# International Handbook of Network Industries

## The Liberalization of Infrastructure

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# 12 The oil industry: a dynamic patchwork of approaches?

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## INTRODUCTION

In the context of this book, the *liberalization of infrastructures* means: 'to allow for more competition and involvement of the private sector, thus redefining the role of government'. Applying this notion to the oil, or petroleum, industry, yields a rather opaque perspective. There is no clear and consistent pattern observable throughout the industry as a whole. It is huge and complex, with a large variety in country-specific public–private relationships. Unlike other 'infrastructures', it is not organized on a national basis. Oil is found in some countries. Sometimes it is also refined into products there, but more often the crude oil is moved abroad for processing. Refined products may be marketed locally, but also exported to markets all over the world. These activities are organized according to the strategies of the companies involved and the policies and traditions of the countries where they take place. The operators are the numerous larger and smaller public and private oil companies, or public–private joint ventures. Together, these firms operate the loosely connected international network of flows, processes, storage and other activities that constitute the structure, or the value chain, of the industry. Transactions may be organized in a variety of ways, covering anything between the spot market and vertical integration. Depending on the countries involved, the public–private interaction is organized in different ways, while the pattern does not seem to show any unilateral movement into a more or less liberal 'direction'. Rather, historically, the dominant feature seems to be the cyclical nature of the supply–demand–price relationship, moderated by specific political, economic and technical factors.

In this chapter we try to capture the meaning of liberalization of infrastructures in the context of the oil industry. The next section presents the value chain, explaining the main technical, economic and strategic characteristics of the segments. The interdependence between these segments has specific consequences for the role of markets and public intervention in the sector. The third section provides an overview of the forms of state intervention in the industry. The fourth section examines how the industry has been organized in terms of public–private relationships, historically. It sketches the evolution of the industry, dealing with its organization in terms of the control over investments, price formation and production and marketing strategies.

By highlighting the consequences of these specific forms of interaction for (groups) of countries involved and for the functioning of the oil industry as a whole, we shed light on the dynamics behind the liberalization of infrastructures in the oil industry. Given the particular organization and functioning of the oil market in the periods distinguished, specific local outcomes emerged in terms of the distribution of the rents, the security of supply and demand, and so on. We show how the public and private actors involved

sought to adjust the prevailing system to their advantage, by allowing more or less competition, by influencing the involvement of the private sector and by redefining the role of governments. Obviously, they were constrained in their actions by the cyclically evolving context of the international energy market, and by local and (geo)political and economic circumstances.

## THE PETROLEUM VALUE CHAIN AND THE STRUGGLE FOR RENTS

The value chain is a useful device to represent the oil industry. Commonly, three main segments are distinguished: first, the upstream exploration and production (E&P) activities; secondly, the midstream transport and refining activities; and, thirdly, the downstream distribution, storage and retail activities. The value chain highlights the several interdependent flows between these segments. A physical flow links the exploration for oil reserves in the ground, their production, the transport and storage of crude oil, the refining process and the storage, distribution and sales of finished products in down-stream markets. Parallel to the physical flow, there is the return monetary flow, associated with the transactions that take place between the segments. In each segment more or less value is added and finally the products are sold to consumers, at a price reflecting the value attached to their specific end use (Ellis Jones, 1988; Frankel, 1976, p. 11–41). Because the activities often take place in different countries, the value chain is international by nature (Odell, 1997).

A classic problem in the oil industry is that it requires a certain degree of coordination between the evolution of demand of petroleum products and the use of capacity in the several segments, to avoid bottlenecks and shortages or unused excess capacities. Crucial to maintaining this balance are upstream and downstream investments, adjusting the segments to supply and demand. Investments depend on the expectations of the firms regarding the value added and rents created, and the market risk to which they are exposed. As is generally acknowledged, in the oil industry there are serious impediments to the functioning of an ideal market in which supply and demand interact in a balanced manner, swiftly reacting upon the information embedded in crude oil and product prices (see Bindeman, 1999a).

The origins of these reservations are various but generally they are labelled as market failures or market imperfections. As for the impact of *market failures*, it is argued that the oil market malfunctions because of the interaction of huge sunk investments involved, the lack of information, long lead times of investments, economies of scale, a weak price elasticity of demand, the geological, technical, economic and political risk, the small number of producers and the possibilities for opportunistic behaviour (Ellis Jones, 1988, pp. 115–19).

A crucial aspect of the petroleum market is that the demand for oil products is a *derived* demand. Oil products deliver energy, enabling end-users to secure specific services, for example, transportation, heating and lighting. As such, there is no objective demand for petroleum, but for the most appropriate form of end-use energy, which may be a petroleum product, given end-use characteristics and the market context. Over the shorter term, generally, there are no readily available alternatives, as users will have

invested in their appliances and installations. When, however, they have to decide upon new investments there is a possibility to switch to other energy inputs. As a consequence, the short-term price of elasticity of demand for petroleum products is fairly low. The amounts of energy consumed are generally dependent on levels of income and economic activities (Ellis Jones, 1988, pp. 61–4).

Adjustment of the production of crude oil and fuels to shifts in demand does not happen easily either. The investments in exploration and production assets and in the transport and storage systems are sunk and the capital costs are fixed. Crude producers and refiners keep on going, as long as their revenues are sufficient to cover the relatively modest variable cost. So, despite oversupply and low prices in the market, firms continue producing while not recovering their full costs. Yet, the industry is also slow in commiting investments in new capacity when demand surges (see Eden et al., 1992; Frankel, 1976).

