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ROBERT GORDON
UNIVERSITY
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FACULTY OF MANAGEMENT
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Title: Is Uganda's Petroleum fiscal system efficient?

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Matriculation Number: 1214951

Submission Date: 30/9/2013

Supervisor: Dr. Labaran Lawal

Aim: To ascertain whether Uganda's petroleum fiscal regime encourages efficiency

Objectives:

1. To evaluate the terms of Uganda's PSCs in respect to cost recovery and test efficiency

2. To examine whether existing monitoring and cost control oversight by government is adequate

3. Ascertain whether the proposed new law addresses the efficiency of cost recovery-monitoring and oversight

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Total word count (excluding acknowledgements, diagrams, references, bibliography and appendices) 22,603

A Dissertation submitted in partial fulfilment of the requirements for the **Postgraduate Certificate/Diploma/MSc Degree in Oil and Gas Accounting**

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Is Uganda's Petroleum Fiscal regime Cost efficient?

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ABSTRACT

The up-front investment required during exploration, development and production of oil and gas fields can be very high and the level of costs incurred has a direct impact to the timing and size of government revenues.
Under production sharing contracts (PSCs), in addition to bonus payments, royalties, taxes and profit oil, cost recovery is one of the terms of fiscal contracts through which International oil companies (IOCs) recover exploration and production costs after successful discovery. Host governments (HG) have been comfortable with the concept, as limits are placed on the amount of costs that can be recouped from every production per year. Likewise to IOCs, cost recovery provides some guarantee of early recovery of their investments and costs can be recovered from production before payment of taxes.
However, of late, various HGs have become concerned of the reasonableness and amounts recovered by IOCs. There are fears that IOCs intentionally increase costs (gold plating) thereby significantly reducing or delaying the revenues that HGs receive. IOC inefficiency can be caused by poorly designed contract terms, ineffective oversight and monitoring institutions.

Using both quantitative (economic modelling) and qualitative analysis this research tested whether Uganda's 1999 model PSC terms and the recently enacted laws encourage cost efficiency in the operations of IOCs. The conclusions from the results of the study are that the Uganda's 1999 PSC model encourages companies to be efficient. This is due to the fact that as costs increase, government share (take) increases as the company's NPV and IRR reduce. The system is thus cost regressive. More still increase in cost recovery limits doesn't improve investors' economics proportionately. Instead, as cost limits are increased, IRR and NPV increase up to the point when the initial investment is recovered and then remain constant or fall thereafter. This is more pronounced in larger fields (≥ 300mmbl).This is due to the fact that larger fields incur higher costs and attract a higher profit oil share in favour of the government. Investors will thus either favour the smaller fields or negotiate better terms. In addition, as prices fall (lower profitability), investor's IRR and NPV reduce but government revenue increases.

Furthermore, the study also concludes that, besides the lack of technical expertise and financial resources, the institutional framework adequately enhances efficiency.

To further strengthen the oversight functions, the new law separated the regulatory, policy and commercial institutions and their roles in terms of cost monitoring and verification. It is recommended that, initially, more capacity building effort in the Petroleum Authority be undertaken in both financial and technical aspects. Because a new model PSC is supposed to be formulated by the Minister, with possibly different terms from the 1999 model, some terms which may need improvement, to enhance efficiency, have been identified like: standard/fixed terms; procurement practices; clear cost definition; and reduction of cost audit lead time.

Keywords: *Cost recovery, gold plating, efficiency, regressive, institutional framework*

ACKNOWLDGEMENTS

I thank the Almighty God for the wisdom, knowledge and good health he has given me for the whole year I have been at the University.

To my late mum, Kevina, I dedicate this study to you, for your unending sacrifice to ensure I get knowledge and education

Deep gratitude to my wonderful wife and children for your patience while I was away.

Dr. Labaran Lawal, my supervisor, I owe you a lot for your critical review

Special thanks to the Office of the Auditor General, my employer, for nominating me for the government of Uganda petroleum training scholarship. I've gained the relevant knowledge which I pledge to use in enhancing the oversight function of the petroleum sector

Thank You and God bless you all

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Acronyms and Abbreviations

AIPN	Association of International Petroleum Negotiators
BCF	Billion cubic feet
BOPD	Barrels of Oil per Day
DMO	Domestic Market Obligations
EIA	Energy Information Administration
ERR	Effective Royalty Rate
HG	Host Government
IOC	Investing Oil Company
IRR	Internal Rate of Return
JOA	Joint Operating Agreement
MMBBLS	Million Barrels
NOC	National Oil Company
NORAD	Norwegian Agency for Development Cooperation
NPV	Net Present Value
OECD	Organisation for Economic Co-operation and Development
OPEC	Oil Producing and Exploration Countries
PEDP	Petroleum Exploration, Development and Production
PEPD	Petroleum Exploration and Production Department
PSC/A	Production Sharing Contract/ Agreement
SPEE	Society of Petroleum Evaluation Engineers

CHAPTER 1: INTRODUCTION

1.1 Background to the Study

Exploration and production of oil and gas are complex tasks/activities, which involve sophisticated techniques and resources. It often costs hundreds or even millions of dollars to drill even a single well. The situation is even aggravated in less developed countries, which although endowed with mineral resources, lack the necessary financial, technical and human capacity to carry out the exploration. To bridge this gap, HGs enter into agreements with wealthy IOCs to carry out exploration and production on behalf of the hosts, in exchange for a return. Several forms of contracts exist for effecting these agreements, ranging from the original concessionary systems, the production sharing contracts, service contracts to the joint venture agreements.

Irrespective of the fiscal regime, the result should be of mutual and equitable benefit, whereby it provides the IOC with a fair rate of return (ROR) on investment commensurate with the project risks, and also provide the HG with an adequate resource for rent, resulting in a win-win situation (Demirmen 2010).

At times, however, the relationship is not harmonious; with conflicting interests among both parties. The underlying tension between the petroleum industry and its government hosts arises from the fact that each party seeks to maximize its share of the net revenue, or the difference between gross revenue (total proceeds from oil production) and costs (Richards 2003)

A key challenge is then designing a fiscal regime that minimizes discontent. It is important that the parties identify the likely sources of future conflicts and formulate contracts that are as comprehensive as possible (Bindeman 1999) so that projects that are profitable for society before taxation should remain profitable after taxation. Conversely the fiscal system should not render an unprofitable or wasteful venture profitable for the investor through inappropriate terms (Stig Sollund 2008). Royalty, cost recovery, domestic market obligation, taxation, signature and production bonus, are the different forms on how HGs extract economic rent from their petroleum resources.

Cost recovery, together with a royalty protects HGs, as a fixed allocation per period, usually a percentage of production, guarantees the government a share in the initial production of fields. Similarly, through cost recovery, IOCs retain a specific portion of total production to recover their costs (Cost oil). Although cost recovery is not an ingredient of concessionary systems, cost control is paramount in determining what costs are deductible and the timing of such costs in order to arrive at a the revenue tax base.

In the petroleum industry, the element of cost recovery is therefore as important in determining net revenues as other factors like price of petroleum and reserve amounts. Of late however, there have been accusations and speculations raised by HGs and civil society that the PSC contractors are not efficient, tend to spend as much as they want uncontrollably, and even make profits out of cost recovery[1].

This research analyses various key important features of petroleum fiscal systems relating to an efficient cost recovery process and attempts to ascertain whether Uganda's fiscal system is efficient to ensure that the host governments receive the full value of their share of revenues under the terms of the contracts signed with oil and gas extraction companies.

1.2 Aims and Objectives of the Study

The main aim of the study is to examine whether there are adequate mechanisms in the Uganda's PSC to ensure an efficient cost recovery process

In order to achieve that aim above, the objectives of the study will be;

1. To evaluate the terms of Uganda's PSCs in respect to cost recovery and test efficiency

2. To examine whether monitoring and cost control oversight by government is adequate

3. Ascertain whether the proposed new law addresses the efficiency of cost recovery-monitoring and oversight

4. Make recommendations (if any) for improvement of cost recovery terms

1 PSC Forum Indonesia 2008 http://pscforum.wordpress.com/ 5/9/08

1.3 Justification of the Study

In Uganda, although oil was discovered in 2006, production is not expected until a refinery has been built (PEPD 2012). The last round of PSC contracts signed for new explorations were in 2002. Government put on hold any new awards and signing of contracts for exploration until new legislation and revised terms of contracts have been formulated. Two new laws have been enacted: The Petroleum Exploration, Development and Production (PEDP) Act 2013; and The Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act, 2013. The objectives of the former are to regulate petroleum exploration, development and production; to establish the Petroleum Authority of Uganda; and to provide for the establishment of the National Oil Company while the latter is to regulate, manage, coordinate and monitor midstream operations. New regulations and a revised model PSC are to be formulated thereafter to take into consideration the changes in the laws.

At the same time, various costs have been incurred to date in respect of exploration activities; approx USD 1.7bn (Kabagambe 2013)[2]. It is estimated that a bigger amount of expenditure will be incurred during the development stage (estimated $12bn)[2] and pipeline construction (estimated $2bn)[2] hence increasing the amounts and timing of cost recovery. This study therefore is timely as it will provide information to various stakeholders and policy makers in formulating efficient cost recovery processes and institutional oversight terms in the revised PSCs and regulations. The anticipated beneficiaries include:

i) Government bodies involved in drafting and signing of new Petroleum sharing contract terms and regulations;

ii) Other regulatory bodies can use the findings as a guide in their monitoring and oversight function;

iii) Academicians and researchers, to contribute to a knowledge gap. There has been limited research in the areas of cost recovery. Most research in PSC's has centered on aspects like flexibility and optimality of PSCs, production (reserve quantities), market (prices of crude), royalties and taxation.

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[2] Uganda Government: Investment in oil exploration hits $1.7 billion, http://www.energy-pedia.com/news/uganda/new-153988 25th March 2013

1.4 The Structure of the Research

This research is organized into six chapters. In Chapter 1, it proceeds with the Introduction; giving a brief background, aims, objectives and rationale of undertaking the study. In chapter 2, a review and analysis of the relevant theoretical and empirical evidence of earlier research regarding efficiency is presented. Any gaps identified during the literature review are discussed in view of forming the basis of this study. The different types and terms of petroleum systems are also reviewed. Chapter 3 continues the review with the analysis of Uganda's petroleum fiscal system, identifying the institutional set up, laws, regulations and terms of the 1999 Model PSC.

The methodology of the research study is embraced in Chapter 4 beginning with the underlying assumptions or paradigm and design of the study, hypothesis, data sources, methods of data collection and analysis and ending with conclusions and limitations of the design.

In Chapter 5, using hypothetical figures, Uganda's model PSC is simulated to test empirically whether it promotes efficiency in IOC operations. The results are analysed and discussed using tables, charts and graphs. The chapter further reviews and scrutinizes Uganda's new laws, institutions and other PSC terms with a view of ascertaining their adequacy in ensuring efficiency. Chapter 6 finally covers the conclusion and recommendations of the study based on the findings.

CHAPTER 2: REFERENCE FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

According to Hart (1998), literature review is "the selection of available documents on the topic which contain information, ideas, data and evidence written from a particular standpoint to fulfil certain aims or express certain views on the topic…. and the effective evaluation of these documents in relation to the research being proposed" (Hart 1998:13).This chapter therefore presents the theoretical framework of the research and review of relevant previous research. It begins with the broad literature on petroleum fiscal systems in general providing an insight and analysis to identify any gaps, trends, ideas and theories (Saunders et al 2012) and progressively narrows down to cost recovery and the different types of recoverable costs which will help in testing efficiency in PSCs. It proceeds with definitions, country experiences and different forms of inefficiencies in PSCs. Finally, the chapter ends with a review of relevant institutional framework best practices for efficient monitoring of PSCs.

2.2 Petroleum Fiscal Systems

A petroleum fiscal regime of a country is a set of laws, regulations and agreements which governs the transfer of economical benefits derived from petroleum exploration and production (Gudmestad, et al 2010). The regime regulates transactions between the HG and the IOC. Before the different types of fiscal systems are discussed, it is important to clarify first, who holds the rights to petroleum underground? According to Gudmestad et al. (2010), at least two systems are possible:

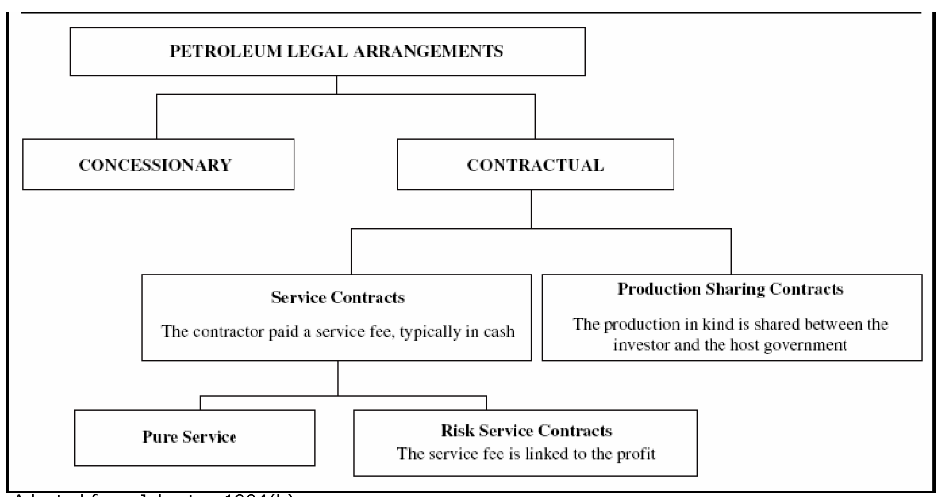
- Whoever owns the ground above, also owns the resources below
- The state owns the resources below, regardless of ownership to the ground above(inclusive of the resources below offshore waters)

While the former is found in the United States of America, the latter system is common in many other resource rich countries (in Europe, Latin America, Africa, Middle East and Asia).

This study will concentrate on the latter system in which the state has the authority to grant rights to any party to carry out petroleum extraction. The state grants such rights through a process of either negotiation or bidding. The national legislation, usually the Constitution and/or the Petroleum

law/Act, is the starting point for any licensing regime as it determines the entitlement of the resources underground. Other laws, regulations and agreements are then derived there from (Tordo 2007).
Solid literature, both theoretical and empirical, has been undertaken on the forms, effectiveness and attractiveness of various oil regimes worldwide. Extensive studies and research by Kemp (1992), Johnston (1994), Bindemann (1999), Johnston (2003), Pongsiri (2004), Tordo (2007), Nichols (2010) etc provide the oil industry with vast knowledge of the functioning of petroleum fiscal systems.
According to Johnston (1994), there are two broad families of petroleum fiscal systems; the Concessionary systems and the Contractual Systems (Figure 1)

Figure 1: Types of Petroleum Fiscal systems



Adapted from Johnston 1994(b)

The similarity is that in both systems, the investor assumes all risks and costs associated with exploration, development and production, and "receives compensation adequate to the risk" (Tordo 2007).
The fundamental difference relates to the ownership of the petroleum resources (Tordo 2007) and the control of exploration and production activities (Johnston 1994 a, Bindemann 1999). Bindemann further states that each form can be used to accomplish the same purpose.

2.2.1 Concessionary (Royalty/Tax) System

In concessionary systems, the host state transfers the ownership of the oil and gas minerals to the IOC, in exchange for royalties and tax. Concessionary systems, also known as the Equity/Royalty/Tax system were the first type of oil and gas agreement (Pongsiri 2004) and very dominant in the 1940's and 1950's. They are still used by most developed countries like USA, Norway and UK. The state grants exclusive rights (license) to the company (licensee) to extract petroleum. The licensee will own the installations put in place as well as the petroleum extracted (Gudmestad, et al 2010). Under this system, royalty is first taken account of, from gross oil production and paid to the state; the concessionaire is then allowed to deduct operating costs, depreciation, intangible drilling costs and other related charges before calculations of taxes. The royalty represents a cost of doing business and is thus tax deductible. Taxable income under concessions may be taxed at the country's basic corporate tax rate. Any tax losses are normally carried forward until full recovery (Tordo 2007).

Traditional (classical) concessions, especially in the Middle East were characterised by development rights awarded to IOC's for large areas (at times entire countries). IOC's had complete control and schedule of mineral development, and contracts were signed for long periods (50-75yrs). However, currently, modern concessions have been restructured to include royalty and bonus payments, work obligation, shorter contract periods, relinquishment clauses and state/NOC participation (Bindemann 1999).

2.2.2 Contractual System

Under the contractual system the host governments retains ownership of the reserves and only grants the IOC (contractor), the right to explore for, develop, and produce the reserves. Contractual systems are either service contracts (pure service and risk service) or PSCs. PSCs are the most common forms of agreement (Nichols 2010) and are used mainly in developing countries like Indonesia, Egypt, Angola, India and Uganda.

2.2.2.1 Production Sharing Contracts

According to Johnston (2003), the concept of production sharing is ancient and widespread whereby farmers in the USA and Venezuela had been practicing it for decades. It's an agriculture concept where the landlord allows the tenant to use his land in exchange for a specified share of production (Bindemann 1999). The first modern oil PSC was signed in 1966 in Indonesia (Johnston 1994). Currently almost half of oil producing countries are using PSCs.

A main argument in favour of the PSC for HG's is that, unlike the traditional concessions, they have turned the balance of ownership of reservoirs from the IOC to HGs allowing them more control and benefits from production without transferring of investment risks (Marcia 2010). This is especially true for developing countries that lack the technical expertise and financial resources to undertake such activities.

The oil is owned by the state which hires the IOC/contractor to explore and, in case of commercial discovery, develop the resources. The IOC operates at its own risk, providing personnel, finance and technical resources for exploration, development and production and receives a specified pre-negotiated share of production as a reward (Al-Emadi 2010, Bindemann 1999). However, in the event that no commercial discovery is made, then the IOC/Contractor bears all the risks and has no claims on the HG (Johnston 2003). Further details of the main features of PSC's will be discussed in section 2.3.

2.2.2.2 Service Agreements

Another variation of contractual systems is service contracts, where the contractor is compensated by payment in cash for their service. All production belongs to the state. Like the royalty and PSC, the contractor is usually responsible for the provision of capital for exploration and development. In return the contractor recovers costs through a fee which is often taxable (Johnston 2003). The difference with the other contracts is that the contractor is not entitled to oil. Service agreements can be pure service or risk service.

A **pure service contract** is where the contractor carries out work on behalf of a HG and a fixed fee is agreed to compensate the contractor with or without discovery of oil (Mazeel 2010). These contracts are usually common in the Middle East where there is little or no risk of discovery of oil and the countries have substantial capital but only need expertise. Contracts usually undertaken by service companies may include drilling and development (completion and testing) services.

Under a **risk service contract** the contractor accepts to share exploration risks by linking his pay to the success of the project (Gudmestad, et al 2010). If exploration is successful, the contractor is allowed to recover the costs through sale of oil/gas and also receives a fee based on the percentage of remaining revenues (Mazeel 2010). A form of risk service contract was developed by the Iranian government, known as "Iranian Buyback Agreement", where the IOC invests until when production begins and the field is handed over to the government or it's NOC.

Although the contract terms allow compensation based on oil/gas revenues (like in PSCs), contractors do not acquire any rights to oil/gas unless if its fees are paid in kind.

PSCs or Service contracts can also be **Technical assistance** contracts, where a company is contracted to carry out a task at an existing field, such as rehabilitation, redevelopment or enhanced oil recovery for a fee. In such fields, a production profile with a specified decline rate is agreed. If future production is as per the agreed decline rate, then all production will go directly to the government. However, if production increases above the agreed rate, then that is deemed to be due to the contractor's technical assistance and hence subject to production sharing between the government and contractor (Mazeel 2010).

