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## ► To cite this version:

Sylvain Rossiaud. Opening the upstream oil industry to private companies: An analysis based on transaction cost economics. 2014. halshs-00960681

**HAL Id: halshs-00960681**

**<https://shs.hal.science/halshs-00960681>**

Preprint submitted on 18 Mar 2014

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**ÉCONOMIE DU DÉVELOPPEMENT DURABLE  
ET DE L'ÉNERGIE**

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**An analysis based  
on transaction cost economics**

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**Janvier 2014**

**Cahier de recherche EDDEN n° 2/2014**

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**Opening the upstream oil industry to private companies.  
An analysis based on transaction cost economics**

Sylvain Rossiaud<sup>1</sup>

January 2014

Abstract

Oil nationalism cycle reflects the difficulties encountered by oil states, international oil companies (IOCs) and national oil companies (NOCs) in establishing order over and above the conflicts in upstream oil transaction. By drawing on transaction cost theory, this article identifies the coordination problems and contractual hazards resulting from transaction and contributes to a better understanding of the different roles of an NOC in the governance of transaction. An NOC can complement or replace coordination through contractual arrangements. We therefore propose and discuss the hypothesis that the functional effectiveness of an oil governance structure depends on the consistency between the role of the NOC in this structure and the state's capacity to ensure effective regulation through contracts.

Key Words: Transaction Costs; Regulation; Oil Governance Structure; National Oil Companies.

JEL Classification: D23; L14; L33; Q38

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## 1. Introduction

In this article we examine the coordination mechanisms that might be used to stabilize relations between oil states, international oil companies (IOCs) and national oil companies (NOCs)<sup>2</sup> in the context of the transaction whereby the state opens its upstream oil industry to private operators. Given the current and forecast oil market configurations given in the IEA reports (2013), the present study is particularly pertinent. First, irrespective of the quantities of subsoil resources, the IEA reiterates that the main risk affecting oil supply security is lack of investment in exploration and production. The likely production profile will depend on above-ground factors, namely the institutional and organizational framework that will promote investment and enable subsoil resources to be transformed into proven reserves. Second, although NOCs control 80% of the world's probable and possible reserves, a large proportion of these reserves is being developed in cooperation with IOCs. In the short and medium term, technological challenges and the volume of capital that needs to be committed would suggest that cooperation is destined to continue between the three players (NOCs, IOCs and the state) in many producing countries, depending on specific needs (Mitchell et al., 2012).

However, this does not necessarily mean that the organizational and contractual framework of the upstream oil sector will readily adapt in response to financial and technological needs. First of all, in certain countries obstacles may get in the way of introducing the reforms seemingly needed for NOCs or IOCs to invest in the upstream oil sector. Kuwait, Mexico and Algeria are the most significant examples. Also, most importantly, when the upstream is opened to significant private investment, the three players are faced with difficulties adapting the governance of their transaction in a coordinated way. There is clear evidence of this in what has been called the millennium wave of oil nationalism observed since the mid-2000s (Stevens, 2008; Cameron, 2010; Bremmer and Johnston, 2009). This has involved unilateral and often conflictual action on the part of states to change the organizational and contractual conditions put in place during the periods when the oil upstream was opened to private companies. What states have tried to do is give (or give back) a central role to the national oil company and re-examine the contractual arrangements for sharing the oil revenues following oil price rises. In this respect, the examples of Russia, Kazakhstan, Venezuela and Bolivia are often highlighted (Domjan and Stone, 2010; Vivoda, 2009).

Here we attempt to shed light on the problems faced by the three players in the upstream oil sector when stabilizing their relations in the context of the transaction to open the upstream to private companies. To do this, we use the theoretical framework of transaction cost economics (TCE) (Williamson, 2010; Gibbons, 2010; Williamson, 2005; Ménard, 2005). TCE focuses on the comparative study of governance structures - that is to say the organizational and contractual arrangements that provide the framework for the transaction - and their different capacities to instil order over and above conflicts and, more specifically, create conditions in which governance can be effectively adapted to economic and technological changes (Williamson, 2005).

In the present article, we look essentially at hybrid governance structures in the oil industry. Structures of this kind are characterized by mixed property rights over assets where

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<sup>2</sup> Note that we are aware that the terms NOC and IOC group together a variety of players. First of all, the term International National Oil Companies (INOCs) tends to blur the distinction between these two types of players. INOCs are public companies that develop internationalization strategies in both the upstream and downstream oil industry sectors. Furthermore, we include in IOCs private independent oil companies as well as oilfield service companies that are in competition with the majors for gaining access to resources (Mitchell et al., 2012).

one or more public oil companies operate in competition/cooperation with private firms. This type of structure is positioned midway along the spectrum, between a liberal governance structure at one extreme and a hierarchical structure at the other<sup>3</sup>. In the case of a liberal governance structure only private companies compete for access to subsoil resources. Coordination between these private companies and the state takes place through oil contracts (licences or production sharing agreements, oil taxation, stabilization clauses). Modes of organization of this kind are rarely observed today. In the case of a hierarchical governance structure the NOC has a monopoly over upstream oil industry operations. Since the public company is in a position of subordination with respect to the state, coordination takes place essentially through command and control. This type of organizational framework for transactions was introduced in the oil-producing Middle Eastern states following the nationalization wave of the 1970s.

