

The National Oil Companies:

Value Creation 2001-2011

University of Houston, C.T. Bauer College of Business

Student Research Project

This report is developed solely for the purpose of class discussion. Cases and reports do not represent endorsements by the faculty or the C.T. Bauer College of Business on effective or ineffective management.

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1. Introduction

a. Research Objectives

This report documents the findings of a research project undertaken by students in the C.T. Bauer School of Business MBA program at the University of Houston.

The purpose of the project was to understand how National Oil Companies have created value for the shareholders and other stakeholders in the past, and how they intend to create value in the future

The intent has been to create a vehicle that will integrate the capabilities within the C.T. Bauer School of top tier academic research with experience-based knowledge of the challenges facing energy companies. Through this integration and our long time frame looking back and forward ten years, we hope to provide a set of analyses and commentaries that will complement existing reports available from financial institutions and will be useful both to financial institutions and to the companies studied.

Our plan is to follow this report with others addressing the value creation models of different sectors of the industry (e.g., Super-majors¹, National Oil Companies, independents, refiners, midstream players), in each case updating prior analyses while detailing the new sector. Further, we hope that these reports will deepen the relationship between the University of Houston and energy companies in Houston and beyond, creating opportunities for mutually beneficial dialogue.

b. The National Oil Companies

Commercial energy provides the foundation for modern society. The machines that enabled the UK to spark the industrial revolution such as Newcomen's steam engine (1712), James Watt's improved versions (1753-75), the resulting railway boom starting with the Stockton to Darlington route in 1825 all depended on availability of commercial coal. The steel industry came to depend on coke from coal in place of charcoal as a fuel and reducing agent from 1709 when Abraham Darby took advantage of adjacently situated coal and iron ore resources on Coalbrookdale, Shropshire. Steel demand expanded rapidly following development of the hot blast process in the early 19th century. In the U.S., coal use exceeded wood in 1885 and its predominance was reinforced by Edison's development of the first commercial electric power generator in 1882.

In 1869, Colonel Drake discovered oil in Pennsylvania, and oil demand grew mainly in heating and lighting sectors as a replacement for increasingly scarce whale oil. Soon, the "waste products" after kerosene had been extracted started finding uses as an alternative to coal in ship's bunkers. Then the horseless carriage was invented in the 1890s and ushered in two decades of intense competition between steam driven, electric and internal combustion power trains. The latter power train proved to be the most practical solution, oil was confirmed as the economic winner and oil demand growth accelerated. Apart from the merits of the power train, oil's natural attributes as a fluid that is widely available, affordable, easy to transport and store and relatively clean burning were an essential part

¹ Available on the Bauer College Web Site at www._____

of the automobile's value proposition. These attributes are still difficult to match and explain the difficulty in replacing the oil with other energy sources. Oil became an internationally traded commodity, with Standard Oil in the U.S. and Royal Dutch Shell as the largest international actors.

Winston Churchill, First Lord of the Admiralty, recognized the strategic importance of oil to the Royal Navy in 1913 after discussions with Marcus Samuel of London-based Shell Transport and Trading. But Shell had merged with Royal Dutch in 1907 and Churchill believed that the combination of Standard Oil and the new Royal Dutch Shell presented monopolistic characteristics. He was unable to negotiate an acceptable deal for supplies of bunker fuel oil with Shell and instead negotiated a deal with Anglo-Persian (later to become BP) and successfully proposed to the House of Commons in 1914 that the UK government should take a 51% ownership in Anglo-Persian.

Churchill commented "We knew that by our contract we should confer upon the Anglo-Persian an enormous advantage which, added to their concession, would enormously strengthen the Company and increase the value of their property. If this consequence arose from the action of the State, why should not the State share in the advantage which we created?"²

Thus came into being the first National Oil Company (NOC), born from government's recognition of the strategic importance of oil to the national interest. Others would follow in consumer countries with concerns over the security and price of supplies, and producer countries with concerns over their share of the revenues from oil extraction and control of the pace of development. The British government sold its BP shares over the period 1979-87 and the French government liquidated its holdings in Total in 1996; the Italian government retains a 30% interest in ENI.

In this report, we focus on national oil companies where the government owns a controlling interest. Our primary objective is to understand whether and how these companies have created value for their owners. For those with some private ownership, we looked hard at the total shareholder returns to private owners. For those owned totally by the government, we focused on the value they appear to have created for the State.

We investigated NOCs in three groups:

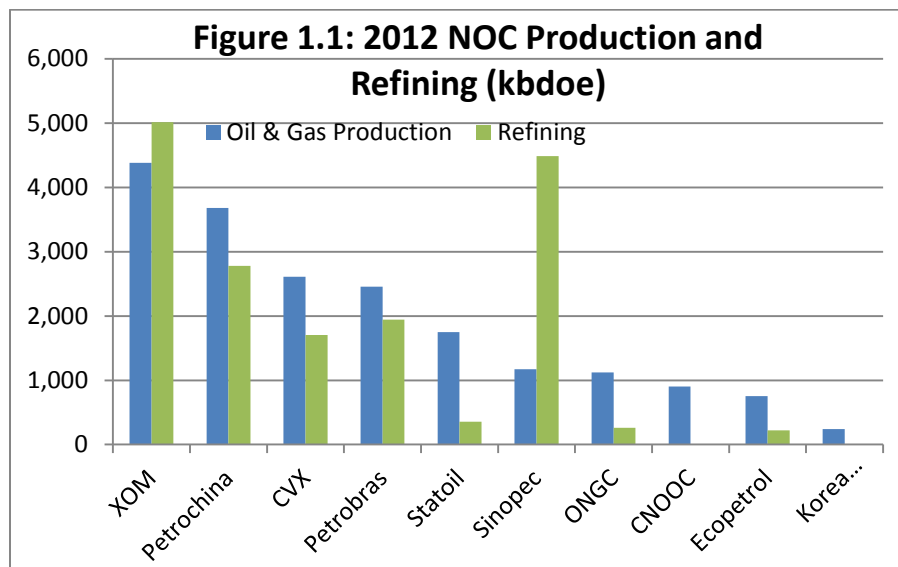
- **Western NOCs with some public ownership:** Statoil, Petrobras and Ecopetrol were created to play a leading role in developing national hydrocarbon resources for the benefit of the state. Each country is a net petroleum exporter but the NOCs have broadened their activities beyond their borders driven by the ambitions of their management to build on their capabilities and create value for their stakeholders.
- **Asian Consumer Country NOCs:** CNPC, Sinopec, CNOOC, ONGC and Korea's KNOC were also formed to lead development of national hydrocarbon resources. All but KNOC have been partially privatized through public offerings. They have also broadened their activities beyond their borders but have been driven as much by their government's

² Terra Incognita: A Navigation Aid for Energy Leaders By Christopher Ross and Lane Sloan

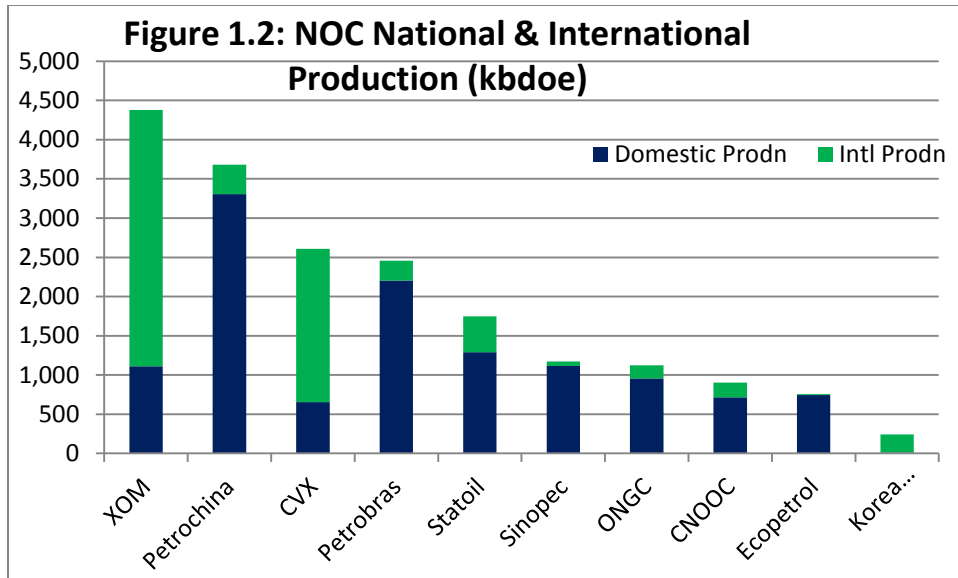
wish as a petroleum importer to access international hydrocarbon resources as by the ambitions of their management to expand their scope of operations.

- **Selected Producer NOCs:** Saudi Aramco, Qatar Petroleum (QP) and Sonangol were selected for investigation respectively as the leading global oil producer, the leading LNG producer and an example of an NOC that acts as a government agency.

The first two groups compete directly with the Super-majors for access to resources and markets (Figure 1.1) as well as for investors. ExxonMobil is larger in terms of oil and gas production and refinery throughput than any of the NOCs, but CNPC (privatized as Petrochina) is a close second ahead of Chevron. All the NOCs except Sinopec have more oil and gas production than refining, reflecting their focus on resource capture and development.

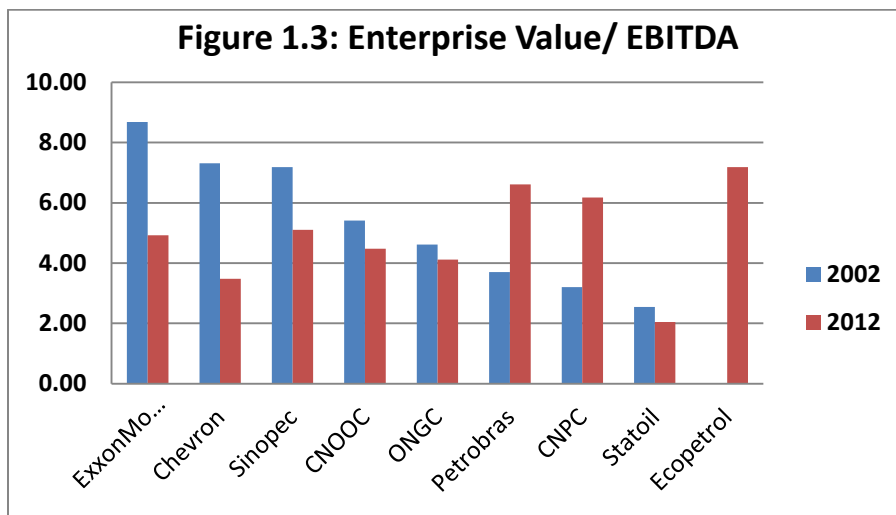


Although much attention has been given to the international expansion of NOCs and their aggressive efforts to capture resources, the fact is that their portfolios are still heavily weighted to national oil and gas reserves and production (Figure 1.2).



This is in sharp contrast to the U.S. IOCs, whose portfolios are more broadly international.

An initial look at multiples of Enterprise Value to EBITDA raises provocative questions (Figure 1.2).



- Why are multiples generally lower in 2012 than they were in 2002?
- Why are NOC multiples now comparable or superior to IOCs?
- Why are Petrobras and CNPC multiples higher in 2012 than in 2002?
- Why are Statoil multiples so low?
- Why are Ecopetrol multiples so high?

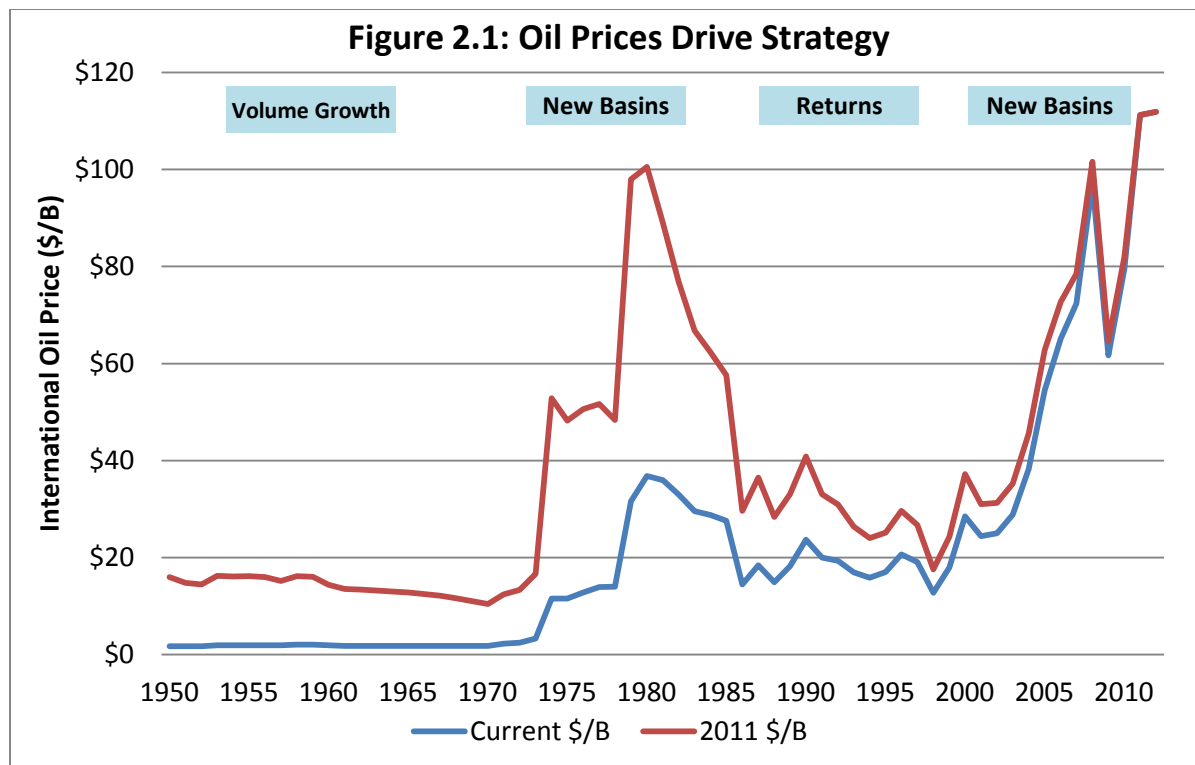
These and other questions on value creation by NOCs are addressed in this report.

2. Summary of Findings

Our review concludes that NOCs with some private ownership performed well for their private owners over the period of 2001-11: better, in fact, than did the Super-majors. The primary reason appears to have been their willingness to invest more aggressively in organic growth relative to their size than did the Super-majors. They were active in acquisition, and then spent heavily in developing the full potential of the acquired company's portfolio of opportunities.

During a decade during which crude oil prices were rising steadily, this was a winning strategy. There is a saying that "generals are always preparing to fight the last war" and it seems to have been the case that the IOCs³ through the first decade of the 21st century largely continued the strategies of the 1990s of consolidation, cost reduction and extreme capital discipline.

Our previous report showed that ConocoPhillips and Chevron were most aggressive in reinvesting in growth (measured as capital expenditures divided by end year total assets) and delivered highest value growth for their shareholders. Other IOCs were more cautious and delivered lower Total Shareholder Returns (TSR). To some extent, the caution of the IOCs opened the door for the NOCs to expand internationally.



