

Contrasts in concession and sharing agreements for oil and gas exploration and production in Brazil

Contrastes nos contratos de Concessão e Partilha para exploração e produção de óleo e gás no Brasil

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Recibido: 18/01/2017 • Aprobado: 15/02/2017

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ABSTRACT:

This study analyzed policy frameworks of petroleum exploration and production in Brazil. In 2010, the Government introduced Production Sharing Contracts. The first auction of new contract model occurred in 2013 and attracted one bidder that acquired the area. It was concluded that: i) the basis for the model selection was the increase of governmental participation; ii) two different Policy Model created legal conflicts, decreasing the attractiveness of the petroleum business, iii) the policy models differ in their levels of attractiveness.

Keywords Policy; Petroleum; Exploration and production; Contract

RESUMO:

Este estudo analisou a regulação da exploração e produção de petróleo no Brasil. Em 2010 o Governo introduziu os contratos de partilha da produção. O primeiro leilão do novo contrato ocorreu em 2013 e atraiu um concorrente que adquiriu a área. Concluiu-se que i) a base para a Seleção do modelo foi o aumento da participação governamental; ii) dois diferentes modelos criaram conflitos legais, diminuindo a atratividade do negócio; iii) os modelos diferem nos níveis de atratividade.

Palavras-Chave: Regulação; Petróleo; Exploração e Produção; Contratos

1. Introduction

In 1858 the first oil mining authorization was issued in Brazil, signed by the Imperial Authority (Quintas & Quintans, 2010), and in 1859 Colonel Drake discovered oil in the city of Titusville, Pennsylvania, USA (Yergin, 1992). Hence the oil production industry has a history of more than 150 years, in both the world at large and Brazil. However, in the early times, the activity was small scale, cluttered and with no control of its impacts.

After World War II, the large availability of oil from the Middle East countries engendered

complacent energy policies worldwide, that supported the outstanding growth of the developed countries (Fouquet & Pearson, 1998). By these times, no severe limitation on the use of energy had been imposed to society, who promoted a large wastage of combustibles through uncontrolled home heating enlightening, transport and industrialization (Graetz, 2012). Besides the abundant availability of petroleum, the lack of any kind of environmental concern increased energy wastage in an uncontrolled way. Exploration, production and transformation of oil regulations did not exist and almost anyone could produce energy without any constraint. The 1973 crisis changed suddenly and radically this landscape, pulling countries to redesign their energy policies, through the imposition of new regulations. These regulations were based on the main fact that oil is a common asset, regardless exploited by private or public companies (Rudiger, 2014). Besides, the environmental impacts of the activity were highlighted in the 1972 Environmental Summit (United Nations Environmental Program, 1972) generating further environmental regulations. The main point of the oil production worldwide was the fact that it was a common asset and its exploration, production and transformation were environmentally degrading activities that should be subject to strict regulations or society compensation.

The need for capturing rent from petroleum production drove states to develop a number of regulatory mechanisms which evolved with time, culture and the experience of each country (Kaiser, 2007). Anderson (1997) reviewed these regulatory mechanisms and observes that they can be traced in the silver mining industry as early as 480 B.C., in the ancient Greece. After this author, in this period, the primitive mechanisms were restricted to royalties for the State, as a function of the production. With time, these contracts evolved and are getting more and more complete, incorporating aspects like the destiny of the production, environment, labor, technology development, etc. Although every exploration and production contract has its own characteristics and aims, the rent capture mechanisms may be divided into three large groups: concessions, sharing contracts and direct assignment of exploratory rights.

Although the aim of the rent capture contracts are focused on the remuneration of the state for the common asset, the contracts must consider the need for an efficient and profitable production for the Oil Companies as well. Therefore, the contracts have to preview a balanced remuneration that do not exclude private companies and the application of up to dated (expensive) technologies. Recently models applying stochastic approaches have been developed to quantify the rent of the State and profits of the Oil Companies in order to reach this economic balance and to promote the safe exploitation of these resources (Hao & Kaiser, 2010).