An analysis in the framework of TCE yields the following three results. First, it enables us to identify coordination problems relating to the transaction to open the upstream oil sector. These problems underpin interactions between state and private companies and concern three main issues, namely the intensity of exploration of oil provinces, the depletion rates of proven reserves, and the sharing of oil revenues. Furthermore, the transaction involves significant *ex post* transaction costs, notably monitoring costs and adaptation costs.

Second, we are able to shed light on the part the NOC plays in the governance of the transaction. With a hybrid governance structure NOCs can replace or complement coordination through contractual arrangements. In particular, we will show that the NOC can help relieve the considerable tension underlying coordination by contracts in transaction governance: contractual arrangements enabling the state to structure the incentives of IOCs *ex ante* are accompanied by an increase in monitoring and adaptation costs *ex post* to the signature of the contract. By ensuring the redistribution of information on behalf of the state, the NOC can help reduce these *ex post* costs and ensure the effectiveness of *ex ante* contractual arrangements.

Third, a TCE approach serves to show that the viability of a hybrid governance structure depends on the consistency between the position and roles of the NOC in the structure and the state's capacity to regulate through contracts. In fact, from the state's point of view, the main risk is that of a reversal of governance (Noreng, 2010) which manifests itself in opportunist behaviour on the part of the public company. This could limit the effectiveness of the public company's coordination role. There must therefore be trade-offs with regard to the NOC's position in the governance structure. These concern in particular the competitive framework in which the NOC operates and its budgetary and operational autonomy with respect to the state. The responses to these trade-offs determine the relative importance of the different roles of the NOC as a substitute for or complement to regulation through contracts, on the one hand, and the degree of risk of the governance structure being reversed, on the other. Depending on these responses, the hybrid structure will align itself more with a liberal structure, or, alternatively, with a hierarchical structure.

Our study is presented as follows. First, we look at the key characteristics of the transaction involved in opening upstream oil to private companies (2). Next, we identify the ways in which NOCs can replace or complement coordination by contracts. We also look at the drawbacks of hybrid governance structures (3). We are then able to discuss the idea that

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<sup>3</sup> A fourth configuration may also be identified, namely the one found in the US, which recognizes private property rights over subsoil resources (Dietsche, 2013). We focus on governance structures in countries where the subsoil resources are state-owned.

the viability of opening upstream oil to private companies depends on the consistency between the NOC's position in the governance structure and the state's capacity with respect to regulation through contracts (4). Our conclusions are presented in the final part (5).

## **2. Key features of the transaction to open the upstream oil sector to private companies**

First we look at the problems of coordination and the transaction costs stemming from the transaction. In this regard, it is important to examine the property rights over subsoil resources that are transferred in the context of the transaction (Schlager and Ostrom, 1992). The bundle of rights shapes the incentives that influence the way companies manage the resources. By analysing these incentives we can identify areas of conflict/cooperation between the state and private companies. The transaction is characterized by substantial attenuation of the rights over the resources that are transferred to private operators. As a result, problems of coordination between players are focussed on three main areas: exploration rates, the depletion rate of reserves, and the way in which oil revenues are shared. As regards transaction costs, the interplay between the potential opportunism of players, the specificity of the assets involved and the uncertainty surrounding the transaction gives rise to significant *ex post* monitoring and adaptation costs.

### *2.1. Attenuation of property rights over subsoil resources*

The concept of attenuation is central to the literature on property rights economics (Furubotn and Pejovich, 1972; Barzel, 1997). Attenuation of rights may have a number of forms (Demsetz, 1998). However, generally speaking, it refers to an arrangement that is characterized by poorly defined or insecure property rights. Property rights economics tries to identify the ways in which the different forms of attenuation affect the behaviour of individuals in terms of asset management (Libecap, 2002). As regards the transaction to open the upstream oil sector, we can highlight three forms of attenuation of rights over oil resources that affect the behaviour of companies in charge of upstream oil operations.

The first form relates to the incomplete nature of the rights over subsoil resources that are transferred to companies. In fact, operators acquire rights to use the resources but they do not own them. Subsoil resources remain the property of the state<sup>4</sup>. As a result, operators have the incentive to manage the reserves so that they maximize the return on their assets, rather than considering the intertemporal value of the subsoil resources. The second form of attenuation refers to the temporary nature of the access rights granted to companies. Consequently, companies are encouraged to manage subsoil resources in such a way as to maximize the value of their assets and to do this within the time horizon determined legally in the contract. The third form of attenuation concerns the potentially insecure nature of access rights transferred to the companies. Oil contracts are agreements with the state, and these contracts are founded on the state's permanent sovereignty over natural resources. This means that the state can always use its legislative or administrative power to change the rules of the game. Consequently "governmental opportunism", the contractual hazard highlighted by Spiller (2011; 2013) in his analysis of infrastructure liberalization policies, is also an important aspect of the transaction to open up the upstream oil sector. Such opportunism on

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<sup>4</sup> There are two main legal regimes associated with opening the upstream oil industry to the private sector, namely licences and production sharing agreements (PSA). The two regimes differ concerning the time of transfer of ownership of the oil produced. In the case of licences, operators become owners of the oil "at the well head". But the operators also have the right to book reserves. This is why companies might prefer licences rather than production sharing agreements. With PSAs, operators are not allowed to book subsoil reserves. Furthermore, operators own only the percentage of production agreed upon with the state or the public company when the contract is signed (Tordo et al., 2010).

the part of governments is discussed by Adelman, in the context of petroleum economics, under the concept of the “great divide” (Adelman, 1972). It characterizes the discovery of profitable oil reserves in a province or an increase in oil prices. Such events act as a particularly strong incentive for the state to implement expropriation or quasi-expropriation measures (Warshaw, 2012; Guriev et al., 2011). This aspect of the transaction provides food for thought on the credibility of a state’s contractual commitments.