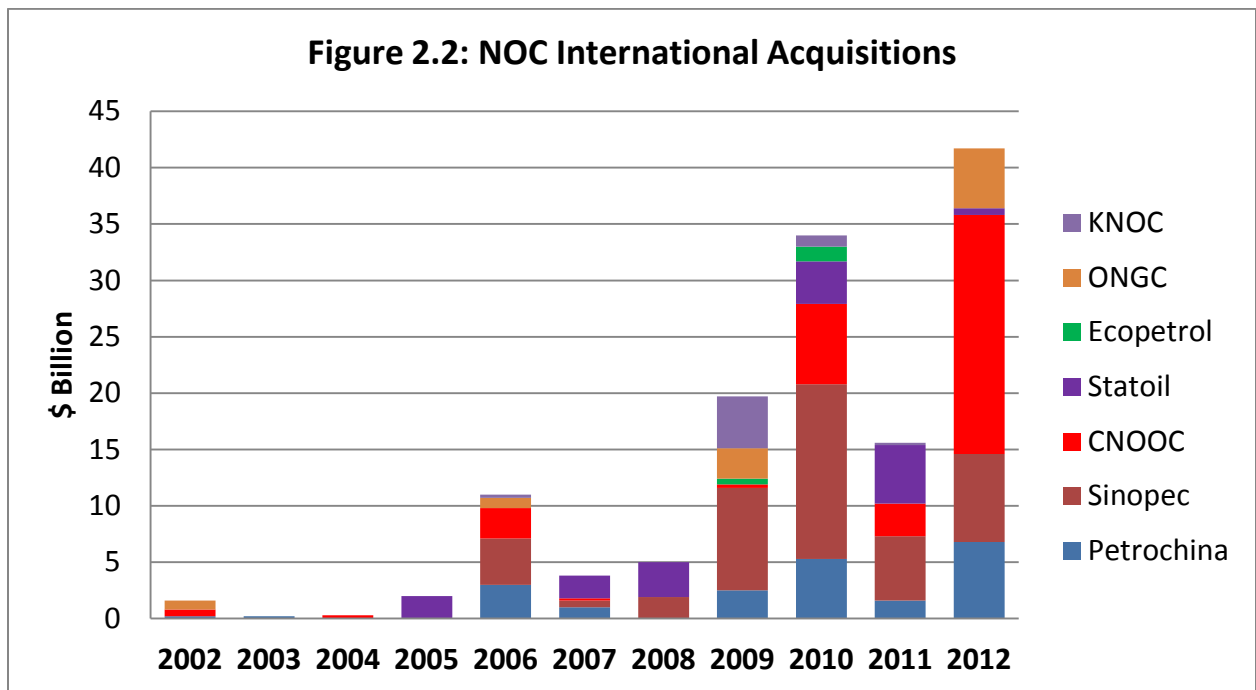
IOC capital discipline was important to the IOC "generals" who remembered the "war" of the 1990s but perhaps forgot that oil markets are cyclical (Figure 2.1). As one executive interviewed in 2006

³ In this report, the terms Super-major and IOC (International Oil Company) will be used interchangeably

said “in 1990, there was a dependence on the price of oil staying high, and that’s very dangerous.”⁴ Capital discipline was reinforced by requiring that new projects be evaluated using low benchmark oil and gas prices. There was also recognition that the IOCs were limited in technical capacity following the staff cuts of the 1990s and that high capital expenditures could over-extend available talent, internally and of that of contractors.

The internationalizing NOCs marched to a different drummer. CEO Helge Lund in 2006 said “a key part of our value proposition is growth” and “I firmly believe we have an obligation, not only to our shareholders but also to our employees, to capitalize on the vast experience and technology development that we have developed”⁵. Other NOCs were driven as well by their governments’ directives to gain access to major oil resources as a financial and security hedge to growing oil imports.

Whatever the motivation, the strategy provided their shareholders with superior returns. Acquisitions of international assets and companies have provided impetus to the growth strategy and have accelerated over the past few years (Figure 2.2), but our research suggests that organic reinvestment in exploration and development were more important drivers of value than growth from inorganic acquisitions.

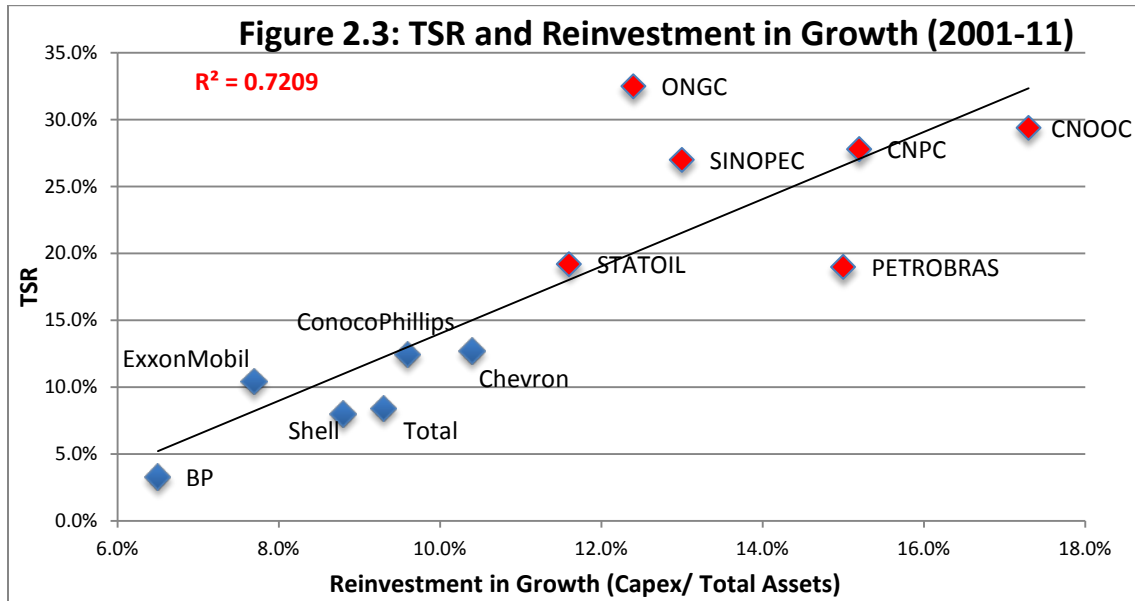


Over the period from end 2001 to end 2011, the five NOCs listed on stock exchanges all invested more aggressively than the IOCs and delivered to their shareholders better returns than the IOCs (Figure 2.3). Over the same time period, there was only a very slight relationship between TSR and return on assets (Figure 2.4); NOC average returns on assets were mainly in the same range as IOCs

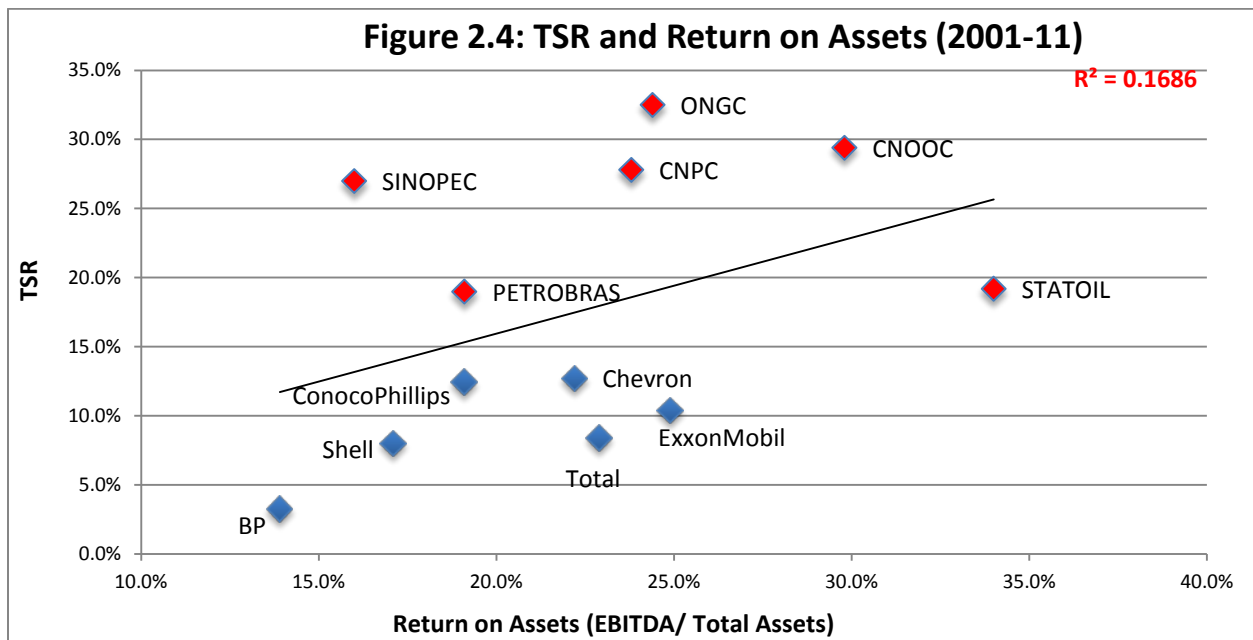
⁴ Terra Incognita, p376

⁵ Terra Incognita, p211 and p 306

but their shareholder returns were higher. This confirms the conclusion from our analysis of the IOCs that reinvesting cash in new projects provided better returns for shareholders than returning surplus cash through dividends or stock buy-backs.

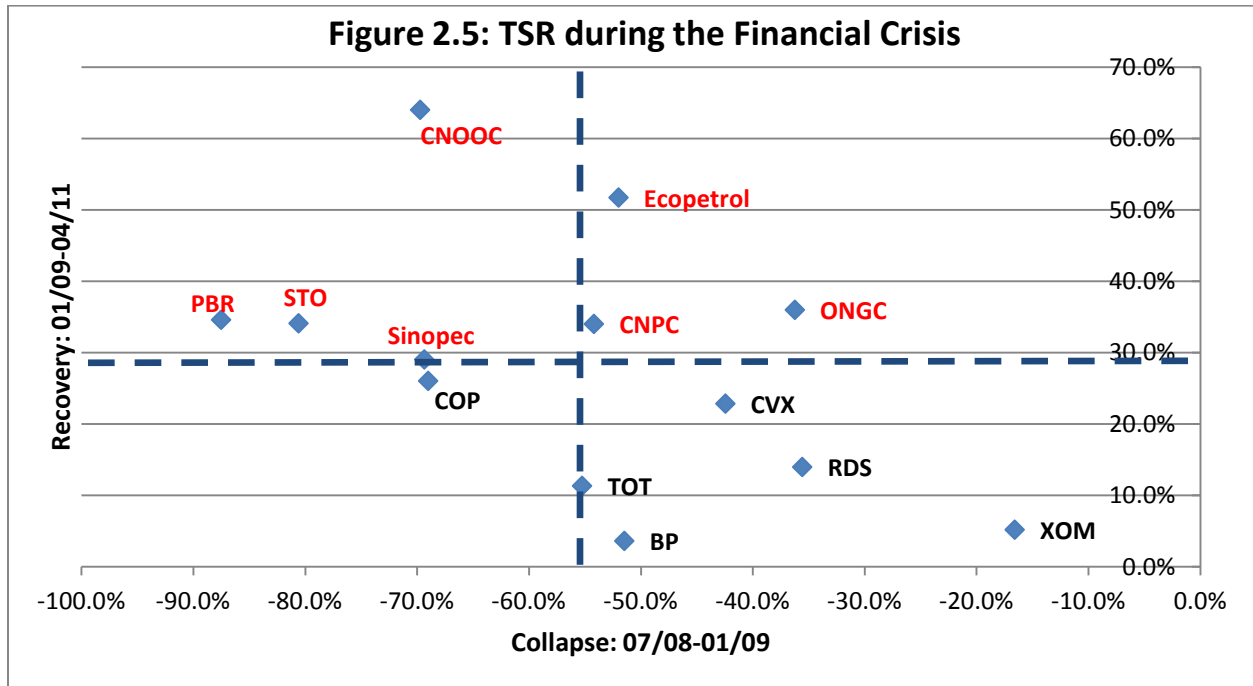


This conclusion of the primacy of growth in creating shareholder value during this period of time was further reinforced in our analysis of independent oil companies, with the caveat that the reinvestment had to be in the “right” growth. In particular, those companies that had concentrated on reinvestment in North American natural gas projects had delivered relatively poor shareholder returns. This report may also be found on the GEMI website.

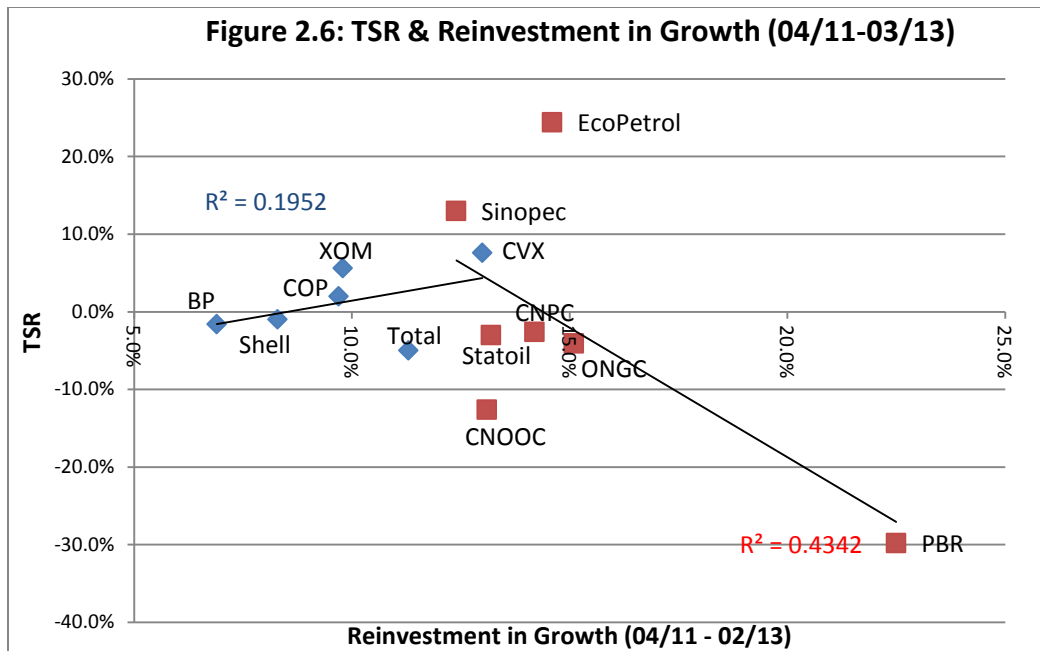


Of course, these findings beg the question of whether growth strategies will continue to provide strong shareholder returns in the future or whether the NOC “generals” will continue to fight the war of the 2000s rather than adapt to the requirements of the 2010s. Initial signs are cause for concern.

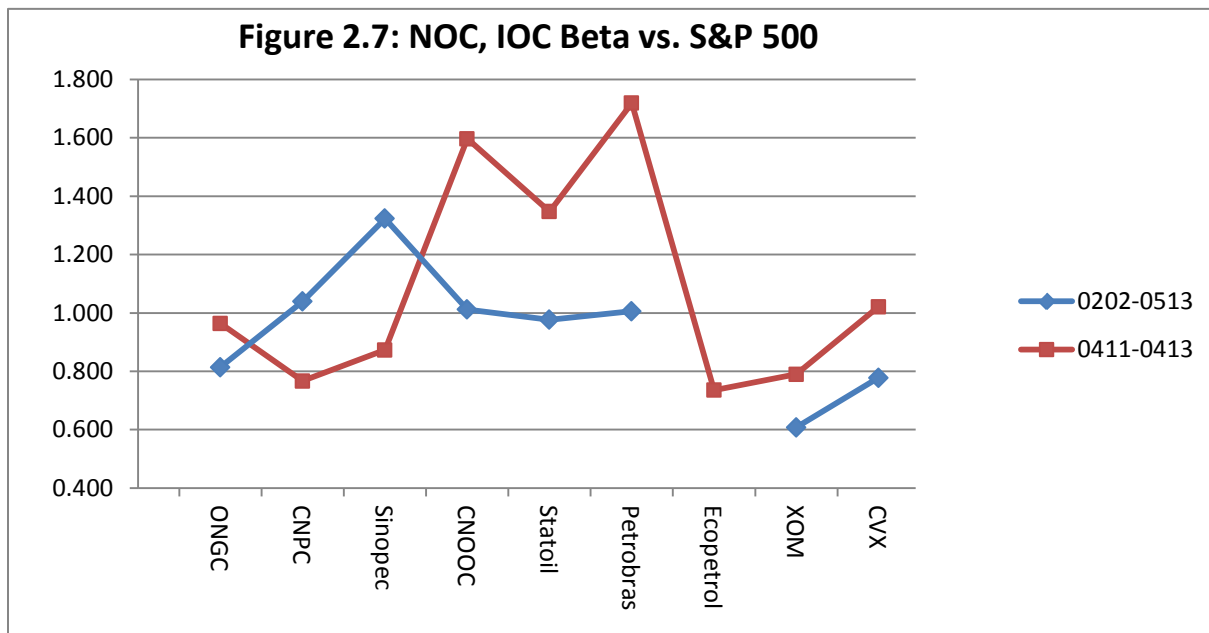
During the financial crisis, NOC stocks were generally more volatile than IOC stocks with a greater loss of value when oil prices collapsed from mid 2008 through mid 2009, and a stronger rebound as oil prices recovered (Figure 2.5). This was consistent with their aggressive capital spending, as free cash flow was hit by lower oil prices.



