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Glossary and Terms

IOC – International Oil Company

NOC – National Oil Company

SOE – State Owned Enterprises

PEMEX - Petróleos Mexicanos

DNPM - Departamento Nacional de Produção Mineral

CNP- Conselho Nacional de Petróleo

E&P – Exploration & Production

LNG – Liquified Natural Gas

KBO – Thousand barrels oil

MBO – Million barrels oil

Introduction

Since 2012, Petrobras and Brazil have been a hot topic in the world of oil and gas, as some of the world's largest oil deposits ever discovered were found in the deep waters outside the east coast of Brazil. The discoveries are capable of changing both Brazil and Petrobras forever, as the prosperity of self-sufficiency and domestic growth are within reach, as long as they avoid the pit-falls along the way. The public ownership in Petrobras is in many ways unique, as it has evolved from a monopolistic giant, to a significant international player and from there further towards its initial legacy. Its history is full of political conflicts and nationalistic developments; its significance in Brazil is without a doubt monumental. The author wanted to further explore the fascinating history of Petrobras, and by doing so going further into the world of public choice theory. A history this complex and eventful, in a country with such strong nationalist and public believes was expected to be a good candidate for applying the different schools of thought within public choice theory.

The thesis concludes that several of the theories put forward by Public Choice theorist can be applied when assessing the government ownership in Petrobras and the most important is that it has visualized that a company such as Petrobras, a major oil company, is very colored and influenced by the fact that it has been and still is a government owned company. The analysis of Petrobras showed a strong connection between the behaviors in government and the government owned company. Although, the review has shown that the theories have been useful in developing an understanding of how Brazil has developed its public ownership and what has been the key drivers. However, one should be aware that Public Choice theory often crosses over between different schools of thought and the result one develops can be subjective and exposed to the assumptions put forward by

Literature review

This methodology section will start by doing a review of the literature present on the subject of Public Choice Theory and state ownership. This is driven by the chosen research objective where the author wishes to investigate if Public choice theory can explain the dynamic evolution of Brazilian state ownership in Petrobras.

Public Choice Theory

Within social science there have existed a divide between two separate branches, the science of politics and the science of economics. They have traditionally been separated by the types of questions they ask, the assumptions they make about individual motivation and the methodologies they apply. Political science devoted its attention towards man's behavior in the public arena, while economic science focused on man's behavior in the marketplace. Perhaps the greatest distinction between them was in their assumptions, where political science assumed that the political man pursued the interest of the state, while economics on the other hand, assume that all men pursue their private interest. Mueller (2003) questions whether this dichotomy is valid, and states that in the field of Public Choice the political and economical man is one and the same. The author further defines public choice as "the economic study of nonmarket decision making, or simply the application of economics to political science" (Mueller, 2003). Public choice revolves around the same subjects as political science, namely; the theory of the state, voting rules, party politics, the bureaucracy, etc. In terms of methodology, however, is that of economics. The basic behavioral premise for public choice is the same as for economics, that man is an egoistic, rational, utility maximizer.

The size of government

An area that has received significant attention is the question of the optimal size of government and its reason for growth. Mueller argue that public choice, the economic analysis of political institutions, is a natural tool in answering these questions[1].

[1] Mueller (2003) p.501

In his book, Mueller start the argument of government size by highlighting the fact that governments have grown, and grown dramatically in the recent years. Also, this growth cannot be confined to a specific area or country. This trend can be seen in Table 1, where figures from Tanzi and Schuknecht (2000) display data from 17 countries, public sector increased substantially in several sentral-european countries before and during World War I. This could naturally be explained by the rapid expansion in military outlays; however, it's interesting to note that government sectors did not retract to pre-war levels. The trend of growing governments continued until the 1980s, when the growth cooled down and started growing at a slower rate.

Lars Udenh argues in his book "The Limits of Public Choice", that the growth of government is due to a multiplicity of causes, which are difficult to estimate in isolation. Udenh summarize the general perception, which mostly point towards the industrialization and democratiza-tion of the Western world. It can further be divided into economic and political factors, where economic rationale predominately relate to the consensus that government is necessary for the market to operate efficiently. Hence, it seems that if the market grows, so do government. As government growth grows at a higher rate than national income, Udenh argue that this can only partly explain the phenomenon. In describing political explanations, the author makes a divide between *institutional and cultural* factors. In short, institutional explanations is closest related to public choice and suggest that expenditure grow as a result of the play of interests. Interests, whether self-interest, group-interest or devotion to causes other than the pleasures of self-contribute to government spending according to Udenh, as it creates a multiplicity of claims, that again creates constant pressure which is difficult for governments to withstand[2]. In summary, institutional models tend to explain the growth of government as the unintended result of individuals and groups. Further on, the notion of *Political Culture*, comprises of political parties and other forces, such as interest groups and social movements. The point Udenh wishes to make is that as long as there is an existence of a political culture, government are not "free" to follow their programs.

Alan Peacock, a significant figure in this field, state "that the search for some all embracing theory of public expenditure is now generally recognized as chimera" [3]. Udenh believe that the

[2] Udenh (1995) p.36-39
[3] Udenh (1995) p.38-39

use of efficiency in the comparison and evaluation of governments is ideological and that by this market ideology, the market is efficient and the government inefficient by definition. A critical voice, as that of Gary Becker, suggest that competition between pressure groups may lead to an efficient allocation of subsidies: "that public ownership may be an efficient way of subsidizing private enterprises and also public enterprises, themselves, may appear to be less efficient than private enterprises only because subsidies are not included in their output"[4].

Political Actors and the Public Interest

Public choice is a scientific analysis of government behavior and the behavior of individuals, with regards to government. In the days prior to Adam Smith[5], the discussion revolving around the social discussion was predominantly moral. This meant that individuals, from businessmen to politicians, were told what the moral thing to do and usually urged to act upon it. One can say that the people of this time were assumed to be, and often were, engaged in maximizing the public interest. Tulloc, Seldon and Brady argue in their book "Government Failure" (2002)[6] that there were, however, two substantial exceptions to this rule. They point towards authors and philanthropists Machiavelli and Hobbes, who argued against morality as producing a system which was essentially amoral. David Hume came later and took what seems today as a rather obvious approach, that most people pursued their own interest in their behavior rather than a broadly based public interest[7]. It was not until the 19th century that economists began assuming that individuals are primarily concerned with their own interests and as a consequence started discussing the ramifications of such an assumptions. Interestingly, this was not the case for political science theorists, who largely assumed that political actors predominately were concerned with the public interest[8].

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4 Udenh (1995) p.439
5 Smith (1904)
6 Tulloc, Seldon, Brad (2002) p.15-16
7 Hume (1987) p.1741–42
8 Tulloc, Seldon, Brad (2002) p.16-17

Rent seeking

Is defined by Tulloc, Seldon and Brady as “the use of resources for the purpose of obtaining rents for people where the rents themselves come from some activity that has negative social value”[9]. A common way of explaining and visualizing the phenomenon of “Rent” is by assuming a monopolistic market situation or segment and depicting the demand schedule. Table 2, display the demand schedule for a monopolized product. *Pm* displays the monopoly price and *Pc* the competitive price one and the rectangle *R* is the rent created, if the monopoly chooses to charge *Pm* instead of *Pc*. The welfare triangle *L*, show the loss of consumers’ surplus on the output of the monopolized product, which would have been produced under perfect competition.” In the traditional discussion of monopoly, it has been customary to treat *L* as a measure of the efficiency loss due to monopoly, and *R* as a pure redistribution of income from the consumers of the monopolized product or service to its producers”[10].

Tulloc, Seldon and Brad argue that the key to understanding rent seeking is to think of the process in the following way: If someone is observed receiving rent, or for that matter engaging in activities that might lead to the rent, the first thought should be to inquire whether society as a whole is better off as a result of the activity or product that creates the rent. They also argue that the *rent-seeking cost*, as difficult as it can be to determine, is important in understanding the effect on society. They believe that there is enough theoretical basis for stating that rent-seeking cost are relatively high, and at times even hidden or disguised. Mueller, on the other hand, argue that there are empirical evidence suggesting that rent-seeking cost may not be as severe as suggested by Tulloc, Seldon and Brad. He argues that “although rent seeking through protectionist measures occurs and it has the predicted consequences, its effects do not appear to be very significant.” Mueller is also very clear that there are different assumptions adjacent when calculating and defining rent-seeking cost, the schools of thought differ and therefore also the perceived magnitude of the rent-seeking cost.

[9] Tulloc, Seldon, Brad (2002) p.55
[10] Mueller (2003) p.333-334

Allocative efficiency & Redistribution

When discussing allocative efficiency and redistribution, it is instrumental to gain an understanding of what it is that sets them apart. In doing so, the following simplified example can be helpful. In a more primitive time, one could envision that a government could arise from an antiquated anarchy, to fulfill a collective need of the community (protection, shelter etc.) or to coordinate hunting or any other food-gathering activity. Another way of envisioning the origin of state could be a more distributional motivation. If so, the best hunter becomes the superior of the tribe and eventually acquires sufficient authority to collect tribute from his fellow tribesmen. War and police activity often begin as the primary activities of "government", but gains from these activities are claimed by the leader(s) of the tribe. As a result, the state can be pictured as coming into existence either to satisfy the collective needs of all members of the community, or to satisfy the wants of only the few. The first explanation corresponds to the achievement of allocative efficiency, the second to redistribution[11].

In public choice theory, the distinction of allocative efficiency and redistribution is fundamental both in economic theory and in public choice theory. When concerning private goods, one can imply the theory of Adam Smith and the *invisible hand* in understanding the market exchange in society. Mueller argue however, that this point is chosen blindly. One could almost say that it's a default. He states that the gains of trade are distributed by arbitrarily determination, but since this distributional issue resolves itself due to the process benefitting all parties, it does not necessarily become a source of conflict. The author further argue that in order to achieve *Pareto efficiency* in the allocation of public goods, there need to be a collective choice process which is less anarchic than the market is required. In other words, a conscious choice of the quantities of each public good to be produced must be made and at the same time, the choice of means for paying for them.

