



European  
University  
Institute

ROBERT  
SCHUMAN  
CENTRE FOR  
ADVANCED  
STUDIES

# WORKING PAPERS

RSCAS 2013/48  
Robert Schuman Centre for Advanced Studies  
Florence School of Regulation

The new Brazilian oil regulation:  
an ex ante economic assessment

Michelle Hallack and François Lévêque



European University Institute  
**Robert Schuman Centre for Advanced Studies**  
Florence School of Regulation

**The new Brazilian oil regulation:  
an ex ante economic assessment**

Michelle Hallack and François Lévêque

EUI Working Paper **RSCAS** 2013/48

This text may be downloaded only for personal research purposes. Additional reproduction for other purposes, whether in hard copies or electronically, requires the consent of the author(s), editor(s). If cited or quoted, reference should be made to the full name of the author(s), editor(s), the title, the working paper, or other series, the year and the publisher.

ISSN 1028-3625

© Michelle Hallack and François Lévêque, 2013

Printed in Italy, July 2013

European University Institute

Badia Fiesolana

I – 50014 San Domenico di Fiesole (FI)

Italy

[www.eui.eu/RSCAS/Publications/](http://www.eui.eu/RSCAS/Publications/)

[www.eui.eu](http://www.eui.eu)

[cadmus.eui.eu](http://cadmus.eui.eu)

## **Robert Schuman Centre for Advanced Studies**

The Robert Schuman Centre for Advanced Studies (RSCAS), created in 1992 and directed by Stefano Bartolini since September 2006, aims to develop inter-disciplinary and comparative research and to promote work on the major issues facing the process of integration and European society.

The Centre is home to a large post-doctoral programme and hosts major research programmes and projects, and a range of working groups and *ad hoc* initiatives. The research agenda is organised around a set of core themes and is continuously evolving, reflecting the changing agenda of European integration and the expanding membership of the European Union.

Details of the research of the Centre can be found on:

<http://www.eui.eu/RSCAS/Research/>

Research publications take the form of Working Papers, Policy Papers, Distinguished Lectures and books. Most of these are also available on the RSCAS website:

<http://www.eui.eu/RSCAS/Publications/>

The EUI and the RSCAS are not responsible for the opinion expressed by the author(s).

## ***Florence School of Regulation***

The Florence School of Regulation (FSR) is a partnership between the Robert Schuman Centre for Advanced Studies (RSCAS) at the European University Institute (EUI), the Council of the European Energy Regulators (CEER) and the Independent Regulators Group (IRG). Moreover, as part of the EUI, the FSR works closely with the European Commission.

The objectives of the FSR are to promote informed discussions on key policy issues, through workshops and seminars, to provide state-of-the-art training for practitioners (from European Commission, National Regulators and private companies), to produce analytical and empirical researches about regulated sectors, to network, and to exchange documents and ideas.

At present, its scope is focused on the regulation of Energy (electricity and gas markets), of Communications & Media, and of Transport.

This series of working papers aims at disseminating the work of scholars and practitioners on current regulatory issues.

### *For further information*

Florence School of Regulation

Robert Schuman Centre for Advanced Studies

European University Institute

Via Boccaccio, 151

I-50133 Firenze

Tel.: +39 055 4685 751

Fax: +39 055 4685 755

E-mail: [fsr@eui.eu](mailto:fsr@eui.eu)

<http://www.eui.eu/RSCAS/ProfessionalDevelopment/FSR/>



## **Abstract**

Following the discovery of the pre-salt petroleum fields, Brazil changed the regulatory framework of the oil industry upstream. Its main objectives are three-fold: (i) increasing the government take; (ii) mitigating the oil curse; (iii) developing the national oil industry. The paper attempts to ‘ex-ante’ assess whether the instruments of the new framework (e.g., the change in the oil regime, the creation of a social fund, the exclusive E&P rights to Petrobras) will be able to achieve these objectives (i.e., goal effectiveness) and whether the costs they entail are lower than their benefits (i.e., welfare increase). Our assessment shows that the new regulatory regime is likely to succeed.

In this paper we identify what are the objectives of the new regulatory framework through the analysis of government and policy-makers declaration. We describe the instruments that the new regulatory framework contain to achieve the objectives. We examine whether the instruments seem well-suited to face the objectives. Moreover, by taking into account also the costs of the instruments, we wonder whether the welfare is likely to increase. And then, we identify some open issues regarding the implementation that may strongly impact the welfare.

This paper is a prospective analysis and there are still some key open elements about how the new regulatory framework will be implemented. We cannot forecast the future but we show that it is likely that the goals will be achieved and this achievement is likely to be welfare improving.

## **Keywords**

Energy policy, Regulatory oil regime, Production Sharing Agreement, Oil&Gas industry.



## Introduction

Following the discovery of the pre-salt petroleum fields, Brazil has changed the regulatory framework of the oil upstream. The paper is devoted to assess ‘ex-ante’ whether the instruments of the new framework will be able to achieve the objectives. The starting point is thus to identify such objectives. To do so, besides the review of the existent bibliography, laws and regulation, the paper builds on a series of interviews carried out in Rio de Janeiro and Brasilia (February 2012). We interviewed around 30 experts in the oil industry, including academics, oil companies, consulting companies, government, regulators and politicians. The new oil Brazilian regime is still not implemented and most of the issues are still under discussion. In that view, interviews played a key role in this research. Actually, the interviews are used to collect information as well as to analyse the views of the different players of the Brazilian oil industry. Thus, we identify the objectives of the new regulatory framework through the analysis of government and policy-makers declarations.

We conclude that the new framework’s objective is threefold: (i) increasing the government take; (ii) mitigating the oil curse; (iii) developing the national oil industry. The reasoning behind this paper is to analyse first the adequacy of the instruments to achieve their goals, and second whether the costs they entail are lower than their benefits. Our assessment shows that the new regulatory regime is likely to succeed.

Aiming to increase the government take, a new oil regime has been implemented. Brazil used to have typical concession regime, but under the new law the Pre-salt fields should be explored under the production sharing agreement (PSA) regime. The oil regime defines the kind of contract that the government signs with the oil companies to explore and produce. The concession is a type of lease contract, which grants an oil company rights to explore, develop, sell and export oil extracted from a specified area for a fixed period of time. On the other hand, the PSA is a type of contract where the state retains ownership of the resources and negotiates a sharing of profits. The key for increasing the government take is the definition of the amount of such profit sharing.

To promote national oil industry, different instruments (old and new) are put into place. The new regulatory framework may still use local content clauses. This instrument has been used in the last years, although their results are not conclusive yet. In addition, a new instrument will be included to the Pre-salt era: Petrobras as single operator. Petrobras is a publicly traded corporation, but the Federal Government is the majority stockholder of the Corporation's voting capital<sup>1</sup>. In that view, the use of Petrobras to guarantee the investment in national content is seen as a key instrument to drive the development of the national industry.

The third objective concerns the oil curse. We will use the term to group two different dimensions of potential drawbacks related to oil exploration. Oil is an international commodity that may strongly impact on the exchange rate and hence it might be a case for the so-called Dutch disease. On the other hand, oil resources may be misused causing distortions in the economic incentives. The new regulatory framework aims to create rules to constraint the use of oil resources and to reduce the heterogeneity among the income received by different States and Municipalities. To mitigate the oil curse, two new mechanisms to allocate the government take have been put in place. First, a ‘Social Fund’ was created to manage the Union oil funds. Second, there is a project to shift the resource sharing among the Union, the states and the cities. These two new instruments aim to find the measure and the mechanism to distribute rent avoiding economic crowd-out effects, and thus to control the oil curse.

---

<sup>1</sup> The Company's shares are common shares with voting rights and preferred shares with no voting rights forever. The government control the common shares of Petrobras stocks, controlling the Corporation’s voting capital, (Petrobras, 2012).

In order to coordinate these three pillars, the government will count on institutions involved in three different phases of the oil production decision-making process: before the oil fields are in the market, the Conselho Nacional de Política Energética (CNPE); the process of marketing the exploration/production rights, the Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP) and the exploration and production phase for which a new body is created, the Empresa Brasileira de Administração de Petróleo e Gás Natural S.A (PPSA).

This paper is a prospective analysis and there are still some opened elements about how the new regulatory framework will be implemented. We cannot forecast the future but we show that one might be optimistic that the goals will be achieved. Moreover, this achievement is likely to be welfare-improving. And in particular we identify the key conditions to make this scenario likely.

In section 1, we show the instruments that the new regulatory framework contain to achieve the objectives. The analysis of the three objectives is detailed in the section 2 (government take), section 3 (oil industry development) and section 4 (avoiding oil curse). We analyse whether the instruments seem well-suited to face the objectives and if it is likely to increase the social welfare. Moreover we identify some open issues regarding the implementation that may strongly impact the welfare. Finally section 5 collects our conclusions.

## **1. The new regulatory framework in a nutshell**

The transformation in the Brazilian regulatory framework is still undergoing. In any case, we summarize the changes in the regulatory framework by identifying two levels: the change in the law, and the transposition to the corresponding regulatory bodies and contracts. We analyse here the changes in the law (by studying the main laws and law's project related to the new oil regulatory framework), and how the industry players and decision-makers are likely to interpret the law (by considering the set of interviews with key players in the industry). It allows us to understand the possible paths for the implementation of the new regulatory framework.

We identify the new regulatory framework with four new laws. Three of them are already approved in 2010, Law 12.276, Law 12.304 and Law 12.351 and the last one was finally promulgated in March 2013 Law 12.734<sup>2</sup>.

The first of this set of laws allowed the Brazilian government to onerously offer to Petrobras the exploration and production of oil and other hydrocarbon fluids without any public tender (Law\_12.276, 2010). This law was the first step for leaving the pure concession regime, established in the Law 9.478 which guaranteed equivalent conditions to all oil companies in the bids (Law\_9.478, 1997)<sup>3</sup>. This law was important to allow Petrobras capitalization, as the government used this instrument to buy Petrobras shares and thus to keep the control of the company shares (Lima, 2011).

The second law signed in August 2010 allowed the creation of the PPSA, a public enterprise to manage the government side of the oil contracts (Law\_12.304, 2010). This a new governmental company will focus on defending the government interests in the contracts with other oil companies. This law was the step before the inclusion of the profit sharing agreement (PSA regime) in the subsequent law (Law\_12.351, 2010).

The law 12.351 is the main pillar of the new regulatory framework. First, by the introduction of the PSA regime, it changes the oil regime in Brazil from a pure concession regime to mixed regime that includes the PSA for pre-salt area. Second, it introduces the rule that Petrobras is the unique operator

---

<sup>2</sup> See the laws: (Law\_12.276, 2010), (Law\_12.304, 2010), (Law\_12.351, 2010) and (Law\_12.734, 2012).

<sup>3</sup> We may note in the law the exploration and production could be done through authorization, however there is not further detail on this mechanism and it was not applied.

of the projects in the pre-salt area. And third, it creates the Social Fund, a mechanism to allocate the government take.

The fourth law, modify the division of royalties and special participation among the Union, the states and the municipalities (Law\_12.734, 2012)<sup>4</sup>.

### **1.1 Regulatory background**

Until 1995, Petrobras, a national company founded in 1953 and controlled by the federal government, held monopoly rights of oil exploration and production in Brazil, (Matoso et al., 2011). The constitutional amendment 09/95 ended the Petrobras monopoly, but the concession regulatory framework was established in 1997. It opened the oil activity (including exploration and production) to private firms, created the National Petroleum Agency (ANP – Agencia Nacional de Petróleo, Gás Natural e Biocombustível)<sup>5</sup> and created the National Council for Energy Policy (CNPE- Conselho Nacional de Política Enrgética)<sup>6</sup> (Buchebe, 2007). The regulatory framework adopted under this model and still in vigor for bigger part of petroleum production can be summarized as a concession regime which the licenses are auctioned by the regulatory body. The licensing auctions had three criterions: the bonus value, the exploration scheduling and the amount of national contents.

“Since 1998, the Brazilian petroleum regulatory agency has been hosting licensing rounds for leasing acreage for petroleum exploration rights right under a concession regime. The adopted model is competitive sealed bid auctions, in which the winner is the oil company presenting not only higher cash bonus, but also committing an expressive exploration program and a percentage of local content in services and operation to be applied in both the exploratory and production development phases”, (Rodriguez et al., 2009, page 6).

In this regulatory framework all enterprises have the same rights and duties, there were no separation between national and foreign enterprises. The government intervention was limited to the model choice (i.e., what are the variables that the enterprises should bid in the auctions?) and also in the choices of the regions which will be offered in the concession auctions. In this framework the government player is the CNPE. It is worth to note that after the concession is auctioned there were no room for further government intervention. The ANP as a public authority had the role to oversee the contracts enforcements and penalize the enterprises deviating from the contract.

In this context, Petrobras was still the most important player in the Brazilian oil industry but a number of competitors entered into the Brazilian oil industry. There is relevant bibliography analyzing and discussing the results of the licensing rounds, for instance (Matoso, et al., 2011 and Rodriguez, et al., 2009)<sup>7</sup>.

