A Review Paper on Upstream Petroleum Fiscal Systems

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Abstract

The petroleum industry is the industry of wealth and power. In many countries, whether petroleum is exported or imported, it dominates the economy. For any country, natural resources are the crown jewels. Few industries combine such a dramatic contrast between risk and reward so that countries with petroleum resources carefully guard this wealth .

A petroleum fiscal system includes all the contractual and fiscal aspects that determine the relationship between the host government and the foreign oil companies [1]. This term defines the right and obligations of both the host government and the oil companies. The essence of these systems is how the oil wealth is shared between the investors and the host government or how costs are recovered and profit is shared .

Upstream petroleum agreements are often called Exploration and Production (E&P) contracts. Exploration and production contracts and the associated fiscal systems may be of several types depending on the legal framework of the government and its adopted fiscal policy. Although the main types of E&P contracts and fiscal regimes were established a long time ago, the economic parameters of each type of upstream petroleum contract and fiscal system have considerably changed in the last decades. Upstream agreements in different countries do not have the same nature because each producing country adopts its particular agreements for petroleum exploration and production according to its economic and political situations.

This chapter will present a general overview of the petroleum fiscal systems and their types, the historical development of petroleum agreements, the fiscal terms of each system, and the economic framework of each system.

1. Introduction

In the upstream sector, three different strategies are available for the host government to explore and develop its hydrocarbon resources. The first strategy is a standalone strategy in which the host government runs its petroleum sector alone and no private companies are available. In such case, there's no need for the fiscal system. In the second strategy, there's no direct involvement of the host government only private companies. The third strategy involves direct cooperation between the host government and the foreign oil and gas companies [2].

Exploration and Production E&P contracts and the associated fiscal systems may be of several types depending on the legal system of each country and its adopted petroleum policy. Basically, there are two main types of petroleum fiscal systems, namely royalty: tax or concessionary systems and contractual: based systems as shown on **Fig.2.1** [1].

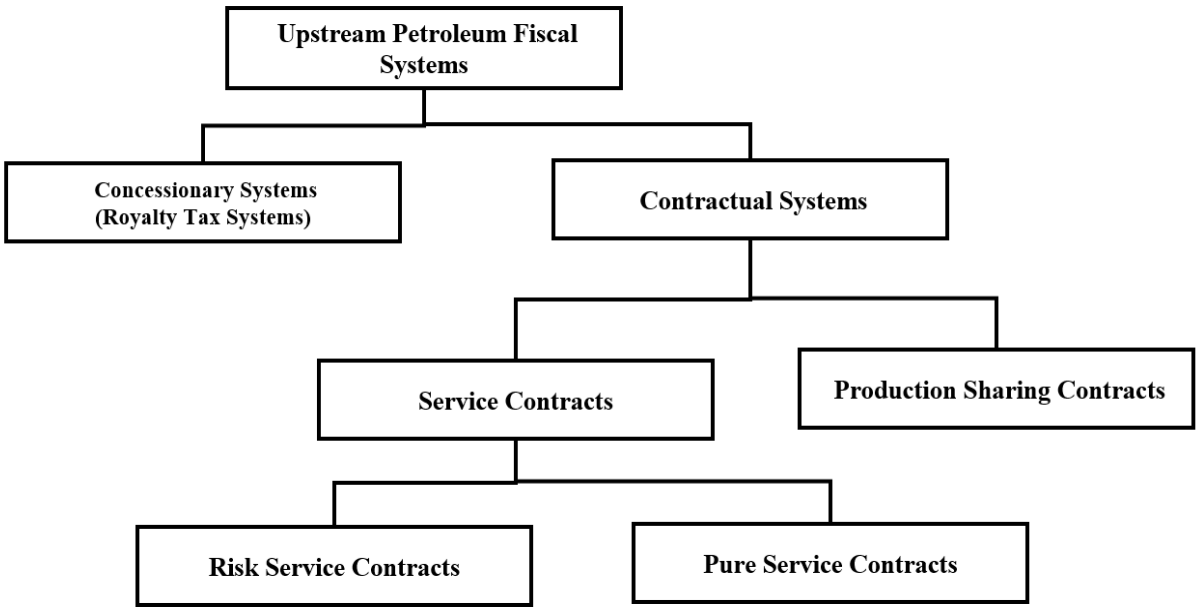

Fig.2. 1: Classification of petroleum fiscal systems [1].