Lastly, the issue of the distribution of the gains from collective action is often more visible in the allocation of public goods by political process, than it would be in the allocation of private goods

[11] Mueller (2003) p.44-45

by a normal market exchange process. This would therefore imply that this and other distributional issues become dominant in the political process[12].

Politicians

Lars Udenh writes in great detail of the different views within public choice theory on the political business cycle. He refers to Alberto Breton (1947) who stated that the principal actors are political parties and citizens, and that the governing party is assumed to maximize the probability of being re-elected[13]. However, Udenh argue that the individual politician is immediately more concerned of things such as “personal pecuniary gains, his own image in history, the pursuit of lofty personal ideas, personal power, his personal view of the common good, and others which are peculiar to each politician”. The first contribution from public choice theory concerning political business cycles arose when a man named William D. Nordhaus (1975), developed a theory on politicians in power and their egotistic actions in relation to elections. The theory is that politicians would manipulate certain macroeconomic variables (most likely inflation and unemployment), in order to win elections, and thereby creating business cycles. The theoretical basis of this manipulation is the “Phillips-curve”, which suggest that there is a trade-off between inflation and unemployment. Another public choice view came from the theorist Richard E. Wagner (1977). He was of the same opinion as Nordhaus, that politicians created business cycles, what he meant was critical, however, was the macroeconomic approach to the problem. He was of the firm belief that the economy is such a large “creature” that could not be controlled by simply manipulating a few aggregate variables. Udenh shared Wagner’s belief, and state that it is not likely that government could control inflation and unemployment, which were initially put forward by the theorist of political business cycles.

After reviewing the theory on the subject of political business cycles, Udenh believes that it could be wise to distinguish between politicians and parties. If one would refer to methodological individualism, the party should have no preference. According to Udenh, the

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[12] Mueller (2003) p.45

*In economics, the invisible hand is a metaphor used by Adam Smith to describe unintended social benefits resulting from individual actions.

**A simple explanation of Pareto efficiency is a state of allocation of resources in which it is impossible to make any one individual better off without making at least one individual worse off.

[13] Udenh (1995) p.447-474

usual procedure has been to construct the utility function of parties and governments as aggregates of their members' utility functions, but according to what we have learned above, this is not sufficient. Parties and government are supposed to have only one consistent set of preferences, although, they can only maximize one utility function with their policy[14]. Lastly, Udenh argues that one way of looking at the relation between parties and politicians would be to see the former as a means for the latter. This would result in reducing the parties into mere instruments for ambitious politicians, seeking prestige, riches and power.

Bureaucracy

A simple way of explaining bureaucracy and its importance within Public Choice theory is that it tries to examine the roles of those in government that determine policies beyond that of simply carrying out the expected demands of its citizens. In Public Choice theory it is assumed that the bureaucrat, like everyone else, is a selfish utility maximizer. The questions arises as to what does the bureaucrat maximize? Mueller bases his reasoning heavily on Weber (1947), who assumed that the bureaucrat's natural objective is "Power". He further states that power in this context can be defined as: Physical power, the ability to apply force. Economic power, the ability to purchase goods etc. And lastly, political power, which is defined as the ability to achieve certain ends through a political process. The power elements that gain the most attention in public choice theory, is naturally economic and political. Mueller concludes that citizens are expected to serve the state and that the state is not servant to the people. A more modern author on the subject of public choice theory, Lars Udehn, state that the most influential contributor to the public choice theory of bureaucracy is William Niskanen. Niskanen uses an economic approach to bureaucracy where he focuses more on the bureaucrats output, treating them as production units on a par with firms, he asks, what, instead of profits, do bureaucrats maximize? According to Niskanen, their budgets[15].

Tulloc, Seldon and Brad, also claim that Public Choice theorist are aligned in stating that government is not systematically engaged in maximizing public interest, but that the assumption is that government officials naturally attempt to maximize their own private interests. The flaw

[14] Udenh (1995) p.447-474
[15] Udenh (1995) p.482-486

concerning the bureaucrats is according to the authors, the institutional situation they are constrained, which frees them from carrying out the tasks they have been assigned in an efficient manner.

Federalism

"The term federalism has come to mean the optimal layering or decentralization of existing government services based on an examination of possible economies of scale. The appropriate governmental unit is designated on the basis of least cost or efficiency". This is how Tulloc, Seldon and Brad define Federalism within public choice theory. Mueller, on the other hand, chooses to distinguish Federalism into two salient properties: "(1) separate and overlapping levels of government exist and (2) different responsibilities are attached to the different levels of government". A good example to visualize this feature is within the United States. State and local levels of government are the primary responsible for law enforcement, however, certain criminal offences have been legislated by congress, so that federal enforcement (FBI, CIA) often duplicate, or assist the work initially intended for the state and local police. The presence of Federalism is not universal, although some form of Federalism is to be found almost everywhere. As a general rule, the trend has been that under modern circumstances, central control has gradually been replaced by local control. However, Tulloc, Seldon and Brad, argue that for many services, the central government is growing more rapidly than local governments rather than disbursing its employees. This is according to the authors a sub-optimal development, as "the central government should provide only those activities where few external benefits are very large"[16]. Furthermore, they claim that the optimal solution comprises of different-sized governmental units, designed for different functions.

Critique of Public Choice Theory

Some of the aspects of Public Choice theory can be viewed as traditionalistic and even a bit outdated, an example being that initial thinking and consensus revolved around the notion that politicians are motivated by the desire to maximize their political power. Although this might

[16] Tulloc, Seldon, Brad (2002) p.78-79.

well be the case in many instances, I believe that the notion put forward by Udenh, which states that politician's foremost concern is personal gain, second political power and public interest. This would correspond better with general economic theory and is a factor to take into account in the further analysis. Also, the notion that politicians would be capable of manipulating macro-economic variables in order to favor personal/party positions, for example in relation to elections, is a theory which seems to be of little relevance. There is very little empirical data to support such a theory and keeping in mind how complex the current macroeconomic climate has become, no emphasis will be put on this theory. Lastly, the concept of rent and rent seeking cost, is an area which does not come with a clear position from the public choice literature. Although, Muller does state that it is important to be aware that the assumption one makes has a large impact on the perceived impact of rent seeking cost present in the particular scenario.

State Ownership

State ownership is a subject which has been, and still is, a topic with different points of view and ideas surrounding its purpose and effectiveness. Some of the most famous and celebrated economic thinkers in the last two centuries participated in the debate and provided the primary economic theories on the subject. In Brazil, the concept of public ownership has always had a strong foundation, lagging behind the shift to privatization which has been observed in other up and coming developing countries around the world. A key notion to understand about state ownership and privatization is the motives and rationales which drive governments one way or the other. Only by understanding a nations motives for pursuing the level of government involvement and public policy can one start to understand and assess its effectiveness by measuring the perceived results with the ambition set out in the motive behind the direction of policy. An important consideration to make is to encompass the field of study, meaning which public service/good is the subject of privatization. The reason being that for different services and goods to be produced there might be specific arguments for keeping ownership within government. In order to get further understanding of the subject, there will be a further analysis and description of the primary sections on privatization, from the "Free-Marketers" to the "statistics view". It is hard to conclude or even summarize the empirical evidence and conclusions in this field, however, a key notation to take into consideration is the debated importance of efficiency. Numerous authors cite studies where cost and performance advantages can be derived from privatization[17], while others refer to cases where public ownership clearly suggest better performance in terms of productive efficiency. Lastly, there are researchers who are not able to cite any substantial findings of public sector being the inferior performer as there is a great lack in empirical data to demonstrate such as position[18]

In the book "Limits to privatization" compiled by Von Weizsacker et al. (2005) they seek to explore what they refer to as "a good balance between private and public ownership". The authors emphasize the changing role of state throughout much of the 19th and 20th centuries, where governments initiated a higher degree of involvement in a number of societal functions, by referring to the increased nationalization occurring not only in Russia, but in many Western countries as well. Communism and Socialism gained a foothold in respectively Russia and Europe under the motivation that the public would have more to gain from capital being raised more readily and cheaply by the state and not the private companies, who inevitably would put their individual commercial interest first[19].

During the 1960s and 1970s the focus for many states were centralized around ownership and initiative for essential infrastructure as the foremost task of the state. Governments all over the world initiated large responsibilities within their infrastructure and in several aspects of production. However, in recent decades, there has been a shift in the opposite direction, with privatization gaining more ground. Economic theory generated in the 1960s served as inspiration to the shift in sentiment in the 1980s, combined with significant globalization, developments within technology, market expansion and the growth of private operators. These factors served as a basis for questioning the states dominant role and in accentuating the private sector. Prominent economists who shared their view on this debate include Ronald Coase, Frederik von Hayek and Milton Friedman. They argued that the current populist view of social equality had several flaws,

[17] Bennett, Johnson (1980) p. 363-396

[18] Atherton, Windsor (1987) p. 88

[19] Von Weisäcker, Ulrich, Young, Finger (2005) p.95-97

in that it was inefficient, partly dishonest and demoralizing for high achievers, and in the end even counterproductive to its own aims. Politicians in the UK, the US and elsewhere, best described as neo-conservative, embraced these ideas in order to put an end to affirmative action and other equity measurers. Socialist and equity concerns were accused of serving as a cover-up for state cronyism, and some even made comparisons to the communism and the Soviet Union, the arch enemy of its time.