2.2.2.3 Partnerships and Joint Ventures

Joint ventures (JVs) are business enterprises jointly undertaken by two or more companies, who share the initial investment, risks and profits. They come together to form a new entity by contributing equity, for a specific period of time, share revenues, expenses and assets. Although Roberts (2010), distinguishes between partnerships and JVss, for the purpose of this study, both terms will be used interchangeably.

In both Concessions and PSC's it is common for two or more companies to participate as partners in a license or contract. The advantages of JVs in the petroleum industry are (Roberts 2010):

- Risk sharing- exploration and production projects have become more complex and risky with high geological (deep offshore drilling), financial(expensive), political (nationalisation) and commercial (price volatility) risks such that these can now be spread across more widely to a group of companies;

- Skills sharing- allows parties to pool skills, expertise and abilities to avoid duplication and also learn from each other; and

- Participation in multiple projects- allows one party to undertake only a part of a project and frees up the unutilised resources to be devoted to other profitable projects

Governments can also initiate JVs in order to get alternative view points on the effective development of the resource and also as safe guard of excessive cost (Gudmestad et al 2010). In countries like Norway, government may award a license to several companies jointly, even if they applied separately. JVs are also created through a Farm-in, whereby, a company which initially owned a license or contract, and/or makes a large discovery, may agree that another party enters the project as a new partner. A case in point is Uganda where in 2012 Tullow Plc, after successful discovery, entered into partnership with Total and CNOOC (Tullow 2012).

JVs can be incorporated or unincorporated. Unincorporated JVs are more common and refer to relationships which are documented by contract or agreement known as a Joint Operating Agreement (JOA) which specifies how responsibilities and benefits will be shared amongst themselves. The parties do not incorporate a separate company. They are usually referred to as contract joint ventures (Al-Emadi 2010, Roberts 2010).

Under JVs, one of the participating companies will be designated as an *Operator* by the host government (although partners may be allowed to nominate) while the rest are known as *Non operating partners.* The operator will conduct all operations using its personnel and contracted services and the non operators will either reimburse (through billings) or prepay (cash calls) their shares of expenditure to the operator depending on the agreed procedures. Each partner will lift its own share of oil/gas produced and is responsible for its sale.

It has been argued that JVs are important tools in promoting efficiency through economies of scale, cost sharing, reduced duplication and increased monitoring of operators by, not only, governments but also non operating partners (Roberts 2010).

2.3 PSC Terms

PSC terms are diverse and vary across countries. Johnston (1994,2003), Kaiser & Pulsipher (2004), Nichols (2010) and Mian (2010) have all categorized the general and most common terms of PSC’s to include:

2.3.1 Bonus Payments

A signature bonus is a sum of money (cash) usually paid by the contractor to the host government upon the signing of the contract. Additional bonuses may be paid when important milestones on the project are achieved like discovery, reaching certain levels of daily production or cumulative volumes. Some countries, like Angola, may require a large amount which may be individually negotiated. A signature bonus will provide the government with a financial benefit irrespective of whether the contractor will find petroleum.

2.3.2 Royalty

This is the "first cut" off of production paid to the government by the IOC. Royalties are often a percentage of gross production and may change on a sliding scale based on daily production (Nichols 2010). Royalties were more common in concessionary systems since ownership of the reserves was with the licensee but currently used in PSCs as a tool in the production allocation process. They guarantee government a fixed minimum amount of revenue regardless of the profitability of the project.

2.3.3 Maximum term and Work Commitment

PSCs have a specified maximum time, usually 30-35 years, divided into periods like exploration and production period at the end of which, even if the field is still producing, the contractor is not entitled to future production unless contract extensions have been approved. During the time of contract the contractor is obliged to perform a minimum amount of seismic work, surveys, drilling of pre-agreed number of wells, minimum investment etc. Contractors submit work programmes with budgets to government for approval.

2.3.4 Government participation

PSCs may provide rights for government to back-in and become a joint working interest partner (through the NOC) usually at the development stage. Governments are usually 'carried' through the exploration. The level of participation ranges from 10-51 percent.

2.3.5 Cost Recovery

This is the process through which the oil company recovers some of its investments. Also known as "Cost oil", it is the second tranche of production allocated to the contractor. According to Johnston (2003), "mechanically", cost recovery is the only distinction between concessionary systems and PSCs. Some PSCs normally limit the amount of production that can be used for cost recovery in a given period to a percentage of gross production ranging from 30 to 60 percent. Once the exploration and original development costs have been recovered, the cost oil limits may decrease at times to between 15 and 30 percent. Other PSCs don't have limits on cost oil or allow 100% cost recovery (such as the second generation Indonesian PSCs). The IOC could henceforth claim 100% of production as cost recovery in the initial years of production. PERTAMINA (the Indonesian NOC) only started to receive a share of production whenever the PSC reached a point where less than 100% of production was needed for cost recovery (Machmud 2000).

PSCs usually define the costs that are recoverable and the order of recovery. Starting with any unrecovered operating costs from prior years, to current operating costs, unrecovered exploration, interest on financing(if allowable), investment credit(if any) and abandonment cost (Nichols 2010). Any unrecovered costs during the period are carried forward for recovery in subsequent periods.

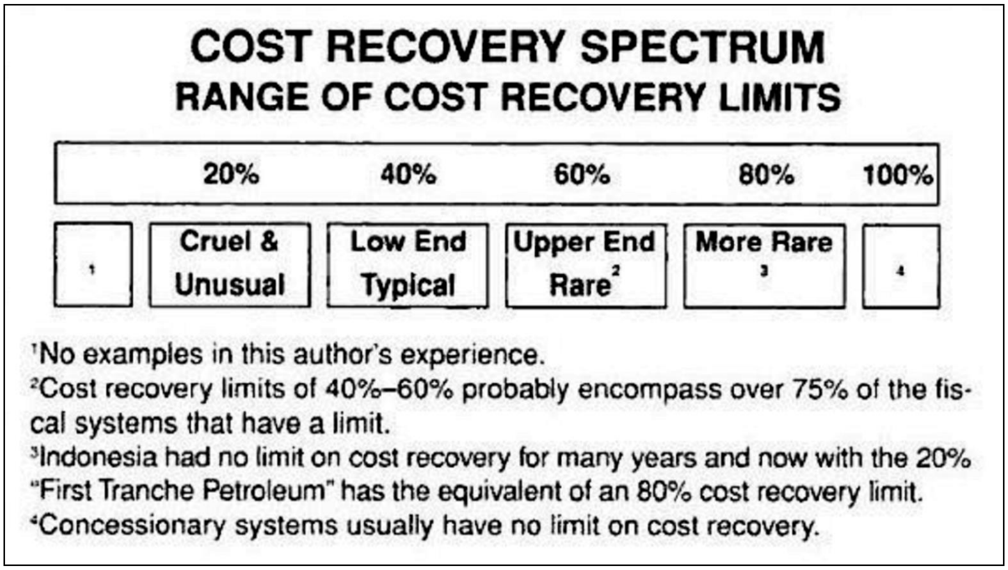
Excess cost oil remaining after all costs have been recovered during a particular period is usually treated as profit oil and divided between the government and the partners according to the agreement, although in some PSCs the entire remaining cost oil goes to government. In the Egyptian and Syria PSCs, extra cost oil belongs to government.

On the issue of overheads (general and administrative costs), PSCs usually allow the operators to recover some of their home office costs usually allocated based on a percentage of overall direct costs for the field. The percentages may be on a sliding scale varying between exploration, development and production phases. Some use a fixed rate, per well per month, to allocate overheads.

Not all costs incurred by the IOCs may be fully recovered. If at the end of the agreement or on abandonment, there are still outstanding unrecovered costs and there is no production/ revenues to cover them, then the loss is borne by the IOC. Finally, some countries like Peru (1971 and 1978 PSCs) did not have cost recovery clauses. After the allocation of royalty, the remaining production was shared between the HG and contractor on an agreed formula. The contractor would use that to cover all his risks (costs and profits) and pay income tax.

Below in Figure 2 is a spectrum of the different cost recovery limits

Figure 2: Cost Recovery Spectrum



Source: Adopted from Johnston 1994

2.3.6 Profit Oil and taxation

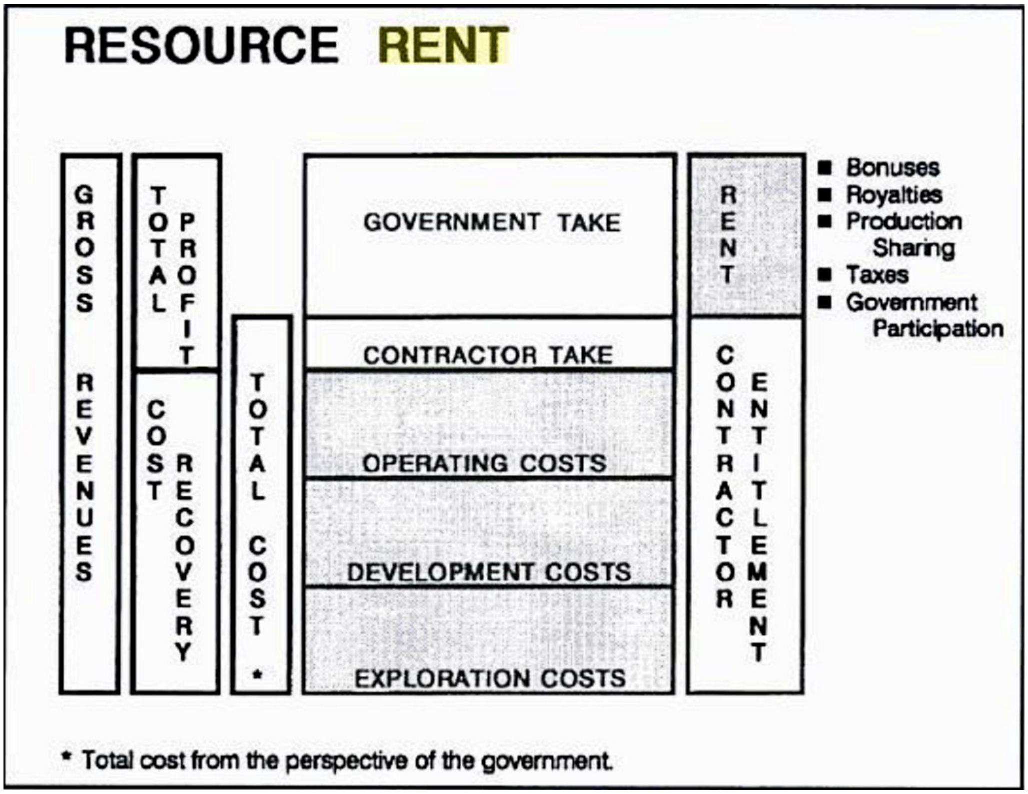
Profit oil is the balance remaining after deducting royalties, production taxes (if any) and cost oil. This is shared between the host government and the working interest partners (contractor). It ranges between 15 and 55 percent for the contractors (Johnston 2003). These percentages may change say, once exploration costs have been recovered and again when development costs are recovered or when milestones in daily or cumulative production are reached. Thereafter, the contractor's share of the profit oil will then be subject to taxation by government. Income tax is paid at a rate similar to what other businesses operating in that host country pay (20%-50%) after deducting all allowable expenses, depreciation, finance costs etc. In some cases the taxes may be fully assumed by the state company (Libya), in which case the government's share is increased to take into account the assumption of taxation.

2.3.7 Other Terms

Other terms include; purchase of seismic and geological data by the contractor before bidding/negotiations, asset retirement obligations or abandonment costs to be accumulated in a sinking fund as the field produces, relinquishment of acreage at the end each period in the contract, capital uplift allowance to IOC to encourage increase in investment, valuation and pricing of petroleum, commerciality to determine whether a discovery on a property is economically feasible, domestic obligations to meet home demand, ring fencing to limit crossover of costs/benefits between fields, local content to develop home infrastructure and expertise, reinvestment obligations, tax and tax holidays (Nichols 2010).

Figure 3 below highlights the allocation of petroleum revenues from production under a PSC.

Figure 3: Resource Rent allocation under PSCs



Adopted from Johnston 1994

The revenues (rent) collected for the state are all referred to as government take. Before a detailed literature review of efficiency in cost recovery is undertaken, in the next section, the study discusses various components of cost oil, its usefulness and examines the effect of accounting methods on efficiency.

2.4 Cost Oil

Regardless of the type of fiscal system, oil companies engaged in exploration, development and production will incur costs that can be identified to belong to one of the following categories:

a) Acquisition Costs

Costs incurred in order to acquire legal title to a working interest in the property. They include costs relating to either purchase or lease of rights to extract the oil and gas; like bonus payments, legal expenses, title search etc.

b) Exploration Costs

Costs incurred to resolve doubt as to whether or not proved reserves actually exist on the property (Koester 1982). They relate to collection and analysis of geophysical and seismic data. Also include costs associated with drilling exploratory wells which are further subdivided into intangible or tangible. Intangibles are those incurred to ready the site prior to the installation of drilling equipment whereas tangible costs are those incurred to install and operate the equipment.

c) Development Costs

Costs incurred after proved reserves are determined to exist on the property, up to the point where property is capable of producing reserves. Development costs involve the preparation of discovered reserves for production e.g access roads construction or improvement, additional drilling or well completion (casting, cementing or perforating), installation of infrastructure like extraction pumps, gathering pipelines and storage tanks.

d) Production Costs

These are costs incurred in lifting (extracting) of oil or gas from the reserves. They include treatment costs, wages for workers and electricity for operating equipment. Production costs are considered part of periodic operating expenses.

e) Abandonment costs

Also known as decommissioning costs, they relate to costs incurred to implement the removal, disposal or reuse of installation when it is no longer needed for its current purpose (Jahn et al 1998 quoted by

Gudmestad et al 2010). It involves plugging wells, dismantling wellhead, production and transport facilities and restoring sites to approximately their pre-exploration condition.

All the above costs are recoverable through the cost oil component of the fiscal regime.

2.4.1 Is Cost oil Important? Who gains and who loses?

Cost recovery limits have a dual role of allowing the company recover some of its initial investment and also guaranteeing the host government a share in the production. But do HGs or IOCs usually get what they deserve/or due to them?

The argument in favour of cost oil to HG's is that they are shielded from having to put their limited resources at risk while at the same time benefiting from any potential revenues to be generated where there is successful exploration (Johnston 2008). This is more obvious in poor countries with a multitude of development priorities like education, health, water and sanitation, in which to invest their meagre resources instead of financing risky exploration ventures.

Moreover, as Johnston notes, "To say that oil companies provide capital and technology is an over-simplification". Actually, to a large extent companies provide a service of "procurement" for and on behalf of governments and themselves for both capital and much of the technology.

Johnston (1994) further states that as long as there is production, a cost recovery limit forces some form of profit sharing.

For companies, although cost oil provides some cushion for cost recovery, others view it as synonymous to "bad oil". Considering that a firm's major objective is an "acceptable pay-out time to recover their original investment," a growing point of view sees cost oil as adding no benefit to the IOC. This is because, taking into account the time value of money, costs being paid at a later stage (in most cases a year or two later) which do not take into account the depreciation of money over time will never accurately reflect true costs. Moreover very few PSC's offer the opportunity for the recovery of financing costs or interest expense (Nakhle 2008). To compound the problem further, some costs may never be recovered, either as a result of contract termination or depletion of reserves. These then become sunk costs.

If, in fact, no interest expense is recoverable and there is a fear of sunk costs, as is common in most PSCs, doesn't that create an incentive to IOCs to inflate costs in order to compensate for the time value of money thereby creating inefficiencies and reducing government share?

2.5 Efficiency in Fiscal regimes

According to Oxford English dictionary, Efficiency is the "level of performance that describes a process that uses lowest amount of inputs to create greatest amount of outputs" whereas cost efficiency is "maximizing productivity with minimum expense or effort".

In petroleum fiscal regimes, many researchers have attempted to define efficiency through a variety of ways.

Kemp (1992) studied the efficiency of petroleum fiscal systems in UK, Norway, Denmark and Netherlands in collecting the prospective economic rents from the development of new fields where there are uncertainties regarding development costs and oil prices. Using financial modeling, he observed that the fiscal system in UK and Denmark are progressive in relation to development cost variations and oil price changes. In Norway, the system is regressive and produced a significantly high level of take, with little incentives for small fields. In the Netherlands, the system is moderately progressive in current money terms, but regressive in present value terms. He opined that this was the consequence of the gross royalty plus the modest pace of depreciation permitted.

Earlier studies by Johnston (1994) also studied the Papua New Guinea, Tunisia and Peruvian PSC systems and found their progressiveness through the use of Rate of Return or R-Factor as revenues rose.

Kaiser and Pulsipher (2004), using meta modeling to determine whether a particular fiscal regime (concession or Contract) is progressive or regressive for Angola and Gulf of Mexico offshore projects, showed that increase in royalty rate impacts IOC take, present value and rate of return slightly more than increase in taxation.

Using the same methodology Iledare and Kaiser (2006) analyzed petroleum fiscal regime in E&P offshore and observed that contractor take increases with an increase in commodity price and profit oil and falls with the royalty and tax rate. They further showed that the value of profit oil split is a more significant parameter than cost recovery (almost four to five times).

Isehunwa et al (2009 and 2011) found that government take in Nigeria is more sensitive to tax than to royalties and the proposed sliding royalty rates calculated based on both oil price and volume of production yield higher government take than those based on either volume of production or price of oil alone.

Demirmen (2010) described efficient systems as those that encourage exploitation, promote development of both small and large reserves, allows special incentives for difficult to explore/develop and enables equitable sharing of economic benefits.

Up to this point it is evident that research on efficiency of PSCs has dwelled mainly on optimality, flexibility, neutrality, stability of fiscal regimes in the lens of only increased oil prices, volumes, taxation rates, reserves. The two questions that arise are whether costs/ cost recovery is not as important as other terms in determining efficiency or whether progressive (introduction of R factors/IRR) regimes are necessarily efficient?

In section 2.5.1 the study tries to answer the latter question. Following on the research analyzes the importance of cost efficiency. Although limited, some literature and recent disputes between governments and IOCs provide some clues;

Johnson's (1981) study on effective PSCs, using 24 PSC options, concluded that the inclusion of sliding scales, based on production levels alone doesn't maximize governments' benefits in all environments.

Le blanc leonard (1996) also noted that despite rising oil prices, industry well being depends on both risk management and cost control. He further argues that with increased cost efficiency, there is little fear of low prices. That efficiency comes through well designed cost control processes and institutional monitoring.

Later Osmundsen (1998), in a two period model of taxation of non renewable natural resources showed that specific cost characteristics of non renewable natural resources extraction could distort both extent and pace of extraction hence affecting revenues.

2.5.1 Progressiveness and Efficiency

Progressive regimes refer to fiscal systems where, as profitability of the project improves, government shares increases. Whereas, under regressive regimes government's share relative to the IOC declines when profitability increases. Most front end loaded systems tend to be regressive as they concentrate so much on government getting upfront revenues from bonuses, royalty and limiting cost oil and are production based. On the other hand progressive regimes tend to defer government share and base it to profitability. Tordo (2007) suggests that a tax system should provide for a minimum number of front-end loaded non profit-sensitive taxes. Because in most PSCs government share depended on daily production, these were found to be regressive; most scholars and analysts recommended various measures to make fiscal systems more progressive by using either the Internal Rate of Return (ROR) or R factor.

