ECONOMIC ANALYSIS OF NEW IRANIAN PETROLEUM CONTRACT (IPC): THE CASE STUDY OF CASPIAN SEA FIELDS

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1- Abstract

New generation of upstream oil and gas contracts with the title of Iran petroleum contract "IPC" has been recently designed and set in the oil ministry's agenda. In this article, addressing the economic components of the fiscal regime of the contract, the fiscal simulation of the contract has been provided. Most important fiscal parameters of the contract are: Capex and Opex, Cost of Money, remuneration fee, amortization period and R-factor. Technical information of the Sardar_E_Jangal field has been used as a case study for this paper. The results show some merits and demerits. The most important output of the model is that the contractor's take is so small (about 8% in the discounted manner and the IRR of Contractor doesn't exceed some amount (14.6%) by price increasing, showing the service nature of the contract. According to the results, remuneration fee is the most significant factor which can affect the IRR and take of the contractor, so its level should be determined carefully regarding the fiscal simulation model. Another issue which should be paid attention to is the determination of R-factor and remuneration fee slides. The fiscal regime is regressive in the levels of price lower than $50 and is progressive in the higher levels, but the profitability of the contractor in the higher levels is constant in absolute terms which can reduce the attractiveness of the contract. One of the major defects of the contract is the Gold-plating issue which is raised because of using R-Factor mechanism. Using the saving index can mitigate the problem notably.

2- Introduction

Iranian petroleum contract (IPC) is a new model of upstream oil and gas fiscal regime which have been recently unveiled. The contract is a combination of Buy-Back (former upstream contract of Iran) and Production Sharing Contract (PSC). There have been a long controversies over the economic performance of the buy-back and specially the low share of operator in the final take.

Iranian authorities sought to improve the former buy back framework in favour of the operator. The main feature of the new fiscal system is fee per barrel as a remuneration which is very simillar to the Iraqi fiscal model which has been attractive to the industry.

To evaluate the IPC economic and fiscal performance, we simulate the contract for a representative oil field in the Caspian sea. The data used are taken from a real oil field in the country.

In doing so, economic measures are derived to determine the various fiscal regimes' performance under four criteria; i) The amount of government revenues; ii) Timing of government revenues; iii) Progressivity/adaptability of the fiscal model; and iv) Contractor profitability.