---

<sup>4</sup> The original law project was law 448, (Law\_Project\_448, 2011), The law project was proposed by the senate and approved by the Brazilian’s deputies, but first there was a Veto from the president and it was just in March 2013 that the law was finally promulgated.

<sup>5</sup> (Law\_9.478, 1997)

<sup>6</sup> The CNPE is a President advisory body. Its function is to formulate energy policies and guidelines to promote rational use of Brazil energy resources; ensure the supply of energy to remote areas (or with difficult access); periodically review the primary energy mix, establish guidelines for specific energy programs, to establish guidelines for the import, export and storage of fossil fuels, (MME, 2012)

<sup>7</sup> Despite of the key role of Petrobras in these rounds there is no conclusive work that shows Petrobras anti-competitive behavior. Nevertheless, there is some evidences that Petrobras has more information than others players because of its position as monopolist for over 40 years. For more see (Hernades-Perez, 2011). Moreover, as consequence of the historical dominant position of Petrobras, scale economy and learning effects can also explain the position of the company in the biddings results.

## 1.2 New regulatory framework

On November 8, 2007, the state-owned Petrobras announced that it had discovered a huge reserve of light oil in the Tupi pre-salt field in the Santos basin. Following this first discovery, other subsequent discoveries were made in the pre-salt area, as the Campos and Espirito Santo fields<sup>8</sup>. Considering all the discoveries in pre-salt area up to 2011, ANP estimates 30 billions<sup>9</sup> of barrels of oil in new pre-salt reserves<sup>10</sup>. The magnitude of the new discoveries has led the policy-makers to re-think the role of oil in the Brazilian economy as well as to re-structure the industry regulatory framework.

On August, 31, 2009, the federal government proposed to the Brazilian Congress a new regulatory framework for the exploration and production (E&P) of the oil industry for a subarea of the Pre-salt area (and other areas to be considered strategic).

In this paper we first define the three objectives of the new regulatory framework, second we identify the relevant instruments designed to fulfill such objectives. Then, we analyze whether the instruments are adequate, from a qualitative point of view, to implement the corresponding pillar of the Brazilian policy. Comparing with the former framework, it is possible to highlight the following key new instruments:

- (i) The inclusion of the profit sharing agreement (PSA) as Pre-salt oil regime (instead of concession). This kind of contract increases the risk of the government since the government shares the profits, so there is not guaranteed revenue. However, it might improve the amount of government take
- (ii) The creation of PPSA represents a shift from the absence of state intervention after the contract signature to its participation in the decisions of exploration and production (i.e. the inclusion of PPSA in the consortia opens a room for State intervention after the contract signature). This measure may reinforce the three pillars of the Brazilian objectives, because it ensures the ex post bargaining position of the State. It may help to assure the local content clauses, may help to minimize costs increasing government take and also may help a better production scheduling the production to avoid the drawbacks associated with exchanges rate impact (Dutch disease).
- (iii) The monopoly of Petrobras in the operation of all the Pre-Salt fields was established. Moreover, a minimum participation that Petrobras should have in each project (30%) becomes also mandatory (Law\_12.276, 2010, Law\_12.351, 2010). This implies a move from equivalent role of all the oil enterprises to differentiated position of. This instrument is associated with the policy of reinforcing the national sector. With the minimum participation, Petrobras ensures its involvement in every project of exploration and production. With the monopoly in the operation, Petrobras keeps control of the operational level of the national oil industry.
- (iv) The creation of a national fund for the allocation of the expected revenues from the oil commercialization. This measure represents a shift from the absence of rule in the allocation of the government take, to a creation of a fund for the allocation of oil revenues. This instrument may be a measure to mitigate the effects of the Dutch disease. And also to constraint the use of resources avoiding resources' misuse. All the oil revenues of Federal Government will be concentrated in the same fund, in order to avoid possible negatives effects in the economy, and to focus their use on the eradication of poverty and on economic development (Law\_12.351, 2010).

---

<sup>8</sup> The area concerned is commonly called pre-salt because the oil is located below a thick salt layer and more than 6,4 kilometers sea level, deep beneath a 4,828 meter layer of salt deposits. It is 350 kilometers away from the coast and its surface is around 149 000 km<sup>2</sup>.

<sup>9</sup> The 30 billion of barrels is an estimation done by ANP, (ANP, 2011). There are also other estimations much more optimistic and arrive up to 80 millions of barrels.

<sup>10</sup> These discoveries are the world's most promising fields since the discoveries in Kazakhstan in 2000.

- (v) The second dimension of Law 12.351 implies a shift from income allocated to producing states to the new sharing rule among the Union, the states and the municipalities. This measure aims to increase and stabilize the income of non-producing states (Law\_12.351, 2010).

These five instruments however are not isolated, they interact between them and they may impact in the different objectives. In the next sections, we analyse the change in the regulatory framework, describing in detail the relationship between the three main objectives that guided the reform and the instruments designed to implement them. We divide the next sections by objectives and we highlight the different instruments that may impact in each objective positively and negatively.

## **2. Increasing the government take**

This section describes the relationship between the first objective of the new regulatory framework (increase in the government take) and the instruments designed to achieve it. The new regulatory framework impacting the government take in three different ways: (i) changing the regime of resource access (from concession to production sharing agreement); (ii) modifying the incentives in the bidding process (the minimum participation of Petrobras in every project will impact the players' incentives when bidding in the auctions) and (iii) incentivising cost reduction (controlling cost by PPSA and monopsony power of Petrobras).

### ***2.1 From concession to Production Sharing Agreement regime***

The main formal difference between the 'concession' and 'PSA' regimes has to do with the ownership of the oil (and other hydrocarbons) to be extracted (Nakle, 2008). Under concession agreements, the oil company usually retains ownership of any oil that is produced, so that it is free to sell it at the market price. In a PSA regime, the ownership of the oil is split between the IOC (Independent Oil Company) and the host State (or its national oil company) (Brinsmead, 2011).

Even if the differences of the two regimes seem just a legal matter (the oil ownership), it has consequences in the amount of government take. The differences between the two regimes in the government take are related to the risk bearing resulted from the contract. Put it differently, the main difference concerns how the fees received by the government include risks: the risk of oil price, the risk of volume production and the risks of production costs. In the production sharing agreement the government take depends on all the risks associated with the exploration, the production and the market price. Under concessions, it will depend only on how the fees paid by the government are calculated.

The risk bearing effect can be observed in the way to allocate production costs. Under the PSA regime, the government and oil companies share profits, so that it guarantees that the cost is covered before the calculation of the government take<sup>11</sup>. Under the concession regime, there is no guarantee that the costs will be covered before the payment of the government take. Moreover, the government take does not depend on production costs, the companies have therefore more incentives to decrease production costs<sup>12</sup>.

---

<sup>11</sup> The PSA offers a profit distribution. The extracted oil is first used to pay for the costs of the joint-venture, this is the "cost-oil". The rest of the oil, the "profit-oil", is divided between the Union and the joint-venture. In the case of Brazil the percentage of the profit-oil that goes to the Union will be the result of the bidding to acquire blocks in the Pre-Salt. (This situation aims to increase the Brazil percentage in the oil profit if there is enough competition in the bidding process as we will discuss further).

<sup>12</sup> The difference of the incentives between concession and PSA can be compared with other regulatory mechanism as the "price-cap" and "cost-plus" tariffs. The first (concession and price cap) drive the decrease of production costs can also result in under-investment and the consequent problems of safety (or quality). The second (cost-plus and PSA)

Besides that the new regulatory framework also changed the nature of the bidding process in the auctions (as observed in the table 1).

**Table 1: Brazilian Government Take**

<b>Law 9478 – Concession</b>	<b>Law 12351 – PSA</b>
<ul style="list-style-type: none"> <li>• Signature Bonus (defined by auction)</li> <li>• Area reservation fee (pre-established)</li> <li>• Royalties (pre-established)</li> <li>• Special participations (pre-established)</li> </ul>	<ul style="list-style-type: none"> <li>• Oil profit (Production sharing defined by auction)</li> <li>• Royalties (pre-established)</li> <li>• Signature Bonus (pre-established)</li> </ul>

Source: Own elaboration data from Law\_9478 and Law\_12351

As we can observe in the Table 1, there are four types of governmental participation in the Brazilian concession regime<sup>13</sup>:

- The signature bonus which is an up-front payment done in the moment of contract signature. The minimum value is determined by the government and the actual value depends on the auction result. The higher the bonus signature offered, the higher the possibility to win the auction.
- The right to reserve and product in the area, paid for by the monopoly right to explore and product the resources in determined area. This is an established fee paid per Km, independently of the actually production.
- The royalties are values established before the auction procedure and range between 5 and 10% according to evaluation of the risk done by the regulator (ANP). These values are paid by month over the production of gas and oil.
- The special participation, which is an “extra” fee that must be paid depending on the production volume (big fields) or on high profitability. In practice as the regulator are not really able to calculate the profitability because the information about costs is asymmetric, the application of special participation mainly depends on the field size.

In the second column of the Table 1, we observe that the new regulatory framework does not include area reservation fees and special participations. But it includes the oil profit. Moreover, the new regulatory framework also changes the fee that is defined by the auction procedure: from the bonus signature to the participation in the oil profit.

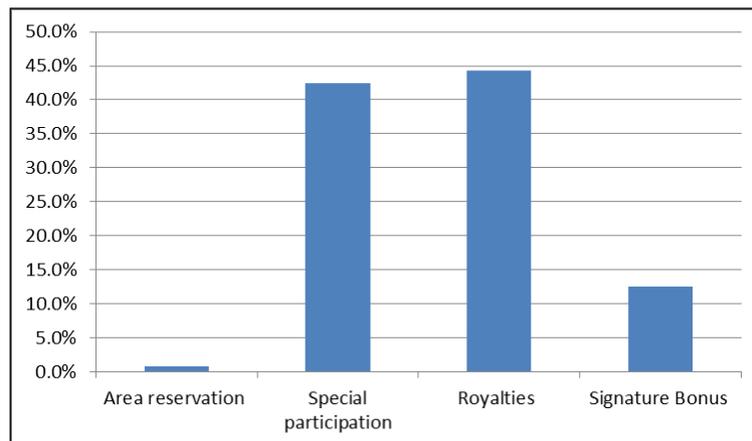
The exclusion of the area reservation fee actually means a decrease in the government take not associated with any risk (volume, geographical, production). However, as we can see in the Figure 1, the weight of this kind of government take in the total amount is close to be irrelevant.

(Contd.) \_\_\_\_\_

guaranteeing to cover the cost give less incentives to decrease the investment. For more about price-cap and cost-plus (Kahn, 1970).

<sup>13</sup> It is worth to note that these level of government take described here does not include the general taxes applied to the oil and gas sectors.

**Figure 1: The percentage of government take by type (in 2007)**



Source: Own elaboration data from ANP and (Regra, 2008)

The exclusion of the special participation will have a much higher impact. Special participations are added to deal with the different levels of productivity of the fields. But under the PSA, it is substituted by the profit oil that the government receives. In that view, the oil profit includes the risk of the production costs, whereas the special participation is a fixed percentage of the total of the oil produced. This change in the regulatory framework thus implies a change in the risk bearing. As the participation of the government in the oil profit will be auctioned, it will depend on players' expectation about the productivity of the field. Thus, the government take includes players' perceptions of risk and their behaviours in the auction. In that view, a possible hedge against this risk is establishing a minimum value for oil profits (along the lines of a floor hedge).

Finally, the signature bonus will be kept. The main idea behind this bonus, which is an up-front payment, is to avoid players not willing to explore the field to bid in the auction. The only difference between regimes in this regard is that under concessions, this value is defined by the auction. In the PSA regime, it will be defined by the government body (or by the regulator) before the auction takes place. Although the way to establish this value is not defined yet, it should not represent significant changes in the government take.

From the previous analysis we may conclude that the government is affording to take more risk. The logic for that is the aim to obtain higher government takes. As consequence of the pre-salt geological discoveries, the perceived geological risk has strongly decreased. It has pushed the government to take part of the risk (which the companies bear under the concession regime) in order to increase the government take<sup>14</sup>.

## ***2.2 The new role of Petrobras impacting players' bids***

We can assume that the government take from profit oil will be higher than the concession bonus signature. We can expect that the profit oil may substitute the share of the special participation in the government take. As consequence, the auction results, under the PSA regime, will have a higher impact on the government take than in the concession regime. Therefore, the government has stronger interest to have good results in the PSA auctions.

---

<sup>14</sup> It is worth to note that the government has even makes some exploration fields in order to increase the value of the fields. As it was observed in the case of the Libra field first exploration, ANP contracted Petrobras to explore and open the information of the fields as it is authorized by Law\_2351.

According to the Law 2351, the PSA contract should be auctioned<sup>15</sup>, but there is no further detail about the auction process. Nonetheless, it is expected that the auction will allocate the project to the consortium accepting the lower oil profits (higher oil profits for the government take)<sup>16</sup>. Hence, Petrobras should be part of any consortium winning the auction, under the conditions of the contract winning the auction. In the past Petrobras has been the largest player in the auctions, winning alone or in consortium around 90% of the auctions (see below)<sup>17</sup>. However, Petrobras is not central only because of the weight of its bids, but also because the way others players interpret Petrobras' bids. The new role of Petrobras will thus impact the bids in several ways.

