

may be regarded as a positive factor, at least some reservations can be made. Thus pursuit of cost consciousness may result in the contractor employing technologies which are very "fried and trusted" because they give him comfort with respect to both their performance and costs. He will feel that there are less risks attached with respect to overall costs and completion time if this course of action is pursued.

The result may be that the employment of innovatory technologies is not encouraged. These may well be riskier (because they have not been widely employed), but they could also be more likely to enhance productivity, reflected in higher production rates and/or overall field recovery.

### **c) Exploration**

As noted above Production Sharing Contracts can generally encourage exploration, at least within the contract area. They are also very suitable for employment in situations where new exploration acreage is being offered. Typical Buy Back Contracts are not really designed with this situation in mind.

### **Conclusions**

Both Production Sharing and Buy Back Contracts can generally accommodate the state's requirements to maintain title to the mineral rights and to obtain ownership of the physical facilities installed to produce the

oil. Under both forms of agreement the investor has the status of a contractor. Both forms of agreement can readily allow the host Government and its agent to have the desired control over the development and production activities.

With respect to development cost and completion risks under a typical Production Sharing Contract these are shared between the two parties in accordance with the cost recovery and profit oil sharing terms. The contractor will bear a significant share of the risks in present value terms. The cost recovery ceiling plays a key role. The presence of uplift on investment costs or interest on unrecovered costs reduces the contractor's risks. Under a Buy Back Contract the development cost risks are essentially borne by the investor. The completion time risks are shared, but the investor bears a high proportion in present value terms.

Under a typical Production Sharing Contract reserves and production risks are shared between the two parties. The contractor's share of the risks is high in present value terms. The state's share can be high in absolute terms, especially if the profit oil sharing is progressively related to production (cumulative or quarterly). Under a Buy Back Contract these risks are also shared. The state's absolute return over the whole lifetime of the field is highly geared to the reserves recovered. The contractor's production risk in the early years of field life,

and in present value terms could be substantial.

Under a typical Production Sharing contract the oil price risk is shared between the two parties such that the contractor is highly exposed in present value terms. The state's absolute return will be highly price sensitive, especially under agreements where the profit oil share is related to the achieved rate of return.

With respect to other incentives, in a typical Production Sharing Contract the investor will have an incentive to introduce a development plan which maximises overall economic recovery. The contract lasts for the life of the field. Normally there will be adequate incentives to appraise and develop satellites of an existing main field. Consistent with this there will usually be incentives to introduce innovatory technologies. Where these are felt to be risky the presence of uplift on investment costs or interest on unrecovered costs reduces the risks involved.

In a typical Buy Back Contract the attention of the contractor will not be geared to maximisation of overall recovery. The contract will have terminated before the field is economically depleted. He will not have a strong incentive to introduce a field development plan which maximises overall economic recovery. He will be primarily interested in production during the early years of the life of the field.

A priority of the contractor will be cost control. While this is generally desirable it may mean that the introduction of innovatory technologies, where the cost and completion data risks are higher, is inhibited. In turn this may mean that productivity (daily output and overall recovery) is not maximised.

Production Sharing Contracts are suitable for use in situations where new exploration acreage is on offer. Buy Back Contracts are not designed with this in mind. ■

accordance with the cost recovery and profit oil sharing terms. If the oil price increases less oil is required for cost recovery and more is available for profit oil sharing. Both parties then gain in accordance with the profit oil sharing terms. The investor will achieve payback more quickly and his return in present value terms increases. There is generally a symmetrical effect with respect to oil price falls. More oil is required for cost recovery purposes and so less is available for profit oil sharing. The contractor's return in present value terms falls. In contracts where there is an uplift on costs or interest on unrecovered costs for cost recovery purposes the investor is given some protection from the risks.

Under a Buy Back Contract the state bears the greatest share of the price risk. Oil price increases and decreases directly impact on the state's revenues. The contractor may bear a small element of price risk. In the event of a price fall the share of the production revenues received to pay for cost reimbursement and remuneration fee could fall below his entitlement under the agreement.