3- literature review

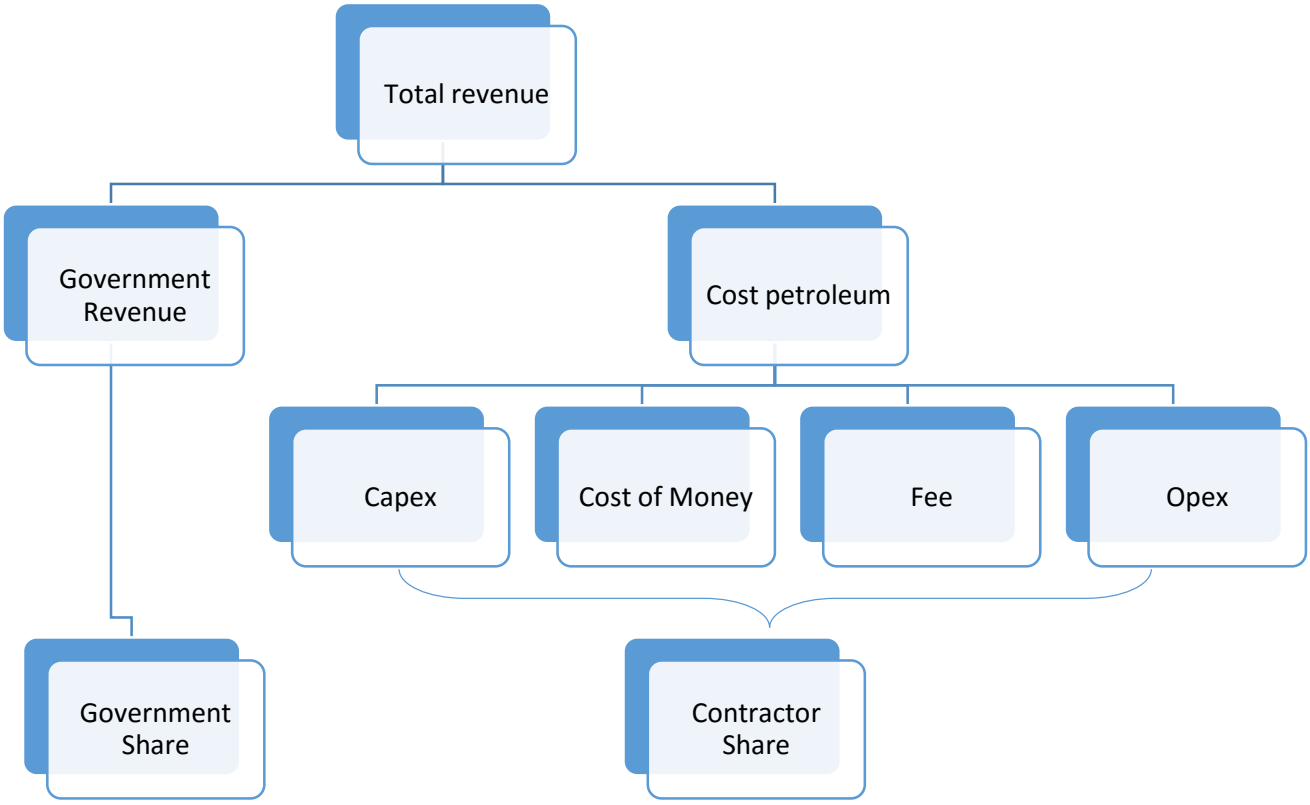
Energy modeling divides to two general categories: demand side and supply side modeling. Dealing with technical issues of oil and gas reserves and suppliers behavior in the market, supply side modeling is more complicated. In addition, some uncertainties appearing due to geopolitical issues, supply disturbances, environmental catastrophes and technology growth, complicate the supply's modeling and forecasting as well.

A group of modelling studies on supply side, the fiscal regime's effects on production has been addressed. Most of these studies models the tax/royalty systems (Vcrlcgcr 1980, Stauffer and Gault 1985, Ahmadian 1997, Lazzari and Pirog 2008 and Smith 2012). In addition, some fewer studies have addressed the contractual systems (PSC and Service contracts) effects on oil production (Yusgiantoro and Hsiao 1993, Ghandi 2012, Zhao and et al 2012, smith 2012 and Taherifard, 2009).

Fiscal regime simulation studies were so limited and almost been done by IOC's consultants for their usage. Among very few papers in this particular area, we can refer to Van Meurs (2009), Luo Dongkun and Yan Na (2010), Xu Zhao and et al (2012), and Lei Zhu and et al (2015).

4- IPC fiscal regime

In contrary to Buy-back contracts in which the contractor was absent in production period, in IPC the contractor will be present in all of the exploration, development and production phases. Regarding to revenue division of petroleum fields the IPC have a large similarity with Iraq's contracts known as technical Service contracts (TSC). With another point of view, it can be considered as a combination of Buyback contracts and Production Sharing Contracts, because in this contract, such as Buyback contracts the contractor's entitlements will be paid only from in question field's revenue and such as PSC he will be receiving some benefits of the production in the production period. In below figure the overall structure of this contract has been shown.



As seen in above figure total petroleum operation related costs will be depreciated from allocated revenue _ cost petroleum. in addition to the incurred and paid petroleum cost, a determined remuneration fee will be paid to the contractor. total petroleum cost and remuneration fee should be recovered out of the 50% of revenue of crude oil of that filed. detailed costs and remuneration fee are discussed in below.

4-1- Cost petroleum

Petroleum costs which have been incurred and paid by the contractor in connection with this contract are divided to four divisions as below.