Moreover, the production of the several products, by refining an amount of crude oil, is a typical multi-product process, which yields several fuels (fuel oil, kerosene, gasoil, gasoline, and so on) in more or less fixed proportions. Yet, demand for those fuels does not evolve in such fixed proportions. So, there is always a shortage or an excess production of these fuels, with an impact on the prices they command in the market. The industry has to cover its costs and earn a profit on the revenues of selling all these products at their going price (Frankel, 1976; Ellis Jones, 1988, Bacon et al., 1990).

The structure of the production processes in the value chain implies that there are a number of interfaces, where volumes of crude oil (either produced or as reserves in the ground), semi-finished and end-use products change hands between the firms active in the several segments of the industry. In principle, these interfaces could take the shape of 'markets'. Yet, as stated above, the market is not trusted.

This implies that forms of explicit coordination have always been sought by the industry to protect their investments and to generate 'appropriate' margins to survive the business cycles. Historically, a variety of contractual and ownership structures have been used to coordinate these exchanges, ranging from vertical and horizontal integration, to long-term contracts and spot markets. Firms and states have sought to integrate, forward and backward, into those segments of the value chain where high rents are generated, or withdrew when rents were too low (Frankel, 1976; Penrose, 1969). Moreover, horizontal cartels have been established between firms to ban competition and coordinate investments (Bindemann, 1999a). Prominent examples of private 'market coordination' are Rockefeller's Standard Oil in the USA at the end of the nineteenth century and the Red Line Agreement and, the Seven Sisters' cartel of the international oil companies (IOCs) between 1928 and 1959.

Also among governments, there is a strong distrust that reliance on the market will yield a maximum of welfare to their economies. So, many governments from producing and consuming countries have intervened in the oil industry either at home or abroad, via regulation and state ownership or through particular (tax) arrangements with national private companies. Indeed, there is a strong notion that the exploitation of petroleum resources and/or the provision of energy and oil products belong to the 'national interest' of states, as a driver and precondition for economic activities and social and political stability. Hence, as a means to protect the national interest and security, governments all over the world have intervened in the operation and organization of the upstream

and downstream industry (Baker Institute, 2007; Bohi and Toman, 1996; Claes, 2001, Mommer, 2002; Stevens, 2005, 2008a, 2008b). The Organization of Petroleum Exporting Countries (OPEC), founded in 1960, is the most well-known example of collective state intervention from the producer's side in the market, while the International Energy Agency (IEA) was established as a response by the consumer countries in 1974.

At the same time, however, such coordinative mechanisms and cartels – either public or private – have been interpreted as *market imperfections*, as producers' and firms' attempts to abuse their market power to collect high monopoly rents, by curbing industry output or by fixing prices. This interpretation has brought about other forms of state intervention, in response to these 'monopolistic' practices. These interventions range from competition policy and the regulation of private firms' monopolistic behaviour, to industry nationalization and the establishment state-owned enterprises.

Obviously, the interpretation given by different governments at different times has been influenced and inspired by their ideological perspective and by their interests regarding the distribution of the rents. Indeed, a crucial element in the evolution of the oil value chain is the struggle over the rents between producer countries, consumer countries and national and international oil companies, governments and consumers. This rivalry is a consequence of the important distributional effects that emerge from the different forms of organization and coordination in the value chain and the resulting performance of the firms in the segments and the host countries (Stevens, 2008a, 2008b).

## STATE INTERVENTION IN THE OIL MARKET

This section provides an overview of five basic types of state intervention in the supply and the demand side of the oil market. The first, most general form of intervention involves the establishment of norms and standards in respect of accounting, safety, environmental protection, land-use and spatial planning, health impacts, emergency stocks, fuel composition and quality, and so on. Part of these norms is enforced via the firms' permits and concessions for undertaking specific activities in the industry; others are generically applicable to all parties and substances involved in specific activities. Such rules apply, in varying ways, to all segments of the value chain. In general, it can be stated that there are large differences in stringency of these norms and standards between the categories of developed, developing and less developed countries, but also within these categories. This variation in stringency does not only apply to the norms as such, but also to the local enforcement of such norms (see O'Rourke and Connolly, 2003).

The second form of intervention involves the establishment of taxes and levies on specific products and activities, or their subsidization. Such instruments may serve a number of purposes, such as: (1) the redistribution of rents between the several types of consumers; (2) the stimulation or discouragement of specific behaviour and activities in the industry and among consumers; and (3) generating income to the state. Important examples are the differences in taxation and levies on the export and import of specific fuels, either as a way of replenishing the state budget, or as a means of protection of the local oil industry. More recent are carbon dioxide ($CO_2$) emission taxes (see Bacon, 2004; Dunn, 1993; Energy Charter, 2008; Gupta and Mahler, 1995).

The third form of intervention implies the outright regulation of activities of the industry (see Bindeman, 1999b; Mommer, 2002). Examples are:

- the granting of (partial) monopoly rights to firms undertaking specific activities, like exploration, crude production, refining, distribution and retail trading
- quantative import and export controls for crude oil and specific fuels
- the establishment of production, supply and other quota to specific firms
- the regulation of prices of inputs, such as crude oil, pipeline and other transport tariffs, and outputs, via pre-tax product prices, at the wholesale or retail level
- the regulation of profits, returns on investments and other financial elements of the firms
- investment controls
- local content rules.