## 2.2. *The area of conflict-cooperation between the state and private oil companies*

On the basis of the incentive structure determined by the different forms of attenuation of property rights over resources, it is possible to identify areas of conflict and cooperation between the state and private companies that underpin the transaction.

The first point concerns the rate of exploration of an oil province. Generally speaking, the transaction is supported by a convergence of interests between the state and private companies, with the former seeking to benefit from the technological and financial capabilities of the latter. Nevertheless, one cannot discount the idea that companies might adopt a wait-and-see approach, or engage in under-exploration, that is to say exploration within existing oil fields. Indeed, from a private company’s point of view, the risk of expropriation, - or quasi-expropriation - of its investments may encourage it to reduce its exposure to the *ex post* opportunism of the state, in particular by reducing the degree of specificity of their investments<sup>5</sup>.

The rate of depletion of proven reserves is the second potential point of conflict between parties. Depletion rates preferred by states may differ from those preferred by private companies. The incentive is for companies to extract oil so as to maximize their assets within the legal time frame of their access rights. A faster depletion rate would therefore suit them best. This could pose problems for the state. The severity of the conflict will depend on the time horizon chosen by the state in accordance with its macro-economic interests and the estimated volume of its subsoil resources (Stevens and Mitchell, 2008). Aside from the issue of attenuation of property rights, it should be noted that the particular cost structure of the oil industry also helps shape the behaviour of private companies, which tend to prefer strategies of rapid extraction. Investments are concentrated in the first phase of a project (Hannesson, 1998). Consequently, in order to get a good return on their investments companies must ensure that proven reserves are extracted rapidly.

The final area of conflict underpinning the transaction concerns how the rent is shared. The main problem is that it is impossible to define *ex ante* rules whereby the oil rent is shared in accordance with the respective rights of the state and the operators. As Adelman points out, fiscal devices defined *ex ante* in the contract can only be “a concession to ignorance” and “bargaining over rent, and the difficulty of measuring it and defining it in a law or contract to accommodate the unexpected, will last as long as the industry” (Adelman, 1995, p. 18).

A state that opens its upstream oil industry to private operators must be able to shape incentives to ensure that its own preferences are imposed (Stiglitz, 2007; Hernandez-Perez, 2011). This issue falls into the realm of agency theory. Adopting an approach based on transaction cost economics, however, provides broader insights into the problems of coordination.

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<sup>5</sup> For an analysis of the consequences of insecure property rights in terms of natural resource management, see Bohn and Deacon (2000) and Besley (1995).



### 2.3. *Ex post contracting costs and trade-offs in the governance of oil contracts*

While recognizing the importance of contractual arrangements as a means of structuring *ex ante* incentives of the players, TCE focuses its attention mainly on *ex post* transaction costs. Williamson (1996) maintains that *ex post* transaction costs result essentially from the need to monitor *ex post* the tasks of the parties involved in the transaction, as well as the need to adapt contractual arrangements in the face of uncertainty. As to their relative importance, it should be remembered that this depends on the interplay between the specificity of the assets concerned, the uncertainty surrounding the transaction, the potentially opportunist behaviour of the players, and their bounded rationality.

A comparative analysis of oil contracts confirms an idea that is central in TCE-based analyses undertaken for other transactions: contractual arrangements that make it possible to shape incentives *ex ante* entail an *ex post* increase in transaction costs (Tadelis and Williamson, 2013; Bajari and Tadelis, 2001). More precisely, governance of oil contracts involves two principal trade-offs. The first concerns the existing tension between protecting companies' expectations through formal safeguard clauses and ensuring sufficient flexibility to allow coordinated adaptation among parties. The second concerns the increased *ex post* monitoring costs borne by the state to ensure the effectiveness of fiscal tools used to efficiently re-shape companies' incentives.

#### 2.3.1. *Trade-off between stability and flexibility*

As with all transactions involving highly specific assets and characterized by pervading uncertainty, governance of oil contracts faces the dilemma of flexibility versus stability. The highly specific nature of the assets creates a bilateral dependency between state and operators. Interaction between parties must be ongoing. Also, the non-strategic uncertainty surrounding the transaction – as opposed to the behavioural uncertainty stemming from the opportunist behaviour of the actors (Sutcliffe and Zaheer, 1998) – creates a need for adaptation in the contract terms defined *ex ante*. The bounded rationality of the players means that it is impossible to draw up complete contracts. As illustrated by Adelman's statement quoted above, this need is particularly strong with respect to the fiscal measures governing the distribution of the rent. The state and the companies cannot agree *ex ante* how the revenues will be distributed *ex post*. Non-strategic uncertainty has both a geological aspect – the problem of determining the volume of exploitable reserves – and an economic one, namely the difficulty of estimating future production costs and variations in the market value of oil<sup>6</sup>.