More concerning is how investors seem to be responding to NOC value propositions since the financial crisis. The strong relationship between TSR and reinvestment in growth that held in the period 2001-11 weakened for the IOCs, mainly due to very weak TSR from Total (excluding Total, the IOCs R^2 would be 0.842). But for NOCs as a group, the relationship turned negative (Figure 2.6) implying that investors believe that some NOCs may be destroying value in the current environment of lower expectations for oil prices.

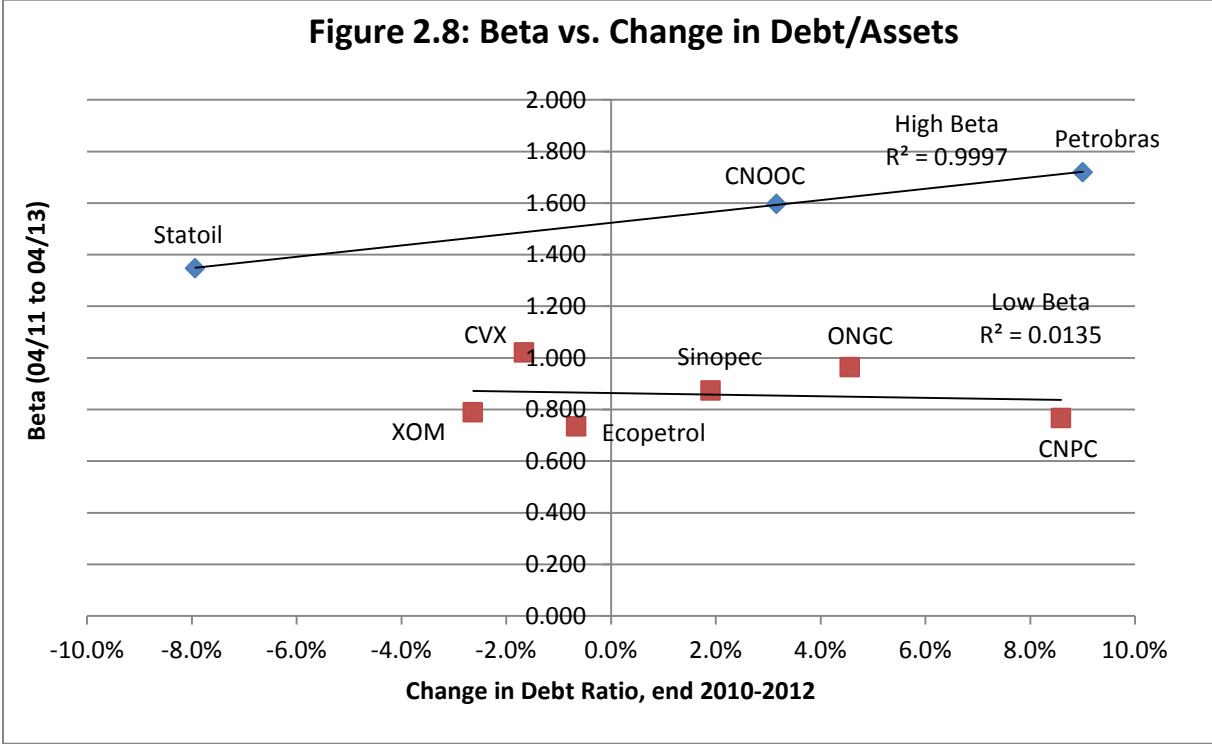


Examination of the change in corporate beta values relative to the S&P 500 sheds further light on this hypothesis (Figure 2.7). Both ExxonMobil and Chevron show slightly higher beta (and perceived risk) over the past two years than over the longer 2002-2013 time period. By contrast, Petrochina (CNPC) and Sinopec show lower beta in the recent period, possibly due to a more favorable political environment for their Chinese downstream businesses. By contrast, while over the full period 2002-2013 NOC beta values relative to the S&P 500 were close to 1.0, over the past two years beta values for Statoil, CNOOC and Petrobras have increased significantly relative to the IOCs and to the other NOCs studied, suggesting



that their risk has increased from the capital markets' viewpoint.

We were interested in whether this disparity in Beta values was caused by a change in debt leverage or resulted from strategic issues. Our analysis suggests the latter (Figure 2.8). While the high Beta companies as a group (CNOOC, STO, PBR) showed a strong relationship between Beta value and change in leverage, the low Beta group had no such relationship, nor was there any overall relationship between leverage and Beta for the two groups together. Something else seems to have driven the market to single out the high Beta companies as being higher risk.



We believe that the reasons are strategic: these three NOCs have a large legacy portfolio of mature domestic production assets and aggressive growth aspirations aimed at diversifying and rejuvenating their portfolios, but they each face challenges in their exploration and production segments:

- (i) CNOOC has a challenge to integrate its Nexen acquisition and demonstrate that it can earn a reasonable return on the purchase price;
- (ii) Petrobras has to prove it can profitably and safely develop its massive pre-salt resources and persuade its government to moderate its various mandates on the company;
- (iii) Statoil has to prove that its acquisitions of North American shale gas and oil sands resources can provide attractive returns and that it can grow profitably.

By contrast, while government oil product price controls hurt Petrochina and especially Sinopec when crude oil prices were rising, this risk has dissipated with lower crude oil price expectations. This may have contributed to the decline of Petrochina and Sinopec betas to parity with ExxonMobil and Chevron, as their exposure to Chinese downstream markets may now be viewed more positively from a risk point of view.

The strong implication is that investors are making a distinction between “good growth” and “not so good growth.” Disciplined investment in projects focused on increasing oil and oil price-related natural gas production represents “good growth” as does (more recently) exposure to the growing Chinese downstream market.

The overall business logic for investment in finding and developing oil resources is still compelling. As the global economy grows, more people will join the middle class and will covet mobility. The McKinsey Global Institute estimates that there will be 3 billion more middle class consumers in the global economy by 2030⁶, up from 1.8 billion today, and demand for fuels to power trucks and passenger vehicles will grow accordingly. So far, no transportation technology has been able to compete with the hydrocarbon fueled internal combustion engine: batteries are still much too expensive for electric vehicles to be competitive outside the very highest niches of the market, and biofuels suffer from serious fundamental issues of low energy density and competition with food production. At the same time, much of current oil production comes from mature fields that are in the decline phases of their lives so that the oil industry must discover and develop resources to fill the gap created by a declining base production and rising demand. It will not be easy and will require the companies to take on difficult technological and political risks.

Natural gas is different. The global resource is less mature and larger relative to current demand than oil. Therefore, there is more price risk than for oil and companies wishing to invest in major international natural gas projects must continue to transfer much of that risk to their customers, who should value secure supplies of this clean burning, low carbon emissions fuel.

From time to time a combination of demand surges and geopolitical events will cause oil prices to rise as has been the case over the past 40 years. Price increases signal the need for greater end-use efficiency and for increased production, and reward those companies that have had the courage to sustain their capital investment programs through temporary price dips. Price expectations may have been lowered for the next few years, but this is a long lead time industry: successful companies must look beyond the current trough towards the next crest and work to continuously improve their capital allocation choices.

⁶ Resource Revolution: Meeting the world’s energy, materials, food, and water needs, November 2011

3. Western Hemisphere Public NOCs

Statoil, Petrobras and Ecopetrol are majority owned by their respective governments. Each company provided outside investors with strong returns following their IPO through 2008. Statoil and Petrobras faltered during the financial crisis and have underperformed the IOCs on TSR since 2Q13; Ecopetrol by contrast has continued to outperform the IOCs. Each company has demonstrated strong capabilities in its areas of focus:

- Offshore exploration and production for Petrobras and Statoil
- Heavy oil development and production as well as enhanced oil recovery for Ecopetrol.

a. Statoil

Statoil was established as a National Oil Company in June 1972 soon after the discovery of the Ecofisk, the first North Sea Oil field, by Phillips Petroleum. Statoil made its first discovery in 1976 and established a reputation as a competent operator and technology innovator during the 1980s. It expanded into international ventures during the 1990s. The company completed an initial public offering (IPO) of stock on the Oslo and New York stock exchanges in June 2001. The shareholder value proposition was disciplined growth, anchored by profitable operations on the Norwegian shelf of the North Sea. CEO Helge Lund in 2006 recalled “we formulated quite aggressive targets in 2001 ... as a basis for the investor proposition. These ambitions were very high, but in 2004 Statoil delivered on the targets in a disciplined manner.”

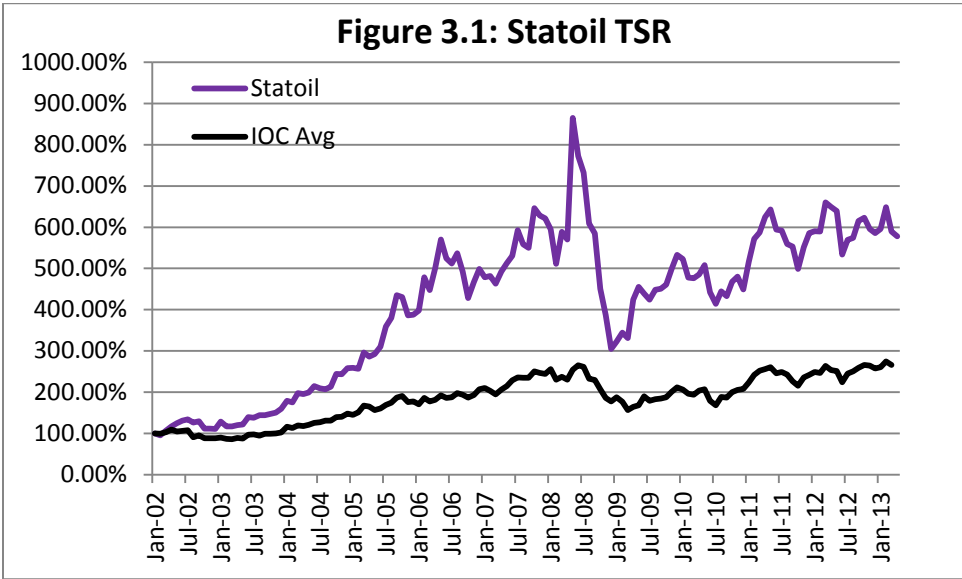
Statoil continued to invest in growth through strong capital spending, accelerated by acquisitions and joint ventures to expand its access to resources, particularly in North America:

- April 2005: Statoil buys EnCana’s deepwater Gulf of Mexico assets for USD \$2.0 billion.
- April 2007: Acquired North American Oil Sands Corporation to establish position in Canadian oil sands.
- November 2008: Acquired 32.5% interest in Marcellus shale gas acreage from Chesapeake
- December 2008: Completed full acquisition of Brazilian Peregrino field from Anadarko.
- April 2009: Acquired 40% stake in 50 blocks in US GoM from BHP Billiton.
- October 2010: Acquired 67,000 net acres in Eagle Ford shale through a 50/50 JV with Talisman.
- October 2011: Acquired Brigham Exploration Company for \$4.4 billion USD.
- August 2012: Partnership with Rosneft for Russian offshore exploration.

Statoil further concentrated focus on its exploration and production business by completing an IPO of its fuel and retail business in 2010 and then divested its 54% stake to Alimentation Couche-Tard for \$1.4 billion.

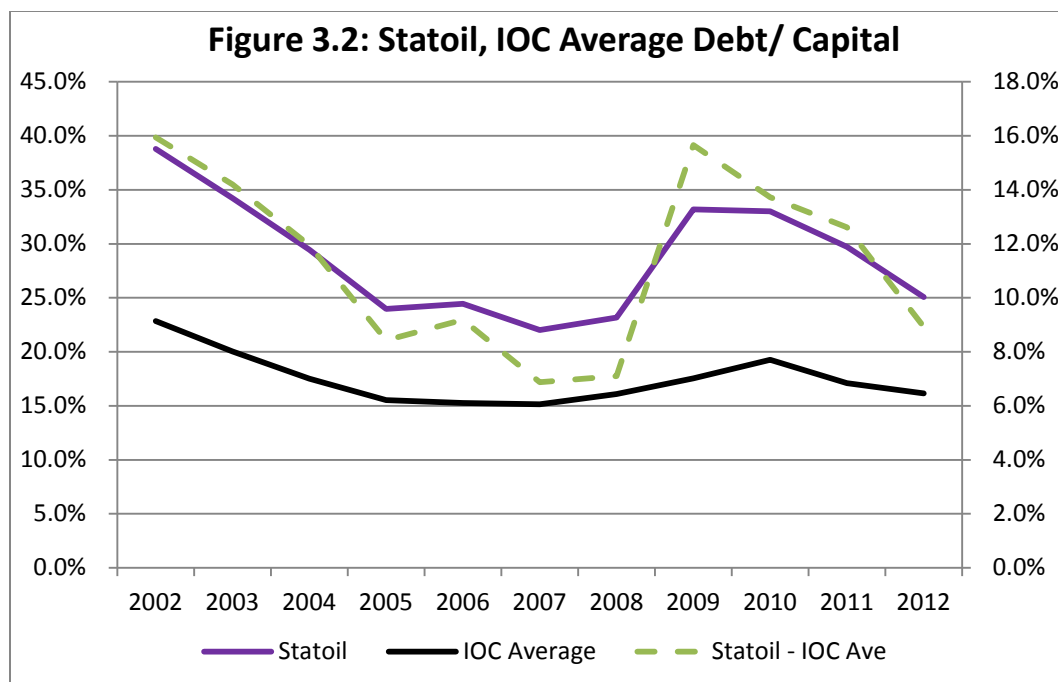
By 2012, Statoil had become a large international oil company anchored by a dominant position in its home market. Worldwide oil and gas production was 1748 kbdoe of which 55% was oil, within range of Chevron’s worldwide production of 2620 kbdoe. Approximately 25% of Statoil’s worldwide production and most of its growth comes from outside Norway.

Statoil's focus on upstream growth resulted in strong shareholder returns after the IPO, but has led to greater volatility in TSR during and since the financial crisis (Figure 3.1). Nevertheless an investor buying Statoil stock at the start of 2002 would have realized a six-fold increase in value by early 2013.



Whereas some other NOCs have suffered from unhelpful government interventions, the Norwegian government appears to have acted as a responsible owner of Statoil and has refrained from oil product price controls and other mandates and directives. The government has encouraged development of Norwegian local content through a number of now globally competitive oilfield service companies without forcing Statoil to make infeasible commitments or to lower safety or economic standards. The greater volatility in Statoil's TSR compared to IOCs is most likely due to its strong growth agenda and its investment choices.

Statoil's strong growth agenda resulted in commitments to capital projects that caused financial stress in 2009 (Figure 3.2): Statoil debt to total capital ratio had been converging with the IOC average through 2009, but diverged again in 2009 before falling back towards IOC levels since.