The fourth approach involves public ownership in the oil industry, either directly controlled by a Department or Ministry, or at arm's length, via ownership of the shares of firms. In the former case, generally, the aim is to actively influence the industry and/or control the local market, reducing the power of other (foreign) firms. In the latter case, generally, the objective is revenue generation. Other arguments for state ownership are the acquisition of technology and access to up and downstream markets. Public firms may also establish joint ventures with national or foreign private firms (Baker Institute, 2007; Grayson, 1981).

The fifth approach involves competition policy, under which the state seeks to reduce the market power of firms, consortia and cartels. This may happen, either through the traditional remedies of competition policy, like a forced fragmentation of the dominant firms or competitive bidding for retail and other concessions, or via the establishment of a countervailing power; often a state-owned firm.

Table 12.1 summarizes the most common forms of state intervention in the different segments of the value chain. Norms and standards for safety, environmental protection and spatial planning have been neglected, as these apply to all activities. Norms may be used strategically, in protecting markets or forcing firms to engage in specific forms of behaviour and rent sharing with governments.

Typically, in upstream exploration and production, state intervention by host countries aims to balance, on the one hand, the need to attract (foreign) firms and capital to engage in these activities, while on the other securing that the rents generated are appropriated to an acceptable degree. Essentially, this balance has been established via concessionary schemes, taxation, royalty and profit-sharing regimes and the regulation of foreign investments and by establishing state-owned oil companies (NOCs) (Baker Institute, 2007; Bindemann, 1999b; Dam, 1976; Energy Charter, 2008; Johnston, 2008; Mommer, 2002; Parra, 2005).

Moreover, depletion policies have been used to control the supply of oil to the market (Baker Institute, 2007; Claes, 2001; Lovejoy and Homan, 1967). Increasingly, the decommissioning of installations is becoming an issue for regulation and state intervention – particularly offshore (Osmundsen and Tveterås, 2003). State intervention in exploration and production (E&P) is not limited to producer governments. Many consumer governments have sought to support national public and private firms in exploring and

*Table 12.1 Common forms of state intervention in the oil industry*

| Activities in the value chain | Main forms of intervention |
|---|---|
| Upstream | |
| Exploration and drilling test wells | – Permits and concessions for access to exploration acreage<br>– Exploration levies and fees<br>– Subsidization and support for national firms, exploring abroad |
| Production of crude oil | – Taxation and royalties<br>– Regulation of production capacity<br>– Regulation of well depletion and crude production quota<br>– Local content requirements<br>– Profit sharing<br>– Rules on foreign investments<br>– State ownership and joint ventures<br>– Subsidization and support for national firms, producing crude abroad<br>– Decommissioning of installations |
| Midstream | |
| Transport and storage of crude oil | – Export quota and taxes<br>– Mandatory use of national shipping |
| Crude refining and product manufacturing | – Subsidization<br>– Investment controls and local content rules<br>– Regulation of crude purchases (by origin)<br>– Regulation of input prices<br>– Wholesale price regulation<br>– Output quota<br>– State ownership and joint ventures |
| Transport, wholesale and storage of oil products | – Subsidization<br>– Regulation of mandatory fuel emergency stocks<br>– Regulation of cost and tariffs<br>– Product specifications<br>– Import and export controls<br>– State ownership and joint ventures |
| Downstream | |
| Local storage, trading and distribution of products to retail outlets | – Subsidization<br>– Regulation of mandatory emergency stocks<br>– Regulation of investments, cost and tariffs<br>– Import and export controls<br>– State ownership and joint ventures |
| Retail trade in products | – Regulation of locations and market shares<br>– Regulation of mandatory purchasing quota<br>– Subsidization and taxation<br>– Regulation of end-user prices and tariffs<br>– Competitive bidding and licensing of new outlets<br>– State ownership and joint ventures |

producing crude abroad (Baker Institute 2007; Grayson, 1981; Pirog, 2007). As illustrated below, over time, this balance has been achieved in different manners; each with its particular pattern of coordination and outcomes for the different parties involved, depending on the evolution of the oil market and the geopolitical context.

In the midstream segment, state intervention – if any – has sought to achieve two dif-

ferent objectives. Either the aim was to curb the dominant market power of the large international oil companies, forcing them to supply their products at 'acceptable' prices, while appropriating a share in the rents generated via end-use levies, or to support the construction of 'national' refineries, to reduce the dependence on foreign fuel supplies and to stimulate a national industry for strategic and economic reasons (Baker Institute, 2007; Grayson, 1981; Molle and Wever, 1984).

In consuming countries, the import of crude oil instead of ready-made products may provide a balance-of-payments advantage. Moreover, national refineries and distribution systems are often seen as a strategic asset in times of international conflict. Sometimes, after being abandoned by the IOCs for lack of profitability, they were taken over by the state involved. In oil producing countries, the construction of export refineries had to enhance the export value, as oil products command a higher value in the market than crude (Al-Moneef, 1998). Hence, the construction and operation of national refineries and petrochemical complexes was often supported via state ownership and joint ventures with (local) private firms under preferential conditions, subsidization, the regulation of crude purchases and wholesale prices, guarantees for market share, and so on (see Bacon et al.,1990; Correljé, 1994).