However, the foremost reasoning used in the political arena was the term “economic efficiency”. The objective was to delegitimate state functions in an increasing number of sectors, by successfully referring to the state as “inefficient”. This was a cornerstone in neo-politicians argumentation for increased privatization going directly against Keynesianism, the ideological adversary at the time. They believed that Keynesian deficit spending had a direct effect on increased “stagflation”, the unfortunate combination of high inflation, slowing economic growth and a high, stagnating unemployment rate. The state should instead, in order to become efficient, promote tax reductions, low inflation and services from the private sector. As a result, the private sector would grow and at the same time automatically sustain economic growth and technological progress.

The historical debate on government versus privatization is according to Von Weizsacker et al. (2005) subject to two polar perspectives, namely the statist and the libertarian position. The theories differ in their view on interests and motivation for the public and private sector. During the 20th century many socialists adopted the statistic view, and argued that it is attractive for the state to own property and to provide public services. Furthermore, they believed that state agencies will act in the public interest without the need of any external regulation. Milton Friedman, a supporter of the free market with minimal intervention, formed the basis of the libertarian view. The focus was minimizing regulation and restrictions on the actions of private property, and in a sense transferring property rights from the public domain into private actors. This gives an interesting realization, that despite their contradictory views, they share the common assumption that the right ownership of public assets is essential to a sound result. This leads us to another highly relevant aspect addressed by both sides, namely regulation. There is some disagreement in that effective regulation is the answer to ensuring that services act in the public interest. For instance, problems experienced with unregulated or weakly regulated private ownership has given ground to the conclusion that private ownership can bring benefits if, but only if, there exist a strong regulatory framework to ensure that private actors address the needs of all their customers and support broader public goals.

The authors of “Limits to privatization” argue that perhaps the most popular position in their time of writing leans towards “Privatization – but with a strong regulation”. They also underline the fact that it is not only private companies that should be subject to regulation. An increasing number now argue for public ownership, but with strong independent regulation present. The rationale behind this relates to the ability to ensure that public service addresses the interests of their users, and not their staff. Also, the ability to keep up pressure to improve efficiency and effectiveness is relevant because of the absence of supervision from neither shareholders nor competitors. They further raise the question whether this kind of regulation can prevent the complacency, inefficiency and unresponsiveness that exist in many public services, which have contributed to the apparent appeal privatization have today. Later in their analysis several cases and results are presented in favor of such a pragmatic view, where privatization accompanied by strict regulation has shown to produce good results in a number of industries[20].

The role of state own enterprises

In a paper entitled The Theory of State-Owned Enterprises in Market Economies, Lawson (1994), argues that the motives for state ownership are fundamental for understanding where we should expect to find SOEs. The schools of thought differ, as for example Bos (1986) argues that these boil down to two: ideological and economic. In Marxist arguments state ownership is essential to ensure the demise of a capitalist class whose economic power resides in their ability and desire to deny others access to the means of production. Socialists, on the other hand, would want to influence or control the overall direction of the economy. For others it may be important to promote self-management, perhaps through syndicalist principles, where the system would be organized so that the industries are managed and owned by the workers. The economic reasons for state-ownership revolve around the issue of natural monopoly, the advantages for

[20] Von Weisäcker, Ulrich, Young, Finger (2005) p.44-45

stabilization policy of direct industrial intervention and the redistribution of power, income or wealth[21].

State ownership and involvement in the oil industry

Robert Pirog analyzes in a report titled "The Role of National Oil Companies in the International Oil Market" both differences and similarities between private and national oil companies. He argues that reserve and production positions of national oil companies are less relevant if we assume that they operate in more or less the same way as the private international companies and that state ownership primarily apply to the distribution of stock shares. They differ according to the author, however, in objectives and in the characteristics of their operations. The importance of differing objectives is primarily important when it leads to different characteristics and outcomes, which Pirog argues are the case for the national oil companies. This gives us a good incentive to further explore the objectives and characteristics of the national oil companies[22].

Objectives of National Oil Companies

The objectives of privately held companies are often straight forward in that the goal consists of maximizing shareholder value. Maximizing shareholder value, in the context of the oil industry, relates to the maximizing of oil resources through managing production, exploration, and development activities in order to assure a functioning market. Reserve replacement, the ability to expand production and sales to meet demand growth in developing economies as well in developed areas are factors mentioned in order to ensure the long-term viability and growth of the company. Technical efficiency in all parts of the value chain serves as a catalyst towards cost minimization, improvements in product performance and environmental integrity. National oil companies are often completely or majority owned by their national government and therefore other objectives come into play, deviating from solely maximizing the company value.

- *Wealth Distribution*

[21] Lawson (1994) p.283-309

[22] Pirog (2007) p.2-5

A continuous occurrence among national oil companies relate to the redistributing of the nation's oil wealth to the society as a whole. Common techniques exercised are fuel subsidies, employment policies, and social welfare programs. Positive attributes credited to subsidized fuel prices is reduced energy prices in the general population, enhanced industrial and transportation resources and the elimination of the damaging effects to the domestic economy from the volatile world petroleum prices. However, the gains come with a price, the national oil companies suffer tremendously in terms of lost potential revenue. It also have effects beyond the company in that the low prices encourage demand growth, corruption, inefficient use of fuels, and in some cases arbitrage-based smuggling schemes. When looking beyond the domestic implications caused by the expanded use of fuels plausible effects include; reduced exports, tightening supply in international markets, again leading to higher prices in the oil-importing countries.

- *Jobs Programs*

Ann Myers (2007) collected data comparing total employee numbers per million barrel equivalent from both NOC and Private oil companies. The study gave a clear impression, that on average, employment is higher in NOC in relevance to total production. Pirog (2007) argue that these results support the notion that NOC function, in many instances, as a job program for the domestic economy. There is no uniform explanation to why this is the case, and the country demographics should come into account, but relevant factors mentioned include different operational requirements, government policy and inefficient technologies.

- Economic Development

Another area where governments tend to utilize their national oil companies is in relation to the overall process of economic development. The discovery and exploitation of fossil fuel has immense implications, and in some cases the petroleum industry serves as the first, substantial economic sector being opened to the world economy. In such an instance, the introduction of concepts as international investment contract, property law and financial standards are all necessities to ensure economic development. The industry could therefore impose synergies to the larger domestic industry, channeling technology transfers to the larger domestic economy. The notion is to ensure the development of additional service businesses through local content rules. There have also been examples of NOC being required to supply subsidized fuels to industries that are, according to the government, prioritized in the nation's development plan.

- *Foreign Policy*

Another important objective mentioned by Pirog (2007) is the use of NOC as a tool for governments to achieve foreign policy goals. The rationale is often to develop direct alliances as well as increased political relationships through ties created between national oil companies. Oil is a strategic and powerful commodity, and there are several examples of strategic relations being created through the use and/or production. Pirog accentuates China's oil-based relationships with Venezuela, Russia, Iran and several others as partly politically motivated. In more specific instances we find that Iran has threatened to execute oil-cut-offs towards the western world as a reply to the reactions received due to their controversial pursuit for nuclear weapons. Political unrest occurred in 2006 between Russia and former members of the Soviet Union which eventually lead to interrupted natural gas deliveries to Europe, as a result of the conflict over supply prices and transport fees.

- *Energy Security*

Among the foremost rationales mentioned in favor of national oil companies are energy security. It refers to both the demand and supply side of energy security; demand relates to independence from one or a few critical consumers, while supply security covers a variety of objectives. Petróleos de Venezuela S.A previously attempted to direct oil sales away from the U.S because they had a desire to reduce U.S economic influence and introduce Venezuelan oil to other consuming markets. However, there often exist technological difficulties that make this kind of strategic transition hard to accomplish. These long-standing relationships often results in significant specialized investments in both infrastructure and technology making a shift in target importers a costly affair, which the United States-Venezuela case indicated.

The most common objective for governments and their national oil companies, in relation to supply security, relates to the ownership, or exclusive rights to, desired supplies of oil.

- *Vertical Integration*

Vertical integrated firms in the oil industry relates to firms that operate in both upstream and downstream markets. National oil companies in oil-producing nations have traditionally focused on upstream operations, however, some strive to achieve vertical integration. Pirog (2007) explains the different justifications for such an expansion; economically, vertical integration could allow the NOC to add value through both producing and selling petroleum products. Access to markets otherwise unavailable and diversification and risk mitigation are also mentioned. The volatility of the oil market can lead to different profit accumulation at different times, to differing parts of the value chain and during various market conditions. In short, vertical integration may increase the profitability of national oil companies in changing markets.

Characteristics of National Oil Companies

When comparing national oil companies to private oil companies it becomes likely that they differ not only in objectives but in characteristics as well. Pirog (2007) defines four broad characteristics that can be attributed to NOCs.

Efficiency

The aspect of efficiency and inefficiency are subjects that often occur in the discussion of national oil companies. The most common definition of productive efficiency is the maximization of output at any given level of input. What sets the oil industry apart from other more conventional manufacturing industries is the presence of geological factors. These more or less uncontrollable aspects of the industry can cause difficulties for management in that it often provides an element of uncertainty. There have been used several different empirical methods for measuring private and national oil companies behavior in relation to their relative effectiveness. Efficiency in producing revenues, defined by Eller, Harley and Medlock, in a study on private versus national oil companies, is often affected by the national oil companies' objectives, which often go far beyond simply value creation. There are several examples (Saudi Aramco, PEMEX, and others) where subsidized sales and wealth distribution are denoted as the key driver for inefficiency, even when accounting for vertical integration and government share of revenues[23].

Investment

[23] Eller, Hartley (2007) p. 2-5

According to Pirog (2007) NOCs generally have a shorter time horizon for operational decisions than the international oil companies, simply because there can be demands put forward by government and national treasuries that can effect and drive decision making. Also, the national oil companies may have a stronger focus on earning current revenues and production, rather than maximizing the long term position. As a result, existing fields might be mis-managed and therefore recovering a smaller percentage of the recoverable reserves, while neglecting both exploration and development opportunities.