Further, the collapse in North American natural gas prices coupled with logistical constraints that depressed prices for its Canadian oil sands and Bakken shale oil production cast a shadow on the returns that could be expected from its North American acquisitions. In 2012, Statoil operating profit to total assets returns for development and production in Norway were 29%, while international returns were 8%. This explains to some extent the low EV/EBITDA multiple for Statoil, where investors recognize that the high returns of the Norwegian Shelf cannot be replicated internationally.

Nevertheless, Statoil's strong commitment to technology development and deployment, environmental standards and social performance, coupled with a solid inventory of future organic growth projects and a benign government majority owner should propel total shareholder returns above the IOCs over the coming decade.

b. Petrobras

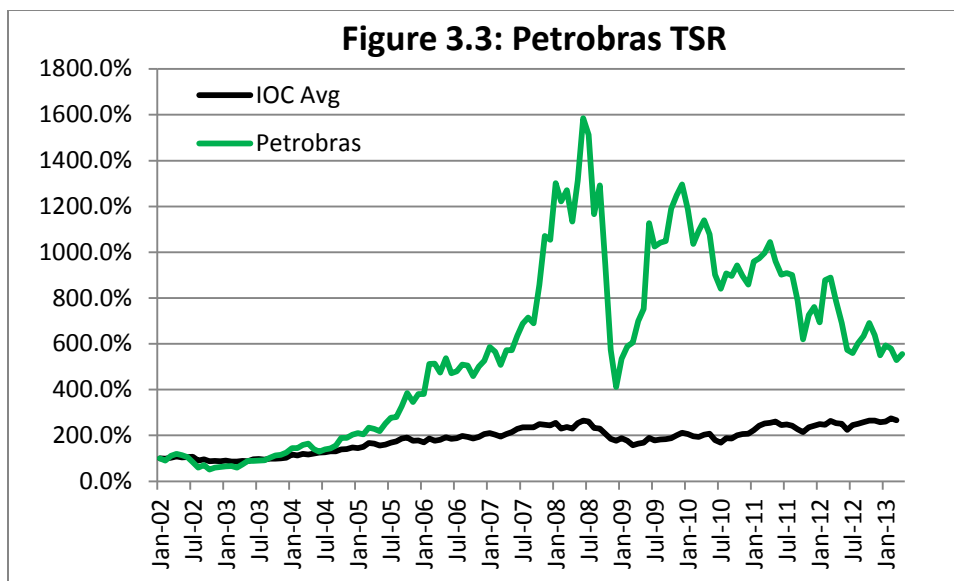
Petrobras was established in 1953 by President Getúlio Vargas. In 1958, the first offshore oil discovery was made in Sergipe, in the Guaricema Field, at a depth of 80 meters. In 1974 Petrobras discovered oil in Bacia de Campos field. Petrobras made several large new Campos Basin discoveries in the 1980s and in 1992 was recognized at the Offshore Technology Conference in Houston for contributions to offshore technology.

After a decade of failed economic plans and hyper-inflation, Fernando Cardoso became Finance Minister in May, 1993 under the Franco administration and was elected President of the Republic in December, 1994. He instituted major economic and social reforms:

- Instituted **fiscal responsibility** to attract productive investment and eliminated the traditional trade-off between development and monetary policy

- **Opened up and modernized the economy** through privatization and reform of social security and laws regarding government employees
- **Modernized infrastructure**
- **Invested in education and health**
- **Broadened the public agenda** to include environmental protection and racial/gender equality

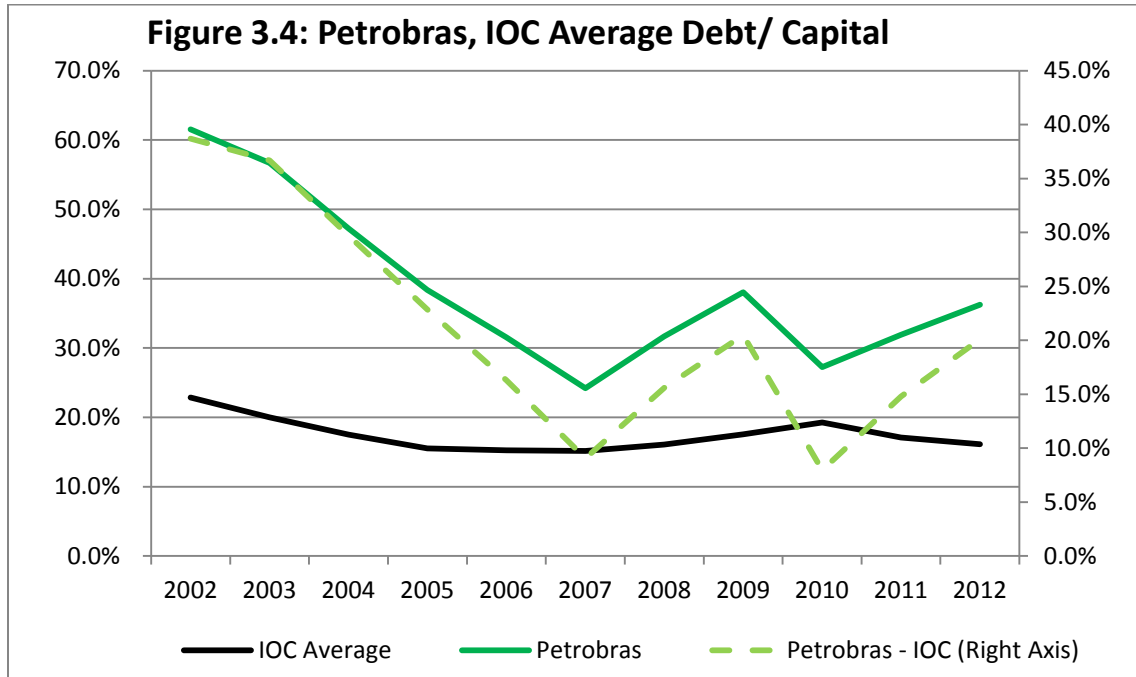
These policies truly transformed Brazil. In 1997 the government created ANP (National Petroleum Administration) to act as an independent energy regulatory agency and Petrobras' state oil monopoly was broken by Constitutional Amendment 9, opening the door to IOCs to bid for offshore leases. Petrobras still retains a monopoly for oil refining, product imports and distribution in Brazil but competes in other sectors. Exploration and Production remains the largest business segment for Petrobras with the majority of its business offshore Brazil where its exploration success in the 2000s translated into very high shareholder returns (Figure 3.3). An investor buying stock at the start of 2002 would have realized a six-fold increase in the value of his holdings by early 2013. However, the investor might by now wish that he had monetized the investment in early 2010 when the appreciation would have been twelve-fold.



Petrobras, like Statoil, was hard hit by the financial crisis and also rebounded strongly. However, Petrobras TSR has slid steadily since 2010. Government from time to time controls retail refined products prices, forcing Petrobras to import products at a loss. This was the case in 2011 and 2012. Also in 2010, the Brazilian government took \$42 billion from Petrobras in exchange for an Assignment Agreement with the government for rights to pre-salt oil fields, financed by a \$70 billion stock offering. This presents Petrobras with an enormous opportunity but also a set of problems:

- Does Petrobras have the financial and technical capacity to find and develop these potentially very large fields in a timely manner?

- Can Petrobras find local suppliers who can meet high Government expectations for the proportion of total spending provided by local content, while delivering products and services of the quality and safety required?
- Will Petrobras continue to be obliged to subsidize domestic fuel prices?



At the end of 2009, Petrobras had a debt to total capital ratio of 37% after a \$10 billion loan from China carrying a commitment to sell 1.95 million barrels of crude oil to China over ten years. Debt was reduced following the 2010 stock offering, but has begun to climb above 30% again since. If Petrobras were to develop the pre-salt fields on its own, the financial burden would be heavy. It is likely that investors are concerned by the Brazilian Government's demands on Petrobras to undertake a massive investment program using a large proportion of local content and continue to be the monopoly supplier of oil products to the domestic market at prices that from time to time are lower than its costs.

Petrobras' high EV/ EBITDA multiples at the end of 2013 indicate that investors believe that 2012 earnings were unnaturally low, but until Government demands are clarified and eased, investors would be wise to be wary despite Petrobras' proven track record and strong technical capabilities in deep water exploration and development.

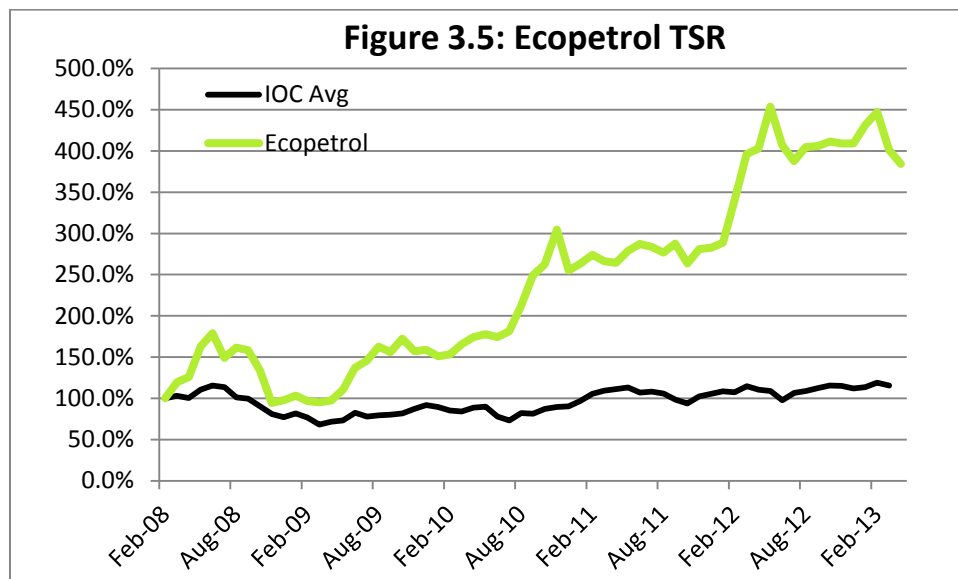
c. Ecopetrol

Ecopetrol was formed as a national oil company in 1951 to operate the De Mares concession which had reverted to the state after the expiration of the term of ExxonMobil's initial concession. In the 1960s, Ecopetrol took control of the Barrancabermeja and Cartagena refineries. Colombian oil production declined steadily from 226 kbd in 1970 to 131 kbd in 1980 causing the government to open up new leases for international oil companies to explore with Ecopetrol as non-operating partner. Oxy discovered the Cano Limon field in 1983, after which BP discovered Cuisiana and Cupiagua fields in the

1990s. In 2003, the government restructured Ecopetrol with the objective of making it more international and competitive in the global oil and gas industry. In November 2007, Ecopetrol held an initial public offering on the Colombian Stock Exchange (BVC), which raised \$5.7 trillion Colombian Pesos (US\$2.8 billion) from the sale of a 10.1% stake. On September 18, 2008 Ecopetrol announced the listing of its American Depositary Shares (ADSs) on the New York Stock Exchange.

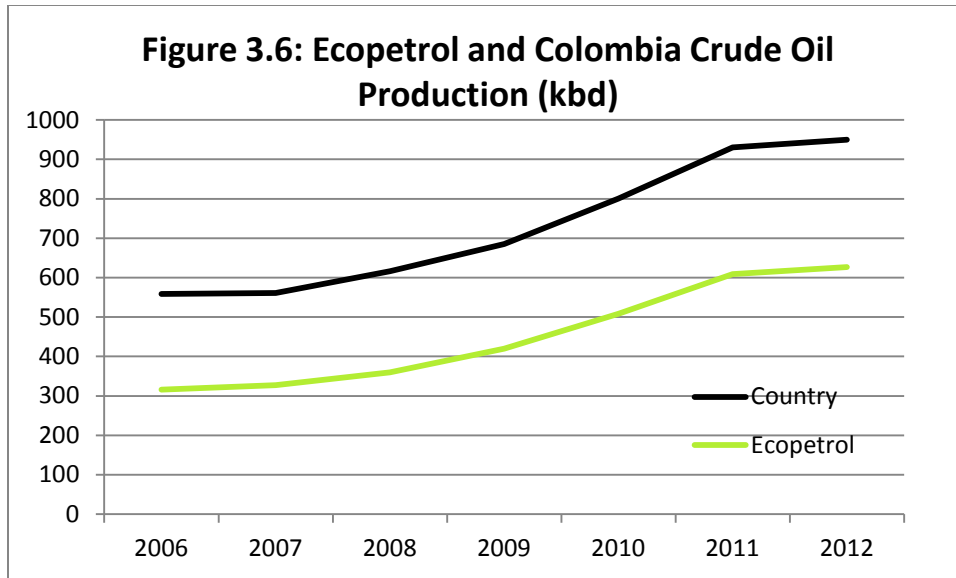
Ecopetrol is an integrated oil company in Colombia with interests in exploration and production, refining and petrochemicals, pipeline operations and marketing. Ecopetrol has small business units in Peru, Brazil and the U.S., where it is building a portfolio of deep water exploration leases.

Since its IPO, Ecopetrol has provided strong returns to its shareholders (Figure 3.5).



TSR growth followed strong reinvestment in production growth which drove growth in Colombian national crude oil production (Figure 3.6). This performance echoed the experience of YPF Argentina in the 1990s following its nationalization. The transformation of a national oil company from government owned to a new level of accountability required by public investors unleashes energy and innovation for the benefit of all stakeholders.

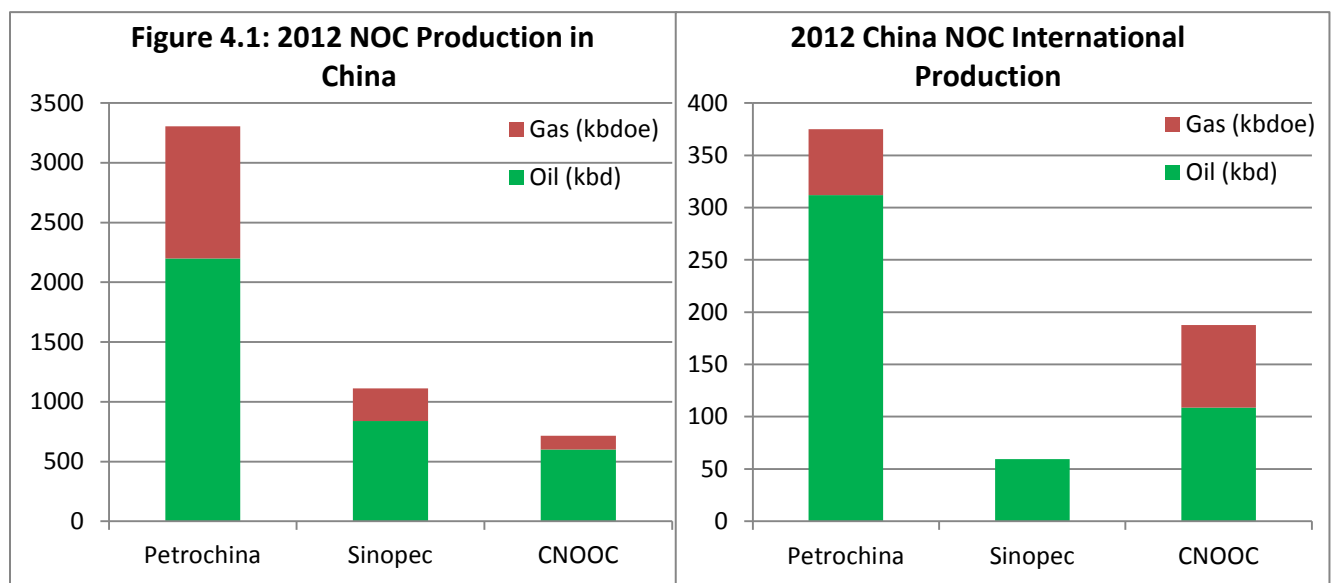
Production growth was assisted by acquisitions of Hocol Petroleum in 2009 for \$0.8 Bn and a joint acquisition of BP's Colombian assets with Talisman in 2011 at a cost to Ecopetrol of \$0.8 Bn. However, most of the value has been created by organic capital expenditures in exploration and development, which will reach close to \$6 Bn in 2013. The company is building a competitive advantage in heavy crude oil, in which sector it is taking advantage of declining production of heavy grades from Venezuela, Mexico and California and believes that there is substantial further growth potential on the Llanos, Caguan-Putumayo and Piedemonte Llanero regions. This growth strategy is supplemented by investments in infill drilling and water injection to sustain production and increase recovery from its conventional crude oil reservoirs. The company is also optimistic that there may be potential offshore of its North Coast in the Caribbean.