### 2.2.1 The auction features

In order to understand the new role of Petrobras in the auction process, this section gives an overview on how the auctions used to be structured in the Brazilian concession regime, and what are the expected changes in the PSA regime.

For each round of auction, an authorization of CNPE is required and the ANP starts the process. Thus first there is a decision taken by the CNPE about how much, when and where the blocks will be open to bids. This is a political choice as it may have several impacts on development of the regions of the country, in the amount of expected government take and so on. After that, the ANP with the Agencies' specialists enters in the second step of decisions. The ANP analyzes seismic data to define the blocks and also to define the rules and the actions mechanisms in order to achieve the policy objectives in the most efficient ways.

In the concession regime, the criteria to choose the winner depends 40% on bids in the signature bonus, 20% on the local content and 40% on the E&P program<sup>18</sup>. The choice is totally transparent as a first-price sealed bid auction occurs for each block. Companies submit their offers in sealed envelopes which are opened to everyone so that chances of cheating and corruption are reduced. This system, which has been used for more than 10 years, has proven its efficiency and seems to be considered as a successful process by both regulators and IOC's<sup>19</sup>.

With the new regime, the auction criteria will change. Indeed, even if the local content and the E&P program remain as factors to win the bid, a new factor appears with the PSA model: the oil profits (which will substitute the bonus signature in the auction).

### 2.2.2 The impact of mandatory participation of Petrobras on the auction results

Petrobras has been the main player of the Brazilian auctions in the concession regime. Hernandez-Perez (2011) studied the intensity of auctions competition (represented by the amount of the average winning bid), taking into account the participation of Petrobras. The work shows that, out of 311 offshore blocks offered, Petrobras bid 244 times (alone or in a consortium) and won 220 blocks, which

---

<sup>15</sup> The other mechanism accepted by the law (2351) is the direct contract with Petrobras.

<sup>16</sup> These guidelines can be observed in letter attached to law project signed by the diverse ministries one of them the current president Dilma Russef, (E.M.I. n 00038 – MME/MF/MDIC/MP/CCIVIL).

<sup>17</sup> Data from ANP database – auction rounds <http://www.anp.gov.br/?id=2652>.

<sup>18</sup> The weight of the different parameters of the auctions changes in the different rounds. The values described here refer to the last rounds (since the 7<sup>th</sup> round).

<sup>19</sup> We can find some critics about the auctions process, especially regarding the first-price sealed bid (Hernandez-Perez, 2011). Nevertheless, other propositions that could improve the information assessment could also open room for corruption.

shows that Petrobras wins more than 90 % of its bids. Moreover, 40% of the blocks are offered to a Petrobras ‘consortium bidding alone’(Hernandez-Perez, 2011)<sup>20</sup>.

Petrobras seems to have a competitive advantage in Brazil auctions because of the geological knowledge of Brazilian basins, and because of the technological knowledge to explore and produce hydrocarbon in deep-off-shore. Petrobras knowledge comes from its incumbent situation and its historical main role in the petroleum industry. The better knowledge of Petrobras seems not be just geological information, as all players have access to it, but that knowledge is related to intangible assets which is mainly kept by their workers. How this knowledge actually differentiates Petrobras of the other companies is hard to know. However, one may observe that Petrobras impacts players’ behavior in the auctions. Most of the companies (especially when entering in the market) prefer to be part of a consortium with Petrobras. This effect decrease actual competition. This lack of competition is conspicuous if we compare the average winning bid of blocks where Petrobras is involved and the others bids without Petrobras participation. (Hernandez-Perez, 2011) showed that the participation of Petrobras in the bids decrease the number of bidders.

The new oil regime may totally change this phenomenon. Indeed, as Petrobras will be involved in the winning consortium with at least 30% of the shares and will be the sole operator in the blocks under the PSA regime, the great advantage of being Petrobras ally will decrease. Every consortium winning the bid will be able (and obliged) to be associated with Petrobras, and thus the Petrobras know-how will not be an entry barrier.

In addition, it is possible that the new regulatory regime ends up with a lower Petrobras participation in the auctions. As Petrobras have the obligation to participate (minimum of 30%) and to operate each block, the allocation of its resources should give priority to its obligations. Thus, in the scenario of resource scarcity, Petrobras should decrease its bids. The absence of Petrobras in the bids should increase competition and it might lead to increase of government take.

Another consequence of the role of Petrobras as unique operator is the increase of its market power position. Petrobras will become a monopsony (or a quasi-monopsony) for many products and technologies related to the Pre-salt exploration and production. This market position of Petrobras may drive input prices down. And it may decrease cost and increase profits. A consequence of the increase of profit oil is the increase of the government take.

Nevertheless, the new regime also may have negative impacts on competition. The PSA regime is new, and thus it may be perceived by companies as regulatory instability (at least in the beginning). They may be concerned with the possibilities of hold-up owing to the higher interference of public enterprises (PPSA and Petrobras). However, these perception and subsequent disincentives seem to us not likely to be significant. In comparison with other countries, Brazil is much less risky for IOCs and they will be eager to participate in the Pre-Salt adventure.

### ***2.3 New mechanism for controlling costs: the creation of PPSA***

The PSA regime introduces the obligation to share oil profits with the government. This decreases players’ incentives to keep lower production costs, as the profits are not earned only by them but it should be shared with the government. The choices in the exploration and production can represent huge amount of resources and also different technological choices. To control the situation, the presence of the PPSA in the consortium with veto power aims to allow the government to oversee the consortium’s decisions.

---

<sup>20</sup> These results of Hernandez-Perez (2011) study only concern offshore blocks, which is the main capability of Petrobras, as underlined by most of the analysts interviewed (Hernandez-Perez, 2011).

The PPSA aims to protect the rights of the State in the consortium, as well as to manage all the issues related to the PPSA contract (Law\_12.304, 2010). PPSA will monitor the projects and the investment decisions. It may have several benefits, as to prevent Petrobras not to take into account the efficient propositions of the other companies in the consortium. Also, it will be a source for data for the government and thus decreasing the information asymmetry, which is a frequent issue in the calculation of the government take (Pires, 2011).

The role of the (future) PPSA will be, in our view, crucial not just because of their benefits, but also because of its potential drawbacks. In the case that the government behave opportunistically by using the PPSA power inside the consortium, it may result in hold-up problems and all the associated long-term negatives consequences. According to how the contract will be delimited and how PPSA will behave, we may consider three possible scenarios:

- i) In the first scenario, PPSA power is not delimited by contract, i.e., consortium contract does not frame the timing of exploration/production and does not delimit the PPSA power on deciding the investment decision. In this context PPSA may decide to exercise its power to increase the government take in the short run. It will probably result in hold-up of private companies' profits. As Petrobras owns at least 30% of the consortium's share, PPSA and Petrobras will stand for 65% of the shares in the operation committee. The collusion of Petrobras and PPSA would win any decision in the operational committee. The other IOC's will be in minority and won't be able to control their investment. For instance, PPSA and Petrobras could decide to slow down production on a block in order to focus on other more strategic or profitable area. For a company involved in only one of these blocks, it may be very risky to invest without being sure that the exploration and exploitation will be made at a reasonable pace.
- ii) In the second scenario, PPSA power is not delimited by contract but it decides not to collude with Petrobras, focusing on less costly exploration and production and the profit maximization of the field. It will likely generate credibility and it will likely not generate any negative effect in the long term.
- iii) In the third scenario, the PPSA power is delimited by a contract, which, for instance, may establish the exploration and production timing. Nowadays in the concession regime there are a scheduling about periods of exploration/ commercialization declaration and production. Some scheduling frame could be included in the PPSA contracts. It would allow the IOCs to have a better forecast about the investment recover. Other clauses regarding the investment decision and technological choices could also be added. This kind of clause, decreasing the discretionary power of the 'ex-post'<sup>21</sup> consortium's decision, would be a safeguard for the IOCs. It would decrease any potential negative effect of the PPSA in the long and short term.

Therefore, the creation of the PPSA is a sensible answer to control costs and to disclose information in the context of PSA agreement. Nevertheless, because of its power, any deviation in the PPSA behavior from the ideal behavior may represent an important loss of credibility of the regime from the private companies' viewpoint. Private companies' expectation on the profitability is central to assure high government takes, as it strongly impacts on the auctions results.

## **2.4 Assessment**

The PSA regime can be thought of as seeking higher profits for the government, through assuming a more risky position with respect to production costs. Moreover two additional instruments can be thought of in the same terms: the new role of Petrobras (as unique operator and the minimum participation in every project with at least 30%) and the creation of the PPSA.

---

<sup>21</sup> Ex post here meaning after some (specific or sunk) investment decision is taken.

The risk of the Pre-salt fields seems much lower (according to many specialists) because of the geological characteristics of the region. However, the assessment of the new risk position implied in the new regulatory framework is extremely difficult to assess and beyond the scope of this paper. The implementation of such risk position has important consequences in the bidding process. Another risk that may be evaluated is the players' perception of the regulatory risk. If the government enters into a PSA but the auction results are worse, the situation may result in a decrease of the government take.

The role of Petrobras mandatory participation in every project may have two positive impacts in the government take: the increase of the auction competitiveness and the decrease of input costs. And both, more competitive auctions and higher profit oil results in larger government takes.

To control the increasing power of Petrobras in this new context the government create the PPSA to oversee the cost and guarantee the higher oil profit. The participation of PPSA in the project decisions as well as its veto power, however, can be misused. If misused the PPSA power could generate important losses to the associated companies and it would strongly affect the credibility of the new regime. We can conclude that the PPSA control might be an effective measure, in case PPSA does not misuse its power.

In a nutshell, it is very likely that the new regime will result in an increase in the government take.

### **3. Developing the national oil industry**

The second main objective of the new regulatory framework is to push the development of national gas and oil industry. The national development of the industry means the internalization of the production chain and specially the internalization of the innovation process. There is a significant economic literature discussing the pros and cons of industrial policy.

One may think of a variety of market failures that explain the economic logic behind industrial policies: for instance, the innovation spill-overs (positive externalities).

There is an increasing recognition that “developing societies need to embed private initiative in a framework of public action that encourages restructuring, diversification, and technological dynamism beyond what market forces on their own would generate” (Rodrick, 2004, page 1).

The industrial policies complement market forces: they reinforce or counteract the allocative effects that the existing markets would otherwise produce<sup>22</sup>. In the Brazilian industry, the main idea behind the industrial policy is the development of the national outsourcing in the different levels of the industry chain. In other words, the objective is not just to generate rent by producing and exporting fuel, but also by producing the entire chain within the country. And special attention paid to innovation, because of the expected externality effects that it may generate (Heum et al., 2011).

There is also relevant literature examining the local content experiences in different oil and gas industries. Nordås et al. (2003) analysed six different countries (Norway, Nigeria, Indonesia, Malaysia, Brazil and Mexico) and compared their success to the development of the oil and gas industries by using their local content policies. The Norway experience has been recognized as an example of success. Nigeria's policies have not obtained positive results. The rest of the experiences may be placed between these two extremes. The Norway firms have developed industrial capacity that now serves the oil and gas industries all around the world. In contrast to the other countries, Nigeria was not able to develop a manufacturing sector, which seems to be a prerequisite to succeed. Indonesia

---

<sup>22</sup> In Latin America the discussion about Industrial Policy may remote to the discussion of CEPAL in the 1960's, which one of the main authors is Raul Prebisch (Prebisch, 1959). Since that it has strongly transformed and passed by different economic theoretical backgrounds, but in some somehow it always has been presented in the Latin America economic policies. The main arguments can be seen in (ECLAC, 1995) and (Kosacoff et al., 1999).

and Malaysia have achieved in some extent the expansion of domestic manufacturing where oil and gas activities have taken place (Nordås et al., 2003).

Brazil and Mexico are countries with strong national oil companies (respectively, Petrobras and Pemex). They both have policies focused on local contents. But the investment in national chains has been mainly pushed by their national oil companies. The strategy adopted by these countries seems more effective than the cases of Nigeria, Malaysia and Indonesia, but they are not as successful as Norway (Heum, et al., 2011).

Next we analyse the new regulatory framework from the viewpoint of the implementation of industrial policy.

### ***3.1 Challenges of using local content clauses***

In the concession regime, the mechanism developed to use the petroleum exploration and production to develop the Brazilian industry is the clause of local content. Actually, it is one of the elements auctioned in the rounds. In principle, it is possible to conclude it worked, because of the high local content in the auctions bids. Nevertheless, we observe changes in the local content rules, resulting in a situation where the local content bids are not really competitive. Moreover, we observe that the ANP capacity to actually enforce the clauses is uncertain. We will analyse below these effects.