But, as already discussed, strategic uncertainty resulting from government opportunism also makes relative stabilization of resource access conditions necessary. Otherwise, there is a substantial risk of companies reducing their investments in specific assets, possibly leading to under-investment and faster depletion of reserves. Oil contracts therefore require relational governance, governance that can evolve, and which must be able

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<sup>6</sup> The various types of uncertainty change according to how the players interact and as the "life cycle" of the oil province advances. Uncertainty surrounding the levels of reserves and production costs decreases as the companies, and potentially the state, go through a learning process. This is termed endogenous uncertainty, over which the parties have a certain influence. On the other hand, changes in crude prices are considered an exogenous uncertainty (Folta, 1998). Another way of looking at uncertainty is proposed by Carson et al. (2006) who make the distinction between volatility and ambiguity. Volatility refers to the rate and unpredictability of change in an environment over time, while ambiguity refers to differences in how players perceive the present environment. For us, this distinction is important when analysing oil sector transactions. For example, private companies may disagree with the state on the profitability of projects. Understanding the way in which the different transaction costs vary and relate to one another during the transaction is indeed a thorny issue and one that requires the introduction of a dynamic perspective (Ménard, 2013).

to reconcile two apparently conflicting needs, namely stability and evolution (Cattan, 1967).

The problem of stabilizing relations by means of safeguard clauses in contracts illustrates this dilemma. Safeguard clauses take the form of stabilization clauses negotiated between the parties and included in contracts, generally at the request of international oil companies (Wälde, 2008; Bernardini, 2008; Coale, 2002). Their justification is that they can protect against the potential *ex post* opportunist behaviour of the state. In fact, the idea is to tie the state's hands and bring it 'down from its sovereign pedestal' (Wälde, 1994, p. 24) in its relations with private companies. Such clauses were included in contracts governing traditional concessions in the first half of the 20<sup>th</sup> century then began to reappear at the end of the 1980s. It is not difficult to see the potentially perverse effect of such clauses, which might become an obstacle if it proves necessary to adapt the terms of the contract. If parties are obliged to adapt to non-strategic uncertainty, excessive procedural rigidity might encourage the state to make unilateral and conflictual adjustments (Spiller, 2011).

### 2.3.2. Trade-off between good incentives *ex ante* and increased monitoring costs *ex post*

Private companies might also engage in *ex post* opportunism. They have much easier access to information about geological conditions, future changes in production costs and even crude oil prices. Consequently the state is prepared to bear the cost of *ex post* monitoring of operators in order to guard against any potentially opportunistic behaviour on their part.

Thus far we have looked at the fiscal provisions that govern the distribution of the oil rent and also influence the ways in which companies manage their reserves. Another idea commonly discussed in comparative analyses of contractual arrangements conducted in the framework of TCE is that progressive taxes, which encourage companies not to neglect the geological potential of oil provinces, may also lead to the highest *ex post* monitoring costs for the state. Table 1 illustrates this tension. It is explained by comparing two types of fiscal instruments that can be used for sharing the oil rent: royalties, at one end of the spectrum, and a resource rent tax (RRT) at the other.

Royalties calculated at a fixed rate on a company's output are the most common arrangement for capturing oil rents. From the state's point of view, royalties makes it relatively easy to guard against opportunism from companies. In fact the state can simply monitor the output levels of the oil fields. Nevertheless, royalties are a regressive fiscal instrument; they can distort companies' investment decisions and their approach to managing reserves (Gillis, 1982; Boadway and Flatters, 1993; Heaps and Helliwell, 1985; Johnston, 2007). The reason is that these taxes on output do not respond to changes in the profitability of reserves resulting from variations in oil prices or production costs. The percentage of the rent captured by the state is thus inversely proportional to the profitability of the fields. Consequently, some fields could become unprofitable for a company. The same can be said of resources that are more difficult to extract in fields already under production.

The fiscal base for the RRT is the differential rent. The share captured by the state varies as a function of the profitability of investments and production (Garnaut and Clunies Ross, 1975). RRT is thus a progressive fiscal instrument. It does not act as an incentive for companies to disregard the geological potential of oil provinces. However, this type of fiscal arrangement entails increased monitoring costs for the state. Its effectiveness depends on the state's capability to monitor *ex post* not only output but also production costs and market prices of crude. Otherwise there is a huge risk of companies developing large-scale tax evasion strategies.

Table 1: Fiscal tools and *ex post* monitoring costs

| Type of fiscal arrangement                     | Monitoring of output | Monitoring of market prices | Monitoring of exploration and production costs | Impact on company incentives |
|--|----------------------|-----------------------------|--|------------------------------|
| <i>Royalties</i>                               |                      |                             |  |                              |
| . Fixed rate on production                     | Necessary            | Not necessary               | Not necessary                                  | Regressive                   |
| . Fixed rate on value of production            | Necessary            | Necessary                   | Not necessary                                  | Regressive                   |
| . Sliding scale according to production volume | Necessary            | Not necessary               | Not necessary                                  | Neutral                      |
| Bonus  | Not necessary        | Not necessary               | Not necessary                                  | Regressive                   |
| Export duty                                    | Necessary            | Not necessary               | Not necessary                                  | Regressive                   |
| Fixed rate on profits                          | Necessary            | Necessary                   | Necessary                                      | Neutral                      |
| Resource Rent Tax                              | Necessary            | Necessary                   | Necessary                                      | Progressive                  |

### 3. Role of national oil companies in a hybrid oil governance structure

Given the specific features of the transaction of opening up upstream oil, what are the relative strengths and weaknesses of a hybrid governance structure for enforcing order over and above situations of conflict? By a hybrid governance structure we mean an approach to organizing transactions characterized by mixed property rights over oil assets, with the public company competing and/or cooperating with private companies. Furthermore, compared with liberal or hierarchical governance structures, the distinctive feature of hybrid governance is that national oil companies can act as a replacement and a complement for coordination by contracts. However, the drawback of this type of organization is that it reduces incentives intensity and its viability is fragile regarding the risk of opportunistic behaviour by NOCs.