#### **f) Decommissioning**

In modern Production Sharing Agreements decommissioning costs are shared between the two parties primarily in accordance with cost recovery conditions. In modern agreements it is commonly specified that, after a specified proportion of the initial recoverable resource have been produced, provisions for (future) decommissioning costs are made and allowed as cost recoverable. This has implications for the amount of profit oil available for sharing. In many agreements the provisions have to be placed in an Escrow Account.

Under a Buy Back Contract the state (or its agent) will assume all the decommissioning risks. The contract with the investor will have been terminated and the latter's responsibilities will have ended.

### **Other Comparative Incentive Effects**

#### **a) Field Economic Recovery**

Under a typical Production Sharing Contract the contractor is generally given encouragement to maximise field economic recovery through the cost recovery and profit sharing terms. Normally there will be adequate incentives at the initial field development stage to ensure that the contractor employs a producing system with this in mind. The knowledge that the contract will last for the full life of the field encourages the investor to take a long-term view.

The only constraints could be where the cost recovery ceiling is relatively low and unrecovered investment costs have to be carried forward for a long time. This issue would be more marked if a low cost recovery ceiling were combined with a lack of uplift or interest on unrecovered costs.

In the later years of the life of the contract the issue arises of incentives to explore for and develop satellite deposits in the vicinity of the main field. If the terms of the agreement are on a contract area basis there will generally be adequate incentives. This will normally apply with cost recovery conditions. Only in circumstances where the state's share of the additional revenues is extremely high (for example, if the profit oil sharing terms are based on cumulative production) could disincentives apply.

Under a typical Buy Back Contract the investor will not be involved for the whole lifetime of the field. There is a danger that the contractor will not emphasise a development plan with maximum economic recovery in mind. The incentive will be to emphasise a development concept which brings relatively early and assured production, possibly even at the expense of overall recovery. By the later years of the life of the field the contract is likely to have terminated, and the investor will not have any interest in developing satellites of the

**In a typical buy Back Contract  
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main field, for example. Similarly, he will not be interested in ongoing exploration where the fruits of that effort due would not accrue until after the contract had terminated.

#### **b) Cost Consciousness**

The majority of Production Sharing Contracts incorporate terms which reward cost consciousness. Reducing the investment and operating costs increases the amount of profit oil available for sharing. In some contracts, however, "gold plating" incentives are introduced. This can arise in situations where the profit oil sharing is based on the contractor's achieved rate of return, and where the scheme involves several progressive tiers of threshold rates and related profit oil shares accruing to the state. Where the state's share increases to very high levels as the achieved rate of return increases there can be an incentive on the investor to increase his expenditures to prevent him entering a higher profit oil sharing tier. (In this respect it should be noted that any increase in the state's share applies to all of the profit oil). This effect would be more likely if a substantial uplift on investment costs were permitted for cost recovery purposes, along with a system of steeply increasing profit oil shares accruing to the state.

Under a Buy Back Contract the investor has a very strong incentive to control costs. In fact, from his perspective this is likely to be the dominant incentive effect in the whole contract terms. While in general terms this

## **Under a Buy Back Contract, cost control is likely the investor's dominant incentive in the whole contract**

parties in accordance with both the cost recovery and profit oil sharing terms. If recoverable reserves turn out to be less than expected this may be manifested in lower production rates from the beginning of project life. In that event the overall investment cost recovery period may well be extended and there will be less profit oil available to share. While both parties share in the reduced wealth the contractor's return in present value terms will suffer relatively more as he has incurred the front-end costs. The state may lose more in absolute terms over the life of the field, especially if its profit share were directly and progressively related to the size of the field (for example, via cumulative production). Similarly the state may lose absolutely more if the contract relates its profit oil share to the achieved rate of return or to an R-Factor schedule which in turn closely relate to the size of recoverable reserves.