1- Direct Capital Cost (DCC): these costs include costs which were incurred in connection with appraisal and development operations and are necessary for meeting the development and production plan objectives.
2- Indirect Costs (IDC): these costs mean all costs which are indirectly related to the development operations and are limited to Iranian governmental organizations and officers Charges such as the Iranian Corporation Income Tax (CIT), Value Added Tax, withholding tax, social securities (SSO), customs duties and so on.
3- Cost of Money (COM): this item is to compensate the costs incurred by the contractor in connection with financing the project, but in contrary to Banking Charges in Buyback Contracts, COM are solely applicable to indirect costs (IDC) incurred prior to first production date, and Petroleum Costs and Remuneration fee only in the event of the delay or late payment and are not cover the costs relating to financing the Direct

Capital Cost (DCC). the rate which will be used for computing the COM is equal to LIBOR plus a premium.

4- Operating Costs (Opex) which consist of all costs and expenses related to Production operation in accordance with the development and production plan(s) (DPP), except Capex, IDC and COM.

4-2- Remuneration Fee

Inconsideration of Participation of IOCs in exploration and development operations, taking risks in different rates and costs and provision of technology and know-hows, IOC is entitled to some Fees which is defined and formulated proportionate to the magnitude of the risks taken.

Fee for development (DF) shall be equal to….$/bbl of production, say (A)$/b of Production of crude Oil for Oil field and (B)$/mcfd of natural gas produced in case of independent Gas fields, which the operator of development is entitled to receive under the following conditions:

A. **Period of payment**

Starts from the commencement of the First Production for a period which is estimated to be 15-20 years depending on the fields condition, however shall not exceed 20 years.

B. Amount

DF shall be paid in full amount of (A) $/b ofcrudeoilor(B)$/mcfd of natural Gas produced only if the field achieves the defined targets and Production rates and Plateau duration otherwise, shall be adjusted proportionate to the production plateau as in practice achieves multiply to the percentage of duration fulfillment. therefore, the following formula shall be applied:

DF(Payable) = (A) or (B) (full figure) * P (Plateau percentage) * D (Plateau duration percentages)

In addition, mentioned Fees of (A) and (B) will be linked to the oil and gas prices. This will cause the IOC to enjoy the market changes positively. by the way, “R” (RI) index shall be used to adjust the E&D&P operator’s rewards. as RI increase the DF will be decreased by a sliding scale. RI is defined as follows:

$$\frac{\text{All Cumulative amounts received by operator as per any annual financial report}}{\text{Total Costs incurred and Paid by Operator as per same annual financial report}}$$

4-3- Cost recovery

According to the contract, the cost recovery year commence from the year of first production. DCC and IDC incurred prior to first production date, together with accrued COM as defined in the contract hall be depreciated within 5-7 years (depends on the nature and characteristics of projects) from that date.

After achieving first production, except DCC, which should be amoritized in 5-7 years, other costs including IDC and Opex should be recovered by

contractor at cost without COM on current basis upon submission of the quarterly invoices confirmed by N.I.O.C. .

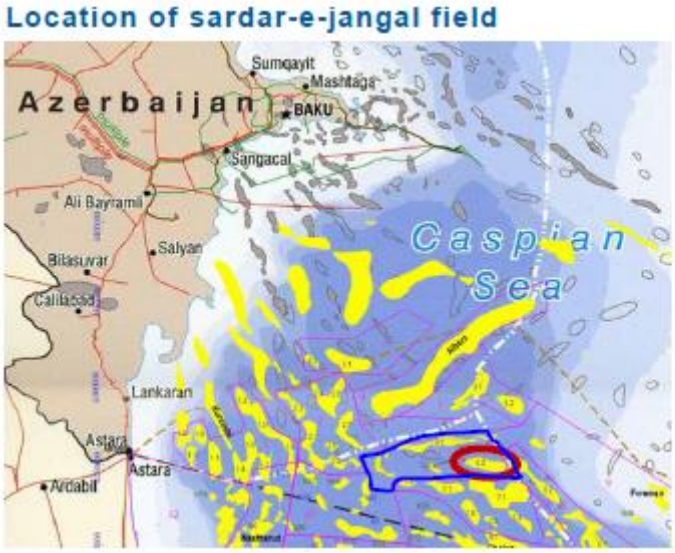
As mentioned before COM will not be applied to DCC in development phase and after first production date, only calculated and applied in the event of dealy of the payment of petroleum cost to the unpaid amount.