#### **3.1.1 The definition of local content**

Local development requires the use of domestic resources, especially domestic labour and skills. This does not need to be necessarily associated with a national company, but it can be a company with foreign ownership installed within national borders. The objective is to encourage the aggregation of value in the production chain within national borders (by employing local staff, local materials, local services and facilities). This means that local content policies should encourage foreign firms to collaborate with local companies. Such collaboration is expected to generate dynamics that will have positive impacts on the development of indigenous firms, (Nordås, et al., 2003).

In Brazil, the definition of local contents is done by the regulator (ANP) and has changed between the first and seventh rounds. In the beginning, the local content product was defined as any product by a company which was legally installed in Brazil, independently of the products components. There were several adaptations and since the 7<sup>th</sup> round the local content is defined by the national percentage of each component and service. It has been an evolution that defined better the local component according the actual aggregate value by national products and services. On other hand, it has included a hardly complicated and sophisticated mechanism which increases administrative costs (Rocha, 2010).

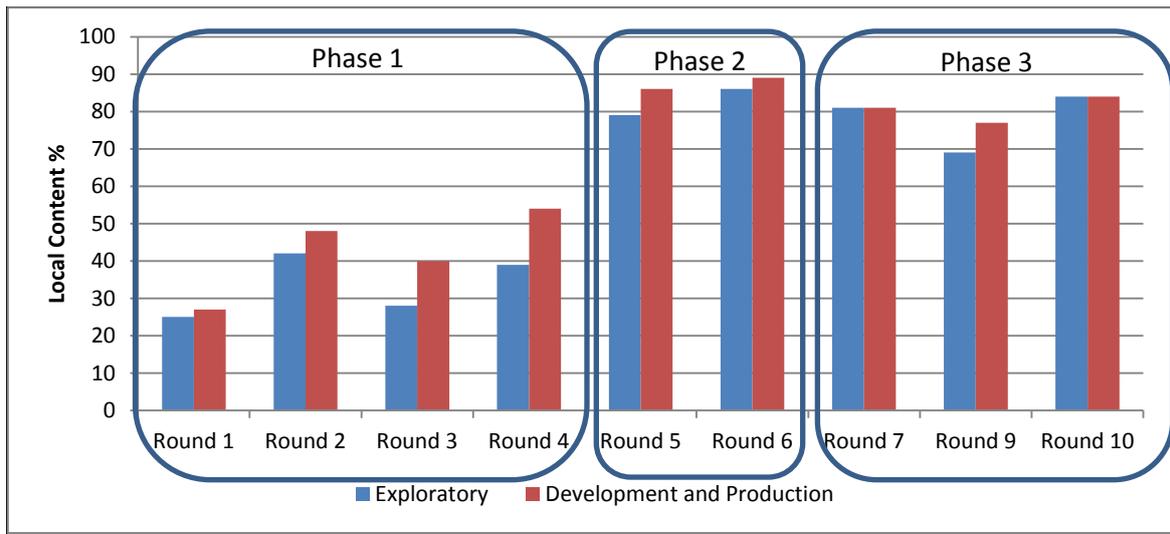
Besides that the Brazilian regulator ANP is the responsible to enforce the contracts. They emit Local Content Certification for the divers companies and products through the industry chain. And, they oversee companies' compliance with their obligations in the signed contracts. In case the oil companies do not comply with the local content established by contract, they get penalized.

This mechanism generated two key economic problems: how to define the value of local content that is economically efficient; and how to define a penalty strong enough to enforce the contract but not too strong to become an entry barrier. The level of local content cannot be too high, in otherwise, it might avoid some efficient companies to enter in the market if they are able to cope with the 'too' high level of local content. It is true for the companies along the whole chain of production, from the ICO's to the provider of tools and software. We observe that this is still a challenge for the concession regime to promote local content.

### 3.1.2 The observed results of local content in Brazilian bids

In order to identify the information about the willingness (and expected costs) of the enterprises to use local contents, the volume of the local content was introduced in the auctions. As we can observe in the figure 2, the companies had offered a percentage for exploration phase (blue in figure 2) and another for the development phase (red in figure 2). We can separate the bids in local contents in three phases according to the rounds' rules: phase 1, including the four initial rounds (between 1999 and 2002), phase 2 including the fifth and sixth rounds ( between 2003 and 2004) and phase 3 including the seventh, ninth and tenth rounds (between 2005 and 2008).

**Figure 2: Local content average result in the auctions rounds<sup>23</sup>**



Source: Own elaboration data from ANP

In the first phase there was no requirement of minimum local content rate and the maximum rate for punctuation effect was 70%. The weight of the local content in the note offer for block was 15%. In this phase we can observe a low average of local content bids.

In the second phase it was established the minimum amount of local content<sup>24</sup> and the weight of local content in the bid increased to 40%. We observe an important increase in the local content bids and some bids reached 100% of local content. It was observed the tendency of some players to overbid the local contents to win the concession auction without take into account the actual feasibility and cost that it would represent.

In the third phase beyond the requirement of global minimum percentages was transferred to limit the offers to the maximum values. Moreover the bids were also separated in sub-sections inside exploration, development and production<sup>25</sup>. For these rounds the weight of the Local Content was

<sup>23</sup> The 8<sup>th</sup> round legal proceeding was suspended; it is why it is not included in our figures. Moreover, it is worth to note that the 10<sup>th</sup> round just include on-shore fields, which often demands a lower level of exploration/ development technologies.

<sup>24</sup> The minimum of local content differentiated for blocks located in lands, blocks located in flat waters and for blocks located in deep waters.

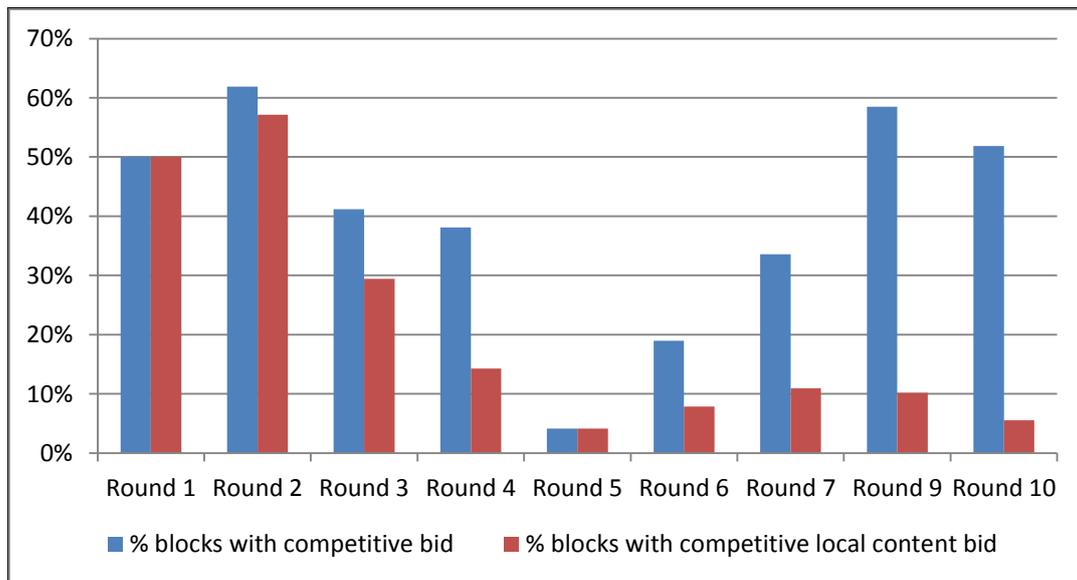
<sup>25</sup> “In these rounds was transferred to consider the localization of the blocks according to 4 criterias: in land, flat waters with blade up to 100 meters, flat waters with blade between 100 and 400 meters and deep waters with blade above of 400 meters. A relation having itens and subitens so for the exploration as for the development it was in a spread sheet, with a minimum percentage for each one of these itens and subitens, only the company offered values of local content and attributed weights for each one of them.

20%. Most of the local contents bids were the maximum rate allowed in the auction, (TCU, 2010)<sup>26</sup>. We saw a decrease of the rates in the round 7 and 9. The round ten included just onshore fields, and thus, the local content maximum rates and bided rates tended to be higher.

The difficult to bid a coherent value of local content in the auctions can be understood by the uncertainty that players have in the moment of the auction. The exploration phase is defined between 3 and 8 years and the production phase up to 27 years (Rocha, 2010). How much local content they will be able to include is quite uncertain. Consequently, the behaviour of the companies' bids does not seem able to reflect the costs of the local content policy.

The figure 3 represents the participation of the local contents on the bids competition. The blue bars show the percentage of bids that there were any bid competition (on local content or bonus or investment scheduling). The red bars show the percentage of bids which had any competition on local content rate. In the first round every competitor in the bid had a different local content rate. In the second, third and fourth rounds the local content differences decreased. In the fifth round there were small competition in the bids and it included all variables (including the local contents). It is worth to remember that in this round the local content rate become more important in the auctions' results (from 15% to 40%). In the sixth round the importance of local content competition comparing with the total competitive bids was lower as many of the competing bids bided the highest local content value. In the last three rounds the local content value also had a reduced importance, it can explained by the tendency to the players to bid the local content rate as maximum of established by the auction rule (AlonsoTrigo, 2010).

**Figure 3: Local content divergence in the bids<sup>27</sup>**



Source: Own elaboration data from ANP

(Contd.) \_\_\_\_\_

The punctuation of global local content in such a way for exploration as for the development was a result from the sum of the multiplication of the offers of percentages of local content for itens and subitens for the respective weights. Another new from the rounds was the introduction of the "Cartilha de Conteúdo Local" as a tool of measurement of contractual local content", (ANP, 2009).

<sup>26</sup> In 2005 as established the local content certificated program and harder criterions. Moreover in 2007, it was deliberated by that ANP should make transparent the criterions of determination of minimum and maximum level of local content allowed in the bids (Acórdão 2.249/2007).

<sup>27</sup> The 8<sup>th</sup> round legal proceeding was suspended; it is why it is not included in our figures.

Further studies on the players strategy on this bids are necessary and it seems that players had a learn curve about how to bid on local content variable. In addition, they needed to adapt according to the changes in the rules of local content bids (as changes on the rate floor/ceiling and on the weight in the bids results). However, after the data analysis and the interviews, it seems that the strategies of the enterprises were to put the maximum amount of the local content. Even if the capacity of the enterprises to actually follow the amount of local content proposed in the bid seemed limited afterwards<sup>28</sup>.

### 3.1.3 The enforcement of local content: the role of ANP

A gap between the contracts and the actual local content percentage has appeared. The ANP role enforcing the contracts is taking places. Between 2008 and 2010, ANP overseen was focused on the contracts established in the first four rounds. In these contracts no penalties were necessary. The companies were able to follow the contract first because the amount of local content bid in the first rounds were lower and second because the definition of the local content in the first rounds were less restrictive. In 2011, ANP supervised the local content contracted in the 5<sup>th</sup> and 6<sup>th</sup> round and found many irregularities. Until now, around 70 contracts out of 255<sup>29</sup> do not comply adequately with their local content clauses; five operators may have some penalties and four operators were penalized (Macedo, 2012).

The local content clauses as mechanism to drive industrial policy cannot be fully evaluated by now. As we explained before, the investment cycles in the petroleum industry is of too long and there is too much uncertainty about technology and resources availability in the moment of the blocks' bids. In this regard, however, we are able to underline some challenges of this mechanism: the first concerns the definition of local content; the second one deals with the definition of the amount of local content at the signature of the contract because of the high uncertainty; the third challenge is the difficulty of enforcement.

The problems of enforcement can be seen first regarding the ANP cost to measure and to oversee; and second the judiciary costs, as the companies tend to use all legal rooms to avoid or reduce their penalties.

Moreover, if the amount of contract which is not followed by the companies keeps increasing, it could indicate that the enterprises prefer to pay penalties than invest in the local content. It can be seen as central failure of this kind of policy, as the objective is not to receive penalties but have the oil and gas industries developed. Seen all these challenges another mechanism will be adopted under the PSA regime.

## **3.2 The role of "public" enterprises**

Under the concession regime, the ANP has two main roles in the application of local content policy an 'ex-ante' role (defining the rounds) and an "ex-post" role (penalizing the companies which do not follow the contracts). The ANP roles were the only government instrument to apply local content policy. There was no 'policy' intervention through the process of exploring and producing the oil fields.

In the PSA regime, the use of Petrobras as only operator aim to promote the industrial policy through the time. Moreover the PPSA will be able also to oversee the decision through the decision

---

<sup>28</sup> In the interviews it was underlined that some players actually had bid in order to win without actually take in consideration the cost of the local content, instead they may just take into account the penalty or the expectation to renegotiate the clause.

<sup>29</sup> Number of blocks auctioned in the 5<sup>th</sup> and 6<sup>th</sup> rounds.

process. These two mechanisms will allow the intervention by increasing local content or by enforcing local content contracts over the exploration and production period. This mechanism strongly relies on Petrobras and brings many advantages and challenges for the enterprise. And in order to offset Petrobras power, the overseeing role of PPSA can be quite important to keep the policy in the track.