ROR is a basis of rent tax calculation under which the government's share is set by reference to the cumulative contractor rate of return; no tax being levied if that falls short of some benchmark rate.

R factor is the ratio of contractor's undiscounted cumulative revenues to contractor's cumulative costs. Government's profit share increases as the ratio increases. This improves on the Rate-of-Production system by being a more direct measure of profitability. Single or multiple tiers can be used whereby at different ROR/R factor, different tax rates apply.

As noticed in the definitions, in determination of profitability, the level of costs incurred is as important as the revenue. Improved profitability will also mean reduced costs. However, because the tax rates are dependent on the contractor achieving a certain profitability (ROR, R-Factor) threshold, it is possible for the contractor not to achieve that level of profitability, so as not to attract a higher tax rate. The IMF paper 2012[3] on extractive industries states that "companies can reduce profit-related taxes by increasing deductible costs"

Indeed Pedro (2011) notes that R-factors and IRR based systems increase significantly the risk of not collecting the appropriate government share; cost control has to be of high quality and rigorous confirming Johnson's 1981 study. Tordo (2007) also further noted that if taxation is high, R factor may not be the best because there is an incentive to spend additional cash flow rather than seeing it go to governments through royalties and taxes

[3]INTERNATIONAL MONETARY FUND. Fiscal Regimes for Extractive Industries: Design and Implementation. Prepared by the Fiscal Affairs Department. Approved by Carlo Cottarelli August 15, 2012

which prove no tangible benefit to the project (Masson and Remillard 1996 quoted by Tordo 2007)

Therefore sliding scales based on profitability (ROR/R Factor) have to be carefully balanced. They have to achieve a higher government take, while they should also encourage efficiency. These features only work well over a relatively narrow range.

2.5.3 Types of inefficiencies

a) **Gold Plating**- the practice of making unreasonably large expenditures due to lack of cost-cutting incentives (Johnston and Johnston 2010, Svetlana et al 2003). 'Gold plating' is a situation in which the fiscal regime creates an incentive to spend more than is necessary and profitable, or bring forward investment.

b) **Inflating of costs/budgets** - Is the artificial inflation of reported costs. This affects government take by reducing the reported profits to be split between government and industry.

c) **Transfer pricing** – passing value to associate companies by contracting out work or purchase of goods or services to associated companies at rates higher than arms length prices.

d) **Gaming of entitlements-** Overstating the cost recovery budget or estimates will of course end up with higher contractor's entitlement nomination, justifying more share of crude liftings. At the end of the period, when actual entitlement based on actual volumes, actual prices, and actual cost recovery has been calculated, the contractor will then be found to be in an overlift position. Although eventually the overlift will be settled, the contractor will at least have gained with regards to getting the cash earlier (time value of money). This is equivalent to getting an interest free loan. The effect is even more pronounced if lifting is done in periods of high oil prices and the overlift is settled in periods of lower prices.

Although this study does not aim to prove the existence of such inefficiencies by companies, it will aim to identify any possible risks or avenues that can lead to such practices.

2.5.4 Institutional capacity

An institutional framework will consist of certain policies, laws, rules and regulations that must be abided by in order to participate in a given project, program or industry. It also includes the various entities and personnel to manage and monitor the adherence to framework by different actors.

In the oil and gas sector, for efficient management of resources, it is not only important to have an institutional framework in place but the fiscal system should be simple and flexible (Mian 2010). Simple in that it is easier to manage, more efficient to implement and audit.

Pedro (2008) and Johnston (1994) allude to the fact that differences in what parties share from a given contract is not attributable to the type of fiscal regime, but rather to the design and structuring of arrangements.

This is also supported by Tordo (2007) who noted that good fiscal design without complementary institutional structures may still not achieve the desired goals; design needs to be within the administrative and audit capacity of the relevant institutions.

Mian (2010) while defending the contractors, further reasoned that no contractor will try to spend an excessive amount of money in an effort to reduce government take in a properly designed system because "contracts today call for maintaining strict corporate governance policies and that most decisions have to be approved by technical committees, audit committees, contract committees and management committees".

The question then is; do developing countries like Uganda possess the necessary capacity? A few country experiences below show the glaring gaps.

Many developing countries lack the capacity or the will to undertake cost audits to ensure costs being charged are valid. Nigeria went for years without conducting regular cost audits of companies. The risk is then that "a company or contractor makes unreasonably large expenditures due to a lack of cost-cutting measures."[4]

Over the past two decades, various disputes have emerged between the Alaskan government and the IOCs and more than one sixth of its revenues, has been obtained through legal challenges to the industry's original payment. These disputes involve incorrect industry reporting of the value of

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[4] See "Escaping the resource curse" op.cit., pg. 380

the oil produced and/or the cost of production and transport (Svetlana et al 2003).

In India disputes arising between the government and IOCs on matters of cost recovery are not uncommon. From the government's point of view, the current structure has resulted in a huge administrative burden of conducting cost audits and budget approvals. The Comptroller and Auditor General (CAG) in its first audit of private oil & gas firms observed "loopholes in the production sharing contract (PSC) regime" that encouraged contractors to show higher investment, so that it could take longer to recover the cost and "delay government's revenue maximization"[5]

Likewise in Indonesia, over the last decade various disputes have emerged due to government imposition of cost caps or ceilings and elimination of 17 expenses IOCs would claim under cost recovery. This was because under the previous PSC mechanism, "the bottom line financial impact is absorbed more by the government"[6]

In Kazakhstan, disputes arose after IOCs released a statement of project costs to be higher than they had envisaged and that the ultimate costs (amounting to a projected loss of over $20 billion dollars) would thereby be borne by the HG through cost recovery. Although the Kazakhstan PSCs are flexible (allow companies 100% cost recovery), they penalize the host government heavily if the project profitability is low. In the event that costs are not controlled, state revenues are affected.[7]

The conclusion from the above is that although the type of fiscal system doesn't matter (R/T or PSC), the design matters (Pedro 2008). It is not only the exogenous factors (oil prices, production volumes, revenues) that determine efficiency but endogenous (like costs and institutions) too. Johnston (1994) argues that different countries can have different tax rates and systems e.g. Indonesia 85% (PSC) and Spain 40% (R/T), yet both are extracting their resource rent efficiently. Although the type of efficiency was not defined, it is evident that tax/royalty rates alone don't ensure efficiency. The question is why did developing governments neglect the efficiency of cost recovery in PSCs? Is it because the magnitude of revenue flowing from

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[5] http://profit.ndtv.com/news/economy/article-govt-panel-against-cost-recovery-by-oil-firms-312499

[6] The Jakarta Post Newspaper, September 25th, 2008,

[7] Greg Muttitt of PLATFORM (2007), "Multinational companies and the contract dispute over Kashagan, the world's largest undeveloped oilfield", Hellfire Economics pg 3-11

resource rent is so huge that it makes governments of resource intensive countries to think themselves self-sufficient that they do not need to seek to maximize revenues through efficiencies and other avenues? (Sachs et al 2007)

Or is it that IOCs are reluctant to increase productivity as Bindemann (1994), concurring with Johnson (1981), argued that PSCs are not economically efficient as they don't encourage marginal productivity, i.e. any additional unit of production by the IOCs will only guarantee them a fraction of that unit because of the cost recovery and profit oil limits?

This research attempts to answer those questions.

The different types of institutional arrangements suggested by The Bridge Group AS[8] include:

- **Constitutional mandate**- The legal basis for hydrocarbon exploration, development and production is normally established in a country's constitution. It establishes the mandate of ownership of reserves. As earlier mentioned, all other elements of the framework should be consistent with the constitution.

- **Energy and petroleum policy**-creates an environment for exploration, development, production and utilization of any resources produced to take place, efficient management of the oil and gas resources as well as revenues accruing there from.

- **Laws** e.g Petroleum Law- creates a "Competent authority" with jurisdiction over management of the state's interest (whether it be a Ministry, a regulatory body or NOC). Other laws include; Taxation and Environmental laws.

- **Regulations and guidelines**-These are normally issued at the executive or ministerial level and do not require the legislative branch's approval. They implement the policy and objectives of the law by establishing mechanisms and procedures

- **Fiscal regime** –Concessions, PSCs, Joint operating arrangements, Service agreements.

- **Institutions** (and human capacity) in charge of licensing, promotion, resource assessment, supervision and monitoring, audit and data management. They include the Parliamentary oversight committees, Ministry of Energy/petroleum, Petroleum department, Petroleum Authority, Taxation Authority, Environmental agencies, NOC e.t.c

2.5.5 Accounting method and efficiency

In this section we analyze whether, apart from the fiscal system, a company's accounting method can affect cost efficiency. Companies involved in oil and gas exploration and development have the option of choosing between two accounting methods; the Successful Efforts (SE) and Full cost method. International Accounting Standards Committee (IASC) defines these concepts as:

• **Successful Efforts accounting (SC)**- allows the company to capitalize upstream costs (expenses) that lead to finding, acquiring and developing mineral reserves, and those costs that do not (unsuccessful), are charged to expense against revenues of that period. Costs whose outcome is unknown may be capitalized or expensed. Used by mostly large enterprises.

• **Full Cost accounting (FC)** - allows all costs incurred in searching for, acquiring, and developing mineral reserves to be capitalized regardless of the outcome.

These alternative accounting methods are a result of two views held by the industry. The main argument for SE is that the ultimate objective of an oil and gas company is to produce the oil or natural gas from reserves it locates and develops so that only those costs relating to successful efforts should be capitalized. Conversely, because there is no change in productive assets with unsuccessful results, costs incurred with that effort should be expensed.

On the other hand, the view represented by the FC method holds that, in general, the dominant activity of an oil and gas company is simply the exploration and development of oil and gas reserves. Therefore, all costs incurred in pursuit of that activity should first be capitalized and then written off over the course of a full operating cycle.

[8]Norwegian Consultancy firm in partnership with NORAD and NPD: Presentation to the Coordinating Committee for Geoscience Programmes in East and Southeast Asia. www.ccop.or.th/ppm/document/CAWS6/CAWS6DOC11-Ole.pdf

Any accounting approach that a company chooses affects how its net income and cash flow figures are reported.

In PSCs, SE method is synonymous with ring fencing of fields (cost centres), whereby loss making fields are not transferable to profit making ones. Costs incurred on dry holes are usually not recoverable. Ring fencing is then used as a control to ensure government does not subsidize unsuccessful efforts (Bindemann 1999). It then logically follows that the FC concept impedes measurement of the efficiency and effectiveness of the project since costs of unsuccessful activities are treated the same way as successful activities. Full cost approach delays loss recognition (IASC 2010) and can create avenues for gold plating.

In conclusion therefore this study will examine whether Uganda's cost recovery process is efficient and that the institutional set up can provide the needed oversight function to promote efficiency.

Fiscal systems should encourage efficiency on the part of IOC's within each cost environment. Similarly government institutions should be efficient in the management and monitoring of contracts. The IOC's and the government should both benefit from increased efficiency.

2.6 Chapter summary

The existing studies and literature on cost recovery in PSCs has been examined. Starting with the general types of fiscal systems, through to the terms of PSCs and zeroing down to cost recovery, the review has revealed that the element of cost oil/recovery, although important, had not been emphasized as much as price and reserves/production in affecting profitability of contracts. Likewise the efficiency and/or capacity of institutions in management and monitoring such fiscal systems has been reviewed; and countries which had either neglected the cost recovery process or weak institutional capacity have had serious disputes with IOCs through "gold plating". Finally the review analyzed how, apart from the fiscal system, an accounting method used by the companies may lead to inefficiency in exploration and production activities.

CHAPTER 3: UGANDA'S PETROLEUM SECTOR INSTITUTIONAL FRAMEWORK

3.1 Introduction

In the previous chapter the study examined how institutional set up of a country can enhance the efficient and effective management and monitoring of the Petroleum sector. In this chapter, the institutional framework in Uganda is explored, including the relevant policy, new petroleum laws(2013), regulations and type of petroleum contract in place, the entities and current status of exploration and production activities and in particular the cost recovery process. The details of the model PSC of both 1999 and 2006 will be analyzed. It's on the basis of such analysis that economic modelling and content analysis/comparisons with other countries' frameworks is undertaken in chapter 5.

3.2 Historical Development of Uganda's Petroleum Industry

3.2.1 Period 1925 -1980

In 1925, the petroleum potential of Uganda was documented by Edward James Wayland, a Government geologist, who documented numerous hydrocarbon occurrences in the Albertine Graben based on oil seepages he mapped at that time[9]. The first well, Waki-B1 was drilled in the Butiaba area in 1938. Although hydrocarbons were encountered, no major testing was done. The graben forms the northernmost part of the western arm of the East African Rift System (Appendix 1). The graben stretches from the border between Uganda and Sudan in the north to Lake Edward in the south, a total distance of over 500 km with a variable width of 45 km, and it straddles both the Democratic Republic of Congo and Uganda borders. The Ugandan part of the graben measures about 23,000 km^2 (Ochan and Amusugut 2012).

Further geological surveys carried out in the 1940s and 1950s established the presence of sedimentary sequence of clays and silts in the Kaiso area on the eastern shores of Lake Albert. Because of World War II, changing

[9] "Petroleum in Uganda" Book by E.J. Wayland 1926 quoted by the Petroleum department of Uganda website.

policies of the colonial governments and political instability, the period 1945-1980 had no major exploration activities undertaken.

3.2.2 Period 1983-2005

The period between 1985 and 2005 could be described as the period when most significant and comprehensive efforts were undertaken by government that have influenced the petroleum sector in Uganda. This effort was driven by the worldwide interest in exploration arising mainly from the high oil prices of the late 1970's. First, between 1983 and 1992 a number of successful aeromagnetic surveys on the entire graben were undertaken, producing 9,578 line km of data (PEPD). Although five sedimentary basins (The Albertine Graben, Hoima Basin, Lake Kyoga Basin, Lake Wamala Basin, Kadam-Moroto Basin) were identified, the Albertine Graben has so far been the most prospective area for petroleum in Uganda

The Petroleum (Exploration and Production) Act was enacted in 1985. During this same period, with the support of the World Bank, exploration promotion and specialized training of staff was undertaken (PEPD).

In 1990, because the graben straddled the two countries, a Cooperation Agreement between Uganda and Congo (DRC) for joint exploration and development of common fields was put in place.

In 1991, the first production sharing agreement was signed between the government and Fina Exploration Uganda for the entire graben. During this same period the Petroleum Exploration and Production Department (PEPD) was created out of the former Petroleum Unit.

Because Fina Exploration did not do major exploration work, its licence in 1993 was not renewed. In the same year the petroleum exploration and production regulations came into force. The graben was subdivided into 9(nine) smaller exploration areas and promoted for investment.

In 1997 Exploration Area 3 (Semliki Basin) was licensed to Heritage Oil and Gas Limited. Between 1998 and 2001, Heritage Oil and Gas had acquired 398.39 line km of 2-D seismic data with drillable prospects. In 2001 another company, Hardman Resources and Energy Africa, was licensed to Exploration Area 2 (Northern Lake Albert Basin). In 2002 and 2003, two (2) wells were spud by Heritage and Energy Africa reaching total depth of 2,487m and 2,963m respectively at Turaco-1 and 2. In July 2004 Exploration area 1 was licensed to a JV Heritage and Energy Africa (Tullow

Oil). Drilling of a third well Turaco-3 confirmed presence of natural gas in one of the zones tested but was heavily contaminated with Carbon-dioxide. In 2005, Exploration area 5 (Rhino Camp basin) was licensed to Neptune Petroleum (Tower Resources).

3.2.3 Period 2005-todate (Oil Discovery)

In 2005, Mputa-1 well drilled by Hardman and Energy Africa in Kaiso-Tonya area became the first discovery well in Uganda (PEPD). Various wells have been drilled to date with discoveries of commercial quantities (Appendix 2).

Exploration activities in the country have had an unprecedented drilling success rate with 90 exploration and appraisal wells so far (as of July 2013) drilled of which 77 wells were successful representing 85% success (PEPD 2013). Figure 4 below shows Hoima district in Uganda where most discoveries have been made.

It is currently estimated that about **3.5 billion** barrels of oil equivalent in place have been discovered in the Graben of which **1.2 billion** barrels is recoverable at current technical and commercial environment. With improvements in technology, recoverable reserves could even go up to 1.7 billion barrels (Kabagambe 2013). In addition the country has **500 Bcf** of proved natural gas located in the Albertine graben (EIA 2013). The area so far tested presently represents less than 40% of the total area with potential for petroleum in the country, hence the likelihood for additional reserves in the country.

Figure 4: Map of Uganda showing Hoima district near Lake Albert were exploration and discoveries have been found

Source: http://upload.wikimedia.org

In 2007 Dominion Petroleum was licensed for Exploration area 4B (Lake Edward and George Basin).
The National Oil and Gas Policy was passed in February 2008 with a goal of using "the country's oil and gas resources to contribute to early achievement of poverty eradication and create lasting value to society". In 2009 drafting of a Petroleum Bill was commenced, debated in 2011-12 and finally approved and passed in March 2013 as the Petroleum Exploration, Development and Production (PEDP) Act, 2013[10]. The Petroleum Refining, Gas Processing and Conversion, Transportation and Storage (PRGPCTS) Act 2013 was also enacted in July 2013.
Currently the Graben is subdivided into seventeen (17) exploration areas (EAs) out of which, four areas are licensed to three operators; Tullow, Total and CNOOC (EA 1 and 1A, EA 2 and Kingfisher Discovery Area). Refer to appendix 2 above. In 2011, Tullow sold part of its stakes in its four blocks (1, 1A, 2, and 3A), which are all located in the Lake Albert Rift basin. Tullow, Total, and CNOOC now each own a third of each block. The companies have presented field development plans and are still awaiting government approval.

3.2.4 Pipeline and Refinery

In line with the Oil and Gas Policy, government decided that a refinery is constructed before any production is undertaken in order to add value to the countries discovered oil. After a feasibility study conducted in 2011 recommended commercially viability of the refinery, government and the oil companies reached an agreement to its development in a phased manner, starting with a capacity of 30,000 barrels per day by the end of 2016 which will be increased to 60,000 barrels per day before 2020 (Kabagambe 2013). Full scale oil production is expected to start in 2017, a year later than previously anticipated (TOTAL, EIA). The planned refinery will meet the petroleum product market for Uganda and her immediate neighbours, which is currently at 34,225 barrels per day and growing at 7% p.a (PEPD 2013). Further expansion of the refinery beyond 60,000 barrels per day will depend on confirmation of additional reserves.
In addition, Uganda being a land locked country, an export pipeline will be built to transport extra crude oil to the sea port. The route to Mombasa

[10] The Petroleum Act 1985 was repealed

seaport on the Indian Ocean in neighbouring Kenya is seen as more viable than the route through Tanzania (EIA).

Uganda estimates to produce up to 200,000 barrels of oil per day at peak production and according to Kabagambe, a pipeline of throughput [capacity] of 120,000 barrels makes economic sense. The refinery shall have the first call on daily production volumes and the extra crude oil would be available for export. A USA energy advisory firm, Taylor DeJongh, has been contracted to assist government in sourcing for financing and a lead investor for the refinery.

A Resettlement Action Plan (RAP) for persons whose land will be acquired for the refinery development, among others, was completed and compensation of the 718 affected persons has begun (The Monitor of 18/7/13).