The mechanisms for withdrawal of petroleum from the subsoil have to be deeply discussed because, regardless the risks of climate changes, this asset is expected to dominate energy production in the next years. According to the forecasts presented in the World Energy Outlook 2013 report, put out by the International Energy Agency (IEA, 2013), by the year 2035 oil and gas will still be responsible for supplying 50.5% of all primary energy worldwide. The same report also predicts that in 2035, 76% of world primary energy demand will be fulfilled by three types of energy: oil, natural gas and coal. These predictions conflict with the need to substitute fossil fuels by low-carbon sources, in order to control CO₂ emissions. Clearly, the planet as a whole faces the same dilemma as do individual nations: balancing the need for energy against environmental protection, particularly the imperative to minimize the increase in global temperature (IEA, 2013).

In Brazil, although in 2013 46.4% of the energy production came from renewable sources (MME & EPE, 2014), oil and natural gas still contributed 51.4% of the share, making petroleum the most important energy element in the national production mix. According to the International Energy Agency (IEA, 2013), in its New Policies Scenario for 2035, it is projected that petroleum will still be responsible for 50.4% of the total supply of Brazilian primary energy, with 34.4% in the form of oil and 16.0% in the form of natural gas. To support this consumption, oil production will grow from 2.2 million barrels day⁻¹ in 2012 to 4.1 million barrels day⁻¹ in 2020 and to 6 million barrels day⁻¹ in 2035 (IEA, 2013). This growth prediction is based on the newly discovered hydrocarbon deposits of the pre-salt reservoirs.

Deep-water petroleum exploration of the pre-salt reservoirs will strongly increase the complexity of the projects and their investment scale (IEA, 2013). This production scenario will not be

attained if the required financial resources are not allocated by the industry, if adequate extraction technology is not available, or if the industry is unable to develop the necessary technical capacity. In this context, efficient and balanced exploration and production contracts should be developed that remunerate the whole society, but at the same time is profitable for the companies, including the Brazilian Petroleum Company (Petrobras).

Like other countries worldwide, the Brazilian Government has evolved in the application of these contracts and presently regulatory mechanisms for the assignment of exploratory areas to national and international companies are inscribed in a historical, political and economical framework. The objective of the present work was to evaluate the strengths and weakness of each of the regulatory mechanisms of assignment of exploratory areas. Among these regulatory mechanisms (models) we focused on concession contracts, production sharing contracts. Direct assignment of exploratory rights and service contracts are applied in very specific cases in Brazil.

This study considered: i) the reasons for the choice of new models, as a function of the level of governmental participation in the activity; ii) other countries' policies, even though unsuitable for Brazil, because of the level of governmental participation in the activity; and iii) the suitability of individual companies to the four policy models as mentioned above.

2. Methods

In the present work we applied a qualitative methodology: critical analysis of narrative in which the research group has the objective of studying processes through actual experiences and from preferences expressed by stakeholders (individuals or organizations), either orally or written (Creswell, 2012). In the present study, we focus on the analysis of the Brazilian government's actions related to the construction of a regulatory model in the oil and gas industry, between the years 1997 and 2010. The research was carried out mainly using the websites of the Ministry of Mines and Energy (MME), the National Petroleum Agency (ANP), the Natural Gas and Biofuels Energy Research Company (EPE), and the Brazilian ensemble of the legislation regulating the industry.

We believe that the literature survey undertaken here, together with a critical analysis of the state's acts followed on the above mentioned websites, may foster a more in-depth

3. Results and discussion

3.1. Depicting policy models for oil and gas exploration and production

In order to withdraw petroleum and gas from the reservoirs, Governments normally apply three basic commercial models to explore and produce petroleum: 1) formation of a State company: as in Mexico, Saudi Arabia and Oman; 2) contracting with private companies: as in Canada, USA, Australia and the United Kingdom; and 3) a combination of these first two forms, forming a public-private partnership, as in Brazil, Kazakhstan, Nigeria and Norway. In these last two models, although the work is performed by private companies, the states define the model of contract to be adopted for each area. The main models of contract are Concession, Production Sharing, Direct Assignment of Exploratory Rights and Service Contract, which aim to attract private enterprises to carry out exploration and production activity, while obtaining as much public revenue as possible from the activities (Lima, 2011). The type of contract chosen defines the role and participation of the states, since public income can be earned either via tax rates and government tax structures, or by a direct government share in the procedures. Whichever the model of contract, States usually issue public auctions in order to give to the exploration and production companies the opportunity to compete for the best fields.