The precise cost recovery time also has an effect on the ultimate risk-sharing. Thus if there is an uplift on investment costs available for cost recovery purposes the additional protection which the contractor receives reduces further the oil available for profit-sharing purposes to the disadvantage of the state. A similar effect emerges in contracts where there is interest available on unrecovered costs carried forward. Both these devices reduce the volume of profit oil. The state's position with respect to profit oil is protected by the ceiling on the share of production available for cost recovery.

In general there is symmetry in the

effects with respect to an increase in recoverable reserves above those expected compared to a shortfall. The contractor will feel the benefit strongly in his return in present value terms through the acceleration of the timing of overall investment cost recovery. The state could gain absolutely more through reserves augmentation, particularly if the profit oil sharing terms were progressively linked to production (especially cumulative production), or if the profit oil sharing terms were related to the project rate of return, and the size of reserves was in turn directly linked to the project rate of return.

Under a Buy Back Contract the contractor generally bears substantial reserves risk in the early part of field life. If these turn out to be less than expected the result in an adverse case could be to slow down the rate at which he recovers his investment outlay, given the ceiling on the proportion of production available for payments to him. In a very adverse situation (for example, in combination with low oil prices, the period of amortization might be reached before he had recovered all his agreed costs and received all his remuneration fee.

There is also a reserves risk borne by the state. The state's share of revenues throughout the life of the field depends on the size of recoverable reserves. After the contract with the investor reaches termination all the reserves risks are clearly left with the state.

### **c) Production Risks**

In general the risk-sharing features broadly follow that for reserves and so are not discussed here in detail. In many Production Sharing Contracts the state's share of profit oil is progressively related to production levels. Thus in absolute terms the state can bear a substantial share of the production risks. The contractor's ability to recover his costs is constrained by the production level. This means that his production risks are very substantial with

respect to his return defined in present value terms.

Under a Buy Back Contract the production risks broadly correspond to those relating to reserves. From the contractor's viewpoint the production performance in the early years is obviously of critical importance as this determines the revenues for cost reimbursement and remuneration fee. State revenues depend on production throughout the life of the field. In the decline years when the contract with the investor is terminated the production risks are fully borne by the state.

### **d) Operating Cost Risk**

Under a Production Sharing Contract the operating cost risks are shared primarily according to the cost recovery provisions. The cost recovery ceiling is an important element. Frequently in such contracts operating costs are recoverable prior to investment expenditures. However, if there is an increase in operating costs above expected levels the result could be that the combined costs in any period (normally quarter) would exceed the cost recovery ceiling. This ceiling gives protection to the state's revenues. Both parties share in the reduction in the overall amount of profit oil stemming from any cost increase. In late field life when production is small a very low cost recovery ceiling could mean that the contractor cannot recover all his operating costs.

Under a typical Buy Back Contract the operating cost risks are primarily borne by the contractor. His revenues for cost reimbursement and remuneration fee are fixed in the contract and overruns are essentially his responsibility. The state (or its agent) assumes full responsibility for operating costs and their consequences for state revenues after the contract has been terminated.

### **e) Oil Price Risks**

Under a Production Sharing Contract oil price risks are shared between the parties in

features. Thus the foreign oil investor is clearly a contractor under both types of agreement. Thus the host Government retains full title to oil in the ground throughout the life of the contract. Further the host Government, or its agent the national oil company, can obtain title to the equipment and facilities invested in the project. In a Production Sharing Contract the timing and details relating to this transfer of title varies from country to country but the principle is well established.

### **Comparative Risk-Sharing Features of the Two Types of Contracts**

In discussions of contractual terms attention is most often focussed on the Government take and post-tax returns under a set of specified assumptions regarding reserves, production, investment and operation costs, and oil prices. The specific terms of contracts obviously play a central role in determining the level of take. Discussion of specific terms is beyond the scope of this paper. In the assessment of contract terms the incentive and risk-sharing attributes are of major importance and these are discussed here. Buy Back Contracts in Iran have generally applied to discovered projects and so exploration risks are not discussed in this section.