Besides being a strategic investment for the country and the region, developing a refinery in the country will improve Uganda's balance of payment by reducing the petroleum products import bill, ensure security of supply for petroleum products, create jobs for Ugandans and transfer technology in the refining and associated industries. In his state of the nation address on 6th June 2013, the President of Uganda reiterated the importance the oil and gas sector in contributing to the electricity generating capacity of Uganda concluding further that the infrastructure projects will boost Uganda's growth and "expand the country's GDP by a factor of 9%".

3.3 Uganda's Petroleum Regulatory and Institutional Setup

The Constitution of Uganda (1995) vests the mandate of ownership and management of mineral resources (including oil and gas), whether on or underground land/water, in the state on behalf of the people. With the discovery of petroleum, government found it necessary to put in place a National Oil and Gas Policy in 2008 to address the entire spectrum of exploration, development, production and utilization of the country's oil and gas resources more comprehensively than it had been provided for in the Energy Policy of 2002. The Policy addressed:

- efficiency in licensing, managing and producing of the oil and gas resources;

- optimum national participation in oil and gas activities to support the development and maintenance of national skills;
- collection of the right revenues to create lasting value for the entire nation
- protection of the environment and biodiversity

To operationalize the policy, the PEDP Act 2013 and PRGPCTS Act 2013 were passed in 2013.

The PEDP Act establishes the framework and institutions to regulate the upstream activities, establish the Petroleum Authority and National Oil Company and outlines the functions of the Ministry in charge of petroleum.

Among the functions of the Minister are:

- granting and revoking of licenses;
- negotiating and endorsing petroleum agreements; and
- approving field development plans.

The functions of the Authority include:

- monitor and regulate petroleum activities including reserve estimation and measurement of produced oil and gas to allow assessment of government take;
- review and approve annual work programmes and budgets submitted by licensees;
- asses field development plans (FDPs) and make recommendations to the Minister;
- ascertain **cost oil or gas** due to licensees; and
- ensure cost efficient operations and optimal levels of recovery of petroleum resources etc

The functions of the NOC (to be incorporated under the Companies Act) will include:

- to handle state's commercial interests in the petroleum subsector;
- manage state participation (administer JV contracts) and marketing of the country's share of petroleum in kind;

- to pursue upstream, midstream, and downstream ventures locally, and later internationally.

The PRGPCTS Act is to regulate the coordination and management of petroleum refining, gas processing and conversion, transportation and storage of oil and gas.

A Public Finance Bill (2012) which is before Parliament contains details on petroleum revenue management (Part VII Sec 51); it provides for the collection, deposit, management, investment and expenditure of the petroleum revenues. It also proposes the establishment of a Petroleum Fund to be managed by the Minister of Finance. These pieces of legislation are complemented by other relevant laws and statutes like those on Environment, Wildlife, Water, Land and Income Tax.

3.4 Uganda's Petroleum Fiscal Instrument

Uganda, like many developing countries, adopted the PSC. Under the previous law, government had developed a model PSC in 1999 which would be used as the official contract between the government and oil companies. In 2006 another model PSC was developed. The difference between the two is that, whereas in the 1999 Model, all the percentage figures for cost oil, profit oil and royalties were stated, they were excluded in the 2006 model. Secondly, the basis of calculation changed from using the total daily production figures to incremental production. The major similar terms were: a state participation of not more than 20%; ring fencing and gas terms to be negotiated on discovery of gas. It is not clear why the changes were made but it's evident that government preferred to negotiate all the terms in the PSC instead of having standard fixed terms (Anderson and Browne 2011). According to Johnston (2008), although fixed terms are more transparent and preferred by NGOs and citizens, negotiation may be the only choice, especially for countries with less-than-exciting acreage and risks. He however, further argues that for negotiations to be efficient, it has to be available to many players (various proposals and offers) so that the Ministry or NOC become aware of what the market can bear as they carry out their negotiations. So far in Uganda four companies had signed PSCs by 2007 and all had negotiated terms different from each other and the 1999 model PSC. Because of confidentiality clauses and standardisation, this study only summarises the salient features of the 1999 model.

The new petroleum law, however, requires the minister of petroleum to develop a model PSA to be submitted to cabinet for approval and there after table it before parliament. This shall guide negotiations of any future agreements. Below are the salient features of the 1999 model.

Table 1: Uganda's 1999 Model PSC

UGANDA PSC (1999)		
Area	designated blocks	
Duration		
Exploration	4 years +2 +2 -year renewals	
Production	25 years	
Relinquishment	50% on first renewal 25% on second renewal	
Exploration Obligation	Minimum work and budget	
Bonuses		
Signature	Negotiable	
Production	None	
Royalty	Sliding Scale	Rate, %
(Daily production)	Up to 2,500 BOPD	5
	2,500-5,000	7.5
	5,000-7,500	10
	>7,500	12.5
Rentals	$2.5/km^2 initial period $5.0/km^2 after 1st renewal $7.5/km^2 after 2nd renewal $500/km^2 Development Area	
Cost Recovery royalty)	50% (gross production net of Carry forward un recovered costs	
Depreciation	6 years straight line	
Profit Oil split	Production, BOPD	Split,%
(in favour of government)	Up to 5,000	50/50
	5,000-10,000	55/45
	10,000-20,000	60/40
	20,000-30,000	65/35
(Daily production)	30,000-40,000	75/25
	>40,000	85/15
Taxation	30% income tax	

Source: 1999 model Production sharing contract

Other terms include; ring fencing, training fees for 1st, 2nd, 3rd and production stage payable by contractors, recoverability of decommissioning expenditures and interest on development loans as long as debt is less than 50% of total financing.

Regarding cost recovery process, since production has not yet started, government is in the process of verification of exploration costs. Although the PSC is silent on which government institution is to undertake the cost audits, the Auditor General has undertaken the audits through the use of international accounting firms. The approved costs and reports have been passed on to the speaker of parliament and the ministers responsible for finance and energy.

3.5 Chapter summary

As a follow up of literature reviewed in chapter 2, this chapter highlighted the legal and institutional framework of Uganda which is line with industry norms. Two new petroleum laws were passed by parliament in 2013. Although oil discovery was in 2006, production is expected to start in 2017 when a refinery has been built. Currently the oil companies have submitted FDPs and awaiting approval. A model contract which was formulated in 1999, with some fixed terms, has been reviewed, although these have not been used; instead negotiated contracts have been signed. In line with the new law, the minister is supposed to develop a new model PSC which will form the basis of future negotiations. The cost recovery process is still at verification of exploration expenditure stage by the Auditor General's Office. In the next chapter the study reflects on the research methods to be used to analyse the above framework for efficiency.

CHAPTER 4: RESEARCH METHODOLOGICAL REFLECTIONS

4.1 Introduction

This chapter embraces the research methodology adopted in the study. In order to have a better insight of the way the study was undertaken and why a given approach was chosen, the chapter starts with an outline of the philosophy underpinning the study, discussing the different philosophies and why the mixed stance and consequent choice of both quantitative and qualitative were adopted.

The chapter proceeds by discussing the design, the hypothesis to be tested, empirical data assumptions, evaluation techniques used and the means of analysis of the data. Finally, the chapter concludes with the limitations of the research and ethical considerations.

4.2 Choice of a Paradigm/Philosophy

In this research, 'methodology' and 'method' are used interchangeably. According to Hussey & Hussey (1997) a research 'methodology' refers to the overall approach taken, as well as to the theoretical basis from which the researcher comes, and that a research 'method' is the various means by which data is collected and analysed. The approach taken in this study is to include all facets of the research process ie the research design, the approach taken, the particular data collection methods chosen and the means of analysis, under the overall heading of methodology.

However, underpinning any methodology is a philosophical stance usually known as the 'paradigm'.

A *paradigm* is a "worldview" or a set of assumptions about how things work. Rossman & Rallis (2003) define paradigm as "shared understandings of reality"

The choice of philosophy is important as it guides the conduct of the research, defines the understanding of reality and makes assumptions about the best way to get knowledge for the research. Traditionally a distinction made by researchers is between two contrasting paradigms: positivism and interpretivism (Brymann & Bell, 2007)

Positivists emphasize that reality is concrete and should be measured through objective means rather than through sensation and intuition (Easterby-Smith et al, 2008). They are rational and exclude speculation.

This method of investigation holds that the goal of knowledge is simply to describe the phenomenon under investigation, the object of study is observed independent of the researcher, knowledge can only be verified through direct observations, data collected through figures or numbers and analysis should involve attachment of numerical values to social characteristics (Abdullahi et al, 2012). A positivist philosophy tends to be based on deductive theorising, where a number of propositions are generated for testing, with empirical verification then sought (Babbie, 2005) Contrary, Interpretivism suggests that reality is created by humans. Researchers observe aspects of the social world and seek to discover patterns that could be used to explain wider principles (Babbie 2005). They reason that that there is no one reality, rather reality is only dependent on an individual's perception and experience (Robson, 2002). Interpretivists (constructionist) further argue that the side of the real world that are distinctly human are lost when they are analysed and "reduced to the interaction of variables" (Hughes & Sharrock, 1997)

Because positivism is objective and deals with measurable facts, it is usually explanatory rather than descriptive. In studies such as economic analysis and modelling of PSCs, it is thus the most preferred choice. Ketokivi & Mantere (2010) quoted by Saunders et al (2012) noted that because positivists use deductive rather than inductive philosophy the view is that positivists use quantitative data while interpretivists tend to use qualitative data. However, before a paradigm choice can be made, a look at the different types of research data is made below.

4.3 Qualitative verses Quantitative Research

Qualitative research involves unstructured interviews, observation, and content analysis of relevant literature. It concentrates on words and observation to express reality and describe people in natural situations (Amaratunga et al 2002). It attempts to find out how people perceive their lives and studies the *why* and *how* of things and not just *what*, *where* and *when*? A common belief in qualitative research is that human experiences, feelings, opinions and their very existence are too complex to be presented and represented in numerical terms as portrayed in a quantitative research. Critics of qualitative research, however, note that it is purely descriptive and therefore not rigorous, and that data are flawed due to the subjective role of the researcher (Goulding, 2002).

Quantitative research on the other hand involves a structured "scientific" approach of interviewing, testing and objective analysis of interrelationships among different data sets. Quantitative research designs are either 'descriptive' in nature (where subjects are usually measured once) or 'experimental' (where subjects are measured before and after an intervention) (Hopkins, 2000). Usually, a descriptive study establishes associations between variables, while an experiment establishes causality (Abdullahi et al 2012).

Quantitative research is more objective and it's easy to examine a large amount of data in a relatively short time compared to qualitative research.

From the above it can be concluded that interpretivists tend to use qualitative while positivism is normally associated with quantitative data.

Bryman and Bell (2007) however caution against assuming that positivism and science are synonymous, noting that some differences exist. There are some circumstances where inductive (qualitative) approach is apparent within the positivist research. This thinking had earlier been argued by Chih Lin (1998), who noted that qualitative work can be either positivist or interpretivist.

To reiterate the objectives of this research as;

1. To evaluate the terms of Uganda's PSCs in respect to cost recovery and test efficiency

2. Ascertain whether the proposed new law addresses the efficiency of cost recovery-monitoring and oversight

3. To examine whether monitoring oversight by government in the cost recovery process in Uganda Oil sector is adequate.

Using assumptions of various cost variables, production profiles, oil prices discounted cash flow techniques and economic modelling in Uganda's 1999 model PSC, it is envisaged that the research will use quantitative methods to address the first objective. In addition, using qualitative information, like comparisons of different country PSCs cost recovery regimes, the research can identify characteristics that are commonly related to some policy (Chih Lin, 1998), which can help answer questions from the quantitative results obtained and hence give additional confidence to the research conclusions made there from (Chih Lin, 1998 quoted Gary King et al 1994:40, 42). Furthermore, as argued by Mian (2010) and Johnston 1994, there are some boundary conditions (prospectivity, proximity to markets and infrastructure etc) which are unique in each country and cannot easily be quantified hence making analysis or comparisons using only financial figures difficult. Therefore a positivist approach combining both qualitative and quantitative research will be adopted for this objective to be met.

Also known as the *mixed method* or *between-method triangulation*, this approach means that the union between quantitative and qualitative methodology could accommodate the strengths of each of these approaches and counterbalance their weaknesses at the same time (Abdullahi et al 2012).

In order to achieve objectives 2 and 3, the research will adopt the interpretivist qualitative approach due to the availability of sufficient literature on the topics and different country experiences and laws to compare with.

4.4 Sources of Data

There are two major types of data sources for research: Primary and Secondary data. Primary data is collected or observed directly from first hand by the researcher using tools such as experiments, survey questionnaires, interviews and observation.

Secondary data on the other hand, is data that has not been originated by the researcher but already exists. Sources include newspaper articles, book reviews, journal articles, school or government data bases etc.

Primary data, although more reliable and up-to-date compared to secondary data, is time consuming. Cost recovery and efficiency studies would necessitate the actual verification of costs through access of company financial information over the years, analysis and interview of management on the companies' efficiencies and processes. This would dictate the use of primary data. However, because of the confidentiality clauses in PSCs and limited time period for the research, primary source will not be applicable. The research uses mainly secondary data including easier-to-access peer reviewed journal articles, text books, Ministry of Energy and Mineral resources database/website, company websites, published audit reports and parliamentary reports. To enhance the quality and reliability of data, triangulation, where one source of method is used to corroborate with another (Mason 2002:33), will be used. Other credible oil industry sources like E&P global benchmark survey report (cost figures) and USA based EIA will provide the relevant statistical and financial data for comparison and benchmarking.

4.5 Research hypothesis

A *hypothesis* refers to a provisional idea whose merit requires evaluation. It's a concept that requires more verification by the researcher in order to either confirm or disprove it. Although governments have designed numerous frameworks for extracting economic rent from the petroleum sector, structuring a fiscal system that is appropriate or 'on target' under a variety of unknown future circumstances is nearly impossible. However it is universally agreed that for contractors, profitability lies at the heart of any negotiations (Johnston 1994). Governments must then design a system that provides a fair return to the industry as well as the state. As noted in Chapter 2, costs and institutional efficiency can improve the profitability of projects and thus, irrespective of the fiscal system used, cost efficiency is paramount in determining both government and contractor share.

It's on this premise that the provisional ideas/hypothesis tested in this study are;

- Uganda's model PSC cost recovery terms are efficient.ie a reduction in costs benefits both government and contractors

- monitoring oversight by government in the cost recovery process in Uganda oil sector is adequate

- the proposed new law addresses the efficiency of cost recovery-monitoring and oversight

4.6 Design and methodology

The application of a mixed research paradigm will influence the design choice. The quantitative method of economic modelling of PSC uses discounted cash flow techniques to evaluate the efficiency of the regime. This will necessitate estimating variables like discount rates, production rates, reserve sizes, oil prices and varying cost recovery limits to establish their effects on government contractor/take both in absolute figures and proportions. This method was chosen because it has been widely used in the oil industry in evaluating fiscal regimes (Kemp 1988, 1992, Johnston 1994, 2003; Bindemann 1999, Tordo 2007, Pedro 2001, 2002, 2008). It is expected that for an efficient system, government and contractor take would increase as costs decrease (Demirmen 2010).

For the humanist paradigm (qualitative), the research will use current peer reviewed articles, world bank sources and book reviews-those focused on costs, institutional set up and transparency (Tordo 2007, Stiglitz 2002, Svetlana 2004 etc) and experiences by other developing countries like Indonesia, Angola, Nigeria, Bangladesh etc to benchmark efficient fiscal designs, challenges and solutions. The research also uses those countries' PSC terms as case studies because "understanding them will lead to better understanding, perhaps better theorizing, about a still larger collection of cases"(Stake, 2005). The fact that countries have a variety of organisational structures, governance regimes and collections does not lessen their usefulness as a collection of cases. Indeed such variety can be particularly useful when conducting cross-case analysis (Stake, 2005).

An upcoming oil producing country like Uganda is in a strong position to benefit from practical experiences of other developing country oil exporters.

4.7 Data Analysis and evaluation

Efficiency: As noted in chapter 2, various researchers have defined efficiency in petroleum fiscal regimes in terms of effectiveness in sharing of government revenues. This study however evaluates efficiency in terms of cost control by contractors and institutional framework by government to monitor IOC operations. If the fiscal system allows/provides room to contractors to overspend then it is not efficient.

The most common analysis and evaluation tool used in this research is the 'take' static. As mentioned by Johnson (2003), the common denominator in all fiscal regimes is what is known as 'take' statistic. This statistic represents the division of project profits between IOC (Company take) and HG (government take). Companies and governments use different parameters to calculate takes. The best way to calculate take requires detailed economic modelling using cash flow analysis. Once a cash flow projection has been performed, the respective takes over the life cycle of the project will be evaluated. There is however little guidance on the choice of the correct sharing rule that governs a particular contract. Rutledge and Wright (1998) claim that a 50%-50% split between government and contractor was considered a fair value before the two oil shocks, but after the creation of OPEC, companies began to accept some erosion of their take (Kaiser & Pulsipher 2004). According to an IHS CERA report (2011)[11], the average government take is 70%. Below the study analyses the components of each take statistic.

4.7.1 Government Take

It includes bonuses, royalties, profit oil, taxes and government participation. Government take represents the government's share of total net profits. This includes years when profits are zero or low and years when profits are high (Johnston 2003).

$$\textit{Government take} = \frac{\textit{Government Income}}{\textit{Total Revenue-Cost Recovery}}$$

According to Kaiser and Pulsipher (2004), take is more of a fiscal statistic as opposed to an economic statistic, that's why it's more meaningful to governments than companies. Unlike the economic measures which are generally well-established, general confusion surrounds the application and interpretation of take. Government take can be calculated in discounted or undiscounted value. This is because much as both government and companies' value money, the HGs' discount rate for its benefits are usually different from the company's. Generally speaking government social rate is usually less than company's rate. Thus, if profits are undiscounted, the contractor will overestimate and the government will underestimate its take contribution (Tordo 2007). Government take also doesn't take into consideration other benefits (and spill over effects) like, skills transfer, employment benefits, 'crypto' taxes like surface rentals, training fees and DMO which impact both company and HG cash flows. Government take also fails to provide information about the timings of payments. Different countries can have same 'takes' yet one is receiving its share in the earlier years of the project than the other. In fact unless it incorporates discounting it may not say anything at all about the time value of money (Johnston 2003).

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[11] Boston Consulting Group benchmarking report on India; re-evaluating the upstream fiscal regime for future rounds of licensing, September 2012

4.7.2 Effective Royalty Rate

Because of the weaknesses of government take, analysts developed a companion statistic known as the 'Effective Royalty Rate' (ERR), which gives an indication of how quickly a contractor can get its money back. ERR is defined as the minimum share of revenue (or production) that the HG might expect to receive in any given accounting period from royalties and its share of profit oil (Tordo 2007). In a concessionary system with no cost recovery limit, the royalty is the only government guarantee therefore the ERR is the royalty rate because in a given accounting period there is no limit to the amount of deductions a company may take and companies can be in a no-tax-paying position.

In PSCs with cost recovery limits, HGs are also guaranteed a share of profit oil. This profit oil share and royalty may however be the only source of income for the HGs, since like before, companies may have many deductions for tax purposes and no taxes are collected by HGs. The ERR would be composed of only royalty and profit oil. ERR is a good measure of efficiency since the more efficient companies and governments are the less the cost, the earlier it is recovered and the more is left for taxation (assuming a fair profit oil split). The study will be analyzing different cost levels vis a vis the ERR and government take.