When governments decide to arbitrate on oil research and exploration rights, they work with the following perspectives (MME, 2014):

1. Perspective of Income: After Tolmasquim and Pinto-Junior (2011), this perspective is about how the

petroleum income will be distributed between the government and private companies. Petroleum income is the difference between gross revenue from the sale of the product and the cost of exploration and exploitation, including an expectation of return on the invested capital, which is based on the financial markets. In practice, the income to be captured by the government can be realized through either a concession agreement, a sharing contract by simply calibrating how much revenue the government needs, through taxes or sharing production, and how much private profit is desired by companies willing to explore and produce. These calculations can be carried out through financial models, like the one applied by Hao and Kaiser (2010).

2. Investment attraction: Also according to Tolmasquim and Pinto-Junior (2011), the expectation for attracting investments in exploration and production activity is a key factor in determining the income portion for the companies. According to Quintas and Quintans (2010), companies' investors consider the taxes, political regime, regulatory stability of the country and the geological risk of the offered area. They will also consider the technical challenges and the exploration and production costs. Hao and Kaiser (2010) show an example of the calculation carried out in a sharing contract system in China, which is similar to Brazilian's, attributing to government taxes and royalties, the costs of recovery and the profits are equally split between a national oil company and an international oil company. For attracting private investors, governments need to consider all of these factors, in order to determine how much income would be sufficient to remunerate the investments and risks involved in the operation. As discussed in Quintas and Quintans (2010), depending on the country, private companies may establish the remuneration very high. This seem to be the case in Brazil, because after 20 years of market opening, companies like ExxonMobil, Shell, Chevron, BP, Statoil, Devon, Anadarko and Kerr Mcgee that are able to explore and produce oil in the deep and ultra-deep waters of the new pre-salt reservoir (MME, 2014), did not decided yet to enter the game, regardless the fact that the areas are highly attractive.

Level of governmental participation: While the government is responsible for controlling and enforcing exploration, production and sale of oil and gas, it needs to determine its own level of direct participation in the industry. All governments apply taxations and fees to the oil production, some can be very light like or very heavy, depending on the perception of taxation as an opportunity to make revenues (when taxes are elevated), or opportunity of improve local production (when taxes are small) (Osmundsen & Løvås, 2009). Besides, Governments can further increase their part on participating on the production, and consequently participating in the risk. This can be done through National Oil Companies (NOCs) or sharing with International Oil Companies (IOCs). Participate in oil production is a big challenge for Governments because they have to develop edge technologies, which have already been acquired by IOC. For instance, in Brazil, the National Oil Company Petrobras has been developing its own technologies since the early 1950s, but deep water wells demand partnerships with IOCs. Another way to increase the governmental rent on petroleum production is to assume the marketing of the product in the internal market and externally. In addition, the arrangement also allows the State to fully assume planning, coordinating and fostering of the results of the exploitation for the benefit of the country society.

3.2. Brazilian Policy Framework 1997 – Concession Contracts

In Brazil, from 1954 to 1997, exploration for and production of oil were carried out exclusively by the state-owned company Petrobras (Campos, 2014). Article 177 of the 1988 Brazilian Constitution mandated that exploitation of oil fields, oil refining, oil import and oil export were the monopoly of the State; assigning or granting oil fields to private oil companies was illegal.

Whether public or private enterprises are more desirable is always debatable. Tirole (2014) pointed out that market competition can work in the consumer interest because it motivates businesses to produce high-quality and low-cost products and services, whereas a monopoly can impose private interests on the public, especially when they are free to set prices and define quality.

According to Armstrong and Sappington (2006), a challenge for many governments is the introduction of competition into regulated monopolies. While a competitive environment may be desirable for private companies, governments need to develop and enforce market-monitoring regulations to ensure fair prices and adequate quality, and to prevent the development of private monopolies/oligopolies. Although there are a number of ways to deal with these challenges, the

optimal liberalization policies are very difficult to determine and to implement.