Downstream, consumer countries' governments try to strike a balance between securing the provision of petroleum products, achieving acceptable end-use prices for the several types of consumers and generating their own revenues. Combinations of subsidization and taxation are used to redistribute rents between the several types of consumers. In high-income countries it is common to tax 'luxury' fuels with a low price elasticity of demand, like gasoline and automotive diesel for passengers transport, as a source of income to the state. Often economically essential fuels, like gasoil for freight transport, navigation, agricultural use and power generation, are not taxed at all. Kerosene is provided at subsidized tariffs to consumers, as a fuel for the poor. Fuel oil may be provided at a rebate to power generation and infant industries. (see Bacon, 2004; Gupta and Mahler, 1995; IMF, 2006). In many oil producing countries fuels are made available to consumers at extremely low prices. End-use price regulation is also applied to achieve macroeconomic objectives, like the reduction of the rate of inflation and the provision of stability to consumers by shielding them from sharply rising crude oil and product price movements (Baker Institute, 2007, pp. 14, 15; Contín et al., 2009). In addition to fiscal measures and end-use price regulation, quotas and concessionary and licensing arrangements are used to support the development of retail networks, either in less attractive peripheral regions, or to bring about competition in regions where the retail branch was dominated by the large international oil companies (Correljé, 1994).

It is evident that the particular combinations of these different forms of state intervention in the oil industry have varied at different times and by country. Nevertheless, as illustrated in the historical overview below, a sequence of periods can be distinguished in the organization of the oil industry, in which specific forms of state intervention – or the absence thereof – were characteristic. New circumstances regarding access to resources, supply and demand arose with specific consequences for (the relationships between) the segments of the oil value chain, the role and strategies of the firms in the industry and the interventions through which national governments have sought to secure their position in the value chain.

## THE ORGANIZATION AND REGULATION OF THE OIL INDUSTRY

Crude oil is currently produced all over the world. Large-scale exploitation started in the mid-nineteenth century in the USA. Subsequently, oil was discovered in Russia, Romania, Indonesia and Mexico. In the early twentieth century, the oil reserves in the Middle East and Latin America came into the picture. In the second half of the century, new oil provinces were discovered and brought into production in the North Sea, Alaska and Africa. The geographical expansion of the petroleum resource base is an ongoing process, facilitated by the continuous development of exploration and production technology (Pinder, 2001).

The consumption of petroleum products also experienced a remarkable evolution. Starting with kerosene as a fuel for illumination and cooking; oil derivatives became a main source of energy almost everywhere in the world. Fuel oil became a main fuel for navigation, industrial heating purposes and power generation, until this role was partly taken over by natural gas. Gasoline and diesel became dominant fuels in transport. Gas oil is used as a multifarious fuel in many mobile and static services, such as heating, power generation, industrial and agricultural uses. Kerosene became the main fuel in air transport, with petroleum gases substituting for kerosene in domestic uses. Remaining fractions are processed in the petrochemical industry. Similar to the developments upstream, this also happened in a dispersed geographical pattern. The USA converted to oil early. In Europe this happened in the 1950s, later followed by the Soviet empire and Latin America, Asia and Africa. Patterns of use showed large variations, often depending on the stage and structure of economic development, modes of transport and power generation and the availability of alternatives, such as low-cost coal, natural gas, nuclear energy and hydropower (Darmstadter et al., 1977; Lucas, 1985; Schurr et al., 1960; Schipper et al., 1992).

### Pre-1927: Unfettered Competition and Rivalry

Not long after the discovery of oil in Titusville, Pennsylvania, in 1859, the industry began to experience the typical boom and bust cycles. From 1870 onwards, John D. Rockfeller managed to bring a large part of the US refining industry under control of his Standard Oil, by his dominance of the railroads as the essential transport facility. Interestingly, during this period the price for kerosene fell by about 50 per cent, to the enthusiasm of the consumers. By 1890, however, the American Congress passed the Sherman Act, which forbade every contract, scheme, deal or conspiracy to restrain trade. Standard Oil attracted the attention of the antitrust authorities and in 1911 it had to be broken up in to 34 companies, including Exxon, Mobil and Chevron.

Standard Oil was not the only large US oil company, however. It had to compete with Gulf Oil (established in 1890) and Texaco (1901) inside the USA and in Asia and Europe. Royal Dutch Shell (1907) was producing oil in the Dutch East Indies and also selling in Asia and Europe. Firms, like Nobel and Rothschild produced considerable volumes of oil in the Baku region in Russia to supply Europe. In the first decade of the twentieth century, the Anglo-Persian Oil Company (later British Petroleum – 1909) and the Turkish Petroleum Company (1910) started E&P activities in the Middle East, in Persia

(Iran) and the Turkish Empire. The relations between these companies and their 'host countries', were relatively easy; most countries were still under colonial rule. Countries without colonial rule, like Argentina, Mexico and Romania, put more pressure upon the oil companies (see Philip, 1984).

In Europe, tension developed between countries with access to oil, like the UK and the Netherlands, and Germany, France, Spain and Italy without oil-rich colonies. The strategic role of oil was underlined by the conversion of the British Royal Navy to fuel oil and the establishment of the Anglo-Persian Oil Company to secure oil supply (Sampson, 1985). In the USA, motor fuel taxation began in 1919 and spread to all states within ten years, to finance roads and highways to accommodate growing car traffic. Also, European countries started to raise levies on petroleum fuels.

**1928–59: The Seven Sisters and Private Coordination**

By 1928, the seven largest internationally operating oil companies came to sign the 'As Is' agreement to coordinate the industry. Parties were Standard Oil of New Jersey (Exxon), Gulf, Texaco, Socal and Mobil from the USA, and British Petroleum and Shell from the UK and the Netherlands. The French firm CFP played a minor role. They agreed to respect each other's market shares. Their main market was in transport fuels, initially, but rising wages in the coal industry were gradually shifting the comparative advantage to fuel oil in industry and heating oil in domestic households. The IOCs set posted prices for crude oil based on the Mexican Gulf basing point system. While abstaining from price competition, they set end-use prices and coordinated the evolution of the industry, via investments in crude production, transport facilities and refineries. The Seven Sisters did coordinate the entire oil value chain in the non-communist world (Blair, 1978). At the time, the USA was the main producer of crude, with a share of about 60 per cent of the total production. Yet, the USA was essentially self-sufficient, as was the Soviet Union (10 per cent of total). A main exporting country was Venezuela (15 per cent). The discovery of substantial oil reserves in Iraq, Iran, Saudi Arabia and Kuwait turned these countries into important suppliers with a share in total supply of about 4 per cent each. Generally, the concession agreements involved a 10 per cent royalty share for the colonial powers in the host countries.