Reserves and Production

The fact that national oil companies, at times, are driven by non-commercial objectives can constrain their ability to efficiently replace reserves and concurrently expand its oil and gas production. Empirical evidence, as brought forward by the *Energy Intelligence Research* (2007) show that when looking at replacing the oil reserves, none of the top ten oil companies as shown in Table 1 is present, which is predominantly NOC's. Neither does it include any of the companies in Table 2 or 3. This might suggest that the NOC's, while holding the largest reserve base, are not able to restore its current position through E&P. It is interesting to note, however, that neither any of the top ten IOC's are on the top list of replacing oil reserves. The combination of reserves linked to older deposits which are unlikely to yield high production in the years to come and the fact that, from a geological viewpoint, the largest traditional oil reserve pool have already been discovered.

- *Access to capital*

It is generally viewed that NOC's are in a weaker position than IOC's with respect to accessing capital, predominantly through capital markets. Up until the recent oil crash of 2014, the international oil companies have typically been financially sound as their own cash reserves have risen and internal financing therefore materialized as a viable option. This is largely due to strong balance sheets and income statements, which in return provide options for increased capital expenditure and maintaining high dividends. Several NOC's on the other hand, particularly those who are struggling with inefficiency in turning oil into revenues, are less likely to receive favorable terms from the financial markets. They often have an obligation to the national treasury, where they are obligated to finance domestic welfare programs. In addition, several NOC's will also be limited by the domestic prices they realize, as they can be below market price. Pirog argue that the above elements, in many cases, leave the NOC's unable to access enough internal earnings to finance optimal levels of exploration and development of oil resources[24].

Private and State sector cooperation

In the 1990s, an increasing range of opportunities emerged for private sector cooperation with state controlled companies to explore for and develop state oil reserves through different mechanisms. It is both international practice and the interest of the state company that drive the use of a competitive process in selecting foreign partners, although it at times is sidelined by government policy. The developments in the space of cooperation have not always proven to be successful, especially from the point of the IOC. Terms which initially seemed favorable for the foreign companies have shown to somewhat deteriorate as oil prices increase, as the national oil company grew more confident or by the change of government policy[25].

Meeting national development needs

The competitive landscape for oil companies has gradually changed as the oil majors no longer enjoys the same technological advantage as they did previously. The state companies has caught up in many areas and are often better equipped to set demands for their cooperation. An example is within the contribution to national development, this would typically involve local sourcing, development of skills and supporting long term diversification in the economy. This is particularly true in mature petroleum provinces, where NOC are operating with higher competency levels. In order to gain a foothold in these markets, foreign oil companies need to demonstrate that they are able to offer what the producer need. This is often within technology, human resource development, cost control, capital or refineries. This is a significant historic shift

[24] Pirog (2007) p.15-16.

[25] Mitchell, Marcel, Mitchell (2012) p.42.

for the legacy players, also known as the "Seven Sisters[26]", which at their peak in 1960 controlled approximately 80 percent of the world's oil and gas reserves.

Summary of methodology

In the methodology section the author have covered several of the most significant theories within public choice theory, while at the same time acknowledging the importance that basic theory around public ownership versus privatization play an important part in evaluating Brazils ownership in Petrobras. There are several key learnings to take out from the literature review and also some aspects of the theory which might not be as relevant to the topic in question.

Public Choice has a theoretical framework which can be utilized in investigating traits within government and even large NOCs. Based on the review above, there will be an attempt to view Brazil and Petrobras in context with the theories on size of government; will the theoretic descriptions be in any way applicable for Petrobras? Also, the public choice view on the role of the bureaucrat, is this somehow in line with what we have gotten to know of Brazil and its political structure and culture? In terms of redistribution, can one say that Brazil choice of active public ownership leads to an effective and "just" distribution, keeping in mind the conflicting view on politician's self-interests?

By going deeper into some of the theory and data on national oil companies, it is in the view of the author that one need to assess the NOCs characteristics and objectives in order to understand the rationale behind its development and behavior. The theories present on this subject show that there are varieties in both subjects which differ from company to company and nation to nation, that should be factored in when doing an overall assessment. These revelations should help to gain an understanding of some of the key behavioral characteristics we are looking for from a Public Choice perspective, such as public interests, the political actors, the size of government and bureaucracy. In order to do the necessary analysis on the above mentioned subjects, a

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Anglo-Persian Oil Company (now BP); Gulf Oil, Standard Oil of California (SoCal) and Texaco (now combined in Chevron); Royal Dutch Shell; and Standard Oil of New Jersey (Esso) and Standard Oil Company of New York (Socony) (now combined in ExxonMobil).

thorough account of the history of Brazil and Petrobras will follow, with a particular emphasis on government involvement.

One could argue that not all of the topics covered under the Public Choice umbrella are completely relevant to the case of Brazil and Petrobras. In order to establish which parts of the theoretic framework, if any, is relevant to the research question, a section on petroleum in Brazil and the rise of Petrobras will follow.

Petroleum in Brazil – A historic perspective

In an article called *Hydrocarbons in Latin America – Case of Brazil* by da Motta et Al. the authors summarizes the evolution and history of the Brazilian oil sector[27]. They believe that it's suitable to make a divide into four stages; initial exploration, nationalization, state monopoly and the creation of Petrobras and lastly the introduction of the Petroleum Law. George Phillip, a famous author specializing on South America, wrote a book called "Oil and Politics in Latin America – Nationalist Movements and State Companies" where he analyses thoroughly the history and characteristics of Brazilian Oil and Politics. Several of his key points and conclusions are referred to and discussed in this chapter.

The first records of any kind of search for hydrocarbons in Brazil go as far back as to 1858. At this time concession was given to search for coal and bitumen, while the first oil explorer, an Englishman by the name of Thomas Denny Sargent, began his quest for the valuable resource in 1864. He was not successful in his endeavors and several other initiatives were to follow in the second half of the 19th century, with no or limited results[28].

In the years before 1930, and for some time afterwards, there was little notable oil issue. In comparison to its South American neighbors, Brazil's oil industry was almost classically underdeveloped. Oil consumption was less than a third of that of Argentina, less than half of Mexico and oil made up less than 10 percent of exports. During the 1930s, this position changed.

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[27] Motta Et. Al (2008) p.2-4

[28] Phillip (2006) p. 235-236.

Largely because of an increase in local oil consumption and the increasing centralization of Brazilian politics, which created some movement towards an active oil policy[29].

Policymakers created two state agencies of significant importance, the National Mineral Production Department (*Departamento Nacional de Produção Mineral* – DNPM) and the National Petroleum Council (*Conselho Nacional de Petróleo* – CNP). The intention of the DNPM was to introduce a specific policy for development of mineral extraction activities in the country, while the CNP would be the regulating body, in charge of structuring and regulating the activities of the petroleum industry. The creation of the CNP in 1938, was primarily an answer to a security problem, as war in Europe was likely so was a war with Argentina, rather than a strategic approach. However, it was none the less the first step in a nationalistic policy that would culminate with a state monopoly in the sector, and the creation of Petrobras[30].

In the period from 1939 to 1953, multiple wells were drilled and nine areas for exploration were discovered. This period is not considered a huge success, as the 1950s began; only 10 percent of Brazil's consumption of refined products was developed locally. In 1946, with the end of the world war, a large debate erupted concerning the country's petroleum policy. The centerpoint of the debate was whether or not to accept the participation of foreign companies to explore for and produce oil. A nationalist campaign began under the slogan "O Petróleo é Nosso", which translates into "The Petroleum is ours", sponsored by the Centre of the Defense of Petroleum. Brazil's current president, Getúlio Dornelles Vargas was overthrown and the return of Brazil to civilian rule in 1946 partially removed the military from the power of which it had enjoyed up until then. The military officials still wanted a political foothold and believed that they needed to use forms of pressure that were more appropriate to a democratic form of politics. And so, a successful campaign would not only lay the ground for a state oil monopoly, but also give the military something to control and would provide "an extra political resource to strengthen its position in the center of the system"[31].

[29] Phillip (2006) p. 238-239.
[30] Phillip (2006) p. 245-247
[31] Phillip (2006) p. 245-249

Other key players in Brazilian society were a large section of the middle class, who supported the idea of a strong state vigorously while emphasizing the goal of economic development. Lastly, and perhaps as important as the military, was the Brazilian Communist Party. A controversial party at the time, who focused on the oil issue partly out of opposition to the alliance between Brazil and the US while at the same time seeking allies within "progressive" sections of the army. Despite the rising attention and support for the campaign and the national oil issue, there were still political hurdles and obstacles. Legislative bills were sent to congress, but were neither acceptable to the nationalist or the oil companies, and were effectively dead before they were brought forward to a vote. Nevertheless, Brazilian Oil consumption continued to rise and action needed to be taken. In the period of 1948-1950 plans were made to ensure that the country could become self-sufficient in refining and slowly, the state was effectively taking control of the sector. Also, it became clear that the oil companies would not be offered long term concession contracts, which they would require in order to commence for oil exploration in Brazil. It was made more and more likely that there would be created a state owned oil company, political differences and drive for power would prove to be key drivers for establishing the setup of such an important company[32].

Getúlio Vargas, who had been reinstated in 1950, finally submitted his Petrobras bill to congress in 1951, where he immediately met opposition. Vargas's proposal was to set up Petrobras with a 51 percent government equity which were supposed to serve as a holding company for further oil development and refining. The rationale behind opening up for private investors was so that the company could build up its capital and give the company potential for expanding its operation outside Brazil's borders. The provision of 51 percent to the state was not acceptable to the oil nationalists, who wanted tighter legislation to prevent "backdoor" dealing with foreign companies. The technocratic solutions put forward by Vargas were not acceptable for those who were fighting and appeared to be winning the battle of the oil issue, and as a response, the left wing introduced an alternative bill, which provided for a complete state ownership to enable state monopoly for all phases of the industry. The final blow to Vargas and his initial bill, were when his political opposition surprisingly declared its support for the complete state monopoly. This was primarily done because his opponents wanted to deprive him of as much political

[32] Phillip (2006) p. 255-256

capital as possible for bringing it to its existence. It became more and more evident that this was primarily a debate which had more to do about politics within Brazil, rather than a debate about actual policymaking. The issue revolved around who was to control Petrobras and who were to take political credit for creating it. Vargas and his liberal supporters made several attempts to amend the bill, which were all disregarded. The bill was approved as it initially had been put forward by the left wing, and in October 1953, the bill creating Petrobras was passed into law[33].