2. Concessionary System

The concessionary system or royalty: tax system was the first system used in the world and is used currently by around half of the petroleum-producing countries including the US, UK, Russia, Norway, France, Argentina, South Africa, and Australia [3, 4].

Under this system, the host government grants a license to an international oil company (IOC) or a group of companies to explore, develop and produce hydrocarbons for a fixed period within a certain

area [5]. According to this system, the host government transfers the title of the petroleum resource to the contractor once they are produced[1].

In its basic form, the concessionary system has three components, which are royalties, deductions, and tax. The level of the royalty and tax varies considerably. In this system, the royalty represents a cost of doing business, and it is usually a percentage of the gross revenue from the sale of hydrocarbons, which can either be paid in cash or in-kind and is tax deductible [1, 6-8]. After royalty has been deducted from gross revenue, what is left is called the net revenue. Deductions are then taken from the net revenue. Deductions such as operating cost for the whole project, depreciation of capitalized assets, depletion and amortization, all drilling costs are deducted from the net revenue. The last component of the concessionary system is the tax. The tax base or the taxable income is calculated by the difference between the gross revenue less the royalties and the allowed deductions [1, 6, 9].

Although the concession system is now considered as an old version, many countries still adopt variations of the concession in modeling their fiscal policy. The major disadvantage associated with the traditional concession framework from the host country's point of view is that it grants considerable power to the oil companies and leaves the host government in the position of being a simple tax collector[10].

3. Contractual Petroleum Fiscal System

Under contractual systems, the government retains ownership of minerals. The oil companies have a role of “contractors” who develop and extract in return for compensation according to the contractual arrangements with the host government[1, 5]. As it is shown on **Fig.1**, Contractual arrangements are further classified into production sharing contracts (PSC) or sometimes production sharing agreements (PSAs) and service contracts or service agreements (SA).

In the contractual arrangements, the government is traditionally represented by the National Oil Company (NOC). The international oil companies (IOCs) provide the technical and financial services, to explore, develop and exploit the mineral resources. However, the NOC negotiates with the IOC for a profit: sharing mechanism from the expected oil or gas production as a reward for the risk taken and services rendered. Each government’s law determines the basic terms of a contractual arrangement, although many issues may be negotiated. At the beginning of each negotiation between NOCs and prospective IOCs, the terms of model contracts are often used as a basis for the bidding process. After that, the elements of the contracts may be subjected to renegotiation as more information such as the political and economic condition of the specific region becomes more available or changed.

Indonesia is the pioneer of the PSC, with the first contracts signed in the early and miD.1960[1]. A PSC allocates a portion of the produced oil called cost oil to the contractor to recover all costs (operating and capital cost) also known as OPEX and CAPEX that are paid during the different phases of the project. This is done after royalties have been paid to the government of gross production. The rest called the Profit Oil is then shared between the Host Government and the IOC according to terms stated in the contractual agreement [1, 6]. Production sharing contracts are the most widely used systems in the world as it is used in 48% of the producing countries while service agreements are implemented only in 8% of all oil: producing governments[11].

Services agreements are considered a development of the production sharing agreements in terms of controlling and monitoring of the host country on the petroleum resource, as in such agreements the producing country keeps its full sovereignty. The foreign company operates as an IOC and takes the risk solely. The recovery in some contracts of this type starts only after marketing the production. Under service contracts, foreign companies act as contractors who receive a fee for the services rendered [12].

These agreements are further divided into pure and risk service contracts. In pure service contracts, the contracts are paid for the services provided regardless of if there's discovery or not. However, in risk service contracts, the contractor is only compensated in case of commercial discovery. The fee usually allows the recovery of all or part of costs and a profit component. Moreover, the contractor may have the right to purchase crude oil from the host government at a discount [5].

The terms and features of risk service contracts are similar to those appearing in the PSCs. The usage of the risk service agreements is less compared to the concession or the production sharing contract. The key feature of the risk contracts is that no royalty is used with these arrangements. The IOCs may provide technical, financial, commercial, and buyback services.

The first service Agreement in the world was concluded in Iran between Iranian Oil Company (NIOC) and the French company (Airab) on 12/12/1966. Risk service agreements are popular in many countries such as Brazil, Chile, Ecuador, Argentina, Peru and Venezuela, Philippines, and Iran[1].

4. Historical Development of Upstream Agreements

Since the 19th century: the start and the early development of the petroleum industry: the host governments depend mainly on the skills and knowledge of the international oil companies to efficiently explore and develop their hydrocarbon resources[13].