By focusing on growth in its home country, Ecopetrol is capitalizing on its “home field advantage” and is taking less risk than other NOCs with public ownership. So far, the Colombian government has been a benign owner and has refrained from imposing mandates on Ecopetrol such as have been imposed by the government of Brazil. Ecopetrol has built a track record of success and appears to justify its current high EV/EBITDA multiple.

4. Asian Public NOCs

China: In the late 1990s, the Chinese oil sector was reorganized with the objective of forming two vertically integrated companies, CNPC and Sinopec. CNOOC established CNOOC Ltd., incorporating the exploration and production assets of its holding company. The operating assets based in China were organized as National Oil Companies and listed on international stock exchanges in the early 2000s: CNPC (as Petrochina) in April 2000, Sinopec in October 2000 and CNOOC in February 2001. All were listed on Hong Kong and New York Stock Exchanges; Sinopec and CNOOC were also listed on the London stock market. The IPOs were successfully placed with the help of ExxonMobil, BP and Shell which purchased a significant share of the available shares. Over the 2000s, international assets that had been acquired earlier by the Petroleum Industry Department were assigned to Petrochina and all three



companies began to expand internationally.

Though all three companies are expanding aggressively in international oil and gas exploration and production, their positioning and investor value propositions are quite different:

- Petrochina is a major oil company with a balanced portfolio of upstream and downstream assets (Figure 1.1) working to sustain its Chinese production while growing internationally.
- Sinopec has twice the refining capacity as Sinopec (Figure 1.1) and less than half the oil and gas production volumes (Figure 4.1) so is positioned as the market leader in the rapid growing Chinese market, with ambitions to grow its international exploration and production business.
- CNOOC is a large independent international oil and gas exploration and production company of similar scale as Oxy, Apache and Anadarko, with a profitable base offshore China.

India: The Indian Oil and Gas Corporation was organized as a limited Company in 1994 and was partially privatized, with government entities holding 74% of the shares. The company operates the Mumbai

High Oil production complex and some smaller domestic fields, and has grown international production through exploration and acquisitions. It has ownership positions in a single refinery and in substantial midstream infrastructure.

After their IPOs, the Chinese government entities retained 90% of Petrochina, 80% of Sinopec and 67.5% of CNOOC shares. In each case, there was uncertainty at the time of the IPO on whether these NOCs would be able to develop the capabilities required to run a commercial oil company and whether the Chinese and Indian governments would act as responsible owners committed to long term value creation. Following a decade of operations since their IPOs, this uncertainty has been resolved in a positive way and the companies have delivered substantial value to their government and private shareholders.

South Korea: Korea National Oil Company (KNOC) is wholly owned by the government, operates a small gas field offshore Korea and has been acquiring international exploration and production assets. It also is responsible for the Korean strategic petroleum reserve which provides a buffer against seasonal or other supply disruptions. It is not clear whether the resources captured by KNOC will create value for the South Korean state.

a. CNPC/ Petrochina

Petrochina is the largest of the three Chinese NOCs in terms of domestic and international oil and gas production (figure 4.1) with 60% of the combined oil production and 74% of combined natural gas production in China.

CNPC is also the largest international oil producer among the Chinese NOCs due to major interests in Kazakhstan, but CNOOC is the largest international natural gas producer among the Chinese NOCs. CNOOC international production will double since its merger with Nexen was completed in February 2013.

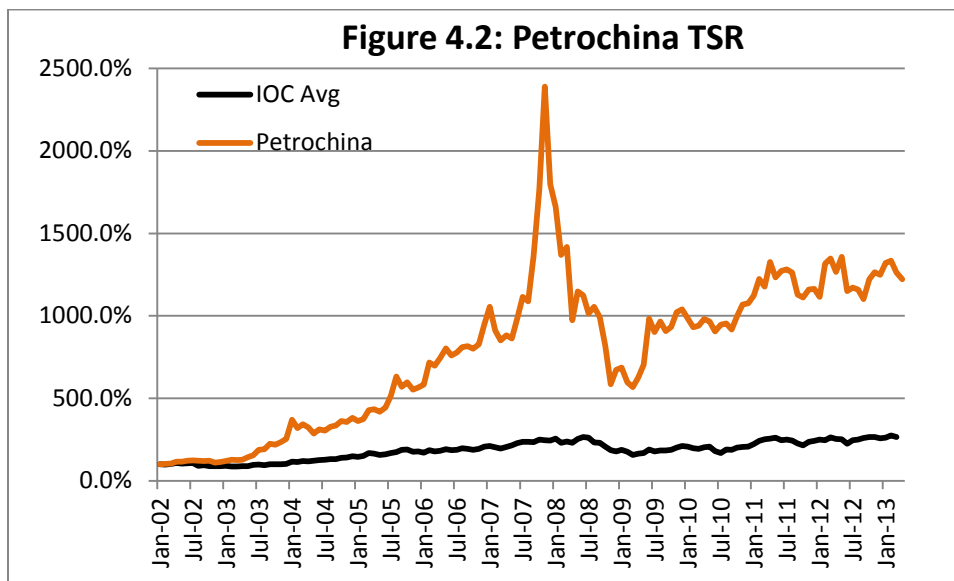
CNPC has a balanced portfolio of exploration and production, refining and chemicals assets with 2012 refinery throughput of 2.8 mbd comparable to its global oil production of 2.5 mbd. Sinopec is more heavily weighted towards Chinese refining and chemicals with 2012 refinery throughput of 4.5 mbd compared to global oil production of 0.9 mbd. Thus, Sinopec is highly exposed to government controls on products pricing when international crude oil prices increase but benefits from exposure to the growing Chinese downstream market when crude oil prices are stable. CNOOC Ltd. is a pure play international and domestic China (primarily offshore) exploration and production company, though the parent company holds some downstream assets in China.

In its pursuit of reserves and production growth, CNPC has made several important acquisitions to create international positions in Kazakhstan, Australia and Canada:

- In 2006, Petrochina purchased 67% of PetroKazakhstan for \$2.7 Bn (from its parent CNPC) and in 2007 GU Kazermunai for \$1.0 Bn, establishing a strong position in Kazakhstan.
- In 2010, Petrochina purchased Canadian Athabaska Oil Sands for 1.7 Bn

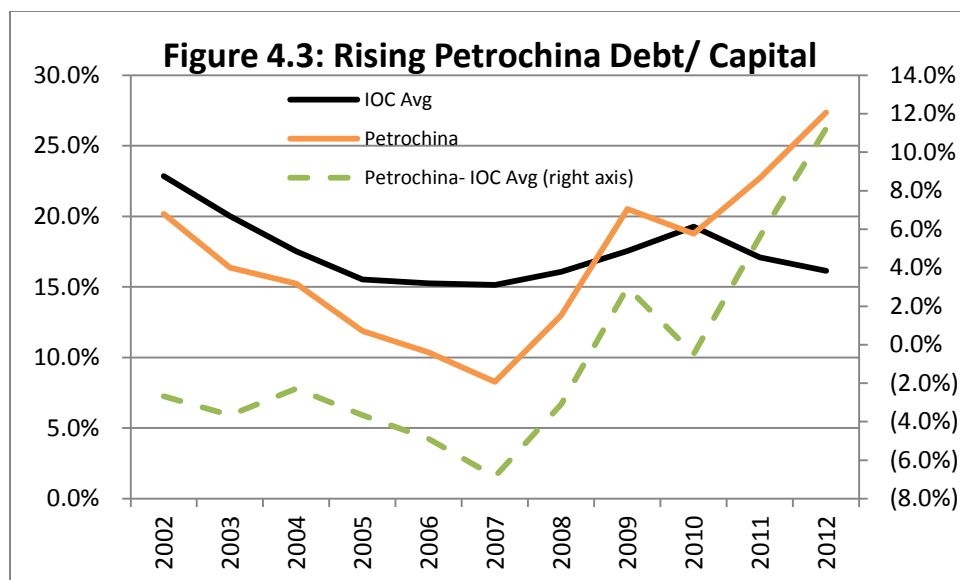
- In 2010 Petrochina purchased (through a joint venture with Shell) Arrow Energy, an Australian coal seam gas producer for \$3.6 Bn. The JV went on to purchase Bow Energy for \$0.6 Bn in 2011.
- In 2012 Petrochina bought a 49.9% interest in Encana's Duvernay shale properties for \$2.2 Bn. Petrochina also purchased a 20% interest in Shell's Ground birch asset in Canada for \$1.3 Bn.
- Also in 2012, Petrochina farmed into BHP's Browse LNG project for \$1.6 Bn..

Petrochina also invested strongly in exploration and development, which, we believe, was instrumental in creating growth in shareholder value. An investor who purchased stock in early 2002 would have benefited from twelve-fold appreciation in his investment by early 2013



However, TSR performance by Petrochina since 2011 has been lackluster and quite volatile. All businesses showed reduced profits in 2012 compared to 2011. The main problem appears to have been in the downstream businesses, with refining and chemicals recording worse losses in 2012 than in 2011 and natural gas businesses moving from profits in 2011 to losses in 2012. Unhelpful price controls by the government hurt refining in 2011 and natural gas in 2012.

As a result of lower profits, combined with continued high expenditures for acquisitions and capital projects Petrochina has required an increase in debt (Figure 4.3), such that Petrochina's debt ratio was more than 10 percentage points above the IOC average at the end of 2012 and deteriorated further in 1Q13.



The rising debt level is worrisome and may require a slow-down in investments for growth unless Petrochina can uncover opportunities to make significant reductions in costs. This, in turn, will likely weigh on Petrochina's ability to grow shareholder value. Investors may be factoring in the liberalization of the oil products pricing formula in China such that the 2012 EV/EBITDA multiple is quite robust, but it is difficult to see catalysts for strong future value growth in a flat oil price environment.

b. Sinopec

As shown previously, (Figure 4.1), Sinopec is primarily a refining and chemicals company with 2012 oil and gas production of 1.1 mbdoe of which about 50 kbd is from outside China. Refinery throughput in 2012 was five times higher than its production of crude oil and natural gas. Through Sinopec, investors may participate in China's rapidly growing and oligopolistic domestic market for fuels and chemicals. However, the investors are also exposed to losses when international prices rise and the government limits domestic oil products and natural gas prices, forcing Sinopec and Petrochina to import crude oil and LNG at prices above the regulated internal market prices.

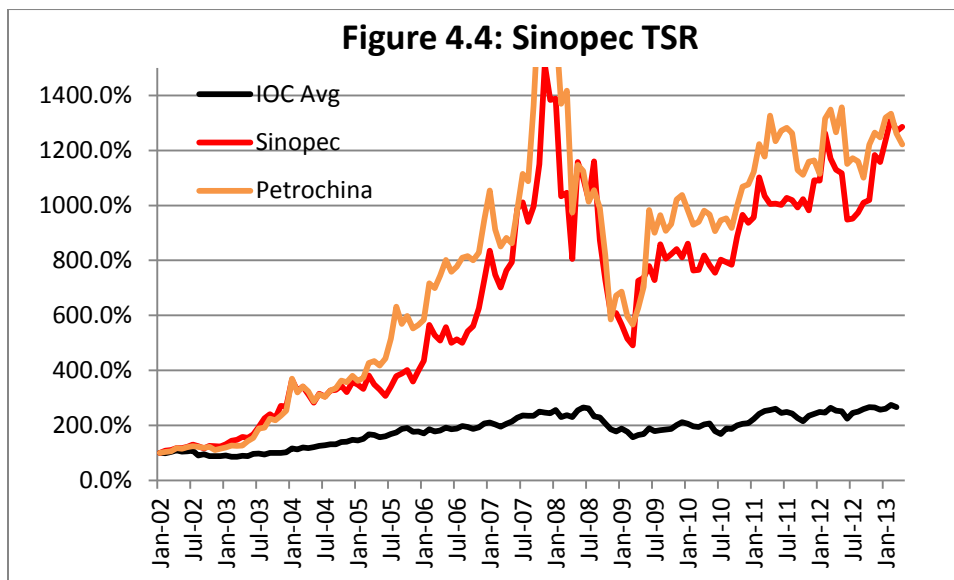
In 2008, Sinopec losses were such that the government provided a 50 billion Yuan subsidy to Sinopec to compensate for the flawed policy. The refining segment also incurred losses in 2011 and 2012. In March 2013, the government announced a more responsive approach to setting domestic prices for gasoline and diesel which should reduce the risk of future losses.

Sinopec has been active in acquisitions in recent years primarily to strengthen its international exploration and production business. Reported acquisitions above \$1 Billion include:

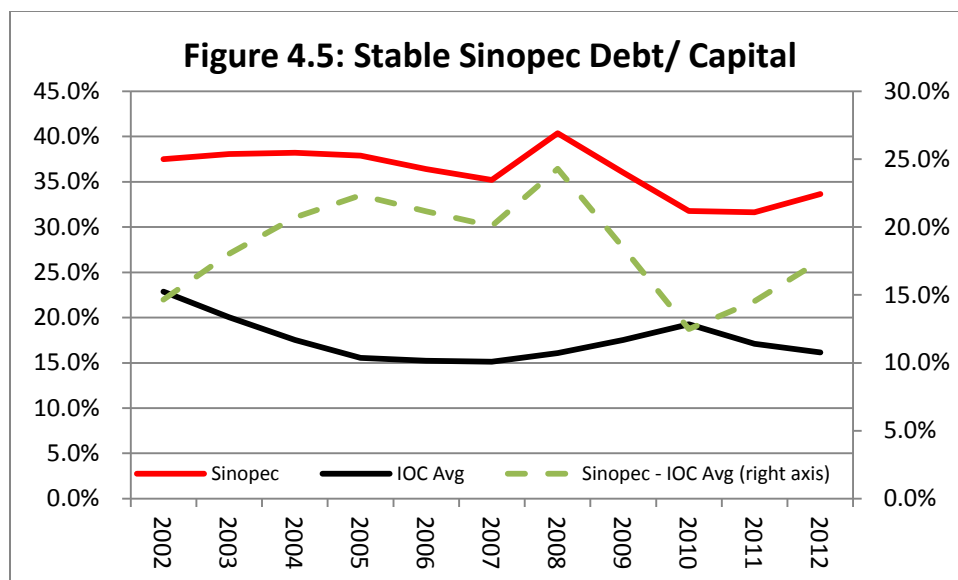
- In 2006 bought Udmurneft Russia for \$3.6 Bn.
- In 2008 Sinopec bought Tanganyika Oil Company for \$1.9 Bn.
- In 2009, Petrochina purchased addax Nigeria for \$8.9 Bn (and added Cameroon in 2011)

- In 2010, was particularly active, purchasing Repsol Brazil for \$7.1 Bn, various Caspian investments for \$1.2 Bn, ConocoPhillips' share of Syncrude Canada for \$4.6 Bn and Angolan interests from Marathon for \$2.4 Bn
- In 2011 Sinopec purchased Daylight Energy of Canada for \$2.8 Bn and an initial stake in APLNG, a coal seam methane and LNG joint venture between ConocoPhillips and Origin Energy for \$1.8 Bn. This stake was increased in 2012 for a further \$1.4 Bn. Sinopec also purchased a 30% interest in GALP Brazil for \$5.2 Bn in 2011.
- In 2012, Sinopec purchased Talisman UK for \$1.5 Bn and stakes in five U.S. shale gas plays owned by Devon Energy for \$2.4 Bn.