The Ascent of Petrobras

The early years of Petrobras revolved around the exploration and production of crude oil, along with other activities of the oil, natural gas and derivate sector. The exception was distribution and retail sales, which was not governed under the Petrobras monopoly. Petrobras was viewed by many as an immediate success and while the enterprise matured in the period of 1954-60 it could portray sound profitability, although this could not be regarded as solely coming from earnings of operations. Phillip explains that in this period, an astonishing 39,4 percent of Petrobras's funds stemmed from tax evasions and earmarked sources of revenue[34]. In the following period Petrobras made good use of its independence in its policies of hiring foreign experts. The company needed expertise to find more oil and the most notable and important person they hired, was Walter Link. He was a famous geologist who after being appointed as head of the exploration department, wrote the "Link Report". The findings reported by Link were highly controversial in Brazil, as he pointed out that the current view on Brazil's geology and amount of resources was flawed. He suggested that for Petrobras to find more oil, the focus needed to be shifted from onshore Amazonas to deep-water offshore and overseas. The "Link Report" triggered an emotional response in Brazil and Petrobras's objective of discovering enough oil to make Brazil self-sufficient appeared to be threatened. This was a blow to many Brazilians who were accustomed to the notion that the country contained an abundance of all kinds of raw materials, including oil. The report created internal divides within the company and the head of the Petrobras openly critized the report in a presentation to congress.

[33] Phillip (2006) p. 257-258
[34] Phillip (2006) p. 260

George Phillip marks this as the beginning of the politication of Petrobras, whereby political criteria were largely substituting organizational criteria in internal decision making. In the years to follow and the debate concerning expansion, there was a growing tension between the Petrobras's technical staff who were supported by right wing politicians and the Petrobras Unions, in which the Communist Party and far left was strongly placed. Phillip argues that the main conflict was concerned around who should control Petrobras rather than what its role should be[35]. In hindsight, this conflict colored Petrobras for years to come.

The period from 1970-80 was era of significant importance and controversy for Petrobras. It can be described as a time of authoritarianism where press freedom as well political organization was greatly restricted, Petrobras being no exception. The appointment of the former General Ernesto Geisel as president of Petrobras, a man with strong ties to military officials, would further increase the company's state perspective. Under Geisel's leadership, Petrobras moved aggressively into all parts of the distribution market on the justification of national energy security, on the basis of skepticism towards private companies and their ability to deliver oil products to areas where profit margins were low even if social need was high. The most controversial aspect of Geisel's presidency was however, oil exploration. Domestic oil exploration ceased to an almost complete halt, while at the same time foreign oil companies were prevented to enter the Brazilian exploration market. The effect was made evident by Brazil's increasing reliance on imports from the middle-east and policy makers were forced to take action, without any cooperation from Petrobras[36].

There were several notable events that followed. It started with Petrobras setting up an overseas exploration subsidiary, in order to find oil to be imported into Brazil. This was a less momentous decision than to admit foreign oil companies into the country, it was nonetheless a signal that the government had abandoned the objective of making Brazil self-sufficient in oil.

This marked a significant turning point for Petrobras and Brazil, as gradually consensus developed, even in Petrobras, that self-sufficiency should be abandoned. Several questions were raised after the above was realized and many felt that Petrobras's criteria for investing should be shifted towards profitability. Petrobras was experiencing diminishing onshore reserves, further

[35] Phillip (2006) p. 275-277
[36] Phillip (2006) p. 275-278

establishing that self-sustainability were not within reach. Transition from onshore to offshore activities were difficult both from an economical and geological perspective, as this would imply oil production several times the cost of purchasing the barrels internationally (crude oil was selling below 2$ a barrel)[37]. Despite the market conditions, Petrobras began exploring offshore and taking some investment decisions not necessarily justifiable by commercial criteria, even with expectation of higher crude prices.

In 1975, the government undertook a large change in policy, when it declared that it would sign "risk contracts" with foreign oil companies. Although this allowed for foreign direct investments in the exploration arena, it did not compromise Petrobras's foothold. The negotiations were handled by Petrobras itself and they were later accused by economic liberals of slowing down the process, by company officials skeptical to foreign investment. 4 years later the first "risk contracts" were signed, helped by a shift in political power as the new Figueiredo government took office. The new government was of the opinion that energy policymaking needed to be centralized and that Petrobras needed to become less influential over energy matters than before. So, by the end of 1979, the decision was made to open up practically the whole country to private investment.

In the period from 1975 to 1984, Petrobras drilled 885 onshore and 750 offshore wells. The companies under risk contracts, in turn, drilled 51 onshore and 64 offshore wells. The risk contracts were in effect from 1979 to 1988, when the promulgation of the new Brazilian Constitution forbade new such contracts (because they had not had the effects the government had hoped for). Only those under which commercial discoveries had been made continued in effect. All told, under the risk contracts 122 onshore and 74 offshore. The "risk contracts" were generally considered a failure, as they had not generated the discoveries the government had hoped for and eventually desisted. In the 1980s Petrobras shifted its focus onto research and development (R&D). Most notably, was the Technical Development Program for Deep Water Production Systems (Procap). Procap led to new drilling techniques that allowed for operations in depths, previously thought impossible or at the very least highly unlikely. The research and investments made lay the foundation for the company's growth and propelled the company into deep water reserves far offshore and increased its profitability.

[37] Phillip (2006) p. 281-282

Andrew D. Fishman wrote in his article "PETROLEUM IN BRAZIL: Petrobras, Petro-Sal, Legislative Changes & the Role of Foreign Investment" that "If the 1980s, marked by the foundation of Procap, was the decade of technological advance for Petrobras, then the 1990s was the decade of corporate innovation"[38]. He also argued that without the managerial independence of this era, Petrobras would not have seen the vast improvements which materialized. Table 4 portrays the development in Petrobras's hydrocarbon production from the period of 1954-2007.

Growth and relaxation of state monopoly

The historic Petroleum Law was passed in 1997, after nearly 50 years of monopoly, which completely reformed the industry. In short, the law did the following: demonopolized hydrocarbon exploration and production, allowed IOC's to participate through concessions, it allowed private purchases of minority participation in Petrobras and created national body's to administer and supervise policy (National Agency of Petroleum, Natural Gas and Biofuels, National Council for Energy Policy)[39].

The concessions were set up in a way that if commercial discoveries were made and production to be commenced, there were minimum requirements in developing investments and ensuring local requirements in contracting and procurement. Gradually, foreign oil companies started to establish them self in Brazil, but the current output and near term projections relied heavily on Petrobras and its strategic planning (it was still responsible for almost all Brazilian oil and gas production). The international presence did however increase upstream activity, as they brought with them something that Petrobras did not have enough of, namely capital.

Government also amended the law (1997) in that it allowed not only Brazilian corporations and nationals to buy stock in Petrobras, but also foreign companies and individuals, whether

[38] Fishman (2010) p.2-4
[39] Fishman (2010) p.3-4

Brazilian based or not[40]. Table 5 show how the ownership structure changed in Petrobras as a result[41].

Brazil is today one of the world's pre-eminent hydrocarbon countries. It is attracting the attention of the world largest E&P companies due to world-class exploration success in its deep-water basins and the fact that it remains open to private investments. The pre-salt discoveries of 2006, particularly in the Santos Basin, especially the Tupi Field, propelled the country into the limelight following several years of disappointing production. The Tupi Field ranks alongside Kashagan and is considered to be one of the largest and most significant oil discoveries of the past few decades and the biggest in the Americas since the Cantarell field in Mexico in 1976[42]. The sheer magnitude of these discoveries, many of which hold billions of barrels of oil reserves, has led the Brazilian government to restructure the fiscal and regulatory terms, in what would later be known as the pre-salt polygon. The government induced new regulation that greatly strengthened the role of the state, by increasing its control of Petrobras and establishing a new framework to govern licensing of pre-salt and other "strategic areas"[43].

In Brazil's current concessionary system, there is no obligatory state participation, either at the exploration or development stage. As we have seen, Petrobras was historically given the virtue of operating a large number of blocks and fields. The 1998 legislation allowed the company to retain its current operations – which is a grounding factor for its large presence still. However, the legislation passed in 2010, which were regarding the promising Pre Salt areas, established Petrobras' dominant position[44]:

- Petrobras is the sole operator of all currently unlicensed acreage that is considered either to hold pre-salt potential or to be of strategic importance to the state.
- The government, at its discretion, can award acreage to Petrobras on a 100 percent basis

[40] Genaro & Cote (2010)
[41] Source: Petrobras - Capital Ownership

[42] Source: The Oxford Institute for energy studies (2014)
[43] Wood Mackenzie. (2014) p.4-6
[44] Wood Mackenzie. (2014) p.6
****Kashagan: Offshore field in Kazakhstan discovered in 2000, is located in the northern part of the Caspian Sea and is considered the world's largest discovery in the last 30 years is considered the world's largest discovery in the last 30 years

- Petrobras is to hold a minimum 30 percent stake in any pre-salt acreage that is made available to private investors.