In order to introduce competition in the petroleum industry, in November 1995 the Brazilian Congress approved Constitutional Amendment # 9, which, although keeping the government monopoly, allowed oil exploitation activities to be contracted out to public and private companies through bidding processes (Lima, 2011). This Concession Contract was similar to those used by oil-producing countries such as the United States, Canada, Scotland, England, Norway and Australia, cited as references by the Brazilian Government (MME, 2014). The successful use of the Concession Contract in these developed countries provided the inspiration for its implementation in Brazil.

Applying the concession regime, 12 public auctions were held by the National Petroleum Agency, and in 2012, 701 areas (blocks) were granted. Among these Concessions, 279 are presently in the exploration phase, 75 are developing, and 347 are producing oil and gas (ANP, 2015). During the last ten years, 800 exploratory pioneer wells have been drilled, resulting in 448 discoveries. The rate of success in 2012 was 61.8% on land and 57.8% offshore. From 2003 to 2012 the average rate of success was 52%. The development of the discoveries has evolved Brazilian reserves from 11.2 billion barrels of oil in 2004, to 15.6 billion barrels in 2013, a 39.3% growth, see Table 1 (ANP, 2015). There has been a significant evolution of proven reserves of natural gas as well, growing 40.5% during the same period. According to a report from BP (2014), in 2013, Brazil occupied the fifteenth position worldwide in proven oil reserves and the thirty-second position in natural gas, most of which in the new frontiers of the pre-salt area.

Since 2004 there has been a significant transformation of reserves into production, with an increase of 36.62% in oil production, 46.67% in liquid natural gas and 66.0% in natural gas (Table 2). This production lead Brazil to the thirteenth position in the world production of oil and in thirty-third in natural gas. Although so far Brazil has concentrated production on oil, the characteristics of its sedimentary basins promote the production of natural gas in association with oil. 66.6% of the total natural gas produced in 2013 was associated with oil. It is noteworthy that the peak of Brazilian oil production occurred in 2011, with an average daily production of 2,193 thousand barrels of crude per day.

Proven oil reserves (Billion of Barrels)										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	11,243	11,773	12,182	12,624	12,801	12,876	14,246	15,050	15,314	15,593
Onshore	865	883	905	886	896	939	916	915	920	898
Offshore	10,379	10,890	11,277	11,738	11,906	11,937	13,330	14,135	14,394	14,695
Proven Natural Gas Reserves (Billion m3)										
Total	326,084	306,395	347,903	364,991	364,236	367,095	423,003	459,403	459,187	458,163
Onshore	73,730	71,752	74,522	68,131	66,305	65,489	68,803	70,577	72,375	69,780
Offshore	252,354	234,643	273,381	296,860	297,931	301,606	354,200	388,827	386,812	388,382

Table 1. Brazilian proven reserves. Source: ANP (2015)

Oil production (Million Barrels)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	540.717	596.255	628.797	638.018	663.275	711.883	749.954	768.471	754.409	738.715
Onshore	78.632	74.962	70.841	69.893	66.337	65.465	65.973	66.441	66.046	63.893
Offshore	462.085	521.292	557.957	568.126	596.938	646.418	683.981	702.029	688.363	674.822
LNG Production (Million Barrels)										
Total	22.457	28.943	31.532	30.903	31.628	28.717	30.204	31.942	32.131	32.938
Production of associated and no-associated natural gas (billion m3)										
Total	16.971	17.699	17.706	18.152	21.593	21.142	22.938	24.072	25.832	28.174
Associated	12.981	13.778	13.661	13.506	14.519	16.976	17.300	17.650	17.939	18.767
Non-associated	3.990	3.921	4.045	4.645	7.074	4.165	5.638	6.422	7.893	9.407

Table2. Oil and natural gas production in Brazil in the last 10 years. Source: ANP (2015)

Since 1997, Petrobras has lost some of its market shares, and some private companies are now operating oil production fields on both land and sea. Nevertheless, according to the ANP (2015), Petrobras still accounts for 92.4% of the oil operations in the country, see Table 3. The tenth largest producer, Partex, produced an average of only 323 barrels of oil per day in 2012.