Some countries, notably Mexico as a producer, and France, Spain and Italy, tried to achieve independence from the IOCs by establishing state-owned oil companies (Correljé, 1994; Grayson, 1981). After the Second World War, the USA established its long-term oil relationship with Saudi Arabia by forming Aramco (Arabian American Oil Company), a conglomerate built upon private US companies. By the end of the war, the Seven Sisters' market coordination began to be questioned in the USA and Europe (see Adelman, 1972, p. 136; Blair, 1978, pp. 38–43; Hartshorn 1962; Jacoby, 1974, pp. 37–40; Odell, 1986, p. 118; Painter, 1984; Yergin, 1991, p. 424).

**1959–73: The Independents Break Down the Oligopoly**

After 1959 the dominant position of the Seven Sisters came gradually under pressure because of the arrival of a number of new firms. These were smaller US firms, such as Marathon, Continental, Amereda, Occidental, independent from the majors, plus some

European NOCs, such as ENI/AGIP (Italy), Deminex (Germany) and Hispanoil. Three developments infused competition in the fast growing post-war oil market. First, the US firms had managed to get concessions for the production of crude oil in new, recently decolonized, countries, such as Libya and Algeria, competing with the arrangements offered by the majors. Secondly, in 1959, the USA decided to establish import quotas for crude oil, to protect its indigenous oil industry and to avoiding dependency on imported crude. The US independents, thus, were blocked from delivering the crude to their home market and had to find alternative outlets. Thirdly, Italy, Germany and Spain had ambitions to become less dependent on the IOCs and managed to arrange production concessions too, via their own E&P firms.

As a consequence, the number of oil-producing countries increased. Excess oil production, as compared to the evolution of demand, caused a gradual erosion of the prices for crude and products. Substantial rebates were given on the prices posted by the majors, which eventually only functioned as a fiscal reference price, determining the royalties and income taxes payable to the host countries (Adelman, 1972). The expanding world economy, with a fast growth of automobility and low fuel prices stimulated the consumption of oil. Coal was displaced by fuel and heating oil. Yet, low prices kept the large oil companies from investing in new exploration and production ventures (Clark, 1990; Odell, 1986).

The decline in real crude prices and the falling value of the US dollar also brought about a reduction of the purchasing power of the host countries. This induced a growing discontent. By 1960, main oil producers, such as Venezuela, Iran, Iraq, Saudi Arabia and Kuwait established the Organization of Petroleum-Exporting Countries (OPEC). Later on Indonesia (1962), Libya (1962), Qatar (1961), the United Arab Emirates (1967), Algeria (1969) and Nigeria (1971) joined. In the early 1970s, the first serious conflict took place. Libya forced the US independents, Occidental, Marathon and Continental, to enhance their royalties (see Adelman, 1972, 2002; Hammer, 1988; Odell, 1986; Parra, 2005; Yergin, 1991).

### 1973–83: The Oil Crises Break Down Vertical Integration

By the end of 1973, the conflict between Israel and its Arab neighbours ignited the first oil crisis. Following a cutback in production and driven by political unrest, prices skyrocketed from a level of less than US$2 per barrel to US$12. After the crisis, OPEC appeared on the market as the new coordinating mechanism, posting the real crude oil prices.

In addition to this change in the pricing regime, the market structure underwent a radical change. Host countries began to nationalize the production activities of the IOCs, replacing them with their own NOCs. This effectively shifted the coordination of the market to the OPEC countries. The traditional vertical integration of the majors was broken. Crude production was in the hands of the NOCs, while refining and marketing remained with the majors and independents. Initially, consumer countries tried to conclude state-to-state contracts with producers, hoping for a favourable treament. Yet, gradually a spot market began to develop in which increasing volumes of crude were sold.

On the consumers' side, the crisis brought about the shock of being dependent upon an OPEC cartel, controlling the prices and the availability of oil. Generally, it was believed that the price shock was caused by the looming depletion of the reserves. Only

few recognized that the actual cause was the lack of investments in new exploration and in production facilities (see Odell, 1986). Consumer countries responded in a number of ways. A first response was the establishment of the International Energy Agency, to develop a mechanism to redistibute oil in case of further supply disturbances. Secondly, countries tried to isolate their economies from rising fuel prices by introducing end-use price regulation. Thirdly, policies were set up to save energy, which inspired the development of energy efficiency norms and standards. Fourthly, the IOCs invested in substitute sources of energy, like nuclear energy, natural gas, coal and hydro power, and in sun, wind and biomass. Fifth, large investments were made in E&P ventures in new, relatively unexplored, non-OPEC areas, such as Alaska, Canada, Venezuela, Mexico and offshore in the North Sea, the South Chinese Sea and the Barents Sea. In part these investments were made by the majors, to replace their assets lost to the OPEC countries. Yet, some OECD countries set up state-owned companies to produce indigenous oil, such as Statoil (Norway), BNOC (UK), Veba (Western Germany). These investments created large amounts of reserves, to be produced at higher costs than in the OPEC area, but justified by the high oil prices at the time (see Venn, 2002, pp. 113–43; Clark, 1990, pp. 323–9).