### 3.2.1 The key role of Petrobras

Under the new PSA regime, Petrobras will be assigned to operate all the pre-salt blocks which will be allocated. It aims to develop the indigenous oil industry through Petrobras. It means the development within the company and also the collaboration with other national enterprises and national research center. Petrobras on one hand must give priority to indigenous outsourcing as much as possible; however, it needs to take into account the constraints and the costs.

Petrobras has 56 years of experience in the Brazilian oil industry; it was responsible for the discovery of the oil in Brazil's Pre-Salt layer. It is the biggest deep water operator in the world and has the largest floating production system fleet. Petrobras is known for having knowledge about researching and mining the Brazilian sedimentary basins, a fruit of the investments it has made in upwards of five decades. As the sole operator, Petrobras will be able to apply all of this experience in exploring and producing oil and gas in the Brazilian Pre-Salt.

Besides the technical qualification of Petrobras, the choice for having Petrobras as the sole operator is also a consequence of its nationality and more important the participation of the government in the company's ownership. Petrobras is a semi-public corporation, with both private and public capital, however as mentioned before the government has majority in the decisions rights. The dubious character of Petrobras (public and private) is quite complex mechanism. Thus sometime it allows the use of the company to drive governmental policies, as consequence of the Union control of the company, and in other moment it acts as private enterprise looking for profit, as the expected behavior from a company quoted in the international stock market (Alveal, 2001).

Under the concession regime Petrobras has already demonstrated its potential to drive the oil and gas industry in Brazil. Petrobras has shown in the last years, in average, a much higher level of local content than what was demanded by the contracts (Negri et al., 2010). The supply chain of goods and services to the oil industry is highly intensive in scale and technology. Externalities from the economies of scale and technological efforts of firms can be observed. Negri et al. (2010) showed that the firms that signed contract with Petrobras created more jobs and exports more than the other firms of the same sector<sup>30</sup>. The study shows the impact of the Petrobras in the different industries in Brazil. Then, it is in order to guarantee and increase the impact of Petrobras in the Brazilian industry that the company has been chose and the unique operator (Negri et al., 2010).

In the new regulatory framework Petrobras have special rights and duties. If on one hand it means the monopoly to operate all the non-allocated pre-salt fields, on the other hand it also means the obligation to explore and produce in each field auctioned. The relation between government interest and Petrobras interest should be equilibrated.

#### *The expected impact of the unique operator clause in the company*

The unique operator situation of Petrobras actually means a legal entry barrier and an actual monopoly situation. On the other hand, it means the obligation to invest in every project which may encounter limits in the restriction of financial and human resources.

---

<sup>30</sup> The sectors where the is greater impact are: chemicals, rubber, metallurgy, machinery and equipment, electrical machinery, electronic equipment and instrumentation

From the Petrobras perspective, the monopoly situation may help her to keep the Brazilian pre-salt knowledge. In other words, it protects the Petrobras know-how, keeping her technical competitiveness in the deep offshore E&P (especially in Brazil).

Second, it may have a global positive effect as it may accelerate the learning curve of Petrobras because of the amount of new fields that need to be explored. Moreover the Petrobras will be able to profit of the scale economies, driving knowledge and research and as well as for increase logistic efficiency.<sup>31</sup> Another advantage for Petrobras is the increasing efficiency in the coordination between the blocks. The knowledge and participation in every block will allow Petrobras to coordinate better the production in different blocks (BCG, 2011).

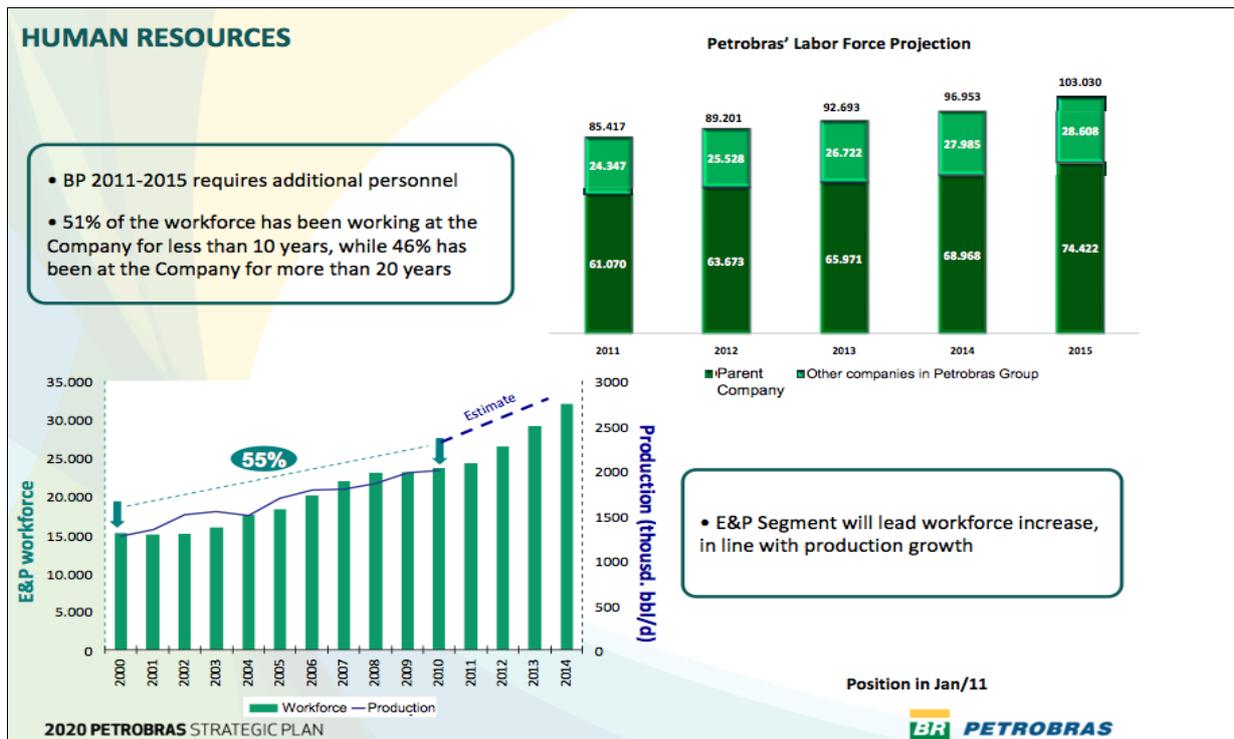
Third positive effect for Petrobras as it will become a monopsony (or quasi-monopsony) for most of the input associated with the Pre-salt fields' exploration and production. And we can expected that it could drive input prices down.

On the other hand, the first negative effect of the new Petrobras' position seems to be the pressure over the Petrobras human and well as financial resources. Petrobras will need enormous amount of investment and qualified human resource to be able to operate all the pre-salt fields, (Petrobras, 2011). We can have some figures about the amount of work force that Petrobras is expecting to contract in the figure 4. However, even if is expected to have massive contraction to increase the Petrobras' workforce, the big issue here is the qualification (and the time necessary to qualify) of the new employees.

---

<sup>31</sup> A study conducted by BCG – which involved 500 Petrobras employees – showed that “experience curves” yield to major Capex savings for Petrobras and its suppliers. For Petrobras, “the magnitude and duration of the pre-salt development campaign would strongly drive experience-effects gains via continued optimization efforts”. Such experience effects will be all the more so effective because Petrobras will be the only operator on the pre-salt and because it will be able to manage and concentrate its efforts. Indeed, the results of the model established by BCG are promising: “Based on the estimation of consolidated experience curves, the potential for investment reduction in wells and subsea systems across the pre-salt campaign could be calculated. In present value, these investment reductions added up to 11% for well drilling and completion and 10% for subsea systems. Combined, these savings amounted to about 8% of the total forecast investment for the pre-salt campaign (BCG, 2011).

Figure 4: Petrobras workforce



The issue of human resources is still harder because in the last decades (before 2004) the Petrobras spent long period without contracting (around 10 years) it provoked a gap of high qualified experts in Petrobras. The mechanism utilized to fulfill the gap of qualification is a strong investment in the education and qualification of Petrobras employees. However, as part of the knowledge is mainly acquired by the experience, it may be a challenge for Petrobras, especially in the moment of high need of qualified human resources.

The high amount of investment needed is also a key issue<sup>32</sup>. Investment needs are associated with financial resources and the risks associated. The market risk associated to the financial resources necessary to allow the amount of investment necessary may weaken Petrobras. To support the costs of future operations, Petrobras has aggressively pursued an open capital strategy domestically and abroad<sup>33</sup>. Moreover, it also borrows money from the Banco Nacional de Desenvolvimento Economico e Social (BNDES), and makes a financial contract with the Chinese oil firm Sinopec and Bank of Development of China (BDC) with the commitment of oil exports<sup>34</sup>. However, the technical and financial challenges associated with the development of Brazil's new oil finds would need to raise further funds to cover the future investments. In a world where credit is crunched, others wonder whether Petrobras will be able to have enough financing funds. Up to know, however, it was not seen any lack of funding to Petrobras investment.

<sup>32</sup> The Petrobras' expected investment between 2011 and 2015 is US\$ 224.7 billion from which 87% is in E&P (Petrobras, 2011).

<sup>33</sup> On September 24, 2010 Petrobras initiated a public offering in New York and São Paulo worth US\$70 billion. Two-third of the new value was acquired by the government.

<sup>34</sup> In May 2009, Petrobras signed agreements with the Bank of Development of China (BDC) and Sinopec, through which obtained loan of U.S. \$ 10 billion and is committed to providing 150 thousand barrels of oil per day to China (Sinopec) in 2009 and 200 thousand barrels per day, between 2010 and 2019 (Itamaraty, 2011). It is worth to note that China become the highest importer of Brazilian petroleum in 2010 (ANP database).

Second, the obligation of join every block (with a minimum sharing of 30%) according to the contract signed in the auction may lead a situation of non-profitability for Petrobras. The consortium of firms may win the PSA auction with a too lower participation of the profit oil. If not obliged Petrobras could choose not take part, though, under the new law it is obliged to participate.

The third drawback for Petrobras (and also for the global welfare) is the decrease of companies' diversity. The decrease of diversity of the companies making research to solve the Pre-salt challenges may decrease the potential and the efficiency of innovation (FGV/IBRE, 2010). Maximizing the reservoirs' recovery and increasing efficiency of the E&P process will require new cutting-edge technology. Theoretical works have pointed out the importance of diversity and competition to drive innovation.<sup>35</sup> Moreover, the study of FVG (2010) showed the potential negative impact in the necessary innovation of having a unique operator for such huge area (FGV/IBRE, 2010). This drawback may be minimized as consequence of the existent IOC's already operating in the pre-salt area in Brazil. Another source of technology diversification can arise from the different operators that may explore and produce oil in equivalent pre-salt fields in other countries (as in the African cost or in the Guyana).

#### *The alignment of capability and the exploration rhythm*

The new petroleum law raises another important issue: as Petrobras is the sole operator in the Pré-Sal, the ways blocks are designed should change? Indeed, as Petrobras is already committed in several blocks (in 2011, Petrobras produced 2.1 million barrels per day in Brazil and 141 million barrels per day abroad), and the company means to operate may be limited (especially in the short term).

We could imagine two scenarios. In the first one, ANP and CNPE could only focus on Brazil interests. In this case, we could imagine that the optimum pace for Brazil could be higher than the optimum one for Petrobras. Thus, in order to increase the speed of exploitation of the area, they could give several blocks to be auctioned. In this scenario, as Petrobras is compelled to operate every attributed block, Petrobras will have to follow a quick pace and may have to abandon some of its positions abroad to operate in the Pre-Salt. However, Petrobras is so important for Brazilian economy that weakening the company could be quite a dangerous behavior for the Brazilian government.

That's why we could imagine a second scenario. In this second scenario, ANP and CNPE would work for the Brazil interests but reminding that compelling Petrobras to work fast could be too costly and inefficient. Therefore, we could imagine communication and mutual agreement between Petrobras and CNPE to adapt the pace. ANP and CNPE would then offer few blocks to be auctioned, giving Petrobras the ability to operate at a reasonable pace.

#### 3.2.2 The overseen role of PPSA

The presence of Petrobras to nationalize the supply chain will be fundamental; however, because of double character of Petrobras (public and private) PPSA will have an overseeing role. PPSA aims to guarantee the interest of the Union. As well as looking for lower costs (to increase government take), the PPSA will need to look for decisions complying with the interest to national industry policy.

The PPSA will have a say in the equilibrium between the costs and the advantages associated with local content policies. They will probably work close to the CNPE being able inform the expected cost and benefits of the choices.

---

<sup>35</sup> For better discussion about the relation between diversity and innovation see (Sampson, 2007) and for competition and innovation see (Gilbert, 2006).

### **3.3 Assessment**

The Brazilian industrial policy aims to promote the internalization of the oil and gas production chain, and hence to increase the aggregate value for the whole economy. It also aims at the stimulation of spill-over effects among industries. The spill-over effects are markedly related to the broader impacts that the efforts to innovate may generate.