#### **a) Development Risks**

At the field development phase the main risks are (1) cost and (2) completion. Under Production Sharing Contracts these are shared between the investor and the state in accordance with the cost recovery terms. The ceiling on the share of production available for cost recovery is obviously important here. It can determine how quickly the investor recovers his costs. (In this context it is important to note that the investor will be assessing the project in present value terms). In contracts which contain an uplift on investment costs for cost recovery purposes there is clearly a further protection to the investor: in other words

the state shares more of the risks of cost increases. The ceiling on cost recovery on the other hand limits this exposure. In contracts which permit unrecovered costs to be carried forward with interest there is again cost risk protection to the investor which is also limited by the cost recovery ceiling. The cost recovery ceiling enables the state to receive some profit-oil payments relatively early in the project's life, but the presence of uplift or interest on unrecovered costs has the effect of postponing and reducing the amount of the profit-oil share receivable by the state.

With respect to cost savings at the field development phase there is generally a symmetry with cost increases. The benefits of cost savings will normally be shared in a similar manner.

Under a typical Buy Back Contract where there is an agreed investment cost the cost overrun risks are fully borne by the investor. This may have an incentive effect on the contractor to bid/negotiate a level of expenditure which provides him with some comfort to mitigate the downside risk. The development plan for the field may also be designed by the contractor in a manner which incorporates technology that is relatively low risk or "tried and trusted".

If cost reductions materialise both parties should benefit. The state in particular clearly benefits from the reduction in the cost reimbursement. The contractor should benefit in present value terms. He has a lower outlay. This should be recovered more readily within the constraints of the share of production revenues to which he is entitled. Similarly, the receipt of his remuneration fee can come earlier and with less risk attached to the timing.

Under a Production Sharing Contract development completion risks are shared between the two parties in accordance with the cost recovery terms discussed above. In many respects the risk-sharing features are similar and are not repeated here. Project completion delays postpone the first production and the receipt of the related

**In Buy Back Contracts,  
there is a danger that  
the contractor will not emphasise  
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maximum economic recovery in mind**

income. This effect is quite strong over the lifetime of a field because the income relating to each year is effectively postponed.

The (negative) effect of completion delay is relatively greater on the contractor, especially when measured in present value terms. He has incurred the investment expenditure, and the postponement of the recovery of his costs and as well as his share of profit oil can have a major effect on his net present value.

There is generally a symmetry in the effects of a reduction in the completion time. The contractor will tend to gain relatively more from this outcome.

Under a typical Buy Back Contract the completion delay risks are largely borne by the contractor. Postponement of the start-up date entails delays in the receipt of revenues to repay investment costs and in the remuneration fee.

Completion delays also adversely affect the position of the state. Its revenues are postponed. But as the state has not incurred direct outlays the effect calculated in present value terms is relatively less pronounced.

Correspondingly, early completion brings benefits to both parties. Again, the contractor gains relatively more, especially in present value terms, because he is more dependent on the early expenditures and revenues.

#### **b) Reserves Risk**

Under a Production Sharing Contract the reserves risk are shared between the two

## Host government retains full title to oil in the ground throughout the life of both the PS and BuyBack Contracts

adequate full-cycle returns.

### Key Elements of Production Sharing and Buy Back Contracts

#### a) Production Sharing Agreements

Under a Production Sharing Contract the private investor is a contractor who incurs the investment costs and risks. When petroleum is produced the oil is generally divided into cost oil and profit oil. The cost oil is available for the recovery of exploration, appraisal, development operating and decommissioning costs. The profit oil is divided between the host Government (or its agent) and the investor.

The precise cost recovery and profit-oil sharing terms have a major effect on the prospective returns and risks borne by the respective parties. The most common and simplest arrangement for cost recovery involves a ceiling on the proportion of production (gross revenues) available for this purpose. While a figure of 50% is common there are considerable variations around the world. Sometimes depreciation schedules for different categories of costs are specified. Sometimes the cost recovery ceiling varies with water depth (as a proxy for cost). In some contracts, such as in Angola, there is an uplift factor added to the investment cost which is also cost recoverable. The size of the uplift may vary with water depth, again as a proxy for cost. In some contracts (for example in China) interest is available on unrecovered costs carried forward. In a few

contracts interest on loans is allowed as a recoverable cost.