In 1979/80, a second price shock hit the market, following the Iranian revolution against the reign of the Shah and the Iran–Iraq War. The oil price went up from US$12.70 to $40 at the height of the crisis. These events induced fear among the consumers, as demand had been growing again during 1978 and further growth was expected. Although oil supply did meet consumption levels, additional panic purchases to replenish stocks and speculation put pressure on the market. The IEA was not effective, as it was geared towards physical disruptions and not against price shocks. Moreover, Saudi Arabia refused to increase its output to replace the Iranian production (Adelman, 2002, p. 175). Producers in OPEC began to sell increasing volumes of crude on the emerging spot market, instead of via lower-priced, long-term contracts. As a consequence, consumers saw themselves forced to buy on the spot market, thus putting more pressure on the price. This motivated OPEC to put a premium upon its posted prices (see Venn, 2002, pp. 24–7). In 1981, Iraq tried to gain control over the border river Shatt-al-Arab, taking advantage of the weakened Iranian army. The resulting war lasted for seven years and seriously hampered the oil production in both countries. It was also feared that a blockade of the Strait of Hormuz might shut in the oil produced by Kuwait (Claes, 2001, pp. 101–7; Clark, 1990, pp. 323–9).

Overt rivalry had grown among consumers and producers. Consumers faced an increasingly complex oil market. The Organization of Petroleum-Exporting Countries was blamed for driving up the prices. The variety in producers' pricing strategies contributed to uncertainty. Consumers were competing among themselves, trying to secure highly politicized state-to-state deals. What was completely lacking was coordination between the governments of consumer and producer countries and their oil companies, paralysing both OPEC and the IEA (see Adelman, 1995; Claes, 2001; Hartshorn, 1993; Odell, 1986; Venn, 2002; Yergin, 1991).

**1983–2001: Over-supply and Under-investment**

By the end of the 1970s, gradually, the tide began to turn. Newly discovered oil from Alaska, Canada, Mexico, the North Sea, the UK, Russia and China was reaching the

market. In parallel, demand continued falling, as a consequence of the substitution of other sources of energy and because of the economic recession and the process of deindustrialization in the OECD world. During the early 1980s, spot markets had replaced long-term contracts for crude oil and oil products. The Organization of Petroleum-Exporting Countries could no longer dictate posted prices. Prices were determined by supply and demand on the exchanges of New York, Rotterdam and Singapore. As a consequence, the oil market was becoming increasingly liquid and sensitive to perceptions, sentiments and real world events in its price formation (Adelman, 2002, p. 176).

The emergence of a surplus in crude oil production and refinery output drove the prices down. In response, OPEC began to reduce its supply of oil to the market. The decline in the demand for oil continued, however, and the share of OPEC in total oil supply fell significantly. From March 1983 onwards, OPEC introduced crude production quotas for its members states, to influence the oil price via the control over supply. Saudi Arabia got a key role as the OPEC swing supplier, maintaining the balance between demand, the growing volume of oil supplied by non OPEC producers and the rigid production of the other OPEC members. This proved an increasingly unrewarding task, because the kingdom had to reduce its production time and again, while the price kept falling. Eventually, in 1985, Saudi Arabia refused to continue this any longer, causing a free fall of the oil price. From then onwards, coordination of the oil market was a function of the degree of control of OPEC, the 'clumsy cartel', over its production (Adelman, 1982).

There is an important difference between the behaviour of OPEC and non-OPEC producers. In essence, firms in the latter countries keep on producing oil from existing wells, as long as the variable production costs, including taxes, are covered by their revenues. If the medium-term supply-demand outlook suggests an acceptable oil price, they invest in new E&P ventures. The Organization of Petroleum-Exporting Countries, by managing its output, attempted to maintain the oil price at a level of about 22 and 25 dollars per barrel. It had great difficulty in making the right judgements and was plagued by incidents and disturbances in the world economy and the oil market. Some members did not adhere to the quota and secretly sold more oil, driving down the price. The Organization of Petroleum-Exporting Countries had great difficulty in meeting the diverging interests of its members. Small and densely populated countries with moderate reserves, like Algeria, Libya and Iran, aspired high prices to harvest shorter-term gains. In contrast, producers with large reserves, like Saudi Arabia, Kuwait and the United Arab Emirates, sought to maintain the position of oil over the longer term via a stable, moderate price, avoiding substitution by alternative sources of energy (see Adelman, 1990; Claes, 2001; Noreng, 2002; Hartshorn, 1993; Parra, 2005; Van der Linde, 1991, 2000; Verleger, 1990; Yergin, 1991).

Moreover, by the mid-1980s, the perception that the world was running out of oil and energy had withered away. High prices and supportive government policies made available a wealth of oil and natural gas, while energy efficiency and economic restructuring had reduced the energy intensity of the OECD countries. Outside OPEC, fundamental changes were taking place. Responding to the nationalizations, the shift in the rents towards OPEC and the falling oil price, the IOCs were forced to reduce their costs. This brought about a wave of mergers, starting with the US companies. In 1984, Gulf was taken over by Chevron, which merged in 2001 with Texaco, absorbing Unocal in 2005. Another US major, Mobil Oil, merged in 1999 with Exxon. In 1998 BP took

over AMOCO. In Europe, in 1998, Total (France) and PetroFina (Belgium) became TotalFina, which merged in 1999 with Elf (France) into TotalFinaElf, later Total. Over the 1980s and 1990s, state oil companies in OECD countries were privatized, partly in reaction to the changed ideas about energy and oil scarcity, and partly as a consequence of the general tendency of liberalization and the need to replenish the state budget. Examples of (partial) privatizations are BNOC, BP, Repsol from Spain, ENI from Italy, Statoil from Norway, and Neste from Finland. In some production countries, notably Russia after the fall of the communist regime, the industry was opened up to foreign involvement. Most countries relaxed their resources and depletion management upstream; downstream competition policy ruled and international schemes for crisis management were dismantled. Wholesale and retail price regulation was abandoned.