The local content clauses give incentives to all operators to internalize and to innovate in Brazil. However until now the capacity of the local content clauses to actually promote the indigenous industry development cannot be fully evaluated as well as the mechanism to define what is the efficient amount of local content. As we described before the rules of local content bids in Brazil's auctions had faced challenges to reveal players information and had changed many times.

In the PSA the government will promote the role of Petrobras as the main driver of oil and gas industrial policy. It can be explained by the observed role that the company has already played under concession regime. First, Petrobras has made the effort to have most of employees in the company citizens of Brazil. This implied a significant internalization of the chain if compared to other companies. Second, Petrobras has given priority to contracting enterprises with high local content, especially long-term contracts. This allowed the development of private national companies. And third, Petrobras has invested heavily in Brazilian research programs with strong cooperation with the Universities.

It is not clear whether the local content clauses will remain as a bid criterion in the PSA regime. However, it is clear that the position of Petrobras as unique operator makes the company the main responsible to drive the development of the Brazilian oil and gas industry. This should be done by increasing Petrobras itself (being a company with high local content, especially with high participation of Brazilian labour) and also by contracts with other companies and research laboratories with high Brazilian content.

Regarding the impact of the regime on Petrobras, we expect it will be positive. Even if we take into account the pressure that is concentrated on Petrobras, the position as unique operator and the consequent compulsory 30% participation will be mainly positive to the company.

We showed that the negative effects related to the resources constraints can be mitigated by adjusting the rhythm of government choices and the potential of Petrobras. The challenges that can be generated by the absence of innovation diversity may be mitigated, first by the current allocation of pre-salt fields (done under concession regime and which are operated by different companies), second by pre-salt technology developed by companies operating pre-salt regions in other countries, e.g. in the African coast. It may be enough to keep diversity on the innovation process. The Petrobras operation monopoly may balance the pressure in the costs caused by the local content policy. First, costs decrease may occur as consequence of the scale and scope economies. Second, as consequence of the Petrobras market power as input buyer, it may push down the input prices.

In a nutshell, the objective to develop the national industry thanks to the new regime is very likely to be achieved.

## **4. Mitigating the oil curse**

Empirical evidence showed that the exploitation of natural resources may not be a driver to promote countries development, and even the contrary natural resources richness may be a "a curse". A number of studies have shown correlation between low economic growth and the exportation ratio of natural

resources<sup>36</sup>. This phenomenon raised the interest of economists, why the natural resources richness rarely means countries prosperity? There is no conclusive work pointing out the causes of the “natural resources curse”. For the sake of this analysis we will divide the causes of natural resources curse in two different issues: first macroeconomic effects that may displace some economic activities because of the exchange rate (often called Dutch disease). The second regards the microeconomic economic effects that displace economic activities by rent seeking behaviour<sup>37</sup>. Besides the monetary effects of the oil rent in a country, in a region with high oil rent can be become more profitable to work for receiving part of this rent than in others activities. For instances it may drive the development of services and commerce to attend the agents receiving part of the oil rent (public or/and private). Moreover, in case of corruption the oil rent spills can be especially dangerous as it deviates the human resources from other productive sectors.

Two modifications in the new regime may avoid the oil curse in Brazil, first is the development of social fund which aims to avoid the Dutch disease dangers. The second is the redistribution of government take among the diverse government levels (municipalities, state and Union). The new arrangement should decrease the risks of the rent seeking hazards.

#### **4.1 The Social Fund: avoiding Dutch disease**

The so-called Dutch disease refers to the fears of deindustrialization that gripped the Netherlands as a result of the appreciation of the Dutch currency after the discovery of natural gas deposits within the country's in the 1960s (Gylfason, 2001a).

In other words, “The Dutch disease is a major market failure originated in the existence of cheap and abundant natural or human resources that keep overvalued the currency of a country for an undetermined period of time, thus turning non profitable the production of tradable goods using technology in the state-of-the-art” (Bresser-Pereira, 2008, page 1).

The shift away from manufacturing can be detrimental: resources (capital and labor) would shift into the production of domestic non-tradable goods to meet the increase in domestic demand and into the booming oil sector. Both of these transfers would shrink production in the now lagging traditional export sector. This is known as the ‘resource movement effect’.

Moreover, the prices of natural resources are quite volatile. That results in a fluctuation in the exchange rates and consequently in the exports and imports. Unstable exchange rates create uncertainty that damages the trade and the investment. Thus, there is an especial damage for the industries with higher need of investment. Because of the long term nature of investments, the uncertainty tends to be harder in the long term. As the activities with higher aggregate value need higher investment (in physical or human capital), the Dutch disease can lead an economy to a less efficient system (Cagnin et al., 2008).

Largely inspired by the Norwegian model, the Social Fund<sup>38</sup> - Fundo Social do Pre Sal - has been created in December 2010 to manage the oil revenues of the Union (Law\_12.351, 2010). The Social Fund could be a solution to mitigate the Dutch disease by absorbing the excess liquidity while fulfilling social achievement, improving Brazilian's standard of living and facing the current infrastructure bottlenecks.

---

<sup>36</sup> For studies on natural resources curses empirical studies see for instance (SACHS et al., 1995), (SACHS et al., 1997), (Auty, 1993) and (Gylfason, 2001b).

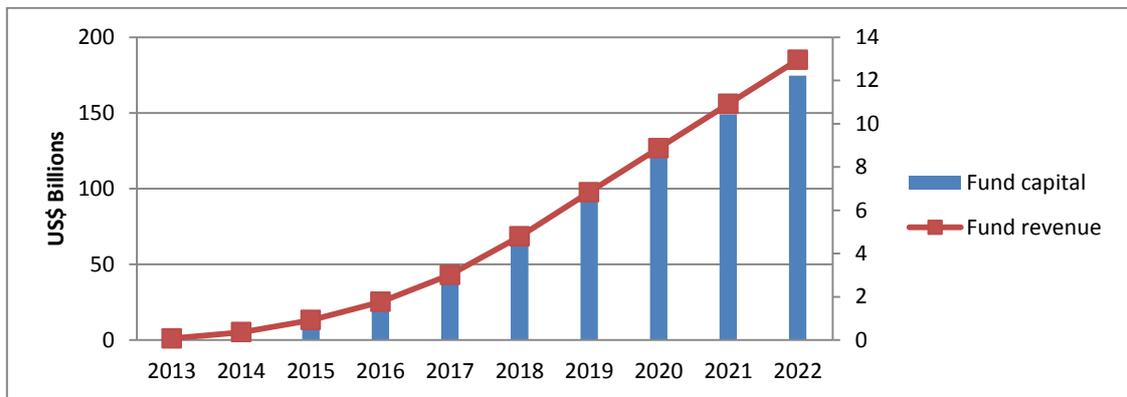
<sup>37</sup> This analysis follows the separation of (Gylfason, 2001b).

<sup>38</sup> Brazilian fund have similarities with the Norwegian fund, seen their hybrid characteristic (saving, stabilization and sovereign wealth), (Fasano, 2000). Nevertheless, it is worth to note that fund expenses would be quite different. While in Norway the fund is dedicated to the pension in Brazil it will be dedicated to reduce many of the social gaps of the country.

We can divide the government funds in at least three different kinds: the stabilization funds (aiming to insulate the budget and economy from volatile commodity prices), the saving funds (aiming to make inter-generation compensation) and the sovereign wealth funds (aiming to diversify the reserves portfolios to have an higher return rate) (Cagnin, et al., 2008). The Brazilian Social Fund aims to be a hybrid fund, at the same time a stabilization, saving and sovereign fund.

The oil fund aims firstly to be an inter-generation compensation. As we can observe in the figure 5, it would represent increasing revenue in time and keeping the capital saved allowing inter-generation compensation. As the capital would not be utilized, independently of the actual production and petroleum rent the volume of revenue would be stable (Cagnin, et al., 2008). It would also avoid the problems associated with the volatility of resources revenue, allowing for instance long term investment (as it is the case of education and healthy sectors).

**Figure 5: Social Fund Simulation**



Source: (Frischtak et al., 2008)

Moreover, in order to avoid Dutch disease effects the Social Fund needs also to act as a stabilization fund. First, it means that at least part of the fund should be invested abroad in order to avoid the over-valuation of the exchange rate. If the social fund makes all the investment in Brazilian currency, it would not be able to avoid the Dutch disease impacts. And in order to have higher return, the social fund should be invested in a diversified portfolio that maximizes returns which will be expended for social purposes. In this way we can say that the Social Fund also will act like a sovereign wealth funds.

It is worth to note that this fund has also some drawbacks, first the save fund needs to postpone consumption. In an undeveloped country where the population has several basic needs, the consumption postponement is not always an ‘acceptable’ solution. Moreover, the character of stabilization fund (keep at least part of the money in a foreign exchange rate) has a financial cost. As Brazilian interest rate are historically much higher than the international interest rate, the stabilization fund has a significant opportunity cost that need to be considered.

#### **4.2 Sharing the resources among municipalities, state and Union**

On the other hand, the “oil curse” could affect Brazil increasing the rent seeking activities and also by increasing the corruption problems<sup>39</sup>. Moreover, experience from the past in Brazil and elsewhere shows that oil windfalls may decrease the incentive of efficient investments decision. In Brazil, being a federation, the states and the municipalities also receive part of the government take. However, the control of the use of the oil revenue in the state and municipal level is much unclear. Studies showed

<sup>39</sup> Brazil is ranked at 69<sup>th</sup> of 180 in Transparency International’s 2010 Corruption Perception Index.

that there is strong misallocation of revenue at the municipality levels and with quite different implication for the cities' wealth (Enriquez, 2007)<sup>40</sup>.

#### 4.2.1 Importance of the oil revenue in Brazilian economy

To understand how important the oil revenues could be in the next generation, we can try to simulate the share of oil revenues in the Brazilian GDP in 2035, when Brazilian production will probably achieve the peak. Let's first start with a reminder of the current situation (see table 4): the oil revenue is about 1% of Brazilian GDP.

**Table 2: Current oil revenues in Brazilian GDP**

	2008	2009	2010
<b>Oil revenues (in R\$ Million)</b>	37525	29557	27920
<b>%GDP</b>	1.24%	0.93%	0.76%

Source: Own elaboration data from ANP and IBGE

We can analyze three different parameters: the oil production, the annual GDP growth rate and the oil price. A likely scenario, which is going to be our reference scenario, could be an annual GDP growth rate of 4.5%, an oil production of 6.5 Mb/d and a global oil price of 247\$<sup>41</sup>. Thus the oil revenues would be in this reference scenario at 273 660 Million R\$, which would represent 4.2 % of the GDP in 2035.

We can now analyze how these three parameters can impact the rate of oil revenue in the Brazilian GDP. So fix two parameters, and we change the other one.

**Table 3: The oil revenue in Brazilian GDP in 2035 for different oil prices scenarios**

Oil price (\$)	210	247	270
Oil revenue (% GDP)	3.5%	4.2%	4.6%

**Table 4: The oil revenue in Brazilian GDP in 2035 for different oil production scenarios**

Production (Mb/d)	6	6.5	7
Oil revenue (% GDP)	3.8%	4.2%	4.5%

**Table 5- The oil revenue in Brazilian GDP in 2035 for different GDP growth rate scenarios**

GDP Growth rate	3.50%	4.50%	5.5%
Oil Revenue (% GDP)	4.8%	4.2%	3.6%

Source: Own elaboration

The rate of oil revenue participation in the Brazilian GDP seems that would be between 3.5% and 4.8%. This range can be higher, between 2.8% and 5.7% if we take the two extreme cases, however

<sup>40</sup> The study shows that the cities have quite different capabilities to manage the resources. "In consideration of weak governance and low human capital accumulation, the possibilities to take advantage of the benefits from mining are limited" (Enriquez, 2007, page 18).

<sup>41</sup> Source: IAE

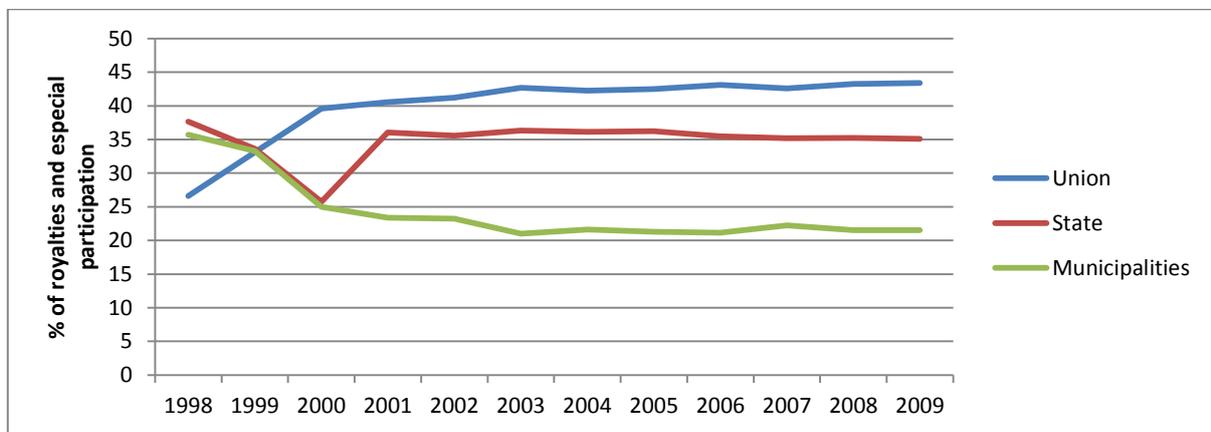
even if the oil industry will increase participation in the Brazilian economy it will not become a kind of oil country<sup>42</sup>.