The main weakness with ERR is that it normally excludes the effects of government participation. In addition huge government takes can be misleading. Eg Kazakhstan's Kashagan PSC has a government take of around 83% or more, but only a 2% ERR. The contract is back-end loaded. The average ERR for PSCs is closer to 30 percent (Johnston 2003)

4.7.3 Company (contractor) take

This is the percentage of profits to which the contractor is entitled. It's the complement of government take. For companies, once a cash flow projection is performed and the company's take is computed then according to Mian, (2002) and Seba, (1987), the primary analytical technique utilised is the time value of money (discounting) approach. These techniques are used to compare costs and benefits that occur in different years. For oil companies, benefits and costs occur at different times, with many costs preceding and usually exceeding benefits during the first years of the project. This approach uses the net present value (NPV), internal rate of return (IRR) or profitability ratio/investment efficiency ratio for analysis.

4.7.3.1 Net Present Value (NPV)

The NPV is the present value of expected future cash flow of a project. This is the basic economic criterion that most companies use for accepting or rejecting a project. For a project to be accepted, NPV must be greater than zero at an appropriate discount rate and must be at least as high as the NPV of mutually exclusive alternatives.

The discount rate should be a function of the riskiness of the estimated cash flows. In reality, companies often use a "hurdle rate" which represents the minimum return that the particular company is willing to accept in order for it to invest in the project. Each company has a unique risk-reward profile, hence uses a specific discount rate. The choice of a discount factor is an important decision for companies evaluating projects since selecting a high rate may result in "missing" good investment opportunities, while selecting a low rate may expose the firm to unprofitable or risky investments (see Allen and Seba 1993; Deluca 2003; Ehrhardt 1994 as quoted by Tordo 2007). In the petroleum industry, the generally accepted methods for estimating a discount rate are; weighted average cost of capital (WACC), market surveys (opportunity cost of alternative ventures) and cost of debt (interest rate). The WACC is measured by weighting the typical oil company debt and equity costs by the typical oil company debt and equity capital structure percentages, and then adding the weighted costs. If the study was for appraising individual companies, WACC would be the most appropriate, since it reflects the markets' expected yield from the stock and debt of the company. According to the Texas Comptroller of Public Accounts Manual for Discounting Oil and Gas Income, in reality, companies use discount rates that combine inflation rate, risk free component (return to compensate investors), risk premium component (premium above WACC to compensate the investor for assuming diversified company-wide risk) and property-specific risk premium (return that compensates the investor for assuming the unique risks associated with a particular project). Because of the difficulties in ascertaining particular company discount rates, the study will use market survey data used by various analysts like the SPEE.

4.7.3.2 Internal Rate of Return (IRR)

Companies also use the IRR method to analyse project profitability. The IRR is the discount rate that results in a zero NPV for the project. In most cases both methods can lead to the same result i.e. a project whose NPV is greater than or equal to zero at some discount rate, also has an IRR that is greater than or equal to that discount rate. The IRR measures the relative attractiveness of a project, while NPV measures the worth of project in absolute terms. In terms of cost efficiency, the more efficient the company is, the higher the IRR for the company. For governments however, creating IRR-based scales for taxation may not be recommended in general as it leads to gold plating in most cases (Pedro 2008). Other difficulties with IRR are that not every project may have an IRR while others may have more than one IRR. Multiple IRRs can arise in oil projects especially since cash flows are negative in the first period (exploration period), then positive thereafter (production) and finally negative (decommissioning and decline stages).

Due to its limitations, IRR is normally used in conjunction with other profitability indices (Tordo 2007) like the profitability index.

4.7.3.3 Savings Index

This is a measure of a contractor's incentive to save (Johnston 2003). It measures the degree to which the contractor will benefit from a reduction in costs. Since both companies and governments are concerned about reducing costs, this statistic can be used to quantify, to some extent, the incentives companies have to keep costs down. This index can only be influenced by profit based fiscal terms like profit oil split and taxation. It can also be calculated with either discounted or undiscounted cash flows. Irrespective of the type of fiscal system used, a dollar saved means an added dollar to either taxable income or profit oil. In a PSC, assuming a profit oil split of 60/40 percent in favour of government and an income tax of 35%, then for a dollar saved in costs will translate in the company receiving 40¢ prior to income tax. A tax of 35% will then leave the company with 65% of ¢40. i.e. The savings index will then be ¢26(26%). The higher the government profit oil share and taxation rate, the lower the savings index. This can lead to gold plating by oil companies.

4.8 Limitations and Mitigations

The limitations of the design is that economic analysis of petroleum fiscal regimes relies on assumptions about numbers, rates, reserve estimation, cost and price estimation which are inherently volatile. The accurate computation of economic and fiscal system measures associated with a field largely depends on the reliability of the assumptions. In effect, only at the end of a field's economic life, when all revenue, cost, royalty and tax data are known, can the profitability and the division of profits between the host government and the investors be reliably determined. The problem is further aggravated in countries like Uganda without key oil infrastructure.

This will be mitigated through use of current and trusted sources like the government department database/website with further validation from the relevant officials in those departments through email or telephone contact. Trusted sources like Wood Mackenzie, E&Y reports, provide reliable reserve/cost data worldwide.

The research also intends to use a multiplicity of ranges of values. Using sensitivity analysis, varying cost levels and cost oil limits, a variety of possible outcomes can then be derived.

Another limitation of benchmarking PSCs of various countries, is that each contract is unique and depends on various boundary conditions (Mian 2010, Johnston 2003) like; prospectivity of the area, competition for the prospects, expected limits of resources and production levels, expected development and production costs, expected product prices over the contract duration, proximity to the market and infrastructure and profit expectation of the contractor. Using comparative industrial averages for costs/prices and countries with relatively similar prospectivity (same regions), this limitation can be minimised.

It is also argued that annual reports by governments or companies are usually written for a particular audience and a particular purpose, and as such there is the potential for bias. However, unless otherwise challenged by any credible independent source, the research considers information there from as reliable.

4.9 Ethical Consideration

The research considered issues related or conforming to accepted standards of social and ethical behaviour. Snowball (2008), noted that studies are sensitive to the regions in which they are conducted. The research is cognizant of the fact that Uganda is still in its early stages of its oil and gas industry. Up to 2012 there was only one company that had oil rights and hence eligible for cost recovery. This study does not examine the efficiency of the said company but rather assesses industry best practice and associated literature to ascertain efficient PSC regimes. A model PSC (1999) is used to evaluate fiscal terms. Any information that is deemed confidential in nature is not presented in the report.

Bell and Bryman (2007) further noted that researchers should avoid misleading and false reporting of findings. This is addressed through keeping proper records of the research process, analysis and assumptions for regular review by the research supervisor and signing of ethical forms.

To enhance external validity, it is important that results from the quantitative and qualitative benchmarking of different regimes are transferable, i.e ability of the research results to transfer to situations with similar parameters, populations and characteristics (Lincoln & Guba, 1985).

Another fear is that research is biased (Barth, 2011) and that most studies are commissioned/funded to legitimize a political/business line rather than the truth (Crompton 2006). This study is however not sponsored by government or industry.

4.10 Chapter Summary

The chapter illustrates how the chosen research design affects the entire study, the way it's executed and the conclusions made there from. The study further justifies the use of both qualitative and quantitative methods of research, using secondary data as the principal source of information. Making assumptions on hypothetical figures, the chapter explains how the study uses the 1999 model PSC terms to evaluate the efficiency of the regime by simulating values for costs, prices, reserve size, cost oil limits etc. The main evaluation tools discussed include the take statistic, NPV, IRR and companies' incentive to save indexes. For the institutional arrangements, a benchmark of various PSCs was undertaken to compare Uganda's framework with industrial best practice (generally accepted norms). The results of the study follow below in chapter 5. Notwithstanding the limitations of economic analysis, the study findings are reliable and valid.

CHAPTER 5: DESIGN ISSUES AND ANALYSIS OF FINDINGS

5.1 Introduction

In this chapter, using hypothetical figures, the model 1999 PSC is evaluated. It starts with the various assumptions of base case field sizes, costs, prices, discount rates and the justification for their use. It then proceeds with sensitivity analysis of different parameters affecting efficiency, like cost recovery limits, Capex and Opex. Empirical findings are analysed using take statistics, NPV, IRR and saving index under different scenarios, comparing effects on both company profitability and government revenues. In addition, using other countries for best practice comparison, evaluation is made regarding adequacy of the institutional set up and oversight/monitoring roles enshrined in the PSC terms and new law to ensure efficiency in oil production. It concludes with results and outcomes of the model, also set out in Appendix 3, on the basis of which the efficiency of the regime is determined.

5.2 Field Input Variables (data) and Economic Assumptions

The evaluation of petroleum fiscal systems requires data on numerous system parameters, including but not limited to, the field size, cost structure, discount rates, crude oil prices, inflation, currency exchange rates, regulatory changes and local and global economic conditions (Tordo 2007). As mentioned in section 4.8 of Chapter 4, the accurate computation of the economic and fiscal system measures associated with a field largely depends on the reliability of the assumptions. Moreover, it is important to underscore the fact that the country's stage of development impacts the accuracy of the estimates and the uncertainty associated with the economic outcome of the evaluation. For a country like Uganda, which is just entering the development stage, such data may be difficult to get. Furthermore, the precise figures are also always changing. The research therefore relied on data that is available on either the websites of government and company or that has been generated and used by industry analysts as at the time of the study. The study is modelled on three hypothetical fields: small; medium; and large.

5.2.1 Field sizes and Production profile

- **Large Size (600mbbls)**

According to Tullow Plc 2009 end of year reports, the Jobi-Rii field in the Paara Discovery Area (formerly Exploration area EA-1) has been described as the "Largest recent oil discovery onshore sub-Saharan Africa"[12]. After recent appraisals, it is estimated to be in the region of 600-700mmbbls. This also compares well with earlier estimates which had been provided by Credit Suisse while evaluating Heritage Oil and Gas ltd before it farmed out in 2010 to Tullow Plc.

- **Medium Size (300mbbls)**

This type of field is similar to the Kingfisher Discovery area (EA-3A) which has been estimated to contain 300mmbbls by both government[13] and Tullow Plc sources (Tullow fact book 2009). This is also comparable with Kemp's (1988, 2001) definition of Medium Volume (MV) reserves ranging 250mmbbls.

- **Small Size (100mmbbls)**

This has been related to data provided by Wood Mackenzie to IMF when evaluating a field on shore Mozambique (Daniel et al 2008). Kemp and Gray (1988) definition of Low Volume reserves of 100mmbbls further validates the assumption.

- **Production profile**

It is assumed that the ramp up period for the larger fields is more than for the smaller ones because of learning curve effects. Details as in Table 2 below:

Table 2: Production Profile

Production (mmbbls)	Build up to Peak Output (years)	Plateau Output (b/d)	Decline rate(pa)*
600	3	130,000	16%
300	3	70,000	19%
100	2	30,000	23%

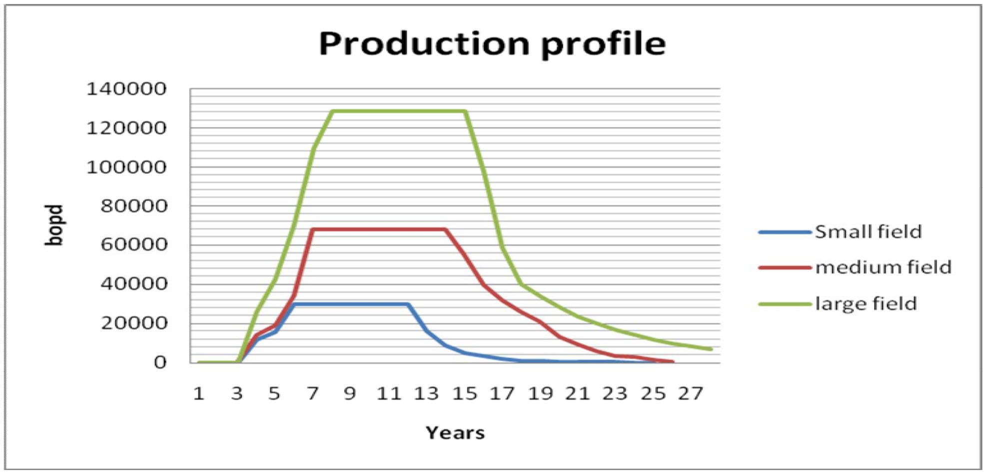
Source: Author's own assumptions. * based on Kemp (1988)

[12] Tullow Plc 2009 Annual Report and Accounts Highlights pg 33

[13] Prime Minister of Uganda website: opm.go.ug/news-archive-prime-minister-mbabazi-speaks-out-delayed-government-contracts/html (accessed 7/8/2013)

It is also assumed that the decline stage is the longest taking between 12 to 15 years depending on the size. Production is assumed at primary recovery throughout the field life (No enhanced oil recovery is factored into the model).

Figure 5: Production profile



Source: Author’s Computation

5.2.2 Key Parameters

Table 3: Key field Parameters

Parameter	Small field	Medium Field	Large field
Peak Production rate bopd (000)	**30**	**70**	**130**
Field life (years)	**20**	**23**	**25**
Oil Price ($)/bbl	**110**	**110**	**110**
Finding & Develop Cost $/bbl[14]	**12**	**10.34**	**10.14**
Operating costs $/bbl[13]	**6.97**	**6.2**	**5.5**
Decommissioning cost ($m)	**20**	**35**	**50**

Source: Author’s Assumptions

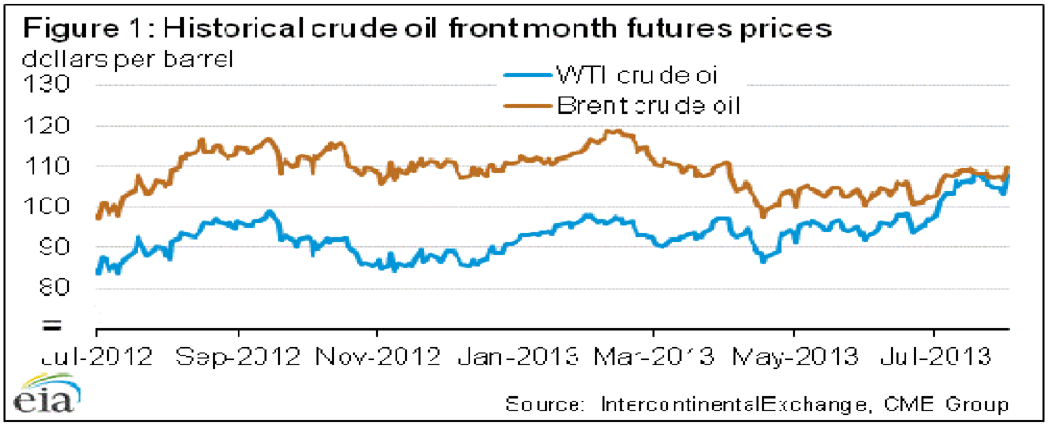
- **Oil price**

The model assumes a base price of $110/bbl based on the IMF World economic outlook report (April 2012) which forecasts a Brent crude oil price of $110/bbl for the year 2013.

[14] Global E&P benchmark study by Ernst & Young (Nov 2011) based on 75 largest companies end of year results 2010 for Africa & Middle East (adjusted)

This is comparable to the current EIA price (1 August 2013) of $109.54, as indicated by Figure 6 below.

Figure 6: Crude Oil futures price



Source: http://www.eia.gov/forecasts/steo/uncertainty/ (short term outlook)

- **Cost assumptions**

Finding and development costs (FDC or CAPEX) include exploration costs, unproved property acquisition costs, development costs, field pipelines and storage tanks[15]. FDC are in line with estimated development costs of the area expected between $10-12bn {(12+2)/1.2bnbl=$11.7per barrel)}[16]. CAPEX is incurred in the first three (3) years before production. Operating costs (OPEX) include production, administrative, transport, gathering, treatment, field storage and maintenance costs[17]**.** Cost/bbl reduces as field size increases due to economies of scale. Refinery and pipeline costs have not been included since delivery point is at entry to the refinery/pipeline and both the government and contractor will pay for its own share of cost (for refining or transport by pipeline to the sea).

- **Other assumptions:**

Gas economics have not been modelled. Bonuses and surface rentals are not included in government revenues since they have not been so material. Although not mentioned in the model PSC, excess cost oil is shared as profit oil. For comparison, the discount rate used is 10% (common for the oil industry) for both the government and corporation; although governments

[15] decommissioning costs have been removed and treated separately

[16] PEPD Website; Also Pedro Van Meurs projected range of onshore total costs(capex+opex)/bbl is $8-$28 (Pedro Van Meurs 2008)

[17] E&Y figures have been adjusted by 30% to remove production taxes which are considered separately

usually have lower rates known as 'social' rates. Inflation has not been factored in both the cost and price levels (for the base case).

5.3 Results of Analysis[18]

The results for each field are summarised below:

Table 4: Fiscal system output (base case)

Parameters	Small field	Medium field	Large field
Base Case price($/bbl)	110	110	110
Government Revenue-Undiscounted ($M)	7,066	24,683	50,489
Government take-Undiscounted (%)	78%	88%	89%
Government Cash flow-Discounted[19] ($M)	2,903	8,176	16,104
Government take-discounted (%)	85%	98%	99.6%*
Effective Royalty rate (%)	57%	71%	73%
Contractor's Cash flow NPV[19]($M)	525	163	68
Project's IRR (%)	9%	1%	0.2%
Break –Even price[20] ($)	60.4	98.5	107.3
Break-Even Cost[21] ($/bbl)	34.7	18.48	16.0
Savings Index (US$)	0.18	0.10	0.10
NPV/BOE ($/bbl)	5.25	0.5	0.1
Operating leverage[22] (%)	27%	27.5%	27.2%
Cost recovery amounts	1,913	4,994	9,435

Source: Author's computation *takes of approximately 100% are due to the effect of both royalties and cost recovery limit.

[18] Details in spreadsheet in Appendix 3

[19] NPV at 10%

[20] The minimum oil price that causes the project's NPV to become zero

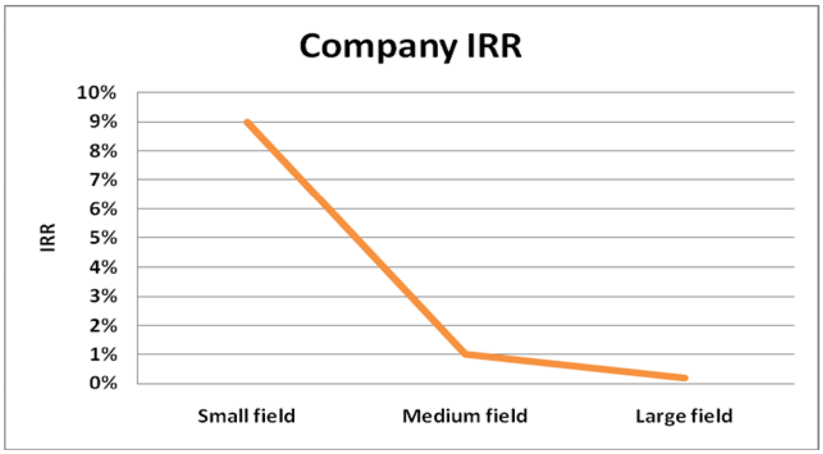
[21] Maximum costs/barrel at which NPV becomes zero (includes Capex + Opex)

[22] Operating leverage was calculated as the ratio of the net present value of total cost to the net present value of gross revenue (Tordo 2007)

5.3.1 Investor's perspective

As noted from the table above, the smaller the field, the higher the returns for the investors. The small field's NPV is $525m compared to $163m and $68m for the medium and larger fields respectively. The small field will deliver three and eight times more value than the medium and large fields respectively. Expectedly even the project IRR ranges from 9% for the small field to 0.2% for the large field, albeit these are a bit low compared to industrial averages (see figure 7 below).