#### 3.1. National oil companies as a replacement for coordination by contracts

Two types of mechanism enable an NOC to act as a replacement for coordination by contracts. The first is due to the fact that the presence of an NOC in a consortium makes it possible to set up coordination by command, thanks to which the state imposes its preferences for the exploration and depletion rates of proven reserves. From the state's point of view coordination by command may also take the place of oil-rent capture by means of the tax regime. This may be achieved primarily in two ways. In some cases the company's budget is fully integrated in the state budget; alternatively dividends may be paid straight to the state as the owner of the company.

A publicly owned company may act as a replacement for a contract in another way: various coordination issues may be eliminated by making the NOC an operator in the consortium. In particular the spontaneous incentives induced by public ownership may extend the timescale during which the company receives incentives to define its strategy for managing subsoil resources. As a result there is less need for the state, which operates in a long-term perspective, to re-shape incentives. Marcel (2006) notes that the managers of NOCs are fully aware that the motives of international oil companies are fundamentally different from theirs. The author stresses that NOCs are also more inclined to agree to maintaining available but unused production capacity than their international counterparts. Comparative

studies of the depletion strategies deployed by the two types of player demonstrate clearly that NOCs adopt more conservative depletion policies<sup>7</sup>.

### *3.2. National oil companies as a complement to the contract: managing uncertainty and player opportunism*

Contracting costs, analysed above, reveal the need to enforce flexible governance to achieve coordinated adaptation. Yet flexible governance may be undermined by opportunistic behaviour on the part of both the state and the private sector. What are the relative advantages of hybrid oil governance to resolve this dilemma? Two forms of response are possible, originating in the redistribution of information to the advantage of the state made possible by an NOC belonging to a consortium.

#### *3.2.1. National oil companies as a means of increasing the credibility of state commitments*

The information captured by the state may change its incentives to intervene *ex post* in a way which may be seen as expropriation or quasi-expropriation. If the state is in a position to guard against opportunistic behaviour by private companies, it will be more inclined to agree to any *ex post* negotiations that may prove necessary to deal with non-strategic uncertainty. The state may engage in a learning process, potentially curtailing the conflict-ridden and discretionary re-negotiation processes likely to be observed at the start of its relations with private companies. An NOC may thus be seen as an organizational enforcement mechanism (Hadfield, 2005) for boosting the credibility of state commitment. The change in the incentives at work on the state may consequently contribute to altering the beliefs of private companies regarding the credible commitment of the state, possibly prompting private companies to change their approach to exploration and production accordingly. Relying on the “equilibrium view” of institutions (Aoki, 2001; Greif, 2005), the NOC, as a new player, may trigger a change in the self-enforcing beliefs and behaviours of the others players (IOCs and state).

So the presence of an NOC in a consortium may enable the state to achieve the right balance between stabilizing private sector expectations, while securing a degree of flexibility sufficient to adapt the terms of the contract *ex post*. According to this rationale the public company may act as a non-legal enforcement mechanism (Katz, 2008) operating as substitute for legal provisions designed to tie the state’s hands. Consistent with this line of thinking, another aspect of this argument is to see the public company as a complement to the application of a contract that is sufficiently flexible to provide for adaptable governance. The nature of the contracts moves from a rigid procedural regime to a self-enforcing relational contract.

#### *3.2.2. National oil companies and the rising effectiveness of coordination by taxation*

If the NOC is in a position to enable a change in the procedural nature of contracts, it may also be able to change their substance and effectiveness. In this respect we would endorse the approach advocated by Poppo and Zenger (2002) regarding scope for complementarity between relational governance and formal contracts. The reduction in *ex post* monitoring costs obtained thanks to the NOC allows greater flexibility to be introduced to the fiscal regime without weakening the state’s position with regard to *ex post* opportunistic strategies deployed by the consortium. This reduction in the information gap (Mommer, 2002, Stevens, 2008) may be achieved directly if the NOC is represented in all the consortiums in

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<sup>7</sup> We should cite the work of Wolf (2009), who underlines that the rate of production on reserves under the control of private companies is 61%. The same rate ranges from 4% to 6% for NOCs in non-Opec countries and from 2% and 9% for Opec NOCs.

charge of upstream oil operations. The same effect may be obtained indirectly through the benchmarking role which may devolve to the public company. A comparison of the rate of return on investments in oil or gas fields operated by the NOC with private-sector operations in the same province may enable the state to capture information and introduce a degree of flexibility in the tax regime. The public oil company thus remains a vector for reducing the information gap. This reduction in information asymmetry and *ex post* monitoring costs may thus be a significant condition for making tax-based regulation effective.

### *3.3. The disadvantages of a hybrid governance structure*

All governance structures are flawed (Williamson, 2005). According to Noreng: ‘National oil companies appear at first as a solution, as a response to an initial market failure and, subsequently, as a problem, that is a new market failure.’ (Noreng, 2010, p. 80; Boscheck, 2007). What then are the disadvantages of a hybrid governance structure? A summary of the literature on NOCs leads us to focus analysis on two debates: the first one addresses the poor operational efficiency of NOCs (Al Obaidan and Scully, 1991; Wolf, 2009; Toft and Duero, 2011); the second explores the phenomenon of reverse governance (Noreng, 2010; Hults, 2012). This is reflected in the difficulties the state encounters in effectively monitoring the public company and making it really fulfil its role as a complement and substitute for coordination by contracts.