In modern Production Sharing Contracts the contractor has the obligation to undertake the field decommissioning work. Because the expenditures relating to that activity occur after production revenues have ceased there is a problem in ensuring that the costs involved are recoverable. In many modern contracts decommissioning provisions can be made during the life of the field. These may be alienated into a special Escrow Account. The provisions are defined as recoverable costs.

Profit oil sharing can take several forms. In the early contracts there was a flat-rate split between the host Government and the investor. Subsequently schemes whereby the state's share increased with production were introduced. In most the production in question is quarterly. In some the sharing was progressively related to cumulative production. In more recent contracts profit-oil sharing has been related to the contractor's achieved rate of return. In some countries, such as Angola, progressive schemes are common whereby the state's share increases as the contractor's achieved rate of return increases. Other profit-related schemes based on the R-Factor ratio have also become common. The R-Factor is in general the ratio of the contractor's accumulated revenues net any royalty, tax, and profit oil payments to date (numerator) to the contractor's accumulated costs to date (denominator). There are several variants. In some contracts operating costs are excluded from the calculation. (Their inclusion means that in the decline phase of a field the R-Factor can fall significantly with the result that profit-oil payments to the state decline substantially.

In some Production Sharing Contracts there are also conventional royalties (although these are conceptually inconsistent with such contracts). In many corporate profits tax is also payable by the contractor. In some the liability for this obligation is taken over by the national oil company with

such liability being taken into account in the determination of the profit shares.

Production Sharing Contracts generally contain many clauses dealing with all the issues outlined in Section 1. Thus regulations concerning the phasing of exploration, development and production will be stipulated. Similarly, rules regarding the disposal and pricing of oil, procurement, and the role of the national oil company will be established.

#### b) Buy Back Contracts

In the typical Buy Back Contract in Iran the contractor incurs all the investment and operating costs as agreed in the contract. These agreed costs are recoverable by the contractor up to a ceiling again agreed in the contract. The investment costs are recovered when 3 conditions have been met, namely (1) successful completion of the development activity, (2) acceptance of the field facilities by the National Iranian Oil Corporation (NIOC), and (3) the achievement of an agreed production level.