Case study – Petrobras

Assessment of state ownership in Brazil

In assessing the development of the state ownership in Brazilian oil and gas industry it is crucial to look at the country's and Petrobras's history, in order to understand the rationale and drivers which has contributed to the formation of Petrobras as we know it today. Initially, the focus will be on the motives of the politicians and policy makers. The key characteristics and objectives defined earlier in this paper will be tested against the situation in Brazil with Petrobras before applying the theories discussed within Public choice theory. This will hopefully provide a deeper understanding of the actual rationale and behaviors displayed in and around Petrobras.

The motive for public ownership in Brazil

As we have seen previously, there are several schools of thought in regards to public ownership. The perspectives have shifted over time as new theories and economist's joined the debate and presented their reasoning and studies. As there were polar views on government involvement and public ownership within the scholar community, we have learned that there were also, and still are different views in Brazil as to what the optimal role of the state is. As George Phillip writes in his book "Oil and Politics in Latin America", there were a constant battle ongoing between the nationalists, compromising primarily of the military, the middle class and occasionally the communist party (when they were allowed to have a say) and the politicians and left wing thinkers. Although the conflict was primarily grounded in differences in opinion as to how Brazilian oil resources should be developed, utilized and divided, there were still a quite large consensus that Brazilian Oil should benefit Brazilians. As history has thought us, Petrobras was primarily set up with one goal in mind, to ensure self-sufficiency in oil and gas for Brazil.

The objectives of Petrobras

There are undoubtedly similarities between the NOC's around the world, as there are a few key fundamentals on which they have been created. First and foremost Brazil shares with many other countries a nationalistic concern regarding its oil resources, especially when it comes to selling into foreign hands. The protectionism which was developed in the form of the state monopoly through Petrobras, has been played down since then and gradually it has been shifted from self-sufficiency towards profits.

At present time and on the highest level, Petrobras's key objective is the same as for any other IOC, namely maximizing their shareholders value through maximizing its oil resources.

- Wealth distribution

Brazil has had a fairly reasonable approach to its wealth distribution of oil revenues. It has not made the mistakes as its neighboring country Mexico, in under-regulating its resources and grossly under-estimating the potential of local content. However, even though Brazil has not engaged in activities such as subsidizing fuel, it has however been on the receiving end of critics in its direct method of distributing the oil revenues. So far, the Brazilian states with the biggest oil deposits have received the largest part of the oil revenues, leaving non-producing states and municipalities with a significantly smaller share[45]. However, local governments have come to an agreement of a more distributed flow of oil revenues after the anticipated pre-salt oil-fields begin production.

- Jobs Program

Brazil has, as several other oil producing nations, several local content requirements for the oil companies who are to engage in E&P activity in Brazil. Even more so for Petrobras, who by many is seen as the catalyst in driving job creation and activity along Brazil's eastern coast-line. It has been said that the biggest obstacle to developing the huge oil fields in the Santos basin is relating to the lack of skilled manpower. Although Petrobras has tried relentlessly to increase its

[45] Source: The Economist, Brazils Oil Royalties

capabilities, by sending hundreds of its employees oversees to study and learn, the political class in Brazil refused, and are still reluctant in investing in proper education[46].

- Economic development

Brazil is now the world's biggest market for equipment and services in the offshore oil industry and Petrobras the biggest single buyer[47]. The government has re-established Petrobras unique position in Brazil with the bill passed in 2010. The passing of the bill ensures that the company can choose to operate in theory any new oil discovery in Brazil, and the government can choose to allocate the full ownership of the pre-explored licenses to Petrobras. In relation to the large, ongoing development in the pre-salt region, 111bn USD will be invested by 2020, in large extent driven by Petrobras. In order to spur local development and avoid "Dutch disease", government in collaboration with Petrobras has decided to significantly increase its local content requirement, which could go up to as high as 95 percent[48]. This would force potential suppliers and contractors to look for local partnerships, areas to establish new facilities and bases for operation.

- Foreign policy

Petrobras has historically been predominantly interested in mainly operating and focusing its developments within Brazil, although some activities have been established elsewhere in order to mitigate risk, this activity has almost halted all together after the large discoveries in national territories (pre-salt basin). Historically, Brazil was not energy sufficient and had to rely on close ties to America and some of its neighboring countries. The company has not received particularly amount of pressure in increasing its international presence, as it has had an almost exclusive interest in developing and exploiting its resources in Brazil.

- Energy security

There is broad consensus that Brazil no longer should need to worry themselves with national energy security, despite fossil fuels accounting for approximately 47 percent of the total energy

[46] Gall (2011) p.22
[47] Gall (2011) p.4
48Barrosso, Macedo (2012) p.2-3.

supply in Brazil[49]. The country wields an abundance of natural resources and stunning energy prowess. There is estimated that as much as fifty billion barrels of oil could be laying undiscovered deep below Brazilian waters. Many believe that Brazil will command superior stature in the coming years, thanks to its sub-salt discoveries. However, it would also need to adapt to the imminent changes to the energy market, as the demand for world oil is expected to increase by 27 percent over the next 15 years. It cannot expect its power to increase without taking a proactive energy approach[50].

- Vertical Integration

Several multinational oil companies are vertically integrated, and so is the case for Petrobras. It moves oil through its network from extraction through to the retail sites. This provides Petrobras with the control to monitor the cost at each step in value chain, as opposed to smaller, purely upstream/downstream companies. Initially, this could prove to be an area for significant growth, as the country's fleet size is expected to grow at an annual average rate of almost 6 percent, from 2014 until 2018[51]. In order to meet this demand, Petrobras were planning to invest in two new refining facilities, which could ramp up its production by approximately 50 percent. However, the company has decided to terminate the plans and were citing unfavorable market conditions and failure to bring partners onboard for the cancellation[52].

Petrobras' Characteristics

Efficiency

A study conducted by N.M.Viktor, as shown in table 7, takes a closer look at "dead revenues". This basically measures the efficiency with which the companies generate revenues. NOCs, IOCs and the Majors' revenues plotted against their total output and regression equations lines. The table tells us that for the majors, increasing output by 100 percent leads to an almost 60 percent increase in revenues. For IOC's on the other hand, revenues would only rise 43 percent

[49] Gall (2011) p.6
[*****] "Dutch Disease" experienced years ago by the country of Holland, when big petroleum finds triggered massive outside investment and currency exchange escalation that disrupted other industrial sectors as the country's economy became more dependent on hydrocarbons.
[51] Source: Forbes (2014)
[52] Wood Mackenzie (2015) p.6

from a doubling of output. Lastly, for NOCs the increase is a meager 32 percent. However, The NOCs of PdVSA, Pemex, Petrobras and Saudi Aramco are located on the IOCs regression line, which indicates that they are about as efficient in generation of their revenues as the IOCs (Table 8). This basically tells us that although NOC's have a tendency to perform lesser than its IOC peers, Petrobras is far more competitive when comparing to other NOC's.

Reserves and production

A study by Wood Mackenzie suggests that in general, NOC have a tendency to produce its reserves at a slower rate than that of IOC's. In explaining why Petrobras is performing slightly lower than its privately owned peers, Wood Mack refer to the "burden" of having to be a tool for energy self-sufficiency and to supply domestic markets[53]. Although its local presence has somewhat hampered Petrobras' ability and desire to go abroad, it is currently one of the definitive winners of the NOC's with a large reserve growth and huge prospects for growth in its home market.

Investment & Access to capital

Some argue that NOCs has closed the gap and now have several advantages over the IOCs, namely the ability to raise equity and debt in global capital markets at equal, sometimes better terms as the old majors[54]. Although this has been true for a while, it is no longer true for at least Petrobras who is struggling severely with maintaining its cash flow and is therefore forced to slash 2015 capital expenditure of approximately 30 percent. To make matters worse, Petrobras results for 2014 are still not completely audited, which have had them excluded from international capital markets[55].

Petrobras in light of Public Choice theory

The interaction between the individual behavior in the public arena as well as the marketplace, provide the starting point in our further discussion. The primary objective is to understand the

[53] Source: Stanford University (2012)
[54] Source: Economonitor (2013)
[55] Wood Mackenzie (2015) p.12-13

correlation to public choice theory within Petrobras itself and the policymakers and government officials who played an instrumental part in developing the company to its current state. The discussion will try to explain the events we have seen, by using the context of public choice and economic theory.

Size of government

An area of significant attention within the Public choice theory is the discussion revolving "Size of government". In the context of Petrobras, the rationale and key drivers within government size theory will be applied to the development of Petrobras and at the same time help to explain the increase in its presence.

The notion of government growth itself does not directly transfer to the case of Petrobras, but its theories underpinning government growth can help explain the characteristics we have seen develop in the company over time. One way of looking at it is by giving Petrobras the role of government. This is actually not that far-fetched, as Petrobas for a long time was a 100 percent government owned, it comprised primarily of former government officials and ex-military employees. Lars Udenh explain that political factors, namely institutional and cultural factors are key in understanding how the government, or in this case Petrobras, grow. As shown in figure 1, Petrobras did not begin successfully growing until around the 1980s. Before that, Petrobras was highly built up of military and former government employees. As an effect of the organization at the time, the way it acted was highly influenced by the interest of the individuals responsible at the time. As Udenh argue, "There is no end to those who wish to do good", meaning that multiplicity of claims and request creates pressure on governments to grow[56]. In the early stages of Petrobras, this attribute was not present as it behaved very autonous, without the presence of external pressure and impulse. The individuals in charge were content with maintaining its monopoly power and the government subsidies did not help in creating action in spurring growth and development for the company. In the same regard as the both the individual interest and the collective interest of Petrobras at the time hampered growth, one could see the shift in interest as time progressed, namely the internal shift within the organization, turning the focus from self-sustainability towards profitability and expansion.

[56] Udenh (1995) p.95

The notion of political culture can also be applied to the government known as Petrobras. The notion that political culture drive behavior in government is highly transferrable in the case of Petrobras. Udenh explain that the existence of political culture is not "free" to follow their program. In the case of Petrobras, there have been political cultures influencing its actions throughout its existence. It has taken the form of interest groups (unions, military), social movements (communists) and political parties, as the governing party at any given time have either restricted or encouraged the company's ability to grow[57].