#### *3.3.1. The pros and cons of reducing incentive intensity*

In the generic approach to analysing governance structures developed by Williamson (1996), reducing incentive intensity goes hand-in-hand with the switch from market to hybrid governance, and thence to hierarchical governance. With a market framework each technologically separable stage receives the residual income from the asset it controls. In contrast, unified ownership involves dilution, for each unit, between the right of control and the right to income. Tadelis and Williamson (2013) then pointed out that this loss of incentive intensity does not constitute an involuntary consequence of unified ownership. On the contrary it is the goal that is sought, in so far as it allows a cooperative response to the needs of adaptation. By analogy, we should bear in mind that the specific incentive structure induced by public ownership may also be seen as the goal of hybrid oil governance and to an even greater extent of hierarchical governance. The elimination of certain coordination issues made possible by the presence of an NOC requires the incentive structure of public ownership. In so far as NOCs have no incentive to maximize the stock-market value of their assets, they tend to adopt more conservative policies for depleting reserves, which may lead to a greater convergence of interests with states with a long-term perspective.

Reducing incentive intensity may nevertheless impair operational efficiency. The mechanisms likely to be identified in order to support this claim are based, implicitly or explicitly, on the theory of corporate governance. Separating the residual right of control from the residual right to income means that management enjoys discretionary powers to define corporate strategy. It also means it is exposed to incentives other than maximizing profit. For many authors, the drawback of public rather than private ownership is its poor response to these two problems of agency<sup>8</sup>.

Firstly, in so far as ownership is diluted among the whole population or, at the very least, the various ministries, and policy-makers do not lay claim to residual income, there is a problem of collective action to define incentive contracts to direct the management of companies and monitor their operations. In contrast with the management of private

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<sup>8</sup> For a summary of the literature, see Shleifer and Vishny (1997), Shirley and Walsh (2001) and for its application to NOCs, see Hartley and Medlock III (2008).

companies, their public-sector counterparts are not subject to the control of a group of shareholders, with an interest in maximizing the value of assets. They consequently enjoy greater latitude for discretionary behaviour (Noreng, 1996).

Secondly, the dilution of ownership rights may result in the proprietors setting a wide range of goals for the management of public companies. This tends to blur the criteria available to the state for gauging the performance of companies and, in the same way, for defining incentive contracts and exercising adequate supervision over the management of public companies (Shirley and Lixin, 1998).

Lastly, in so far as policy-makers do not attempt to stake a claim to residual income, the goals they are likely to set for a public company may run counter to productive efficiency. In this respect attention is often drawn to the over-manning characteristic of public companies and the ‘soft budgetary constraint’ (Megginson and Netter, 2001) affecting them. In the specific case of NOCs we may add the importance of national missions (supplying the home market at subsidized prices, investments outside the hydrocarbons industry) often allocated to them by their management. NOCs are a key component in the policy of rent redistribution which underpins the legitimacy of rentier states (Losman, 2010; Jones Luong and Weinthal, 2010).

### *3.3.2. The problem of reverse governance and the constrain to maintain stability*

The second problem which may arise in a hybrid governance structure is that the NOC may turn against the state (Stevens, 2008; Noreng, 2010; Hults, 2012). The issue of inadequate monitoring is obviously important, for it significantly reduces the effectiveness of the roles of replacement and complement for coordination by contracts supposedly fulfilled by the NOC. Coordination by hierarchy may become difficult. Furthermore, if the public company embarks on a strategy of retaining information from the authorities, it may undermine the mechanisms discussed above which enable it to fulfil its role as a complement for coordination by contracts. It may impede the mechanism by which the state gains a better grasp of scope for regulation by contract.

The NOC may turn against the state in various ways. In one instance the NOC tends ‘to align with the goals and operations of the private sector’ (Noreng, 1996, p. 198). To this end it starts retaining information as part of a tax-evasion strategy. In addition it may adopt rapid-depletion policies. A second instance sees the emergence of a ‘state within the state’, taking the previous rationale one step further. The lack of state control over the public company combined with information and oil rent retention on the latter’s part position the public company as the organization determining the country’s depletion policy and the legal framework for transactions.

The example commonly cited to illustrate the two variations on this phenomenon is *Petróleos de Venezuela*, the Venezuelan national oil company, during the 1990s and the opening of upstream oil to private oil companies. PDVSA seems to have brought its interests and operations into line with those of the international companies, deploying information-retention and tax-evasion strategies (Rousseau, 2012; Mommer, 2002; Van der Linde, 2000). The authorities were unable to make PDVSA act as a complement for coordination by contract.

In view of the intrinsic strengths and weaknesses of hybrid governance structures, a shift in the nature of the dilemma regarding the governance of oil contracts in such structures seems likely. From the state’s point of view hybrid governance structures are torn between adequate monitoring of the NOC and coping with the problem of lower incentive intensity (Tordo et al., 2011). This brings us to another key idea highlighted in the work on transaction

cost economics, namely the difficulty of securing a viable configuration combining high incentive intensity and strong central control (Tadelis and Williamson, 2013).

#### 4. Horizontal trade-offs in hybrid governance structure

The advantage of the approach proposed here is that it offers a basis for context-sensitive analysis of the viable modalities for opening upstream oil to private companies. The normative recommendations which focus unilaterally on the relative efficiency of one or other contractual form (licences as against production sharing agreements, safeguard clauses or fiscal tools), or on the modalities of NOC reform (privatization, opening to competition) are subject to caution. A systemic analysis focusing on the interaction between the different parts seems necessary to understand the two emerging properties<sup>9</sup> of an oil governance structure: its effectiveness in coordination, on the one hand, and its adaptive capacity, on the other.