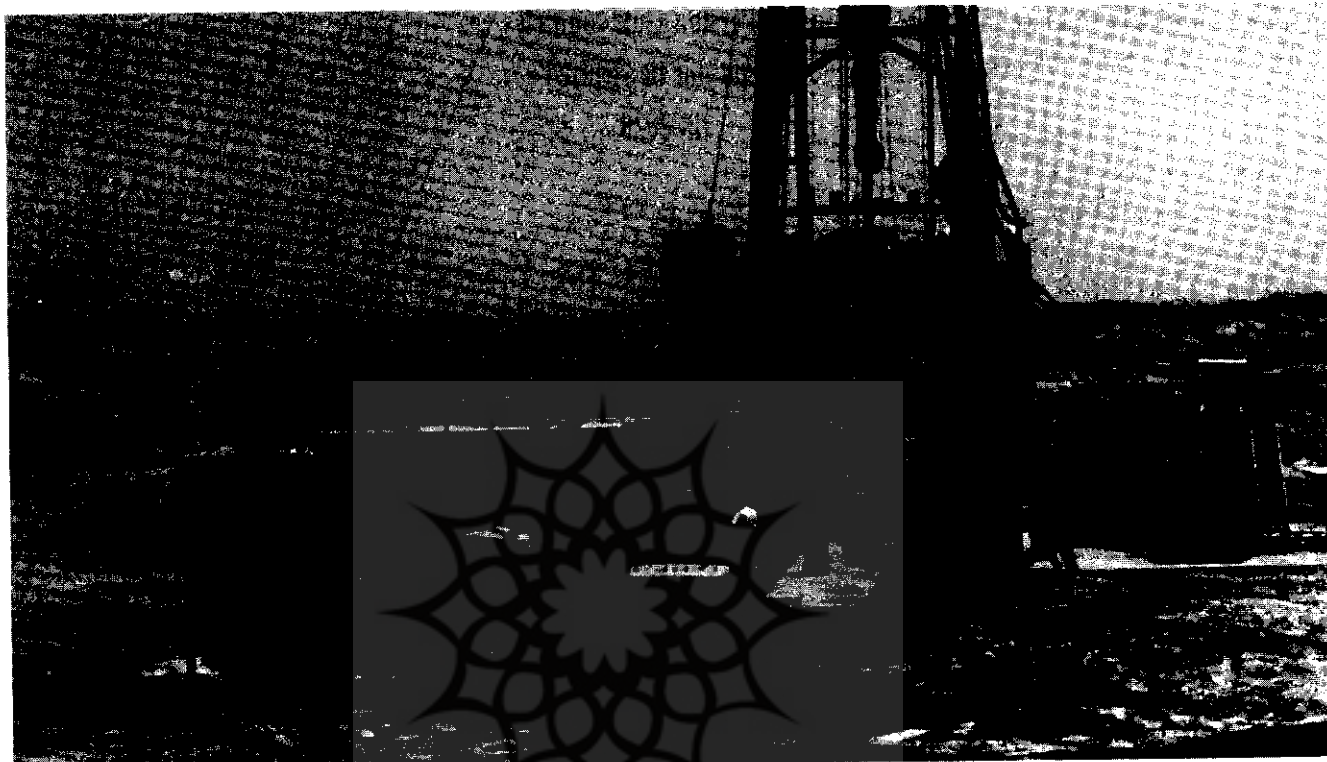
The contractor earns a remuneration fee. This is expressed in US dollars. Key requirements for the earning of the fee are again (1) the completion of the development activity and (2) the achievement of an agreed production level. In a typical agreement the contractor receives repayment of his investment expenditure, operating costs and related bank charges, plus his remuneration fee, from the revenues from the sale of petroleum from up to 60% of the production under long-term sales agreements.

NIOC is generally the operator during the production phase. The company has to produce in accordance with international standards to ensure adequate production for the repayment of the contractor's costs plus his remuneration fee.

### Common Features of Production Sharing and Buy Back Contracts

The two schemes have certain common

# A Comparison of Production Sharing and BuyBack Contracts from the Perspectives of Host Governments and Investors



Professor Alex Kemp

Department of Economics, University of Aberdeen, Scotland UK

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## Introduction - Basic Objectives of Parties

Production Sharing Contracts (PSCs) are now commonly employed in the upstream petroleum industry in many parts of the world. The Buy Back Contract has been developed principally in Iran. All such agreements need to be considered within the context of the basic objectives of the respective contracting parties. While the emphasis will vary considerably among both host Governments and investors there are some elements which commonly recur.

As far as Governments are concerned frequently stated objectives include (a) the

desire to obtain a substantial share of any economic rents, (b) some early and predictable revenues, (c) the ability to regulate/influence the pace of exploration, development and production, (d) influence over oil disposal (for security of supply reasons), (e) local ownership of the resource, (f) promotion of local procurement and employment, (g) appropriate risk-sharing through the contractual terms, and (h) (at least in some countries) the ability to influence prices.

Investors have a primary objective of making satisfactory profits from petroleum exploitation. They would ideally prefer as much freedom as possible with respect to

their exploration, development and production activities. They desire the freedom to dispose of petroleum without restriction. Similarly they prefer oil pricing to be at market values. They also prefer freedom to procure equipment and labour from sources of their own choice preferably at open market values. They will have many other preferences such as freedom to choose investment partners, convert currencies, and raise funds in the manner of their own choosing. They will certainly prefer legislative/regulatory stability over the period of the contract. They will generally prefer a profit-related tax and oil production sharing system, with the level leaving them with