5- The simulation model

A Discounted Cash Flow anslysis within a VBA spreadsheet environment is used to run the simulation. All economic features of the IPC are carefully implemented in the model. This includes key parameters such as cost recovery, all relavant remunerations such as fee per barrel, depreciation method, income tax and R factor.

5-1- Assumptions

The flied technical data are taken from a real field data; an off-shore oil field in the Caspian Sea namely the Sardar-E_Jangal field.



Sardar-E-Jangal field in block 6 is located about 250 Km. of Caspian Sea coastline, in 750 m water depth. It is expected the main prospect is Cheleken. Although the first exploration well in 2012 has discovered hydrocarbon in layers above Cheleken. The second exploration has been completed in 2015. The field dimensions are about 24km x 6km.

the assumed technical and economic parameters are as below.

Project Assumptions		Units	Economic parameters		Units
Contract length	20	Year	Total production	274.8	MMbbls
Exploration period	2	Year	Base production rate	0	bopd
Development period	3	Year	Enhance production rate	70	bopd
Production period	15	Year	MC of new cpacity	27.5	m$/b/d

Project Assumptions		Units	Economic parameters		Units
Disbursement period	7	Year	Capex/bbl	9	$/bbl
Oil price	45	$/bbl	Sustaining capital *	40	$MM/year
Price annual growth	7%		* From yr 2 till 3rd year before production stops		
Price in the last year	162.7	$/bbl	Opex	7	$/bbl
Plateau period	5	Year	COM	9%	Libor+1%
Depletion rate	3%		IDC (share of Capex)	25%	
Discount rate	10%		Cost recovery cap	50%	of revenue

So, the cost Structure of the project are calculated as below.

Cost structure	$MM	$Bbl
Exploration	200.0	0.7
Development	2,411.5	9.0
Sustaining	480.0	1.8
Operating costs	1,875.6	7.0
IDC	602.9	2.3
Decommissioning	-	-
Total costs	5,570.0	20.8

In addition, the Remuneration Fee assumed to be determined and adjusted by R-factor and Price as below.

base fee adjusting by price (in case of 0% price gorwth)		
fee	Price	adjusted base fee
10.0	20	-
110%	40	-
120%	60	18.0
140%	80	-
160%	80	-

Fee Computation					
15.0	Base fee	$/bbl	RI<.25	.25<RI<.5	.5<RI<1	RI>1
			100%	80%	60%	40%
		Fee / bbl	18	14.4	10.8	7.2

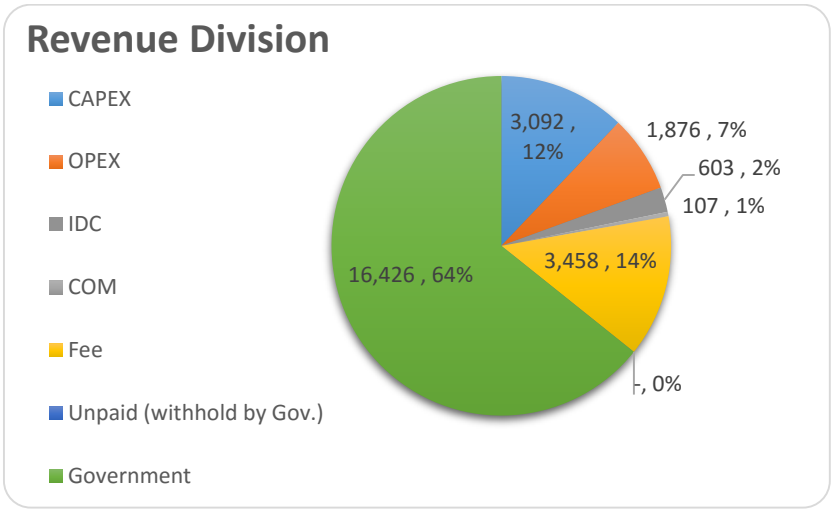
18.0	Init. Fee	$/bbl
12.9	Ave. Fee	$/bbl