Petroleum agreements have witnessed tremendous changes according to the economical and political development of the host governments over the past century. Historically, the old concession

agreements were abusive and unfavorable to the producing countries, especially the Arabian governments where the profit sharing of the host government ranges between 10: 30 cents per barrel. The main characteristics of the earliest concession agreements were[14]:

1. The large concession areas and the long duration of these concessions
2. No relinquishment clause
3. The small number of concessionaires (Companies were Monopolies).
4. Limited bargaining ability of governments
5. The modest financial compensation for the concession
6. Fixed Royalties as the main financial compensation
7. The slow development of the concession conditions
8. No reference to work programs
9. No rules for dispute resolution
10. No corporate taxes
11. Companies had ownership of reserves
12. The oil companies controlled all aspects of oil production, marketing and pricing completely

The awareness of the political and social changes in the seventies of the last century was the main factor in putting an end to such agreements. Afterward, the agreements have been developed to the right of the host country in profit sharing, and production and management sharing, and finally the government's right to own the petroleum resources and achieve its control over its natural resources.

Before World War II, petroleum concession agreements were the dominant agreements in Middle east countries like Saudi Arabia, Qatar, Kuwait, and Iraq besides Iran and Indonesia. Petroleum agreements during this period were highly lenient to the international companies. Iran was the first country to apply this kind of contracts in 1901. The first Arabic agreement made with foreign companies was between the Egyptian Government and the Anglo: Egyptian Oilfields Company in 1912, followed by an agreement between the Iraqi Government and the Turkish Petroleum Company in 1925[14]. The key features of such agreements are summarized as follows:

a. The concessionaires granted the right to explore and produce petroleum from vast areas for long periods up to 90 years without any commitments. Since there were no relinquishment clauses related to the specified areas during the contract tenor which means complete control of the international companies over the petroleum industry of the host government.

b. Contractors were not committed to invest a part of their profit in the host government or developing its local content.
c. Contractors were not obligated to refine the petroleum locally. Besides, pricing and marketing the refined products were the responsibility of the contractor without any control of the host government.
d. Contractors paid a certain amount for the acquisition of the concession besides fixed royalty rate to the host government. The tax rate was fixed through the whole contract period without any profit sharing with the host government.

During 1950, new types of concession agreements were evolved. These contracts were known as half: half profit contracts. These contracts were clear and provide the host governments with some advantages. These concession contracts started by Saudi Aramco then spread through the Middle East. The key features of such contracts are[14] :

- The royalty rate was fixed by 12.5 % of the gross production either paid in kind or cash.
- The contractor is committed to pay 50% tax of its income including royalty provided that the paid royalty and the tax should not exceed 50% of the net cash flow.
- The company profit is calculated using the published prices after deducting the allowable deductions specified in the agreement

By the establishment of the Organization of Petroleum Exporting Countries (OPEC) in 1960, the economic structure of the concessionary systems was significantly changed. The most commonly agreed contract was the Libyan concession agreement signed in 1965s which characterized by the following[14]:

- The contractor is committed to pay the previously mentioned royalty without considering it as prepaid tax payments but as a cost for tax deductions.
- The tax rate was 50% of the taxable income. This taxable income was calculated according to the published prices after deducting the allowable deductions and the royalty.
- The contractors were committed to pay 0.5 cents per barrel as a marketing allowance.

Many governments believe that concessionary systems gave the IOCs too much control over their sovereign resources and oil: producing countries viewed the existing concessions as remnants of colonial times. As a result of this belief, many host countries resorted to nationalization or threats of nationalization they still lacked the intellectual and technical capital to effectively use what they took from the IOCs.

For some countries, the concessionary system was neither politically nor legally acceptable like Indonesia which introduced the first production sharing contract model (PSC) in 1967s[13]. The PSC contracts gave the host government greater control over the operation of IOCs in their countries. Many countries throughout the world soon followed the PSC example set by Indonesia in some form or another [15].

The evolution of fiscal systems changed the type of activities that fiscal contracts govern. The new emphasis was on capacity building. The fiscal terms of the late 1990s and early 2000s have their origin in the multitude of systems that developed during the 1980s and 1990s [16].

Al-Attar and Alomair [17] determined the most important factors that control the choice of the fiscal system including reserves, the recovery factor, and E&P costs. In countries with low reserves and high extraction costs, the concessionary systems are more prevalent while PSC contracts are preferred in countries with large reserves and low extraction costs.