Analysis centring on the links between contracts and NOCs suggests that our attention should focus on how much importance should be attached to consistency between the place of the NOC in the structure and state capacity for regulation by contract at the time of opening. Adopting this point of view, states are faced with three trade-offs. The outcome determines the place of the NOC in the structure. It consequently also determines the relative respective weight of the two forms of coordination: NOC and contracts. Moreover, this outcome cannot take the same form in all countries. Allowance must also be made for the impact of the institutional environment on the relative effectiveness of oil governance structures. Finally, in so far as possible, analytical focus must take into account the adaptive capacity of the governance structure, i.e. its ability to cope and adapt to a dynamic and changing environment (Duit et al., 2010).

##### 4.1. Opening the capital of the public company to private investors

The first trade-off concerns the decision to allow private investors to take a share in the company. The aim is to focus management incentives on maximizing the value of assets and boosting operational efficiency (Hartley and Medlock, 2008). This necessarily entails two key concessions. First, partial privatization of the NOC may limit its capacity to act as a replacement for coordination by contracts. For example the timeframe may be shortened, or in other words the discount rate underpinning policy on depletion may increase. Second, partial privatization may offer the public company an additional incentive to bring its interests into line with its private-sector partners.

##### 4.2. Operational and budgetary framework for the public oil company

Drawing on the typology produced by the World Bank's Energy Sector Management Assistance Programme (ESMAP, 2007) and work by Hults (2012), we may distinguish three models for overseeing NOCs. In the first case such companies operate within a regulatory framework allowing them neither financial nor operational autonomy. Their budget is an integral part of the state budget and the authorities allocate funding, generally on an annual basis. This budget centralization usually goes hand-in-hand with *ex ante* state monitoring of operational decisions by the NOC. The importance of the role allocated to the NOC as a replacement for coordination by contracts is immediately apparent. There is no need for the state to define a specific fiscal regime in order to capture oil rent. Furthermore *ex ante* coordination by command entirely eliminates the need to direct the strategy of public companies by means of contractual provisions regarding exploration work and development plans. The prime examples of this configuration are Petróleos Mexicanos (Pemex) and its

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<sup>9</sup> Broadly defined, an emergent property is "the property of a system that is dependent upon the connective structure of the system's elements" (Harper and Lewis, 2012, p. 329)

counterparts in Kuwait and Yemen. Pemex is often cited as an illustration of the tensions which may arise in this budgetary and operational framework. Above all the company merely acts as a prop for public finance (Rousseau, 2012). Its lack of independence and resources may have acted as a constraint on Pemex when framing and deploying strategy for exploration and production.

In contrast, public oil companies may also operate in a commercial framework, in the sense that they enjoy substantial financial autonomy. In fiscal terms they are on the same footing as their private counterparts. They aim to make a profit, pay tax and distribute dividends. Such financial autonomy is often matched by operational freedom. State supervision of NOC operations is effected *ex post* through the approval of development plans. Between these two extremities an intermediate framework exists in which public companies enjoy relative freedom for certain operational decisions, whereas other domains are still subject to *ex ante* state monitoring.

Endorsing Hults and ESMAP, we can conclude that enjoying budgetary and operational autonomy represents the greatest operational-efficiency incentive for NOCs. This is because the link between the right of monitoring and the right to revenue, resulting from a commercial framework, is an incentive for public companies to deploy strategies centred on optimizing profits. Furthermore schemes to invest in exploration or development are not dependent on funding allocated by the authorities. However, such a situation obviously reduces the role of the NOC as a replacement for coordination by contract. In addition, a commercial budgetary framework may constitute a further incentive for public companies to adopt the same policies as private companies.

#### *4.3. Competitive framework for access to subsoil resources*

The last trade-off relates to the amount of competition between the NOC and private companies for access to resources. Various situations exist, ranging from the monopoly enjoyed by the public company as operator to competitive access to resources between the public company and its private counterparts. The terms of the trade-off are as follows. On the one hand, maintaining a certain level of competition may contribute to improving the NOC's operational efficiency. Furthermore such competition may allow the authorities to capture information by way of the benchmarking mechanism. The authorities may find this instrument useful for obtaining information on the operations of both private companies and their public counterpart (Victor et al., 2012). With this approach, maintaining a certain amount of competition between private companies and the NOC may enable the latter to more effectively fulfil its role as a complement for coordination by contracts. On the other hand, it should be borne in mind that the modalities defining the competitive framework for operations may impact on the NOC's ability to act as a replacement for coordination by contracts. In a general way, the greater the competition for access to resources, the more difficult it is for the NOC to act as a replacement for coordination by contracts.

#### *4.4. Institutional embeddedness of oil governance structures and their adaptive capacity*

There can be no universal answer for resolving these trade-offs and determining the place of the NOC and the need for regulation by contracts it entails. Institutional context matters. A better understanding is needed of the way in which oil governance structures interact dynamically with their institutional environment (Spiller, 2013, Brousseau, 2008; Levy and Spiller 1996, Williamson 2000). This reaches far beyond the scope of the present work, but we may nevertheless suggest several lines of research.