Operator	Oil (Million barrels)
Petrobras	696.89
Shell Brasil	21.96
Statoil Brasil	22.46
Chevron Frade	4.50
BP Energy	4.41
OGX	3.17
Sonangol Starfish	0.23
Petrosynergy	0.21
Gran Tierra	0.13
Partex Brasil	0.12

TOTAL**754.41****Table 3.** Oil production in Brazil in 2012, by operator. Source: ANP (2015)

The reason for this failure to establish a competitive environment may be linked to the lack appetite from the IOCs. Shell, BP, BG, Chevron etc. have the strength and the technology to compete in the Brazilian petroleum production market, but they are not buying the blocks and they are not exploiting. Over its more than 40 years of operation, Petrobras has developed a scale that gives it the best competitive position in these auctions. So, in this context, what would be the best conditions to improve competition in the market of oil production in Brazil? Considering the market share in Brazil, it is necessary that IOCs apply greater efforts in exploration and production. Armstrong and Sappington (2006) observe that “during the transition process, strengthened regulatory scrutiny may be required.” The imbalance in information among the monopolist, new entrant companies and governmental agencies, for example, ensures the established players a better competitive position. In Brazil, Petrobras has a long experience in the industry, and has gone through the long-term costs of the operation knowledge, allowing it to better estimate rates of return— critical information to determine prices.

The industry life cycle also helps to explain the behavior of the Brazilian market. Once an exploratory offshore block is acquired, according to the ANP (2014), the time between the beginning of the exploratory process and the first produced oil can take 10 years, with the first half of the time devoted to exploration and the other half to the development of production, if in fact the block is viable. Table 4 summarizes the bidding rounds made by the ANP, which includes the new operators’ entries and show that although the opportunities were given to the IOCs, Petrobras is the prevailing investor. The question is what is necessary to improve competition in the Brazilian petroleum market? Do Brazilian laws need to be improved? Are the concession and sharing models adequate to promote competition? What is necessary to increase the long term investments of the IOCs?.

Bid Rounds	01	02	03	04	05	06	07	09	10	11	12
Year	1999	2000	2001	2002	2003	2004	2005	2007	2008	2013	2013
OFFERED BLOCKS	27	23	53	54	908	913	1.134	271	130	289	240
ACQUIRED BLOCKS	12	21	34	21	101	154	251	117	54	120	ZERO
IOCs	6	6	8	5	1	1	6	11	2	6	ZERO

Table 4. Results of bidding rounds prior to 2013. Source: ANP (2014)

Due to the definition of new regulations for the pre-salt reservoirs, the Brazilian government interrupted bids between 2008-2012, promoting serious damages in the industry competition. The oil industry moves with exploration campaigns, and those only take place where new areas become available. To stop granting exploration areas is to stop the birth of new cycles in the industry. In addition to the interruption, another situation that weakens the industry is its dependence on offshore wells. The challenges for new operators are the complexity, time organization, knowledge, supplier base structuring, skilled labor recruitment and learning curves. In 2012, 91.2% of the total oil produced in Brazil came from the sea (ANP, 2015).

The petroleum industry relies on a complex infrastructure, which requires time for mobilization, demobilization, and operational scale—other factors contributing to the small number of new entrants in each bidding round. Recognizing the losses caused by interrupting the bidding for exploration areas, the government has released three bids in a single year, as occurred in 2013 (ANP, 2014). Of these three bids, only one was conducted under the new sharing contract

regulatory model, with the formation of Pre-salt SA, an specific National Oil Company for that reservoir. It should be kept in mind, as stated by Tirole (2014), that new regulatory frameworks need extended time to be structured and to mature.