Figure 7: Company IRR per field



Source: Authors computations

In terms of project riskiness, the lower break- even price of the smaller field at $60 provides a safer cushion for the project revenues compared to the other two fields at $98.5 and $107.3. Additionally, in terms of break even costs per barrel, the smaller fields can still be economical up to cost levels of $34.7/bbl (from $18.97); compared to the medium field at $18.48/bbl (from $16.54) and the large field at $16./bbl (from $15.64). The degree of freedom (flexibility) for both larger fields is limited. With the usual oil price volatility and ever increasing costs, there is a higher incentive for efficiency by the investor.

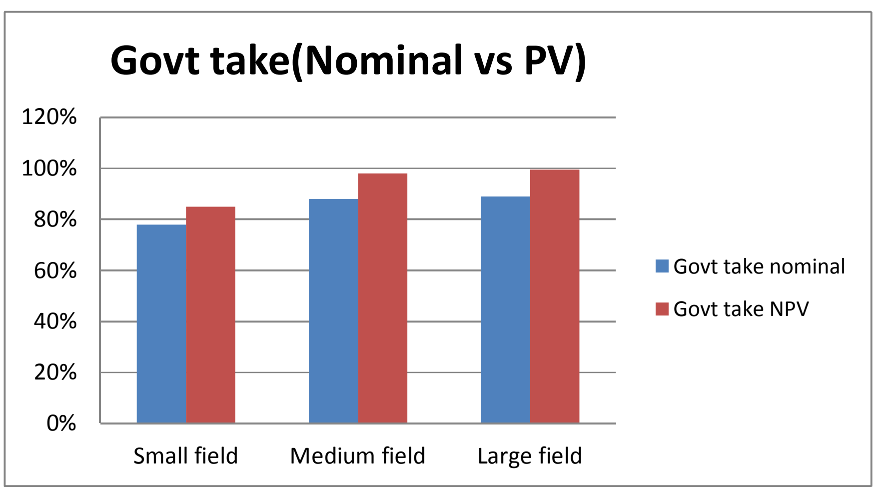
The operating leverage is also a measure of risk. The higher the operating leverage, the more exposed the project profitability is likely to be to a fall in prices (Tordo 2007). The three fields however show low operating leverages at approximately 27%. The NPV/BOE of $5.25/bbl of the smaller field compared to $0.5/bbl and $0.1/bbl for the medium and larger fields respectively further confirms the favorability of the smaller fields to the investor.

In the previous chapter, a discussion was made of how the savings index can be used by investors as a measure of a company's incentive to save costs (to be efficient). Under normal circumstances, investors would all have an incentive to save, especially in the early years of field development. However, the amount of benefit to the investor will be influenced by the profit-based elements of the fiscal system (in this case, profit sharing ratios and taxes) and the timing of the saving. In general, a system that has a higher government marginal take (high profit ratio and taxes) is more likely to create lower incentives to save because the bulk of the savings will be transferred to the government. From the table above, it can be seen that the small field has a higher savings index of US$0.18 compared to USD$0.10 for the other two fields. The anticipated economies of scale for larger fields are not obtained. This is mainly due to the fact that for the larger fields the government profit oil share increases on average to between 71%-73% compared to an average of 57% for the smaller field. Therefore, investors may prefer smaller fields to the larger ones. The larger fields may not encourage efficiency since any gains made, benefit the government disproportionately. Alternatively, companies may try to manipulate production levels so that they don't exceed the threshold that takes them to the higher profit oil rate.

5.3.2 Government's Perspective

Government takes in money-of-the-day terms (nominal) compared to real (present value) terms are shown in figure 8 below:

Figure 8: Government Undiscounted Vs Discounted take



Source: Author's computations

In both nominal and real terms, government take increases as fields become bigger hovering between 78%-100%, despite the oil price being the same. This also confirms the impact of a high government profit ratio as fields become bigger. These are signs of cost regressiveness, since the larger the field, with high levels of development costs, government takes a higher share of the present value (almost 100%). In line with Kemp's (1988) finding while analyzing Ireland take, possible disincentive effects could arise on the larger fields because the higher nominal tax rate also produces a higher effective rate for government (in this case the ERR is over 70% for the larger fields). It is also noteworthy that for all fields, in real terms, the government take is higher than under the nominal terms. This is due to the effect of delay in development cost recovery and also the production based fiscal terms.

In summary therefore, larger fields may not be favoured by investors. Otherwise they may encourage inefficiencies inorder to delay government higer effective share. In the next sections the study analyses the effect on profitability and efficiency to changes in costs, oil price and adjustment of cost recovery limits.

5.4 Sensitivity analysis

A sensitivity analysis was carried out on the base case results to explore the effect on government take and contractor profitability to changes in costs, price and cost recovery limits. Using a range of $\pm$45%[23] for the three parameters, the following results were obtained:

5.4.1 Oil Price Sensitivity

Confirming earlier studies, it can be noted from Table 5 below that government take reduces as price increases, for all fields. Although the take gets higher the bigger the field, the absolute government revenues increase at a decreasing rate for all fields as price increases, confirming the regressiveness of the regime. However much prices rise, government take will initially fall and then remains constant after some time.

It is also noteworthy that the effect is more pronounced in the larger fields than the small ones; since government take falls from over 120% to 94%

[23] The US (EIA) Annual Economic outlook April 2013 projects the oil price at US$163 in 2040(~1.45*110). For comparability the study also used same factor for the down side (±18%, 36%, 45%).

for the larger fields compared to a fall from 100% to 82% for the smaller field as prices increase.

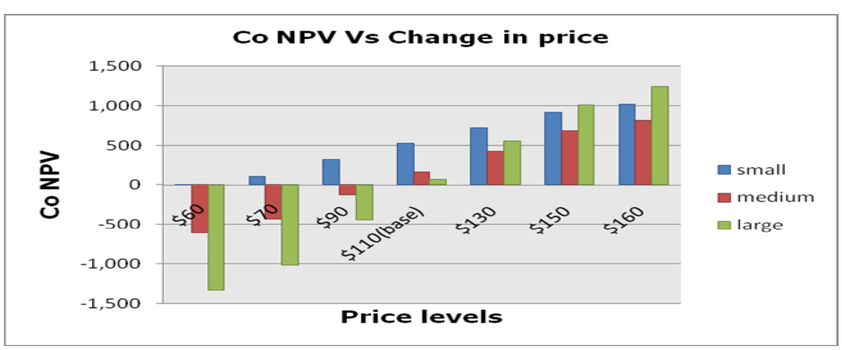
Table 5: Oil Price Sensitivity Results[24]

	SMALL FIELD						
Price sensitivity	$60	$70	$90	$110(base)	$130	$150	$160
Government Take- Discounted	100%	94%	87%	85.0%	83%	82%	82%
Government Take- Undiscounted	78%	78%	78%	78%	78%	78%	78%
Government Revenue NPV10(m)	1,297	1,610	2,251	2,903	3,559	4,219	4,549
Government Revenue- undiscounted(m)	3,201	3,974	5,520	7,066	8,612	10,158	10,931
Contractor NPV10(m)	-5	109	323	525	723	917	1,014
Contractor's IRR	0.0%	2%	6%	9%	12%	14%	16%
Savings Index	0.15	0.15	0.17	0.18	0.19	0.19	0.2
operating leverage	0.5	0.42	0.33	0.27	0.23	0.2	0.19
	MEDIUM FIELD						
Price Sensitivity	$60	$70	$90	$110(base)	$130	$150	$160
Government Take- Discounted	120%	110%	102%	98.0%	96%	95%	94%
Government Take- Undiscounted	88%	88%	88%	88%	88%	88%	88%
Government Revenue NPV10(m)	3,724	4,592	6,370	8,176	10,003	11,835	12,756
Government Revenue- undiscounted(m)	11,454	14,100	19,392	24,684	29,976	35,268	37,915
Contractor NPV10(m)	-612	-435	-122	163	427	686	809
Contractor's IRR	-4.0%	-3%	-1%	1%	3%	4%	5%
Savings Index	0.08	0.09	0.1	0.1	0.1	0.1	0.1
operating leverage	0.5	0.43	0.34	0.27	0.23	0.2	0.19
	LARGE FIELD						
Price sensitivty	$60	$70	$90	$110(base)	$130	$150	$160
Government Take- Discounted	122%	113%	104%	99.6%	97%	96%	95%
Government Take- Undiscounted	89%	89%	89%	89%	89%	89%	89%
Government Revenue NPV10(m)	7,415	9,111	12,579	16,104	19,660	23,233	25,026
Government Revenue- undiscounted(m)	23,730	29,081	39,785	50,489	61,193	71,897	77,250
Contractor NPV10(m)	-1,336	-1,014	-445	68	549	1,012	1,239
Contractor's IRR	-4.5%	-3.4%	-1.5%	0.2%	1.8%	3%	4%
Savings Index	0.1	0.1	0.1	0.1	0.1	0.1	0.1
operating leverage	0.5	0.43	0.33	0.27	0.23	0.2	0.19

Source: Author's Calculation

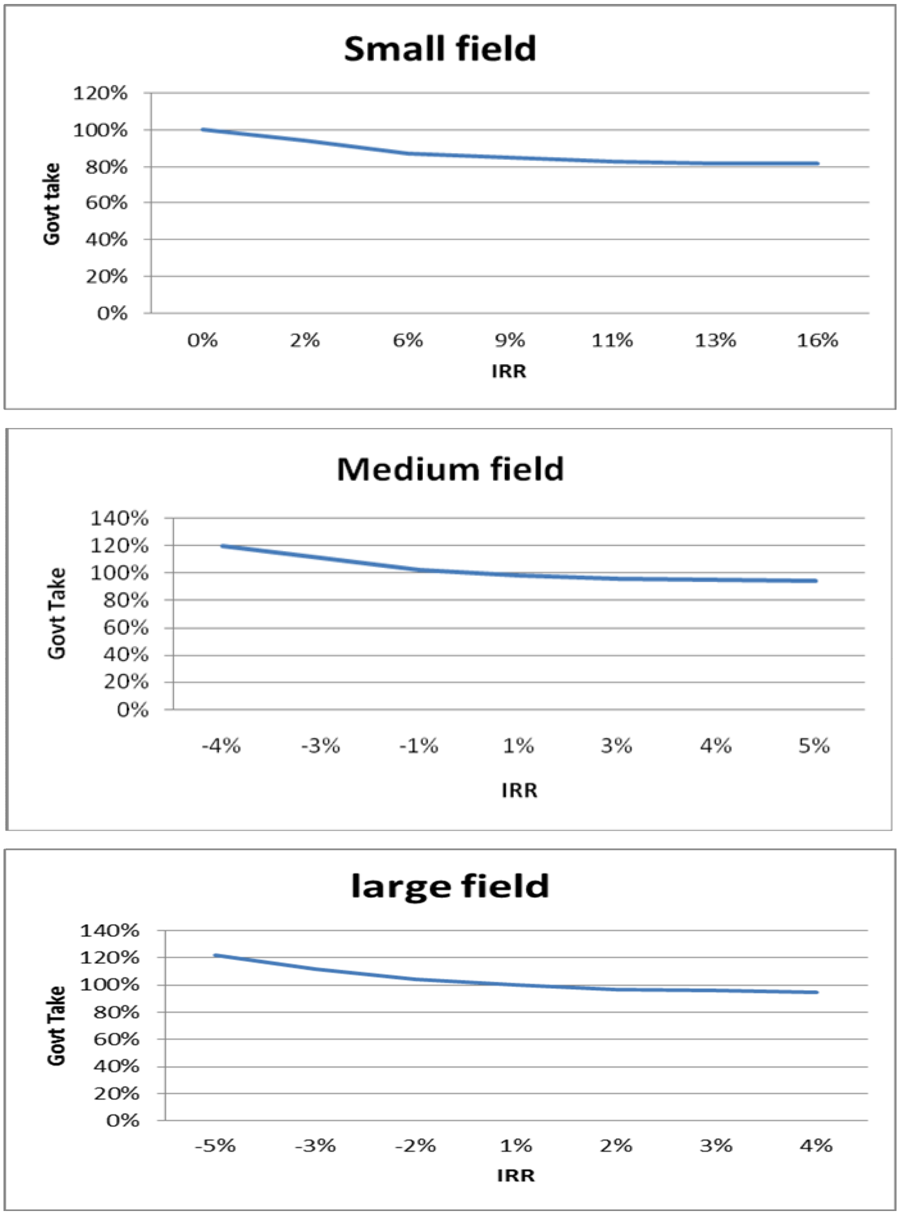
For investors, as prices increase, NPV and IRR increase. For smaller fields however the rate of return is higher than for larger fields ranging between 0% to 16% compared to -4.5% to 5% respectively, confirming their suitability over the larger ones (Figures 9 & 10 below). Much as it is to their advantage, these rates of return are not so very impressive compared to industrial averages.

Figure 9: Company NPV Vs Price changes



[24] The effect of both royalties and cost recovery limit may produce a government take above 100 percent. The table shows government takes of up to 122 percent.

Figure 10: Effect of price change on Government Take and IRR



Source: Author's modelling

Furthermore irrespective of the wide range of prices, the saving index for the larger fields doesn't improve beyond $0.10 yet that for the smaller field increases from $0.14 to $0.20 as prices increase confirming further the lack of economies. Operating leverage on the other hand is more sensitive to prices than to field size, rising as prices fall. Interesting to note however is that a 45% fall in price from $110/bbl to $60/bbl raises the operating leverage by almost 85% from .27 to .50 yet a corresponding increase in price only decreases the leverage by only 30% to 0.19. This illustrates how investors are highly exposed in periods of lower prices hence the need/incentive to save costs. That notwithstanding however, because of the high effective government take at lower prices, any savings would benefit government more.

It can then be concluded in general, and as argued by Tordo (2007), that fiscal systems with low contractor marginal take are more likely to create a lower incentive to saving, Uganda's PSC may not encourage efficiency in periods of lower prices since any savings made will benefit the government more than the investor. That notwithstanding however during periods of high prices (profitability) for all fields the regime encourages more efficiency.

5.4.2 Cost Sensitivities

The sensitivities in costs/bbl have been taken on a total basis i.e Capex + Opex. Decommissioning costs are also adjusted by similar percentages. Details of the results are in Table 6 below:

Table 6: Cost sensitivity results

	SMALL FIELD						
Cost sensitivity	**$10.43**	**$12.14**	**$16**	**$18.97**	**$22.38**	**$26**	**$28**
Government Take- Discounted	81%	81%	83%	85.0%	87%	90%	91%
Government Take- Undiscounted	78%	78%	78%	78%	78%	78%	78%
Government Revenue NPV10	3,229	3,162	3,030	2,903	2,779	2,660	2,605
Government Revenue- undiscounted	7,712	7,584	7,325	7,066	6,807	6,549	6,420
Contractor NPV10	770	722	626	525	420	310	251
Contractor's IRR	20.0%	17%	12%	9%	6%	4%	3%
Savings Index	0.2	0.19	0.18	0.18	0.17	0.17	0.16
operating leverage	0.15	0.17	0.22	0.27	0.32	0.37	0.39
Cost Recovery	**1,052**	**1,224**	**1,569**	**1,913**	**2,258**	**2,602**	**2,773**

	MEDIUM FIELD						
Cost Sensitivity	**$9.1**	**$10.59**	**$14**	**$16.54**	**$20**	**$22**	**$24**
Government Take- Discounted	93%	94%	96%	98.0%	101%	105%	107%
Government Take- Undiscounted	88%	88%	88%	88%	88%	88%	88%
Government Revenue NPV10	9,045	8,864	8,514	8,176	7,860	7,556	7,409
Government Revenue- undiscounted	26,675	26,275	25480	24,684	23,981	23,091	22,693
Contractor NPV10	718	613	395	163	-89	-354	-492
Contractor's IRR	8%	6%	3%	1%	0%	-2%	-2%
Savings Index	0.11	0.11	0.1	0.1	0.1	0.09	0.09
operating leverage	0.15	0.18	0.23	0.27	0.32	0.37	0.4
Cost Recovery	**2,745**	**3,196**	**4,094**	**4,990**	**5,888**	**6,791**	**7,241**

	LARGE FIELD						
Cost sensitivty	**$8.6**	**$10.01**	**$13**	**15.64**	**$18**	**$21**	**$23**
Government Take- Discounted	94%	95%	97%	99.6%	103%	107%	109%
Government Take- Undiscounted	89%	89%	89%	89%	89%	89%	89%
Government Revenue NPV10	17,723	17,383	16,727	16,104	15,511	14,947	14,671
Government Revenue- undiscounted	54,262	53,507	51,998	50,489	48,980	47,471	46,718
Contractor NPV10	1,164	960	530	68	-425	-948	-1,214
Contractor's IRR	6.3%	4.6%	2.1%	0.2%	-1.2%	-2%	-3%
Savings Index	0.1	0.1	0.1	0.1	0.1	0.1	0.1
operating leverage	0.15	0.17	0.22	0.27	0.32	0.37	0.39
Cost Recovery	**5,189**	**6,038**	**7,737**	**9,435**	**11,133**	**12,831**	**13,679**

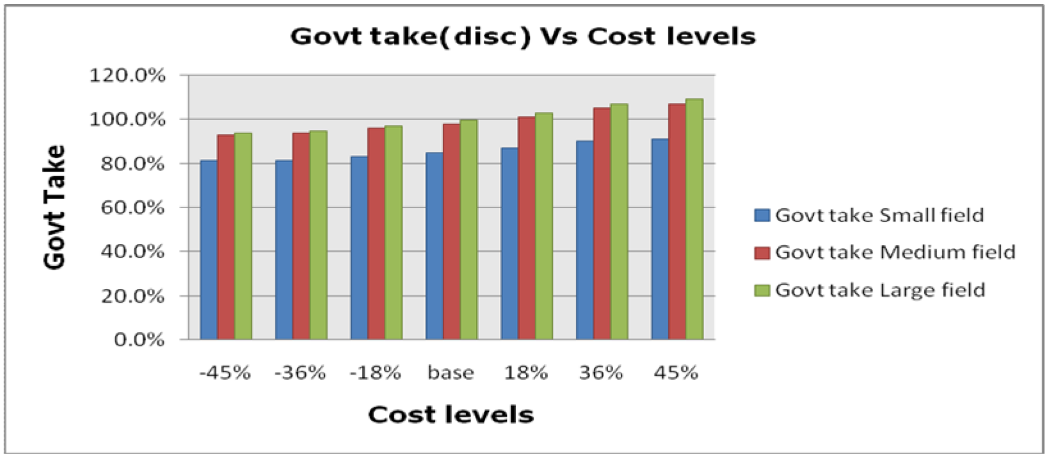
Source: Author's Computations

- **Government's perspective**

From table 6 above it can be noted that, for all fields, government take increases as costs increase while contractor's IRR and NPV decrease. This is further confirmation of cost regressiveness. This is more pronounced in the medium and larger fields where the government's take spreads from 93%

to 109% (15%) compared to smaller fields of 81% to 91% (10%). Figure 11 below shows the cost regressiveness of the regime. The main reason could be the effect of the cost recovery cap (50%) in the PSC, so that irrespective of the costs incurred, there is a limit of what can be recovered in any given period. This has an effect of delaying contractors pay back especially for the larger fields. Secondly the government take is determined by production and not profits or costs.