From a static perspective the institutional environment impacts on the relative severity of the problems of coordination and transaction costs (Williamson, 1991). For example the



political and judicial institutions determine the risk of governmental opportunism (Warshaw, 2012) and hence the contractual and organizational arrangements which may be applied (Levy and Spiller, 1996). Similarly the state's administrative capacity determines the scope for enforcing the various contractual provisions and the manner in which the NOC may be supervised. Comparative analysis of fiscal regimes has made this particularly clear. The effectiveness of progressive tax regimes depends on the state's ability to carry out *ex post* monitoring.

Consistency with the environment at the time of reforms is often presented as the prime condition for an effective governance structure but, in so far as possible, analysis must also take into account the structure's dynamic adaptive capacity (Glachant and Perez, 2008 ; Duit and Galaz, 2008). Reforms lead necessarily to process of path dependence entailing irreversible strategic choices (North, 2005). This is above all due to the interest and power of negotiations between the various actors in a position to direct or impede future reform of the regulatory framework. It is also due to the emergence of routines in the interaction between players on account of their bounded rationality (Chassang, 2010). Lastly allowance should be made for shared beliefs that underpin and restrict subsequent changes to the regulatory framework (North, 2005).

Clearly, there is scope for a new form of trade-off here. The existence of modalities for opening consistent with the institutional framework at the start of reforms may irreversibly determine the subsequent course and, possibly, leaving oil governance little leeway to adapt effectively to economic and technological developments. This problem was apparent in the discussion on stabilization clauses. The latter may seem necessary, given the risk of government opportunism conditioned by the political institutions, but they may also restrict efforts to adapt to non-strategic uncertainty. In this respect we follow the analysis of the new wave of oil nationalism presented by Mabro (2008), in particular. According to this author, the unilateral changes in contracts in Venezuela and Russia mainly originate in the form and substance of the contracts signed with private companies. In particular the safeguard clauses may have prevented coordinated adaptation of the fiscal measures that might have been justified following the rise in oil prices which started in the mid-2000s. In the same way, opening which retains the NOC's role as a replacement for coordination by contracts, in keeping with institutional particularities, may fall prey to "rigidification" (Young, 2010). The established regulatory routine and the NOC's own interests combine to hinder the evolution of the position of the NOC in the structure in a way consistent with the state capacity to regulate by contract or with the changing economic and technological circumstances.

We consequently need to gain a better understanding of the factors that influence the emerging properties of different oil governance structures, both in terms of coordination effectiveness and adaptive capacity. This could entail historical and comparative analysis of oil governance in the four countries which reflect, to varying degrees, the range of possible properties: Norway, Venezuela, Algeria and UK. The first case offers an example of what may be considered as "robust"<sup>10</sup> oil governance. The changes in the position of Statoil in the governance structure have been consistent with the evolution of the regulatory capacity of the state, and with shifting economic and technological conditions. It has allowed the Norwegian structure to adapt to perturbations while maintaining the effectiveness of coordination mechanisms (Al-Kasim, 2006; Thurber and Istad, 2010). Governance as practised in Venezuela since the beginning of the 90s seems a typical example of a "fragile" governance structure. A misfit is observed between the place of PDVSA and the state's ability to regulate

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<sup>10</sup> The four terms used for characterizing the emerging properties of oil governance structures are borrowed from Duit and Galaz (2008).

the industry by contract. A vicious circle is then observed hindering the adaptation of the governance and the effectiveness of coordination. Meanwhile Algeria seems to furnish an example of a “rigid” governance structure. The NOC has defended a position hinging mainly on its role as a replacement for coordination by contracts. It has allowed the state to impose its preference. Nevertheless, it has hindered the process of adaptation to changing economic and technological conditions. Finally, UK offers an example of a “flexible” oil governance structure. The capacity to adapt is strong. Nevertheless, this strong adaptability seems to go hand-in-hand with a low effectiveness of coordination; i.e. the state does not try to ensure the effectiveness of its property rights over resources. Private companies can implement depletion strategies conform to their own interests (Mommer, 2002; Abdo, 2010).

## 5. Conclusion

Oil nationalism reflects the difficulties upstream-oil players have stabilizing their relations following opening to private companies. To obtain a greater understanding of this issue, and in keeping with the theoretical framework of transaction cost economics, we have focused on the problems of coordination and transaction costs inherent in interaction between a state, which owns subsoil resources, and private companies. We were thus able to show that governance of oil contracts is subject to two trade-offs: on the one hand, the stability-flexibility dilemma; and on the other, the higher costs of *ex post* monitoring entailed by the contractual provisions giving private companies healthy incentives. Identifying these trade-offs paved the way for a better understanding of the various parts played by the NOC in oil-transaction governance, acting as a complement and a replacement in coordination by contracts. But the NOC also induces a reduction in incentive intensity and the risk of reverse governance. The choice of the NOC’s position in the structure thus reflects the response to the dilemma between supervising the NOC to ensure it plays an effective part in coordination and the problem of lower incentive intensity.

The main lesson learned from the analytic framework presented in this article is the importance of consistency between the position of the NOC and the contractual-regulation capacity of the state when upstream oil is opened to the private sector. It is consequently necessary to look beyond the cross-the-board recommendations regarding the intrinsic effectiveness of such and such a contractual provision. There can be no single answer for determining the position of the NOC in the governance structure. On the one hand, allowance must be made for the way the institutional environment affects relative efficiency and the scope for genuinely enforcing contracts. On the other hand, analysis must also pay attention to the impact of oil governance in terms of adaptive capacity. A better understanding is needed of the factors explaining the emergent properties of different oil governance structures in terms of coordination effectiveness and adaptive capacity.

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