3.3. The Brazilian regulatory framework 2010 - Production Sharing Contract

With the confirmation of the potential of oil discoveries in the reservoirs located in the pre-salt areas (Campos, Santos and Espírito Santo basins), authorities started to debate the best regulatory model to be deployed for the exploration and production (ANP, 2014). Although the first field was discovered in 2006 in the Santos basin, this debate was intensified and the auctions were interrupted, after the tenth round in 2008 (ANP, 2014). The interruption was supposed to improve the regulatory settings that should consider the lower exploration risks and higher production potentials, considering the higher incomes of the activity. The sharing contract suppose an intense participation of the Government and higher income for the country as well (Vikas, Eppink, Godec, & Int Assoc Energy, 1997; Yusgiantoro & Hsiao, 1993). Regardless the political debates, Petrobras advanced its exploration campaigns in the pre-salt area, drilling an evaluation well in order to estimate the extent and dimension of the discovery (Lima, 2011). The new well drilled in 2007 was successful, and indicated that the potential of the newly discovered reservoir could be 5 to 8 billion barrels of equivalent oil, which makes it one of the largest reservoir sever discovered... It is evident that the action of Petrobras quantifying the dimension of the pre-salt, pressured the regulatory debate in its favor. In the late 2007, the National Energy Policy Council made the official announcement of the findings, and started studying them, in order to review the feasibility of the concession contract (Lima, 2011).

The pre-salt discoveries ranked Brazil as a major producer and exporter in the future (IEA, 2013), because of the new geological model, which has been confirmed in a number of new wells. According to this source, the Brazilian production is expected increase to 4.1 million barrels of oil per day by 2020, reaching 6.0 million barrels per day in 2035. The Agency points out, however, that the new production is not sufficient to compensate the decline in production from mature fields since 2012, when the production leveled off at around 2.0 million barrels per day. To bring the reservoirs of the pre-salt into production is a major operational and financial challenge, that will require heavy investments from the NOCs, or from the IOCs, which demands a lot of infrastructure, but mainly a lot of up to dated technology. The IEA (2013) points out that the technological challenges of oil production in the pre-salt fields have to reconcile with the Local Content Policy, which establishes a mandatory proportion of Brazilian technology. Although there can be no oil production without discoveries and reserves, having discoveries and reserves does not eliminate production challenges. For example, according to the BP report (BP, 2014), Venezuela had, at the end of 2012, 297.6 billion barrels of oil in reserves, making it the owner of the largest reserves in the world. However, its production has fallen every year from 2006 to 2012. In 2006, Venezuela produced 3.36 million barrels a day, compared to 2.75 million barrels a day in 2012, a decrease of 18% and a loss of 611,000 barrels of oil production per day. In the case of the pre-salt exploration and production technology is crucial to convert expectation into product.

In 2010, under the new sharing contract regime, the public company Pré-Sal SA, another National Oil Company was created to replace Petrobras, with the objective of managing the new operations. Two acts were issued concerning the regulations for the pre-salt reservoirs, the first Act (Law 12,351) introduced the Sharing regime and the Petroleum Social Fund; the second Act (Law 12,304) created the Pre-Salt Company; and the third Act (Law 12,276) authorized the Transfer of the Rights of exploration from the government to PETROBRAS, thus capitalizing the Company (Lima, 2011).

The sharing contracts have been discussed for quite a long time by a number of authors. For instance, (Johnston, 2003) wrote an interesting analysis, where he shows that the choice of different contracts can be based on the remunerations petroleum can yield for the government. As stated above in most systems, the State owns the petroleum that can be conceded under different conditions. The type of concession depends a lot on the political situation of the country, but it is

largely based on the risk and price uncertainties of the markets (Blake & Roberts, 2006). Concession rules should find a rightful balance between attracting interest of the companies and State's remuneration. In the case of the pre-salt the model was decided in 2010, just after the US economy crash, but the first auction was carried out later in 2013 as the prices stabilized (ANP, 2014).

The auction under the new sharing contract offered the area of Libra, located in the Santos Basin, 170 km off the coast of Rio de Janeiro, an area with an estimated reserve of 6 to 8 billion barrels of oil equivalent, with an average of 27API. In this auction a bonus fee of approximately US\$ 7.0 billion was agreed on, and a 35-year contract was awarded, with the first four years dedicated to the exploration phase of the block. The auction failed because only one consortium attended, and there was no competitive bid. This consortium was formed by Petrobras (40%), named by law as the operator and required to own at least 30%, Shell(20%), Total (20%), CNPC (10%) and CNOOC (10%). The bid was the minimum required by the government: 41.65% of the profit. Companies with large operational capacity, such as ExxonMobil, Chevron, BP, Statoil, Devon, Anadarko and Kerr Mcgee, declined to participate in this auction, showing that probably the conditions in 2013 were not adequate as in 2010. Presently, with the very low petroleum prices, the pre-salt reservoirs are becoming less interesting and new auctions should have their rules reconsidered.