Since its IPO, Sinopec has sustained strong reinvestment in capital projects of which nearly half targeted exploration and production. This aggressive organic growth strategy has contributed to robust shareholder returns. An investor who invested in early 2002 would have realized twelve-fold gains. This gain is similar to that provided by Petrochina, though the pathway is different. Sinopec's high weighting to refining depresses shareholder value creation while international oil prices are rising. Recent signs are that oil prices may be weaker in the medium term. This, together with a more liberal government oil product pricing policy has lowered risks for Sinopec and has allowed the company to catch up on TSR with Petrochina.



Sinopec has managed to maintain a stable debt to capital ratio, albeit higher than that of CNPC (Figure 4.5). Provided the Chinese government sustains its more liberal refined products pricing policy, Sinopec should be able to support the higher debt through predictable refining, marketing and chemical margins. We suspect that the high EV/ EBITDA multiple that Sinopec has sustained reflects its dominant position in the growing Chinese fuel and petrochemicals markets. It is less clear whether Sinopec's large investments in international oil and gas reserve acquisitions will provide attractive returns or contribute to value growth.



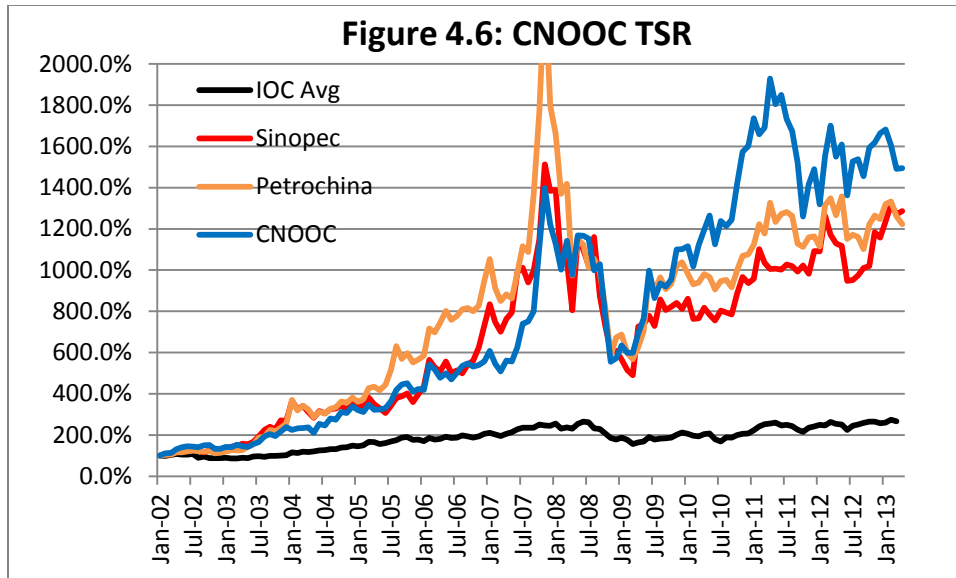
c. CNOOC

On January 30, 1982, CNOOC was incorporated and authorized to assume overall responsibility for the exploitation of oil and gas resources offshore China in cooperation with foreign partners. The company organized bid rounds and took a non-operating share in the successful bidding consortium. The first bid round was held in 1983 and the winning consortium included BP, BHP, Petrobras, Petro-Canada and Ranger of Canada. Subsequent rounds attracted a wide range of international companies including Shell, ConocoPhillips, Petronas, Kerr-McGee, Devon and others. CNOOC Ltd was listed on the Hong Kong and New York stock exchanges in early 2002 and began a strategy of growth through exploration and development offshore China, where CNOOC has achieved steady production growth and appears to have further running room in the deep water South China Sea, and through international acquisitions:

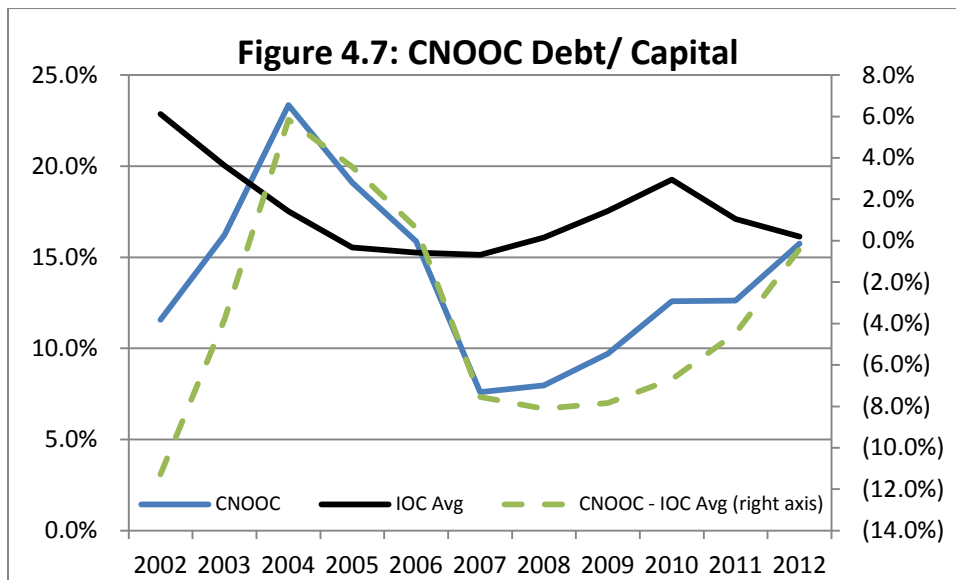
- In 2005, CNOOC made a cash offer of \$18.5 Bn for Unocal. However, the transaction was strongly opposed by the U.S. Congress and the offer was withdrawn.
- In 2010 CNOOC purchased Bidas Argentina for \$4.9 Bn and a 33% interest in Chesapeake's Eagle Ford shale assets for \$1.1 Bn
- In 2011, CNOOC purchased Opti Canada for \$2.3 Bn and made further purchases of Chesapeake leases for \$0.6 Bn
- In 2012, CNOOC increased its share of BG Group's Curtis coal seam gas and LNG project for \$1.9 Bn and negotiated the purchase of Nexen for \$19.2 Bn, which was completed in 2013.

The Nexen acquisition adds 20% to CNOOC global production and 24% to reserves. It doubles CNOOC's international production, with the bulk of the increase in Canada, U.S. and the U.K.

The growth strategy has resulted in exceptional shareholder value growth (Figure 4.6) exceeding the already high performance of its Chinese peers. An investor who purchased CNOOC stock in early 2002 would have multiplied the investment by fifteen.



CNOOC has achieved its growth in production and in shareholder value with a conservative financing strategy, maintaining a debt to capital ratio below the average of the IOCs in recent years (Figure 4.7).



With further growth potential offshore China and a more robust platform for further North American growth, CNOOC seems well positioned for further value growth providing that they successfully integrate the Nexen acquisition and retain key personnel.

d. ONGC

After independence the Indian national government recognized the importance of oil and gas for industrial development and strategic defense. Until the mid-1950's private oil companies mostly carried out exploration of hydrocarbon resources in India. The government of India had disappointing results in its collaboration with Standard Vacuum (Stanvac, formerly part of Mobil Oil, now ExxonMobil) which made the country believe that it needed more control of its own oil industry.

After 1955, the government of India decided to develop the oil and natural gas resources in the various sedimentary basins of the country. With this objective, the Oil and Natural Gas Directorate was set up as a subordinate office under the then Ministry of Natural Resources and Scientific Research. Eventually the Oil and Natural Gas Directorate was given the status of full Commission, and in the 1990's was partially privatized to become the Oil and Natural Gas Corporation of today. ONGC became the upstream flagship of the Indian state energy sector while Oil India became the downstream and chemicals flagship. Both companies have been partially privatized and own shares of the other company. ONGC achieved early success with support from Russia, when it discovered the giant Mumbai High oil field in 1974.

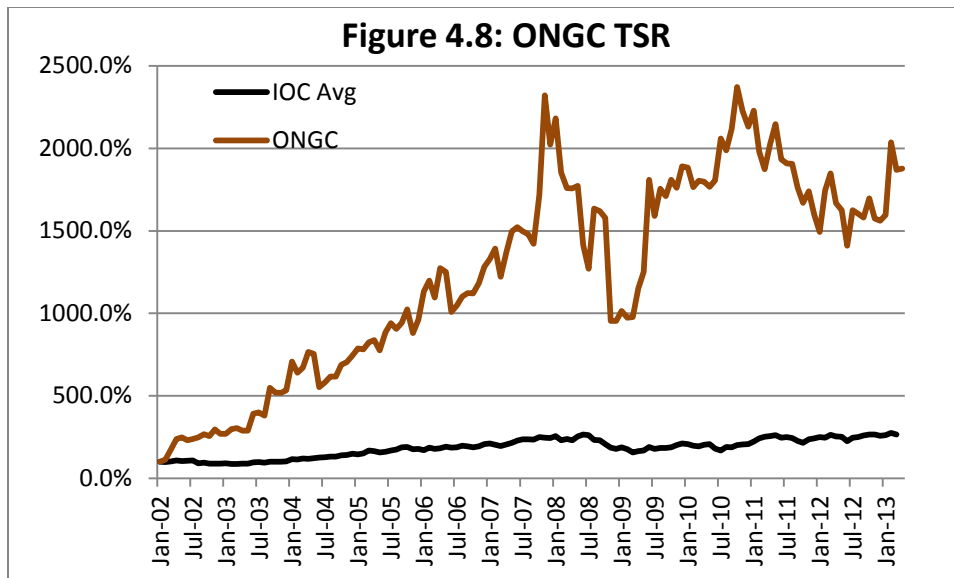
By 1990, Mumbai High production had peaked and ONGC was criticized for over-production causing loss of reservoir pressure. Further criticism of its technical competence came as the Neelam fields (also offshore the West Coast of India) failed to meet expectations. These problems coincided with India's foreign exchange crisis of 1991. The government sought financing from the World Bank and Asian Development Bank and a series of reforms were negotiated as part of the financing agreement, including relaxing government control of the economy and the partial privatization of state owned enterprises.

ONGC strategy was to try to hold domestic production steady through field redevelopment and enhanced oil recovery in existing basins and to grow international production through exploration and acquisitions. Over the past five years, this strategy has been largely successful:

- Production in India declined only slightly from 1,074 kbdoe in fiscal year 2008 to 1,063 kbdoe in FY 2012, though oil production fell while gas production increased.
- Its international affiliate, ONGC Videsh increased production from 178 kbdoe in FY 2008 to 192 kbdoe in 2011 but then lost ground in FY 2012 due to disruptions in Sudan and Syria.

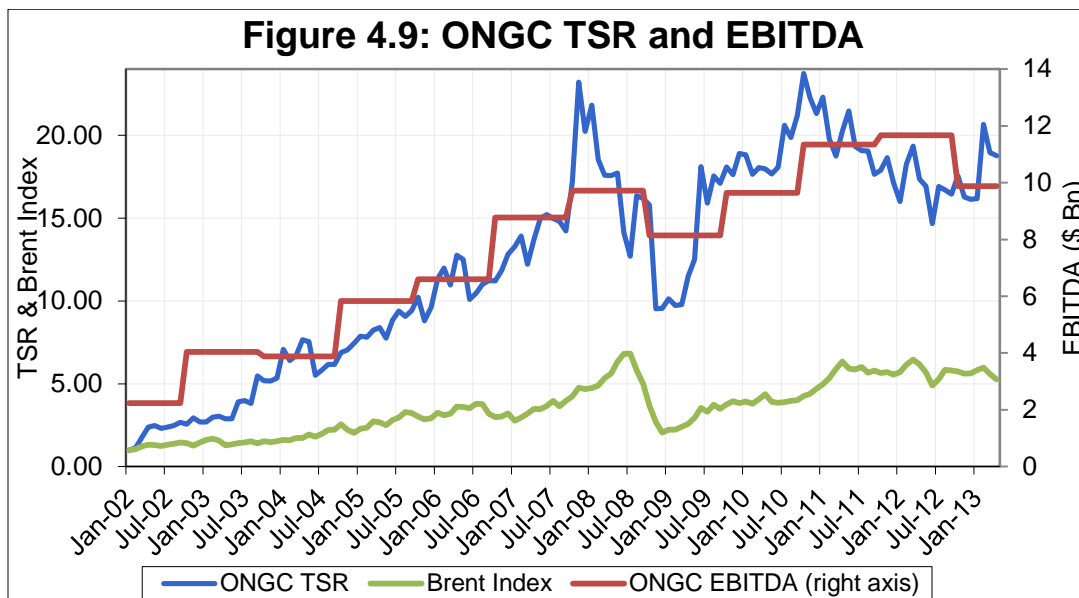
ONGC has 70% ownership in one major 200 kbd refinery, Mangalore Refining and Petrochemicals representing about 20% of India's refining capacity as well as interests in power, pipeline and other midstream and marketing companies. India's government subsidizes petroleum product prices and obliges upstream oil and gas companies to bear 30-40% of the subsidy resulting in lower realizations than they would receive in an open market.

Notwithstanding the subsidy, ONGC has achieved competitive returns on total assets and has delivered strong shareholder value growth (Figure 4.8). A 2002 investor would have received a twenty-fold increase in value by early 2013.



It is difficult initially to understand this exceptional rise in shareholder value: ONGC returns are similar to other NOCs; its reinvestment in growth is comparable; it is having difficulty in sustaining production and is delivering little growth in production or reserves; its dividend yield at 2.4% is unexceptional.

However, it turns out that ONGC TSR is closely related to the company's EBITDA and both are driven by international oil prices, despite the effects of the subsidy that ONGC pays to the state (Figure 4.9)



Every percentage point increase in the Brent crude oil price flows through to an increase in EBITDA and to a 3.3 percentage point change in ONGC's TSR. The question then becomes "why are other oil companies not enjoying similarly high TSR performance"? The answer must be that ONGC must get to keep more of its oil and gas sales revenues, even after paying subsidies, and/or have lower costs than

the other NOCs. Most likely, the fiscal terms of its mature Indian production leases are quite generous compared with more recent international norms.

This advantaged situation is unlikely to last. Even if Indian fiscal terms do not change, ONGC is going to have to work harder and harder to sustain its mature production levels and its costs will rise. Its international assets will be at less generous fiscal terms and will generate lower returns on capital. Other things being equal, a lower oil price environment will result in lower subsidy payments to the state but not in increased revenues to ONGC; costs will inexorably rise and new international production will not contribute the same value per barrel as the mature Indian production. It is difficult to be confident that ONGC will be able to grow its value in the future.

e. Korea NOC

The Korea National Oil Corporation (KNOC), which is 100% owned by the Korean government, was formed in 1979 as Korea Petroleum Development Corp. with the purpose to explore and develop oil and gas fields, to secure stable supplies of petroleum, to store oil for strategic purposes, as well as research, analyze and disseminate information on the petroleum industry.

In 1998, KNOC discovered the Donghae-1 gas condensate field on the Korean continental shelf, which now produces 1 kbd of condensate and 50 mcf/d of natural gas. In 2000 KNOC made an oil discovery offshore Vietnam which began production in 2003. In 2005, KNOC completed an above ground tank farm to allow seasonal and strategic storage of crude oil and products.

After these modest accomplishments, KNOC established an Oil Development Investment fund and began to make acquisitions which have raised annual production to above 200 kbd from projects in 24 countries. KNOC operates fields in Kazakhstan, Indonesia and Vietnam and participates in 43 producing blocks as well as 11 under development and 135 in the exploration stage.

Since 2006, KNOC has invested approximately \$10 Bn in acquisitions. In the North Sea, KNOC purchased Dana Petroleum and used that as a vehicle to buy other North Sea properties from Petro-Canada and Hess; in Canada, KNOC acquired Harvest Energy Trust and used that as a vehicle to purchase Newmont Mining's Black Gold oil sands property, Hunt Oil Company's Canadian assets and other upstream assets in Canada; KNOC purchased Parallel Petroleum with Samsung and an interest in EP Energy to gain a foothold in onshore US unconventional plays.