5-2- Results

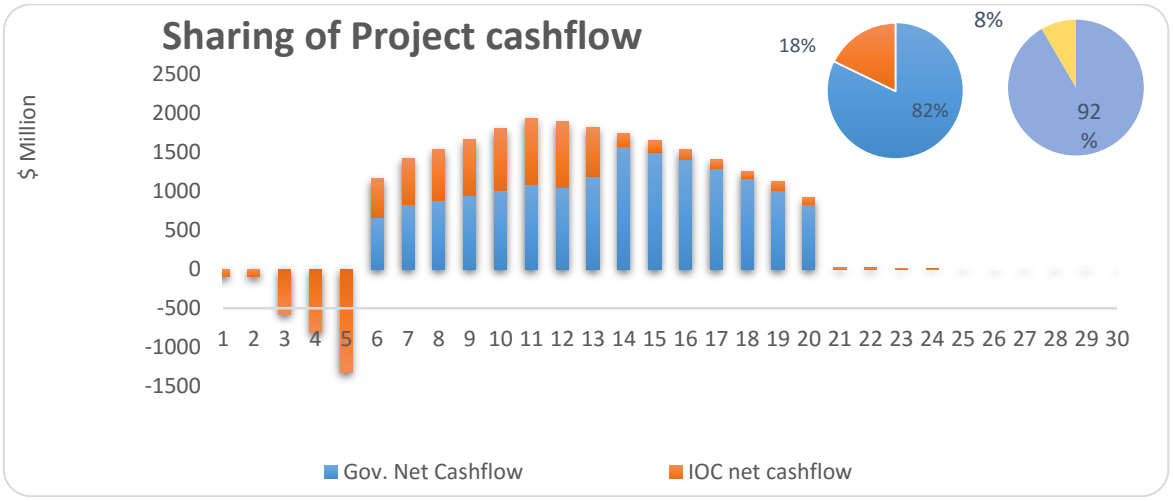
The main results of the model is as below. the IRR of the project and Contractor are 36% and 13% respectively.

Results			US$ Million
	IRR	**NPV0**	**NPV10**
Project	36%	19991.5	5341.6
OilCompany	13%	3,565.8	448.0
Gov. Revenues		16,425.7	4,893.6
Check		0	0
Gov. share		**82%**	**92%**
Unpaid payment		-	256.9

As it seen in below diagram the most proportionate (64%) of the gross revenue of the field will be captured by the Government.