Nevertheless, the oil revenue will probably strongly increase. It explains the current debate on how to reallocate government take among the different government levels. And this is the only piece of the new oil regime in Brazil which is still under discussion.

#### 4.2.2 A new distribution of oil revenue

We can observe the evolution of the participation of the different government levels in the government take according the law 9.478 (Law\_9.478, 1997) applied until 2012. The figure 6 shows that the Union increased the government take when more productive fields (with special participations fees) started to produce. Nevertheless, as observed in the graphic a quite important part of the royalties and special participation is in the hand of states and municipalities.

**Figure 6: The participation of the different government levels in the royalties and special participation**



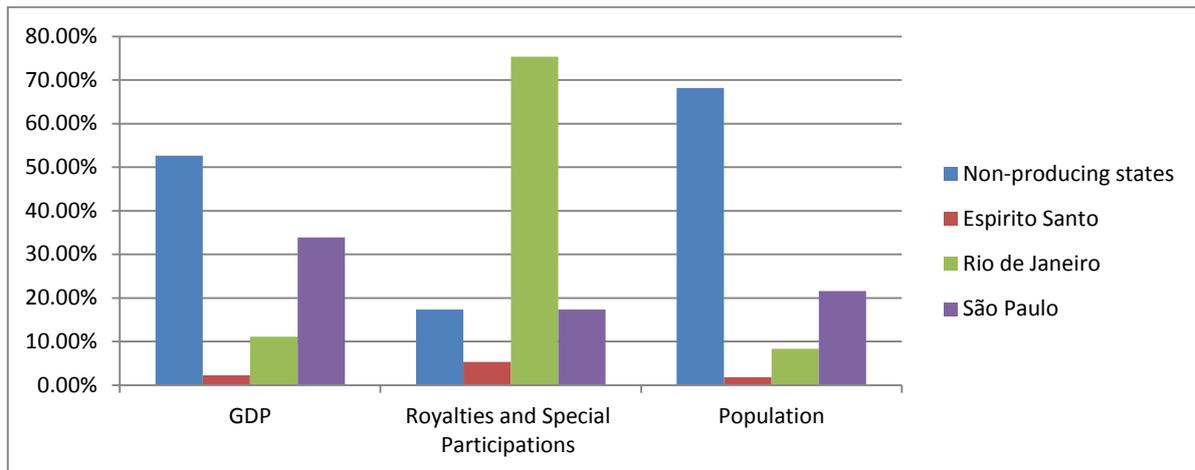
Source: Own elaboration data from (Afonso et al., 2010)

Under the law 9.478 just the municipalities and states bordering the production field receives the royalties and special participation. It shows that there is a strong concentration of oil resources in some regions (and cities). The current distribution is concentrated in three states: Rio de Janeiro, São Paulo and Espírito Santos. Figure 7 shows the discrepancy between the share of the revenue received by the producing states, their population and their GDP. Moreover, as we can observe actually the main concentration of the Royalties and Special participations is in the state of Rio de Janeiro which concentrates more than 80% of the proved reserve<sup>43</sup>, however, the Rio de Janeiro's population is just around 10% of the total Brazilian population.

<sup>42</sup> For instance if we compare with the participation of oil in the Venezuela economy, where it represents around 30% of the GDP, we can expect a lower impact and better possibilities to mitigate the oil curse problems.

<sup>43</sup> Data from ANP, in 2010.

**Figure 7: Distribution of oil revenue (in 2008)**

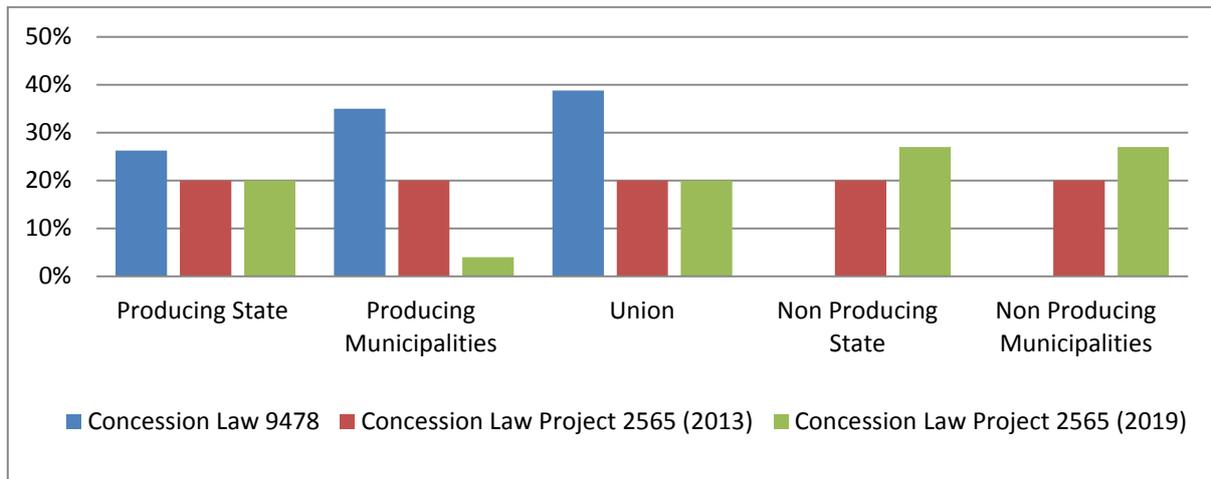


Source: Own elaboration data from (Afonso et al., 2011), ANP and IBGE

The new law from November 2012 for the distribution of the government take among the different government levels was finally approved in march 2013 (Law\_12.734, 2012). The new law resulted in a strong change: especially it would decrease the share of producing states and municipalities and increase the participation of non-producing state and municipalities in the total royalties and special participation. This change would be progressive starting in 2013 and change progressively until 2019.

In the figure 8, the blue bars represents the percentage of royalties' shares taken by each government level (Producing States, Producing Municipalities and Union) under the Law 9478. Note that non-producing states and municipalities do not get any share of royalties in this regime. The green and red barrels how the royalties will be shared among the government level according to the law project 2565. The red barrels show how it will be distributed in 2013 and the greens barrels show it would be distributed in 2019, after the progressive change. Note that under the new law, the non-producing states and municipalities would receive parts of the royalties. It would be done through the formation of a fund with the revenue and shared among the cities and municipalities using the same rules of tax distribution. This fund use would be restricted to some pre-defined uses and they would present administrative accountability from where the rent is expended. It is a way to decrease the problems observed in the municipalities inefficient expenses, and on the other hand keep a level of decentralization in decision of the expenses.

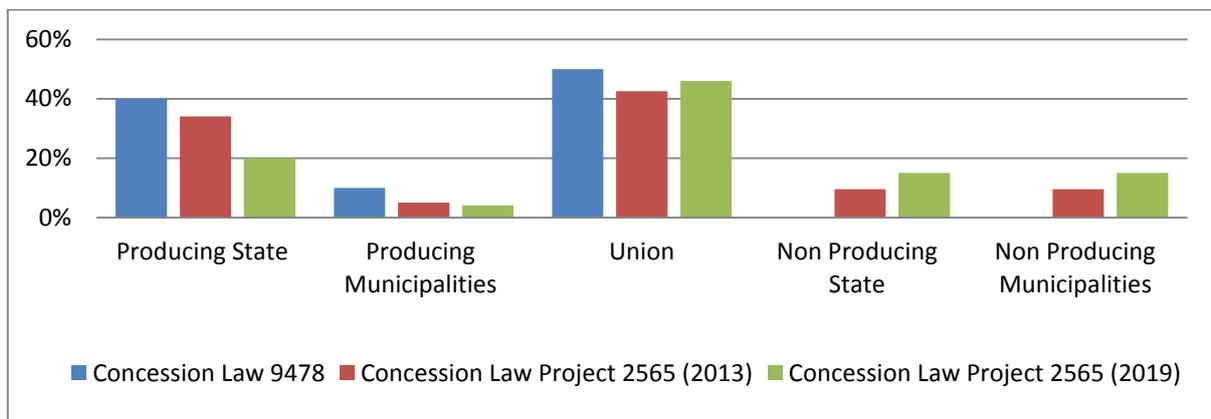
**Figure 8: Royalties split between government levels<sup>44</sup>**



Source: (Law\_9.478, 1997) and (Law\_project\_2565, 2011)

The figure 9 shows the change on the distribution of special participation among different government levels, and we observe the same tendency of the figure 8 a progressive decrease in the participation of producing state and municipalities and an increasing participation on non-producing states and municipalities. The same process of a common fund for the distribution of non-producing states and municipalities' revenues is used to the revenue coming from special participation.

**Figure 9: Special participation split between government levels<sup>45</sup>**



Source: (Law\_9.478, 1997) and (Law\_project\_2565, 2011)

Therefore, the new rule for royalties and special participation will increase the share of the non-producing states and the non-producing municipalities in comparison with the current law. However the share of the the producing states, municipalities and the Union will decrease. It doesn't mean, however, a necessary decrease in the oil revenues because of the expected growth of oil production. This explains also the interest to introduce gradually the changes in the split of the oil revenue, to maintain a certain level of revenue for the producing states and municipalities until the new blocks start to produce.

<sup>44</sup> The value was calculated for offshore take into account the royalty fee of 10%.

<sup>45</sup> The value was calculated for offshore take into account the royalty fee of 10%.

It is worth to underline that under the PSA regime, the government take tool would change as it would include the profit oil and exclude the special participation. As consequence of this new mechanism we can expect an important increase in the participation of the Union in the government take even if there is no other change in the division of royalties and special participation. As described before, in the PSA regime we will also have royalties. And we can expect that their distribution under the PSA regime will follow the same logic of the concession regime<sup>46</sup>.

### **4.3 Assessment**

Brazilian has a diversified economy and oil even if it is becoming important is not and will not be the only main economic drive.<sup>47</sup> At most, oil revenues will be about 5% of GDP in 2035. Nevertheless, measures have been taken to protect the economy against possible drawbacks of natural resource richness.

The promotion of a social fund seems to be quite interesting measure as on the one hand it deals with the problem associated with over-load of foreign devises and on the other hand it gives incentives to promote more efficient expenses of the revenue. Lower volatility of the revenues allows longer term for investment and better rationalization of the efficient way to allocate the resources. The use of this funds to decrease the poverty and to adopt social measures can assure a more equilibrate growth to the country.

The redistribution of royalties and special participation among government levels also is important as it will help to decrease the differences among the regions and it may decrease the inefficient expenses and local oil curse effects observed in the municipality level. However, it is still unclear how municipalities could be actually supervised. Under this new law the non-producing states and municipalities which will receive the revenue through the national funds which will be constrained in their use. Conversely, there is no change on the rules of using of the revenues received by the producing states and municipalities. And if the resources expenses are not well managed at the local level, negative effects would continue to exist.

In a nutshell, the risk of a Brazilian oil curse is very likely to be nip in the bud.

## **5. Conclusion**

Following the Pre-salt fields discovery the Brazilian government launched a series of changes in the law framing the hydrocarbons exploration and production (three of these laws were already approved and one is still waiting for president approval).

We identified three different objectives for the changes contained in the laws: to increase the government take, to develop indigenous industry and to avoid the possible drawbacks resulting from the massive increase of petroleum rents (oil curse)

The main instrument to increase the government take can be identified as the change of regime in the Pre-salt region, from concession regime to PSA regime. In this new regime, the government bears higher risks associated with the production cost, but it is likely to get higher revenue. On the other hand, the increase of government take may increase the challenges related to the oil curse. Another instrument put in place is the creation of PPSA. It may be seen as a complementary mechanism to the PSA. Under the new regime (PSA), the government take is a share of the project profit, which depends

---

<sup>46</sup> As we explained before it does not mean a real decrease in the Union share in the total government take. We can expect that the profit oil taken by the Union under the PSA regime will have an important weight in the total of the government take.

<sup>47</sup> In 2011, Brazil got the position of the world's sixth-largest economy.

on the project costs. In that view, PPSA will be the eyes of the government in order to guarantee cost minimization. On the other hand, PPSA can also be seen as a complementary instrument to the industrial policy that should be carried out by Petrobras. The PPSA, being able to monitor the decisions along the project development, would be able also to participate on the decisions about the technological choices. Thus, PPSA will be able to analyse and evaluate continuously whether the national or international technology should be chosen.

However, the key instrument included in the new framing to drive an industrial policy in the gas and oil sectors is the Petrobras role. As a national company controlled by the government, Petrobras got the responsibility of including high national content in the outsourcing. On the one hand, any industrial policy to incentivize national production has a cost (at least in the short term). In that view, it could drive input prices up impact negatively the government take. On the other hand, the role of Petrobras as unique operator may raise a position of monopsony (or quasi monopsony) and it could push down the input prices, thus raising the government take. In other words, this policy will impact of the government take. Nevertheless, the final assessment of its cost and benefits will depend on the weight of the negative and the positive effects in the costs.