Since its establishment in 1979, KNOC has been engaging in the oil stockpile business to promote the energy security of Korea. As of the end of December 2011, KNOC held 130 million barrels of reserve oil in stockpiling facilities with a total capacity of 146 million barrels in nine regions including Ulsan, Geoje and Yeosu. The purpose of these operations is to balance domestic supply and demand and reinforce the capability to respond to oil shocks. In recent years, KNOC has engaged in "dynamic stockpiling" in which the company trades oil from its stockpile. This has been profitable in a rising oil market, but will not be in a falling market.

The company also operates 487 gasoline stations in Korea; it also operates a single semi-submersible drilling rig in Korea and internationally. It is not clear how these activities fit with the company's mission.

KNOC financial statements are difficult to interpret, but the company seems to be making an EBITDA/ Total Assets return of around 10%, half the average of the IOCs; the financial statements do not appear to make a clear distinction between capital expenditures and acquisitions, but it appears that capital spending on organic growth projects, which we believe is the principle driver of value growth, is low. So KNOC may have secured 219 kbd of international production but may not have created value for its government owner.

5. Selected Government Owned NOCs

We have selected three NOCs wholly owned by their governments that have been very successful in creating value for their owners. Each of them contributes the majority of national GDP and contributes strongly to educational and other social and economic development goals:

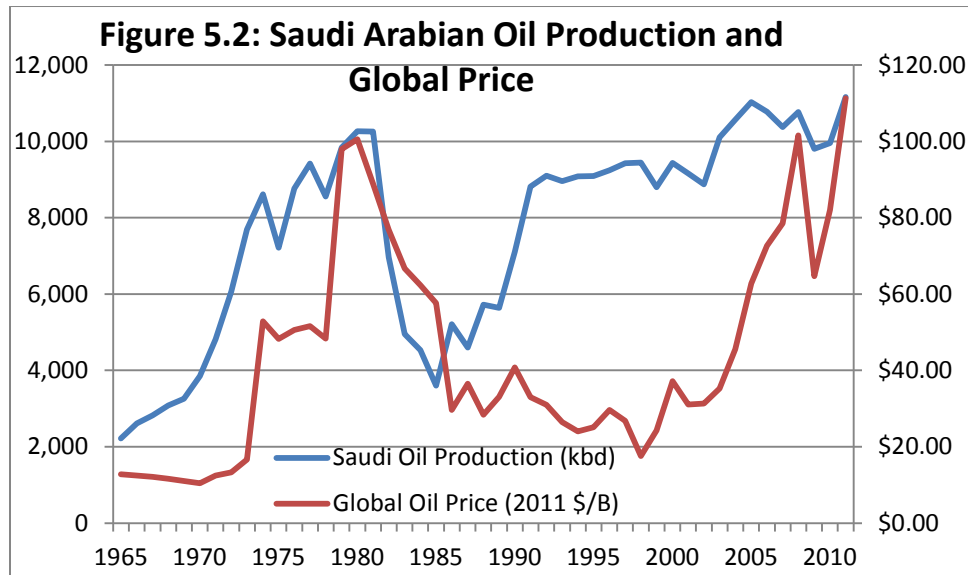
- Saudi Aramco is the most widely respected of the NOCs and operates the Kingdom's oil fields with high technical and commercial skills, having retained the culture and competencies of its antecedent company Aramco after the 1976 nationalization. It has a large refining sector, wholly owned and in joint ventures with IOCs in the Kingdom and has secured international outlets for its crude oil production through joint ventures in the U.S., South Korea and China. It is also a major player in global petrochemicals through joint venture production facilities with Sumitomo, CP Chem and Dow.
- Qatar Petroleum (QP) operates mature oil fields that were nationalized in 1976 and has successfully mobilized the IOCs to construct the world's largest LNG hub to monetize the enormous natural gas resources of the North Field. QP has a 70% ownership in the resulting LNG plants and is full partner in shipping and marketing the LNG. It is the most transparent of the government owned NOCs and publishes detailed financial and operating reports with clarity on its future plans.
- Sonangol has navigated through civil war and a Marxist government in the first decade following Angolan independence to provide a predictable business environment for IOCs to invest in Angola's prolific hydrocarbons resources. Under Sonangol's supervision, national production has increased for 130 kbd to 2 mbd and is now on a par with Nigeria. Sonangol has developed substantial technical and commercial skills, but as yet has limited operational capabilities.

a. Saudi Aramco

The first oil concession in Saudi Arabia was granted to a unit of Standard Oil of California (Chevron) in 1933. Texaco (merged into Chevron in 2001) took a 50% interest in the concession in 1936, and they were joined by Standard of New Jersey and Socony Vacuum (now merged as ExxonMobil) to form the Arabian American Oil Company (Aramco) in 1948, the year that the super-giant Ghawar field was discovered. Aramco expanded Saudi Arabian production to 8.5 mbd by 1973, then the Saudi Arabian government took a 25% participation interest in Aramco, following the lead of several OPEC members. Participation was raised to 60% in 1974. In 1980, the Saudi Government acquired 100 % of Aramco, purchasing almost all of the company's assets. In 1988, by royal decree, the company was renamed as Saudi Aramco.

In 1960 Saudi Arabia became a founder member of OPEC, which was instigated by Ministers Perez Alfonso of Venezuela and Abdullah Tariki of Saudi Arabia, facilitated by Wanda Jablonski of Petroleum Intelligence Weekly. OPEC's stated objective is to co-ordinate and unify petroleum policies among Member Countries, in order to secure fair and stable prices for petroleum producers; an efficient, economic and regular supply of petroleum to consuming nations; and a fair return on capital to those

investing in the industry. OPEC has had little success in its goal to “secure fair and stable prices” (Figure 5.x)



Saudi Aramco is the largest oil company in the world by reserves and by production. It is the only oil company that maintains a “cushion” of oil production capacity that can be used to stabilize oil prices during shortages. Similarly, it has cut back production deliberately during periods of surplus to support what the government of Saudi Arabia believes is a sustainable price level. It is easy to trace the impact of Saudi Arabian production policy on global oil prices (Figure 5.x)

- During the 1960s, OPEC members led by Libya and Iran negotiated with the major oil companies a gradual increase in oil prices, which was preempted by production cutbacks by Arab OPEC members to protest the 1973 Yom Kippur Arab-Israeli war. These cutbacks tightened an already strong crude oil market and prices in the nascent spot market rose to unprecedented levels of \$20/ barrel (dollars of the day) at an Iranian auction. The “oil weapon” had been used for the first time (and the last time for Saudi Arabia) and triggered recession and changed energy policies in consuming countries, including a surge in nuclear reactors and mandated increases in vehicle fuel efficiency.
- After this crisis subsided, Saudi Arabia increased production steadily through the 1970s to meet rising demand at stable prices until the Iran-Iraq war began in September 1980, when reduced production from the combatants could not be replaced by further production increases in Saudi Arabia. Spot prices shot up to \$40/barrel (dollars of the day), triggering another serious global recession and encouraging a rapid increase in non-OPEC crude oil production.
- Lower demand and higher non-OPEC supply left Saudi Arabia exposed as the “swing producer” and when production fell towards 2 mbd in 1975 causing severe financial problems in the Kingdom, Saudi Arabia ceased trying to support prices and instead opted to raise production volumes. Prices fell sharply to below \$10/B (dollars of the day) and production steadily recovered.

- Production remained steady at around 9 mbd through the 1990s, and then was increased to meet accelerating Chinese demand with the objective of slowing the accompanying increase in prices. Saudi Arabia considers that the current global price of around \$100 per barrel is sustainable in the sense that it should not suppress global economic growth or oil demand nor encourage excessive investment in non-OPEC oil production. Time will tell whether that assessment is correct.

After the turbulence of the 1970s and 1980s, Saudi Aramco has operated in a relatively stable environment since the 1988 royal decree. It is widely viewed as the most effective of the producer NOCs and has been ranked as the #1 global oil company by Petroleum Intelligence Weekly since 1989. In a 2006 interview, then CEO Abdullah Jum'ah noted "unlike any other national oil company, we continue to be proud of our connection with our American ancestors."⁷ The corporate culture, which he described as based on respect for partners and employees, and values including a strong work ethic and ethical standards, are consistent with the company's before nationalization.

The roles of government and company are clear: The Supreme Council of Petroleum and Minerals is presided over by the King and sets policy for the sector. Membership includes the Minister of Petroleum and the CEO of Saudi Aramco. Saudi Aramco has a Board of Directors which includes high level Saudi Arabian leaders and a few retired international industry representatives and has the same responsibilities and committees as would be found in a public company. Management develops that corporate strategy for approval by the Board and then executes the plan subject to normal Board fiduciary controls. "The King has given clear instructions that no one is to interfere with Saudi Aramco ... any communication must be through the Ministry and the ministry has instructions not to interfere in the day-to-day management of Saudi Aramco."⁸

Saudi Aramco operates some of the largest oil fields in the world (Table 5.1).

⁷ Abdullah S. Jum'ah was interviewed in 2006 for the book *Terra Incognita: A Navigation Guide for Energy Leaders*

⁸ *Oil Titans: National Oil Companies in the Middle East* by Valerie Marcel, Brookings Institution Press

Table 5.2: Capacity of Saudi Arabian Oil Fields

5,250,000.00	Ghawar
1,500,000.00	Safaniya
1,200,000.00	Khurais
700,000.00	Qatif
500,000.00	Shaybah
450,000.00	Zuluf
450,000.00	Abqaiq
300,000.00	Neutral Zone (half of 600k)
500,000.00	Khursunaya
500,000.00	AFK (AbuHadriya, Fadhili and Khursani)
400,000.00	Nu'ayyim
11,750,000.00	TOTAL
750,000.00	Smaller other fields
12,500,000.00	Total

The company invests continuously in maximizing total recovery from these fields and is a leader in technologies related to carbonate reservoirs. Saudi Aramco is the only NOC with significant patents awarded. In 2011, Saudi Aramco's corporate patent portfolio grew by 24 percent as the company filed 208 patent applications at international patent offices and was granted 31 patents by the U.S. Patent and Trademark Office. To support Saudi Aramco, Schlumberger in 2006 opened its Dhahran Carbonate Research Center (SDCR) located in the eastern province of Kingdom of Saudi Arabia, close to King Fahd University for Petroleum and Minerals.

Saudi Aramco has three joint ventures exploring for natural gas in the Empty Quarter of the country with Shell, Lukoil and Sinopec.

The company owns and operates a fleet of 26 oil tankers of which 22 are VLCCs each with capacity over 300,000 tons through its Vela International Marine subsidiary.

In the downstream, Saudi Aramco operates four wholly owned refineries in Saudi Arabia with a combined distillation capacity of 1.3 mbd as well as joint venture refineries with Mobil, Shell and Sumitomo with a further capacity of 1.0 mbd. Another 0.4 mbd joint venture refinery with Total is commissioning in 2013. The company has joint ventures in the USA (Motiva, with Shell), China (with ExxonMobil and Sinopec), and South Korea with a total capacity of 2.0 mbd.

The company is catalyzing the development of economic development hubs through joint ventures in chemicals with Sumitomo, Dow and CP Chem which produce a variety of petrochemical products. The Dow Samara project is in the engineering stage and will produce 3 mt of chemical products such as Polyurethanes (isocyanates, polyether polyols), Propylene Oxide, Propylene Glycol, Elastomers, Linear Low Density Polyethylene, Low Density Polyethylene, Glycol Ethers and Amines and will act as a catalyst for further economic development in Jubail Industrial City.

Saudi Aramco is also sponsoring a number of Solar projects to reduce domestic consumption of hydrocarbons.

The company is committed to catalyzing social and economic development in the Kingdom beyond catalyzing economic development clusters, with investments such as:

- Educational development at all levels.
- Leading by example in energy efficiency improvements.
- Increasing local content through programs such as the Local Manufacturers Development Program, which has secured 10-year procurement agreements for valves, flanges and other fittings from local sources.
- Striving for a Saudization rate in the contractor workforce of 40 percent in the services sector and 18 percent in the construction sector by end of 2012.
- Helping to develop Dhahran Techno-Valley (DTV), a major undertaking initiated by King Fahd University of Petroleum and Minerals in 2006.

Overall, Saudi Aramco justifies its reputation as the most effective of the NOCs, providing effective and efficient production operations, focused technology development to enhance total resource recovery, securing outlets for its crude oil production through selected investments in international refineries and forging joint ventures within the Kingdom to catalyze economic development. It does not publish financial information so it is not possible to comment on its return on its capital or to what extent its refining and petrochemical investments are creating value. However, the fact that these are largely through joint ventures with companies that are committed to creating shareholder value suggests that they are economically sound. Could the Kingdom do even better with a different economic model? That is a question beyond the scope of this project.

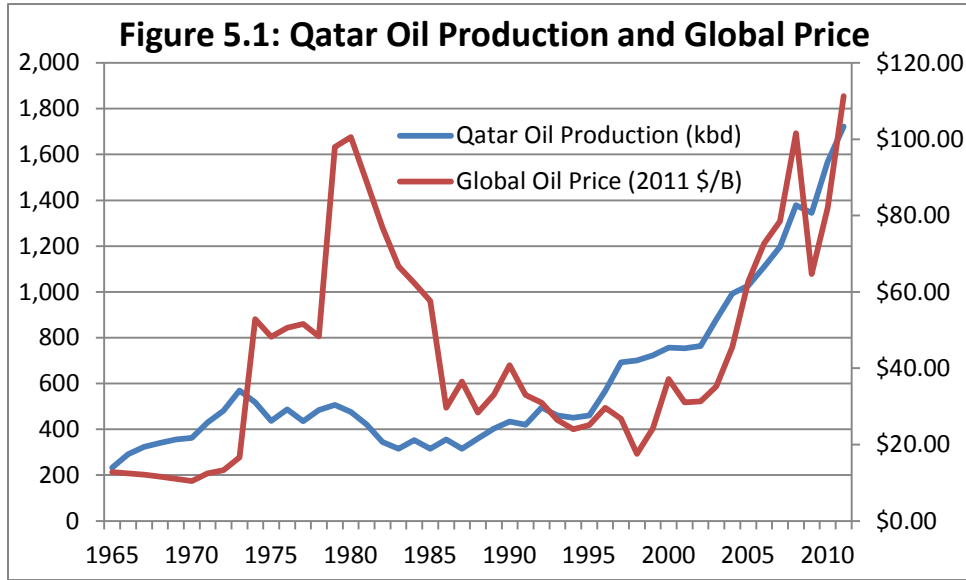
b. Qatar Petroleum

The first oil concession in Qatar was granted to the Anglo Persian Oil Company. The first well was drilled in 1939 and discovered the Dukhan field. Shell acquired exploration rights to most of Qatar's offshore acreage in 1952. North Field Alpha was discovered in 1971, the largest non-associated gas field in the world. Oil production reached a peak in 1973 at 570 kbd after Qatar's largest oil field Bul Hanine came on stream in 1972. Also in 1973, the government of Qatar took a 25% interest in onshore and offshore concessions and increased its share to 60% in 1974, when it established Qatar General Petroleum Company (QGPC). The state took full control of the onshore concessions in 1976 and the offshore concessions in 1977.

In the 1990s, Qatar opened some offshore acreage to international oil companies under exploration, development and production sharing agreements. These have contributed to growth in Qatar's crude oil production (Table 5.1, Figure 5.y)).

Table 5.1: New Offshore Qatar Oil Fields since 1990

Field	Operator	Production Year	BOPD
Al-Shaheen	Maersk Oil	1994	310,000
Al-Rayyan	Occidental Petroleum	2007	10,000
Al-Khaleej	Total	1991	40,000
Idd-El-Sharqi	Occidental Petroleum	1994	126,000
Al-Karkara	Qatar Petroleum Development-Japan	1997	10,000



In 1995, the Emir of Qatar was deposed by his son Crown Prince Sheikh Hamad bin Khalifa al-Thani, who liberalized and energized economic development in Qatar. The development backbone has been to build the largest LNG export complex in the world. The associated condensate has allowed Qatar to increase its liquids production to new heights and LNG and condensate exports have contributed enormous wealth to a small emirate with a total population of 1.7 m.