The market had taken over. End-use levies in consumer countries were increased, however. And the preservation of vulnerable natural areas, spatial planning, quality and environmental standards were becoming increasingly important in determing the oil industry's evolution.

**The New Millennium: An Uncoordinated Oil Market in Turmoil**

Driven by economic growth in the USA, Asia and the European Union (EU) oil demand began to rise again, over the 1990s, causing an upward pressure on prices. In November 1997, though, OPEC missed the decline in demand following the Asian crisis and expanded its output with about 10 per cent. Moreover, Iraq had started to produce again, and the winter in the Northern hemisphere was mild. The result was a dramatic decline in the oil price below US$10 by early 1998. OPEC engaged in negotiations to achieve a reduction in output. Yet, 'the market' did not expect that OPEC would succeed. The Organization of Petroleum-Exporting Countries members did cheat and the impact of the UN sanctions on the contribution of Iraq was uncertain. The amount of oil in storage remained large during 1998 and, eventually, OPEC could stop the falling price only after three rounds of output reductions between March 1998 and March 1999. Main non-OPEC producers, such as Norway, Egypt, Russia, Mexico and Colombia adhered by not increasing their output and, eventually, the price went up again.

By the end of 1999, OPEC was urged to expand its production again. The Organization of Petroleum-Exporting Countries thought it too early because of the large stocks in place. The depletion of stocks during the cold 1999 winter, in addition to the decline in Iraqi output and the fear of a millennium crisis put upward pressure on the oil price. By March 2000, both OPEC and non-OPEC producers agreed upon a higher level of production, bringing about a small price fall. Yet, in July and September additional output was necessary to keep the price at bay. In September 2000, US President Clinton decided to sell 30 millions of barrels from its strategic petroleum reserve (SPR) (Horsnell, 2000).

During the 2000/01 winter, output expansion had little effect as the demand forecast was high. Moreover, in most OPEC countries, with the exception of Saudi Arabia, production capacity was fully employed already. Also the stocks had dwindled, while no replenishment had taken place in expectation of lower prices.

Yet, the oil price started falling because of weak demand driven by an economic slump in Asia and the USA, by OPEC overproduction and by the deployment of the strategic reserves. In turn, OPEC reduced its output in January, March and July 2001.

But the situation in Iraq remained uncertain. The attack on New York's Twin Towers in September 2001 caused a further decline in economic growth. In November, OPEC announced output reductions, also because of the rapid growth of the Russian export of oil. Eventually, other non-OPEC producers also followed suit and reduced their output (Kohl, 2002).

The political perspective had changed. Since the Twin Towers and the intervention in Iraq in 2003, the relationship between the USA and Saudi Arabia and between OPEC and the oil-consuming countries had cooled. Over the post-1985 period, OPEC had aimed at an oil price that was acceptable to both the producers and the consumers. Yet, it did revert to its position in 1973/74 and the early 1980s, taking advantage of the market circumstances, such as the US hurricanes, labour conflicts and political instabilities, which caused volatility and high prices.

From early 2002 onwards, oil prices began to increase again. This caused confusion and many conflicting explanations, including an output reduction of OPEC and non-OPEC producers, in combination with tensions in the Middle East over the anticipated intervention in Iraq, political turbulence in Venezuela and Nigeria, the cold winter in the USA and declining trading stocks. Yet, after the intervention in Iraq, in March 2003, it appeared that the oilfields had not been affected and the price fell for a while. So, early in 2004, OPEC decided to lower its output to avoid the price collapsing. This, however, was not necessary, because over the following period the oil price doubled to a level of US$70 by 2006, and again to about US$150, by July 2008.

The third oil crisis was the consequence of a number of mutually supportive factors. A fundamental aspect was that the large surplus crude production capacity, used by OPEC to manage supply and demand, had evaporated over the 1990s. The unanticipated level of economic development in China and India, but also in the USA and the EU, created a steady growth in demand. This, however, was not met by sufficient investments in crude production and refining capacity, either by OPEC or by non-OPEC producers. Hence, price behaviour in the oil market became extremely volatile. Single events or rumours had immediate effects on prices, which shot up to unprecedented levels until the summer of 2008. Moreover, the instable political situations in many regions fostered a so-called 'fear premium' and speculation, reflecting the threat of supply disruptions. It was expected that demand growth would outstrip the industry's supply capacity quite soon (Jesse and Van der Linde, 2008). Capacity problems also emerged in the refining segment, operating at high levels of throughput. Moreover, the shift in demand towards light products, such as gasoline, gas oil and kerosene, in combination with more stringent sulphur standards, required substantial capacity adjustments. Yet, after more than 30 years of excess capacity and low refining margins, oil companies were reticent in making those investments (Pieterse and Correljé, 2008).