The choice of the best mechanism to attribute exploration and production of petroleum in Brazil is flawed by the long term political debates. The main problem is that the mechanisms have to follow the oscillations of the market and the world economic crisis of 2009 showed that decisions have to be taken fast and the contracts have to show a certain flexibility to adapt to different situations. In Brazil, the debates on petroleum exploitation contracts should go in this direction.

It is interesting to note that the regulation processes in Brazil differs from most oil-producing countries, where government choose only one regulatory model after the interest of the local society. In Brazil, in addition to the concession and production sharing schemes, the state has also applied Transfer of Rights (a rule by which the state gave Petrobras the right to produce up to 5 billion barrels), in the pre-salt area. The simultaneous operation of the three different regimes indicates that the government is willing to concede to the interests of various players in the Brazilian society. This kind of acquiescence is observed in the taxation policy in UK in a different context and discussed by Abdo (2010). On the other hand multitude of regimes has complicated state regulatory picture and fostered potential legal disputes between companies and Brazilian states for oil and gas production rights (Braga & Szklo, 2014).

The low level of competition in the auction under the Production Sharing Agreement in comparison with the auctions under the Concession Agreement, may be attributed to:

1. Technical reasons, which is also related to local content and lack of adapted technology. IOCs have much less investment in technology made in Brazil on the development of new technologies and however they carry out these investments in their home countries, there is an adaptation factor that is not considered while dealing with tropical Atlantic waters and with Brazilian working force. On the other hand, Petrobras has developed a very advanced research center, giving it a competitive advantage.
2. Financial reasons: The financial market in Brazil is certainly unfavorable to production, because rates of interests are way too high, so a company, whatever international or national will have to raise their remuneration very high to impair interests rates.
3. The freefall prices of the petroleum that made exploration of the pre-salt reservoirs more expensive and less profitable.
4. Human-resource: The last , but not the least issue is technological capacity of the human resources. A flawed school system at every levels is not preparing good professionals to the offshore market. It is difficult to find good professionals to deal and to solve problems, because their basics in physics, chemistry and mathematics is too feeble.

The legal obligation of Petrobras' participation with the minimum of 30% in all consortiums, together with the legal obligation of the company to be the operator of all consortiums.

4. Conclusions and policy implications

1. The Brazilian government has opened the oil exploration and production market in the late 1990s

- applying a concession contract that was not able to establish a consistent competitive market, for Petrobras became responsible for more than 90 % of the country oil production.
2. With the discovery of the pre-salt in 2006, a new contract model was applied (exclusively in these new reservoirs) considering the minimum sharing of 30% of the business with the National Oil Company (Petrobras S.A.). It looks like as if the reasons for this decision was to increase the State participation and to increase the oil capture, based on the fact that the risk of exploration of these reservoirs were smaller.
 3. The decision to explore and produce in the pre-salt with this new type of contract was taken in 2010. The first auction of the pre-salt was carried out only in 2013 with a stabilization of the market. However the auction was not competitive because practically only Petrobras participated.
 4. It is clear that the present conditions of the market are not favorable for new oil exploration projects and the governmental contracts should be reconsidered (if they are really interested in this high technology reservoirs). The simultaneous operation of two different Policy Model was created to comply with the different points of views in the country, but it created legal conflicts and insecurity, decreasing the attractiveness of the Brazilian petroleum business.
 5. Finally, this study suggested that the Brazilian Production Sharing Regime, the concession regime and transfer of rights, should be reviewed in order to be adapted to the new conditions of the oil market worldwide.
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Revista ESPACIOS. ISSN 0798 1015
Vol. 38 (Nº 31) Año 2017

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