Figure 11: Government take (discounted) Vs changes in cost levels

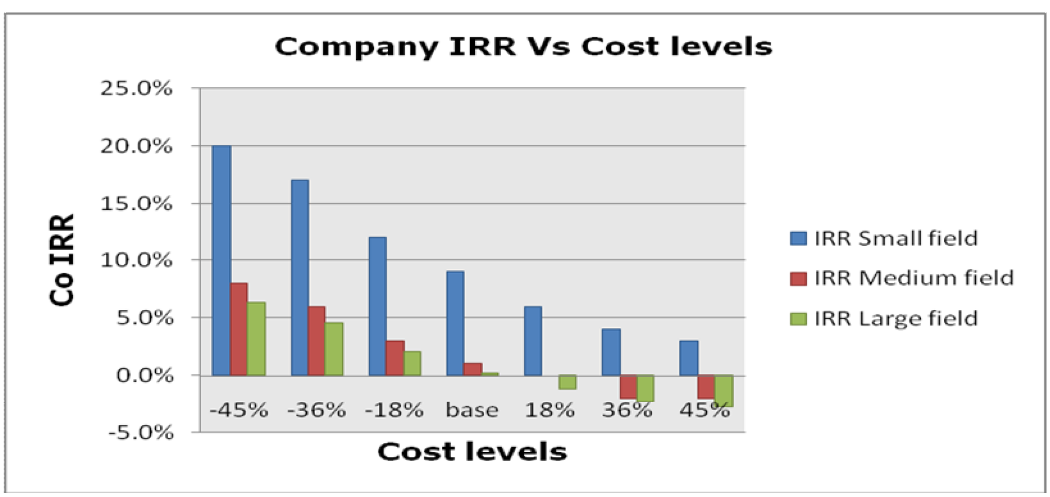


Source: Author's Computations

- **Investor's perspective**

From the investor's point of view, as costs increase, NPV and ultimately IRR decrease. The effect is quite large, because an increase in costs, will cause a corresponding reduction in company NPV of 67% (small fields) and 204% (large field).Likewise the IRR will also reduce by 85% (small fields) and 147% (large field). Figure 12 below shows the effect to IRR.

Figure 12: IRR Vs Changes in costs levels



Source: Author's Computation

As noted, although smaller fields, with much shorter lead times, could still remain economical even with a 45% increase in total cost, the investors' IRR reduces to 3%. It is therefore in the interest of the company to become efficient and economic under such a regime. The Savings Index is not so much responsive to cost changes. Operating leverage, however, increases by more than 2.5 times as costs increase, for all fields illustrating how the investors are highly exposed to an increase in cost. Moreover, because of the regressive nature of the regime, fields with higher operating leverage are more exposed to risks of losses, confirming Kretzschmar and Moles (2006) finding in their study of the impact of tax shocks and oil price volatility on risk. This is evident from figure 11 above; any increase in costs, above base case, for both large fields generates losses for the company. The regime thus encourages efficiency.

It is also important to note that much as government take, in percentage terms, increases with increasing costs, the absolute (dollar) amounts received are actually reducing. An example is in the large field where, although government take ranges from 94%-109% as costs increase, the actual dollar amounts (undiscounted) fall from US$54.26bn to US$46.72bn. The difference of US$7.5bn is all absorbed under cost recovery. These are large amounts which should also be of concern to governments and hence the need to design adequate and effective monitoring systems and cost audits to justify/verify such costs.

5.4.3 Cost Recovery limit Sensitivity (20%-100%)

Table 7 below shows the effect on project profitability to different levels of cost recovery limits. It can be noted that, in general, as cost recovery limits increase the contractor's NPV increases, albeit marginally for all fields. The company's IRR shows almost no significant increase, apart from the small fields where it increases by only three(3) percentage points for the entire cost recovery range. There are no changes in savings or operating leverage for all fields confirming earlier results of absence of economies. At 20% cost oil limit the companies risk not recovering all their investments in the medium and large fields.

The government parameters also display marginal changes reducing government discounted take by 3% to 5% (all fields) as cost recovery limits increase from 20% to 100%.

Table 7: Cost Recovery sensitivity results

	SMALL FIELD							
Cost recovery sensitivity	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**100%**
Government Take - Discounted	87%	86%	85%	85.0%	85%	84%	84%	84%
Government Take - Undiscounted	78%	78%	78%	78%	78%	78%	78%	78%
Government Revenue NPV10	2,982	2,933	2,913	2,903	2,898	2,895	2,892	2,889
Government Revenue - undiscounted	7,066	7,060	7,063	7,066	7,070	7,073	7,076	7,078
Contractor NPV10	445	495	515	525	530	533	535	538
Contractor's IRR	7.0%	8%	9%	9%	9%	9%	10%	10%
Savings Index	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
operating leverage	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Cost Recovery	**1,913**	**1,913**	**1,913**	**1,913**	**1,913**	**1,913**	**1,913**	**1,913**

	MEDIUM FIELD							
Cost recovery Sensitivity	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**100%**
Government Take - Discounted	101%	99%	98%	98.0%	98%	98%	98%	98%
Government Take - Undiscounted	88%	88%	88%	88%	88%	88%	89%	89%
Government Revenue NPV10	8,420	8,278	8,211	8,176	8,160	8,151	8,152	8,153
Government Revenue - undiscounted	24,600	24,625	24654	24,683	24,712	24,740	24,769	24,827
Contractor NPV10	-81	61	128	163	179	188	187	185
Contractor's IRR	0.0%	0%	1%	1%	1%	1%	1%	1%
Savings Index	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
operating leverage	0.28	0.28	0.28	0.27	0.28	0.28	0.28	0.28
Cost Recovery	**4,988**	**4,994**	**4,994**	**4,994**	**4,994**	**4,994**	**4,994**	**4,994**

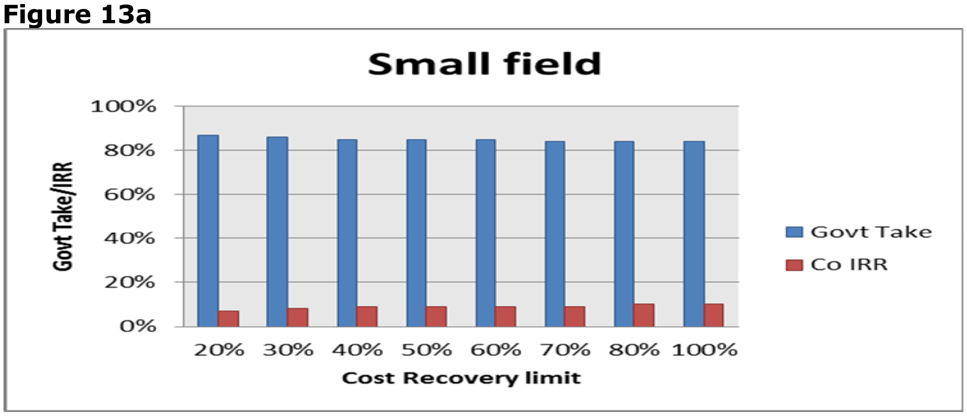
	LARGE FIELD							
Cost recovery sensitivty	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**100%**
Government Take - Discounted	103%	101.2%	100.2%	99.6%	99.2%	98.8%	98.6%	98.3%
Government Take - Undiscounted	89%	89%	89%	89%	89%	89%	89%	89%
Government Revenue NPV10	16,674	16,368	16,203	16,104	16,035	15,978	15,949	15,893
Government Revenue - undiscounted	50,456	50,464	50,476	50,489	50,502	50,515	50,528	50,553
Contractor NPV10	-503	-197	-32	68	136	193	222	278
Contractor's IRR	-1.4%	-0.6%	-0.1%	0.2%	0.5%	0.7%	0.8%	1%
Savings Index	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
operating leverage	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Cost Recovery	**9,427**	**9,435**	**9,435**	**9,435**	**9,435**	**9,435**	**9,435**	**9,435**

Source: Author's Computation

Following from above it is interesting to note that although companies achieve a faster payback of its investment when cost oil limits are increased, the effect on the discounted cash flows (and IRR) is not significant. In fact as cost limits increase, contractor NPV rises up to a level and then remains constant (for the medium field NPV falls as limits are increased to 80%-100%). Figures 13a, b, c below

Figure 13: Govt Take and IRR as cost recovery limits change

Figure 13a



Source: Author's computations

Figure 13 b

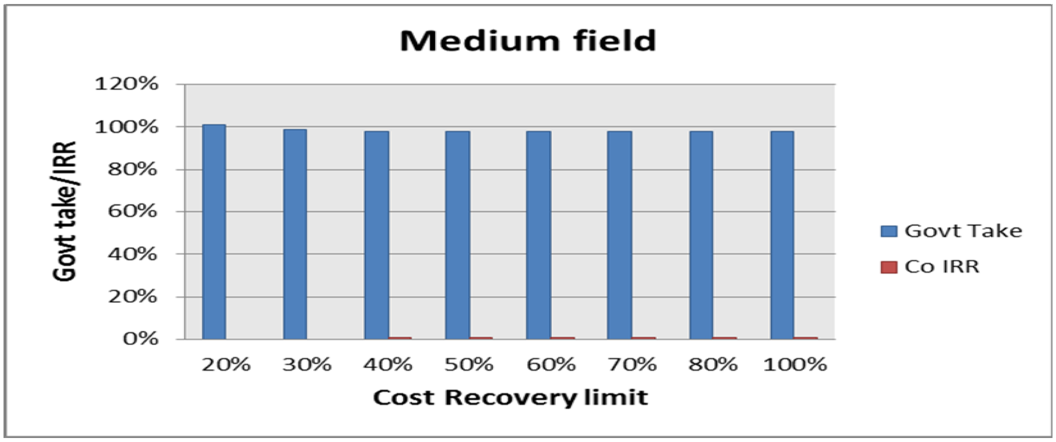
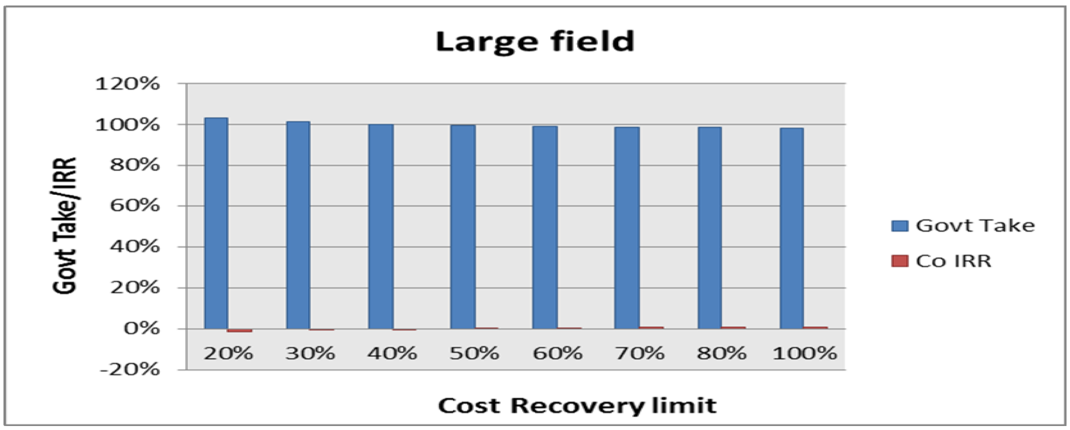


Figure 13 c



Source: Author's computation

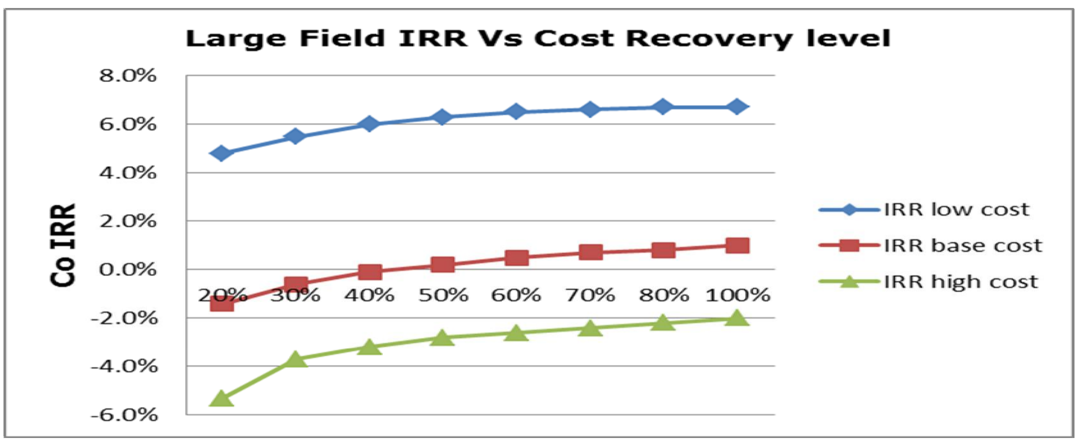
These insignificant changes in NPV to increasing cost oil limits is mainly due to the fact that government profit oil share, which is mainly dependent on sliding production figures, is high especially for the larger fields (in the region of 75-85/25-15). As such, even if companies benefitted from early recoupment of their costs, the largest proportion of production happens later in the project life and this is all shared at higher rates in favour of government. For example, for the larger fields, as cost limits are increased to 100%, companies would recover their Capex by the 3rd to 5th year of production. However, the remaining production, representing averagely 80% of total field production (almost 20yrs), would all be shared on average at 73/27 in favor of government. The benefits of early recoupment are thus outweighed by the later higher government profit share. This also confirms Muscolino et al. (1993) earlier findings that a cost recovery limit beyond the point at which the company recovers all its Capex will only bring about a decrease in the profit oil share and consequently, a smaller profit for the oil company (in PSCs where a larger share of profit oil is taken by the host government). Indeed, from the results above, the medium fields' NPV falls as limits are increased beyond 70%.

At this point the urge/incentive for gold plating by companies could surface in order to delay government enjoying the higher profit share. However, as we have noted in the earlier section, that any increase in costs would affect companies more than it does affect the government. Tordo (2007) refers to this as saturation level. He notes that when sliding scales are used to determine the percentage of profit oil split (or the tax rate), in some cases higher cost recovery limits may lower the contractor's full cycle discounted cash flow. This would depend on several factors, including the level of saturation of the system, the operating leverage, the discount factor, and the steepness of the sliding scale vis-à-vis the changes in the project IRR (Tordo 2007).

It would thus be in the interest of the investor to be efficient.

Figure 14 below further illustrates that for the large field, when costs are high (at $23/bbl), even a 100% cost recovery level still makes the venture uneconomic. Thus confirming the incentive to cut costs or renegotiate the contract.

Figure 14: Large field IRR Vs Changes in Cost Recovery limits



Source: Author's Computation

To establish the effect of profit oil share on project economics, the study simulated the PSC model using lower government profit sharing ratios at 100% cost recovery as below:

Table 8: Proposed profit oil split

Profit Oil split	Production, BOPD	(PSC)Split,%	(prop)split %
(in favour of government)	Up to 5,000	50/50	45/55
	5,000-10,000	55/45	47.5/52.5
	10,000-20,000	60/40	52.5/47.5
	20,000-30,000	65/35	57.5/42.5
(Daily production)	30,000-40,000	75/25	62.5/37.5
	>40,000	85/15	67.5/32.5

Source: Author's proposed split vs 1999 Model

Table 9: Effect on government take and IRR to changes in profit oil ratios

	Small field		Medium field		Large field	
Parameter*	**Govt Take**	**IRR**	**Govt take**	**IRR**	**Govt take**	**IRR**
PSC Split	84%	10%	98%	1%	98.3%	1%
Proposed split	80%	12%	87%	6%	87.4%	6%

Source: Author's Computation.* the cost oil limit is at 100%

All other parameters remaining constant, with a 100% cost recovery limit, the company's profitability improves as government profit ratios are reduced, creating room/flexibility to the company. It is therefore evident that the PSC model profit oil split is more frugal (encourages efficiency) due to the limited returns it provided. Furthermore, a change in profit oil split is thus more valueable to IOCs than the cost limit changes.

5.4.4 Efficiency of the PSC

From the foregoing analysis and findings, it can be concluded that, on the balance, Uganda's model PSC encourages efficiency in the operations of the contractor. The results demonstrate that in periods of rising costs (either due to inefficiency or inflation), contractor IRR and NPV decrease dramatically, while government take increases. This is because of the higher profit oil share in favour of government which is not dependent on project costs but daily production. Even when cost recovery limits are increased, changes in contractor IRR/NPV are insignificant. In fact IRR is negative for large fields for any increase in costs beyond the base case. In addition, the low levels of returns for the investors further strains the investors giving them little room for inefficiency. It is only at maximum efficiency (-45% of base cost) that can they earn a maximum IRR of 20% in the small fields. Otherwise, for the larger fields, IRR never exceeds 8% in all scenarios examined. This could also act as a deterrent to development of larger fields. Companies would, naturally, prefer better profitable terms. It could be the reason why the recently signed PSCs[25] had negotiated different terms from the model (Anderson and Browne, 2011).

Despite the evidence of efficiency, however, it is not possible for governments to foresee all possible outcomes of fiscal regimes. Inefficiencies can still crop up in the smaller marginal fields as noted above. Inflation could also drive costs high especially in periods of rising oil prices. Besides, the new PSAs could be different from the 1999 model. In the next section the study reviews whether the institutional set up of government and current PSA terms are sufficient to ensure efficiency.

5.5 Institutional Set Up

In chapter 2, the relevance of institutions in the efficient management of petroleum resources was discussed. Following on this, Chapter 3 also highlights the petroleum institutional framework in Uganda. In this section the study analyses and benchmarks with other petroleum producing countries to ascertain the adequacy of such institutions.

Arguably, the National Oil and Gas policy 2008 sets the foundation for efficiency in its oil and gas exploitation efforts. Through its guiding principles, the policy states that it aims at:

- *establishing and efficiently managing the country's oil and gas resource potential;*
- *efficiently producing the country's oil and gas resources; and*
- *ensuring collection of the right revenues and using them to create lasting value for the entire nation.*

The new legislation follows on and embraces the principles by creating separate institutions to manage the sector.

5.5.1 Separation of duties

The PEDP Act 2013 creates an administrative arrangement in which it assigns oil sector functions to three state-controlled institutions. First, there is the policy making body, the Ministry of Energy and Mineral Development

[25] Also on www.carbonweb.org/uganda. Because of confidentiality clauses, the study did not evaluate these signed PSA's.

which drafts legislation, issues petroleum regulations, negotiates and endorses petroleum agreements and grants/revokes licenses. Second is the monitoring, regulatory and technical body known as the Petroleum Authority which advises the Minister during negotiation of agreements, review and approval of proposed exploration, appraisal and production work programs and budgets. Third, the Act provides for a National oil company, wholly owned by the state to manage Uganda's commercial aspects of petroleum and participating interests of the state. Several countries have adopted a similar kind of arrangement, like Norway (Ministry, NPD & STATOIL), Brazil (ANP & Petrobras), Indonesia (SKKMigas, formerly BPMigas and Pertamina) and Nigeria is currently proposing the introduction of autonomous bodies responsible for Policy and Regulation (PIB 2008).