Qatargas Operating Company was established by QGPC in 1984 to develop and process natural gas from the North Field into LNG. The Qatargas 1 project was completed in 1996 with three trains each of 2 mt of LNG. Partners were QGPC, Mobil, Total, Misui and Marubeni. Qatargas 2, a partnership of QP with ExxonMobil and Total, was completed in 2009; Qatargas 3, a partnership between QP, ConocoPhillips and Mitsui was completed in 2010 and Qatargas 4, a partnership between QP and Shell in 2011. The Qatargas 2, 3 & 4 projects each consists of 2 trains of 7.8 mt and produces approximately 100 kdb of condensate as well as LPG for export.

QGPC established Rasgas as a 70/30 joint venture with Mobil in 1993. Rasgas 1 has two trains each of 3.3 mt LNG capacity and exported its first cargo to Kogas South Korea in 1999. Trains 3, 4 and 5 were completed in 2004, 2005 and 2007, each with capacity of 4.7 mt of LNG. Trains 6 and 7, each with LNG capacity of 7.8 mt were completed in 2010 and produce a combined 110kdb of condensate. The Ras

Laffan complex also produces helium and processes and transports natural gas by pipelines to the domestic market.

Qatar Petroleum is responsible for managing all phases of production operations for associated and non-associated gas, the removal of natural gas liquids (NGL), transportation, local distribution within the State of Qatar, and the export of natural gas liquids and condensates. IOCs operating in Qatar participate in the drilling decisions for their respective fields. Contractually, IOCs must seek QP's approval on the type, number and location of the wells they propose. QP Reservoir Management Team (RMT) decides whether the proposed wells meet their long term production plans. In addition, QP is responsible for protecting the reservoirs from excessive depletion.

Nakilat is a liquefied natural gas (LNG) shipping company established in 2004 by Qatar's energy and shipping companies and financial institutions. It is a joint stock company owned 50% by its founding shareholders (QP owns 5%) and 50% by the public. It operates and leases a fleet of LNG and gas derivative vessels, most notably the Q-Max (266,000 m³) and Q-Flex type LNG carriers (217,000 m³). Nakilat has 25 wholly owned and 29 jointly owned LNG carriers and four jointly owned liquefied petroleum gas ships, which makes it one of the largest LNG transportation companies in the world.

QP participates in LNG regasification terminals in the Adriatic, at South Hook, Wales and Golden Pass, TX. The latter facility is applying to become an LNG export terminal to liquefy U.S. shale gas for export internationally. The company also is partner with Mubadala, Total and Oxy in the Dolphin Energy Limited pipeline to transport 2 bcf/d of natural gas from Qatar's North Field to the United Arab Emirates and Oman.

QP is also partner in two gas-to-liquids (GTL) plants with Sasol (Oryx, 34 kbd GTL capacity) and Shell (Pearl, 140 kbd GTL capacity).

QP operates two refineries at Mesaieed and Ras Laffan and partners with Total, FEBO of Italy and ARKEMA of France, CP Chem and others in nine entities making a range of petrochemical, lubricant and fertilizer products. QP also is an investor in steel and aluminum production in Qatar and operates three major industrial cities: Dukhan, Mesaieed and Ras Laffan.

QP has been the principle engine of growth for the Qatar economy, skillfully assembling, agreeing terms with and monitoring a set of partners with appropriate capabilities to monetize the huge North Field natural gas resource. QP has provided employment opportunities for Qatar citizens and diversified the economy such that non-hydrocarbon extraction revenues are close to 50% of government revenues. From 2002-2011, QP reinvested in growth at an average of 16% of total assets per year (almost double the IOC average) and earned an average EBITDA/ Total Assets return of 60% (triple the IOC average). By analogy with public owned IOCs and NOCs, we estimate that QP, if public would have returned 30% p.a. TSR from 2001-11, higher than any of the other NOCs studied. It also has an interesting portfolio of future projects planned. We also note the commendable transparency of QP, which publishes audited annual reports that allow such an analysis to be made. QP has succeeded on its stated goals:

1. To provide the state with a reliable cash flow, of maximum value, from diversified business interests.
2. To build an organization with internationally competitive business and technical expertise.
3. To maximize the employment of capable Qatari nationals, and develop them to the competence level of the leading International Oil Company employees.

4. To meet National oil and gas demand in a cost-effective way.

c. Sonangol

Angola achieved independence from Portugal in November 1975 after a revolutionary war that began in 1961. The revolutionary leaders had a broadly Marxist political bias and favored nationalization of critical industries. Just prior to formal independence, Angola nationalized Angol, the Angolan subsidiary of the Portuguese fuels distributor Sacor. The new company was named Sonangol U.E.E. At the same time, a National Petroleum Directorate (DNP) was formed. In 1975, the government established the Commission for Restructuring the Petroleum Sector (CNRIP) and in 1976, Sonangol was given the mission of managing the hydrocarbon resources of Angola.

Immediately after gaining independence, Angola was plunged into civil war. The MPLA (People's Movement for the Liberation of Angola) eventually prevailed after the shooting death of Jonas Savimbi, leader of UNITA (National Union for the Total Liberation of Angola). The war was between rival ethnic groups: MPLA represented the Mbundu people of Northwestern Angola and cosmopolitan mixed race allies in certain major cities including the capital Luanda; UNITA represented the Ovimundu people of central Angola. Grafted onto the local rivalries were those of the Cold War. The MPLA was supported by the Soviet Union and Cuba during the war for independence, while the U.S. and South Africa supported UNITA.

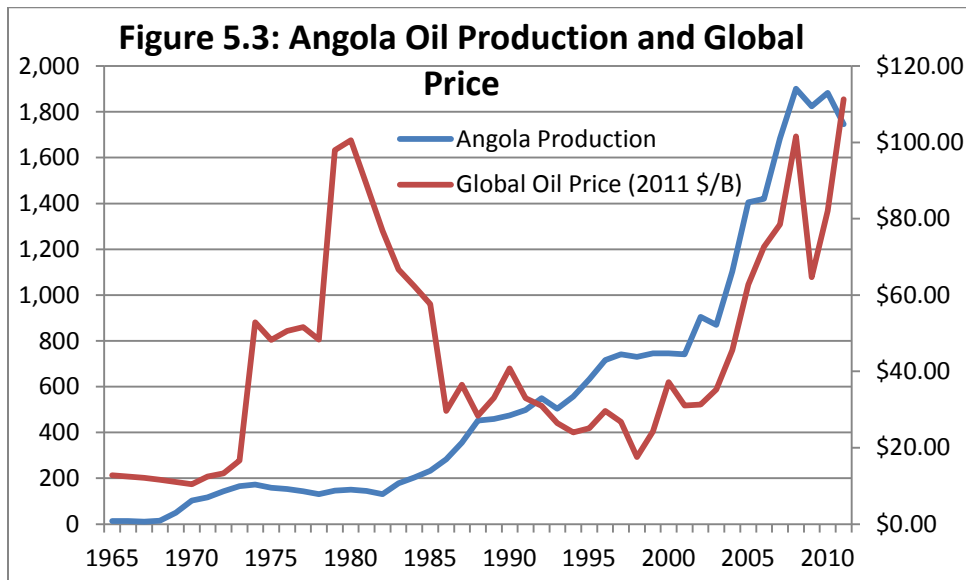
CNRIP was successful in persuading Gulf Oil to return to Angola, promising that their investment would be safe from expropriation and violence. However, Sonangol began its mission with serious issues:

- There were very few qualified Angolans capable of running a National Oil Company, particularly in the exploration and development sector. It would be necessary to retain the skills and financial resources of IOCs to success in Sonangol's mission⁹.
- The Marxist leanings and historical opposition of the U.S. to the MPLA created a political problem for U.S. companies, particularly for Gulf Oil (now Chevron) which was the largest producer with concessions offshore the Cabinda province.
- The ongoing civil war presented issues of security which also made western companies think twice before investing capital and human resources in Angola.
- Angola ranks 157th out of 174 countries in Transparency International's Corruption Perceptions Index, which was and is a further barrier to international oil companies wishing to access Angolan resources.

Sonangol began the pursuit of its mission by sending prospective technical talent for training with SONATRACH in Algeria and ENI in Italy. CNRIP advised the government to absorb the DNP into the Ministry of Petroleum, which formally was charged with oversight of the sector but the government decided to concentrate the technical talent and decision making authority in Sonangol.

⁹ This became apparent during a 1975 dinner discussion in Algiers between Professor Ross and Percy Freudenthal, who was shortly after appointed as first CEO of Sonangol (see also Oil & Governance p845)

The government maintained its Marxist bias for the first decade after independence and rigidly controlled the economy until the mid-1980s. Then the sands began to shift and market reforms led to the rise of private companies which had strong ties to the MPLA leadership. With a broader constituency in favor of and wishing to profit from growth, Sonangol was encouraged to accelerate investment in the petroleum sector. In this, Sonangol has been very successful and Angolan production, which had stalled from 1973 to 1983, began an impressive growth trajectory (Figure 5.3). Sonangol receives oil from producing fields under the terms of the negotiated production sharing terms in which the IOC partners are compensated for their investments through allocated volumes for cost recover and agreed return on investment.



Initially the growth came from further exploration and development in Chevron’s shallow water fields offshore Cabinda. However, the seeds of future growth were planted in the 1993 licensing round of block in deeper water. Activity increased further with the discovery of the giant Girassol field by Elf (now Total) in 1996, which came on stream in 2001, followed by Kizomba (ExxonMobil, 2004) and Greater Plutonio (BP, 2007). The first round of deep water leases have led to proven reserves of 10 Bn barrels, and a second round of ultra-deep leases in 1999 have added a further 3 Bn barrels. More recently, Angola held a limited leasing round of blocks where the target will be pre-salt structures believed to be analogous to those off Brazil that have led to major discoveries. Cobalt International Energy made the first Angolan pre-salt discovery in 2012, potentially initiating a new set of fields that will allow Sonagol to reach and sustain its desired production plateau of 2 mbd.

The rapid growth in production since 1995 coincided with increasing oil prices and provided high revenues to the Sonangol and to the government. Thus, Sonangol’s mandate increased in scope to cover four major objectives¹⁰:

¹⁰ These objectives come from Oil and Governance: State owned Enterprises and the World Energy Supply, edited by David Victor, David Hults and Mark Thurber, Cambridge University Press which provides further detail on the evolution of Sonangol and other NOCs.

1. The original mandate of building a dynamic, dependable domestic oil sector.
2. Maximizing the share of revenues accruing to the Angolan state.
3. Using the oil sector as a tool for steering money and opportunities to the Angolan private sector (mostly individuals with strong ties to the MPLA) and build local capabilities.
4. Perform a variety of functions that would normally be assigned to other government agencies but which Sonangol is better able to perform as the government entity with strongest technical and commercial competencies.

Sonangol is beginning to take operating responsibility for some mature oil producing fields. "To fill this void, Sonangol Group established the subsidiary Pesquisa & Produção (P&P) in 1992. As P&P grew as a company and gained experience in the oil industry, Sonangol Group established the subsidiary Sonangol SGPS as a drilling company to support P&P. They also made a joint-venture with SBM Production to create Sonasing whose mission statement is to prepare and store crude for exportation." (Sonangol.com). Currently P&P produces about 10,000 bpd on areas of Block 02, and roughly 93,000 bpd on Block 03 that is located in shallow waters. This quantity accounts for approximately 6% of all crude produced in Angola.

Sonangol is part owner of Angola LNG, which gathers offshore gas from multiple sources and is scheduled to begin production in June 2013. This project was promoted by Texaco (now Chevron) with IOC partners BP, Total and ENI and is set up as an independent company with corporate headquarters in Luanda. Sonangol is working on a new 200 kbd refinery project, Sonaref, which is in the engineering stage.

Sonangol has succeeded in its major responsibilities showing great skill in attracting capable IOCs to develop Angola's hydrocarbon resources and negotiating some of the toughest fiscal terms to maximize the share of revenues accruing to the government. It has also shepherded the Angolanization of the oil and oilfield services industries and increased local content. However, it has not yet developed strong operating capabilities and the fruits of its success have been captured by a limited segment of the Angolan population.

6. Conclusions

Our research concludes that during 2001-2011, years in which crude oil prices were rising steadily, NOCs performed better for their non-government shareholders than IOCs mainly due to aggressive investment in organic growth and development of their portfolios. Meanwhile, IOCs continued the 1990s strategies of consolidation, cost reduction, extreme capital discipline and caution. This opened the doors for the NOCs adopt an international expansion strategy which eventually led to superior returns to shareholders. Our research shows exceptional performance in shareholder value creation was prompted by organic growth and investment in exploration for and development of hydrocarbon resources, rather than directly from acquisitions, though the acquisitions did provide a broader platform for further organic growth.

The study shows that NOC returns have been more volatile in times of economic downturn or recovery and were adversely affected by the financial crisis of 2008. The NOCs demonstrated greater loss of value when oil prices collapsed and stronger rebound as oil prices recovered. More recently, what seems to be a new reality of softer oil prices has led to higher beta values for Statoil, CNOOC and Petrobras when compared to IOCs and to their other NOC peers, suggesting that these companies' risk has increased from the capital markets' viewpoint. Higher beta values can be attributed to the particularly aggressive growth agenda and investment choices made by these NOCs rather than to any changes in their capital structures.

This study shows that strong commitment to technology development, solid inventory of future organic growth projects and benign government majority owner contributed to Total Shareholder Returns higher than those of IOCs. Another factor favorable to TSR growth is the overall economic climate in the country and liberal attitude of the government towards the NOC. For example, the rise of Petrobras can be partially attributed to economic reforms instituted by President Cardoso in the late 1990s and sustained under the leadership of President Lula da Silva in the 2010s. These included policies that achieved fiscal responsibility, modernization of the economy, and broadening of the public agenda. More recently, the Rousseff administration has increased its intervention in Petrobras operations and strategies and shareholder returns have suffered as a result.

In contrast to Western Hemisphere NOCs, wholly Government owned NOCs are often charged with catalyzing economic development of the country through continuous investment in education, economic development projects and energy efficiency improvements. Saudi Aramco is the most respected of the government owned NOCs and is viewed as the most effective of the producer NOCs by the international community. This NOC plays a huge role in the overall economic development of Saudi Arabia.

The main objective of Qatar Petroleum is providing the state with reliable cash flow and building an organization with internationally competitive business and technical expertise as well as meeting national oil and gas demand in a cost effective way. QP has achieved remarkable success in providing the conditions that have made Qatar the leading global LNG exporter. Angola's Sonangol is charged with

building a dynamic, dependable domestic oil sector (largely through production sharing contracts with IOCs), maximizing the share of revenues accruing to Angolan state, as well as using the oil sector as a tool for steering money and opportunities to the Angolan private sector. Sonangol has also provided the conditions to attract continuous foreign investment in growing country's oil sector.

Our research shows that in the past economic environment in oil and gas industry was good for privatization as oil price trends were favorable and the underlying assets were attractive to investors. As a result, NOCs jumped on the opportunity to expand by acquisition and by strong reinvestment in organic growth. On the other hand, several NOCs have had problems with government mandates and price controls which have preventing them from realizing their full value potential (e.g., Petrochina, Petrobras).

One of the open questions is whether the aggressive investment strategy will lead to superior value creation in a future period when oil prices may be soft. Periods of soft oil prices generally favor the traditional IOC virtues of capital discipline and cost control rather than aggressive growth. It will be interesting to observe whether governments' desires that their NOCs increase access to international resources can be reconciled with the market's shift towards capital discipline as a value driver. If not, NOC individual shareholders may face a period of value destruction.