In order to deal with the third objective (to avoid the oil curse), the government created a fund to manage the Union resources. This would avoid negative impact in the exchange rate, would avoid the misuse of the Union resources and would save resources for compensating next generations. Moreover, a new law, currently under discussion, would redistribute the participation of States and Municipalities and also would create constraint mechanisms to avoid misuse of the oil rent.

This new regulatory framework gives much more flexibility for the government to act to drive the country development (through the increase role of Petrobras and the creation of PPSA). Nevertheless, how the government will use this flexibility is key to the success or failure of this regulatory framework. It is important to have a long run strategy. Taking into account the large economic and political uncertainties over the next 20 years, the multilevel public intervention could be seen as a caution approach. There are several instruments in the new regulatory regime for the Brazilian government to intervene. This does not mean they will be fully used, nor even more so badly used.

## References

- Afonso, J. R. and V. Almeida.** 2011. "Tributação Do Petróleo E Federalismo Brasileiro:A Histórica Oscilação Na Divisão Da Receita," Portal de Economia do José Roberto Rodrigues Afonso:
- Afonso, José Roberto and Kleber Pacheco de Castro.** 2010. "Tributação Do Setor Do Petróleo: Evolução E Perspectivas," *Texto para discussão n 12*. Ministério da Fazenda
- AlonsoTrigo, Sérgio.** 2010. "Revisão Dos Critérios De Julgamento Das Ofertas Nas Rodadasde Licitações," IBP, *RIO OIL & GAS EXPO AND CONFERENCE*. Rio de Janeiro.:
- Alveal, Carmen.** 2001. "Evolução Da Indústria Brasileira De Petróleo," Rio de Janeiro: IE/UFRJ:
- ANP.** 2009. "Local Content: Goals and Brief History," Agência nacional de Petróleo Gás Natural e Biocombustível,
- \_\_\_\_\_. 2011. "Pre-Salt Changes Oil&Gas Perspectives in Brazil," National Agency of Petroleum, Natural Gas and Biofuels:
- Auty, R.** 1993. "Sustaining Development in Mineral Economies: The Resource Curse," *Londres: Routledge*.
- BCG.** 2011. "Investigating the Impact of Experience Curves on the Development of Brazil's Pre-Salt Cluster," *Boston Consulting Group*. World Oil®: September 2011:
- Bresser-Pereira, Luiz Carlos.** 2008. "The Dutch Disease and Its Neutralization: A Ricardian Approach." *Revista de Economia Política*, 28 (1), 47-71.
- Brinsmead, Simon.** 2011. "Oil Concession Contracts and the Problem of Hold-Up." *CEPMLP*, 17.
- Bucheb, J. A.** 2007. "Direito Do Petróleo - a Regulação Da Atividade De Exploração E Produção De Petróleo E Gás Natural No Brasil." *Lumen Juris*, 355.
- Cagnin, Rafael Fagundes and Marcos Antonio Macedo Cintra.** 2008. "Experiências Internacionais Na Gestão De Recursos Provenientes Da Exploração Do Petróleo." *IEDI - Estudos sobre o pre-sal*.
- ECLAC.** 1995. "Latin America and the Caribbean: Policies to Improve Linkages with the Global Economy." *LC/G.1800/Rev.1-P. Santiago, Chile: ECLAC*.
- Enriquez, M.A. D.** 2007. "Curse or Blessing? The Mineral Rent Used by the Larger Mining Cities in Brazil," *Working Paper*. Universidade Federal do Para (UFPA):
- Fasano, Ugo.** 2000. "Review of the Experience with Oil Stabilization and Saving Funds in Selected Countries," *Working Paper/00/112*. IMF:
- FGV/IBRE.** 2010. "Pré-Sal: Potenciais Efeitos Do Operador Único," Fundação Getulio Vargas:
- Frischtak, Claudio and Andrea Gimenes.** 2008. "A Tributação Sobre O Pré-Sal E a Constituição De Um Fundo De Modernização Da Infra-Estrutura," IEDI, *Estudos Sobre O Pré-Sal*.
- Gilbert, Richard J.** 2006. "Competition and Innovation." *Issues in Competition Law and Policy*, Ed. Wayne Dale Collins. American Bar Association Antitrust Section.
- Gylfason, T.** 2001a. "Lessons from Dutch Disease: Causes, Treatment and Cure," *Working Paper n. 6*. Institute of Economic Studies:
- Gylfason, T.** 2001b. "Natural Resources and Economic: What Is the Connection?," *Working Paper n. 530*. CESifo:
- Hernades-Perez, Adriana.** 2011. "Oil and Gas Bidding with a Dominant Incumbent: Evidence from the Brazilian Oil Block Auctions," *Working paper series*. IBRE-FGV/RJ,

- Hernandez-Perez, Adriana.** 2011. "Economics of Oil Regulation and the Brazilian Reform: Some Issues." *Energy Policy*, 39(1), 57-65.
- Heum, Per; Robert Kasande; Ole Fredrik Ekern and Alex Nyombi.** 2011. "Policy and Regulatory Framework to Enhance Local Content: Yardsticks and Best Practice," *The project is financed by Norwegian Petroleum Directorate*. Institute for research in economics and business administration: Bergen
- Itamaraty.** 2011. "Balanço Da Política Externa 2003-2010: Asia E Oceania - Energy," Itamaraty, Itamaraty.gov.br:
- Kahn, Alfred E.** 1970. *The Economics of Regulation: Principles and Institutions*. New York: John Wiley & Sons, Inc.
- Kosacoff, B. and A. Ramos.** 1999. "The Industrial Policy Debate." *CEPAL Review*, 68, 35-60.
- Law\_9.478.** 1997. "Lei Nº 9478, De 6 De Agosto De 1997, Dispõe Sobre a Política Energética Nacional, as Atividades Relativas Ao Monopólio Do Petróleo, Institui O Conselho Nacional De Política Energética E a Agência Nacional Do Petróleo E Dá Outras Providências,"
- Law\_12.276.** 2010. "Lei Nº 12.276, De 30 De Junho De 2010, Autoriza a União a Ceder Onerosamente À Petróleo Brasileiro S.A. - Petrobras O Exercício Das Atividades De Pesquisa E Lavra De Petróleo, De Gás Natural E De Outros Hidrocarbonetos Fluidos De Que Trata O Inciso I Do Art. 177 Da Constituição Federal, E Dá Outras Providências.,"
- Law\_12.304.** 2010. "Lei Nº 12.304, De 2 De Agosto De 2010, Autoriza O Poder Executivo a Criar a Empresa Pública Denominada Empresa Brasileira De Administração De Petróleo E Gás Natural S.A. - Pré-Sal Petróleo S.A. (Ppsa) E Dá Outras Providências. ,"
- Law\_12.351.** 2010. "Lei Nº 12.351, De 22 De Dezembro De 2010, Dispõe Sobre a Exploração E a Produção De Petróleo, De Gás Natural E De Outros Hidrocarbonetos Fluidos, Sob O Regime De Partilha De Produção, Em Áreas Do Pré-Sal E Em Áreas Estratégicas; Cria O Fundo Social - Fs E Dispõe Sobre Sua Estrutura E Fontes De Recursos; Altera Dispositivos Da Lei No 9.478, De 6 De Agosto De 1997; E Dá Outras Providências.,"
- Law\_12.734. 2012.** Lei Nº 12.734, De 30 De Novembro De 2012, Modifica as Leis nº 9.478, de 6 de agosto de 1997, e nº 12.351, de 22 de dezembro de 2010, para determinar novas regras de distribuição entre os entes da Federação dos royalties e da participação especial devidos em função da exploração de petróleo, gás natural e outros hidrocarbonetos fluidos, e Para aprimorar o marco regulatório sobre a exploração desses recursos no regime de partilha.
- Law\_Project\_448.** 2011. "Projeto De Lei Do Senado 448/2011, Dispõe Sobre Royalties E Participação Especial Devidos Em Função Da Produção De Petróleo, Gás Natural E Outros Hidrocarbonetos Fluidos Sob O Regime De Concessão No Mar Territorial, Na Zona Econômica Exclusiva E Na Plataforma Continental, E Sobre Royalties Devidos Sob O Regime De Partilha De Produção, Instituído Pela Lei Nº 12.351, De 22 De Dezembro De 2010.,"
- Law\_project\_2565.** 2011. "Modifica as Leis Nº 9.478, De 6 De Agosto De 1997, E Nº 12.351, De 22 De Dezembro De 2010, Para Determinar Novas Regras De Distribuição Entre Os Entes Da Federação Dos Royalties E Da Participação Especial Devidos Em Função Da Exploração De Petróleo, Gás Natural E Outros Hidrocarbonetos Fluidos, E Para Aprimorar O Marco Regulatório Sobre a Exploração Desses Recursos No Regime De Partilha," Câmara dos Deputados:
- Lima, Paulo César Ribeiro.** 2011. *Pré-Sal, O Novo Marco Legal E a Capitalização Da Petrobras*. Synergia
- Macedo, Marcelo Mafra Borges de.** 2012. "Certificação De Conteúdo Local No Setor De Petróleo E Gás," *Agência Nacional do Petróleo, Gás Natural e Biocombustíveis - ANP*. Coordenadoria de Conteúdo Local (CCL):

- Matoso, Rafael and Marcelo Rezende.** 2011. "Asymmetric Information in Oil and Gas Lease Auctions with National Company," *Working Paper Series SSRN* <http://ssrn.com/abstract=1868976>:
- MME.** 2012. "Conselho Nacional De Política Energética (Cnpe)," [http://www.mme.gov.br/mme/menu/conselhos\\_comite/cnpe.html](http://www.mme.gov.br/mme/menu/conselhos_comite/cnpe.html),
- Nakle, Carole.** 2008. *Petroleum Taxation: Sharing the Oil Wealth: A Study of Petroleum Taxation Yesterday, Today and Tomorrow.* USA: Routledge.
- Negri, João Alberto De; Fernanda De Negri; Lenita Turchi; Marcio Wohlers; José Mauro de Moraes and Luiz Ricardo Cavalcante.** 2010. "Poder De Compra Da Petrobras: Impactos Econômicos Nos Seus Fornecedores Síntese E Conclusões," *Diretoria de Estudos e Políticas Setoriais, de Inovação, Regulação e Infraestrutura (Diset).* IPEA:
- Nordås, H.; E. Vatne and P. Heum.** 2003. "The Upstream Petroleum Industry and Local Industrial Development," *SNF-Report 08/03.* Bergen: The Institute for Research in Economics and Business Administration:
- Petrobras.** 2012. "Estatuto Social Da Petrobras,"
- \_\_\_\_\_. 2011. "Strategic Plan 2020," Petrobras: Rio de Janeiro:
- Pires, Flávia Waehneltd Rocha.** 2011. "O Novo Marco Regulatório Do Pré-Sal," *Law department.* PUC - RJ,
- Prebisch, Raul.** 1959. "Commercial Policy in the Underdeveloped Countries." *American Economic Review of Derivatives Research*, 49, 251-73.
- Regra, André.** 2008. "Participações Governamentais E De Terceiros Na Lei Do Petróleo," B. t. R. O. G. B. Rounds, ANP:
- Rocha, Claudio Eduardo L. de Abreu.** 2010. "Conteúdo Local Na Concessão: Da Licitação À Fiscalização " COPPE/UFRJ, Pos graduação Executiva em Petróleo e Gás,
- Rodrick, Dani.** 2004. "Industrial Policy for the Twenty-First Century," *UNIDO.* Harvard University:
- Rodriguez, M.R. and S.B. Suslick.** 2009. "An Overview of Brazilian Petroleum Exploration Lease Auctions." *TERRE/E*, 6(1), 6-20.
- SACHS, J. D. and A. M. WARNER.** 1995. "Economic Reform and the Process of Global Integration." *Brookings Papers on Economic Activity*, 1, 1-118.
- SACHS, J. D. and A. M. WARNER.** 1997. "Sources of Slow Growth in African Economies." *Journal of African Economies*, 6(3).
- Sampson, Rachelle.** 2007. "R&D Alliances and Firm Performance: The Impact of Technological Diversity and Alliance Organization on Innovation." *The Academy of Management Journal ARCHIVE*, 50(2), 364-86.
- TCU.** 2010. "Acompanhamento Anp. Outorga De Concessão Para Exploração E Produção De Petróleo E Gás Natural Décima Rodada De Licitações.," *ANP4895.* Tribunal de contas da União:

**Authors contacts:**

**Michelle Hallack**

Robert Schuman Centre for Advanced Studies, EUI

Via delle Fontanelle, 19

I-50014 San Domenico di Fiesole (FI)

Email: michellehallack@gmail.com

**François Lévêque**

Mines-ParisTech

60 bd Saint-Michel

75006 Paris

France

Email: francois.leveque@mines-paristech.fr