There are several efficiency benefits to separation of powers, among which include; Firstly, the improved governance through clarity of roles, goals and responsibilities (Lahn et al 2007). According to Boscheck (2007) lack of clarity around regulatory responsibilities contributed to the problems in Nigeria's oil sector. Previously in Uganda's case, the framework (laws, PSC & regulations) was silent on which government institution was to undertake the cost audits. No cost audits were carried out since 2002 until 2009 when the Auditor General was requested by government to undertake the audit (Auditor General's Report to Parliament 2010). The new law has however specified that the Petroleum Authority will be carrying out the cost audits. Secondly the NOC is able, and perhaps be forced to, focus more exclusively on its commercial activities, enhancing its operational performance and increasing financial returns to the state. This is also advocated by the National Resource Charter[26] in their 2009 report. Thirdly, creation of autonomous policy and regulatory bodies may improve the ability of the government to monitor and benchmark both the NOC and other players in the sector, thereby improving performance (Thurber and Istad, 2010). In addition, as NOCs participate in joint ventures, they gain relevant information regarding budgeting and costs allocations which can be relevant to government/Authority in reducing information asymmetry as they do budget approvals and cost recovery audits. This early oversight may create a check to operators to deter inefficiencies. There is however some

[26] An organization of academics and practitioners to help countries efficiently manage their natural resource endowments

argument that regulation and commercial activities can still be performed effectively under the NOC e.g. in Malaysia and Angola. Thurber et al. (2011), argue that because institutional capacity is low in some countries, it may be more effective to create one all-purpose administrative tool rather than to invite the infighting and bureaucracy that can result from creating multiple bodies. It would make sense if Uganda with capacity gaps in the oil sector would follow that route by creating a strong regulator/policy maker first, then commercial elements are incorporated later on. Norway did that in the 1960s before incorporating Statoil in 1972.

5.5.2 State Participation

The new law provides for state participation through a specified participating interest of a license or contract in the event of a commercial discovery. Technically, government is "carried" up to a commerciality point and once it exercises the option, it then 'pays-its-way' for development and operating costs from the commerciality point forward just like any other working interest partners. The concern to partners (and governments too) is how the state finances its share of costs. The state can contribute to capital and operating costs as a full risk sharing partner on pro rata basis through its own resources or can be 'carried' by the operator who is then often reimbursed out of production (with interest). The effects of full risk partner to field economics can be illustrated below:

Table 10: Effect of Government Participation[27]

	Small field			**Medium field**			**Large field**		
Parameter	Govt. Take*	IRR	Co NPV	Govt. take	IRR	Co NPV	Govt. take	IRR	Co NPV
Without Govt. participation	7,066	9%	525	24,683	1%	163	50,489	0.2%	68
With Govt. participation**	7,466	9%	420	25,338	1%	130	51,706	0.2%	54

*Undiscounted Government take. ** Government would have to invest in @ field; Small=$393m, Medium=$998m, Large=$1,887m.

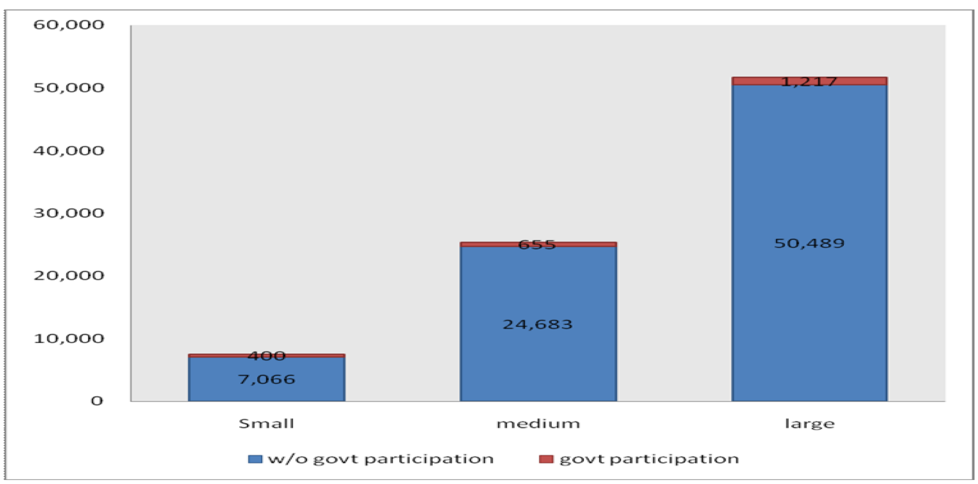
Government participation will increase government take but insignificantly due to the low returns especially in larger fields. Investors, on the other

[27] The research did not model the reimbursement method since the results would be the same (with an additional interest cost) as the cost sensitivity undertaken earlier.

hand, would prefer government not backing-in since the company's NPV is reduced by the government participation amount (20%) as government take increases. However in the event that the HG were to participate, companies would prefer the full risk partner because, for the reimbursement method, the additional interest element makes the fields more uneconomic, as it was revealed in the previous sections, that any increase in costs would affect companies more than HGs. Unless interest is higher than IRR, investors may be reluctant to inject their own finances.

On the government side, a country like Uganda with a budget of UGX 13,169bn (approx $5,000m) for 2013/14, coupled with priority needs like infrastructure, roads, health, water and sanitation projects, it may be a challenge, in the short/medium term, to participate as a full risk partner to raise and invest such large sums of money. Daniel et al (2010) argue that funding state participation draws resources away from other urgent budget priorities. Moreover the gains, in increased revenues due to participation, are too small compared to non participation (see figure 15). Usual government funding delays can also cause project implementation delays, deferring revenue and ultimately reducing project value.

Figure 15: Effect on Government revenues due to participation



Source: Author's modelling.

The logical way would be the reimbursement method. However, even then, as Tordo (2007) argues, this may result in an implied borrowing rate for the host government that is higher than its marginal borrowing rate, and thus interest expenses becoming unbearable. An example is Nigeria which has failed to clear cash calls in time and has led to escalation of amounts owing plus interest to joint venture partners (Omolade 2008).

Therefore, much as state participation increases government take and probably encourages efficiency through reduced information asymmetry, the lack of financial, human and commercial capacity may dictate that in the short run it may be beneficial for government not to back-in as it develops the necessary capacity.

5.5.3 Production Sharing Agreements

5.5.3.1 Allocation of rights and terms of PSA

Allocation of exploration and production rights is one of the ways a country may improve efficiency. In Uganda, previously, allocation of rights was through open-door policy (first-come-first-serve basis). This was considered less competitive and less transparent. The new law has however introduced licensing/bidding rounds which helped to improve transparency. Most countries use bidding rounds e.g Tanzania, Angola and Indonesia. According to Tordo et al. (2010), transparent awards improve the efficiency of the allocation system and make it less vulnerable to political and lobbying pressure. To further improve transparency and uniformity, it is important that biddable, fixed and negotiable parameters are spelt out in the model PSA. Tordo et al. further advise that the number of negotiable terms should be limited, otherwise, like in Yemen, they become complex and difficult to evaluate and administer. Gas terms should also be included in the PSA instead of leaving them out for negotiation.

5.5.3.2 Procurement, budget approvals and cost control

Similar to most PSAs, the new law provides for the approval of budgets (and work programs) by the Petroleum Authority, in addition to the Advisory Committee approval, which is a good starting point for the control of costs. The law and model PSA also propose that while procuring goods and services, preference should be given to those produced or available in Uganda as long as they are of similar price, quality and required quantity. This serves a dual purpose of ensuring local content and cost control, assuming foreign goods and services are more expensive. In terms of procurement process, the PSA further provides that:

"The Licensee shall establish appropriate procedures, including tender procedures, for the acquisition of goods and services which shall ensure that the suppliers and Sub-Contractors in Uganda are given adequate

opportunity to compete for the supply of goods and services. The tender procedures shall include, inter alia. the financial amounts or value of contracts which will be awarded on the basis of selective bidding or open competitive bidding, (the procedure for such bidding, and the exception to bidding in cases of emergency, and shall be subject to the approval of the Advisory Committee)".

This is however open-ended since different companies will have different tender procedures and thresholds for competitive biddings. This could leave room for subjectivity and inconsistencies. For large capital items, the level of expenditure that requires competitive bidding can have a big influence on efficiency (Johnston 1994). Angola and Nigeria have put ceilings of $250,000, above which, approval by government should be sought on the bidding method and eligible companies. Vietnamese PSA requires international tendering for any contract costing over $200,000 (Vietnam Model PSA)

Similarly the model PSA further stipulates that labour and associated labour costs incurred are recoverable without further approval of the government. These are gross salaries and wages including bonuses and cost of living, housing and other customary allowances afforded to expatriate employees in similar operations elsewhere of the Licensees' employees directly engaged in the petroleum operations, irrespective of the location of such employees. This implies that the labour costs are recoverable irrespective of the salary structures and levels of each IOC. There are also no requirements to have salary structures approved by government, which may promote licensees' inefficiencies, as there is no motivation to pay reasonable and competitive labour costs given that the costs are all recoverable without limit. Some countries have put ceilings on recoverable costs like Indonesia and Tanzania (expatriate salaries and wages determined by Min of Finance in the earlier and do not exceed $15,000 in the later). In Nigeria if a given percentage of local content is not met, then that amount is not cost recoverable (Adepetun 1995). It is thus important that standard procurement terms and cost cap thresholds are introduced in Uganda, although too low thresholds may increase compliance and administration costs and affect operational efficiency (Tordo et al.2010).

5.5.3.3 Costs definitions

The PSA stipulates that "*Other costs incurred and expenditures not covered or dealt with specifically in the agreements, which are incurred by the licensees for the necessary and proper conduct of petroleum operations are recoverable"*. This provision is too broad and subject to different interpretations as some costs, not specifically dealt with in the agreements, are bound to be treated differently by the licensees and the government. Improper definition of costs for recovery purposes may also affect the amounts and legality of costs. For instance, the model PSA does not expressly state that corporate social responsibility (CSR) & bonus payments are not recoverable, yet the Ministry of Energy considers them unrecoverable (PEPD and Auditor General's Report 2010). The PSA doesn't also state what happens in case unbudgeted, excess and unapproved expenditures are incurred. This could be left to the subjective decisions of the Advisory Committee or for audit determination. It is important that such expenditures are expressly stated in the contract of their un-recoverability. Angola's PSA clearly states them as unrecoverable and Indonesia, in December 2010, increased the list of 17 non cost recoverable items to 24 (MoEMR no. GR79/2010)

Another area of concern is the overhead costs referred to as general and administrative (G&A) overheads in the PSC. According to the PSC, G&A costs "*include all main office, field office and associated G$A costs incurred in relation to Petroleum Operations, including, but not limited to, supervisory, accounting and employee relations services carried out by Licensee in Uganda*." G&A costs also include "*Licensee's Affiliated Companies' personnel and services costs, reasonable travel expenses of such Affiliated Companies' personnel in the G&A category above in connection with the Petroleum Operations".*

It further states that *a portion of all G&A expenses allocated to exploration, development and production operations* ***based on projected budget expenditures subject to adjustment on the basis of actual expenditure*** *at the end of the calendar year concerned will be recoverable; Expenses shall be necessary, appropriate and economical.* This leaves the choice of allocation method of the G&A costs to the licensee's own discretion. Different licensees may include different costs in the G&A calculations which may leave room for subjectivity and negotiations of allowable costs, especially costs incurred outside the country. If overhead costs incurred outside the host country were all recoverable only by individual submission, huge administration costs, creating confusion, audit complexity and a potential for abuse and disputes would arise. It's quite challenging to properly monitor time - sheet based charges for services of many personnel in corporate headquarters abroad (Nurakhmet 2006). In Indonesia & E. Timor, G&A costs are subject to direct negotiations. Each year, after a detailed study, a method is selected and must be approved by the regulator. This has brought numerous complaints from the Licensees arising from amounts and delays in audits (pscforum 2008).

The Association of International Petroleum Negotiators (AIPN) in its 2004 Accounting rules for JOAs recommended percentage-based overhead charges (www.aipn.org) so that a uniform fixed percentage of overheads is charged depending on the amounts incurred. Tanzania and Kenya has capped the overheads not to exceed a percentage of total contract expenses. Nigeria, Sudan, Yemen, Bangladesh, Azerbaijan PSAs contain clauses with overhead percentage based on sliding scale expenditure, reducing as the expenditures increase (Model PSCs). This improves uniformity and may encourage efficiency as licensees are forced to live within those set limits.

5.5.3.4 Reporting and audits

The new law and the PSA stipulate various reports and statements to be submitted to government. In particular the PSA requires the licensee to report to government on a monthly basis, all expenditures, production, prices, sales, receipts, cost recovery and production sharing related to petroleum operations in the licence area. This improves transparency and may encourage efficiency, although it is silent on the time of cost oil calculations and audit. Currently cost oil audits, on average, take two years or more (probably due to the presumption that cost audits are similar to the non operator (or government) audits carried out within 24 months after the end of licensee's financial year). This time can be quite long and could encourage inefficiency and affect the amount of revenue government receives. In a given month, a contractor who has overstated the cost recovery amount may end up with a higher entitlement nomination, hence lifting more crude. At the end of the period (in this case 2 years), when actual entitlement based on actual volumes, actual prices, and actual cost recovery is calculated, the contractor will be found to be in an overlift position. By the time the overlift is settled, at least the contractor has gained with regards to getting the cash earlier (time value of money). This is essentially getting an interest-free loan from the government, even if it's only for a brief period of one year or less (pscforum 2008). Besides, the oil price differentials between the time of lifting and settling may be different, creating lower revenues to government in case settlements are made during lower prices than at the time of lifting. Industry practice is to calculate cost oil on a quarterly basis.

5.5.3.5 Transfer Pricing

In chapter 2, section 2.5.3, it was seen how transfer pricing can be used by IOCs to pass value to associate companies by contracting out work or purchase of goods or services to associated companies at rates higher than arms length prices.

On July 1, 2011 the government introduced transfer pricing regulations. The regulations apply to related parties engaged in intra-company cross border and domestic transactions. Corporations are required to provide documented evidence that an arm's length amount was paid for goods and services exchanged between related parties. These regulations are in line with OECD transfer pricing guidelines. A practice note was released in May 2012 to aid taxpayers' compliance. In 2012/2013 financial year, taxpayers will be expected to have transfer pricing documentation in place. It is anticipated that these regulations, in addition to prompt and effective tax audits, will encourage efficiency in associated company transactions.

In conclusion, therefore, aside from some few PSA clauses of procurement/ tender procedures, costs definitions and audit timings, Uganda's institutional framework is quite adequate to monitor and ensure efficiency. However, as with all institutional frameworks, their effectiveness depends on the human and financial resources and capacity. As Omolade (2008) argues that, notwithstanding the expenditure limits set out in the Nigeria's PSCs, there is still government inability to adequately monitor IOC's expenses. There is thus need for Uganda government to ensure this capacity is developed.

5.6 Chapter Summary

This chapter sets out to answer the key objectives of this research of whether Uganda 1999 PSC Model is efficient and if the related institutional framework promotes efficiency. Using both empirical and qualitative methods it has been shown that the model encourages efficiency and the institutional framework (laws, regulations and contract terms) are adequate to promote efficiency. However, even with such framework, the underlying driver is the level of technical expertise and financial capacity necessary to administer and ensure compliance. And, arguably, it looks like Uganda still lacks such capacity.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

During the exploitation of petroleum resources of a country, a fiscal system plays a balancing role of both the interests HG and the Investing oil company. It should not only protect the interest of the HG but also provide incentives to the IOC. It is also evident that despite the multiplicity of different petroleum fiscal regimes, the design can be such that they all give the same amounts of resource rent. Many researchers have analysed efficiency of various regimes in terms of their optimality, flexibility, sustainability, neutrality and equitability. This research however set out to study efficiency of fiscal system in terms of cost; whether a fiscal system encourages companies to become efficient. Because enormous amounts of costs are incurred in the exploitation of petroleum resources, their recovery and timings are of profound importance to both the government and IOC. Irrespective of the type of system, cost management will affect the profitability of a project much as prices and reserves. PSCs in particular, provide for a cost recovery process through which companies can recover a given amount of costs per period while also guaranteeing government a share of production. Of late however numerous evidence of disputes have arisen, whereby HG and activists complained that IOCs tend to inflate costs or bring forward expenditures in order to delay or reduce government revenues.

Through the use of both qualitative and quantitative methods, this research aimed to investigate whether Uganda's 1999 Model PSC encourages efficiency. It also set out to establish whether the new law has mechanisms in place to ensure efficiency through monitoring and oversight.

Based on the evaluation methods used, the study concludes that Uganda's fiscal regime encourages efficiency. The IOC's NPV and profitability reduces significantly when costs increase, whereas the HG share of revenues increases. IOC's would suffer any increase in costs as governments benefit. Further during increasing prices, companies are incentivized to be efficient since they receive higher revenue shares as government revenues reduce. This observed behavior to both costs and price is attributed to the fact that government revenues are based on production volumes instead of project profitability. Secondly, contrary to a common notion that 'increases in cost recovery limit (%) will automatically improve IOC cash flows and profitability', in Uganda's PSC, an increase in the percentage only benefits the IOC up to the point when all capital costs are recovered, thereafter any increase has no further economic benefit. In fact because Uganda's profit oil split is high (average 73% in favour of the HG), during periods of high costs, some fields remain uneconomical even at 100% cost recovery limit.

Finally the research also noted that a poorly conceived legal, regulatory, and fiscal framework may lead to inefficiency and loss of economic rent. Uganda's institutional set up though adequate in encouraging efficiency through monitoring, the lack of necessary human and financial capacity may undermine and outweigh any would be gains made there from. It is thus important that this capacity is developed. Some unclear aspects of the framework have also been identified and below are a summary of recommendations that would need addressing to enhance efficiency.

6.2 Recommendations

In future, with new PSAs and regulations, it is important for government to guard against any terms which may be prone to manipulation.

6.2.1 Standardized procurement process

Standardizing procurements in petroleum operations can reduce administrative burdens and improve uniformity. This may involve IOCs obtaining approvals from government or mandatory tendering for any procurements above a set threshold. This will improve consistency and enhance efficiency.

6.2.2 Institutional Capacity development

All relevant government agencies should develop technical capacity to perform their monitoring duties. These include Ministry of Energy, Finance, Tax Authority, Petroleum Authority, Audit Offices and Environmental agencies. Technical capacity development should include independent verification of work plans and budgets, reserve appraisal and calculation, production and revenue monitoring and tax audits.

In addition, it is advisable that initially NOC's role could be limited to managing the marketing of the country's share of petroleum received in kind and developing both financial and human capacity until such a time when it can economically engage in state participation.

6.2.3 Recoverable and Non Recoverable costs

It is very important to have clearly drafted and more precise provisions on recoverable and non recoverable costs, like bonuses, CSR, costs incurred without obtaining prior approvals like not meeting local content requirements. Likewise, general and administrative overheads should be capped in line with AIPN guidance. Lack of proper definitions of costs may cause potential for various interpretations and misunderstanding in terms of accounting, reporting, and auditing.

6.2.4 Carefully Analysis of Pipeline and Refinery costs.

Pipeline and refinery costs, although not specifically modelled in the study, due to their high uncertainty and possible regional sharing, are also equally relevant. Uganda being a land locked country, the ultimate revenue shared between IOCs and HGs can be highly reduced if transport/pipeline tariffs are not carefully monitored and controlled. The problem could further be escalated if the producing company is also operating the pipeline. This could stifle competition (Svetlana et al 2003). It is important that, in the long run, HG should have a stake in such strategic assets for political and economic (cost control and reduction of monopolistic tendencies) reasons.

6.2.4 Cost audit lead times

As mentioned earlier, recoverable cost audit and verification should be undertaken on a timely basis, say quarterly instead of biannually.

It is the hope of the researcher that the study will add value to the existing body of knowledge for the benefit of both policy makers and researchers.

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APPENDICES

Appendix 1: Map of the region showing the Albertine Rift to the west

Source: http://en.wikipedia.org/wiki/files: Map_of_Great_Rift_Valley.svg