Exploration for new reserves and enhanced recovery methods are required to maintain or expand production from mature oilfields. These techniques require substantial capital investments, technology transfers as well as the transfer of skills. In general, countries use more than one type of fiscal system due to different reserves with a wide range of E&P costs and recovery factors[17].

The new upstream agreements include five central components. These components are reduced marginal E&P costs, sharing of geological and capital investment risk between the host country and IOCs, using optimal technology to increase production capacities, and increasing investment to meet future oil demand. Practically, the structure of specific fiscal terms is the important issue rather than the type of agreement itself[17].

The ‘booking’ of reserves is an important consideration for IOCs for financial reporting purposes. Under concessionary systems, the IOC will book all the reserves under the ground. However, under the PSC, IOCs still get a share of production and ‘own’ their share of the produced reserves[13].

Baunsgaard [18] investigated the petroleum fiscal systems for different developing countries. He found that most of the sampled countries use royalties to ensure an up: front revenue stream during any period especially the periods of low economic prices. Most of the countries used *ad valorem* royalties with rates between 2 and 30%, and two: thirds of the countries surveyed used PSCs as the main fiscal system.

According to Johnston[1], half of the African countries use PSCs, while a large portion of the other half, using a profit: based tax system, applies resource rent tax (RRT) in addition to corporate

income tax (CIT). Most of the Asian countries surveyed use PSCs. For the Western Hemisphere, PSCs are rare outside the Caribbean and few countries use RRTs. For the Middle East, PSCs are the most common contract form.

Sunley and et al [18] trace the development of petroleum fiscal systems over time and across countries using Norway, Kazakhstan, Indonesia, and Angola as case studies. They found that the difference in bargaining power between the government and the IOC is one of the main reasons for the wide variation in fiscal patterns across countries. Countries with very attractive geology as well as political and macroeconomic stability tend to have stricter fiscal terms.

Mommer [19] classifies profit- based systems as liberal while gross income based systems as proprietorial. The reality underlying these different systems lies more in ideology and political fashion, for example, the choice of state ownership versus privatization[20].

Even though the oil sector has strong international features, local influences from within and outside of the oil sector significantly influence the design of a country's petroleum fiscal system [2]. A fiscal system should produce a mutually beneficial outcome for both the host government and investors because highly generous terms will reduce government returns and overly tough terms will reduce investment in exploration as investors will redirect their activities to regions with more attractive fiscal regimes[2, 20].

Blake and Roberts [21] compared five petroleum exploration and production fiscal regimes underprice uncertainties. The fiscal systems analyzed were: Alberta Canada (concessionary system); Papua New Guinea (pre.2003, traditional rate of return system); Sao Tome and Nigerian Joint Development Zone (production sharing contract, PSC); Tanzanian (hybrid system) and Trinidad and Tobago (PSC). They also used Monte Carlo simulation to deal with uncertainty and found that some systems are much better than others. They found that Alberta Canada and Papua New Guinea fiscal systems provide companies with the highest after tax values while also being the least distortionary. The Tanzanian system is the lowest in both rankings, providing relatively low after tax values and introducing strong distortionary effects.

Torodo [22] classified the licensing systems in two groups: open: door systems where interested contractors are allowed to submit a proposal for specific areas at any time (mostly annual or bi- annual) and licensing rounds held as an auction or administrative process based on a set of criteria provided by the host governments.

Regardless of what system is used, the negotiation process starts between the contractor and the national petroleum company (NOC) based on the petroleum law in the government of interest. The petroleum law usually defines the petroleum policy of the host government, the terms of petroleum contracts, and the fiscal devices which the government uses to capture an appropriate rent from the petroleum resources. After negotiations, the host government signs a contract with the contractor. When the contractor includes several companies (partners), then the joint venture (group or consortium) between them is formalized using a so called joint operating agreement (JOA) [23].

Nakhle [2] determined the important issues surrounding the choice of concessionary and PSC systems. Concessionary systems may be more attractive for investors than PSCs. However, both systems can be used to achieve similar outcomes depending on how the systems are figured. Comparing systems solely in terms of tax rates or government take is misleading but three important issues should be considered. Firstly, the objectives of the host government, for example, tax rates could be low to encourage the investment and offset negative factors such as political risk, poor geology, and high technical costs. Secondly, government-specific, as well as regional factors, must be kept in perspective, for example, the level of government take in relation to the conditions of geological risk and high costs in mature basins. Finally, there should be a balance between securing a fair share for the host government and providing sufficient incentives for continued investment.