Petrobras' Public actors and interests

A highly interesting discussion is around public actors and interests. As we have learned, in the days of Adam Smith, the social discussion was predominantly moral. In more recent public choice literature, however, the consensus is that most individuals pursue their own interest in their behavior rather than a broadly based public interest.

In light of Petrobras, both in past and present time, this is a very relevant subject when analyzing the motivation of behavior behind and within Petrobras. One could argue that in the initial development of Petrobras, the notion of self-sufficiency and ensuring that the oil resources in Brazil were to be exploited by a state owned company indeed were based on moral interest and the public good. As George Phillip writes, however, the history of Petrobras has countless stories of conflict arising in personal conflict and political interests[58].

One cannot discuss Petrobras and its public actors and public behaviors without referring to the recent events which have sent shock waves through Brazil. In February of 2014, a corruption scandal slowly unfolded which for many, were hard to believe. During the course of 2014, it was discovered suspicious deposits from Petrobras suppliers, and after a Petrobras executive came clean, a long term bribery scheme between Petrobras employees, members of the government and supply companies were revealed[59]. In light of reviewing Petrobras's history development and the recent proof of corruption within Petrobras and the Brazilian government, would strongly suggest that it is primarily an organization built up of individuals who to a large extent act in

[57] Udenh (1995) p.96-97
[58] Phillip (2006) p. 368-378.

[59] Rocha (2015) p.3-4

self-interest. The fact that it is a (partially) public owned company is not sufficient to ensure that it would act solely in the public's interest. In this regard, Tulloc G. Seldon A. and Brad G.L explain that evidence are fairly strong indicating that motives other than the pursuit of private interest are not the ones we can depend for the achievement of long-continued performance. They further claim that if there a very carefully designed incentive structure in place, one can assume that many employees will act primarily in self-interest.

Lastly, public choice theorist are unlikely to believe that government officials, or perhaps even Petrobras executives in this case, are overly concerned with the public's interest. In general, private businesspeople would be subject to surveillance by the public, and therefore these public officials would have very little motive to protect particular businessperson. In the case we have seen, this surveillance have not been sufficient and has led to opportunistic behavior driven solely by private interest and gain[60]. The fact that government official also have been involved would support the notion that the Petrobras executives can be classified as government officials in the definition of public choice theory.

Petrobras & Rent

In determining whether or not rent is present in the case of Petrobras, one would have to assess the historic implications of the state monopoly. The monopoly introduced by the creation of Petrobras was a classic example of a protectionist measure; the rent it created however, is more difficult to define. When taking the definition of "the use of resources for the purpose of obtaining rents for people where the rents themselves come from some activity that has negative social value" one could suggested instances where the actions of Petrobras and the government created *rent-seeking cost*, in doing so, keeping in mind the notion of whether or not society as a whole is better of due to the induction of the rent. Firstly, there is Petrobras' hesitation of engaging in exploration activities in the offshore regions outside Brazil. The hesitation was based on erroneous assumptions and individual interest, which in turn affected society in Brazil as the country were a net importer of oil, it consumed more than it produced. This, in combination with the monopolistic setup, prohibited other participants in exploring for oil and contributing to the

[60] Tulloc, Seldon, Brad (2002) p.3 -13.

oil production. The effects were that although it kept its national control over its resources, society was worse off.

Petrobras & Redistribution

The issue of redistributing gains could be extended to Petrobras' indirect ability of distributing wealth within its society. One could argue that Petrobras, and the policy makers in Brazil have not succeeded in creating Pareto efficiency in its distribution of the oil revenues, as the largest portion of the revenues have been split by the three states in Brazil with the closes proximity to the oil activity. Although this is planned to be rectified after production is started in the pre-salt basin, the current set up does not fulfil definition of redistribution.

Petrobras & Politicians

In public choice theory there seem to be a consensus that parties and/or politicians have limited power in manipulating certain macroeconomic variables, simply due to the sheer magnitude of influence one would need to exert in order to obtain such a result. Although, there are several theorist who believe that politicians do create business cycles to some extent. In the same way as parties and governments are supposed to have only one set of preferences, the same would apply for a state controlled company such as Petrobras. If we were to converge the notion of parties vs politicians to Petrobras, the company would be reduced to a mere instrument for policy makers and executives. As the same way politician strives to be re-elected, Petrobras executives strive to keep their job. Similarly, one can draw the parallel between voters who would react favorable to governments who lower rates of inflation and unemployment while raising their income and stakeholders/shareholders who react favorable to rising share prices, increased production and overall output. However, in the same way that it is unlikely that politicians can manipulate macroeconomic variable, it is also unlikely that an executive or government official could manipulate the share price single handedly.

Petrobras & Bureaucrats

When reviewing bureaucrats in relation to Petrobras, one need to look beyond the employees and government officials who simply perform the roles which are expected of them and seek out those who determine polices beyond what is simply expected. Once again, in light of public choice theory, we are to assume that the bureaucrat is a selfish utility maximizer. If we were to apply Weber's reasoning the natural target for the selfish utility maximizer is power. Power is again divided into three, physical, economic and political. In the area of public choice, the latter two are by far the most significant ones. Russell (1938), further exemplifies these two respectively; "by offering reward or punishment and by exerting influence on opinion through the use of education and propaganda[61]" Political power means inducing to do something that he did not want to do, in example if *A* gets a directors board to vote *x* when all but *A* favor feasible alternative *y*[62]. In the recent corruption events displayed at Petrobras, several of the above occurred. Firstly, policy makers and/or decision maker clearly acted as a selfish utility maximizer, as there rarely any other rational for taking bribes. Also, one would need to exert some form of power, most likely both economic and political power. The bureaucrat could use its influential position to authorize purchases/contacts in return for compensation, one would likely also displayed political power as the bureaucrat induced to company to do something which were in his/her interest (bribe) and which was clearly not in the company's interest. There is even a possibility that this instance could have provoked physical power, in that force would likely be applied by the bureaucrat involved, either before, during or after the individual had engaged in the corruption activity.

Petrobras & Federalism

As for Petrobras itself, it is generally not seen as a particularly decentralized organization, although it has become more competitive compared to its peers over time. In terms of governmental unitization, Brazil chose to establish two separate agencies just before Petrobras was created. The DNPM, intended to legislate and govern the development of mineral extraction. The CNP, who were set up as the regulating body, in charge of structuring and regulating the

[61] Mueller (2003) p.360.
[62] Mueller (2003) p.360.

petroleum industry, including Petrobras. In doing so, the government separated different levels of state, which again prevented Petrobras from having a conflict of interest.

Concluding remarks

Petrobras is a giant in Brazil and a significant global actor in the oil and gas arena. It has established its position primarily through the monopolistic status which it has enjoyed for a long period of time. Being a monopolist in a country as Brazil, is both challenging and rewarding. Petrobras has always had, and particularly recently, access to an abundance of resources. However, being a large publicly controlled company, in one of the world's dynamic economies, has proven to be challenging time after time.

The application of public choice theory to the case of Petrobras, has at time been challenging, but also very rewarding. The theories we have seen are primarily based on individual behavior in the political arena as well as the marketplace. This has proven to be a good fit for a company such as Petrobras, who constantly need to maneuver both the political and business environment. Although, public choice theory is constructed with government in mind, Petrobras is exposed to so much political influence and bureaucratic behaviors that the theories proved to be of significance when evaluation the state ownership in the company.

After reviewing Petrobras in the light of public choice theory, one can make the following observations. The political assumptions of making governments grow can to a large degree be transferred to Petrobras, as governments need outside impulses to grow or else it becomes complacent, which were exactly what happened to Petrobras in the early stages of monopoly power. By utilizing the same logic, one can allocate the same reasoning in assuming that external influencers had the opposite effect in a later stage, contributing to the growth of Petrobras. Alas, the rent seeking cost present in the case of Petrobras can be defined as the effects caused by keeping strict control over its resources, resulting that in the greater scheme of things, society were worse off. The indirect effect of Petrobras on the redistribution of resources is an example that the company and the policy makers have not managed to create pareto efficient conditions in the society. The recent events of the corruption scandal provided a good platform for exemplifying typical, expected bureaucratic behavior.

In assessing the government ownership in Petrobras, public choice theory has been useful particularly in one way. It has helped visualize that a company such as Petrobras, who many would expect act and behave like any other large corporations, actually is very colored and influenced by the fact that it is a government owned company. One can conclude that public choice theory has visualized the clear connection between behaviors in government and a government owned company, such as Petrobras.

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Exhibits:

Table 1. Comparative Ranking of the Top Ten Oil Companies

Rank 2006	Company	Ownership	Rank 2000	Company	Ownership
1	Saudi Aramco	State	1	Saudi Aramco	State
2	ExxonMobil	Private	2	PDV	State
3	NIOC	State	3	ExxonMobil	Private
4	PDV	State	4	NIOC	State
5	BP	Private	5	Shell	Private
6	Shell	Private	6	BP	Private
7	PetroChina	90% State	7	Pemex	State
8	Chevron	Private	8	Pertamina	State
9	Total	Private	9	Total	Private
10	Pemex	State	10	KPC	State

Source: Pirog, Roger. (2003) Table 1.