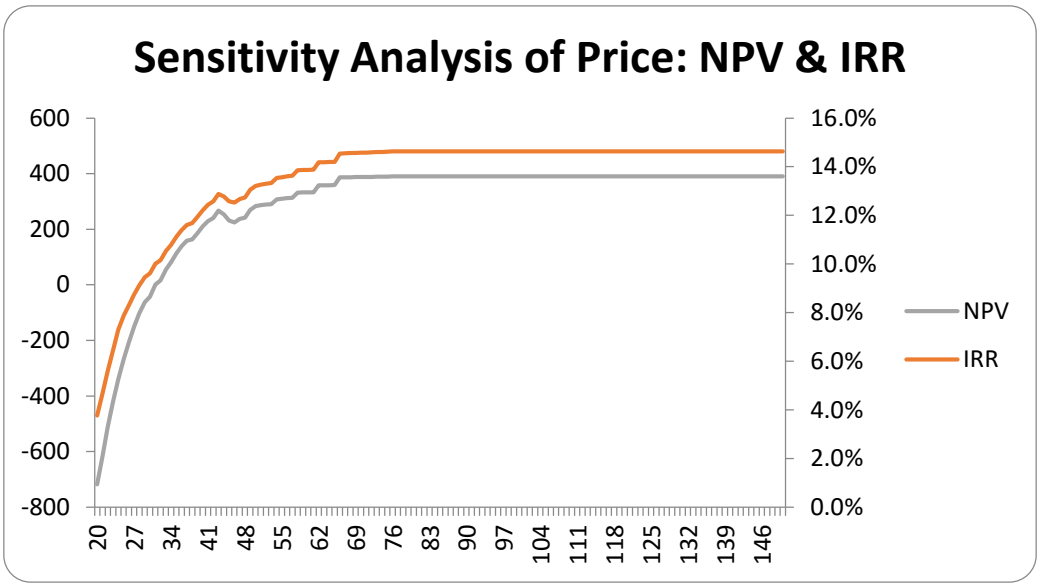


The project cash flow has been displayed in below. Contractor take in undiscounted and discounted manner are 18% and 8% respectively.

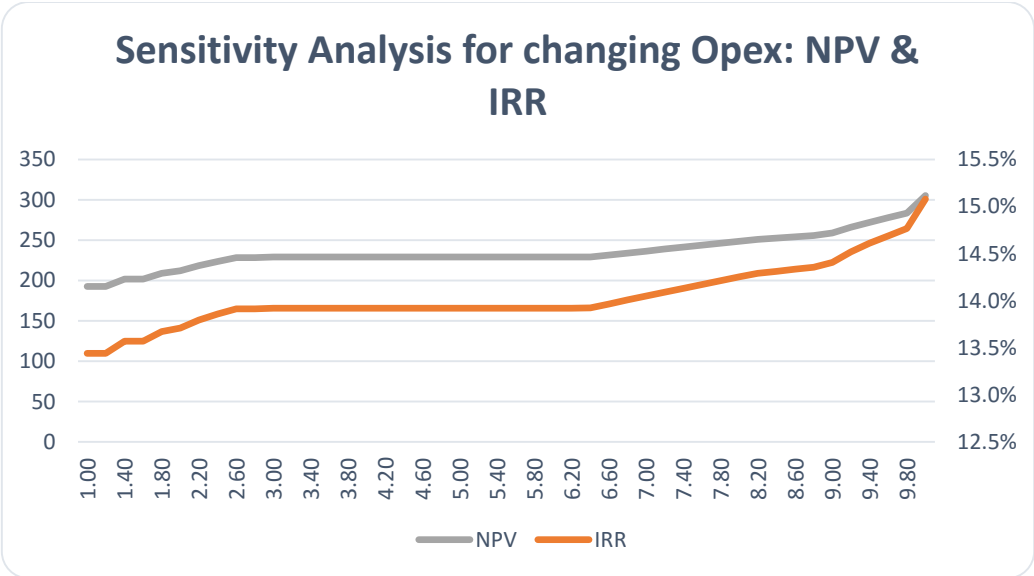


The preliminary simulation results show that fiscal regime is progressive and the IRR of the oil company will not exceed a certain percentage even in high oil

prices. However, the results suggest that the operator's share is higher compared to the buy back, even with the low oil prices.



In addition as it shown in below diagram, the results demonstrate that the contractor may benefit from the Gold Plating as the operator's IRR have direct relation with OPEX.



6- Conclusions

The analysis shows that the new contract is more favorable to the international investors and major oil companies compared to former buy back framework. However, still there are some pitfalls which should be addressed, for example the gold plating issue should be resolved by means of cost reduction measure or any other types of cost caps. The experiences of Mexico and some other East African countries such as Kenya which has recently updated their fiscal regime could be used in a comparative studies in the future. More importantly, the Iraq experience should be taken into account in the future studies as both countries have several similarities.

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