## LOOKING AHEAD

Predictions of demand outstripping the supply capacity and pushing up the oil price to levels as yet unseen did not materialize. The financial/economic crisis did reduce the demand for energy and oil products and moderated the future projections, causing a rapid decline in the West Texas Intermediate (WTI) oil price from US$145 in July 2008

to about $33 by the end of the year. Over 2009, the price recovered to around $60. The reduction in demand may have saved the world from a third oil crisis; it has not solved the underlying coordination problems in the oil market. The combination of the 'struggle for the rents' and the inherent uncertainty about the evolution of demand and supply yields a daunting perspective as regards the future role of the oil industry and the role of oil in energy supply.

The struggle for rents, within the context of fairly unpredictable cycles in the supply–demand relationships, has important implications for the position and the policy objectives of the countries involved and the strategies of firms. The 'free' market of the 1990s and the perception of an oversupplied market led the IOCs to rationalize their operations and made them risk averse in terms of investments in E&P. They were constrained in engaging in new ventures, as they chose to go for short-term shareholder value, under pressure from the financial markets. And, of course, they were uncertain about the need for new capacity (see Skinner, 2006; Stevens, 2005, 2008b).

The IOCs have only limited access to areas with significant undeveloped oil reserves, as these are controlled by local NOCs. Their once indispensable role in providing technology and know-how has also been reduced, because these assets are made available by specialized subcontractors and general subcontractors, staffed with former IOC employees who were laid off, offering their services to any paying customer.

In those countries where the IOCs managed to get a foothold, such as Russia, Venezuela, Mexico, and some provinces in Africa and the Caspian Sea area, the investment climate is hardening, as governments try to get the most out of their contractual relationship. The IOCs also experience a growing competition from smaller private and state-owned companies from consumer and producer countries. On the one hand, privatized NOCs from OECD consumer countries, like RepsolYPF (Spain), ENI (Italy) and Total (France), operate as 'national champions' in supplying their home and other markets, while an increasingly important role is also played by the NOCs from China and India, sometimes in joint ventures with producing countries, with the explicit task of securing access to untapped oil reserves. For these firms, commercial considerations seem less important than their strategic role in securing energy for their growing economies. Yet, also the NOCs from producing countries, such as Statoil and Petronas, have expansion strategies abroad. The recent bidding procedure for the promising oilfields in Iraq is a case in point. The IOCs had to compete with Russian, Chinese and OECD firms, but they all were offered only low-yielding service contracts.

So, oil-producing countries have strengthened their grip on the exploitation of their resources. Many OPEC states do not allow foreign firms or capital in their oil industry. In 2005, national oil companies controlled about 77 per cent of the total proven oil reserves, to which the IOCs have no equity access. Russian private companies controlled another 6 per cent. Exploration and production is reserved to these firms. In a number of countries, such as Russia, Venezuela and Kazakhstan, governments have managed to shift the balance from the IOCs to their NOCs.

Yet, the NOCs and Russia are reticent to invest for several reasons. Often NOCs have only limited resources, as their governments are fully dependent on the oil revenues to maintain their sovereign power vis-à-vis their own population or neighbouring countries. They have to spend much of their income on subsidizing the standard of life of their population, on military expenditure and other politically important oulays. Moreover,

the producers fear a return of a situation of excess supply capacity, in which a divided OPEC will not be able to stabilize the market (Stevens, 2008b).

In parallel, in many OECD countries oil exploration and production is increasingly affected by requirements and rules related with environmental protection and resource management, including $CO_2$ emission reduction policy and local licensing procedures. So far, the security of supply issue has not led to the (re)establishment of public oil companies in the OECD region. However, given the exclusion of the IOCs from promising, low-cost oil provinces, combined with the huge uncertainties as regards the evolution of the energy market and the future availability of oil, this may be only a matter of time. Paradoxically, the solution of bringing about a quick transition towards a sustainable energy system only aggravates the situation. If it succeeds, investments in petroleum E&P will prove worthless over time.

In the introduction to this chapter, we argued that the interaction of logistic and technical characteristics in the value chain, with the evolution of the supply and demand side of the market and (geo)political developments are crucial in understanding the role of governments in the several segments of the industry. In the sections above we have shown that, over the subsequent periods, changes in these aspects have had specific consequences for the interaction for (groups) of countries involved and for the role of the state in the oil market. This interaction cannot be described as a simple cycle, however. During each phase new technical, geographical, economical or ideological drivers emerged, bringing about a long-term pattern of development that looks like a helix. The cyclical pattern repeats itself in a different shape, time and again.

This also means that the notion of the liberalization of infrastructures in the oil industry has a different content and meaning in the different phases (see Table 12.1). The liberalized, uncoordinated, market malfunctions, inviting new forms and ways of intervention by new actors, who for some time managed to control it. But during the 'controlled' period, the seeds are sown for the ensuing disturbances, involving new geographical patterns, new technologies or new economical paradigms, giving way to a new 'liberal' period. What happens is that, while there is an inherent need for coordination, in each phase market developments break down the prevailing patterns of coordination. Standard Oil privately coordinated an unfettered boom-and-bust market. Yet, the Standard Oil Trust was curbed by US 'antitrust' law, giving rise to a competitive oil market. The coordination of the Seven Sisters cartel was severely criticized, but it was broken by the actual competition of the US newcomers and NOCs of consuming governments. This created turmoil, at the expense of the producing countries uniting in OPEC. The OPEC monopoly was broken by IOCs and OECD NOCs entering into new oil provinces with new technologies, giving way to the 'free market' of the 1990s. The consequences are here. New forms of coordination will evolve in response to the market failures and the uncertain circumstances of today. Yet, this new phase has only just begun.

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