According to Johnston (2006) [4], there is no particular difference between the two systems from a financial point of view. The main difference is only from the legal point of view, i.e. in the *ownership structure* or, where and when the title of the hydrocarbons is transferred to the oil company. While the concessionary scheme implies the transfer of the title at the wellhead, when the IOC gains a right over gross revenue less royalty; the PSA allows the transition only at the export point.

According to Iledare [24], Al-Attar, and Alomair [17], the cornerstone of the fiscal system is the structure not the type of the contract so that it can't be easily claimed that one contract is better than the other but each contract must be evaluated separately.

In practice, there are no identical fiscal system designs as there are no identical characteristics of the transaction and the contracting parties across different countries. Moreover, the same country can use more than one set of the fiscal system. The use of more than one fiscal system can be explained by the transition period when the government uses two different systems at once, or simply by using different contract terms applied for different contractors [1].

By comparing the petroleum fiscal systems across Pakistan, Thailand, Turkey, Cameroon and the Democratic Republic of the Congo using government/contractor take

statistics, Zahidi (2010)[25] ranked these jurisdictions in terms of their attractiveness to investors, based on the contractor take statistic.

After the economic evaluation of JVA and PSC systems in Nigeria, Mmakwe and Ajienka (2009) [26]claimed that the JVA arrangement is more attractive to the host government, while IOCs would prefer the PSC.

Blake and Roberts (2006)[21] evaluated the petroleum fiscal systems of five regions under conditions of oil price uncertainty. The regions of interest were Alberta (Canada), Papua New Guinea, the Sao Tome, and Principe/Nigerian Joint Development Zone (SNJDZ), Tanzania, and Trinidad and Tobago. By using Monte Carlo simulation, they ranked the fiscal systems according to the after tax value due to IOCs and the extent of distortions created by the systems.

After using a hypothetical oil field, a discounted cash flow model to determine the impact of two different fiscal arrangements – a PSC and a JVA – on exploration, production, and government take in Nigeria, Iledare (2004)[27] concluded that if the government want to maximize wealth for society, direct government participation might not be the best option.

Rutledge and Wright (1998)[28] compared the distribution of rewards between the government and IOCs in the United Kingdom Continental Shelf (UKCS) with that of Norway. They found that IOCs enjoyed higher profitability than those operating in other oil provinces around the world.

After analyzing the UK regime, including the relaxation of tax terms over time, Abdo (2010)[29] found that this system has failed to increase the government take.

5. Conclusion

There is no ideal fiscal system that is suitable for all countries or projects because they differ in terms of the size and quality of reserves, upstream costs, and political risk.

An efficient petroleum fiscal system can attract investment by using a clear framework. This system will promote the development of a country’s upstream sector by inducing efficient exploration and development by IOCs while ensuring a fair share for the host government.

Land [30] determined a number of criteria to outline fiscal systems for governments that want to maximize their economic rent over the long term. These criteria include economic efficiency, the minimization of both government and investor revenue risk, and finally the ease of implementing the system.

According to Johnston [11], an effective fiscal system should provide a stable business environment, provide a balance between risk and reward, minimize sovereign risk, a stable business environment, provide the potential for a fair return to both the host government and investors, incorporate flexibility for changing economic conditions, minimize complexity and administrative burdens and finally promote competition and market efficiency.

Demirmen (2010)[31] determined four features to design a 'win: win' petroleum fiscal system. This system will promote exploration activities, encourage the development of both small and large oil fields, provide incentives for areas that are difficult to explore and
difficult to be developed, and finally provide a fair distribution of economic benefits for both
the host government and IOC.

Goldsworthy and Zakharova [32] identified a number of fiscal characteristics attributed to a desirable fiscal system. These characteristics include stability, neutrality, rent capture, progressivity and adaptability and timing of revenue, administrative simplicity and enforceability, and finally international competitiveness.

The IMF [33]suggests a combination of a modest *ad valorem* royalty, company income tax (CIT), and resource rent tax (RRT) as an appealing option for countries with lower income. In addition to the above mentioned instruments, host governments may prefer to be more directly involved in upstream projects by taking state participation equity in a project[18].

Agalliu (2011)[34] suggests the incorporation of revenue risk, profitability measures, and fiscal system stability, resource potential, and the relative prospectivity when assessing petroleum fiscal systems.

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