC gets without taking into account the financial implications of the contract on the investor (IOC). From the above calculation, it was concluded that there is a lacuna between discounted and non-discounted calculations and simulations. To overcome the defect of this indicator to reflect the combination of the fiscal terms realistically based on the evaluation and proportion of the HC’s take, front-loading index of the contractor can be used to reflect the effect of the time sequence differences of the HC on the project and the

contractor's profit as suggested by earlier researchers (Dongkun and Na, 2010). Hence, governments should be concerned as this may discourage investors from investing at optimal levels.

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