Table 2. The social costs of monopoly with rent seeking

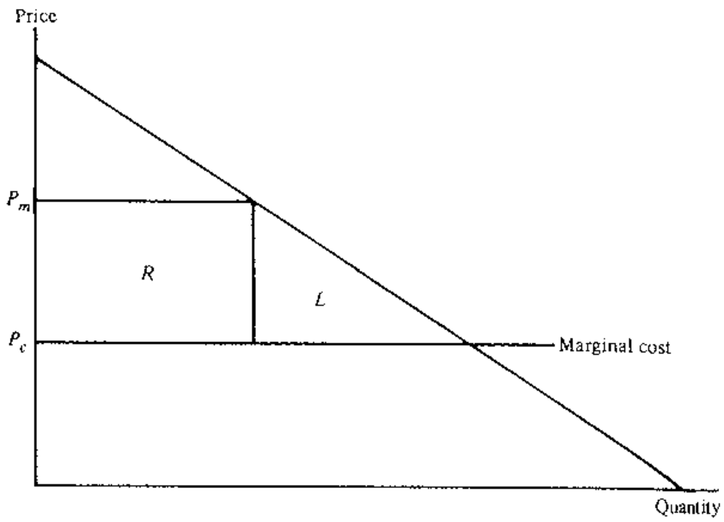
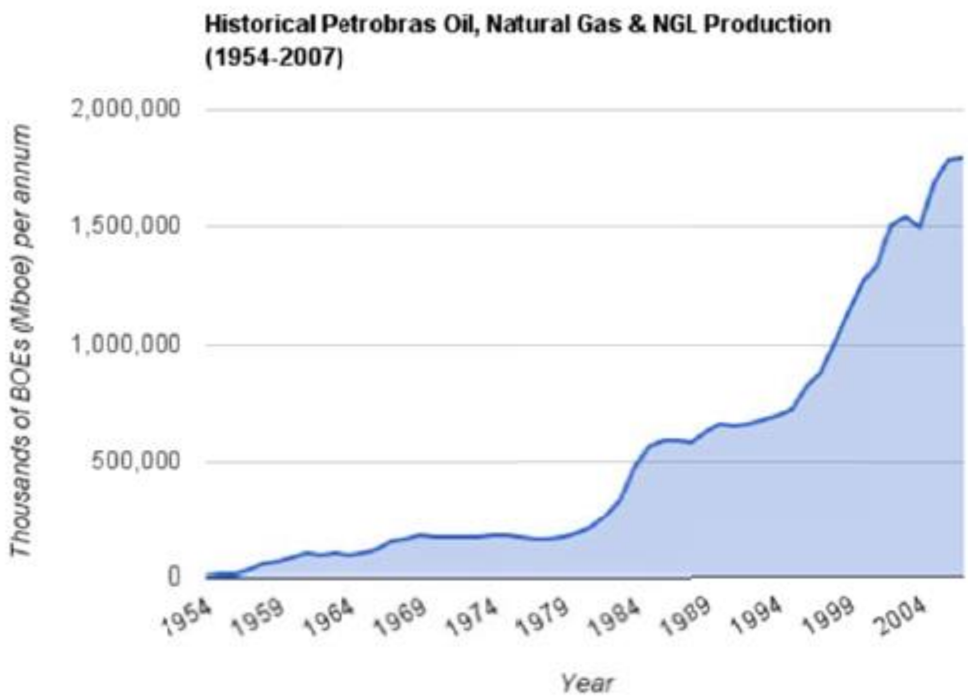


Table 3. World Liquid Petroleum Reserves Holdings (mbo)

Rank 2006	Company	Reserves	Rank 2000	Company	Reserves
1	Saudi Aramco	264,200	1	Saudi Aramco	259,200
2	NIOC	137,500	2	INOC	112,500
3	INOC	115,000	3	KPC	96,500
4	KPC	101,500	4	NIOC	87,993
5	PDV	79,700	5	PDV	76,852
6	Adnoc	56,920	6	Adnoc	50,710
7	Libya NOC	33,235	7	Pemex	28,400
8	NNPC	21,540	8	Libya NOC	23,600
9	Lukoil	16,114	9	NNPC	13,500
10	QP	15,200	10	Lukoil	11,432

Source: Pirog, Roger. (2003) Table 2.

Table 4: Historical Petrobras Oil, Natural Gas & NGL Production (1954-2007)



Source: Petrobras Investor Relations Data (2010)

Table 5: Petrobras ownership structure 2000-2015

Petrobras Ownership %					
	2000	**2003**	**2008**	**2010**	**2015**
Government	60.9	40.1	39.9	53.6	50.3
Bovespa Brasil (*)	18.7	21.1	21.6	10,1	10,1
Foreign Owned (**)	20.4	38.8	38.5	36,3	39,6
Free Floating	39.1	59.9	60.1	46,4	49,7

(*) Includes stock owned by the state (the União) (32.2 percent) and state-owned BNDESPAR bank.
(**) Includes ADRs and foreign shareholders in BOVESPA, Brazil's stock and futures exchange. Source: Petrobras.

Table 6. World Petroleum Liquids Production (kbo)

Rank 2006	Company	Production	Rank 2000	Company	Production
1	Saudi Aramco	11,035	1	Saudi Aramco	8,044
2	NIOC	4,049	2	NIOC	3,620
3	Pemex	3,710	3	Pemex	3,343
4	PDV	2,650	4	PDV	2,950
5	KPC	2,643	5	INOC	2,528
6	BP	2,562	6	ExxonMobil	2,444
7	ExxonMobil	2,523	7	Shell	2,268
8	PetroChina	2,270	8	PetroChina	2,124
9	Shell	2,093	9	BP	2,061
10	Sonotrach	1,934	10	KPC	2,025

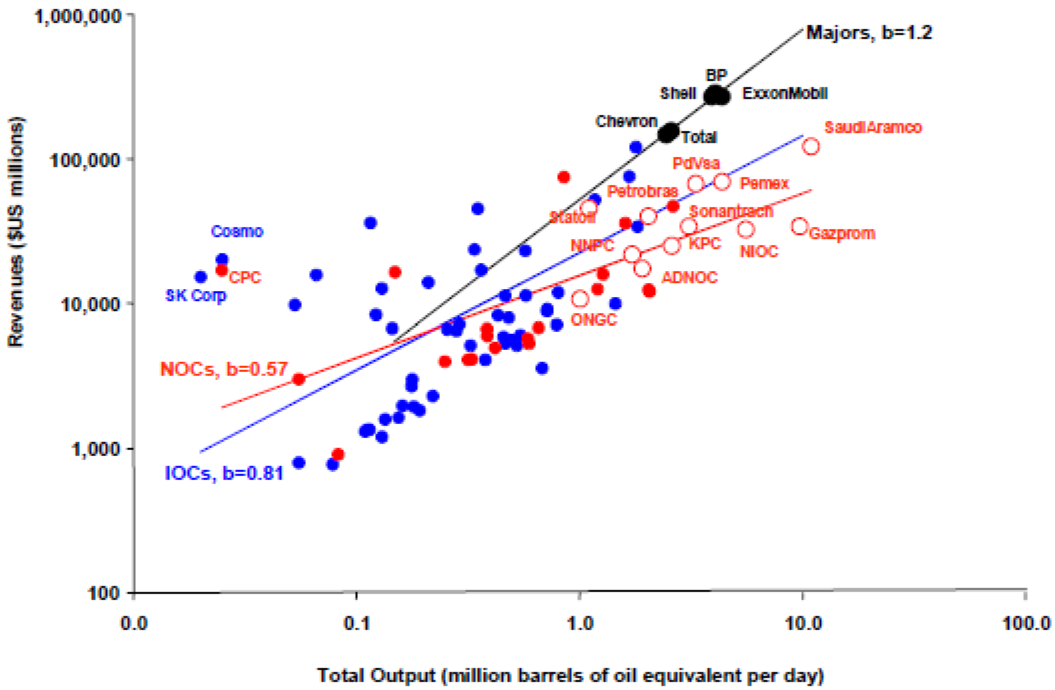
Source: Pirog, Roger. (2003) Table 3.

Table 7: Growth of general, 1870–1996 (percent of GDP)

		Pre– Post– World War I		Pre– Post– World War II				
	About 1870	1913	1920	1937	1960	1980	1990	1996
General government for all years								
Australia	18.3	16.5	19.3	14.8	21.2	34.1	34.9	35.9
Austria	10.5	17.0	14.7	20.6	35.7	48.1	38.6	51.6
Canada	–	–	16.7	25.0	28.6	38.8	46.0	44.7
France	12.6	17.0	27.6	29.0	34.6	46.1	49.8	55.0
Germany	10.0	14.8	25.0	34.1	32.4	47.9	45.1	49.1
Italy	13.7	17.1	30.1	31.1	30.1	42.1	53.4	52.7
Ireland	–	–	18.8	25.5	28.0	48.9	41.2	42.0
Japan	8.8	8.3	14.8	25.4	17.5	32.0	31.3	35.9
New Zealand	–	–	24.6	25.3	26.9	38.1	41.3	34.7
Norway	5.9	9.3	16.0	11.8	29.9	43.8	54.9	49.2
Sweden	5.7	10.4	10.9	16.5	31.0	60.1	59.1	64.2
Switzerland	16.5	14.0	17.0	24.1	17.2	32.8	33.5	39.4
United Kingdom	9.4	12.7	26.2	30.0	32.2	43.0	39.9	43.0
United States	7.3	7.5	12.1	19.7	27.0	31.4	32.8	32.4
Average	10.8	13.1	19.6	23.8	28.0	41.9	43.0	45.0
Central government for 1870–1937, general government thereafter								
Belgium	–	13.8	22.1	21.8	30.3	57.8	54.3	52.9
Netherlands	9.1	9.0	13.5	19.0	33.7	55.8	54.1	49.3
Spain	–	11.0	8.3	13.2	18.8	32.2	42.0	43.7
Average	9.1	11.3	14.6	18.0	27.6	48.6	50.1	48.6
Total average	**10.7**	**12.7**	**18.7**	**22.8**	**27.9**	**43.1**	**44.8**	**45.6**

Source: Mueller, Dennis C. (2003) Table 21.1

Table 8: NOCs (red), IOCs (blue) and Majors (black) Revenues versus Total Output



Source: Nadejda Makarova Victor (2007)